IBM Maintenance Library

3725/3726

Communication Controller and Expansion

Maintenance Information Manual (MIM) Part 1

Volume 1

SY33-2018-7

Eight Edition (June 1986)

This major revision obsoletes SY33-2018-6 and Technical Newsletter SN33-7126. Changes or additions to the text and illustrations are indicated by a vertical line to the left of the change. This edition reflects the 3725 Release 4 enhancements.

Changes are made periodically to the information herein. Any such changes will be reported in subsequent revisions or Technical Newsletters.

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Preface

This publication is intended for the customer engineer who maintains the IBM 3725 Models 1 and 2 Communication Controller and the IBM 3726 Communication Controller Expansion.

For the 3725 Model 1 and 3726, this manual should be used in conjunction with the <u>3725/3726 Maintenance Information Manual (MIM) Part 2</u> for locating and replacing failing field replaceable units within the communication controller and expansion.

For the 3725 Model 2, this manual should be used in conjunction with the <u>3725 Model 2 Maintenance Information Manual (MIM) Part 2.</u>

Organization

The manual is divided into two volumes:

- Volume 1 contains introductory and how to fix information.
- Volume 2 contains detailed descriptions of 3725/3726 functional units as well as extended troubleshooting procedures for each unit.

Troubleshooting notes are added, where appropriate. These enable you to continue troubleshooting when card and FRU replacements have not removed the trouble, and to determine if a board, cable, or top connector is the failing part.

Prerequisite Publications

The reader should have an understanding of telecommunications and modems. The following manuals provide a training on the 3725/3726:

- <u>3725 Model 1 Communication Controller, Introduction,</u> GA33-0010
- <u>3725 Model 2 Communication Controller, Introduction,</u> GA33-0021

Corequisite Publications

The following manuals provide the procedures for operating the communication controller:

- <u>3725/3726 Communication Controller and Expansion, Diagnostic Descriptions,</u> SY33-2027
- <u>3725 Communication Controller, Operator's Guide,</u> GA33-0044
- <u>3725 Communication Controller, Problem Determination and Extended Services,</u> GA33-0014

Summary of Contents : Volume 1

Summary of Contents: Volume 2

Bibliography

The bibliography lists the publications that describe the 3725 Communication Controller and its software support. The publications are grouped into introductory, planning and installation, operating, and maintenance.

Type	Title of Publication	Form Number
Introductory	3725 Model 1 Communication Controller, Introduction	GA33-0010
	3725 Model 2 Communication Controller, Introduction	GA33-0021
	ACF/NCP/EP General Information	GC30-3071
	IBM Diskette General Information Manual	GA21-9182
Planning and installation	TNL to IBM Input/Output Equipment Installation Manual – Physical Planning: System/360, System/370, 4300 Processors	GN22-2302
	3725 Communication Controller, Original Equipment Manufacturer's Information	GA33-0017
	3725 Communication Controller, Template	GX22-7092
	3725 Model 1 Communication Controller, Configuration Guide	SA33-0012
	3725 Model 2 Communication Controller, Configuration Guide	SA33-0022
	ACF/NCP, Installation and Resource Definition Guide	SC30-3178
	ACF/NCP, Installation and Resource Definition Guide	SC30-3178
	ACF/NCP, Resource Definition Guide	SC30-3179
	3725 Model 1 Communication Controller – CE Installation Instructions	Part number
	3725 Model 2 Communication Controller – CE Installation Instructions	Part number
	EP Generation and Utilities Guide and Reference	SC30-3172
	EP Generation and Utilities Guide and Refarence	SC30-3172
	ACF/NCP and SSP Network Definition Guide	GC30-3020
	3704/3705/3725 Assembler Language	GC30-3003
Operating	3725 Communication Controller, Principles of Operation	GA33-0013
	3725 Communication Controller, Operator's Guide	GA33-0044
	3725 Communication Controller, Problem Determination and Extended Services	GA33-0014
	3725 Channel Adapter Card	GA33-0045
	3727 Operator Console, Reference and Problem Analysis Guide	GA33-0015
	7427 Switching Unit Customer Information	GA33-0018
	ACF/NCP, Customization for the 3725	LY30-3071
	ACF/NCP, System Support Program Messages	SC30-3169
Maintenance	3725/3726 Communication Controller, Maintenance Information Manual (Part 1)	SY33-2018
	3725/3726 Communication Controller, Power Supplies Theory of Operation	SY33-2020
	3725/3726 Communication Controller, Maintenance Information Manual (Part 2)	Part number
	3725/3726 Communication Controller Channel Adapter On-line Tests	D99-3725A
	3725 Model 2 Communication Controller, Power Supplies Theory of Operation	SY33-2026
	3725 Model 2 Communication Controller, Maintenance Information Manual (Part 2)	Part number
	3725/3726 Communication Controller, Diagnostic Descriptions	SY33-2027
	3727 Operator Console, Maintenance Information Manual	SY33-2019
	3727 Operator Console, Repair Center Maintenance Information Manual	SY12-8229
	3725/3726 Communication Controller, Parts Catalog	S135-2008
	7427 Switching Unit Maintenance Information	SY33-2022
	ACF/SSP Diagnosis Reference	LY30-3060
	ACF/NCP for the IBM 3725 Diagnosis Reference	LY30-3071
	ACF/NCP/SSP for the IBM 3725 Diagnosis Guide	SC30-3181
	Emulation Program for the IBM 3725 Logic	LY30-3055
	ACF/NCP for the 3725; EP for the 3725, Reference Summary and Data Areas	LY30-3070

Maintenance Library : 3725 Model 1 and 3726

Identifier	Title	Order Number	Contents
3725 MI Vol. A01	3725-1/3726 MIM Part 2, Start	(Part number)	Start of problem isolation
3725 MI Vol. A02	3725-1/3726 MIM Part 2, Power 3725-1/3726 Power Supplies TO	(Part number) SY33-2020	Power MAPs, references, and theory of operation
3725 MI Vol. A03	3725/3726 MIM Part 1, Volume 1	SY33-2018	General information: Chapters 1 to 9
3725 MI Vol. A04	3725/3726 MIM Part 1, Volume 2	SY33-2018	General information: Chapters 10 to 14
3725 MI Vol. A05	3725 Diagnostic Descriptions	SY33-2027	Diagnostic general information
3725 MI Vol. A06	3725 Problem Determination and Extended Services	GA33-0014	Operating procedures, Wrap tests, and Stand Alone link tests for maintenance personnel
3725 MI Vol. A07	3725/3726 Parts Catalog 3725-1 CE Installation Instructions	S135-2008 (Part number)	Parts catalog and installation instructions
3725 MD Vol. B01	3725-1 Component Locations 3725-1 Wiring Diagrams 3725-1 EC/PN Cross References	(Part number) (Part number) (Part number)	Maintenance information support for frame 01 (YZ/ZZ pages)
3725 MD Vol. B02	3725-1 Board Pin/Net List	(Part number)	Maintenance information support for frame 01
3726 MD Vol. A01 (optional)	3726 Wiring Diagrams 3726 Board Pin/Net List 3726 CE Installation Instructions	(Part number) (Part number) (Part number)	Maintenance information support for frame 02 (YZ pages) and installation instructions

<u>Note:</u>

- Three copies of the <u>3725 Channel Adapter Card,</u> GA33-0045, are included in the shipping group.
- One copy of the <u>3725 Operator's Guide,</u> GA33-0044 (operating procedures for the customer personnel) is included in the shipping group.

Maintenance Library: 3725 Model 2

Identifier	Title	Order Number	Contents
3725 MI Vol. A01	3725-2 MIM Part 2, Start	(Part number)	Start of problem isolation
3725 MI Vol. A02	3725-2 MIM Part 2, Power 3725-2 Power Supplies TO	(Part number) SY33-2026	Power MAPs, references, and theory of operation
3725 MI Vol. A03	3725/3726 MIM Part 1, Volume 1	SY33-2018	General information: Chapters 1 to 9
3725 MI Vol. A04	3725/3726 MIM Part 1, Volume 2	SY33-2018	General information: Chapters 10 to 14
3725 MI Vol. A05	3725 Diagnostic Descriptions	SY33-2027	Diagnostic general information
3725 MI Vol. A06	3725 Problem Determination and Extended Services	GA33-0014	Operating procedures, Wrap test, and Stand Alone link tests for maintenance personnel
3725 MI Vol. A07	3725/3726 Parts Catalog 3725-2 CE Installation Instructions	S135-2008 (Part number)	Parts catalog and installation instructions
3725 MD Vol. B01	3725-2 Component Locations 3725-2 Wiring Diagrams 3725-2 EC/PN Cross References	(Part number) (Part number) (Part number)	Maintenance information Support
3725 MD Vol. B02	3725-2 Board Pin/Net List	(Part number)	Maintenance information support

Note:

- Three copies of the 3725 Channel Adapter Card, GA33-0045, are included in the shipping group.
- One copy of the 3725 Operator's Guide, GA33-0044 (operating procedures for the customer personnel), is included in the shipping group.

CE General Safety (Part 1 of 2)

This product meets IBM safety standards.

The following information has been included in this publication for the use and safety of IBM personnel.
For more information, see Electrical Safety for IBM Service Representatives, S229-8124, and Safety/Health Guidelines for IBM Service Representatives, S241-5493.

GENERAL SAFETY DURING WORK

Use these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during maintenance and after completing it.
- Use only field-supply items (such as adhesives, cleaning fluids, lubricants, paints, and solvents) that have been approved by IBM, that is, are supplied under an IBM part number.
- When lifting any heavy object:

1. Ensure that you can stand safety without slipping.
2. Balance the weight of the object between your two feet.
3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. Do not attempt to lift any objects that you think are too heavy for you.

- Do not perform any action that causes hazards to the customer or that makes the equipment unsafe.
- Put removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Always keep your tool case away from walk areas so that other persons will not trip over it; for example, put it under a desk or table.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or are rolled up above the elbows. If your hair is long, fasten it.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

  Remember:
  A metal object lets more current flow if you touch a live conductor.
- Insert the ends of your necktie or scarf inside other clothing or fasten the necktie with a clip, preferably nonconductive, approximately 8 centimers (3 inches) from the ends.
- Wear safety glasses when you are:
  - Using a hammer to drive pins or similar parts
  - Drilling with a power hand-drill
  - Using spring hooks or attaching springs
  - Soldering parts
  - Cutting wire or removing steel bands
  - Cleaning parts with solvents, chemicals, or cleaning fluids
  - Working in any other conditions that might be hazardous to your eyes.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- After maintenance, reinstall all safety devices such as shields, guards, labels, and ground wires.
  Exchange any safety device that is worn or defective for a new one.

  Remember:
  Safety devices protect personnel from hazards. You destroy the purpose of the devices if you do not reinstall them before completing your service call.
- Reinstall all covers correctly before returning the machine to the customer.

SAFETY WITH ELECTRICITY

Observe these additional rules when working on equipment powered by electricity:

- Find the room emergency power-off (EPO) switch or disconnecting switch. If an electrical accident occurs, you can then operate the switch quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
  Always inform your manager of any possible problem or if you must work alone.
- Disconnect all power:
  - Before removing or installing main units
  - Before working near power supplies
  - Before doing a mechanical inspection of power supplies
  - Before installing changes in machine circuits.
- Before you start to work on the machine, unplug the machine's power cable. If you cannot unplug the cable easily, ask the customer to switch off the wall box switch that supplies power to the machine, and either:
  - Lock the wall box switch in the off position,
    or
  - Attach a DO NOT OPERATE tag, Z229-0237, to the wall box switch.

    Note: A non-IBM attachment to an IBM machine can be powered possibly from another source and controlled by a different disconnecting switch or circuit breaker. If you determine that this condition is present, ensure that you remove (eliminate) this hazard before you start work.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, who is familiar with the power-off controls, is near you.

    Remember:
    Another person must be there to switch off the power, if neccessary.
  - CAUTION

    SOME IBM HAND TOOLS HAVE HANDLES COVERED WITH A SOFT MATERIAL THAT DOES NOT INSULATE YOU WHEN WORKING WITH LIVE ELECTRICAL CIRCUITS.

    ....

    Use only those tools and testers that are suitable for the job you are doing.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

    Remember:
    There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through the vital parts of your body.
  - When using testers, set the controls correctly and use the IBM-approved probe leads and accessories intended for that tester.
  - CAUTION

    MANY CUSTOMERS HAVE, NEAR THEIR EQUIPMENT, RUBBER FLOOR MATS THAT CONTAIN SMALL CONDUCTIVE FIBERS TO DECREASE ELECTROSTATIC DISCHARGES. DO NOT USE THIS WRONG TYPE OF MAT TO PROTECT YOURSELF FROM ELECTRIC SHOCK.

    ....

    Stand on suitable rubber mats (obtained locally, if neccessary) to insulate you from grounds such as metal floor strips and machine frames.

- Observe the special safety precautions when you work with very high voltages; these instructions are given in IBM safety service memorandums (SMs) and the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Do not use tools or testers that have not been approved by IBM. Ensure that electrical hand tools, such as power drills and Wire-Wrap (1) tools, are inspected regularly.
- Do not use worn or broken tools and testers.
- Never assume that power has been disconnected from a circuit. First check that it has been switched off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are: moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the glass surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Unless the maintenance information specifically lets you, do not service the following parts with power on them when they are removed from their normal operating places in a machine:
  - Power supply units
    Pumps
    Blowers and fans
    Motor generators

    and similar units. (This rule ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution
    do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.
  - If the victim is not breathing, decide whether to give rescue breathing.

  These actions are described below.

EMERGENCY FIRST AID

When giving rescue breathing after an electrical accident:

- Use Caution. If the victim is still in contact with the electrical-current source remove the power; to do this, you may need to use the room emergency power-off (EPO) switch or disconnecting switch.

  If you cannot find the switch, use a dry wooden rod or some other non conductive object to pull or push the victim away from contact with the electrical-current source.
- Work Quickly. If the victim is unconscious, he or she possibly needs rescue breathing. If the heart has stopped beating, the victim may also need external cardiac compression.

  Only a trained and certified (2) person should perform external cardiac compressions.
- Get Medical Aid. Call a rescue group, an ambulance, or a hospital immediately.

RESCUE BREATHING PROCEDURES

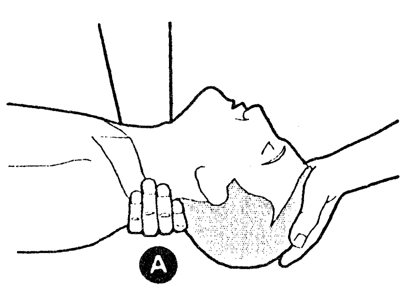
Determine if the victim needs rescue breathing:

1. Prepare the victim:

   Ensure that the victim's airway is open and not obstructed. Check the mouth for objects (such as chewing gum, food, dentures, or the tongue) that can obstruct the flow of air.

   Place the victim on his or her back, then put one hand under the victim neck and the other hand on the victim's forehead.

   Lift the neck with one hand (A) and press the forehead backward with the other hand.



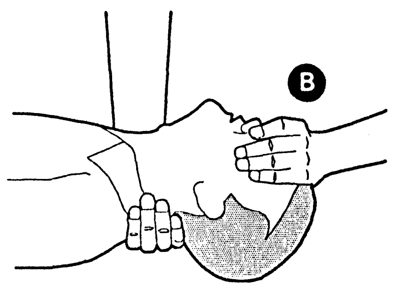
2. Look, listen, and feel to determine if the victim is breathing freely:

   Put your cheek near the victim's mouth and nose.

   Listen and feel for the breathing-out of air. At the same time, look at the victim's chest and upper abdomen to see is they move up and down.

If the victim is not breathing correctly and you decide that you want to give rescue breathing:

3. Continue to press on the victim's forehead with your hand and pinch together the victim's nostrils (B) with the thrumb and finger.



4. CAUTION

   USE EXTREME CARE WHEN GIVING RESCUE BREATHING TO A VICTIM WHO POSSIBLY HAS BREATHE-IN AIR THAT THE VICTIM HAS BREATHED-OUT.

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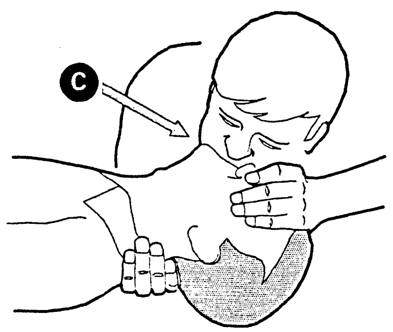
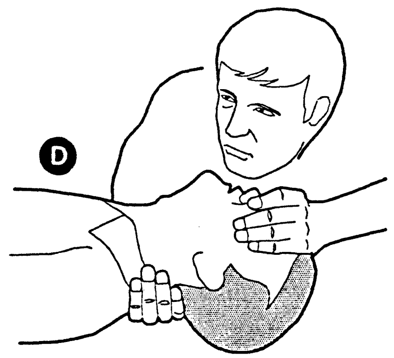
   ....
   ....
   ....
   ....
   ....

   Open your mouth wide and take a deep breath. Make a tight seal with your mouth (3) around the victim's mouth (C) and blow into it.



5. Remove your mouth and let the victim breathe out while you check that the victim's chest (D) moves down.



6. Repeat steps 4 and 5 once every 5 seconds until the victim breathes normally again or until medical aid comes.

REPORTING ACCIDENTS

Report to your manager or to your IBM site all accidents, possible hazards, and accidents that nearly occurred.

Remember : An accident that nearly occurred can be caused by a design problem. Quick reporting ensures quick solving of the problem.

Report also each small electric shock, because the conditions that caused it need only differ slightly to cause serious injury.

(1) Trademark of the Gardner-Denver Co.

(2) If you want to be trained in giving this aid, ask a suitable organization (such as the Red Cross) in your area.

(3) A rescue-breathing face covering (mask) or similar unit can be used if you have been taught how to use it.

CE Safety Inspection Procedures (Part 1 of 3)

INTRODUCTION

The following procedures help the IBM CE check whether the 3725/3726 conforms to IBM safety criteria. They are to be run each time the 3725/3726 safety is suspected.

Any deficiencies detected by running these procedures, if they make the 3725/3726 unsafe, must be reported to the owner and/or user. Then, before any repair action is performed, the IBM CE will correct these deficiencies by:

- Following the repair procedures given in the maintenance package
- Ordering the missing or failing parts, using the 3725/3726 Parts Catalog, S135-2008, (Vol A07).

The 3725/3726 areas and functions checked through these procedures are:

1. External covers
2. Safety labels
3. Safety covers and shields
4. Grounding
5. Circuit breaker and protector rating
6. Input power voltage
7. Power-on indicator
8. Emergency power off

Notes:

1. Since the 3725/3726 can be remotely powered on, all the following procedures must be performed with the Power Control switch on the 3725 control panel set to 'Local'.
2. The 3725 and 3726 each have their own power system, but the 3726 is powered on and off through the 3725.
3. Hazardous voltages are still present in some areas of the 3725/3726 when power is off.
4. Steps 1 through 6 must be performed with the 3725/3726 power off, that is, on the 3725 and 3726:
   a. CB1s tripped (switched off), and
   b. Power cords unplugged from the customer's mains.

1. EXTERNAL COVERS

(Read Notes 1 through 4 before starting the procedure.)

Check that:

- They are all present on the 3725 (frame 01) and 3726 (frame 02).
- They are locked with IBM locks and keys (refer to 3725/3726 Parts Catalog, Vol. A07).
- They can be fully opened.
- Cable stays are present.
- Appropriate service clearance and access are provided around the frames with external covers opened.

Leave all external covers opened to allow further safety inspection steps.

2. SAFETY LABELS

Check that:

- All the safety labels are stuck at the places indicated by letters in the drawings on page xi).
- Each label is of the model corresponding to the model letter as shown on page xii.

3. SAFETY COVERS AND SHIELDS

Check that:

- All the safety covers shown on page xi are present and secured with screws.
- All the voltage terminal boards (TBs) are protected by a plastic shield screwed on top of the TB.

4. GROUNDING

Refer to page xi for ground bus locations, and to the YZ pages for ground distribution diagrams.

Check that:

- Electrical continuity is assured, within each frame, between the frame ground and the terminals indicated on ground distribution diagrams.
- Electrical continuity is assured between frame 01 and 02 grounds.
- The 3725 and 3726 frame grounds are effectively connected to the premises grounding system, through their respective power cords.

5. CIRCUIT BREAKER AND PROTECTOR RATING

Refer to page xi for CB and CP locations, and to page xii for CB and CP identifications and ratings.

Check that:

- All the CBs and CPs in the 3725 and 3726 frames are rated as indicated on page xii. If the rating is not indicated, check the part number against the 3725/3726 Parts Catalog.

6. INPUT POWER VOLTAGE

Labels on the 3725 and 3726 (see page xi, labels G, for locations) indicate the input voltage for which the 3725 and 3726 are wired.

Refer to page xi for the 3725 and 3726 primary power box location, and the YZ pages for wiring options.

Check that:

- The input voltage leads are plugged according to the voltage level measured at customer's mains.
- The labels are consistent with this voltage level. Correct if necessary.

7. POWER-ON INDICATOR

Once the controller is powered on, check that the Power On lamp on the 3725 control panel is lit.

8. EMERGENCY POWER-OFF

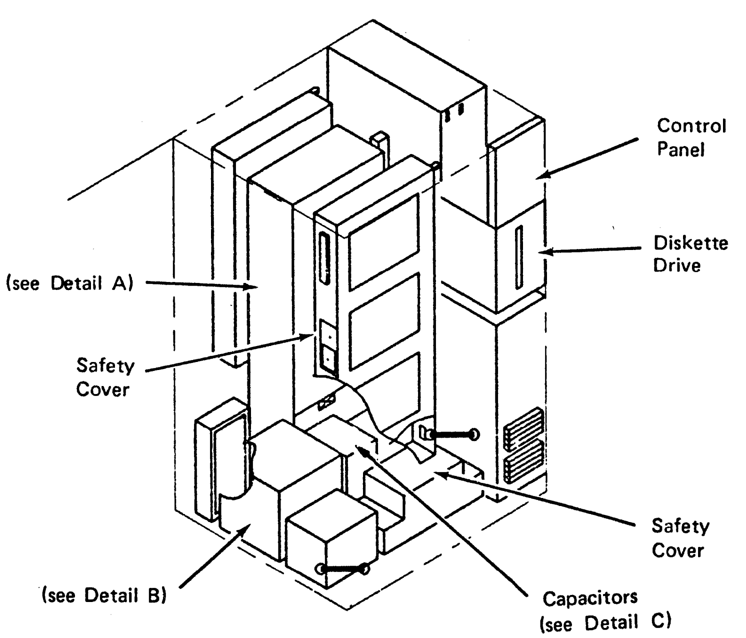
Connect the power plugs to the customer's mains, put both CB1s on, and power on the 3725/3726 (Power Control switch to 'Local' on the 3725 control panel). Then operate the Unit Emergency power off switch, and check that:

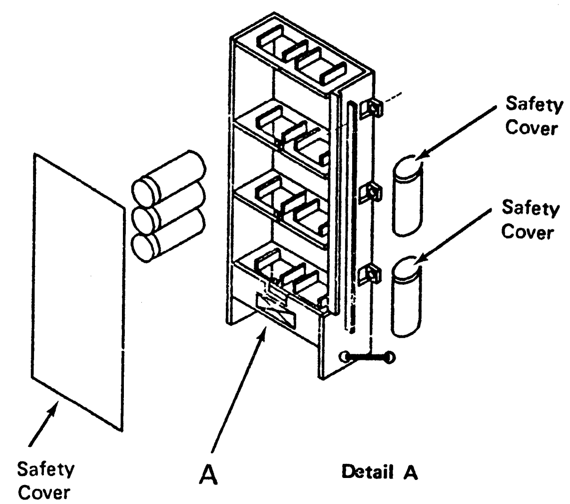
- The controller comes to power off state.
- The diskette drive on the 3725 is stopped.
- The fans on the 3725 and 3726 are stopped.
- The convenience outlets on the 3725 are still supplied with ac power.

Relatch the Unit Emergency switch, then set the controller power on again.

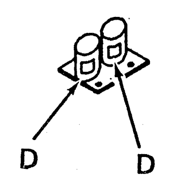
CE Safety Inspection Procedures (Part 2 of 3)

LOCATIONS ON 3725 (FRAME 01)

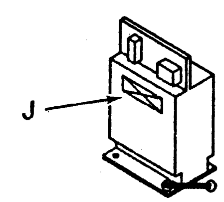




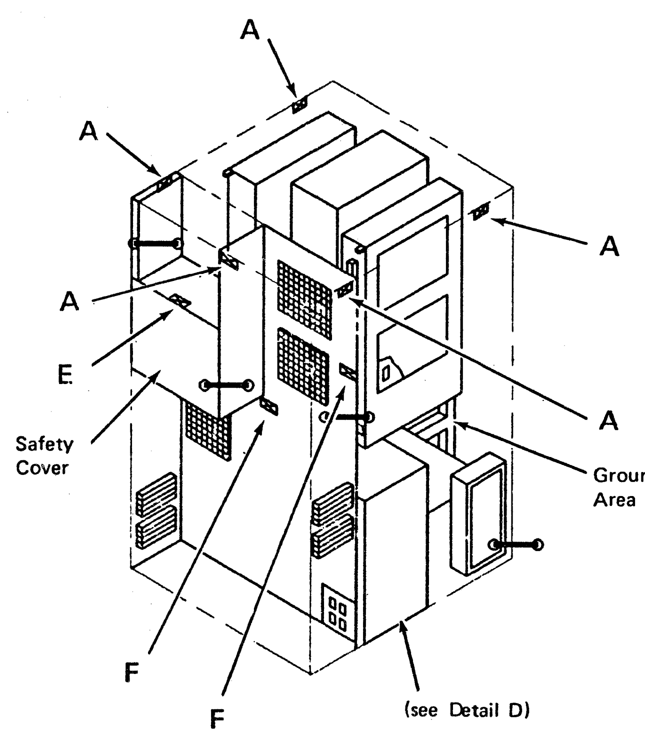
Detail A

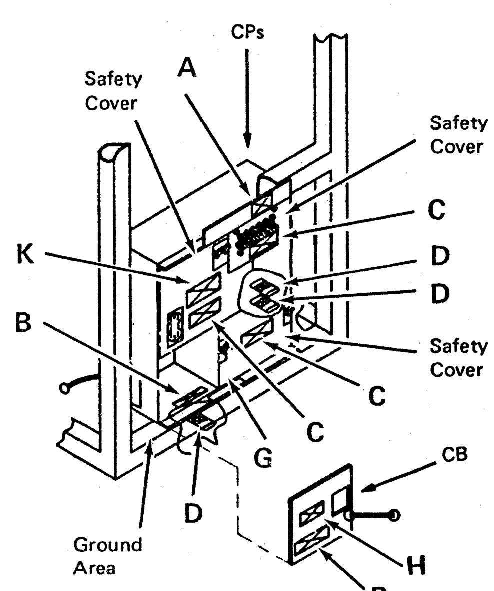


Detail C



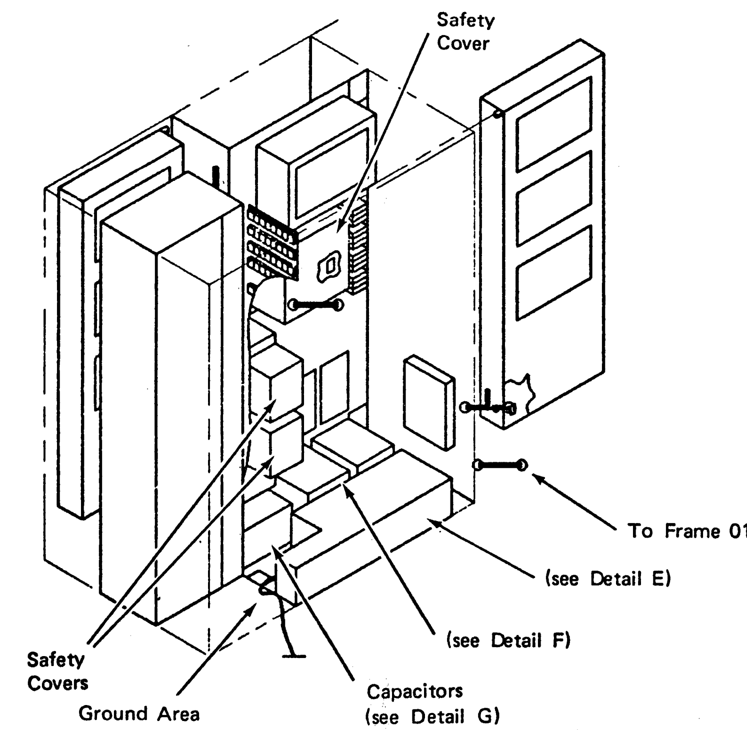
Detail B

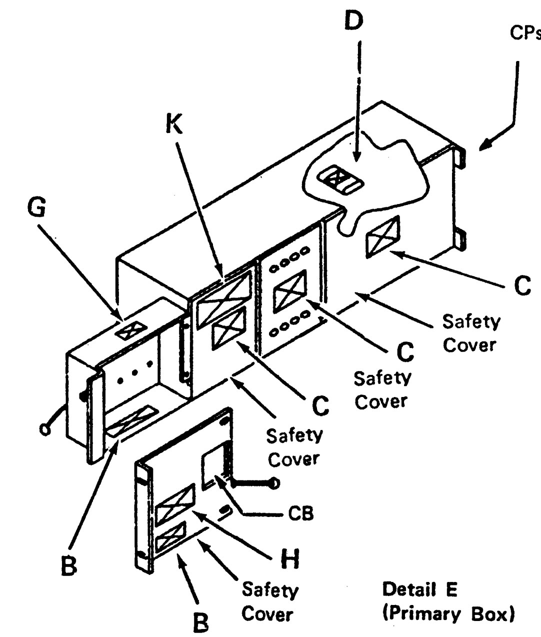




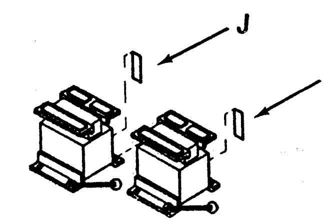
Detail D (Primary Box)

LOCATIONS ON 3726 (FRAME 02)

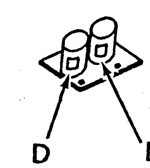




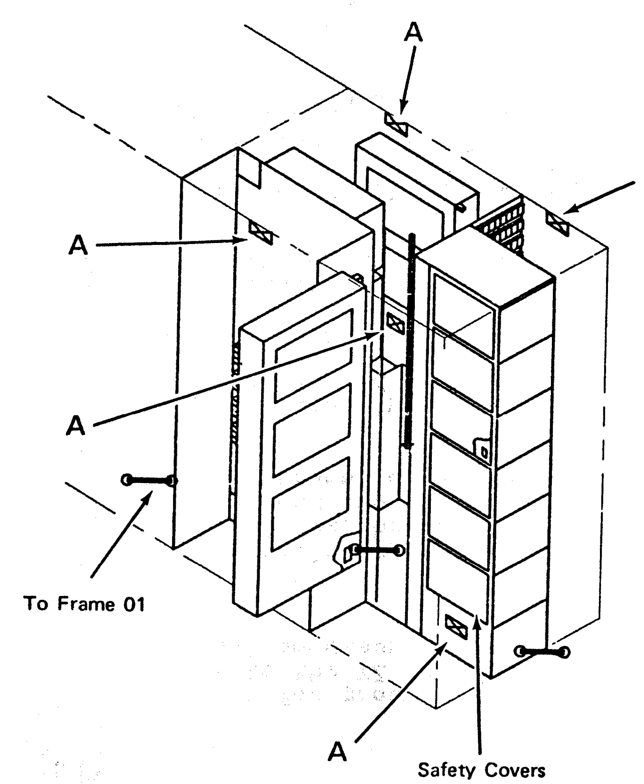
Detail E (Primary Box)



Detail F



Detail G



Legend: A through K: Safety Labels

o——o: Ground Jumper

(See next page for label illustrations)

CE Safety Inspection Procedures (Part 3 of 3)

SAFETY LABEL IDENTIFICATION

(See the previous page for label locations.)

A - P/N 1743129

HAZARDOUS AREA TRAINED
SERVICE PERSONNEL ONLY

B - P/N 138754

LINE VOLTAGE
PRESENT WITH
MACHINE POWER
OFF
138754

C - P/N 82370

TURN MAIN
LINE SWITCH
"OFF" BEFORE
REMOVING

D - P/N 4422117

DANGER
PELIGRO
PERIGO
550 V 危険

E - P/N 1203359

WARNING: Motor may start unexpectedly when power is ON.

F - P/N 737858

WARNING
DUE TO CONNECTED EQUIPMENT OTHER
THAN NORMAL VOLTAGES MAY BE
PRESENT AT ANY TIME

G - P/N 845762

THIS MACHINE IS
WIRED FOR V
SEE LOGIC DRAWINGS FOR
ALTERNATE VOLTAGE INSN

H - P/N 2667694

DANGER
MULTIPLE POWER SOURCES
CB1 DISCONNECTS POWER
FROM THIS FRAME ONLY

J - P/N 2667695

CAUTION
UNIT WEIGHT
EXCEEDS 27KG
2667695

K - P/N 1859279

CAUTION
SWITCH MACHINE TO LOCAL
POWER CONTROL BEFORE
SERVICING TO PREVENT
UNEXPECTED POWER UP.

COUNTRY LABELS

The safety labels shown as models on this page are in the English language. Most of them are available in the local language. The following table gives the label part numbers according to their model and to the country in which the 3725/3726 is installed.

LANGUAGE OR COUNTRY	A	B	C	D	E	F	G	H	J	K
ENGLISH US	1743129	138754	82370	4422117	1203359	737858	845762	2667694	2667695	1859279
CANADA	8326799	6815184 & 138754	8323797	4422117	984124	1743497	8323796 & 6812825	6081051	6081053	4712900
FRANCE	8326722	6815187	1731480	4422117	6841193	4413711	6815192	2667100	6081025	4712901
ENGLISH UK	1743129	138754	82370	4422117	1203359	737858	845762	2667694	2667695	1859279
FINLAND	8326801	6825818	6081036	4422117	6841187	6825871	6825864	2667248	6081026	4712902
BELGIUM	5081052	6843729	6081037	4420468	6081045	6081048	8329449	6081011	6081027	4712903
GERMANY	8326802	6825819	6081038	4422117	6841186	4413713	6815195	6081013	6081028	4712904
ITALY	8326800	6825820	6081039	4422117	6841188	4413712	6815191	6081015	6081029	4712905
NORWAY	1743129	6843726	82370	4422117	1203359	737858	845762	2667694	2667695	1859279
BRAZIL	6081056	6815188	6081040	4422117	6081046	6081049	6081050	6081017	6081030	4712906
SPANISH	8326798	6825821	6081041	4422117	6841189	4413734	6815190	6081019	6081031	4712907
SWEDEN	6081016	8551903	6081042	4422117	6081047	8551934	5688621	6081021	6081032	4712908
JAPAN	8326797	6825840	6081043	4422117	6841177	4413714	6825867	6081023	6081033	4712910
DENMARK	6081058	6081059	6081060	4422117	6081062	6081063	6081064	6081066	6081065	4712909

CIRCUIT BREAKERS AND CIRCUIT PROTECTORS

	3725 Model 1 or 2			3726		
Area	Rating	P/N	Name	Rating	P/N	Name
Main CB	2P-15A	5719456	CB 1	2P-15A	5719456	CB 1
Phase Control Xmer	1P-15A	2644455	CP 2	1P-10A	2306660	CP 1/CP 4
PS1	1P-0.7A	2644456	CP 6	1P-0.7A	2644456	CP 7
PS2	1P-2.5A	1805224	CP 3	1P-2.5A	1805224	CP 2
PS3	—	—	—	1P-2.5A	1805224	CP 5
PS9	—	—	—	2P-3A	5518550	CP 6
Convenience Outlets:						
- 50Hz EMEA	2P-3A	5518550	CP 1	—	—	—
- 60Hz US and Japan	1P-2.5A	1805224	CP 1	—	—	—
Blowers/Fans	2P-3A	5518550	CP 4	2P-3A	5518550	CP 3
Diskette Drive Motor	2P-3A	5518550	CP 5	—	—	—

Contents

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SECTION 2. TROUBLESHOOTING GUIDELINES

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SECTION 1. UNIT DESCRIPTION

Chapter 1. Introduction

Contents

User Application Network (Part 1 of 2)

A user application network (also called a "user network") is a configuration of data processing products, such as processors, controllers, and terminals, for the purpose of data processing and information exchange. This configuration may use circuit-switched, packet-switched, and leased-circuit services provided by common carriers or by post telephone and telegraph (PTT) administrations.

COMMUNICATION CONTROLLER

In the user network, the IBM 3725 Communication Controller and IBM 3726 Communication Controller Expansion control the data transfers between the host processor (hereafter called the "host") and the terminals. The controller comprises:

- A base unit: the IBM 3725 Communication Controller
- An expansion unit (optional): the IBM 3726 Communication Controller Expansion

In this manual, the 3725 with its 3726 expansion is called the "controller", or the "3725" when compared with other communication controllers.

The controller exchanges data with the host at high speed, and with the terminals at speeds adapted to the transmission lines. It also handles line protocols and error detection and reporting.

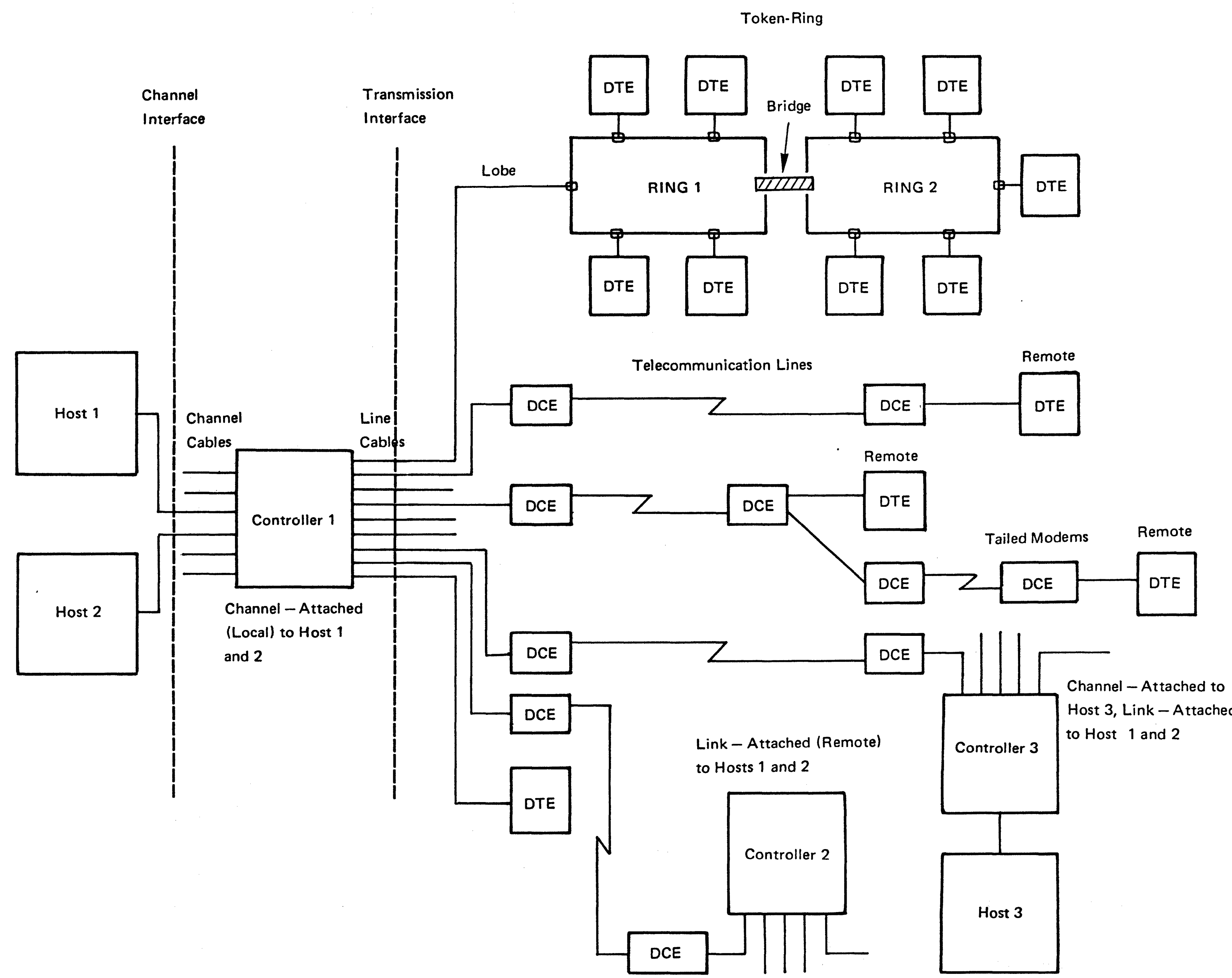
INTERFACES

The controller has two network interfaces:

- Channel interface
- Transmission interface

Channel Interface

The channel interface is the interface between the controller and the host processor(s). Several hosts may be attached to the same controller via multiple channel connections.



Transmission Interface

The transmission interface is the interface between the controller and the user network. The controller can communicate with a wide range of terminals using asynchronous or synchronous transmission, with different line speeds (from 50 bps through 256 000 bps), and with different protocols. (start/stop, BSC, SDLC, and token ring protocol).

The controller may attach via the transmission interface:

- Data circuit-terminating equipment (DCE)
- Data terminal equipment (DTE)

Data Circuit-Terminating Equipment

The DCE, a modem for example, establishes, maintains, and releases the connection, and provides for signal conversion between the controller and the transmission line. Another DCE is needed at the remote end of the line to provide the symmetrical functions between the line and the DTE or link-attached controller.

Data Terminal Equipment

The DTE serves as a data receiver, data transmitter, or both, and provides for the data communication control function according to protocols. The DTE is remote when connected to the controller through a transmission line via DCEs or the IBM Token-Ring Network. It is direct attached when connected to the controller without a DCE.

Channel/Link-Attached Controller

A controller may be attached to the host processor in two ways:

- Via a channel adapter
- Via a telecommunication line connected to the host via another controller

A controller that is attached to a host processor via a channel adapter is called a channel-attached (or local) controller. For example, controller 1 in the accompanying figure is channel-attached to hosts 1 and 2.

A controller that is attached to a host processor via a telecommunication line and another controller is called a link-attached (or remote) controller. For example, controller 2 is link-attached to hosts 1 and 2. In an SNA network, a transmission line connecting two controllers is called a cross-domain link.

A controller may be channel-attached to one host, and link-attached to another. For example, controller 3 is channel-attached to host 3 and link-attached to hosts 1 and 2. The type of attachment for a controller must be specified with respect to a particular host.

Controller General Description (Part 1 of 4)

The 3725 expands IBM's communication controller family, and:

- Preserves compatibility with existing 3704/3705 Communications Controllers
- Increases performance by a higher throughput and greater storage capacity
- Improves attachment capabilities
- Provides an operator console (the IBM 3727 Console with its display and keyboard features) for operator interface and maintenance functions
- Simplifies the machine structure
- Uses new versions of the network control program and the emulation program
- Complements and enhances communication network management
- Improves the reliability, availability, and serviceability (RAS)

CONTROLLER ORGANIZATION

The controller is organized in four functional subsystems each equipped with processors:

- Control subsystem (CSS)
- Transmission subsystem (TSS)
- Token Ring Subsystem (TRSS)
- Maintenance and operator subsystem (MOSS)

Control Subsystem (CSS)

The control subsystem (CSS) controls the data transfers over the channel interface and executes the control program. It is composed of the central control unit (CCU) with its associated storage, and zero to six channel adapters. The maximum number of channel connections is eight.

Transmission Subsystem (TSS)

The transmission subsystem (TSS) controls the data transfer over the transmission interface. It is packaged in up to eight line attachment boards (LABs). Each board includes one or two scanning processors (communication scanners) and the necessary circuits to attach up to 32 lines. The maximum number of lines that may be attached to a controller is 256.

Token Ring Subsystem (TRSS)

The TRSS has the capability to attach one or several token-ring native terminals to the SNA network thru the 3725 in native mode.
The TRSS controls the data transfer over the IBM Token-Ring Network.
The TRSS may have up to two token ring adaptors (TRA) and up to eight ring interfaces for 3725 Model 1 with 3726 attached (one TRA in 3725 Model 1 and one TRA in 3726 or 2 TRAs in 3726).
Only one TRA (4 ring interfaces) may be installed on a 3725 Model 1 without expansion or on a 3725 Model 2.
The TRA is packaged in LAB type C and shares the board with one scanner.

Maintenance and Operator Subsystem (MOSS)

The maintenance and operator subsystem (MOSS) provides the operating and service facilities to the customer's operator and to the customer engineer (CE). The MOSS includes a processor and storage, a diskette drive, a control panel, and their adapters.

A primary operator console (the IBM 3727 Console with its display and keyboard features) is attached to the MOSS. Optionally, an alternate operator console can be installed, in addition to the primary one.

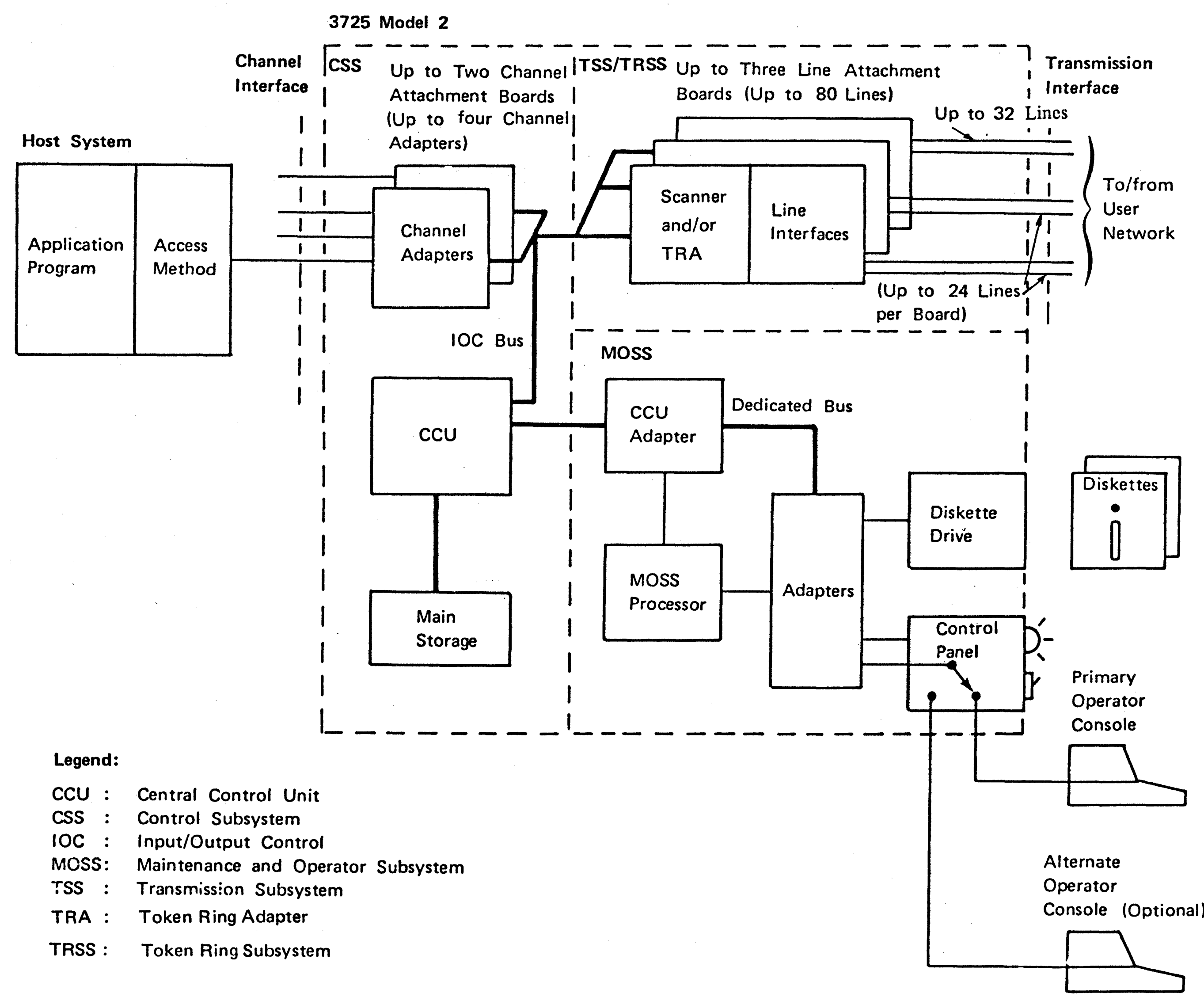
CONFIGURATIONS

Single-Frame Configurations: 3725 Model 2

The 3725 Model 2 configuration consists of the 3725 Model 2 frame, the primary console, and optionally, an alternate console. The 3725 Model 2 frame contains:

- The central control unit (CCU)
- The storage (512K through 3072K bytes by increments of 256K)
- The MOSS
- Up to four channel adapters
- From one to 80 duplex and/or half-duplex telecommunication lines
- Up to four token ring transmission interfaces (one TRA)

3725 Model 2 Block Diagram



Legend:

CCU : Central Control Unit
CSS : Control Subsystem
IOC : Input/Output Control
MOSS: Maintenance and Operator Subsystem
TSS : Transmission Subsystem
TRA : Token Ring Adapter
TRSS : Token Ring Subsystem

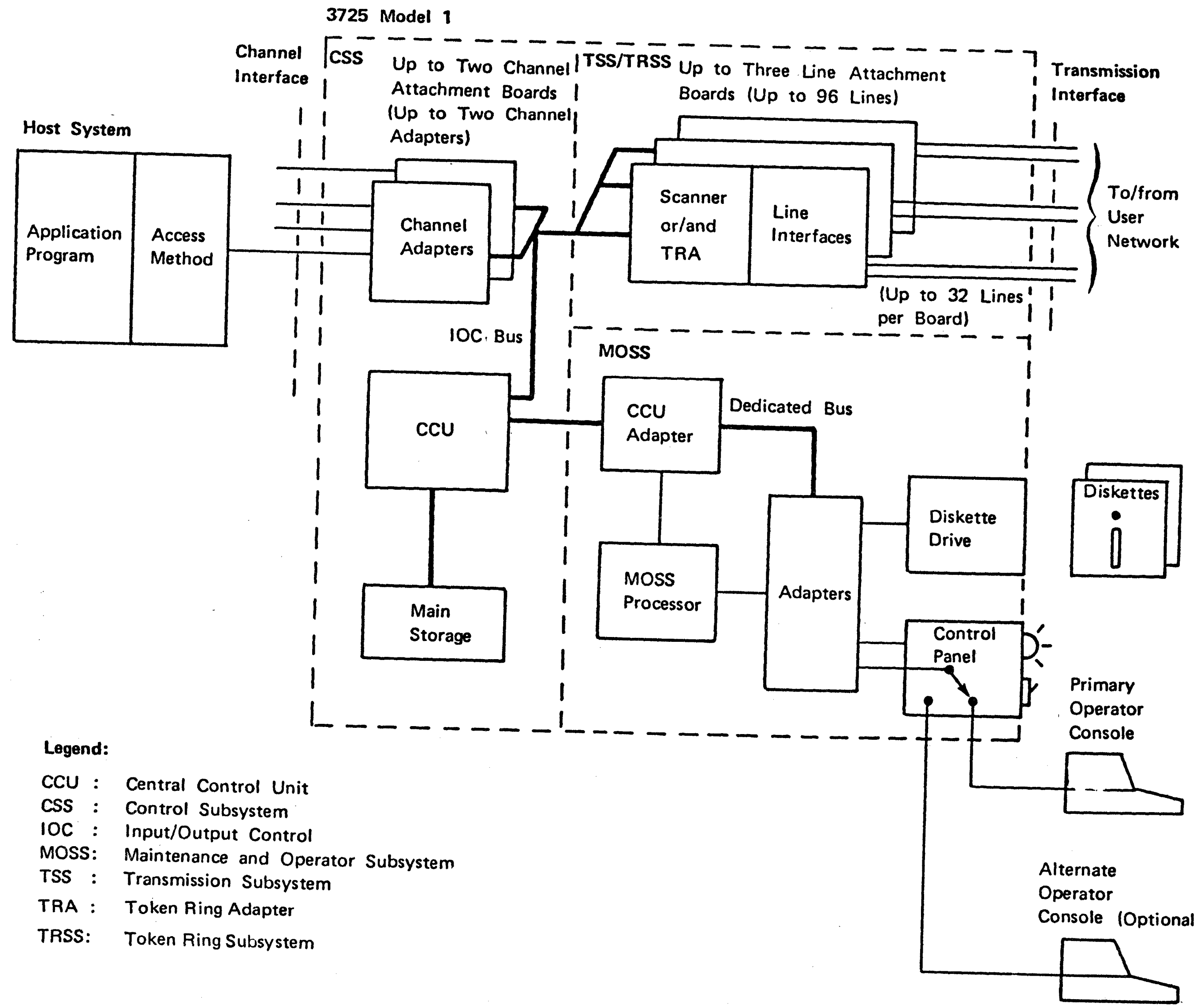
Controller General Description (Part 2 of 4)

Single-Frame Configurations: 3725 Model 1

A single-frame configuration consists of the 3725 Model 1, the primary operator console, and, optionally, an alternate console. The 3725 Model 1 frame contains:

- The central control unit (CCU)
- The storage (512K through 3072K bytes by increments of 256K)
- The MOSS
- Zero, one, or two channel adapters
- Zero, one, or two two-processor switches
- From one to 96 duplex and/or half-duplex telecommunication lines
- Up to four token ring transmission interfaces (one TRA).

3725 Model 1 Block Diagram



Legend:

CCU : Central Control Unit
CSS : Control Subsystem
IOC : Input/Output Control
MOSS: Maintenance and Operator Subsystem
TSS : Transmission Subsystem
TRA : Token Ring Adapter
TRSS: Token Ring Subsystem

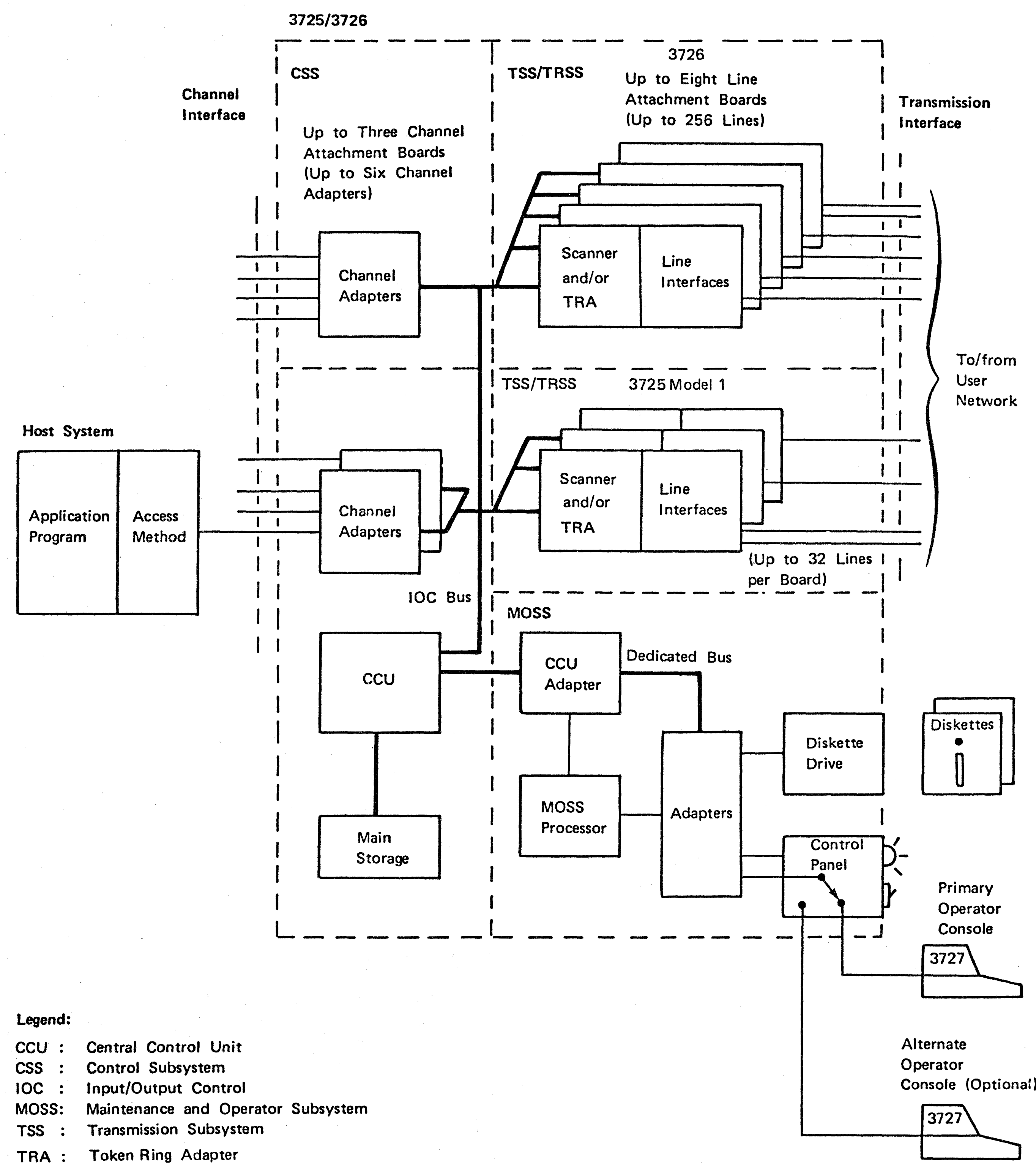
Controller General Description (Part 3 of 4)

Two-Frame Configuration: 3725/3726

The two-frame configuration consists of the 3725 Model 1, the 3726, the primary operator console, and, optionally, an alternate operator console. The 3726 frame contains:

- Up to four additional channel adapters (total for the controller: six channel adapters)
- Up to two additional two-processor switches
- Up to 160 additional transmission lines (total for the controller: 256 lines)
- Up to two token-ring adapters (TRAs) and up to eight token-ring transmission interfaces (four per TRA).

3725 Model 1/3726 Block Diagram



Legend:

CCU : Central Control Unit
CSS : Control Subsystem
IOC : Input/Output Control
MOSS: Maintenance and Operator Subsystem
TSS : Transmission Subsystem
TRA : Token Ring Adapter
TRSS: Token Ring Subsystem

PROGRAMMING SUPPORT FOR THE 3725

The control program that runs in the CCU may be:

- Advanced Communications Function for Network Control Program (ACF/NCP) Version 2 or 3
- Emulation Program for the IBM 3725 (EP/3725)
- Partitioned emulation programming (PEP) extension
- A program written by the customer

Network Control Program

Advanced Communication Functions for Network Control Program (ACF/NCP) Version 2 or 3 (called simply NCP in this manual) is an IBM licensed program product. NCP provides major capabilities for SNA user application networks with SDLC. However, NCP is not limited to SDLC devices, and existing start-stop and binary synchronous networks can be migrated to the 3725.

NCP works with the following access methods:

- ACF/Virtual Telecommunications Access Method (VTAM) Version 1 and 2
- ACF/Telecommunications Access Method (TCAM) Version 2

The network terminal option (NTO) is a licensed program product available to provide start-stop support for NCP in the 3725.

NCP supports the communication network management (CNM) concept when operating with the following IBM licensed programs:

- Network Communication Control Facility (NCCF)
- Network Problem Determination Application (NPDA)
- Network Logical Data Manager (NLDM)

In the 3725, the communication network management is supported by sending failure messages called alerts from the MOSS to the host for display. For most failures, these messages are sufficiently explicit so that the customer can take the appropriate corrective action. Similar messages, called alarms, are sent to the operator console of the controller.

Emulation Program

The Emulation Program for the 3725 (EP/3725, called simply EP in this manual) emulates most of the functions of the IBM, 2701 Data Adapter Unit, 2702 Transmission Control, or 2703 Transmission Control, and can communicate with various access methods running in the host. EP can run only in a channel-attached controller. When EP is used, the host must provide a separate subchannel for each line.

EP works with the following access methods:

- Telecommunications Access Method (TCAM)
- Basic Telecommunications Access Method (BTAM)
- BTAM Extended Support (BTAM-ES)

Partitioned Emulation Programming (PEP) Extension

The partitioned emulation programming (PEP) extension, in addition to performing the usual NCP functions, allows designated lines of the 3725 to operate as a 2701, 2702, or 2703, or any combination of the three. Most programs written for these machines can operate in the 3725 without modification. However, programs that involve timing or special hardware considerations may have to be changed. The PEP is the Network Control Program and Emulation Program merged into one. Most of the code in these two programs remains the same as in their stand-alone versions. However, some program functions are identical and shared. These functions are:

- Level 1, 2, and 3 routers
- Timer
- Channel adapter
- Panel routines
- Direct-addressable storage
- RAS procedures in levels 1 and 4
- Access method line trace routines

Requests that are directed to EP subchannels are handled in the same way as in the stand-alone emulation program. The NCP level 3 router directs initial selection interrupts to the EP initial selection routine, and data service interrupts to the EP data service routine.

PROGRAMMING SUPPORT FOR THE HOST

A number of IBM system support programs (SSPs) are available. They are executed in the host and are used to:

- Generate the control programs
- Load them into the controller
- Dump the controller storage on the host printer
- Transfer diskette files to the host

Program Generation

The control program is generated from standard program modules using the SYSGEN procedure in accordance with the controller configuration required. Several control programs can be generated to handle different subsets of lines attached to the same controller.

The control program for the CCU is kept as a data set on the host storage, but the microcodes for the scanners and MOSS processor are kept as data sets on the diskette.

Network Configuration Changes

The host may issue special commands to the control program to make changes in the network configuration by:

- Adding or deleting SDLC lines
- Adding or deleting terminals or cluster controllers, for example

An option of PEP is the ability to operate the same transmission line alternately in NCP mode or EP mode. The change from one mode to the other is made during program execution via commands sent from the access method.

For terminals and line protocols having no IBM support, the user must provide the routines and incorporate them into the control program.

RELIABILITY, AVAILABILITY, AND SERVICEABILITY

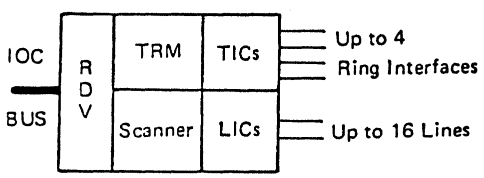
The controller hardware, control program, CNM programs (when installed), and MOSS work together to provide a high degree of reliability, availability, and serviceability. The following main features contribute to this:

- LSI technology with high reliability.
- Functional building block design.
- Storage protection mechanisms.
- Error detection and correction codes on CCU main storage and scanners.
- Fault checking logic.
- Error retries by the microcode.
- Interactive console facilities for the customer and the CE.
- Removable MOSS diskettes to make engineering changes and diagnostics easier. The diskettes also store error messages, microcode, initial program load (IPL) code, and other files.
- Alert messages to the host processor and alarm messages to the console.
- Host-independent problem isolation for most hardware failures.

Data Flow

Note 1: As the CLAB and the CL2B boards are split into two parts in this figure, one for the channel adapter and one for the scanner, the redrive (RDV) function is shown twice for clarity. However, there is one RDV per CLAB or C2LB board.

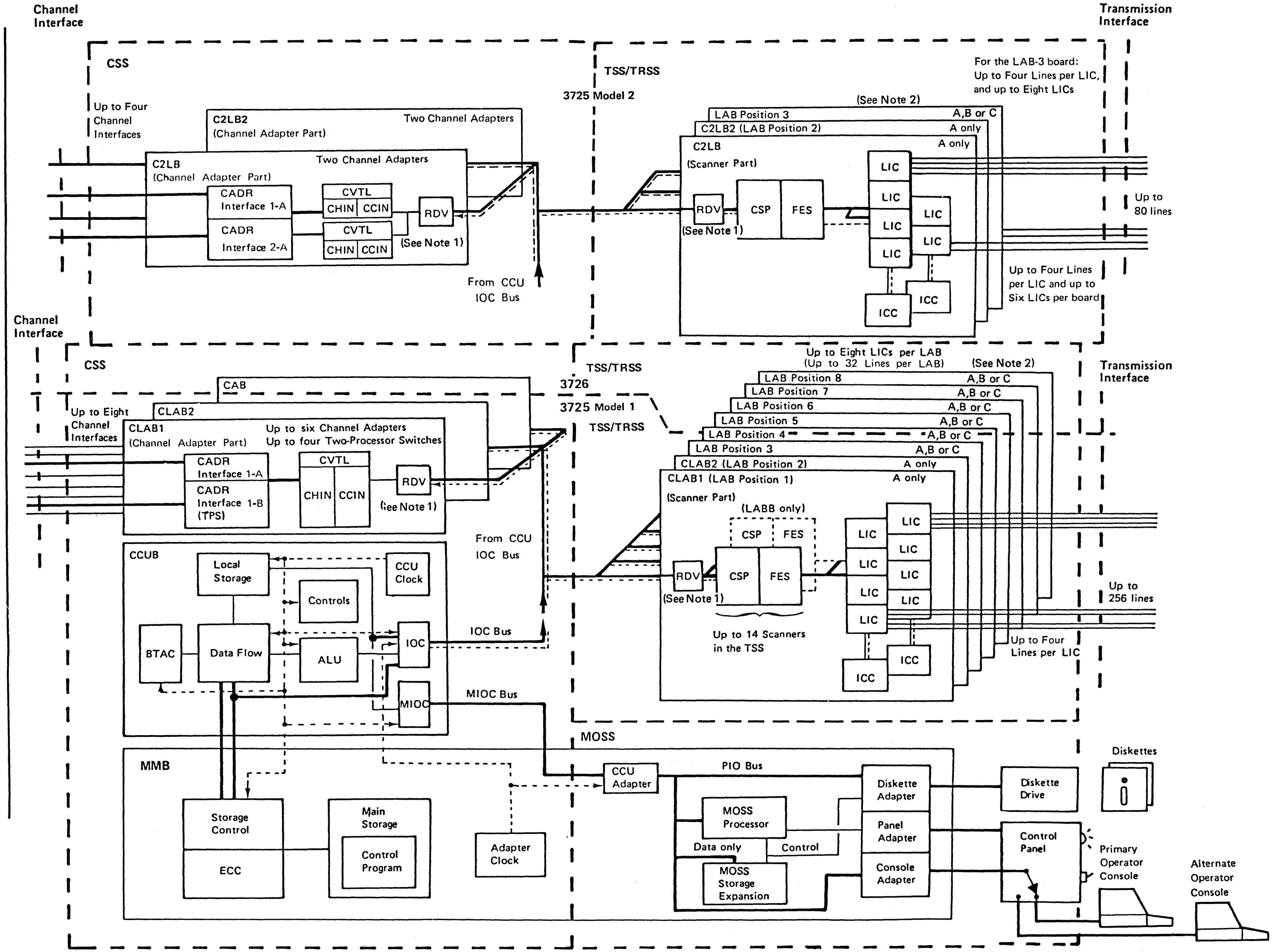
Note 2: LAB Pos. 3 to 8 organization if LAB type C installed



Legend:

----- Clock signals

——— Data/control signals



Legend

ALU	arithmetic and logic unit
BSMI	basic storage module interconnection
BTAC	branch trace/address compare
CAB	channel adapter board
CADR	channel adapter driver receiver
CCIN	channel-to-CCU interconnection
CHIN	channel interconnection
CCU	central control unit
CCUB	CCU board
CLAB	channel and line attachment board
C2LB2	channels (two) and line attachment board 2
C2LB	channels (two) and line attachment board
CSP	communication scanner processor
CSS	control subsystem
CVTL	card - vendor transistor logic
ECC	error checking and correction
FES	front-end scanner
ICC	internal clock card
IOC	input/output control
LAB	line attachment board
LIC	line interface card
MCC	MOSS control card
MIOC	MOSS input/output control
MMB	memory and MOSS board
MOSS	maintenance and operator subsystem
RDV	redrive
TPS	two-processor switch (feature)
TRA	token ring adapter
TSS	transmission subsystem
TRSS	token ring subsystem

Control Subsystem (Part 1 of 2)

The control subsystem (CSS) consists of the following main components:

- Central control unit (CCU)
- Storage
- Programming support
- Channel adapters (CAs)

CENTRAL CONTROL UNIT (CCU)

The central control unit (CCU) is an interrupt-driven processor with a stored program (called the "control program" in this manual) that controls the data transfers on the channel and transmission interfaces. The central control unit board (CCUB) includes:

- Data flow, local store, controls, arithmetic and logic unit (ALU), branch trace/address compare (BTAC)
- CCU clock
- Input/output control (IOC) for transfer of controls and data to and from the channel adapters and scanners via the IOC bus
- MOSS input/output control (MIOC) for transfer of controls and data to and from the MOSS

Machine Instructions

The instruction set consists of 53 instructions. Two of these (IOH and IOHI) are new with respect to the 3704/3705 instruction set, and are designed to manage I/O operations on the IOC bus (see Chapter 10 for details). Of the 51 remaining instructions, all but three are compatible with the 3704/3705 instruction set at both source and object code level. The three exceptions are compatible at source code level only.

Most of the machine instructions are register-oriented, and use two registers, or a register and immediate data, or a register and a storage position.

Interrupt System

The controller has four interrupt levels (numbered 1 through 4), a base level numbered 5, and 128 external registers (numbered X'00' through X'7F'). The first 40 registers are called the 'general registers'. They are associated, eight-by-eight, to the five program levels, and reflect at any time the contents of the instruction address register (IAR) and the seven working registers of the current program level.

Should an interrupt of higher priority be requested, the usual housekeeping before entering the higher program level is already performed. When the level is re-entered, the eight corresponding general registers are transferred into the IAR and working registers, so that the processing resumes where it left off.

- Level 1 handles those situations requiring the most urgent attention: errors and requests for IPL.
- Level 2 handles program-controlled interrupts (PCIs) for line handling, data transfer, and MOSS diagnostics.
- Level 3 handles the interrupts from the channel adapters, timers, and control panel. It also handles PCIs for transmission processing that can be deferred from level 2.
- Level 4 handles PCIs for overall management of system resources, buffer management, queue manipulation, and dispatching of level 5 tasks. It also handles interrupts from the MOSS.
- Level 5 is the background level of the controller. It executes all the low-priority, non-time-dependent functions of the controller, such as line management, data and message handling, control command decoding and execution, and block handling routines, as well as most SNA functions.

I/O commands are executed on levels 2, 3, and 4. Attempts to execute I/O commands on level 5 result in an I/O error.

MAIN STORAGE

The main storage contains the control program. It is packaged on the memory and MOSS board (MMB) and is controlled by a storage control (SCTL) card and an error checking and correction (ECC) card, which corrects single-bit errors, and signals double-bit errors on storage words. The MMB includes a clock to distribute timing to the channel adapters and scanners via the redrive (RDV) cards.

The storage address register is 22 bits long. The read cycle time is 400 ns and the write cycle time is 600 ns.

The storage word consists of 4 bytes referenced as follows:

Y	X	0	1
0 7	0 7	0 7	0 7

Parts of the storage may be protected against write operation by read-only keys set during initialization. A program level trying to write in a read-only segment causes an address exception (except for the MOSS, which may write anywhere in the storage).

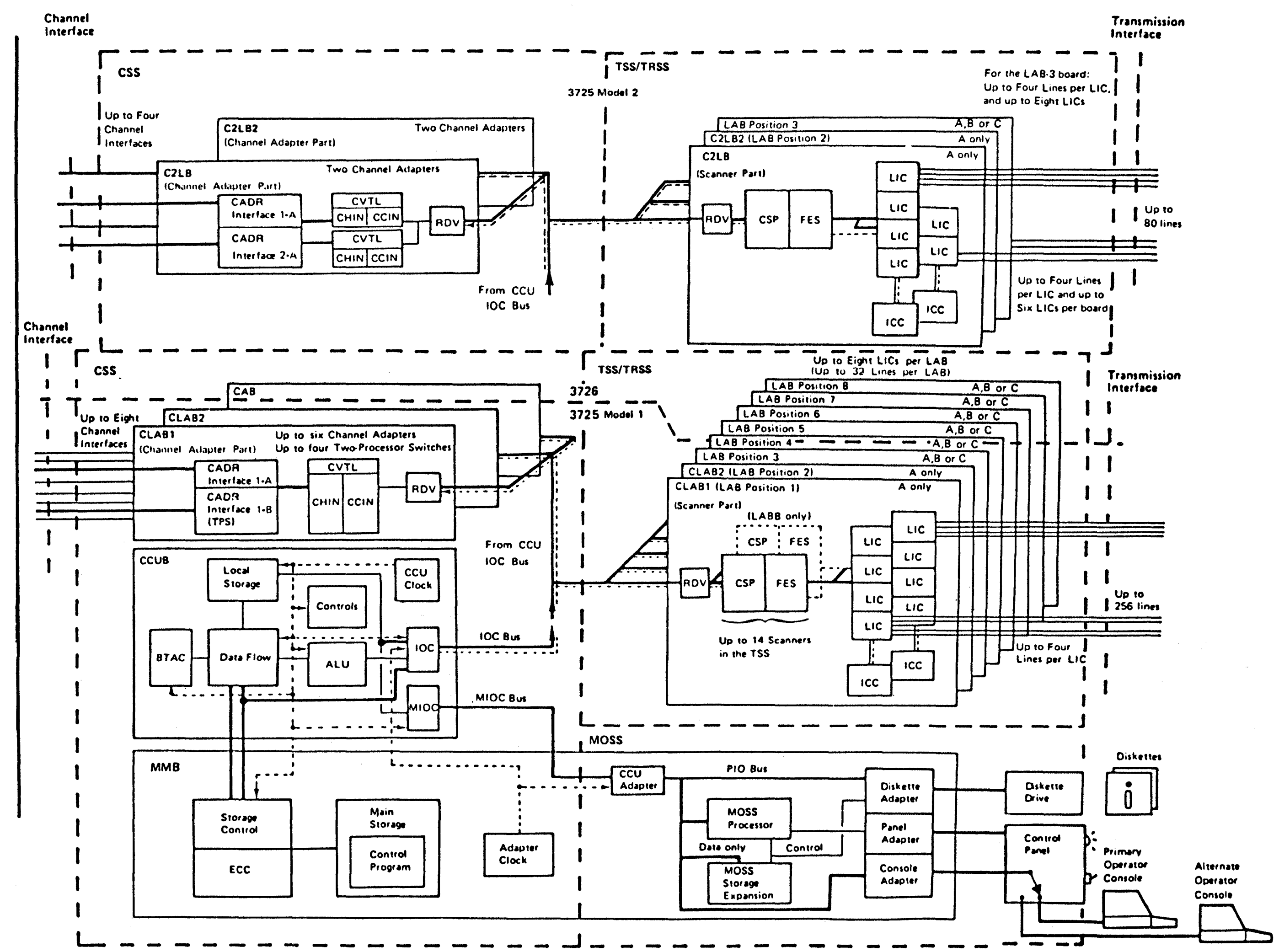
Storage Size

The storage is from 512K through 3072K bytes by increments of 256K.

Cycle Steal Mechanism

The cycle steal mechanism is an adapter initiated operation (AIO). It avoids the overhead caused by data transfers between the host and the CCU storage, and between the CCU storage and the scanners. Cycle stealing transfers data without involving the processing of the control program.

FUNCTIONAL ORGANIZATION



Control Subsystem (Part 2 of 2)

LOCAL STORAGE

The local storage contains the external registers. It includes the 40 general registers, but not registers X'70' through X'7F' which are CCU hardware registers.

CHANNEL ADAPTER

Packaging (3725/3726)

The channel adapters are packaged on one of the following types of board, via the RDV logic:

- Channel and line attachment board (CLAB1 and CLAB2)
- Channel attachment board (CAB)

Packaging (3725 Model 2)

- On the 3725 Model 2 two channel adapters are packaged on each of the following boards: the C2LB and the C2LB2.

Inside a board, a channel adapter is composed of the following cards:

- One channel adapter driver receiver (CADR)
- Channel interface (CHIN)
- Channel-to-CCU interconnection (CCIN)
- Additional functions to CHIN and CCIN (CVTL)

Board Characteristics (3725/3726)

One channel adapter and one line attachment base for up to 32 lines are packaged on each CLAB (1 and 2). The CLABs are packaged in the 3725.

Up to four channel adapters (and no line attachment base) are packaged on the CAB. The CAB is packaged in the 3726.

Board	Channel Adapter	TPS	Channel Connections
CLAB1 CLAB2 CAB	1 1 1 to 4	0 or 1 0 or 1 0 to 2	1 or 2 1 or 2 1 to 4

Board Characteristics (3725 Model 2)

One or two channel adapters and one line attachment for up to 24 lines are packaged on the C2LB and C2LB2 boards.

Board	Channel Adapter	TPS	Channel Connections
C2LB	1 to 2	None	1 or 2
C2LB2	1 to 2	None	1 or 2

Channel Adapter Driver Receiver

Each channel adapter is equipped with a channel adapter driver receiver (CADR) that drives and receives the channel cable signals.

Two-Processor Switch

The two-processor switch (TPS) is a feature of the channel adapter that provides a second CADR card to attach a second channel. With the TPS, the channel adapter can attach either:

- Two channels of the same host, or
- One channel of one host and one channel of another host

However, only one channel connection is active at any one time.

Up to four TPSs may be installed to give up to eight channel connections; the last two TPSs are mutually exclusive to channel adapters 5 and 6.

Channel Interface

The channel interface (CHIN) card includes the necessary logic to:

- Decode commands and addresses received from the host via the channel
- Buffer the data received from or transmitted to the host
- Control the channel tags, the clock, and the timeouts
- Detect errors

Channel-to-CCU Interconnection

The channel-to-CCU interconnection (CCIN) card includes the necessary logic to:

- Control PIO operations with the CCU via the IOC bus
- Control cycle stealing by adapter initiated operation (AIO) with the CCU via the IOC bus
- Control the internal timing, and the CCU and channel bids
- Perform the autoselect function with the other channel adapters
- Detect errors

Redrive

The redrive (RDV) card connects the IOC bus and repowers the bus signals at the entrance to the board.

Channel Operation

With NCP, the channel adapter attaches to a byte-multiplex, block-multiplex, or selector channel. With EP, the channel must be byte-multiplex.

The channel adapter interacts with the CCU by means of:

- Program-initiated operation (PIO) to transfer commands and data between the CCU storage and the channel adapter registers.
- Adapter-initiated operation (AIO) to provide high-speed data transfer in cycle steal between channel adapter and CCU storage.
- Interrupts initiated from the channel adapter to signal an event to the CCU. Interrupt level 1 is used for errors and level 3 for normal operation.

PIO and AIO are initiated by IOH/IOHI instructions.

Channel Adapter Addressing

Each of the six channel adapters is separately addressable from the controller. NCP requires only one subchannel to a host for all traffic; EP requires one subchannel per line controlled.

Channel Adapter Modularity (3725/3726)

For a channel-attached controller, the minimum configuration corresponds to one channel adapter (CA position 1 or CA-1) included in CLAB1. CA-1 may have a TPS feature (TPS-1).

CA-2 is implemented in CLAB2 and may have a TPS feature (TPS-2).

The other channel adapters, CA-3 through CA-6, are implemented in the CAB. CA-3 and CA-4 may each have a TPS feature (TPS-3 and TPS-4 respectively). When TPS-3 is installed, CA-6 is not installed. When TPS-4 is installed, CA-5 is not installed.

The maximum number of channel adapters is six, and the maximum number of channel connections with TPS installed is eight. However, with a TPS, only one of the channels connected to the channel adapter may be active at any given time.

Unit	Board	Channel Adapter Position	Channels (Total) W/o TPS	Channels (Total) With TPS
3725	CLAB1 CLAB2	1 2	1 2	2 4
3726	CAB	3 4 5 6	3 4 5 6	6 8 None None

Channel Adapter Modularity (3725 Model 2)

For a channel-attached controller, the minimum configuration corresponds to one channel adapter (CA position 1 or CA-1). An additional channel adapter (CA position 2) can be installed in the C2LB board. Two channel adapters may be installed on the C2LB2 board. No TPS feature is available for the two channel adapters.

Unit	Board	Channel Adapter Position	Channels (Total) W/o TPS	Channels (Total) With TPS
3725 Mdl 2	C2LB C2LB2	1 and 2 3 and 4	2 4	None None

Transmission and Token Ring Subsystem (Part 1 of 5)

PACKAGING

The line attachments are packaged in one of the following types of board:

- Channel and line attachment board (CLAB)
- Line attachment board type A (LABA)
- Line attachment board type B (LABB)
- Line attachment board type C (LABC)

Each board type A or B includes the following cards:

- Redrive (RDV) card
- Communication scanner processor (CSP1 and 2) cards
- Communication scanner storage (CSM) card
- Front-end scanner (FES) card
- Line interface card (LIC)
- Optionally, internal clock cards (ICC)
- For LAB type C, in addition, the token-ring adapter (TRA) includes a TRM card and up to four TIC cards.

Board Characteristics (3725/3726)

One or two channel adapters and one line attachment base for up to 32 lines are packaged on CLAB1 and CLAB2. A LAB type A includes one line attachment with a single scanner; a LAB type B includes one line attachment with two scanners. A LAB type C includes one line attachment with one scanner and one TRA (neither type of LAB includes a channel adapter).

	Number of				
Board	Scanner	TRA	LICs	ICCs	TICs
CLAB1	1	0	1 to 8	0 or 2	0
CLAB2	1	0	1 to 8	0 or 2	0
LABtypeA	1	0	1 to 8	0 or 2	0
LABtypeB	2	0	1 to 8	0 or 2	0
LABtypeC	1	1	1 to 4	0 or 1	1 to 4

Board Characteristics (3725 Model 2)

One or two channel adapters and one line attachment for up to 24 lines are packaged on the C2LB and the C2LB2. Board characteristics for LAB type A, B, or C are as shown for the 3725/3726.

	Number of				
Board	Scanner	TRA	LICs	ICCs	TICs
C2LB	1	0	1 to 6	2	0
CLAB2	1	0	1 to 6	0 or 2	0
LABtypeA	1	0	1 to 8	0 or 2	0
LABtypeB	2	0	1 to 8	0 or 2	0
LABtypeC	1	1	1 to 4	0 or 1	1 to 4

LAB Numbering

Because CLAB1 and CLAB2 include one line attachment base each (equivalent to LAB type A position 1 and LAB type B position 2 respectively), the LABs are numbered from LAB type A,B or C position 3 (LABx-3) through LAB type A,B or C position 8 (LABx-8). For the 3725 Model 2, only one LAB exists: the LABx-3.

REDRIVE (RDV)

The redrive (RDV) card connects the IOC bus and repowers the bus signals at board entry.

COMMUNICATION SCANNER PROCESSOR (CSP)

The communication scanner processor (CSP) is loaded with microcode that controls the connected lines. The microcode is loaded from the diskette during IPL. Error checking and correction are included in the CSP storage circuits.

The CSP interacts with the CCU via the IOC bus by means of:

- Program-initiated operation (PIO) to transfer commands from the CCU to the CSP.
- Adapter-initiated operation (AIO) to provide high-speed data transfer in cycle steal between the CCU and CSP storage.
- Interrupts initiated from the CSP to signal an event to the CCU. Interrupt level 1 is used for errors and level 2 for normal operation.

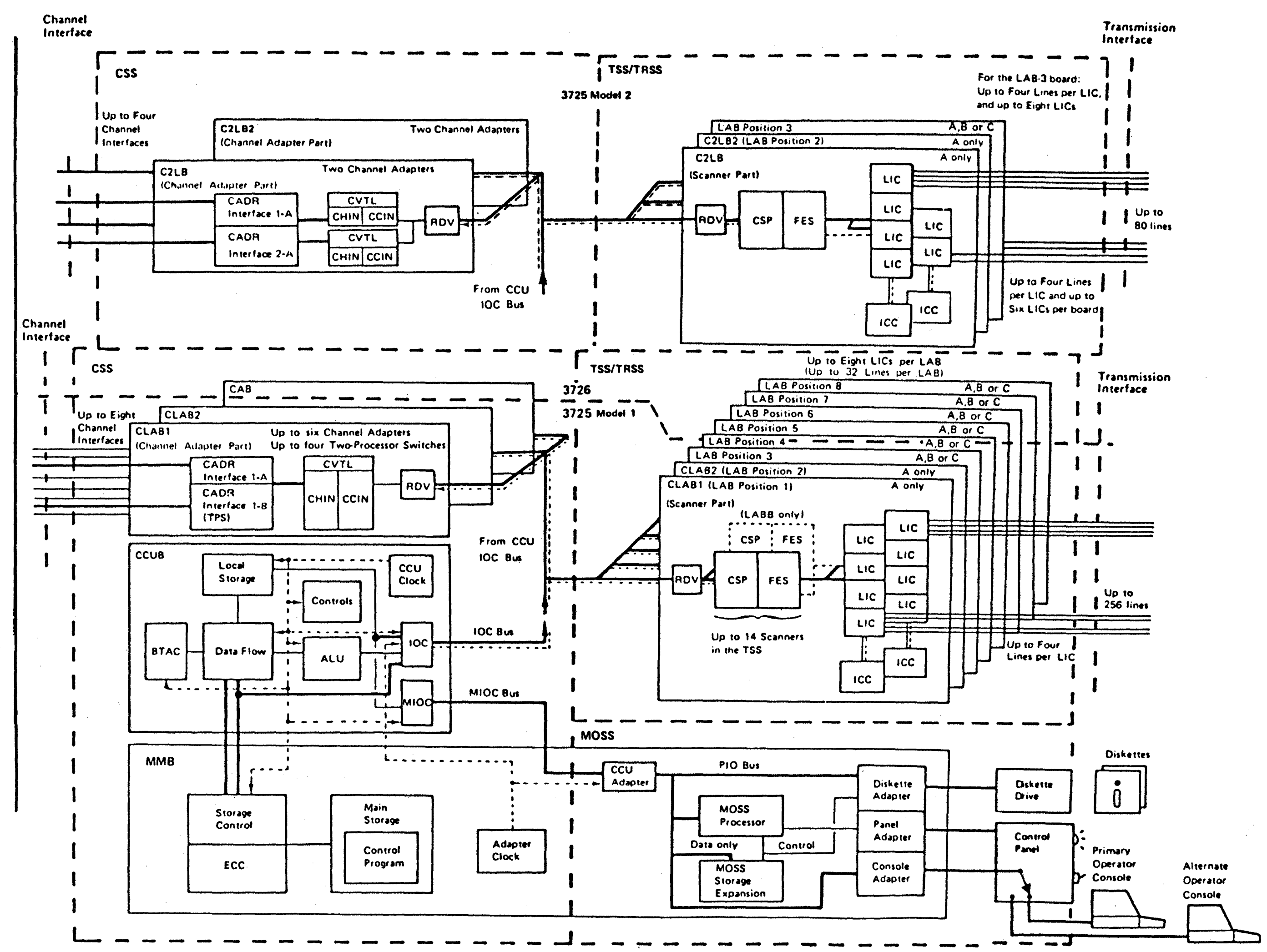
PIO and AIO are initiated by IOH/IOHI instructions.

CSP Modularity (3725/3726)

Number of CSPs per CLAB1 : 1
Number of CSPs per CLAB2 : 1
Number of CSPs per LAB type A: 1
Number of CSPs per LAB type B: 2
Number of CSPs per LAB type C: 1
Total number of CSPs : 14 maximum

CSP Modularity (3725 Model 2)

Number of CSPs per C2LB : 1
Number of CSPs per C2LB2 : 1
Number of CSPs per LAB type A: 1
Number of CSPs per LAB type B: 2
Number of CSPs per LAB type C: 1
Total number of CSPs : 4 maximum



FRONT-END SCANNER (FES)

One front-end scanner (FES) is associated with each CSP to form a 'scanner'. It consists of hardware only.

FES Modularity (3725/3726)

Number of FESs per CLAB1	:	1
Number of FESs per CLAB2	:	1
Number of FESs per LAB type A:		1
Number of FESs per LAB type B:		2
Number of FESs per LAB type C:		1
Total number of FESs	:	14 maximum

FES Modularity (3725 Model 2)

Number of FESs per C2LB	:	1
Number of FESs per C2LB2	:	1
Number of FESs per LAB type A:		1
Number of FESs per LAB type B:		2
Number of FESs per LAB type C:		1
Total number of FESs	:	4 maximum

COMMUNICATION SCANNER (CS)

Each communication scanner (CS) is made up of one CSP and one FES.

Functions

The main functions of a scanner are to:

- Provide buffers for the transmitted or received data, and control the transfers to the CCU
- Support start-stop, BSC, SDLC, autocall, and X.21 protocols
- Control the transmission interface of the controller
- Provide service facilities
- Serialize/deserialize the transmitted and received characters
- Manage the line services

Scanner and TRA Modularity (3725/3726)

The minimum controller configuration corresponds to one scanner (scanner position 1) included in CLAB1. The other scanners (scanner position 3 and scanner positions 5 through 16) are optional. Scanner positions 2 and 4 do not exist, so that the maximum number of scanners is 14.

Scanner and TRA Modularity:

Unit	Board	Scanner Position any CLAB LAB type A	Scanner Position LAB type B	LAB Type C CS	LAB Type C TRA	Lines (Max)
3725	CLAB1	1	N/A	N/A	N/A	32
	CLAB2	3	N/A	N/A	N/A	64
	LABPos3	5	5/6	5	6	96
3726	LABPos4	7	7/8	7	8	128
	LABPos5	9	9/10	9	10	160
	LABPos6	11	11/12	11	12	192
	LABPos7	13	13/14	13	14	224
	LABPos8	15	15/16	15	16	256

Scanner Modularity (3725 Model 2)

The controller configuration corresponds to one scanner (scanner position 1) included in C2LB.

Unit	Board	Scanner Position C2LB and C2LB2 LAB type A	Scanner Position LAB type B	LAB Type C CS	LAB Type C TRA	Lines (Max)
3725 Mod. 2	C2LB	1	N/A	N/A	N/A	24
	C2LB2	3	N/A	N/A	N/A	48
	LABPos3	5	5/6	5	6	80

Scanner Performance (both Models)

Depending on the protocols and transmission speeds, the scanner can handle the following number of lines:

Protocol	Speed (bps)	Number of Lines
SDLC duplex	4 800 9 600 64 000 128 000 256 000	32 16 4 2 1
SDLC half duplex	9 600 64 000 128 000	32 4 2
BSC EBCDIC	9 600 64 000	32 4
BSC ASCII	4 800 9 600 64 000	32 16 4
BSC (Character Mode)*	1 200 or less	8 half-duplex
Start-stop (Character Mode)*	300 600 1 200	32 half-duplex 20 half-duplex 8 half-duplex
Start-stop (Burst Mode)	1 200 2 400 4 800 9 600 19 200	32 half-duplex 16 half-duplex 8 half-duplex 4 half-duplex 2 half-duplex
ALC Airline Line Control	2 400 4 800 9 600 14 400 19 200	16 duplex 8 duplex 4 duplex 3 lines/per LIC 2 lines/per LIC

* After microcode EC 873051, character mode for tributary station is no longer necessary; BURST mode may be used instead.

LINE OPERATING MODES

The microcode operates the lines in normal mode, character mode, or service mode.

The operating mode is selected on a line-by-line basis and the scanner may run all three modes at the same time.

Normal Mode

The microcode normally uses this mode to transfer data using messages (several characters) in a burst.

Character Mode

This mode is similar to the operating mode of the communication scanner type 2 of the 3705 which transfers data character by character.

Burst Mode

This mode allows data transfer by bursts of up to four characters.

Service Mode

In service mode, the scanner executes the commands sent from the MOSS. The scanner may be connected to NCP or disconnected from NCP.

Transmission and Token Ring Subsystem (Part 3 of 5)

INTERNAL CLOCK CARD (ICC)

The internal clock card ICC type 1 or 2 may provide through the LICs, the clock control for internal and external clocked DTE (S/S, BSC, and SDLC protocols). At plant the speed is set to 9600 bps; and at installation time, it may be changed by the CE on a per-LIC basis.
(For details see the following diagram).

Type of Operation	Direct or Local-attached of DTE		DCE Attachement of DTE	
	Internal Clocking **	External Clocking ***	Internal Clocking **	External Clocking
Start/Stop	50 75* 100* 110 134.5 200 300 600 1200 2400* 4800* 9600* 19200* bps	2400 4800 9600 19200	50 75* 100* 110 134.5 200 300 600 1200 2400* 4800* 9600* 19200* bps	N/A
Synchronous	50 110 134.5 200 300 600 1200 bps (BSC only)	2400 4800 9600 19200 5600 245760* bps (BSC and SDLC)	50 110 134.5 200 300 600 1200 bps	N/A

* Additional speeds provided by ICC-2 card.

** The selection of the clock speeds may be done by software at generation time or by hardware (Jumper).

*** The selection of the clock speeds may be done only by hardware (Jumper).

ICC Modularity (3725/3726)

Number of LICs per ICC : 4 maximum
Number of lines per ICC : 16 maximum
Number of ICCs per LAB : 2 maximum
Number of ICCs per CLAB : 2 maximum

ICC Modularity (3725 Model 2)

(For C2LB and C2LB2 boards)
Number of LICs for two ICCs : 6 maximum
Number of lines for two ICCs:24 maximum
Number of ICCs per board : 2
(For LAB3 board)
Number of LICs per ICC : 4 maximum
Number of lines per ICC : 16 maximum
Number of ICCs per LAB : 2 maximum

LIC/ICC Compatibility

LIC Type	DTE clocking	Direct-Attached Terminal
1	Allowed with ICC (up to 19 200 bps)	Allowed with ICC (up to 19 200 bps)
2	Not allowed	Not allowed
3	Not allowed	Allowed with ICC (up to 245 760 bps)
4A	Not allowed	Allowed with ICC (up to 9600 bps)
4B	Not allowed	Allowed with ICC (up to 245760 bps)

Limitations

If the transmission speed of any of the lines connected to a scanner exceeds 9600 bps, the maximum number of LICS for that scanner is 4.

LINE INTERFACE COUPLER CARD (LIC)

One line interface card (LIC) attaches up to four lines to the controller. There are several types of LICs depending on the different transmission interfaces (see Chapter 4 for descriptions of the physical interfaces). Most types of LICs may attach either:

- A DCE (transmission line attachment), or
- A DTE (direct attachment)

LIC Weight

The weight of a LIC is a value (12 through 100) that represents the percentage of scanner occupation. The sum of the weights of all the LICs connected to a scanner must be equal to or less than 100. Several types of LIC may be mixed in the same scanner. On a LIC with several ports (line connections), the weight of the LIC is determined by the speed of the 'heaviest' line. The weights for each LIC type are given in the following tables:

Example 1:

A scanner equipped with eight LICs type 1 with weight = 12 (32 half-duplex lines at 9600 bps) has a total weight of 96.

Example 2:

A scanner equipped with two LICs type 1 with weight = 50 (eight duplex lines at 19 200 bps) has a total weight of 100.

Example 3:

A scanner equipped with one LIC type 2 with weight = 100 (one duplex line at 230 400 bps) has a weight of 100.

LIC Modularity:

Number of lines per LIC : 4 maximum
Number of LICs per LAB : 8 maximum
Number of lines per LAB : 32 maximum
Number of LICs per C2LB/C2LB2 : 6 maximum
Number of lines per CLAB/C2LB2: 24 maximum
Number of LICs per CLAB : 8 maximum
Number of lines per CLAB : 32 maximum

Speed Mixing on LIC

Terminals with different transmission speeds may be connected to the same LIC, with the following exception: if several direct-attached terminals are connected to the same LIC, their transmission speeds must be identical.

Transmission and Token Ring Subsystem (Part 4 of 5)

LIC Type 1 (LIC1)

Line interfaces : V.24 (RS-232C) and V.25 autocall (RS-366)

Transmission speed: Up to 19 200 bps

Number of lines : Up to four

Transfer mode : Half-duplex or duplex

Protocols : Start-stop, BSC, SDLC

DTE clocking : Allowed with ICC (up to 19 200 bps)

Direct attachment : Allowed with ICC (up to 19 200 bps)

LAB type : A, B, or C

Weight:

Protocol	Max Speed (bps)	Weight
Autocall	N/A	12
SDLC duplex	4 800 9 600 14 400 19 200	12 25 42 50
SDLC half-duplex	9 600 14 400 19 200	12 25 25
BSC EBCDIC	9 600 14 400 19 200	12 25 25
BSC ASCII	4 800 9 600 14 400 19 200	12 25 37 50
BSC (Character Mode)(5)	1 200	42
Start-stop (Burst Mode)	1 200 2 400 4 800 9 600 14 400 (3, 4) 19 200	12 25 50 100 100 100 (1)
Start-stop (Character Mode)*	300 600 1 200	12 18 37
ALC duplex	2 400 4 800 9 600 14 400 19 200	25 50 100 100 (2) 100 (1)

Notes:

1. Only two ports per LIC1 are used at 19 200 bp
2. Only two ports per LIC1 are used at 14 400 bp
3. Externally clocked DTEs.
4. At 14 400 bps only, two ports of the LIC type
5. After microcode EC 873051, character mode for longer necessary; BURST mode may be used inst

LIC Type 2 (LIC2)

Line interfaces : US wideband, services 5703/8803, 5701/8801, and 5751/5700

Transmission speed: Up to 230 400 bps

Number of lines : One

Transfer mode : Half-duplex or duplex

Protocols : BSC and SDLC

DTE clocking : Not allowed

Direct attachment : Not allowed

LAB type : A, B, or C

Weight:

Protocol	Max Speed (bps)	Weight
SDLC half-duplex	64 000 72 000 128 000 230 400	25 25 50 100
SDLC duplex	64 000 128 000 230 400	25 50 100
BSC EBCDIC	64 000	25
BSC ASCII	64 000	25

LIC Type 3 (LIC3)

Line interfaces : V.35 high-speed

Transmission speed: Up to 256 000 bps

Number of lines : One

Transfer mode : Half-duplex or duplex

Protocols : BSC and SDLC

DTE clocking : Not allowed

Direct attachment : Allowed with ICC (up to 245 760 bps)

LAB type : A, B, or C

Weight:

Protocol	Max Speed (bps)	Weight
SDLC half-duplex	64 000 72 000 128 000 256 000	25 25 50 100
SDLC duplex	32 000 64 000 128 000 256 000	25 25 50 100
BSC EBCDIC	64 000	25
BSC ASCII	64 000	25

LIC Type 4A (LIC4A)

Line interfaces : X.21 medium-speed

Transmission speed: Up to 9600 bps

Number of lines : Four

Transfer mode : Half-duplex or duplex

Protocol : SDLC

DTE clocking : Not allowed

Direct attachment : Allowed with ICC (up to 9600 bps)

LAB type : A, B, or C

Weight:

Protocol	Max Speed (bps)	Weight
SDLC half-duplex	9 600	12
SDLC duplex	4 800 9 600	12 25

LIC Type 4B (LIC4B)

Line interfaces : X.21 high-speed

Transmission speed: Up to 256 000 bps

Number of lines : One

Transfer mode : Half-duplex or duplex

Protocol : SDLC

DTE clocking : Not allowed

Direct attachment : Allowed with ICC (up to 245 760 bps)

LAB type : A, B, or C

Weight:

Protocol	Max Speed (bps)	Weight
SDLC half-duplex	64 000 72 000 256 000	25 25 100
SDLC duplex	64 000 256 000	25 100

Transmission and Token Ring Subsystem (Part 5 of 5)

TOKEN RING ADAPTER (TRA)

The token ring adapter (TRA) is a part of the token ring subsystem (TRSS) to support the IBM Token-Ring Network.
The NCP Token-Ring Interconnection (NTRI) program is the program running in the CCU to support the IBM Token-Ring Network.
Each TRA is made of one token ring multiplexer (TRM) card and up to 4 token ring interface coupler cards (TIC) to support up to four token ring transmission interfaces.

Functions

The main functions of the TRA are:

- Provide buffers for the command processor for the transmitted and received data.
- Serialize/deserialize the transmitted and received data.
- Control the token ring transmission to the token-ring network.
- Provide service facilities.

TRA Modularity

A TRA must be installed in a LAB type C board and share the board with one scanner.
A LAB C board may be installed in any LAB position 3 to 8.

LAB 3 to 8 organization if LAB type C installed:

```
         -------------------
        |       |  Token    |-- Up to 4
        |  TRM  |  Ring     |-- Ring
        |       |Interfaces |-- Interfaces
 IOC    |       |           |--
 -------|-------|-----------|
 Bus    |       |   Line    |-- Up to 16
        |Scanner|Interfaces |   lines
        |       |           |--
        |       |           |
         -------------------
```

Limitations

3725/3726 Model 1

A maximum of 2 TRAs may be installed, giving up to 8 token ring transmission interfaces (8 TIC cards).
One TRA may be installed in 3725 and one TRA in 3726 or 2 TRAs in 3726.

3725 Model 2

Only one TRA can be installed in a LAB C on LAB position 3 giving up to 4 token ring transmission interfaces (4 TIC cards).

Performance

No performance impact related to the number of token ring interface installed.

Characteristics

The token ring protocol is tha protocol supported (4 Mbits per second).

TOKEN RING MULTIPLEXER (TRM) CARD

Manages the interface between the IOC bus and the different TIC cards.
Converts PIO operation into MMIO operation.

TOKEN RING INTERFACE COUPLER CARD (TIC)

Each TIC card handles, with the help of in housed processor, the token ring transmission interface.

TIC Weight

No weight dependency.

TIC Type

Only one type.

Maintenance and Operator Subsystem

The MOSS contains the following main components:

- MOSS processor, storage, and microcode
- Adapters
- Diskette drive
- Control panel
- Operator console

MOSS PROCESSOR STORAGE AND MICROCODE

The MOSS processor and storage are packaged in the memory and MOSS board (MMB). The MOSS microcode is loaded from the diskette during IML.

The main functions of the MOSS are to:

- Provide the operator with functions for initialization of the controller and the line interfaces
- Support network problem determination through the host by generating alert messages to the host (NCP only) and alarm messages to the operator console, and by running diagnostics in the controller
- Maintain the controller files defining the machine configuration and parameters of the channel and line connections
- Retry automatically failing hardware or software, and re-IPL after nonrecoverable failure when possible
- Provide the CE with utility programs to dump the storages of the CCU, CSP, TIC, and MOSS.
- Provide box error handling and recording

ADAPTERS

Adapters for the CCU, diskette drive, control panel, and operator console are packaged in the MMB.

CCU ADAPTER

The CCU adapter accepts commands from the MOSS processor in PIO mode. Data is passed between the MOSS and the CCU via shared storage areas (mailboxes).

DISKETTE ADAPTER

The diskette adapter accepts commands from the MOSS processor in PIO mode and data by direct storage access.

A diskette has two sides, 77 tracks per side, 26 sectors per track, and 256 bytes per sector, making a total of 1 million bytes of storage per diskette. The data transfer rate is 62.5 kbps and the average access time is 40 ms.

Two diskettes are needed:

- Controller diskette, for normal operation
- Service diskette, for maintenance in offline mode

A copy of each diskette is included as a spare in the shipping group. Their updating is under the responsibility of the CE, except for the customer's procedures and the configuration files.

<u>Controller Diskette</u>

The controller diskette contains the following files:

1. IPL checkout procedures
2. MOSS microcode
3. Controller load/dump program
4. Scanner microcode
5. IPL ports table
6. Box error record (BER) file (CHGCIL)
7. Configuration data file (CDF)
8. Graphic configuration file (GCF)
9. Machine load table (MLT)
10. Control program (pre-cataloged and user-written) procedures
11. One dump buffer area (CHGDMP), which may contain either the MOSS microcode dump or the scanner microcode dump.
12. Line description file (LDF)
13. Port swap file
14. One dump buffer (CHGTRSS), which may contain one to four TIC dumps.

<u>Service Diskette</u>

The service diskette contains the following files:

1. Basic MOSS microcode
2. Diagnostics with the diagnostic control facility (DCF)
3. Limited set of service procedures
4. Files duplicated via the diskette swap procedure

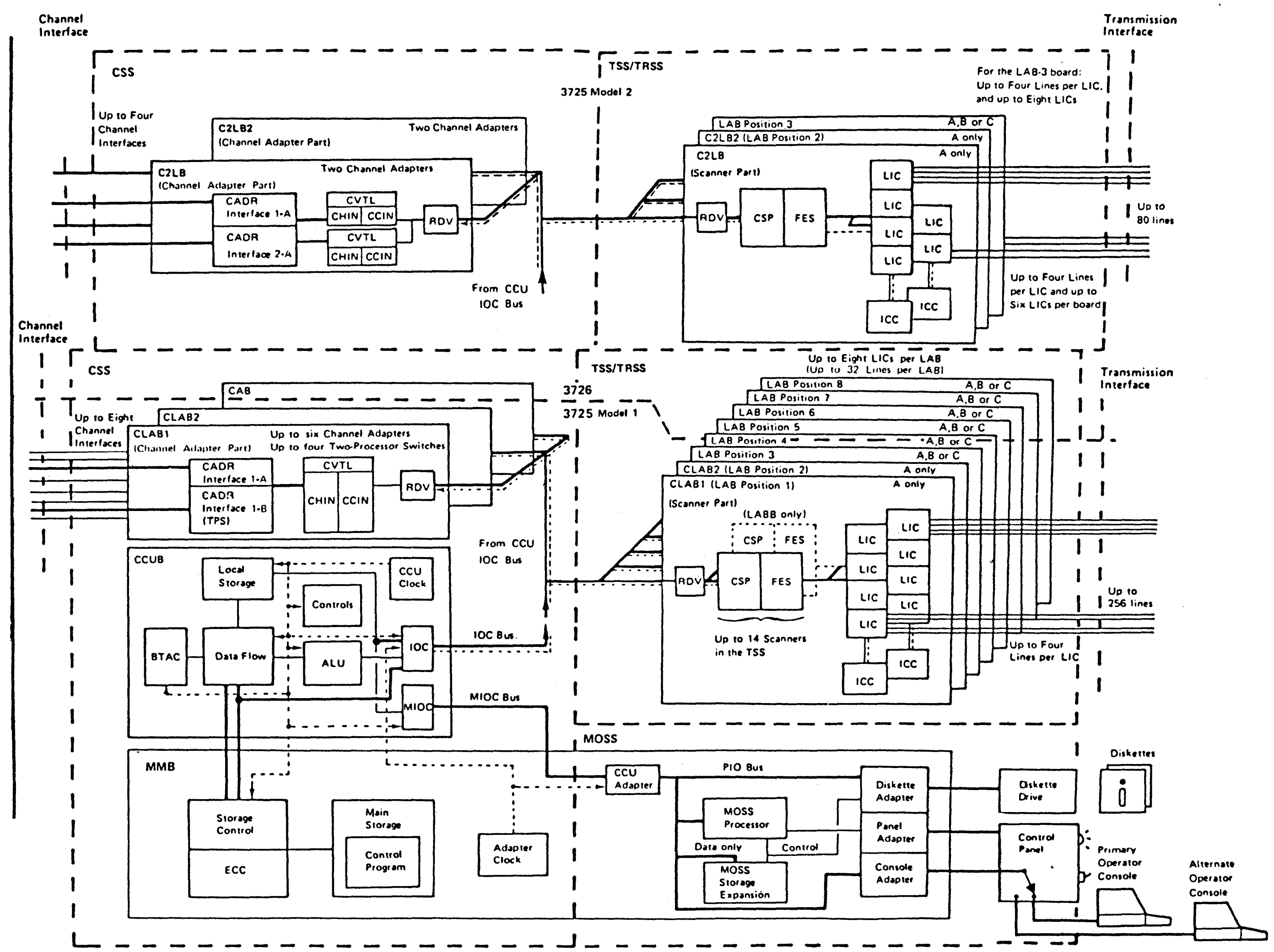
CONTROL PANEL

The control panel is located on the 3725 and contains switches and indicators for the use of the customer's operator and CE to:

- Enable and disable the channel connections
- Power on or off the controller
- Test local/remote control power
- Select the primary or alternate operator console
- IPL the controller and load the microcodes and diagnostics
- Check the controller operation
- Reset certain error conditions

OPERATOR CONSOLE

The console adapter operates in PIO mode and transmits data to the operator console in start-stop mode at 2400 bps without a modem.



Maintenance Philosophy (Part 1 of 2)

The maintenance of the 3725 is based on:

1. Error detection by hardware and software
2. Error collection by the control program and the MOSS microcode
3. Error notification to the customer through alarm and alert messages (NCP), or alarm messages (EP).
4. Problem determination by the customer at the host site and the controller site so as to call the appropriate service personnel.
5. Problem isolation by service personnel
6. FRU replacement, repair, and verification

(See illustration page 1-071.)

__Concurrent Maintenance__

Generally, the controller is not available to the customer when the diagnostics are being run, or a field replaceable unit (FRU) is being replaced. However, the controller is available to the customer when a repair is being made in the diskette drive or the operator console, or when diagnostics are being run only for testing the MOSS.

This mode of operation is called concurrent maintenance.

__Repair Action in Case of Solid Error__

A failing FRU may be indicated by the following error information:

- Repair action codes (RACs) given by the offline diagnostics on the operator console
- Error codes given by the IPL checkout programs on the control panel hexadecimal display
- Error information given on the CE indicator card

Any error indication points to a list of suspected FRUs and replacement procedures in the MIM Part 2.

__Box Error Record (BER) Description__

The BER is a record generated by NCP or the MOSS. It is logged on a MOSS error file which is used to identify all error occurrences in the 3725. (See page 2-170 for more details).

__Tentative Repair Action (Intermittent Error)__

An intermittent error is not confirmed by the diagnostics. BER analysis may identify suspected FRUs. Should the same error appear, the flag byte determines the meaning of the BER and the status of the problem that caused the BER.

__Additional BER Information__

- BER handling: MIM Part 1, Chapter 2 pages 2-170 to 2-342.
- BER Control Blocks:
  - __ACF for NCP/EP for 3725, Reference Summary and Data Areas__ (NCP Handbook), LY30-3070 section 2.
- CE actions based on BERs (usage): MIM Part 2, START entry.
- FRUs pointed by BERs: MIM Part 2, Chapter R5
- Extended Toubleshooting using BERs: MIM Part 1, starting whith page 2-800.
- Aids for BERs: MIM Part 1, page 3-030
- BER File printout at Host: __3725 Problem Determination and Extended Services,__ GA33-0014, Chapter 5, and __ACF for NCP/SSP for 3725, Diagnosis Guide,__ SC30-3181.

__No FRU Isolated__

Errors not isolated by the maintenance package, and design errors on hardware, microcode, or diagnostics are handled on site with the assistance of the support structure.

Maintenance Philosophy (Part 2 of 2)

Error Detection on 3725/3726 Site

Sequence:

1. The control program in the 3725 controller and the MOSS microcode gather error information for problem determination, problem isolation, and FRU replacement.

3725/3726 Internal Error (Box Error)

Hardware, control program, or microcode

NCP gathers:
- CA level 1 errors
- CSP level 1, 2 errors
- Unresolved level 1, 2, 3, 4 software error

MOSS gathers:
- Other errors

RECMS with equipment check for line related errors (NCP only)

NCP/EP and MOSS microcode build RECFMS and BER

1. A BER is generated by NCP or MOSS
2. Time and date are stamped by MOSS (if NCP) or sequencially numbered by MOSS (if EP)
3. BER is stored in the BER file on diskette

Box Error Record

Header	Error Data

MOSS Diskette Files: BER File

or MOSS storage if diskette failure

Alert/Alarm messages based on BER are generated by MOSS

Alert (NCP only) — The Alert is time and date stamped, and indicates the affected element and recommended customer action. Message exchange if CNM: RECFMS00, RECFMS05

Alarm — 3727 Console; MOSS message light on panel

Error in 3725/3726 Attached Network

Line, Station, Modem

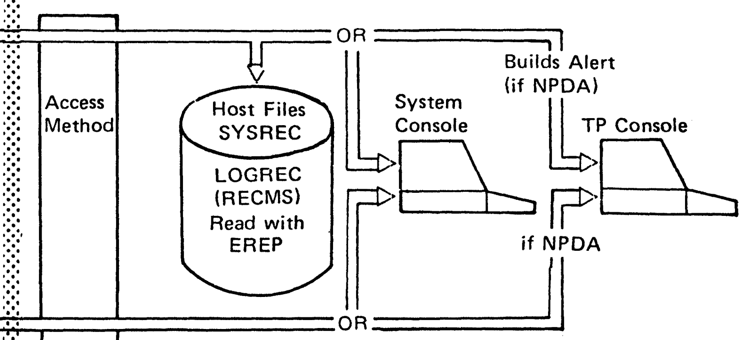
NCP builds RECMS

Contents:
- Unresolved interrupts and program checks
- Solid SNA link/station errors
- SNA statistics
- BSC/SS station statistics and line errors

2. The error information is sent to the MOSS and RECMS (if any) is sent to the host.

3. The customer is notified of the error through alarm on the 3725 controller, and alert messages on the host if NCP is loaded in the 3725.

Error Reporting Path to Host



Note: No Alert is sent to the access method when EP is running in a 3725 controller. EP works the same way in a 3725 controller as in any other 370X controller.

Problem Determination on 3725/3726 Site

4. The customer uses the host system console and message manual, the host NPDA guide (if CNM environment), and the trace information to determine the failing area. If the controller is suspected, the customer may perform further problem determination.

The customer uses the 3725 facilities:
- 3725 Operating Guide
- MOSS functions available from the console

Problem determination ends when the customer identifies
- Failing Software: Customer calls appropriate software support
- Failing hardware, including control codes: Customer calls 3725/3726 support for problem isolation
- Other failures such as DCEs, OEM machines, user errors: Customer calls appropriate service personnel

Problem Isolation on 3725/3726 Site

5. The CE identifies the failing element (FRU) inside the controller by:
   . Using the customer error information
   . Following the procedures in 3725/3726 MIM Part 2
   . Running diagnostic programs
   . Analyzing the recorded BERs
   . Using maintenance aids and tools

   If the problem appears to be in the micro code or control program, the MIM Part 2 indicates the appropriate action
6. The identified FRU is replaced and, if necessary, repaired, and verification is performed.

Chapter 2. Service Procedures

Section 1. Functions

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3725 Console Functions

The following tables:

1. List the functions that the user can select via the CCU function key, or from one of the three primary menus.
2. Indicate in which manual the function is described:
   a. This manual (page number), or
   b. 3725 Problem Determination and Extended Services (Vol. A06), referred to as "PD and ES" in the tables
   c. 3725 Diagnostic Descriptions (Vol. A05), referred to as "Diag" in the tables

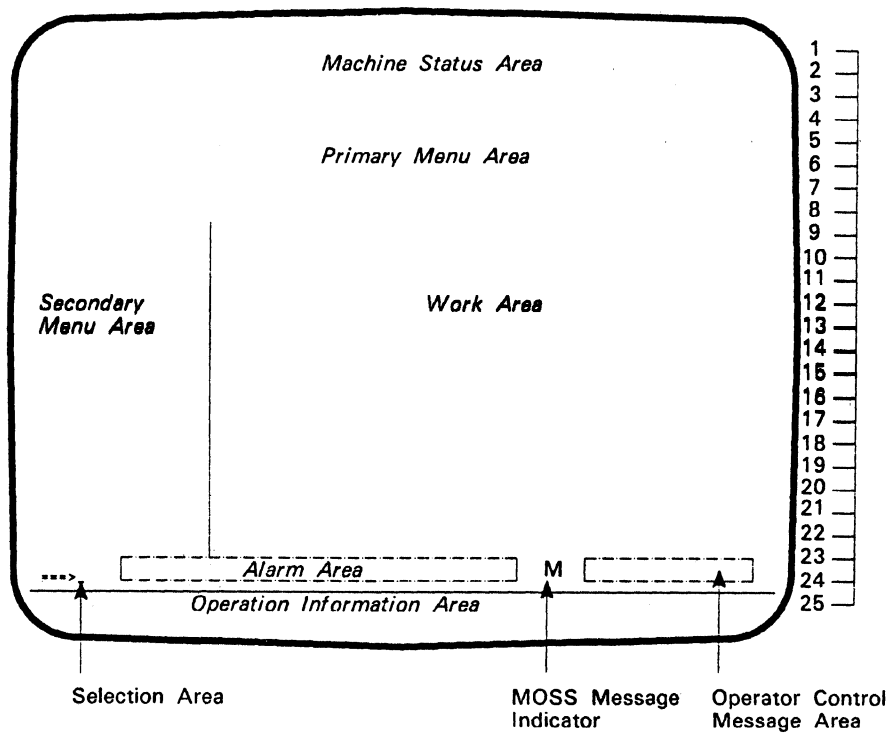
Primary Menu Functions	Diskettes	Described In
CCU Functions (CCU FNCTN)		
Address Compare	Both	PD and ES
Branch Trace	Both	PD and ES
Display/Alter	Both	PD and ES
Display Long	Both	PD and ES
System Control	Both	PD and ES
Data Exchange	Both	PD and ES
AC/BT Parameters	Both	PD and ES
Cancel AC	Both	PD and ES
Cancel BT	Both	PD and ES
CA Status/Registers	Both	PD and ES
Reset CCU/LSSD	Both	2-360
IPL CCU/TSS (==> I)		
One Scanner IML	Controller	2-365
3725 IPL	Controller	2-365
Link Test Requester	Controller	PD and ES
Link Test Responder	Controller	PD and ES
Line Functions (==> L)		
Wrap Test (Modem, Cable)	Controller	PD and ES
Wrap Test (Tailgate)	Controller	2-048
Line Interface Display	Controller	PD and ES
(Stand-Alone) Link Test	Controller	PD and ES
Port Swap File	Controller	PD and ES
Line Description File	Controller	PD and ES
Token Ring INTF	Controller	PD and ES
Error log (==> E)	Both	2-170
GCF/IPL Ports (==> P)	Controller	PD and ES
Control pgm proc (==> C)		
Directory	Controller	PD and ES
Display	Controller	PD and ES
Create/Copy	Controller	PD and ES
Erase	Controller	PD and ES
Modify	Controller	PD and ES
Execute	Controller	PD and ES
Catalog	Controller	PD and ES

Primary Menu Functions	Diskettes	Described In
TSS Functions (==> S)		
Select/Release	Controller	2-371
Dump/IML	Controller	2-371
Mode Control	Controller	2-372
Display/Alter Storage	Controller	2-373
Display/Alter Block	Controller	2-375
Display/Alter LSR	Controller	2-376
Display/Alter X Reg	Controller	2-376
Address Compare	Controller	2-377
Checkpoint Trace	Controller	2-378
TRSS FNCTN (==> R)	Controller	2-380
Select	Controller	2-380
Connect/Disc	Controller	2-380
TRM Registers	Controller	2-381
TIC Interrupt Register	Controller	2-382
Display TIC Storage	Controller	2-383
Dump	Controller	2-384
Display SCB, SSB	Controller	2-385
Display parameters block	Controller	2-385
TIC error status	Controller	2-386
Diagnostics (==> D)	Service	Diag
Utility Programs (==> U)		
Dump Display/Delete	Both	2-391
MOSS Store Display	Both	2-392
Module Display	Both	2-392
ZAP	Both	2-394
CDF	Both	2-400
MLT	Both	2-407
Diskette Swap	Both	2-408
Immediate Functions		
CCU Stop (==> SP)	Both	PD and ES
CCU Start (==> ST)	Both	PD and ES
CCU Reset (==> RT)	Both	PD and ES
Date/Time (==> Q)	Both	PD and ES
Terminate (==> T)	Both	PD and ES

Screen Layouts

BASIC LAYOUT

The operator console has a screen capacity of 2000 characters, organized in 25 rows of 80 characters. These 25 rows are divided into eight areas, each being reserved for specific information and actions.



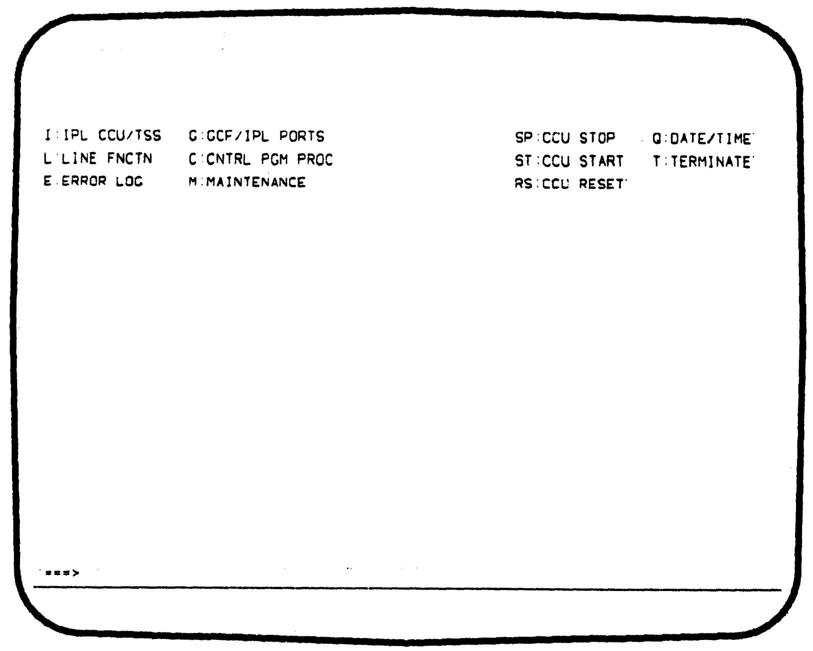
For 3727 operation information, see description in the 3727 Reference and Problem Analysis Guide, GA33-0015, inserted at the back of the console keyboard.

Warning: Before operating the console switch, you must properly terminate (enter T) any operation on the selected console.

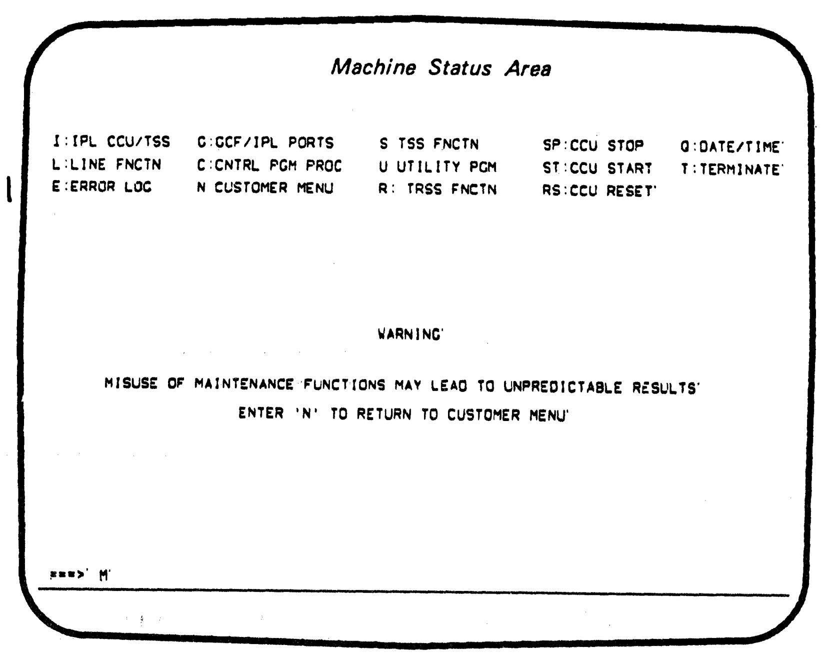
CONTROLLER DISKETTE - TWO PRIMARY MENUS

These are the menus available for normal and maintenance operations on the 3725 by the customer.

Customer Primary Menu



Maintenance Primary Menu

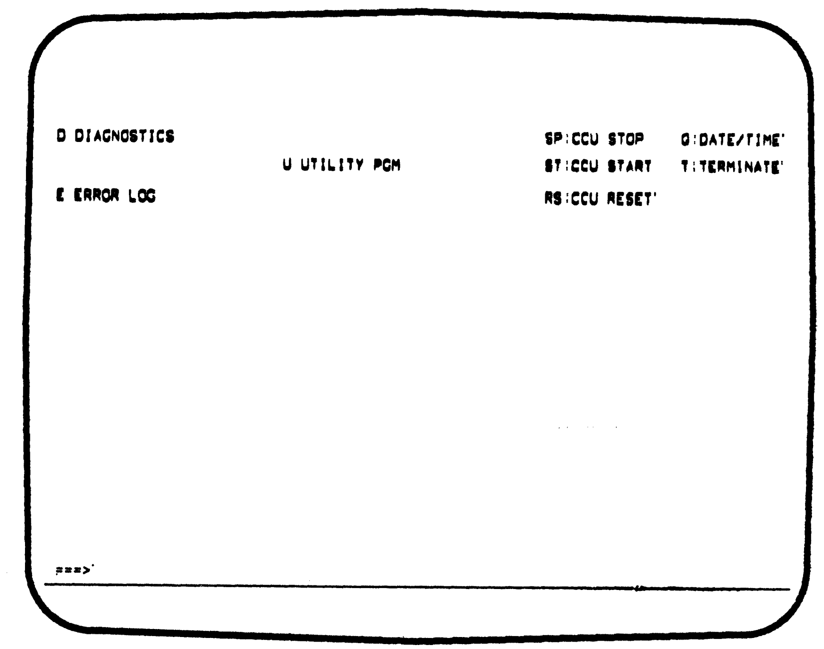


SERVICE DISKETTE - ONE PRIMARY MENU

This menu is available for maintenance operations on the 3725.

The service diskette must be mounted. The maintenance files from the controller diskette must be copied as required to the service diskette before use (see "Diskette Swap" on page 2-408). The maintenance files consist of the BER file, the 3725/3726 configuration data file (CDF), and the machine load table (MLT).

When and how to substitute diskettes is described in the MIM Part 2 (Vol. A01).



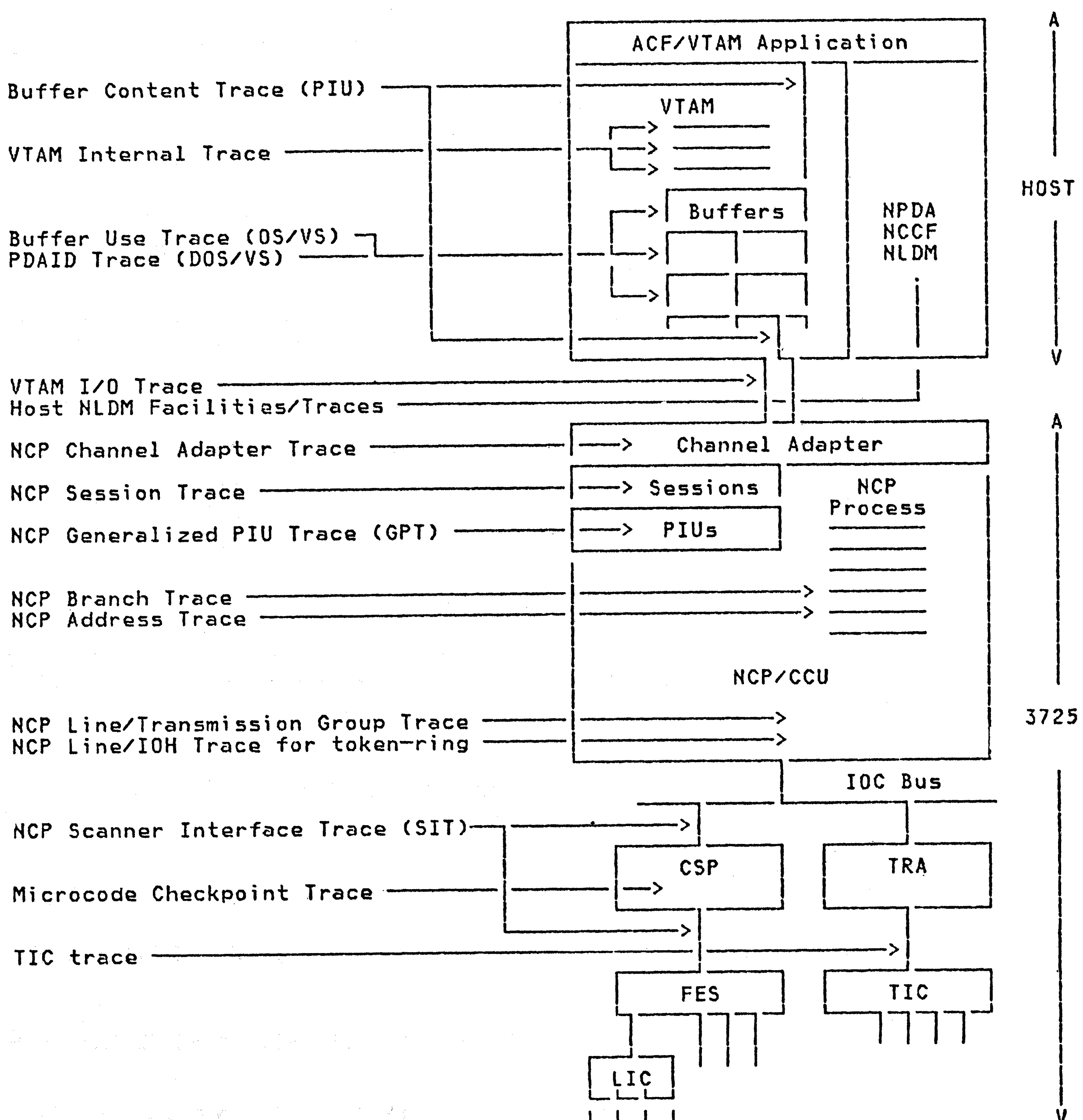
Host Traces (Part 1 of 3)

This section gives a general overview of tracing on the 3725 to help the CE select the type of trace applicable to a specific problem. It is not intended to give a detailed explanation of tracing.

Note: The 3725 does not affect BTAM operation.

HOST TRACES IN AN ACF/VTAM ENVIRONMENT

ACF/VTAM Environment



Buffer Content Trace

The buffer content trace shows what is passing back and forth at two points within ACF/VTAM itself. One of the points is just inside ACF/VTAM code near the application program interface (API); the other point is internally within the ACF/VTAM code. The user data portion (RU) of buffer content trace records written from these two points should be identical for the same PIU, since ACF/VTAM does not modify user data which it handles.

The OS/VS VTAM buffer trace records up to 212 bytes of data (224 bytes for DOS) from VTAM buffers during the transmission of an inbound or outbound message to a locally-attached device or NCP. The VTAM buffer trace includes the transmission header (TH), and the request/response header (RH). VTAM adds 32 bytes of header information to the OS and DOS trace data records. GTF adds up to 12 bytes of header information to OS/VTAM trace data records.

Because the buffer content trace shows contents of the PIU, this trace is sometimes called the PIU trace.

VTAM Internal Trace

The internal trace can be used to trace various kinds of internal activity within ACF/VTAM. This trace can be helpful if you suspect that ACF/VTAM is malfunctioning.

Buffer Use Trace

The OS/VS ACF/VTAM buffer use trace contains information about the 11 user-defined ACF/VTAM buffer pools. This trace is useful to help 'tune' an ACF/VTAM system for optimum number of buffer pools.

The DOS/VS PDAID trace can be used to trace a number of internal functions, but its main use, so far as ACF/VTAM is concerned, is to provide statistics on ACF/VTAM buffer use. Although the PDAID trace is functionally different from the OS/VS buffer use trace, it provides similar information on buffer-pool use.

VTAM I/O Trace

The I/O trace shows what is passing back and forth between ACF/VTAM and NCP.

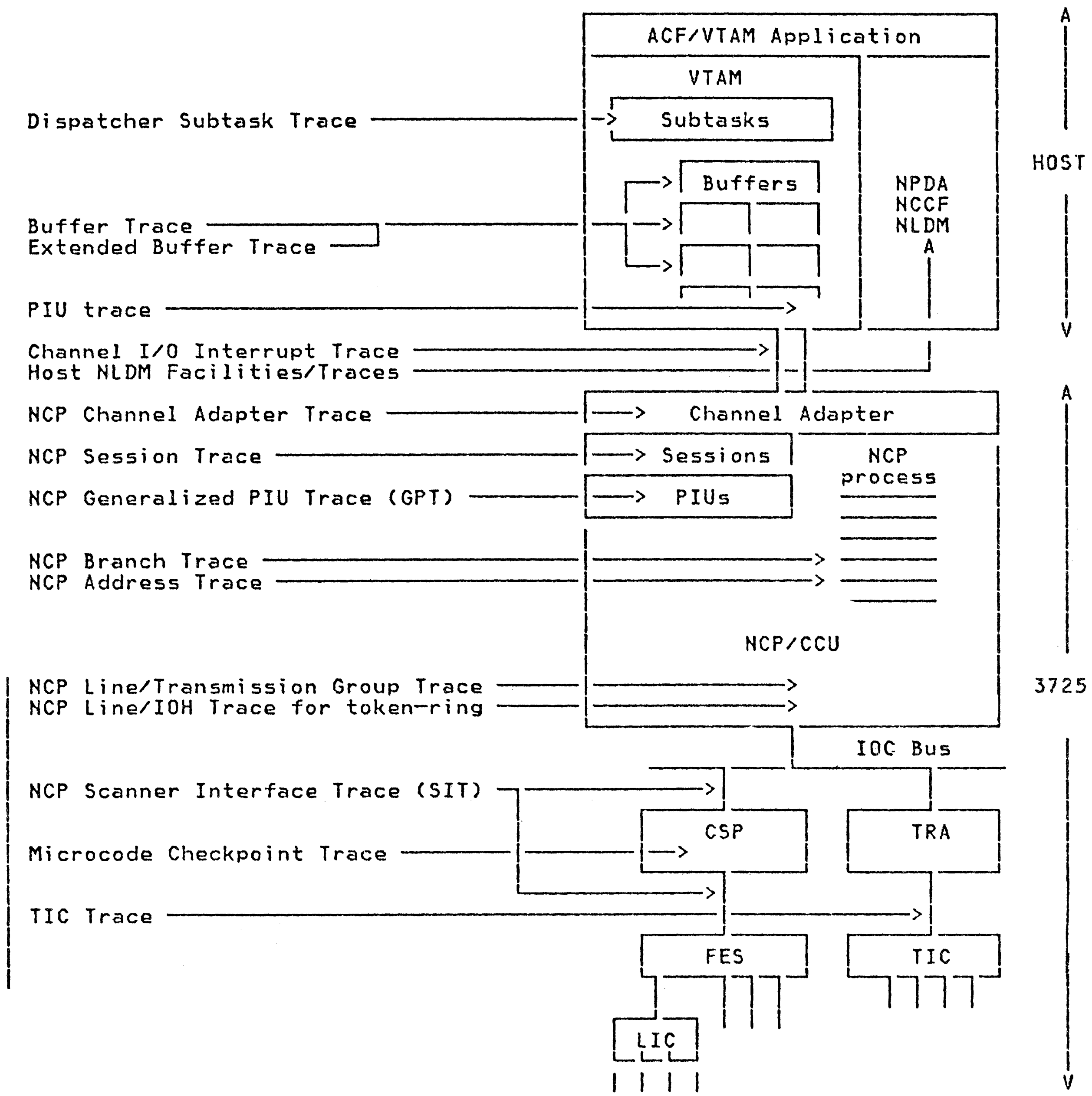
The OS/VS VTAM I/O trace (RNIO) and DOS/VS I/O trace (IO) (part of PDAIDs) record up to 20 bytes of data during the transmission of an inbound or outbound message to NCP. This data includes the transmission header (TH), request/response header (RH), and a variable portion of the request/response unit (RU). OS/VTAM does not add any header information to the RNIO trace; however, ACF/TAP creates a 32-byte header for it. GTF adds up to 36 bytes of header information to the RNIO trace. DOS/VTAM adds a 32-byte header to the IO trace. RNIO or IO trace is similar to a short buffer trace in content if user data is being transmitted and received. However, certain control sequences that do not appear in VTAM buffer traces may appear in RNIO or IO traces.

You use the RNIO or IO trace to determine if the SNA sequences between VTAM and NCP are correct. Because the RNIO or IO trace is abbreviated, you save trace file space by using it instead of the VTAM buffer trace.

Host Traces (Part 2 of 3)

HOST TRACES IN AN ACF/VTAM ENVIRONMENT

ACF/TCAM Environment



Dispatcher Subtask Trace

The dispatcher subtask trace keeps a sequential record in main storage of the subtasks activated by the ACF/TCAM dispatcher.

Buffer and Extended Buffer Trace

- Buffer trace provides a record of ACF/TCAM buffer contents before processing.
- Extended buffer trace allows a user to request a buffer trace entry during processing.

PIU Trace

PIU traces record 38 bytes of information passing in either direction between TCAM and NCP. This information includes indexes to the terminal name table for the destination name and source name, transmission header (TH), request/response header (RH), and the first 15 bytes of the request/response unit (RU). The RU portion of the PIU trace is padded with hexadecimal zeros if necessary to fill out the 15 bytes. TCAM adds a 4-byte header to the PIU trace data containing the source and destination terminal-name table indexes. ACF/TAP does not convert the indexes to trace-name table information for the PIU trace record.

Channel I/O Interrupt Trace

The channel I/O interrupt trace sequentially records the I/O interruptions that occur on a specified non-NCP line or on a channel to a 3725 working under NCP. Optionally, the user may specify that the trace be activated when an I/O error occurs on a line or on an NCP channel. ACF/TCAM stores information about the interruption, including the channel status word (CSW), channel command words (CCWs) and data transferred, as an entry in the channel I/O interrupt trace table. A maximum of 50 emulated subchannels and native channels can be traced at a time.

Host Traces (Part 3 of 3)

HOST TRACES (ENVIRONMENT-INDEPENDENT)

Host NLDM Trace

The Network Logical Data Manager (NLDM) executes on operating systems and access methods supported by NCCF Release 2 and NPDA Release 2E. NCCF Release 2 and NPDA Release 2E are prerequisite for NLDM.

NLDM is an IBM licensed program for the continuous collection of session-related data. It has functions for monitoring session activity and completing problem determination of errors which, typically, manifest themselves as a 'hung' terminal session.

NLDM establishes session awareness in an NCCF application. The control and data flows between NLDM and the access methods provide the session knowledge to accommodate network enhancements in the areas of connectivity, configuration, performance, accounting, and problem determination. NLDM is structured to facilitate the addition of network functions that relate to sessions.

NLDM provides an interactive session trace capability that captures access method PIUs and selected NCP control information about a session. NLDM can be compared to existing TRACE capabilities in the same way that NPDA can be compared to EREP. Both NLDM and NPDA take a traditional batch, offline function and provide an interactive structured facility based on a logical subset of large amounts of data.

The capturing of session data by NLDM allows for continuous capture if desired by the user. The user must be able to turn ON/OFF data capture by session type and/or session name. To provide efficient data capture, NLDM maintains active session wrap areas in virtual storage. Upon session termination the virtual storage wrap areas is migrated to VSAM data base for history. The size of the wrap areas and the amount of history is specified by the user.

NLDM collects session information from two sources: the access method (VTAM or TCAM), and the boundary (NCP).

The functions provided by NLDM are oriented to the CE and the system programmer. These functions correlate and format internal session-related data and require SNA level expertise for full understanding.

NLDM provides information on:

- Activation and deactivation of session trace
- Session name lists
- Most recent sessions
- Session connectivity
- Bind
- Access method PIU trace data

  A formatted PIU trace is provided for all supported sessions. Each PIU entry includes the transmission header (TH), the request/response header (RH), and the first 11 bytes of the request unit (RU). PIU sequence numbers (last four) from the NCP (see description of session trace in NLDM documentation) are correlated with the PIUs from the access methods.

- NCP control block data

  Selected fields from NCP control blocks accompany the last four sequence numbers sent to NLDM by the NCP for a specific session. These fields are interpreted and formatted for display to the user (see "NCP Session Trace" on page 2-033).

- Hex display of access method PIUs

  At times it may be necessary for the CE or systems programmer to view the actual hex representation of the captured PIUs. This facility is available for each of the session types supported.

NCP Traces (Channel Adapter, Session,GPT, and Branch)

NCP CHANNEL ADAPTER TRACE

The channel adapter trace is an optional debugging aid that stores certain fields from the channel control block into a trace table. A maximum of 256 trace entries can be specified at SYSGEN time.

The channel adapter trace can be activated or deactivated from the 3727 console using the CCU functions (see 3725 Problem Determination and Extended Services Vol. A06).

The trace table can be examined in a storage dump or by using the CCU display facilities at the MOSS console (3727). For details of control blocks and tables, refer to ACF/NCP Program Reference Handbook.

Any combination of up to six channels can be traced.

NCP SESSION TRACE

NCP continuously captures the last sequence/reference numbers sent to and from a boundary node resource. When the session ends, if session trace is enabled for the resource, the sequence/reference number plus additional information from control blocks of the NCP are sent unsolicited to the access method CNMI where the Network Logical Data Manager (See NLDM) formats and displays this information.

NCP session trace is totally independent of any other NCP trace facilities, including the generalized PIU trace function added to the NCP fo this release.

Session trace can be activated and deactivated via a REQMS RU from any host that is the owner of the NCP. The PIU sequence/reference number capturing for support of the session trace function will operate continuously after the NCP is loaded and initialized. Storage for saving of sequence/reference numbers is allocated for each resource when the NCP is generated.

NCP provides the session trace NLDM function of capturing, continuously, PIU sequence numbers flowing to or from each SNA boundary node resource (LUs and PUs) for each SSCP-NCP session. For pre-SNA boundary node resources, unique reference numbers and the FIO PIUs are captured continuously.

Both numbers for each resource are sent to the NLDM application using a solicited/unsolicited RECFMS type 04 RU. Unsolicited RECFMSs are sent at session termination, (LU-LU, SSCP-PU), but not for SSCP-NCP PU sessions), for SNA resources and only when an abnormal or error condition is detected for pre-SNA resources.

Solicited RECFMSs are sent to NLDM when an REQMS type 4 is received for a specific resource.

Trace can be activated for the following resources:

- NCP physical services (PU)
- SDLC type 1 and 2 physical units (PUs)
- SDLC logical units (LUs)
- Start-stop devices (DVBs)

Any type of resource not included in the above list is not eligible for trace activation. The following are examples of noneligible resources:

- All NEO programmed resources
- SDLC links
- Start-stop links
- BSC links
- SDLC type 4 stations

NCP GENERALIZED PIU TRACE (GPT)

Overview

The generalized PIU trace facility allows the network operator to select a network addressable resource for the NCP to trace. NCP traces all header and limited data sent between the boundary function and the virtual routing function of the NCP. Trace records are sent from the NCP to the SNA access method for logging and later formatting by ACF/TAP.

Tracing Outbound PIUs

Each PIU is traced in its FID4 format immediately before the NCP delivers the PIU to the connection point manager (CPM) of the resource. The presence of the PIU in the trace data guarantees that the PIU was successfully received by the NCP, passed all explicit and virtual routing requirements, and was destined for a known boundary node resource. It does not guarantee that the PIU was actually sent on a data link control functions.

Tracing Inbound PIUs

Each PIU is traced in its FID4 format after the boundary node has delivered the PIU to the virtual routing component. 'Inbound' here means 'to the virtual route function', not necessarily from the resource being traced. For example, an activate physical request to a PU type 1 resource is turned around by the NCP boundary node and is not actually delivered to the device. This activate physical request is traced in the outbound flow, and the response is traced in the inbound flow.

Limitations

The number of bytes traced varies depending on resource type. The number of bytes traced is listed below and includes the FID4 header.

Resource Type	Number of Bytes Traced
SNA Boundary node LU	40 (TH + RH + 11 bytes of RU)
SNA Boundary node PU	40 (TH + RH + 11 bytes of RU)
BSC 3270 display	44 (TH + RH + 15 bytes of RU)
BSC 3270 controller	44 (TH + RH + 15 bytes of RU)
NCP PU	40 (TH + RH + 15 bytes of RU)
NEO Programmed PU	40 (TH + RH + 11 bytes of RU)
NEO Programmed LU	40 (TH + RH + 11 bytes of RU)

The maximum number of resources that can be traced simultaneously is limited by buffer and cycle utilizations considerations. The NCP always accepts a request to activate GPT (assuming validity checks are passed) even when performance is degraded.

NCP BRANCH TRACE

The mechanism of the branch trace facility allows the CCU to record, in a predefined buffer, the non-sequential operations occurring in the flow of the CCU control program. When a branch occurs in the CCU, the 'come from' and 'go to' addresses are stored in the buffer as well as the corresponding 'come from' and 'go to' program level.

The branch trace buffer can be displayed on the MOSS console (3727) or dumped to the host.

The branch trace is started from the 3727 console (see 3725 Problem Determination and Extended Services Vol. A06).

This trace is more specifically oriented to software activities. However, it can be used by the CE for problem determination or isolation activities.

NCP Traces (Address, Line, and Transmission Group)

NCP ADDRESS TRACE

Address trace is a service aid that records the contents of selected areas of controller storage and selected external registers at each successive interrupt. Certain types of interrupts, or all interrupts, can be recorded. The network control program records the trace data in a trace table in control storage. When the desired data has been recorded, the contents of the trace table can be displayed on the console. For details of control blocks and tables, refer to ACF/NCP Program Reference Handbook. The contents of controller storage can be transferred to the host processor via the Dump program and the contents of the trace table examined in the listing of the dump.

The address trace facility allows the user to select any combination of up to four external registers, general registers, and storage halfwords whose contents are to be recorded each time data is loaded from or stored into a specified storage address at a specified program level.

Address trace is activated or deactivated from the 3727 console for the user specified storage address or external register, using the control program procedures (see 3725 Problem Determination and Extended Services Vol. A06).

NCP LINE TRACE

At the boundary between the CCU and the CSP, the NCP parameter and status information (PSA) as well as line data are placed into line trace buffers by NCP. This information is then transferred to the host where ACF/TAP retrieves and prints it (see ACF/TAP User's Guide, SC30-3115).

A new parameter added to the NCP line trace specifies the amount of data that is to be traced per I/O operation. This parameter can indicate that all data is to be recorded, or that zero to 254 bytes per I/O operation can be traced.

X'FF' indicates all data to be traced.

Note: For starting or ending trace, see ACF/NCP/SSP for the IBM 3725 Diagnosis Guide, SC30-3181.

EP LINE TRACE

The line trace facility of the emulation program is a service aid that permits detailed analysis of the operation of any telecommunication line controlled by the program. This facility records operating parameters of a line each time a level 2 or level 3 interrupt occurs for that line. The program accumulates this information in a trace table within the controller storage. The line trace records can be examined in a storage dump or by using the CCU display facilities at the 3727 console.

The line trace facility does not interfere with normal operation of the telecommunication line. Performance may be diminished somewhat because of the additional processing needed each time a character service interrupt occurs for the line or lines being traced. The amount of decrease in performance depends on how heavily the communication controller is currently loaded. Inclusion of the line trace facility has no effect on performance except when a line is being traced.

Line trace is started or stopped by the host Dynadump utility or by the MOSS/CCU data exchange procedure (CCU services). The 'option' statement of the Dynadump allows the CE to request an EP line trace (with or without data), or a scanner interface trace (with or withut data), or both.

A maximum of 16 SIT traces can run concurrently. There is no limit to the number of EP line traces that can be run. In a PEP system, EP can run 16 SIT traces in addition to the eight traces that can run in NCP.

NCP TRANSMISSION GROUP TRACE

The line trace with the transmission group (TG) option provides the facility to trace all SNA-dependent information, such as: SNA headers, SNA requests, and SNA responses, as they enter and leave an NCP on a cross-domain link. The facility includes the transportation of the traced data to an SNA 4. SSCP (TCAM/VTAM) and the formatting and printing of the traced data at the host by ACF/TAP.

In the NCP, this facility is a special case of the existing line trace facility and as such the TG trace is tightly coupled to a cross-domain link. Activation and deactivation are requested by referencing one and only one of the links in the TG to be traced. Both the TG PIU trace for all links in the TG, and the line trace for the referenced link in the TG, are activated. Additional links in the TG may be line traced in the present mode of activation. The TG trace continues as long as the line trace on the referenced line continues and the line is not removed from the TG.

NTRI TRACES

NCP/Token-Ring Interconnection program (NTRI) provides the user with three traces: Line trace, IOH trace and TIC trace. The trace function records activity on a designated physical link. The information is then transferred to the host, where ACF/TAP retrieves and prints it (see ACF/TAP User's Guide, SC30-3115 for details). It is used later to isolate a problem into the NTRI or TRM/TIC area. An NTRI link is a high-speed line and one line may be traced at a time. The trace function is supported only for physical links.

LINE AND IOH TRACE.

The traced IOHs are the ones dedicated to a TIC and the ones dedicated to the TRM that control this TIC. The IOHs are traced into an IOH trace area and then reported to the host by the line trace process. The IOH trace is activated/deactivated with the line trace.

TIC INTERNAL TRACE.

TIC internal trace data are transferred to NTRI as MAC frames. To start/stop TIC internal trace, NTRI sends a new SCB command. Line trace and IOH trace run together and are activated/deactivated from the host or by the NTRI normal services in case of a slowdown.

ACTIVATION OF TRACES

In NCP three types of trace can be activated: Line trace, Scanner trace and internal trace (including TG). Line trace and IOH trace are activated at the same time, that is, started with the same PIU. NTRI has to activate two traces: Line/IOH trace and TIC internal trace. They are mapped as follows:

- Line and IOH traces are activated by ACTTRACE RU with type=LINE.
- TIC internal is activated by ACTTRACE RU with type=SIT.
- A negative return code is answered on ACTTRACE of TG.

ACF/TAP EDITING AND RU FORMATS

The data of the different traces are transferred to the host using RECTRD PIUs. ACF/TAP receives the LINE and IOH trace records in the following format:

GTF HDR	VTAM HDR	RECTRD RU	Line/IOH element	. . .	Line/IOH element

ACF/TAP receives the TIC internal records in the following format:

GTF HDR	VTAM HDR	RECTRD RU	TIC intern element	. . .	TIC intern element

Each record has a GTF header, followed by a VTAM header, followed by a RECTRD RU, followed by a number of TIC internal trace, line and IOH elements. NTRI is only concerned about the RECTRD RU header, and the line/IOH elements, and the TIC internal trace elements.

(See ACF/NCP/SSP for the 3725 Diagnosis Guide, SC30-3181).

TRACE OBJECTIVES

The NCP scanner interface trace (SIT) objectives are:

- Problem determination between 3725 hardware and NCP/EP software
- Problem isolation in the transmission subsystem and IOC areas (CSP and its microcode, FES, LIC, IOC bus).

This trace allows you to get, for each line interface, data and parameter information from both sides of the CSP.

Between FES and CSP, the values traced are transferred data and FES status.

Between CSP and CCU, the IOH, parameters, and status of each scanner command are traced. The NCP/EP line trace provides a correlation between both traces when they are run concurrently.

The trace information is as follows:

- To and from the control program: IOH, parameter and status
- From the FES: data

The trace information is transferred from the CSP to the CCU by cycle steal. It is stored in the host in the same data set as the NCP/EP line trace for later retrieval, formatting, and printing using ACF/TAP or Dynadump (EP).

In addition to the NCP/EP record types, new trace record types have been defined for the SIT.

A new parameter added to the access method line trace command in the host starts the scanner interface trace alone or together with the NCP line trace. Additionally, it is possible to specify in a parameter of this command the number of data bytes to be traced for each message.

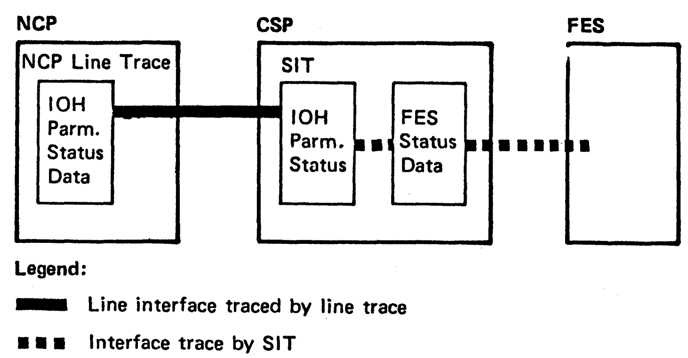
In an EP environment, the starting and stopping of the SIT is done using the host Dynadump facility in a similar way to the EP line trace, or using MOSS/CCU data exchange procedure. The Dynadump formats the trace records so that they are accepted as input to ACF/TAP.

The OPTION statement of the Dynadump allows the CE to request a SIT trace (with or without data), an EP line trace (with or without data), or both.

<u>Note:</u> For starting or ending trace, see <u>ACF/NCP/SSP for the IBM 3725 Diagnosis Guide,</u> SC30-3181.

<u>Using NCP SIT with NCP Line Trace:</u> NCP V2 R1 has two types of traces for isolating telecommunication line problems: scanner interface trace (SIT) and line trace. A maximum of eight traces can be active at one time (these can be any combination of SIT and line traces). Both traces are started from the host. This requires an additional indicator on the activate trace and deactivate trace RUs to specify SIT. The amount of data to be traced by line trace and SIT per I/O operation may be specified by the SSCP in the ACTRACE PIU.

The line trace is a trace of the control program/CSP boundary as seen by the control program. The scanner interface trace is a trace of the control program/CSP/FES boundaries as seen by the CSP. SIT recording is a new function in NCP V2 R1.



<u>Correlating Line Trace and SIT:</u> When it is necessary to run both line trace and SIT concurrently, the trace correlation count (TCC) in the parameter zone of the NCP parameter status area (PSA) can be used to correlate the line trace entry for an IOH operation with the SIT entry for that operation.

The TCC is used in the parameter zone of the PSA when line trace is in progress for a telecommunication line. Each time the NCP to CSP (IOH command) or CSP to NCP transfer completes, NCP line trace captures the parameter zone, then increments the TCC by 1. The trace reader can then use the TCCs to match line trace entries with the corresponding SIT entries.

TRACE LIMITATIONS

For SDLC lines the limitations are as follows:

- Up to 9600 bps, 4 interfaces per scanner
- Above 9600 bps, 2 interfaces per scanner
- Up to 16 interfaces for the whole TSS (eight concurrent traces). This limit, imposed by the NCP, is shared between the NCP line trace and the SIT.

The following table shows the scanner performance possibilities when the SIT is running. The additional checkpoint trace does not modify the results. The values are indicative and do not stand as specifications for the performances.

Protocol and	Maximum Number of Lines		
Line Speeds	No Trace	Trace Activity	
(bps)	Activity	Lines Being Traced	Other Lines
SDLC FDX			
2 400	32	2	30
4 800	32	2	27
9 600	16	2	11
14 400	10	2	5
19 200	8	1	5
19 200	8	2	3
57 600	2	1	0
64 000	2	1	0
256 000	1	1*	0
SDLC HDX BSC			
2 400	32	2	30
4 800	32	2	30
9 600	32	2	27
14 400	20	2	16
19 200	16	2	11
57 600	4	1	2
64 000	4	1	1
256 000	1	1*	0
Start-Stop			
2 400	16	2	12
4 800	8	2	4
9 600	4	1	2
14 400	2	1	1
19 200	2	1	0
ALC FDX			
2 400	16	2	14
4 800	8	2	6
9 600	4	1	3
14 400	3	1	1
19 200	2	1	0

* In the case of high-speed lines, the traced data is limited to 40 bytes per SDLC frame.

<u>High-Speed Trace Limitations for NCP/SIT</u>

The following tables show the maximum number of lines which can be active during a trace, based on the following assumptions:

- Duplex lines
- 50% utilization
- 40-byte trace records
- 70% maximum CCU and I/O bus utilization
- Speed: 256 kbps for each line (one line per scanner)
- Using NCP V2-R1

<u>Note:</u> The following figures are indicative only.

<u>2000-Byte Blocks (PIUs)</u>

	No Trace	LT	SIT	LT/SIT
No trace	7	N/A	N/A	N/A
One line traced	N/A	7	7	7
All lines traced	N/A	6	6	5

<u>500-Byte Blocks (PIUs)</u>

	No Trace	LT	SIT	LT/SIT
No trace	4	N/A	N/A	N/A
One line traced	N/A	3	3	3
All lines traced	N/A	2	3	2

<u>Note:</u> Performance analysis shows that one 256-kbps duplex line or two half-duplex lines may be traced with full data on the NCP line trace. This condition may require other lines to be disconnected in the controller.

NCP SIT (Part 2 of 4)

NCP SIT RECORD UNITS

The trace information is stored in the CCU buffer areas. Every IOH or IOHI instruction processed for the interface being traced causes a trace record unit (TRU) to be stored. Each TRU contains the IOH/IOHI, the parameter area of the PSA, the data (if any) as exchanged between the scanner and the line interface, and the status area of the PSA, in that order. If checkpoint trace has not been deactivated from the MOSS, checkpoint data, comprising the interface control block (ICB) control and status information, is also stored.

The scanner moves the trace data into the current buffer (or buffer chain) until it is completely filled. TRU recording may be continued by providing a new buffer (or buffer chain) via a second trace command.

TRU Formats

The TRU field formats are as follows:

IOH/IOHI Field

Byte 0 contains the character 'I' identifying an IOH/IOHI field.

Bytes 1 and 2 contain the byte count (always 5).

Byte 3 contains an X'00' pad byte.

Bytes 4 and 5 contain the first halfword of the IOH/IOHI instruction.

Bytes 6 and 7 contain the second halfword of the IOH/IOHI instruction.

Parameter Field

Byte 0 contains the character 'P' identifying a parameter field.

Bytes 1 and 2 contain the data count (equal to 16 for a normal command or 6 for a 370X emulation command).

Byte 3 contains an X'00' pad byte.

Bytes 4 through 19 (normal mode) or 4 through 9 (emulation mode) contain the parameter area of the PSA.

Data Field

Byte 0 contains the character 'R' for received data, or 'X' for transmitted data.

Bytes 1 and 2 contain the data count (depends on the length of the data burst).

Byte 3 contains an X'00' pad byte.

Bytes 4 through 'n' contain the data burst. The data burst is a maximum of 8 bytes long, rounded to the next even (halfword) count. The true burst count may be found in the FES status.

The remaining bytes contain the scanner status.

Status Field

Byte 0 contains the character 'S' identifying a status field.

Bytes 1 and 2 contain the data count (equal to 12 for a normal command or 6 for an emulation command).

Byte 3 contains an X'00' pad byte.

Bytes 4 through 15 (normal mode) or 4 through 9 (emulation mode) contain the status area of the PSA.

Checkpoint Data Field

Byte 0 contains the character 'C' identifying a checkpoint data field.

Bytes 1 and 2 contain the byte count (always 5).

Byte 3 contains an X'00' pad byte.

Bytes 4 and 5 contain the scanner microcode checkpoint entry address.

Byte 6 contains the ICB status byte.

Byte 7 contains the ICB control byte.

Overrun Field

Byte 0 contains one of the characters 'I', 'P', 'R', 'X', 'S', or 'C' identifying the type of TRU that the scanner was trying to store when the overrun occurred.

Bytes 1 and 2 contain the byte count (always 0).

Byte 3 contains an X'00' pad byte.

Notes:

1. The first 4 bytes of every field contain a 1-byte field identifier, a 2-byte count of the data contained in each field, and a pad character to round out the header field to 4 bytes.
2. The data count field specified in the TPSA is reinitialized each time there is a turnaround on the line, or a new SDLC frame is transmitted or received.

SIT Trace Records

Record Identifiers

Identifiers (ID) added to SIT help to differentiate between records.

ID		
I	IOH	(SIT)
R/X	Data	(SIT)
P	Param Area	(SIT)

(See page 2-040 for field explanation.)

Note: To find the actual format of an edited SIT, or the description of the PSA field, refer to ACF/NCP and SSP Diagnosis Guide, Chapter 6.

LINE CHARACTER TRACE

SDLC (Normal Mode)

During reception, the non-flag characters, the CRC characters, and the first ending flag are available in the data bursts. The leading flags before the first non-flag character are deleted by the FES.

During transmission, all the flags, the non-flag characters, and the pads are in the traced burst. The CRC characters are built by the FES and not available in the burst.

BSC (Normal Mode)

During reception, the following characters are not available in the burst because they are deleted by the FES:

- The phase SYN characters and all the following SYNs up to a non-SYN character
- All the SYN characters when in control mode or in normal text
- All the DLE-SYN characters and the first DLE of a DLE-DLE sequence when in transparent text mode
- The BCC characters

Note: The EIB (if requested) is built by the FES and inserted in the brust after an ITB character.

During transmission, all the SYN and control characters, the data, and the pads are available in the traced burst. The following are not traced because built by the FES:

- The SYN-SYN or DLE-SYN sequence generated every second
- The continuous SYN or DLE-SYN sequences generated when underrun occurs
- The BCC characters

BSC (Character Mode)

During reception, all the received characters are available in the parameter-status (PSA) except the phase SYN-SYN sequence.

During transmission, all the transmitted characters are available in the PSA except the SYN-SYN or DLE-SYN sequence generated when an underrun occurs.

Start-Stop (Character Mode)

All the received and transmitted characters are traced in the PSA. The start and stop bits are not available because they are deleted and inserted respectively by the FES.

LINE ERROR TRACE

The following tables gives the traced line errors.

1. The first column list the line error types.
2. The second column shows the errors recorded in the FES status associated to the burst.
3. The third column shows the errors that are recorded in the extended interrupt register (EIRR). The EIRR is not traced.
4. The last column shows how the error is recorded in the traced NCP/EP command status.

SDLC

Type of Line Error	Recorded in FES Status	Recorded in EIRR	Recorded in the Command Status as:
Extra bits inserted or deleted in flag streams	Yes		CRC check or receive text timeout (receive only)
Extra bits inserted or deleted in data streams	Yes		Flag off boundary, abort (receive only), or idle
Change in bit values	Yes		CRC check (receive only)
Line broken	Yes		Idle or abort (receive only)
Other side aborted	Yes		Abort (receive only)
Modem errors	Yes	Yes	Modem check and LCS
Hardware error in CSP, FES, LIC, or ICC		Yes	Internal box error and LCS
Nothing received after turn around			Timeout and LCS (receive only)

BSC

Type of Line Error	Recorded in FES Status	Recorded in EIRR	Recorded in the Command Status as:
Extra bits inserted or deleted in control mode		Yes	Timeout (receive only)
Extra bits inserted or deleted in text mode	Yes		CRC check (receive only)
No SYN received at least every one second and for no more than 3 seconds		Yes	Timeout (receive only)
Line broken			Timeout (receive only)
Modem errors	Yes	Yes	Modem check and LCS
Hardware error in CSP, FES, LIC, or ICC		Yes	Internal box error and LCS
Nothing received after turn around			Timeout and LCS (receive only)

NCP SIT (Part 4 of 4)

Start-Stop

Type of Line Error	Recorded in FES Status	Recorded in EIRR	Recorded in the Command Status as:
Invalid stop bit	Yes		Stop bit check (receive only)
Extra bits inserted or deleted	Yes		Stop bit check (receive only)
Line broken	Yes		Stop bit check and all zero characters if a line break generates a conti¬nous space (receive only)
Receive line break (at¬tention) during trans¬mission		Yes	Line break (receive only)

Microcode Checkpoint Trace

TRACE OBJECTIVES

To improve problem isolation between hardware and the scanner microcode, a checkpoint trace is provided within the scanner.

It traces predefined checkpoint addresses in the scanner microcode, when the instructions at these addresses are executed, and records predefined data. The trace output is inserted between the scanner interface trace fields, and therefore follows the SIT process.

The checkpoint trace is always ready to start at the same time as the SIT trace. If you want to stop the checkpoint trace use the TSS function , selection 9 (see page 2-378). From a user point of view (transfer to the host and printing/aditing) this could be considered as a subset of the SIT.

You must correlate the trace output with the functional flowchart of each operation provided with the documentation. Any discrepancy in the microcode address sequencing points to a microcode anomaly, allowing you to take the appropriate corrective action.

SCANNER MICROCODE SEQUENCE OF OPERATION

Using the CPT trace records only and the address look-up tables. You may identify the sequence of operations that took place for a specific command.

The address look-up table that follows is an example. It lists all the microcode modules with their storage addresses for SDLC Receive and Receive Monitor commands.

ADDRESS LOOK-UP TABLE

SDLC Receive or Receive Monitor Command			
Storage Address*	Symbolic Name of Module	Process/Description	Number of Occurrences
'D1B7'	CHHCBR00	Receive or receive monitor command handling	1
'D1FC'	CHHEBA01	Prepare and cycle steal IOH parameters from CCU	1
'D24F'	CHHCBR04	Receive 1st data	0, 1
'A82F'	CHHCSEND	Ending Status (LVL 3)	1
'A8C8'	CHHCSCCU	Start CS Status to CCU (Request LVL 2 to CCU)	1
'D1B7'	CHHCBR13	Receive continue command handling	1
'D407'	CHHEBR14	Prepare and cycle steal parameters from CCU	1
'A82F'	CHHCSEND	Ending Status (LVL 3)	1
'A8C8'	CHHCSCCU	Start CS Status to CCU (Request LVL 2 to CCU)	1

* Addresses may change with the scanner microcode level

These addresses are only provided as an example. (Charts of correct operations are found in the MIM Part 2, Chapter R6.)

MICROCODE CHECKPOINT TRACE RECORDS

An identifier (C) indicates the data pertaining to the checkpoint trace within the SIT.
The IOH (SIT record) indicates the executed command, and the Address 1 (CPT record) gives the scanner storage address of the module that starts this execution of the command. Then Address 2 (CPT record) indicates the address of the second module in sequence, and so on.

ID			
I	IOH (SIT)	<--	ex. SDLC Receive or Receive Monitor Card
C	Address 1 (CPT)	<--	D1B7 (CHNCBR00 Module)
R/X	Data (SIT)	<--	Data SIT record
P	Parm area (SIT)	<--	Parameters SIT record
C	Address 2 (CPT)	<--	D1FC (CHHEBA01 Module)

V
Until end of Trace

CPT Record Contents

C	ADDR = D6AC

Bytes 0 1 2 3	Byte 4	Byte 5	Byte 6	Byte 7
			....	XXXX4567
C	Address		Status	Control
Identifier	Checkpoint entry address		ICB status (Note 1)	ICB control (Note 2)

Notes:

1. For ICB status and control information, see page 13-554.

2. If a hardware/microcode error occurs, bits 4, 5, 6, and 7 indicate the type of error. Otherwise, the status bits are all zero.

Trace Summary

TRACE COMPARISON

	Line Trace	Scanner Interface Trace	Checkpoint Trace
Goal	Check communication line functions	Check scanner functions in correlation with NCP/EP line trace	Problem isolation between the scanner microcode and scanner hardware
Method	Trace data and control information in CCU	Trace data and control information for each IOH	Internal trace of key entry points for each IOH
Limitations	1 line at a time for EP; 8 lines at a time for NCP	Max 4 interfaces up to 9600 bps. Max 2 interfaces up to 256 kbps (see note)	Max 4 interfaces up to 9600 bps. Max 2 interfaces up to 256 kbps (see note)
Customer Impact	In line mode (performance impact)	In line mode (performance impact)	In line mode (performance impact)
Start-Stop	Host (NCP/EP) or 3727 console for EP	Host (NCP/EP) or 3727 console for EP	Host (with SIT) Option select from MOSS
Output	Host	Host	Host
Hard Copy	Yes	Yes (ACF/TAP)	Yes (SIT imbedded)
Doc Support		Access method for operation. ACF/TAP Dynadump for output	MIM Part 1 MIM Part 2
Contents	IOH Data Parameter A Status A	IOH TCC CCU Parm/Status FES Status Data	CSP Address ICB Control ICB Status

Note: At 256 kbps, control information is fully traced, but data is traced only for 40 bytes.

COMMUNICATION FUNCTION TRACES

The following table summarizes the available traces for 3725 communication functions in which the 3725 might be involved.

Trace Type	Called by	Output Returned via	Users
Applications	Host	Host	Customer
VTAM/TCAM			Customer or CE
Buffer	Host	ACF/TAP	Customer or CE
I/O	Host	ACF/TAP	Customer or CE
PIU	Host	ACF/TAP	Customer or CE
Internal	Host	VTAM/TCAM dump	Customer or CE
NLDM	Host	NLDM	Customer or CE
EP Line	Host/ MOSS (*)	Dynadump	Customer or CE
			Customer or CE
NCP Line	Host	ACF/TAP	Customer or CE
NCP TG	Host	ACF/TAP	Customer or CE
NCP gen.PIU	Host	ACF/TAP	Customer or CE
NCP session	Host	NLDM	Customer or CE
NCP CA	MOSS (*)	NCP dump	Customer or CE
NCP address	MOSS (*)	NCP dump	Customer or CE
Branch	MOSS	MOSS console	Customer or CE
SIT	Host	ACF/TAP/Dynadump	Customer or CE
Checkpoint	Host/ MOSS	ACF/TAP/Dynadump	CE

* Called via CCU services, or as control program procedures

More detailed accounts of host/control program tracing can be found in the following IBM publications:

- ACF/VTAM OS/VS Debugging Guide, SY27-8006
- ACF/VTAM VSE Diagnosis Guide, SY38-3020
- DOS/VSE Serviceability Aids and Debugging Procedures, GC33-5380
- ACF/VTAM DOS/VS Debugging Guide, GC27-0021
- ACF/VTAM DOS/VSE Diagnostic Techniques, SY38-3020
- ACF/VTAM OS/VS Diagnostic Techniques, SY38-3029
- OS/VS2 MVS/VTAM Debugging Guide, GC27-0023
- ACF/TCAM Diagnosis, SC30-3137
- ACF/NCP Diagnosis Guide for the IBM 3725, SC30-3228
- NCP/TCAM Network User's Guide, GC30-3009
- NLDM Diagnosis, GC30-3166

LOGREC DISPLAY WITH EREP

The environmental recording, editing, and printing program (EREP) edits and prints statistical error records that have been stored on the LOGREC file of the recorder file (SYSREC) by the recovery management support recorder (RMSR).

Note: EREP is not available on System/370 Models 115 and 125 that do not support RMSR. For ACF/VTAM, EREP records permanent errors on the channels that connect local 3270 devices or communication controllers. It also maintains miscellaneous data recorder (MDR) records from communication controllers, These contain error information for lines or logical units connected to the controller.

For the 3725/3726 communication controller, the objective of EREP is to read LOGREC for RECMS with equipment check for line-related errors. (See "Maintenance Philosophy" page 1-070).

For information on how and when to run EREP, refer to OS/VS Environmental Recording, Editing, and Printing (EREP) Program, GC28-0772.

FILE TRANSFER TO THE HOST

For information concerning how, when, and which files to transfer to the host, refer to page 2-450 and to the 3725 Problem Determination and Extended Services (Vol. A06).

Wrap Tests Controlled from the Host

The following figure shows the different wrap test possibilities on the communication link, with the progression of testing procedures from the TSS or TRSS to the terminal.

The wrap tests controlled from the MOSS are shown for comparison on page 2-046.

WRAP TEST AT TAILGATE LEVEL

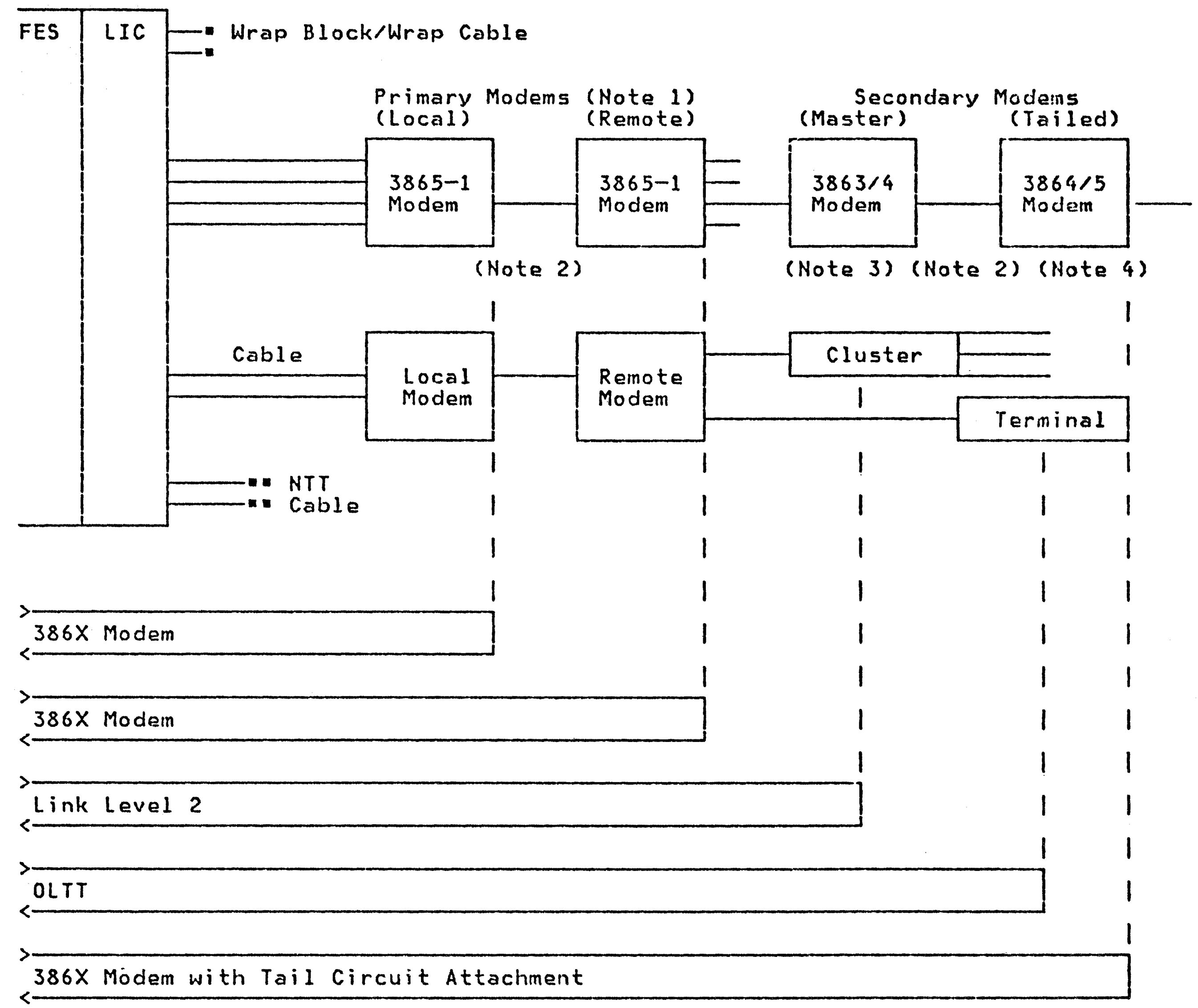
The wrap test at the tailgate level, referred to as "Wrap Block/Wrap Cable" in the figure at right, is available in maintenance mode only. (See page 2-048 for details.)

MODEM OR NTT CABLE

The wrap tests at modem or NTT cable level are part of the line functions and are described in the <u>3725 Problem Determination and Extended Services</u> (Vol. A06).

<u>Notes:</u>

1. The primary modems are 3865 Model 1 modems equipped with the data multiplexing feature.
2. The telecommunication line is a 4-wire nonswitched line.
3. The master secondary modem is a 3863 or 3864 Model 1 equipped with the tail circuit attachment accessory. This device allows the recognition of the "raise TC" pattern to which the primary modems are transparent.
4. The tailed secondary modem is a 3864 or 3865.



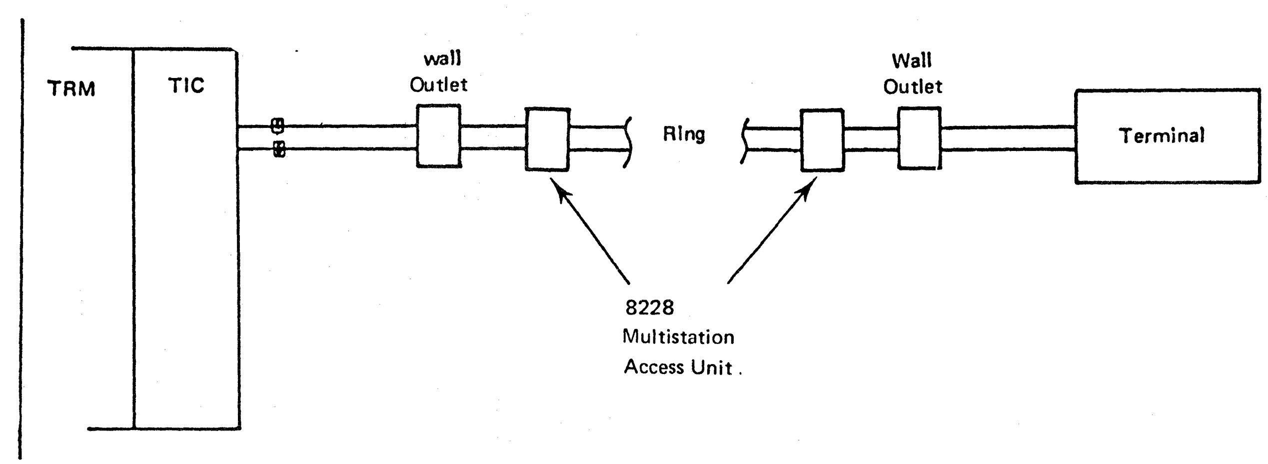
TOKEN-RING WRAP TESTS:

Using NCP/TRI

Under NCP/TRI a wrap test is performed at each TIC open command processing as a first step before inserting itself into the ring. The TIC internal lobe media test, tests the ring up to and including the local IBM 8228 Multistation Access Unit or equivalent (the 8228 is a wiring concentrator). Also its tests the ring up to the point were it is unplugged before the 8228. (I.E. At the tailgate, at the wall connector, etc.) The lobe media test is only invoked on the open command and is not performed as a result of the reset or initialisation commands. Note that a disconnected cable during the lobe media test will cause a lobe wire fault check to appear in both the display token-ring status function (See page 2-386) and the ring status field (field E) of the token-ring interconnect function (See the Problem Determination and Extended Service Guide, GA33-0014, under token-ring interconnect function.) When a lobe wire fault is detected the TIC will be frozen and the status will remain unchanged until the next open is issued.

Using TRSS diagnostics

Using the TRSS diagnostic routine TG0I, a wrap test is also performed up to and including the 8228 or up to the point at which the ring is unplugged before the 8228. (See 3725 Diagnostic Description, SY33-2027, Vol A05). However, no open command are issued by the diagnostic routine so a lobe wire fault will not be detected.



Wrap Tests Controlled from the MOSS

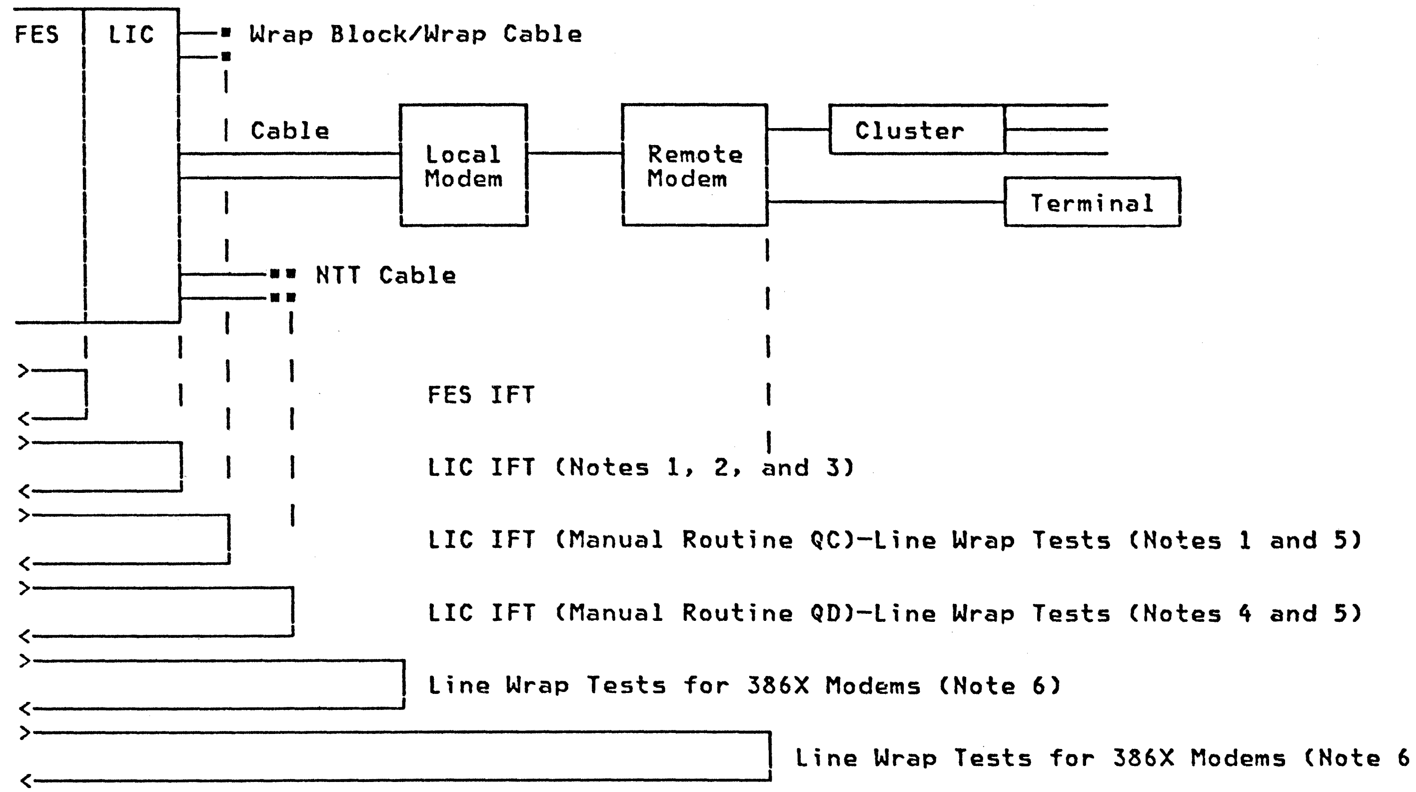
The wrap tests controlled from the MOSS are shown on this page only to compare them with the wrap tests controlled from the host (see page 2-044).

WRAP TEST AT TAILGATE LEVEL

The wrap test at the tailgate level, referred to as, "Wrap Block/Wrap Cable" in the figure at right, is available in maintenance mode only. (See page 2-048 for details.)

MODEM OR NTT CABLE

The wrap tests at modem or NTT cable level are part of the line functions and are described in the 3725 Problem Determination and Extended Services (Vol. A06).



Notes:

1. A line position can be plugged with a line cable, or be without a line cable, or can be plugged with a wrap block (LIC type 1, 2, 4A, or 4B), or with a wrap cable (LIC type 3). The CDF for each line must be updated accordingly when running the diagnostics.

   When the TSS IFTs are run, the hardware for a selected line is:

   a. Tested up to the LIC drivers if the line cable is present.

   b. Tested up to the LIC and ICC (if present) card level for a line without cable.

   c. Fully tested if a wrap block or a wrap cable is present on the selected line. Plugging a wrap block or wrap cable and updating the CDF automatically selects the manual intervention section QC.

2. During LIC wrap mode operation, the transmit data line and the control lines are not deactivated at the modem interface.

3. Although this is not a user-activated test, an "echo-check" mechanism (inline) checks the transmitted data in wrap mode (refer to "LIC Driver Check", page 13-261).

4. For selection of the NTT manual intervention routine QD, refer to 3725 Diagnostic Descriptions, SY33-2027 (Vol. A05).

5. In these wrap modes, the clocking is taken from the 480-Hz clock. Therefore, an error such as an overrun, detected at the operational speed, might not occur at the above testing speed.

6. If the cable is NTT with the connector switch set to "operate", the test indicator (TI) signal is not forwarded to the connected modem, so that the received pattern differs from the expected one.

Wrap Test at Tailgate Level

This wrap test level is available with the line functions (select 1) in maintenance mode only.

The tailgate level is a third option that you can select at wrap test initialization. It is run in a similar way to that for modem level or cable level. These are described in detail in the 3725 Problem Determination and Extended Services (Vol. A06). The following only gives additional information specific to tailgate level, and makes reference to the above manual.

WRAP TEST INITIALIZATION SCREEN

In Maintenance mode, the initialization screen offers three wrap level options:

1: MODEM
2: NTT CABLE
3: TAILGATE

CONTROL LEAD WRAP TEST PATTERN SELECTION SCREEN

A default pattern is available with all LIC types for the tailgate level wrap (whereas with LIC type 1 it is available only for modem or NTT cable level wrap). These default patterns are as follows:

LIC type 1:

```
TRANSMIT PATTERN:  11111011  10000011
EXPECTED PATTERN:  11111011  10100011
```

LIC type 2:

```
TRANSMIT PATTERN:  11101011  10000011
EXPECTED PATTERN:  11110011  10100011
```

LIC type 3:

```
TRANSMIT PATTERN:  11101011  10000011
EXPECTED PATTERN:  11011011  10000011
```

LIC type 4:

```
TRANSMIT PATTERN:  11000011  10000011
EXPECTED PATTERN:  01000011  00000011
```

If you prefer to create your own pattern (instead of using the above default patterns) as proposed by option 3 of the pattern selection screen, you should refer to the 3725 Problem Determination and Extended Services for control lead bit definitions. This manual also gives the bit meanings for the above default patterns.

WRAP TEST START SCREEN

This screen gives the actions to be taken before the test is started. These depend on the level option you selected at wrap test initialization.

With the option TAILGATE, the prompt on the screen is:

- PLUG APPROPRIATE WRAP FACILITY AT TAILGATE, THEN PRESS SEND TO START THE WRAP

The wrap facility requires one of the following CE tools (refer to Chapter 3 for details):

- Wrap block, part 1733977, for LIC types 1, 2, 4A, and 4B
- Wrap cable, part 1733979, for LIC type 3

Alarm/Alert List

ALARMS

When the operator console is powered on:

- You are informed that an alarm is generated by an audible alarm and by the MOSS Message lamp on the control panel.
- When an alarm is already displayed, you are informed that another one is waiting for display by the alarm indicator (an M on line 24).

When the operator console is powered off, you are informed that an alarm is waiting for display by the MOSS Message lamp on the control panel. Power on the operator console and the alarm will appear on line 24 of the screen.

Alarms are also recorded in the BER file. You can display them using the error log function, described in Chapter 2.

The alarm appears on line 24 and remains until you display the next one by pressing MSG. Up to five alarms may be stacked. If a sixth one is generated, it is stacked but the oldest one is erased.

Pressing MSG when no alarms are waiting clears the alarm area.

3725 ALARM MESSAGES		
A0	MOSS IML EXCEPTION xxx yyy zzz	hhmmss
A2	MOSS RECOVERABLE ERROR, TRANSFER DUMP	hhmmss
A3	DISKETTE DOWN, DO NOT ATTEMPT TO IPL	hhmmss
A4	DISKETTE MEDIA ERROR	hhmmss
A6	MOSS OFFLINE, ALERT SENT	hhmmss
A7	HARDWARE ERROR, 3725 RE-IPL	hhmmss
A8	CONTROL PROGRAM ABEND xxxx 3725 RE-IPL	hhmmss
A9	CHANNEL ADAPTER x DOWN	hhmmss
A10	GENERAL IPL CHECK	hhmmss
A11	SCANNER xx DOWN (LINES xxx-yyy) IML SCANNER	hhmmss
A12	SCANNER xx DOWN (LINES xxx-yyy) IML SCANNER	hhmmss
A13	SCANNER xx DOWN (LINES xxx-yyy) IML SCANNER	hhmmss
A14	SCANNER xx DOWN (LINES xxx-yyy) IML SCANNER	hhmmss
A15	LINE ADAPTER xxx DOWN	hhmmss
A28	TRM xx DOWN (TIC 1-4)	hhmmss
A29	TIC x DOWN ON TRM xx	hhmmss

ALERTS

For a complete description of:

- VTAM alerts, refer to ACF for VTAM, Messages and Codes, SC27-0467.
- TCAM alerts, refer to ACF TCAM release 4 Messages, SC30-3140.

Alerts related to 3725 alarms except alerts IST757E and IST761E, for which there is no alarm.

VTAM ALERT MESSAGES
IST757E MOSS UNAVAILABLE - HARDWARE ERROR
IST758E MOSS RELOADED - HARDWARE ERROR
IST759E MOSS DISKETTE UNUSABLE
IST760E MOSS DISKETTE HARDWARE ERROR
IST761E MOSS CONSOLE UNAVAILABLE
IST762I MOSS IN MAINTENANCE MODE
IST763I PHYSICAL UNIT RELOADED - HARDWARE ERROR
IST764I PHYSICAL UNIT RELOADED - PRIOR ABEND CODE WAS xxxx
IST765E CHANNEL ADAPTER x UNAVAILABLE - HARDWARE ERROR
IST767E SCANNER xx (yyy - zzz) UNAVAILABLE - HARDWARE ERROR
IST768E SCANNER xx (yyy - zzz) UNAVAILABLE - HARDWARE ERROR
IST769E SCANNER xx (yyy - zzz) UNAVAILABLE - SOFTWARE ERROR
IST770E SCANNER xx (yyy - zzz) UNAVAILABLE - SOFTWARE ERROR
IST771E SCANNER xx LINE xxx UNAVAILABLE - HARDWARE ERROR

TCAM ALERT MESSAGES
IED301E 3725 MOSS UNAVAILABLE - HARDWARE ERROR
IED302E 3725 MOSS RELOADED - HARDWARE ERROR
IED303E 3725 MOSS DISKETTE UNUSABLE
IED304E 3725 MOSS DISKETTE - HARDWARE ERROR
IED305E 3725 MOSS CONSOLE UNAVAILABLE
IED306I 3725 MOSS IN MAINTENANCE MODE
IED307I 3725 RELOADED - HARDWARE ERROR
IED308I 3725 RELOADED - ABEND xxxx
IED309E 3725 CHANNEL ADAPTER x UNAVAILABLE - HARDWARE ERROR
IED311E 3725 SCANNER xx (yyy - zzz) UNAVAILABLE - HARDWARE ERROR
IED312E 3725 SCANNER xx (yyy - zzz) UNAVAILABLE - HARDWARE ERROR
IED313E 3725 SCANNER xx (yyy - zzz) UNAVAILABLE - SOFTWARE ERROR
IED314E 3725 SCANNER xx (yyy - zzz) UNAVAILABLE - SOFTWARE ERROR
IED315E 3725 SCANNER xx LINE xxx UNAVAILABLE - HARDWARE ERROR

NPDA MESSAGES

For a complete description, refer to Network Problem Determination: User Action Guide, SC34-2032.

NPDA MESSAGES
BACKUP TIMEOUT: RING INTERFACE COUPLER
BACKUP TIMEOUT: RING MULTIPLEXER
DEADMAN TIMEOUT: RING INTERFACE COUPLER
HARDWARE ERROR: CHANNEL ADAPTER
HARDWARE ERROR: COMMUNICATION CONTROLLER RE-IPLED
HARDWARE ERROR: LINE ADAPTER
HARDWARE ERROR: SCANNER
INITIALIZATION FAILURE: RING INTERFACE COUPLER
INITIALIZATION FAILURE: RING SUBSYSTEM ATTACHMENT
MOSS HARDWARE DOWN - IPL SHOULD NOT BE TRIED: MOSS
MOSS RECOVERABLE ERROR - TRANSFER MOSS DUMP: MOSS
MOSS DISKETTE DOWN - IPL SHOULD NOT BE TRIED: MOSS
MOSS DISKETTE ERROR: DISKETTE MEDIA
MOSS CONSOLE UNAVAILABLE: MOSS CONSOLE/ADAP/CABLE
MOSS OFFLINE: MAINTENANCE MODE
NCP LEVEL 1 ERROR: RING MULTIPLEXER
NCP LEVEL 2 ERROR: RING INTERFACE COUPLER
NCP LEVEL 2 ERROR: RING MULTIPLEXER
SCANNER ERROR: COMMUNICATION CONTROLLER PROGRAM
SOFTWARE ERROR: COMMUNICATION CONTROLLER RE-IPLED

Online Test Group (Part 1 of 4)

The online test group is divided into two parts:

1. CA OLT responder (group 6)
2. CA OLTs

The CA OLT responder (routine MA), when loaded and running in the CCU, replies to commands from the OLTs that run in the host.

REQUIREMENTS

The following sequence must be followed:

On the 3725:

1. Load the channel adapter OLT responder from the 3725 console

On the host:

2. Load OLTEP, or IPL OLTSEP
3. Select the required OLT number

Note:

Refer to the appropriate OS OLTEP, DOS OLTEP manuals, or operator's guides, or to the OLTEP Guide for the following:

- To start the online test
- For test description and routine selection
- To run the option selection

RUNNING TIME

Load OLT responder	1 min 21 sec (Note)
CA OLT	50 sec

Note: The loading of the OLT responder takes 30 sec when the command processor has already been loaded in the CCU by a previous IOCB or CA run request.

SELECTION

For running offline diagnostics, see Chapter 1 of the 3725/3726 Diagnostic Descriptions (Vol. A05).

DIAG==>_

6

Move the cursor from its initial position (DIAG==>) to the next after each parameter is entered. To skip a parameter entry, press the --> key.

ADP#==>

Enter the selected CA number in the range:

1 to 6 for the 3725/3726
1 to 4 for the 3725 Model 2

LINE==>

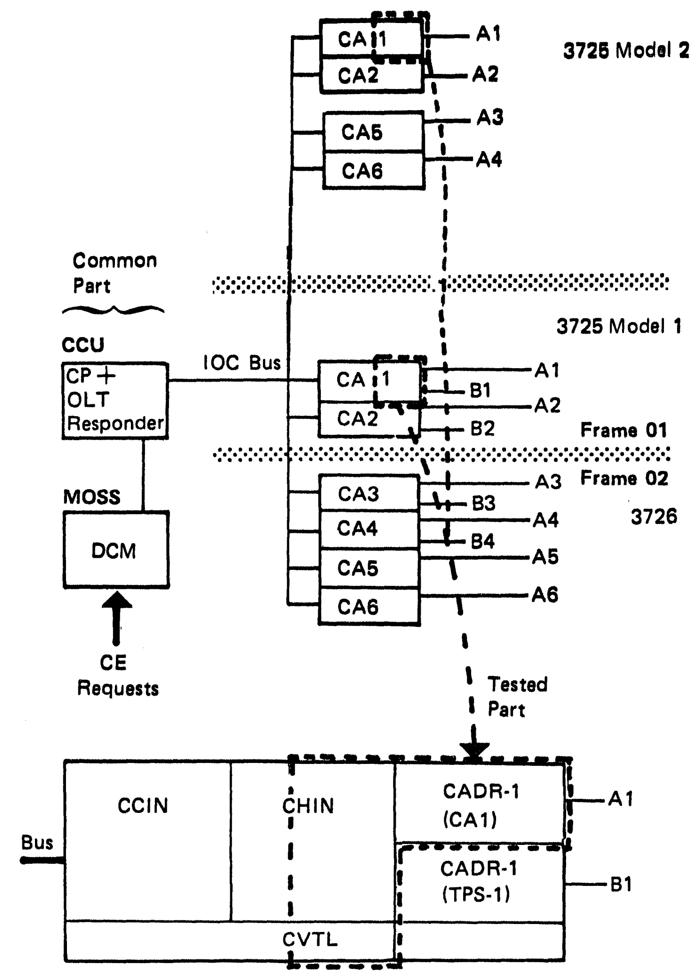
(Not applicable)

OPT==>

For option display and description, see Chapter 1 of the 3725/3726 Diagnostic Descriptions.

TESTED PART (BOTH MODELS)

(It is assumed that CA1 interface A has been selected.)



Online Test Group (Part 2 of 4)

PROCEDURE

```
 PROCESS  STOP-CCU-CHK SERVICE-MODE
               BYP-ADP-CHK

 D:DIAGNOSTICS                                       SP:CCU STOP     Q:DATE/TIME
                                  U:UTILITY PGM      ST:CCU START    T:TERMINATE
 E:ERROR LOG                                         RT:CCU RESET

 DIAG  |ADP# |LINE |

 1 ALL             |
 2 CCU             |
 3 IOCB            |
*4 CA  |1-> 6|     |
*5 TSS |1->16|0->31|
*6 OLT |1-> 6|     |
*7 TRSS|6->16|1-> 4|

        AND        |                                    DIAG - RUN INIT

 OPT = Y IF MODIFY |
 OPTION REQUIRED   |
                    ENTER REQUEST ACCORDING TO THE DIAG.MENU
                    DIAG==> 6     ADP#==> 2   LINE==>     OPT==> N
 ===>
```

*   For the 3725 Model 2 the display is as follows:

```
 4 CA  |1-> 4|     |
 5 TSS |1-> 6|0->31|
 6 OLT |1-> 4|     |
 7 TRSS|6    |1-> 4|
```

On the above screen, the CA OLT responder is selected. CA number 2 will be tested.

Press SEND to execute the request. Then:

1. Check that the All Channel Adapters Disabled light is on at the control panel.

2. At the request of the responder, and using the Enbl/Dsbl switch on the control panel, enable the channel adapter interface A or B to be tested, then press SEND.

3. The following message is then displayed:

   IF ESC REQUIRED, ENTER RE THEN PRESS SEND

   Enter RE to enable the ESC range of addresses and the execution of OLT sections requiring these addresses.

   The following routines fail if invoked without E being entered:

   T3725AK3, AK4, AK7, AM01, and AM02.

4. The following message is displayed:

   PRESS SEND TO CONTINUE OR ABORT RTN TO RELEASE CA

   If the host is in the "hung" state, you must comply with these instructions to release the CA.

   If the host is not in the hung state, just press SEND.

   Warning: The routine must not be aborted when the host is not in the hung state.

5. When the All Channel Adapters Disabled light turns off, the OLT responder is loaded and is ready to communicate with the host. "Routine MA01 ADP nn" is displayed on the 3727 operator console.

6. INTERRUPT L1 RELOAD, and

   INTERRUPT L3 RELOAD

   messages indicate that the responder cannot be loaded. In that case, the IOC bus and the CA diagnostic groups have to be run.

One channel adapter is tested at a time.

CA OLT RESPONDER

The CA OLT responder runs under the control of the DCM in the MOSS and the command processor in the CCU.

CA OLTS

Selection

The OLT selection and loading procedure is described in the appendix to the host OLT documentation: 3725 Channel Adapter OLTs, internal reference D99-3725A.

D99-3725A Contents

- OLT loading and running procedures
- OLT routine description
- OLT messages
- OLT CDS description for 3725
- OLT CDS card preparation

The OLTs are numbered from 3725AA to 3725AN.

Routine List

Routine	Function Tested
T3725AA01	Check No-Op command causes channel end
T3725AA02	Check illegal commands are rejected
T3725AA03	Check ending status of WRT break
T3725AA04	Check Write IPL command and Write command
T3725AB01	Check Halt I/O (NSC, ESC)
T3725AB02	Check ending status of test I/O (NSC, ESC)
T3725AC01	Check Halt I/O (NSC)
T3725AC02	Check ending status of test I/O (NSC)
T3725AD01	Check data wrap using command chaining
T3725AE01	Check No-Op on NSC and ESC address
T3725AE02	NSC preparation busy condition
T3725AE03	NSC TIO short busy condition
T3725AE04	ESC short busy condition
T3725AE05	ESC TIO short busy condition
T3725AF01	Normal wrap mode - 16 bytes (NSC, ESC)
T3725AF02	Cycle steal mode test - 36 bytes (NSC, ESC)
T3725AF03	ETB/ETX recognition in EBCDIC mode - 36 bytes (NSC, ESC)
T3725AF04	ETB/ETX recognition in ASCII mode - 36 bytes (NSC, ESC)
T3725AF05	DLE-STX recognition in EBCDIC and ASCII (NSC, ESC)
T3725AF06	DLE remember test in EBCDIC and ASCII (NSC, ESC)
T3725AF07	SYN character monitor - pass 1 (NSC, ESC)
T3725AF08	SYN character monitor - pass 2 (NSC, ESC)
T3725AG01	Cycle steal 250-byte wrap test (NSC, ESC)
T3725AG02	Cycle steal 255-byte wrap test (NSC, ESC)
T3725AG03	Cycle steal 520-byte wrap test (NSC, ESC)
T3725AH01	Sense 3725 ID is sent to the host
T3725AI01	Circle-B decode test (NSC, ESC)
T3725AI02	2848-ETX decode test (NSC, ESC)
T3725AJ01	Check No-Op on NSC address
T3725AJ02	NSC preparation busy condition
T3725AJ03	NSC TIO short busy condition
T3725AK01	Normal wrap mode - 16 bytes (NSC)
T3725AK02	Cycle steal mode test - 36 bytes (NSC)
T3725AK03	ETB/ETX non-recognition in EBCDIC mode - 36 bytes (NSC)
T3725AK04	ETB/ETX non-recognition in ASCII mode - 36 bytes (NSC)
T3725AK05	DLE-STX recognition in EBCDIC and ASCII (NSC)
T3725AK06	DLE remember test in EBCDIC and ASCII (NSC)
T3725AK07	SYN character monitor - pass 1 test (NSC)
T3725AK08	SYN character monitor - pass 2 test (NSC)
T3725AL01	Cycle steal 250-byte wrap test (NSC)
T3725AL02	Cycle steal 255-byte wrap test (NSC)
T3725AL03	Cycle steal 520-byte wrap test (NSC)
T3725AM01	Circle-B non-decode test (NSC)
T3725AM02	2848-ETX non-decode test (NSC)
T3725AN01	Request for shutdown

OLT Running Restrictions

1. The following sections need two addresses to run (primary address = NSC, secondary address = ESC). They are:

   T3725AB
   T3725AE
   T3725AF
   T3725AG
   T3725AI

   If you do not specify the ESC address, these sections will be bypassed with message notification.

2. The following sections need a primary address (NSC) only. They are:

   T3725AC
   T3725AJ
   T3725AK
   T3725AL
   T3725AM

   If you specify the ESC address, these sections will be bypassed with message notification.

   These sections are run with block multiplexer or selector channel, which uses NSC address only.

3. The following routines run under OLTSEP in a standalone environment. They are bypassed when using OLTEP.

   T3725AB routine 1
   T3725AC routine 1
   T3725AE routines 2, 3, 4, and 5
   T3725AJ routines 2, and 3

4. The following routines are automatically bypassed (with notification to the user) when you run OLTs on a 308X under NST 370XA mode:

   T3725AE routines 2, 3, 4, and 5
   T3725AJ routines 2, and 3

Messages

Refer to D99-3725A.

Online Test Group (Part 4 of 4)

OLT CDS FOR THE 3725

3725 CDS Card and Storage Layout

One CDS card is required for each NSC address. This card is punched as follows:

Note: A CDS must be created for each subchannel address.

CDS Byte Location (Host)	Card Columns	Contents/Description
	1	Must be blank
	2-4	CDS
	5-9	Must be blank
0-3	10-17	Native subchannel unit address in hexadecimal (right justified). Example: 0000003A
4-5	18-21	Must be blank
6-7	22-25	Class and type code for 3725: 40A0
	26-29	Must be blank
9	30-31	Flags code: (Use a 4, otherwise leave blank) Col 30: Device shared with another system CPU Col 31: The CA has a two-processor switch
10-11	32-35	Must be blank
12-13	36-39	Emulator subchannel (ESC) unit address in hex of lowest IBM 2701, 2702, or 2703 emulator line address. Example: 00F1
14	40-41	Enter number of contiguous emulator line addresses in hex, or leave blank if no ESC
	42	/ (end of CDS)

Range Definition Card Layout

Each emulation line address in the range defined by the channel data CDS card (columns 36-41) must be defined by an appropriate CDS entry, otherwise the message 'NO CDS ENTRY' will print for each undefined address. To prevent these messages from printing for unused lines (those lines not defined as an IBM 2701, 2702, or 2703 by a CDS entry), punch a dummy CDS entry for each unused address using the format that follows.

The range is a card punched as follows:

Card Columns	Contents/Description
1	Must be blank
2-4	CDS
5-9	Must be blank
10-17	Unused ESC unit address: The emulation subchannel (ESC) unit address, in hexadecimal, of an undefined emulation line address. The address range is defined by the channel data CDS card.
18-21	Must be blank
22-25	4001
26-51	Must be blank
52	/ End of range definition card
53-80	Must be blank

System Tests

<u>Warning:</u> To run ST370, NST-2, and ST4300

1. Only one 3725 channel adapter interface may be enabled.
2. Power on and initialize the 3725 Communication Controller (see <u>3725 Communication Controller, Problem Determination and Expanded Services,</u> Vol. A06).
3. After initialization, verify that the 3725 control panel hex display is 000.

<u>ST370</u>

ST370 is a standalone program used as a system test on all System/370 Models and the 3033 processor. The main purpose is to test the interface and interaction of most attached devices. It is assumed all other CPU and device diagnostics are running clean. ST370 is interrupt-driven and attempts to issue SIOs and run devices as quickly as they are available. It is not designed to be a stress test and sets no criteria as to the number of times a device is run in any given period of time.

For more information on ST370, see the <u>ST370 Users Guide,</u> D99-0370.

<u>NST-2</u>

The new systems test-2 (NST-2) is a diagnostic program that supports the IBM 3031, 3032, 3033, 3081 Processors and 3041 and 3042 Attached Processors. NST-2 also supports the attached, supported I/O for each of the specified processors. User options are entered and messages are displayed using menu frames.

Menu displays and their associated help frames assist the user with the methods of entry and the options available.

NST-2 messages provide the information the user needs to understand non-machine detected errors and NST-2 responses to user input requests.

For more information on NST-2, see the <u>NST-2 Users' Guide,</u> D99-NST2A.

<u>ST4300</u>

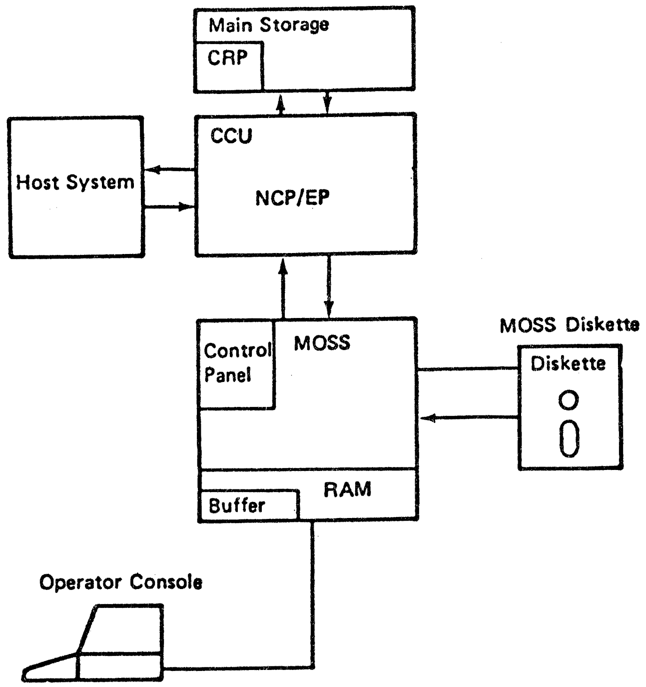
ST4300 is a standalone system checkout program that tests the interface and interaction of most attached devices on a system. It resides on SOSPC volumes and is self-configuring.

ST4300 is derived from ST370 and operates in the same way as ST370, with some exceptions.

For more information on ST4300, refer to the diagnostic information section of the Maintenance Information Logic Volume supplied with the 4300 system.

Error Log Function (Part 1 of 4)

This section describes the generation, formatting, storage, and display of the box error records (BERs).



BER GENERATION

The BERs are created by the MOSS, from error information supplied either by NCP/EP or by the MOSS itself.

If the MOSS is offline or not operational, NCP/EP stores the error information in the check record pool (CRP) located in main storage. When the CRP is full, each attempt to store more error information increments a count in the CRP, but the error information itself is lost. This count is entered into the last BER of the CRP (field LOST in NCP/EP BERs). When the MOSS comes back online, the contents of the CRP are transferred to the MOSS (see "BER Recovery Procedures" page 2-800).

| <u>BER TYPE:</u>
| One byte points to the general area of BER occurrence

- X'01'-- MOSS- related errors (plus errors/events recorded by MOSS when MOSS takes control of the box or operations such as CCU Hardcheck, scanner errors...)
- X'10'-- Errors related to Channel Adapter operations
- X'11'-- Errors related to Transmission Subsystem operations
- X'12'-- Control Program exceptions (software errors detected by the hardware)
- X'13'-- CCU- related errors when NCP/EP has control (excluding the CCU Hardcheck)
- X'14'-- IOC Bus- related errors (when not possible to attribute them to a specific adapter)
- X'15'-- TRSS Related errors when NCP/NTRI has control.

| <u>BER ID:</u> When the BER is created by
| NCP/EP, 1 byte identifies the category of
| error or event :

- Bit 0-- probable cause of the error
  - bit 0 = 0 the most probable cause is the Control Program
  - bit 0 = 1 the most probable cause is the Hardware or Microcode
- Bits 1,2,3-- Program level that recorded the error/event
  - 001 = Control Program level 1
  - 010 = " " " 2
  - 011 = " " " 3
  - 100 = " " " 4

<u>When the BER is created by MOSS,</u> a byte identifies the origin of error or event :

- ID=X'00'created by MOSS int. lvl 0
- X'01' " " " level 1
- X'02' " " Mailbox support
- X'03' " " MOSS int. lvl 5
- X'04' " " " " lvl 3
- X'05' " " " " lvl 4
- X'06' " " program lvl 7
- X'07' " " MOSS int. lvl 4 (TRSS)

Therefore the ID does not refer to error categories as in NCP/EP. For MOSS BERs, the error categories are found in another byte, either called MOSS CHECK Code or ERROR Code.

BER FORMATTING

The MOSS formats the error information together with date, time, flag, and other control bytes in the MOSS RAM 365-byte buffer as follows:

Byte	Contents
1	Total BER length in bytes
2	Flag
3	Month (in packed decimal)
4	Day (in packed decimal)
5	Year (in packed decimal)
6-9	Time of day (binary value in seconds)
10	BER type
11	BER ID
12-n	Error information (hexadecimal) (n is the total BER length)

<u>Note:</u> NCP supplies both date and time, but EP supplies time only.

MOSS formats the labels according to the following rules:

- Labels should be self explanatory
- Labels should refer to NCP/EP control blocks whenever applicable

| The exact layout depends on the BER type
| and BER ID. Pages 2-340, 2-341 and 2-342
| give all possible layouts and BER
| contents.

<u>Example of Date and Time</u>

Byte	3	4	5	6	7	8	9
Contents	18	12	84	00	00	F5	8F
Meaning	18th	Dec	1984	One bit=1 second 62 863 sec = 17h27m43s			

(See conversion tables page 2-470)

BER STORAGE ON DISKETTE

The MOSS stores the BERs, prepared in the MOSS RAM, on the <u>wraparound</u> BER file on diskette in order of arrival. The BER file can contain from 20 to 250 BERs depending on the length of the BERs.

When the BER file is full, the next BER to arrive overwrites the oldest BER (or BERs) in the BER file. No count is kept of such overwrites.

BER STORAGE WHEN DISKETTE IS NOT OPERATIONAL

When the diskette is not operational, the MOSS keeps the BERs in the 340-byte buffer in MOSS RAM. When the buffer becomes full, new BERs are lost, but a count is kept in the last byte of the buffer of the BERs lost. This is called the lost record
| count. The 640-byte buffer in MOSS RAM is preserved during MOSS IML. during MOSS IML. To read this buffer, see page 3-030.

When the diskette becomes operational
| again, MOSS stores the 640-byte buffer in the BER file on diskette, together with a BER giving the number of lost BERs in the error description line (Type 01, ID 06, error 02).

BER FILE ERASURE

The entire BER file can be erased using the DUMP/DPLY DEL utility program.

<u>The BER file should be erased only in exceptional cases,</u> since:

1. It is not possible to erase individual BERs in the file, but only the entire BER file.
2. The service personnel might need old BERs for history purposes.
3. The BER file, when full, writes the most recent BERs on the diskette space used by the 'oldest' BERs (wraparound file). When the BER file is erased, a BER to this effect is logged in the file.

BER DISPLAY

Normally, you access the BER file on MOSS diskette using the error log function from the 3727 operator console. For full details, refer to the <u>3725 Problem Determination and Extended Services</u> (Vol. A06).

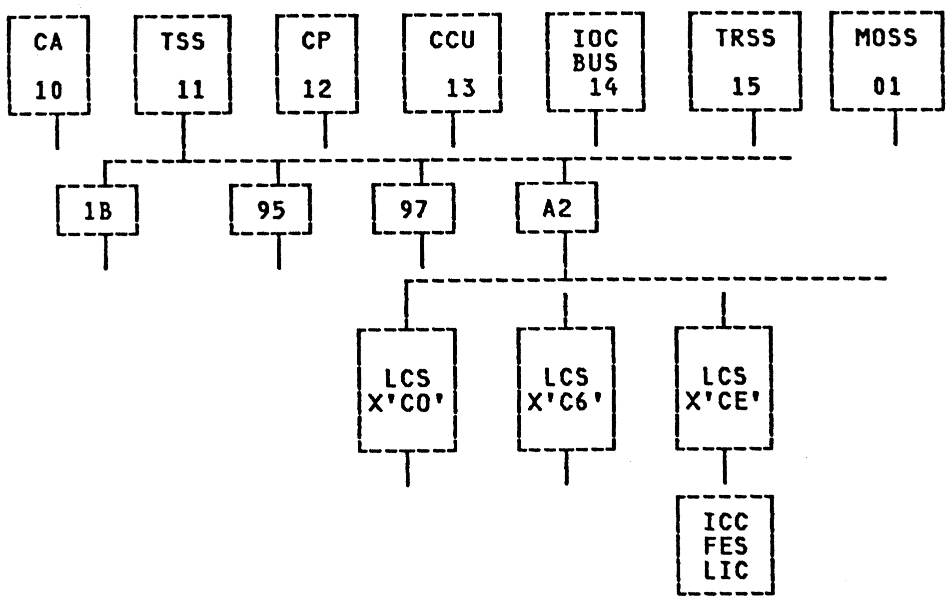
However, if a 3725 control panel error occurs, or if a MOSS IML threshold is reached, the BERs in the MOSS RAM can be displayed on the hexadecimal display on the control panel. Refer to page 3-030.

BER display screens are explained on page 2-180.

BER STRUCTURE

The BERs have a hierarchical structure, which allows going from the general problem area to the specific failing element. Here is a typical BER tree structure, based on a real example. We also give indications on where the information is found.

The "types" and "IDs" are given by "MOSS BER LIST" and "BER DETAIL" display screens.



The BER "TYPES" correspond to specific 3725 areas.

The "ID" correspond to different categories of errors or events.

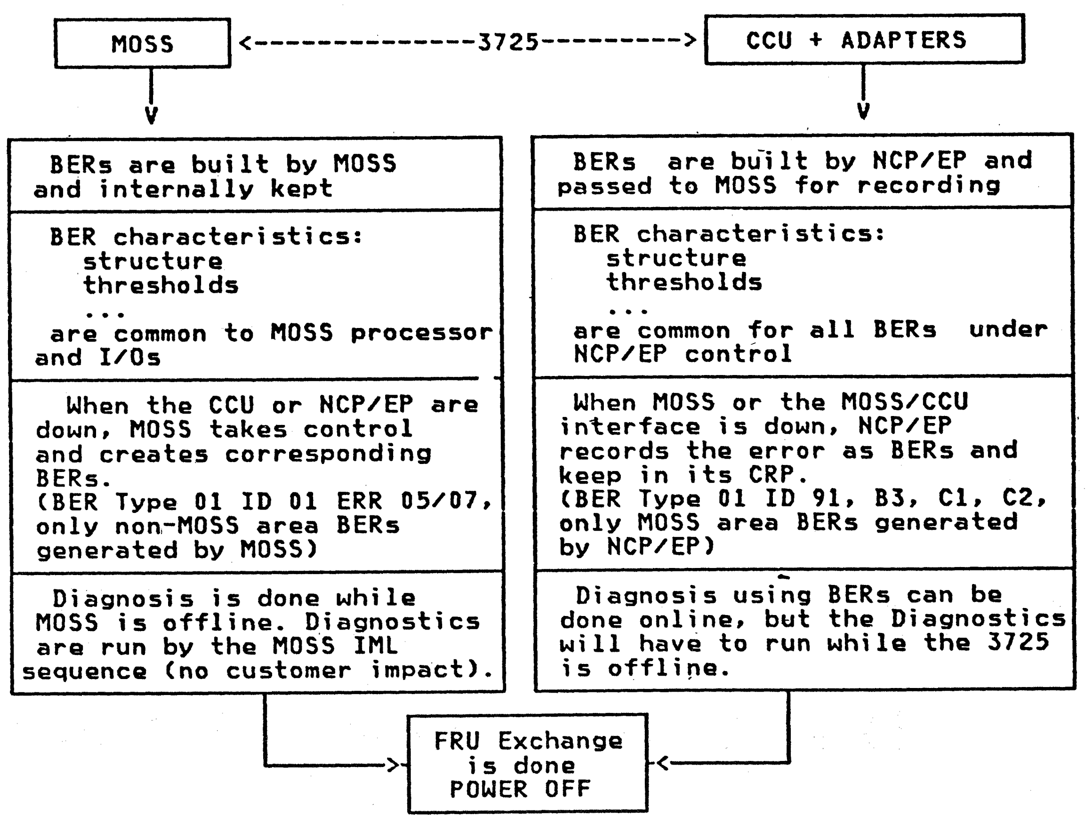
"ERROR STATUS" Selected field, from the "BER DETAIL", is a predetermined field that indicates a particular error. BERs have different "Error Status" according to the type of anomaly.

FRU LIST (prioritized)

(Found in MIM Part 2)

APPROACH TO PROBLEM ISOLATION

The following chart explains why the BER formats and contents of NCP/EP-generated records are different from the MOSS-generated records.



THRESHOLDS

There is one BER for each error occurrence in the whole 3725 except in one case, when the Diskette drive CAC retries operations. The BER (Type 01 ID 03) contains the retry count, indicating the number of retries before success. Therefore no BER is created by threshold only (except in the particular diskette case).

Thresholds, when existing, are solely used to:
- Trigger recovery (e.g. PIO retry, MOSS re-IML...)
- Define level of box degradation (e.g. Scanner or MOSS down...)
- Generate Alarms/Alerts.

The thresholds are defined on a per case basis. This is indicated in the following "BER Types Summary" tables (Alarm or Alert column).
For NCP/EP BERs subject to retries and thresholds, it is possible to see if one specific BER is the result of a threshold: the byte F (Indicator Flag) will then have bit 1 on.
For the whole machine, passing a threshold does not change the BER Type and ID, except for one instance:
- When two BERs of type 11 and ID 97 (PIO errors) are generated within 100 msec, a BER type 11 and ID 98 is created.

BERs That Are Not Machine Errors

BER Type 11 ID 96:
- Scanner disconnect state. The scanner has been disconnected by a request from the MOSS operator, and is reporting this to the Control Program

BER type 15 ID 96:
- TRA disconnect state. The TRA has been disconnected by request from the MOSS operator, and is reporting this to the control program.

BER Type 11 ID A4:
- BER Type 01 ID 06 ERR 01: BER File deleted on the diskette by a MOSS Command.
- BER Type 01 ID 06 ERR 05: 3725 Re-IPL end.
- BER Type 01 ID 06 ERR 07: MOSS Offline request by the operator.

Unresolved Interrupts

The Control Program logs BERs based on "unresolved situations" following interrupts. See "BER/Alarm/Alert/ Mechanisms" starting page 2-250 for the complete list.

BER Handling Tools

BER Functions	See for details in:
Displays at console	MIM part 1, starting page 2-180
Display MOSS processor BERs at operator panel	MIM part 1, starting page 3-030
Host print request for BERs	ACF for NCP/SSP for the 3725 Diagnosis Guide Chapter "Printing NCP, MOSS, or CSP Dump"
BER format	3725 PD and Ext.Ser. Chap. 5, and MIM part 1, page 2-340
BER save and purge	MIM part 1, pages 2-409 and 2-410
BER flagging	MIM part 1, page 2-172 and MIM part 2, Chapter 2

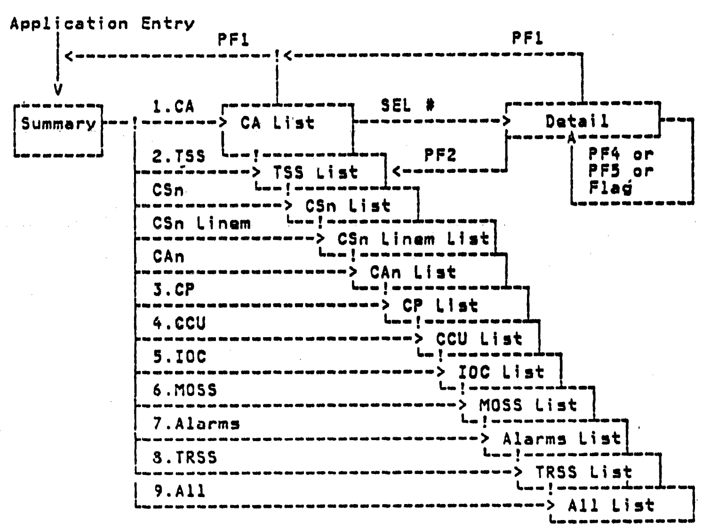
Error Log Function (Part 3 of 4)

BER DISPLAY SAMPLE SEQUENCE

There are three kinds of BER display screens:

- BER summary
- BER list
- BER detail

When faultfinding, you should normally display the BER summary, then the BER list, and lastly the BER detail(s) appropriate to the fault. An example is given in the following figure.



BER Display Sample Sequence

```
                              BER SUMMARY
SEL# NAME                                      TYPE  PENDING  DATE 1ST BER  TOTAL
                                                       BERs   MM/DD HH:MM   IN FILE
 1   CA   (CHANNEL ADAPTERS)                    10      0                      0
 2   TSS  (TRANSMISSION SUBSYSTEM)              11      5     04/23 20:38      5
 3   CP   (CONTROL PROGRAM)                     12      0                      0
 4   CCU  (CENTRAL CONTROL UNIT)                13      0                      0
 5   IOC  (I/O CONTROL)                         14      0                      0
 6   MOSS (MAINTENANCE OPERATOR SUBSYSTEM)      01      1     04/21 07:00      2
 7   ALARMS                                             1     04/23 20:40      2
 8   TRSS (TOKEN RING SUBSYSTEM)                15      0                      0
 9   ALL  (ALL FILE CONTENTS)                           2     04/23 07:00      9

- ENTER SEL# OR NAME  ==>
```

BER DISPLAY PROCEDURE

With Controller Diskette

1. Press SELN AREA to position the cursor.
2. Press M followed by SEND to display the 'MAINTENANCE' primary menu.

   Note: If you do not press M, the BER DETAIL screen that will be displayed will not contain coded maintenance information (see customer BER DETAIL screen).
3. Press E followed by SEND to select the 'ERROR LOG' function.

With Service Diskette

1. Press SELN AREA to position the cursor.
2. Press E followed by SEND to select the 'ERROR LOG' function. If you press E then SEND, the following screen is displayed:

If you type 'ALL' or '8' with "BER SUMMARY" displayed, the following BER 'ALL LIST' screen is displayed:

```
                                  ALL   LIST                BER TYPE:    TOTAL:9
SEL# DATE/TIME FLAG   NAME   TYPE ID    ERROR DESCRIPTION
1    04/23 20:40     ALARMS            A11 SCANNER 01 DOWN(LINE 000-031)IPL SCAN
2    04/23 20:40     CS1  LINE31 11 98  PIO OUT ERROR
3    04/23 20:39     CS1  LINE31 11 98  PIO OUT ERROR
4    04/23 20:38     CS1  LINE31 11 98  PIO OUT ERROR
5    04/23 20:38     CS1  LINE31 11 98  PIO OUT ERROR
6    04/23 20:38     CS1  LINE31 11 B1  SCANNER COMMAND TIME OUT
7    04/22 08:00 FF  ALARMS         A4  DISKETTE ERROR
8    04/22 08:00 FF  MOSS DISK   01 03  CRC ON READ DATA FILE:CHGPROC
9    04/21 07:00     MOSS APPL   01 06  BER FILE DELETED
 *** END OF FILE ***
- ENTER SEL# OR NAME  ==>
PF1:BER SUMMARY   PF4:BACKWARD   PF5:FORWARD
```

In maintenance mode, if you type '6' (SEL #) with BER "ALL LIST" displayed, the following screen is displayed:

```
                                  BER DETAIL
SEL#:006 FLAG:00  DATE:04/23 TIME:20:38  TYPE:11  ID:B1  LOST:     CP-ABEND:
CS1  LINE31  SCANNER COMMAND TIME OUT
 F:10000000
 TA:10  TD:1F  NW:DCC0  LNVT:08F0  LCS:00
 PSA:DA06 0000 0000 0000 0191 0000 0000 0000 0592 0800 0000 0000 0191 0000



 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

This screen contains the coded maintenance information appropriate to the type of BER.

In customer mode, if you type '6' (SEL#) with BER "ALL LIST" displayed, the following screen is displayed:

```
                                  BER DETAIL
SEL#:006 FLAG:00  DATE:04/23 TIME:20:38  TYPE:11  ID:B1  LOST:ddd  CP-ABEND:hhhh
CS1  LINE31  SCANNER COMMAND TIME OUT






PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

This display is explained in the <u>3725 Problem Determination and Extended Services</u> (Vol. A06) under "Error Log Function."

Error Log Function (Part 4 of 4)

BER UPDATING

The only field updatable in a BER is the flag.

This flag can be updated only when displaying the BER DETAIL screen.

BER Flag Explanation

An intermittent error is not confirmed by the diagnostics (tentative repair action). An analysis of the BERs may identify the suspected FRUs.

Should the same error appear, the flag byte value determines the meaning of the BER and the status of the problem that caused the BER.

How to handle these flag values is described in MIM Part 2, Chapter 2.

BER Flag	Meaning
00	No action taken
0F	BER recorded for information only
1x	Hardware suspected
2x	Microcode suspected
3x	Control program suspected
4x	Hardware suspected, save/purge requested
5x	Microcode suspected, save/purge requested
6x	Control program suspected, save/purge requested
7x	Hardware suspected, saved
8x	Microcode suspected, saved
9x	Control Program suspected, saved

x Value	Meaning
0	No repair action taken
1-9	Number of repair action
A	Action pending
B	This unit not at fault
C	Customer responsibility
D	No repair action required
E	FRU list exhausted
F	Problem resolved

BER Flag Updating

The BER flag should be updated on the primary controller diskette for a standard reference.

The maintenance mode must be entered from the primary menu before selecting the BER details to be updated.

To update the flag:

1. Place cursor under hh value of FLAG:hh field.
2. Override with new hexadecimal value.
3. Press SEND.

   The procedures in MIM Part 2, Chapter 2, show the value required when updating the BER flag in the course of repair action, or tentative repair action.

BER Display Screens (Part 1 of 3)

BER SUMMARY DISPLAY

```
                                BER SUMMARY
SEL# NAME                                     TYPE  PENDING  DATE 1ST BER  TOTAL
                                                     BERs   MM/DD HH:MM   IN FILE

 1   CA   (CHANNEL ADAPTERS)                   10     0                      0
 2   TSS  (TRANSMISSION SUBSYSTEM)             11     2     04/23  20:39     4
 3   CP   (CONTROL PROGRAM)                    12     0                      0
 4   CCU  (CENTRAL CONTROL UNIT)               13     0                      0
 5   IOC  (I/O CONTROL)                        14     0                      0
 6   MOSS (MAINTENANCE OPERATOR SUBSYSTEM)     01     0                      1
 7   ALARMS                                           1     04/23 20:40      2
 8   TRSS (TOKEN RING SUBSYSTEM)               15     0                      0
 9   ALL  (ALL FILE CONTENTS)                         2     04/23 07:00      9

- ENTER SEL# OR NAME  ==>
```

Field Description for BER Summary Screen

SEL#: A number in the left-hand column, which may be typed at the cursor position, to select the appropriate BER list screen.

NAME: An acronym in the next column, which may be typed at the cursor position, in place of SEL# to select the appropriate BER list.

TYPE: The number that categorizes the BER by its origin.

PENDING BERS: BERs that contain a flag with value X0 (that is, no repair action taken).

DATE 1ST BER: The time and date of the oldest BER in this category that is not updated (pending BER).

TOTAL IN FILE: The total number of BERs of this category in the BER file.

You use the data in this screen to help you in selecting the BER list.

Note: If you already know the precise origin of the fault (such as CS3, or LINE7), you can type this at the cursor position instead of SEL# or NAME. For example, typing CS3 displays only those BERs associated with CS3.

BER LIST DISPLAY

As an example, the display below shows a BER 'ALL LIST' screen.

```
                              ALL    LIST               BER TYPE:    TOTAL:9
SEL# DATE/TIME FLAG   NAME   TYPE ID   ERROR DESCRIPTION
1    04/23 20:40     ALARMS           A11 SCANNER 01 DOWN(LINE 000-031)IPL SCAN
2    04/23 20:40     CS1  LINE31 11 98  PIO OUT ERROR
3    04/23 20:39     TRM6  TIC1  15 91  AIO ERROR
4    04/23 20:38     TRM12 TIC2  15 B4  DEADMAN TIMER
5    04/23 20:38     CS1  LINE31 11 98  PIO OUT ERROR
6    04/23 20:38     CS1  LINE31 11 B1  SCANNER COMMAND TIME OUT
7    04/22 08:00 FF ALARMS          A4  MEDIA ERROR
8    04/22 08:00 FF MOSS DISK    01 03  CRC ON READ DATA FILE:CHGPROC
9    04/21 07:00    MOSS APPL    01 06  BER FILE DELETED
 *** END OF FILE ***
- ENTER SEL# OR NAME  ==>
PF1:BER SUMMARY    PF4:BACKWARD   PF5:FORWARD
```

Field Description for BER List Screen

XXX LIST: The criterion XXX of selection from the BER summary, or from the previous BER list (ALL in this example).

BER TYPE: The type of BERs corresponding to the selection from the BER summary.

TOTAL: The number of BERs corresponding to the selection from the BER summary.

SEL#: The sequence number of the BER in the BER file. BERs are numbered in ascending order from the most recent to the oldest (compare with DATE 1ST BER in BER summary).

Enter this SEL# when you want the corresponding BER DETAIL screen. The detail screen gives additional maintenance information concerning the BERs.

Note: The BER file is not frozen while you work. New BERs may be logged while you troubleshoot, but they do not appear on the screen. These new BERs (with a new SEL number) will appear next time a BER LIST display is requested.

DATE: Four digits defining month and day. EP does not handle the date (in EP, DATE: 00/00).

TIME: Four digits defining hour and minute.

Note: Under NCP, the time and date information comes from the host. If the host is remote, the time recorded on the BER may differ from the 3725 time.

FLAG: Two hex digits (00-FF) being the status of the BER (see page 2-172). The FLAG field is not updatable on the LIST screen.

For better readability, a 00 flag does not appear on this screen, and is therefore left blank.

NAME: More precise information about the origin of a BER (for example, CS, line, or channel number). The NAME may be typed at the cursor position to obtain the appropriate BER list. The NAME is repeated in the error description line of the BER DETAIL screen.

TYPE The number that categorizes the BER.

ID Two hex digits that give more precision to the origin of the BER.

ERROR DESCRIPTION Up to 40 characters that describe the error.

PF Keys on BER List Screen

PF1: Return to BER SUMMARY.

PF4: This key enables you to scroll backwards, 10 BERs at a time.

PF5: This key enables you to scroll forwards, 10 BERs at a time.

BER Display Screens (Part 2 of 3)

BER DETAIL DISPLAYS

To display an individual BER detail screen, type the corresponding SEL# (sequence number in BER file) on the BER LIST screen, at the cursor position. The layout is the following:

```
                           BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:hh  ID:hh  LOST:ddd  CP-ABEND:hhhh
<         error description line                        >
 X:bbbbbbbb
 XX:hh  XX:hh  XX:hhhh  XXXX:hhhh  XXX:hh
 XXX:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh



 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

This screen contains the coded maintenance information appropriate to the type of BER selected.

Note: When used in customer mode, the screen layout is different (an example with real data for "MAINTENANCE" and 'CUSTOMER' display screens is given on page 2-171).

Finding the Appropriate BER Detail Screen

Use the following table to find the page for BER DETAIL screen explanations for a given BER type and BER ID. This table also shows what created the BERs (control program or MOSS).

For software information on BERs originated by NCP/EP, refer to BER in ACF/NCP Control Program for the 3725; Emulation Program for the 3725 Reference Summary and Data Areas, LY30-3070.

Type	Meaning	Created by	Page Number
01	MOSS-related BER		2-240
	ID 00	MOSS	2-260
	ID 01	MOSS	2-270
	ID 02	MOSS	2-280
	ID 03	MOSS	2-290
	ID 04	MOSS	2-300
	ID 05	MOSS	2-310
	ID 06	MOSS	2-320
	ID 07	MOSS	2-325
	ID 91,B3,C1,C2	NCP/EP	2-330
10	CA-related BER	NCP/EP	2-190
11	TSS-related BER	NCP/EP	2-200
12	NCP/EP-related BER	NCP/EP	2-210
13	CCU-related BER	NCP/EP	2-220
14	IOC-related BER	NCP/EP	2-230
15	TRSS-related BER	NCP/NTRI	2-231
02	See Note on page 2-466		

If you scroll through BER detail screens and see one that shows anomalies, such as a blank screen or unformatted hexadecimal characters, this means that the BER file is full and cannot renumber the BERs correctly. To correct this problem, press PF2. This gives a new, correct BER list.

Common Fields in Header Lines

In each detail screen, the top two lines and the bottom line always have the same format. The field descriptions are:

SEL#: Three digits (from 1 to 255) defining the SEL# (BER file sequence number).

This is either the BER corresponding to the SEL# (from the BER LIST screen), or the next or previous BER of the same selection criteria (obtained when pressing PF4 or PF5).

Note: You may alter these three digits by placing the cursor under the digits, then pressing ENTER. This displays the BER DETAIL screen corresponding to that new SEL#.

FLAG: Two hexadecimal digits defining the BER status.

This field may be updated on the BER detail screen (see page 2-172).

DATE: Four digits defining month and day (contains 00/00 in EP). Same as in LIST screen.

TIME: Four digits defining hour and minute. Same as in LIST screen.

TYPE: Two-digit hexadecimal number that categorizes the BER.

ID: Two-digit hexadecimal number that specifies the origin of the BER (BER identifier).

For a BER created by NCP/EP, the BER ID contains the interrupt level at which the error was detected and recorded, as shown in the following table:

Bit	Meaning
0	0 = software error 1 = hardware error (including microcode errors)
1	Control program level bit 0
2	Control program level bit 1
3	Control program level bit 2
4	Specific error bit 0
5	Specific error bit 1
6	Specific error bit 2
7	Specific error bit 3

LOST: Three digits defining the number of BERs, if any, that have been lost after creation of this BER. This field applies only to CP BERs.

CP-ABEND: Four hexadecimal digits defining the abend code (this field does not apply to MOSS BERs).

ERROR DESCRIPTION: One line giving a description of the error (same as on the BER LIST screen, but the maximum length is 80).

PF Key on BER Detail Screen

PF1: Display BER summary.

PF2: Display BER list. Pressing this key displays the LIST screen from which the BER detail was selected. The new LIST screen starts with the BER requested in BER DETAIL.

PF4: Scroll back to previous BER (this is the previous BER in the list from which the BER detail was selected).

PF5: Scroll forward to next BER (this is the next BER in the list from which the BER detail was selected).

Note: Using PF4 or PF5, you may request a BER that is outside the selected list; the message 'SEL# range limited to 255' appears when you do this.

FIELDS COMMON TO MANY BER DETAIL SCREENS

X'76' and X'76'U

After storing the IOC bus error register in X'76', the control program starts reading each RDV address and error register in order to place its contents in the BER fields. If another IOC bus error occurs while filling in the BER fields, the contents of the IOC bus error register for the second error are placed in the X'76'U field of the IOC BER.

Redrive Address and Error Register

Bit	Meaning
0-0	1
0-1	Enable/Disable Latch (1 = disable state)
0-2	Primary RDV Address DB0 5
0-3	Primary RDV Address DB0 6
0-4	Primary RDV Address DB0 7
0-5	Secondary RDV Address DB1 4
0-6	Secondary RDV Address DB1 5
0-7	Secondary RDV Address DB1 6
1-0	IOC bus parity inbound
1-1	IOC bus parity outbound
1-2	IOC tag check outbound
1-3	IOC tag check inbound
1-4	Halt remember
1-5	Select out secondary
1-6	Cycle steal grant secondary
1-7	Command reject

Note: Details are given on page 11-040.

Address and Command Format on the IOC Bus at TA Time

Byte-->	DB0		DB1		
Type	0123	4567	0123	4567	Comments
RDV	0100	000.	CCCC	....	Format
	....	....	CCCC	....	Command
	....	....	....	...0	Write
	....	....	....	...1	Read
C2LB	....	...0	....	000.	3725-2
CLAB1	....	...0	....	000.	3725-1
C2LB2	....	...0	....	001.	3725-2
CLAB2	....	...0	....	001.	3725-1
LAB pos 3	....	...0	....	010.	3725-1/2
CAB	....	...0	....	011.	3726
FRAME	....	...1	....	000.	3726
LAB pos 4	....	...1	....	011.	3726
LAB pos 5	....	...1	....	100.	3726
LAB pos 6	....	...1	....	101.	3726
LAB pos 7	....	...1	....	110.	3726
LAB pos 8	....	...1	....	111.	3726

Board Position	Redrive Number	Redrive Address Primary Field (DB0) 5 6 7	Redrive Address Secondary Field (DB1) 4 5 6
C2LB	1	0 0 0	0 0 0
CLAB1	1	0 0 0	0 0 0
C2LB2	2	0 0 0	0 0 1
CLAB2	2	0 0 0	0 0 1
LAB pos 3	3	0 0 0	0 1 0
CAB	10	0 0 0	0 1 1
Frame	4	0 0 1	0 0 0
LAB pos 4	7	0 0 1	0 1 1
LAB pos 5	6	0 0 1	1 0 0
LAB pos 6	5	0 0 1	1 0 1
LAB pos 7	8	0 0 1	1 1 0
LAB pos 8	9	0 0 1	1 1 1

CA (Type 10) BER Detail Displays (Part 1 of 4)

CA BER, Type 10 - Summary

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
10	foC3	0915	Invalid ESC address - EP or NEO is CA owner - Mismatch between Sysgen and the hardware, if found at IPL time. - Program error (such as possible overwrite of Control Blocks where ESC values are kept), if found in normal operations.	3725 reIPL	A8 (4)
14	foC2	0910	Address exception (AIO). X'76' bit 0.0 on.	3725 reIPL	A8 (4)
16	foC2	0911	Storage protect (AIO). X'76' bit 0.1 on.	3725 reIPL	A8 (4)
18	foC1	0912	Invalid channel adapter selection in control program (attempt to select a non-install. CA). Control Program issuing an Output X'7' with either bit 0.2 or bit 0.3 set, and bits 0.4 and 0.6 indicating select bits.	3725 reIPL	A8 (4)
1B	foC3	0913	Invalid IOH/IOHI input to channel adapter. X'7E' bit 0.5 on.	3725 reIPL	A8 (4)
1C	foC1	0914	Output Sequence issued in error to CA	3725 reIPL	A8 (4)
1E	foC1	0913	Invalid IOH/IOHI output to channel adapter. Output X'D', X'E', or X'F'.	3725 reIPL	A8 (4)
1F	foC3	0913	Invalid IOH/IOHI output to channel adapter (hardware detected). X '7E' bit 0.5 on.	3725 reIPL	A8 (4)
33	foC4	091E	Unresolved CA level 3 interrupt. 1- Lvl 3 but no CAB for this CA and not for EP 2- Lvl 3 but no Initial Select nor Data Status	3725 reIPL	A8 (4)
34	foC4	091F	Level 3 IPL CA not first interrupt 1- Stacked status cleared by Initial select for the 1st time, or transfer of Final status but not on the IPLing CA. 2- PRI	3725 reIPL	A8 (4)
35	foC4	0	ESC address out of range (level 3 detected.	-	no
90	foC3	0	Invalid ESC address. EP or NEO not CA owner, NCP is the owner on an ESC Address Compare.	CP retry	no (2)
90	foC3	0	Invalid ESC address (limit threshold)	CA down	A9 (3)
90	foC3	0924	Invalid ESC address (last CA). All CAs have been disabled.	3725 reIPL	A7 (4)
91	foC2	0	AIO Error. X'75' bit 0.0 off X'76' bit 0.4 on for IOC timeout X'76' bit 0.5 on for Bus in parity error X'76' bit 0.6 on in both cases (AIO) X'76' bits 0.0, 0.1, 0.2, and 0.3 contain the IOC Status at the time of error.	CP retry	no (2)
91	foC2	0	AIO Error (limit threshold).	CA down	A9 (3)
91	foC2	0924	AIO Error (last channel adapter). All CAs have been disabled.	3725 reIPL	A7 (4)
92	foC3	0922	Level 1 from CA during recovery (interrupt from a CA which is already being disabled by Error Recovery Procedures as a result of level 1 checks). Indicates the probable failure of the disable sequence.	3725 reIPL	A7 (4)

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
93	foC3	0	Driver/receiver card check. X'D' bit 1.6 or 1.7 on.	CP retry	no (2)
93	foC3	0	Driver/receiver card check (limit threshold).	CA down	A9 (3)
93	foC3	0924	Driver/receiver card check (last CA). All CAs have been disabled.	3725 reIPL	A7 (4)
94	foC3	0	Level 1 from a CA not generated active. X'7E' bit 0.5 on.	CP retry	no (2)
94	foC3	0921	Level 1 from a CA not generated active (limit threshold).	3725 reIPL	A7 (4)
95	foC3	0	Unresolved adapter level 1 interrupt. (CA reg X'E' did not specify a CA with the level 1 interrupt).	CP retry	no (2)
95	foC3	0919	Unresolved adapter level 1 interrupt (limit threshold).	3725 reIPL	A7 (4)
96	foC3	0	Channel bus in check. X'D' bit 1.3 or 1.5 on.	CP retry	no (2)
96	foC3	0	Channel bus in check (limit threshold).	CA down	A9 (3)
96	foC3	0924	Channel bus in check (last CA). All CAs have been disabled.	3725 reIPL	A7 (4)
97	foC1	0	PIO error (input or output IOH failed). X'75' bit 0.0 off X'76' bit 0.4 on for IOC timeout X'76' bit 0.5 on for Bus in parity error X'76' bit 0.6 off in both cases.	CP retry	no (2)
97	foC1	0	PIO error (limit threshold).	CA down	A9 (3)
97	foC1	0924	PIO error (last channel adapter). All CAs have been disabled.	3725 reIPL	A7 (4)
98	foC3	0	Internal adapter error. X'7E' bit 0.5 on. X'E' bits to indicate CAs. The Control Program checks the level 3 instruction that failed. If it is a valid IOH/IOHI, retry the instruction in the interrupted level. If it is not a valid IOH/IOHI, attempt to disable the CA.	CP retry	no (2)
98	foC3	09F0	Internal adapter error (final status transfer) Not enough information available to recover when a Data/Status interrupt is pending during level 1 processing.	3725 reIPL	A7 (4)
98	foC3	09F1	Internal adapter error. Status byte cleared (X'0' bit 0.6) Not enough information available to recover when an Initial Selection Interrupt is pending during level 1 processing.	3725 reIPL	A7 (4)
98	foC3	0	Internal adapter error (limit threshold).	CA down	A9 (3)
98	foC3	0924	Internal adapter error (last CA). All CAs have been disabled.	3725 reIPL	A7 (4)
99	foC3	0923	Ground fault. X'D' bit 1.4 on.	3725 reIPL	A7 (4)
9A	foC2	0920	IOH failed in level 1 - abort AIO recovery. Control program cannot get the registers needed to determine the error.	3725 reIPL	A7 (4)
9B	foC1	0920	IOH failed in level 1 - abort PIO recovery. IOH required for the recovery failed twice in level 1, or output IOH X'7' failed twice in level 1.	3725 reIPL	A7 (4)

CA (Type 10) BER Detail Displays (Part 2 of 4)

CA BER (Type 10) Summary (Continued)

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
9C	foC3	0920	IOH failed in level 1 - abort ADP recovery.	3725 reIPL	A7 (4)
9E	foC3	0	Unresolved error on CA level 1, CA register X'D' did not specify any adapter error bit. See "BER/Alarm/Alert Mechanism" page 2-250.	CP retry	no (2)
9E	foC3	0	Unresolved error on CA level 1 (limit threshold).	CA down	A9 (3)
9E	foC3	0924	Unresolved error on CA level 1 (last CA). All CAs have been disabled.	3725 reIPL	A7 (4)
9F	foC3	0925	ESC interrupt - EP or NEO is not the CA owner. X'F' bits 0.2 or 0.3 on. ESC address in X'3' byte 0.	3725 reIPL	A7 (4)
B1	foC4	0	Unresolved CA level 3. Initial select interrupt (X'F' bit 0.2), but no bit on in X'0'. See 'BER/Alarm/Alert Mechanism' page 2-250.	CP retry	no (2)
B1	foC4	091C	Unresolved CA level 3 initial select interrupt (limit threshold).	3725 reIP	A7 (4)
B2	foC4	0	Unresolved CA level 3 data/status interrupt (X'F' bit 0.3), but no bit on in X'2'. Not a system reset.	CP retry	no (2)
B2	foC4	091D	Unresolved CA level 3 data/status interrupt (limit threshold).	3725 reIPL	A7 (4)
B5	foC4	0	Level 3 cannot disable CA. Permanent X'77' bit 1.0 on.	CP retry	no (2)
B5	foC4	0927	Level 3 cannot disable CA (limit threshold).	3725 reIPL	A7 (4)
B6	foC4	0	Inappropriate command (not NOP nor TIO) on Stacked Initial Status (X'0' bit 0.5).	CP retry	no (2)
B6	foC4	0926	Inappropriate command (not NOP nor TIO) on Stacked Initial Status (limit threshold).	3725 reIPL	A7 (4)

Notes:

1. BERs have different formats and different detail display screens according to the type of error reported:

   foC1: Level 1 during a PIO operation
   foC2: Level 1 during an AIO operation
   foC3: Channel adapter error reported at level 1
   foC4: Unresolved error reported at level 3

2. The control program maintains an error counter. When the threshold is reached, the control program action is as indicated in the table. The threshold is 2 per 0.1 seconds per adapter.

3. The control program continues in degraded mode, keeping track of the lost resources (CA), if any.

4. The alert/alarm is triggered by MOSS BER ID 06, error code 05.

CA (Type 10) BER Detail Displays (Part 3 of 4)

CA BER, Type 10 - IDs 18, 1C, 1E, 97, 9B (foC1)

Program level 1 generates one of the following BERs when an error occurs during a PIO operation on a channel.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:10  ID:hh  LOST:ddd CP-ABEND:hhhh
CAn < description of the error >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  ETA:hhhh  RHB:hh  X74:hhhhhhhh  CAA:hh
 X79:hh  IAR:hhhhhh  I:hhhh  TA:hhhh  TD:hhhh
                                          (see note)
                                              |
                         ---------------------V------------------------
 X76       XD            CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
CAB/CHCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
         hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh CABCNTL:hhhh
X 0:hhhh X 1:hhhh X 2:hhhh X 3:hhhh X 4:hhhh X 5:hhhh X 6:hhhh
X 7:hhhh X B:hhhh X C:hhhh X D:hhhh X E:hhhh X F:hhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

CA BER, Type 10 - IDs 14, 16, 91, 9A (foC2)

Program level 1 generates one of the following BERs when an error occurs during an AIO operation with a channel.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:10  ID:hh  LOST:ddd CP-ABEND:hhhh
CAn < description of the error >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  ETA:hhhh  RHB:hh  X3M:hhhhhhhh  X75:hhhh
                                          (see note)
                                              |
                         ---------------------V------------------------
 X76       XD            CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
CAB/CHCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
         hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh CABCNTL:hhhh
X 0:hhhh X 1:hhhh X 2:hhhh X 3:hhhh X 4:hhhh X 5:hhhh X 6:hhhh
X 7:hhhh X B:hhhh X C:hhhh X D:hhhh X E:hhhh X F:hhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Note: For the 3725 Model 2, CLA1 information applies to the C2LB board, CLA2 applies C2LB2; except LAB3, all other information has no meaning for Model 2.

CA BER, Type 10 - IDs 10, 1B, 1F, 90, 92, 93, 94, 95, 96, 98, 99, 9C, 9E, 9F (foC3)

Program level 1 generates one of these BERs when a CA reports an error on its level 1.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:10  ID:hh  LOST:ddd CP-ABEND:hhhh
CAn < description of the error >
 F:bbbbbbbb ETA:hhhh
 X7E:hhhh  X76U:hhhh  RHB:hh  X74:hhhhhhhh  CAA:hh  BRR:hhhh  XE:hhhh
                                          (see note)
                                              |
                         ---------------------V------------------------
 X76       XD            CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
CAB/CHCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
         hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh CABCNTL:hhhh
X 0:hhhh X 1:hhhh X 2:hhhh X 3:hhhh X 4:hhhh X 5:hhhh X 6:hhhh
X 7:hhhh X B:hhhh X C:hhhh X D:hhhh X E:hhhh X F:hhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

CA BER, Type 10 - IDs 33, 34, 35, B1, B2, B5, B6 (foC4)

Program level 3 generates one of the following BERs when a CA request at level 3 remains unresolved.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:10  ID:hh  LOST:ddd CP-ABEND:hhhh
CAn < description of the error >
 X77:hhhh  X7F:hhhh  X0:hhhh   X1:hhhh   X2:hhhh   X3:hhhh   X4:hhhh   X5:hhhh
 X6:hhhh   X7:hhhh   XB:hhhh   XC:hhhh   XF:hhhh
CAB/CHCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
         hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh CABCNTL:hhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Notes:

- When the registers are set to "FF", the information they contain is not valid.
- For the 3725 Model 2, CLA1 information applies to the C2LB board, CLA2 applies C2LB2; except for LAB3, all other information has no meaning for Model 2.

CA BER, Type 10 - Field Explanation

Field Name	Meaning	Details on Page
BRR	Board RDV response to poll Contains the RDV address and error register indicating the CA position (see CDF)	2-182 2-403
CAn	Channel adapter number (1 to 6) in error description field This CA number (decimal) is derived from: - field CAA for PIO operation - field XE for CA error reported at level 1 - field X75 for AIO operation - field XF for CA error reported at level 3	
CAA	CA address (defined by the bits 4, 5, and 6 of this byte) as used by NCP/EP in its control blocks (not to be confused with ESC or NSC address used by NCP/EP) CAA field decoding (hh): 0123 4567 0000 0000 CA 1 hh = 0 0000 0010 CA 2 hh = 2 0000 0100 CA 3 hh = 4 0000 0110 CA 4 hh = 6 0000 1000 CA 5 hh = 8 0000 1010 CA 6 hh = A	
CAB/ CHCB	48 bytes of fields from the channel adapter control block (CAB), from CABCND up to and including CABXR6F. For EP, the fields CASEL through TERMADR are included from the EP CHCB (16 bytes). The remaining space is padded with xFF. CABCNTL: Channel adapter contact control flags. Padded with xFF for EP.	
CABC CNTL	Channel adapter contact control flags. Padded with xFF for EP.	
CABR CLA1 CLA2	CAB RDV address and error register CLAB1 RDV address and error register (see Note) CLAB2 RDV address and error register (see Note)	 2-182 2-182
ETA	TA field of IOH failure in level 1	
F	Indicator flag byte x... .... 1 Control program is NCP or PEP 0 Control program is EP .1.. .... Adapter down ..1. .... Control program put adapter down ...1 .... Error on invalid ESC .... 1... Unused .... .1.. Unused .... ..1. CA is being disabled ....1 IOH or IOHI on level 1 failed twice	
FRDV	Frame RDV address and error register (see Note)	2-182

Note:
For the 3725 Model 2, CLA1 information applies to the C2LB board, CLA2 information has no meaning for Model 2.
applies C2LB2; except LAB

Field Name	Meaning	Details on Page
I	First two bytes of instruction	
IAR	IAR of interrupt level	
LABn	LAB position n RDV address and error register (see note) 2-182 (where n is 3, 4, 5, 6, 7, and 8)	
RHB	RDV hash byte is the OR of byte 1 of all 'read RDV address and error register' commands	
TA	IOHI image -- TA data registers X'50', X'70' (TA:hhhh means data bytes 0 and 1)	11-040
TD	IOHI image -- TD data adapter specific bytes (TD:hhhh means data bytes 0 and 1)	11-040
X3M	CA cycle steal fixed pointer register	12-090
X0	X'0' - CA initial selection register	12-025
X1	X'1' - CA CSCW and subchannel address	12-025
X2	X'2' - data status register	12-030
X3	X'3' - CA ESC subchannel	12-035
X4	X'4' - CA IOH bytes 1 and 2	12-035
X5	X'5' - CA IOH bytes 3 and 4	12-035
X6	X'6' - CA NSC status register	12-040
X7	X'7' - CA enabled indications	12-045
XB	X'B' - CA ESC TIO address and status	12-050
XC	X'C' - CA AIO operations register	12-050
XD	X'D' - CA error register	12-055
XE	X'E' - CA level 1 error register	12-060
XF	X'F' - CA level 3 interrupt request (see CAn)	12-060
X74	X'74' - Cycle steal control word register	10-230
X75	X'75' - LAR bytes (see CAn)	10-230
X76	X'76' - IOC error summary register	10-230
X76U	X'76' - Cause of error not found (PIO to read error register failed)	10-230 2-182
X77	X'77' - Interrupt request reg - adapter level 2 and 3	10-230
X79	X'79' - Utility	10-230
X7E	X'7E' - CCU level 1 interrupt	10-230
X7F	X'7F' - Interrupt request reg - CCU level 2, 3, and 4	10-230

Notes:

- PF keys and header fields (such as SEL#) are explained on page 2-181.
- All values are in hexadecimal format (X'0' to X'F'), except for:
  a. The flag byte F and XD, which are in bit format (8 and 16 bits, 0 or 1)
  b. The error description line with a CA number in decimal (1 to 6)

TSS (Type 11) BER Detail Displays (Part 1 of 4)

TSS BER, Type 11 - Summary

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
14	foT1	0930	Address exception (AIO) X'76' bit 0.0 on.	3725 reIPL	A8 (4)
16	foT1	0931	Storage protect (AIO) X'76' bit 0.1 on.	3725 reIPL	A8 (4)
18	foT2	0932	IOH/IOHI to CS not installed X'7E' bit 0.5 on. IOC Bus check in Error Status Type 1 of CSP: bits 0.1 and 0.5 on (X'02' bits 0.1 and 0.5).	3725 reIPL	A8 (4)
1B	foT2	0933	Invalid IOH input to CS X'7E' bit 0.5 on. Origin given in Error Status type 1 of CSP, bit 1.7 on.	3725 reIPL	A8 (4)
1C	foT7	0	Line command reject. See "BER/Alarm/Alert Mechanism" page 2-250.	Line down	A15
1E	foT3	0	Invalid IOH output to CS (pgm reset done) X'7E' bit 0.5 on. Undefined IOH instruction sent to the CSP. Origin given in Error Status type 3 of CSP (bit 1.1 on).	CS down	A14(3)
1E	foT3	0	Invalid IOH output to CS (disable rdv done).	CS down	A13(3)
91	foT1	0	CS AIO error X'75' bit 0.0 on X'76' bit 0.4 on for IOC Timeout X'76' bit 0.5 on for IOC Bus In parity error X'76' bit 0.6 on in both cases (AIO) X'76' bits 0.0, 0.1, 0.2, 0.3 contain the IOC internal status at time of error.	CS retry	no (2)
91	foT1	0	CS AIO error (threshold-pgm reset done).	CS down	A12(3)
91	foT1	0	CS AIO error (threshold-disable rdv done).	CS down	A11(3)
92	foT1	0	CS AIO error unresolved. See "BER/Alarm/Alert Mechanism" page 2-250.	CS retry	no (2)
92	foT1	0	CS AIO error unresolved (limit threshold - pgm reset done).	CS down	A12(3)
92	foT1	0	CS AIO error unresolved (limit threshold - disable rdv done).	CS down	A11(3)
93	foT1	0	CS AIO invalid CSCW X'75' bit 0.0 on X'76' bits 0.2 and 0.6 on.	CS retry	no (2)
93	foT1	0	CS AIO invalid CSCW (limit threshold - pgm reset done).	CS down	A12(3)
93	foT1	0	CS AIO invalid CSCW (limit threshold - disable rdv done).	CS down	A11(3)
95	foT3	0	CS hardstop X'7E' bit 0.5 on. Origin given in Error Status type H of CSP.	CS down	A12(3)
96	foT3	0	CS disconnect state (following request from MOSS) X'7E' bit 0.5 on. Error Status type 1, bit 1.3 on. Ext Reg X'01' bit 5 on.	CS off line	no

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
97	foT2	0	CS PIO error - output IOH/IOHI X'75' bit 0.0 on X'76' bit 0.4 on for IOC Timeout X'76' bit 0.5 on for IOC Bus In parity error X'76' bit 0.6 off in both cases Origin given in Error Status type 1 of CSP.	CP retry	no (2)
98	foT2	0	CS PIO error - output IOH/IOHI (limit threshold reached on two 11 97 BERs - pgm reset done).	CS down	A12(3)
98	foT2	0	CS PIO error - output IOH/IOHI (limit threshold - disable rdv done).	CS down	A11(3)
99	foT3	0	CS adapter error X'7E' bit 0.5 on. Origin given in Error Status type 3 of CSP.	CS retry	no
99	foT3	0	CS adapter error (pgm reset done)	CS down	A12(3)
99	foT3	0	CS adapter error (disable rdv done)	CS down	A11(3)
9A	foT3	0	CS adapter error unresolved - CSP on LAB type A and Error Status = 0. - CSP on LAB type B and Error Status = 0 from one CSP plus an error in the Get Error Status to the other CSP. See "BER/Alarm/Alert Mechanism" page 2-250.	-	no
9A	foT3	0	CS adapter error unresolved (pgm reset done).	CS down	A12(3)
9A	foT3	0	CS adapter error unresolved (disable rdv done)	CS down	A11(3)
9B	foT3	0	Interrupt from disconnected CS level 1 interrupt presented to NCP/EP while the scanner is disconnected (X'01' bit 5 on). X'7E' bit 0.5 on.	-	no
9B	foT3	0	Interrupt from disconnected CS (disable rdv done).	CS down	A11(3)
9C	foT2	0	CS PIO error - input on get line ID (see BER 11 97 for general PIO errors).	CP retry	no (2)
9C	foT2	0937	CS PIO error - input on get line ID (limit threshold).	3725 reIPL	A7 (4)
A1	foT4	0	Unresolved level 2 interrupt If spurious retry count (the interrupt occurred on a non-defined line) See "BER/Alarm/Alert Mechanism" page 2-250.	CP retry	no (2)
A1	foT4	0936	Unresolved level 2 interrupt (limit threshold)	3725 reIPL	A7 (4)

(Continued on next page)

Notes:

1. BERs have different formats and different BER DETAIL screen layouts, according to the type of error reported:

   foT1: Level 1 during an AIO operation
   foT2: Level 1 during a PIO operation
   foT3: Error reported by scanner on level 1
   foT4: Unresolved error reported on level 3
   foT5: Scanner error reported on level 2
   foT6: Scanner error reported on level 3
   foT7: Control program error reported on level 1

2. The control program maintains an error counter. When the threshold is reached, the control program action is as indicated in the table. The threshold is 2 per 0.1 seconds per adapter.

3. The control program continues in degraded mode, keeping track of the lost resources (CS), if any.

4. The alert/alarm is triggered by MOSS BER ID 06, error code 05.

TSS BER (Type 11) Summary (Continued)

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
A2	foT5	0	Internal CS error reported via level 2 X'77' bit 0.1 on. Origin in LCS.	Line down	A15
A4	foT5	0	Recovery done on NCP backup timer expired. See "BER/Alarm/Alert Mechanism" page 2-250.		A15
B1	foT6	0	CS command timeout. Command sent to the scanner; backup timer in NCP/EP Lvl 3 expired before receiving a level 2 from scanner to process it. See "BER/Alarm/Alert Mechanism" page 2-250.	Line down	A15

TSS BERs, Type 11 - ID 14, 16, 91, 92, 93 (foT1)

Program level 1 generates one of the following BERs when an error occurs during an AIO operation on a scanner.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh  LOST:ddd  CP-ABEND:hhhh
CSnn LINEnn < error description >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  ETA:hhhh  RHB:hh  X3F:hhhhhhhh  X75:hhhh

                                         (See Note)
                                             |
                         ----------------------V-------------------- ------
 X76     CS STATUS2      CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB 7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhh h hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT B ER
```

TSS BER, Type 11 - IDs 18, 1B, 97, 98, 9C (foT2)

Program level 1 generates one of these BERs when an error occurs during a PIO operation on a scanner.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh  LOST:ddd CP-ABEND:hhhh
CSnn LINEnn < error description >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  ETA:hhhh  RHB:hh  X74:hhhhhhhh
 X79:hh  IAR:hhhhhh  I:hhhh  TA:hhhh  TD:hhhh
                                         (See Note)
                                             |
                         ----------------------V--------------------------
 X76     CS STATUS1      CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

TSS BER, Type 11 - IDs 1E, 1F, 95, 96, 99, 9A, 9B (foT3)

Program level 1 generates one of these BERs when an error is reported by a scanner on level 1.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh  LOST:ddd  CP-ABEND:hhhh
CSnn LINEnn < error description >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  RHB:hh  CSPA:hh  BRR:hhhh  ETA:hhhh

                                         (See Note)
                                             |
                         ----------------------V--------------------------
 X76     CS STATUS3/H    CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

TSS BER, Type 11 - ID A1 (foT4)

Program level 1 generates one of these BERs when a requested TSS level 2 interrupt remains unresolved.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh LOST:ddd CP-ABEND:hhhh
CSnn LINEnn < error description >
 F:bbbbbbbb TA:hh  TD:hh  NW:hhhh  IDR:hhhh  LNVT:hhhhhhhh  LCS:hh
 PSA:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
IOB/LXB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
        hhhhhhhh hhhhhhhh
SCB:hhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhh SCBCSCF:hh
AXB ACB TRACE:hhhhhhhh hhhhhhhh hhhhhhhh hhhh
AXB PSA TRACE:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hh
CCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhhh hhhhhhhh
    hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhhh hhhhhhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

TSS (Type 11) BER Detail Displays (Part 3 of 4)

TSS BER, Type 11 - ID A2, A4 (foT5)

Program level 2 generates one of these BERs when a scanner internal error or a transient line error is detected.

```
                         BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh LOST:ddd CP-ABEND:hhhh
CSnn LINEnn < error description >
F:bbbbbbbb TA:hh  TD:hh  NW:hhhh  IDR:hhhh  LCS:hh
PSA:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
IOB/LXB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
        hhhhhhhh hhhhhhhh
SCB:hhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhh SCBCSCF:hh
AXB ACB TRACE:hhhhhhhh hhhhhhhh hhhhhhhh hhhh
AXB PSA TRACE:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hh
CCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhhh hhhhhhhh
    hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhhh hhhhhhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

Note: For the 3725 Model 2, CLA1 information applies to the C2LB board, CLA2 applies C2LB2; except LAB3, all other information has no meaning for Model 2.

TSS BER, Type 11 ID 1C (foT7)

Program level 1 generates one of these BERs when a command reject is reported by a scanner on level 1 (control program error).

```
                         BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh
CSnn LINEnn < error description >
 F:bbbbbbbb
 TA:hh  TD:hh  IDR:hhhh  LCS:hh
 PSA:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhhhhhh hhhh hhhh


OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

TSS BER, Type 11 ID B1 (foT6)

Program level 3 generates one of these BERs when a timeout occurs on a command sent to the scanner.

```
                         BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:11  ID:hh
CSnn LINEnn < error description >
 F:bbbbbbbb TA:hh    TD:hh    NW:hhhh   IDR:hhhh  LCS:hh
 PSA:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
 IOB/LXB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh
         hhhhhhhh hhhhhhhh
 SCB:hhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhh SCBCSCF:hh
 AXB ACB TRACE:hhhhhhhh hhhhhhhh hhhhhhhh hhhh
 AXB PSA TRACE:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hh
 CCB:hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhhh hhhhhhhh
     hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhhh hhhhhhhh
OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

Note: For the 3725 Model 2, CLA1 information applies to the C2LB board, CLA2 applies C2LB2; except LAB3, all other information has no meaning for Model 2.

TSS BER, Type 11 - Field Explanation

Field Name	Meaning	Details on page
AXB ACB TRACE	14 bytes from the adapter control block extension (AXB), from field AXBTCTL through AXBSTAT3 inclusive. For EP, this area contains the CCB extension starting at the EP CCB offset x'60'.	
AXB PSA TRACE	17 bytes from the adapter control block extension PSA trace area (fields AXBISSCF through AXBTROFF). For EP, this area contains the remaining portion of the EP CCB extension padded with 16 bytes of x'FF'.	
BRR	Board RDV response to poll Contains the RDV address and error register	2-182
CABR	CAB RDV address and error register	2-182
CCB	64 bytes from the character control block. For NCP, the fields come from CCBL2 through CCBPOLL inclusive. For EP, the fields come from CCBTROPT thru CCBXPTR inclusive.	
CLA1 CLA2	CLAB1 RDV address and error register (see Note) CLAB2 RDV address and error register (see Note)	2-182 2-182
CSnn	CS number (decimal) in error description field This CS number is derived from: - field TA for PIO operation for CS error reported at level 2 for CA error reported at level 3 - field X75 for AIO operation - field CSPA for CS error reported at level 1 If no n is specified (blank CS), problem isolation by program was not possible. For explanation, see "Line Group" on page 11-050 (bits 1-4=0110, all scanners responded).	
CS STAT	CS STATUS1: CSP error status 1 CS STATUS2: CSP error status 2 CS STATUS3/H: CSP error status 3	13-350 13-350 13-350
CSPA	CSP address used by NCP/EP (see CSn and LINEnn)	
ETA	TA field of IOH failure in level 1	
F	Indicator Flag x... .... 1 Control program is NCP or PEP 0 Control program is EP .1.. .... Adapter down ..1. .... Control program put adapter down ...1 .... Redrive disabled .... 1... Unused .... .1.. Error on 'Get error status' .... ..1. CA is being disabled ....1 IOH or IOHI on level 1 failed twice	
FRDV	Frame RDV address and error register (see Note)	2-182
I	First two bytes of instruction	
IAR	IAR of interrupt level	
IDR	Get line ID response	13-123

TSS BER, Type 11 - Field Explanation (Continued)

Field Name	Meaning	Details on page
IOB/ LXB	36 bytes of the LINK IO control block (LXB) for SDLC lines of the output block (IOB) for BSC/SS lines.	
LABn	LAB position n RDV address and error register (see Note) (where n is 3, 4, 5, 6, 7, and 8)	2-182 2-182
LCS	Line communication status	13-351
LINEnn	Line number (0 to 31) within the CS (in error description line)	
LNVT	Line vector table	13-120
LOST	Lost record count (LRC)	
NW	Network address (NCP) or CA number and ESC (EP)	
PSA	Parameter area (16 bytes) - status area (12 bytes) The byte contents of the PSA depend on the current command (CCMD).	13-554
RHB	RDV hash byte is the OR of byte 1 of all read 'RDV address and error register' commands	
SCB	16 bytes from the station control block, from Field SCBSSCF through SCBRTCNT inclusive. For BSC/SS lines and for EP, this area is padded with x'FF'.	
SCBC/ CSF	Configurable station control flags from the station control block (SCB) padded with x'FF' for EP and BSC/SS lines.	
TA	IOH/IOHI image -- TA data registers X'50', X'70' (TA:hh means TA data byte 0) (see CSn and LINEnn)	11-040
TD	IOH/IOHI image -- TD data adapter specific bytes (TD:hh means TD data byte 1)	11-040
X3F X74 X75 X76 X76U X77 X79 X7E X7F	CSP shared pointer register X'74' - LAR bytes (See CSn and LINEnn) X'75' - Cycle steal control word register X'76' - IOC error summary register X'76' - Cause of error not found (PIO to read error register failed) X'77' - Interrupt request reg - adapter level 2 & 3 X'79' - Interrupt level X'7E' - CCU level 1 interrupt X'7F' - Interrupt request reg - CCU level 2, 3, & 4	2-182 10-230 10-230 10-230 10-230 2-182 10-230 10-230 10-230 10-230

Notes:

- PF keys and header fields (such as SEL#) are explained on page 2-181.
- All values are in hexadecimal format (x'0' to x'F'), except for:
  a. The flag byte F and CS STAT, which are in bit format (8 or 16 bits, 0 or 1)
  b. The error description line with a CS number and line number, which are in decimal.

NCP/EP (Type 12) BER Detail Displays

NCP/EP BER, Type 12 - Summary

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
11	foN1	000A	IN/OUT or IOH/IOHI on Level 5. IAR not 0, retry not possible.	3725 reIPL	A8
12	foN1	001B	Invalid Operation Code X'7E' bit 0.4 on.	3725 reIPL	A8
13	foN1	0950	Address Exception - I fetch X'7E' bit 1.1 on.	3725 reIPL	A8
14	foN1	0951	Address Exception - I execution X'7E' bit 1.3 on.	3725 reIPL	A8
15	foN1	0952	Storage Protect - I fetch IAR not 0. X'7E' bit 1.2 on.	3725 reIPL	A8
16	foN1	0953	Storage Protect - I execution X'7E' bit 1.4 on.	3725 reIPL	A8
17	foN1	0954	Level 5 branch to storage location 0. IAR = 0.	3725 reIPL	A8
18	foN1	0955	User (non-NCP Code) branch to storage location 0. IAR = 0.	3725 reIPL	A8
19	foN1	000E	Level 1 code error (interrupt reason lost). Program check in level 1.	3725 reIPL	A8
21	foN2	0	Level 2 PCI The level 2 PCI should be off because level 1 has reset it (X'77' bit 0.7). If it is on (hot level 2 PCI), or if spurious retry count from a PCI level 2 interrupt.	-	no (2)
21	foN2	0956	Level 2 PCI (limit threshold)	3725 reIPL	A8

Notes:

1. BERs have different formats and different BER DETAIL screen layouts, according to the type of error reported:

   foN1: NCP/EP program exception reported at level 1
   foN2: Program-controlled interrupt request at level 2 unresolved

2. The control program maintains a counter of error occurrences. When the threshold is reached, the control program action is as indicated in the table. The threshold is 2 per 0.1 seconds.

NCP/EP BER, Type 12 - IDs 11 thru 19 (foN1)

Program level 1 generates one of these BERs when a NCP/EPprogram exception occurs.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:12  ID:hh LOST:ddd CP-ABEND:hhhh
< error description line >
 X7E:hhhh  X74:hhhhhh  X79:hh  IAR:hhhhhh  I:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

NCP/EP BER, Type 12 - ID 21 (foN2)

Program level 1 generates one of these BERs when a program controlled interrupt request at level 2 remains unresolved.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:12  ID:21 LOST:ddd CP-ABEND:hhhh
< error description line >
 X7F:hhhh  IAR3:hhhhhhhh  IAR4:hhhhhhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5:NEXT BER
```

NCP/EP BER, Type 12 - Field Explanation

Field Name	Meaning	Details on page
I	First two bytes of instruction	
IAR	IAR of interrupt level	
IAR3	IAR contents of level 3	
IAR4	IAR contents of level 4	
X74	X'74' - Lagging Address Register	10-230
X79	X'79' - Byte 1 interrupted levels	10-230
X7E	X'7E' - CCU level 1 interrupt	10-230
X7F	X'7F' - Interrupt request reg - CCU level 2, 3,and 4	10-230

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.
2. All values are in hexadecimal format (X'0' to X'F').

CCU (Type 13) BER Detail Displays (Part 1 of 2)

CCU BER, Type 13 - Summary

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
32	foU3	0	Level 3 interrupt configuration check. Invalid level 3 interrupt (such as CA interrupt on a link-attached box). Can be a Sysgen error.	-	no (3)
32	foU3	0978	Level 3 interrupt configuration check (limit threshold).	3725 reIPL	A8
91	foU1	0	Unresolved level 1 interrupt. No bit in CA reg X'E'.	-	no (3)
91	foU1	0970	Unresolved level 1 interrupt (limit threshold).	3725 reIPL	A7
92	foU1	0971	Unresolved interrupted level. Interrupt level not 2, 3, 4, 5 as per content of X'79' bits 1.0, 1.1, 1.2, 1.3.	3725 reIPL	A7
93	foU1	0972	Unexpected CCU hardcheck (CCU not stopped). Not possible to reset X'77', bit 0.1, or MOSS has not reset this bit after IPL.	3725 reIPL	A7
94	foU1	0973	Unexpected IPL request. Not possible to reset X'77' bit 0.0, or MOSS has not reset this bit after IPL.	3725 reIPL	A7
95	foU1	0971	Invalid level 1 interrupt, IAR (IN X'79').	3725 reIPL	A7
B1	foU3	0	Unresolved level 3 interrupt. NCP reading out X'77' does not find bit 1.0 on (CA Lvl 3) and X'7F' bits 0.2, 0.6, 1.5 and 1.6 on, (level 3 raised by MOSS Diag, User, Timer, or PCI).	-	no (3)
B1	foU3	0974	Unresolved level 3 interrupt (limit threshold)	3725 reIPL	A7
C1	foU2	0	Unresolved level 4 interrupt NCP reading out X'7F' does not find bits 0.3, 0.4, 0.7 and 1.7 on (Lvl 4 interrupt raised by MOSS request SVC, MOSS response SVC, PCI or SVC).	-	no (3)
C1	foU2	0975	Unresolved level 4 interrupt (limit threshold)	3725 reIPL	A7
C2	foU2	0	Unresolved level 4 PCI. Level 4 PCI (X'7F' bit 0.7) and not Wait state, but no bytes are set in level 4 Control Block of NCP. Mask used to set interrupt does not indicate: Lease, Slowdown, Dispatcher Request, SVC Interrupt, or Mask indicates Wait state plus MOSS offline, Outmail box, CRP request for MOSS transfer, or MOSS request.	-	no (3)
C2	foU2	0976	Unresolved level 4 PCI (limit threshold).	3725 reIPL	A7

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
C3	foU2	0	Hot/Spurious level 4 PCI interrupt. Level 4 PCI latch (X'7F' bit 0.7) does not go off, after a reset by Output X'77' bit 1.6.	-	no (3)
C3	foU2	0977	Hot/Spurious level 4 PCI interrupt (limit threshold).	3725 reIPL	A7
C4	foU2	0979	Unresolved level 4 SVC interrupt. Level 4 SVC interrupt (X'7F' bit 1.7) but CCU is in Wait state. Abend if Hot SVC interrupt (X'7F' bit 1.7 still on after reset latch by Out X'77' bit 1.7).	3725 reIPL	A7
C5	foU2	0	Continuous/unresolved MOSS level 4 request (X'7F' bit 0.3 still on after reset latch by Out X'77' bit 0.4).	-	no (3)
C5	foU2	097A	Continuous/unresolved MOSS Level 4 request (limit threshold).	3725 reIPL	A7
C6	foU2	0	Continuous/unresolved MOSS level 4 request (X'7F' bit 0.4 still on after reset latch by Out X'77' bit 0.5).	-	no (3)
C6	foU3	097B	Continuous/unresolved MOSS level 4 request (limit threshold).	3725 reIPL	A7

Notes:

1. BERs have different formats and different BER DETAIL screen layouts, according to the type of error reported:

   foU1: level 1 generated for CCU-related errors
   foU2: level 4 generated for CCU-related errors
   foU3: level 3 generated for CCU-related errors
   (only for link-attached 3725)

2. The alert/alarm is triggered by MOSS BER ID 06 error code 05.

3. The control program maintains a counter of errors. When the threshold is reached, the control program action is as indicated in the table. The threshold is 2 per 0.1 seconds.

CCU (Type 13) BER Detail Displays (Part 2 of 2)

CCU BER, Type 13 - IDs 91 thru 95 (foU1)

Program level 1 generates one of these BERs when a CCU-related error occurs.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:13  ID:hh  LOST:ddd CP-ABEND:hhhh
< error description line >
 X7E:hhhh X74:hhhhhh X79:hh IAR:hhhhhh X7D:hhhh
 XD:hhhh  XE:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

CCU BER, Type 13 - IDs C1 thru C6 (foU2)

Program level 4 generates one of these BERs when a CCU-related error occurs.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:13  ID:hh  LOST:ddd CP-ABEND:hhhh
< error description line)
 X77:hhhh  X7F:hhhh  RCB:hhhh hhhh hhhh hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

CCU BER, Type 13 - IDs 32, B1 (foU3)

Program level 3 generates one of these BERs only if the 3725 is link-attached (remote) and an interrupt from a channel adapter is detected via the CCU external register X'77'.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:13  ID:hh  LOST:ddd CP-ABEND:hhhh
< error description line >
 X77:hhhh  X7F:hhhh  X0 :hhhh  X1 :hhhh  X2 :hhhh  X3 :hhhh  X4 :hhhh  X5 :hhhh
 X6 :hhhh  X7 :hhhh  XB :hhhh  XC :hhhh  XD :hhhh  XE :hhhh  XF :hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

CCU BER, Type 13 - Field Explanation

Field Name	Meaning	Details on page
IAR	IAR of interrupt level	
RCB	Level 4 router control block	
X0	X'0' - Channel adapter initial selection register	12-025
X1	X'1' - CA CSCW and subchannel address	12-025
X2	X'2' - data status register	12-030
X3	X'3' - CA ESC subchannel	12-035
X4	X'4' - CA IOH bytes 1 and 2	12-035
X5	X'5' - CA IOH bytes 3 and 4	12-035
X6	X'6' - CA NSC status register	12-040
X7	X'7' - CA enabled indications	12-045
XB	X'B' - CA ESC TIO address and status	12-050
XC	X'C' - CA AIO operations register	12-050
XD(=X6D)	X'D' - CA error register	12-055
XE(=X6E)	X'E' - CA level 1 error register	12-060
XF	X'F' - CA level 3 interrupt request and CA number	12-060
X74	X'74' - Cycle steal control word register	10-230
X77	X'77' - Interrupt request reg - adapter level 2 and 3	10-230
X79	X'79' - Interrupted Level	10-230
X7D	X'7D' - CCU hardcheck register	10-230
X7E	X'7E' - CCU level 1 interrupt	10-230
X7F	X'7F' - Interrupt request reg - CCU level 2, 3, and 4	10-230

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.
2. All values are in hexadecimal format (X'0' to X'F').

IOC (Type 14) BER Detail Displays

IOC BER, Type 14 - Summary

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
91	foI1	0	Unresolved adapter level 1.	-	no (2)
91	foI1	0990	Unresolved adapter level 1 (limit threshold).	3725 reIPL	A7
92	foI1	0	Unresolved AIO level 1. Attempt to cycle steal by CSP or CA as indicated by X'75' bit 0.0.	-	no (2)
92	foI1	0991	Unresolved AIO level 1 (limit threshold).	3725 reIPL	A7
93	foI1	0	Unresolved PIO level 1. PIO error detected by the IOC that was found unresolved (no Time out nor Parity error, in X'76' bit 0.4 and 0.5).	-	no (2)
93	foI1	0992	Unresolved PIO level 1 (limit threshold).	3725 reIPL	A7
95	foI1	0994	All read RDV error registers failed Read Redrive Error regs (X'1' or X'9') fails multiple times in level 1. The RDV slot in the BER contains X'FFFF' if the Read RDV Error reg fails,and X'FFyy' if the Write RDV Error reg fails; (yy contains the Error reg while the first byte contains the Address).	3725 reIPL	A7

Notes:

1. All IOC BERs (type 14) have the same format and the same BER DETAIL screen layout:

   foI1: Level 1 when an error occurs on the IOC bus.

2. The control program maintains a counter of errors. When the threshold is reached, the control program action is as indicated in the table. The threshold is 2 per 0.1 seconds.

3. If a read RDV error register command fails multiple times in level 1, the control program stores 'FF' in byte 1 of BER types 11 and 14. If this happens for all the RDVs, the BER type 14, ID 95, is generated.

IOC BER, Type 14 - All IDs (91, 92, 93, 95) (foI1)

Program level 1 generates one of these BERs when an error occurs on the IOC bus.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:14  ID:hh  LOST:ddd CP-ABEND:hhhh
< error description line >
 F:bbbbbbbb
 X7E:hhhh X76U:hhhh RHB:hh X74:hhhhhhhh X75:hhhh

                        (see Note 3)
                                |
      ------------------------V-------------------------
 X76 CLA1 CLA2 LAB3 CABR FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh



 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

IOC BER, Type 14 - Field Explanation

Field Name	Meaning	Details on page
CABR	CAB RDV address and error register	
CLA1	CLAB1 RDV address and error register (see Note 3)	2-182
CLA2	CLAB2 RDV address and error register (see Note 3)	2-182
F	Indicator flag byte x... .... 1 Control program is NCP or PEP 0 Control program is EP .1.. .... Adapter down ..1. .... Control program put adapter down ...1 .... Error on invalid ESC .... 1... Second CSP on board is down .... .1.. Error on 'Get error status' .... ..1. CA is being disabled ....1 IOH or IOHI on level 1 failed twice	
FRDV	Frame RDV address and error register (see Note 3)	2-182
LABn	LAB position n RDV address and error register (where n is 3, 4, 5, 6, 7, and 8) (see Note 3)	2-182
RHB	RDV hash byte is the OR of byte 1 of all read 'RDV address and error register' commands	
X74	X'74' - Cycle steal control word register	10-230
X75	X'75' - Lagging Address Register (LAR) bytes	10-230
X76	X'76' - IOC error summary register	10-230
X76U	X'76' - Cause of error not found (PIO to read error register failed)	10-230 2-182
X7E	X'7E' - CCU level 1 interrupt	10-230

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.

2. All values are in hexadecimal format (X'0' to X'F'), except for the flag indicator F, which is in bit format (8 bits, 0 or 1)

3. For the 3725 Model 2, CLA1 information applies to the C2LB board, CLA2 applies C2LB2; except LAB3, all other information has no meaning for Model 2.

TRSS (Type 15) BER Detail Display (Part 1 of 3)

TRSS BER, Type 15 - Summary

BER	BER Format (1)	Ctrl Pgm Abend Code	Error Description	Recovery or Program Action	Alarm or Alert
14	foR1	0B01	Address exception (AIO)	3725 down	A8 (4)
16	foR1	0B02	Storage protect (AIO)	3725 down	A8 (4)
18	foR2	0	IOH/IOHI to TRA not installed (PIO)	....	...(.)
91	foR1	0	TRM AIO error	TRM retry	no (2)
91	foR1	0	TRM AIO error (threshold)	TRM down	A28(3)
91	foR1	0	TRM AIO error (RDV disabled)	TRM down	A28(3)
92	foR1	0	TRM AIO error unresolved	TRM retry	no (2)
92	foR1	0	TRM AIO error unresolved (threshold)	TRM down	A28(3)
92	foR1	0	TRM AIO error unresolved (RDV disabled)	TRM down	A28(3)
93	foR1	0	TRM AIO invalid CCW	TRM retry	no (2)
93	foR1	0	TRM AIO invalid CCW (threshold)	TRM down	A28(3)
93	foR1	0	TRM AIO invalid CCW (RDV disabled)	TRM down	A28(3)
96	foR3	0	TRM disconnect state (request by MOSS)	TRM off	...(.)
97	foR2	0	TRM PIO error	TRM retry	no (2)
98	foR2	0	TRM PIO error (threshold)	TRM down	A28(3)
98	foR2	0	TRM PIO error (RDV disabled)	TRM down	A28(3)
99	foR3	0	TRM adapter error	TRM retry	no (2)
99	foR3	0	TRM adapter error	TRM down	A28(3)
9A	foR3	0	Unresolved TRM error	TRM down	A28(3)
9B	foR3	0	Disconnected TRM Interrupt	TRM down	no (2)
9C	foR2	0	TRM PIO error - input on get line ID	TRM retry	no (2)
9C	foR2	09x3	TRM PIO error - input on get line ID	3725 down	A7 (4)
A3	foR4	0	Invalid level 2 interrupt	TRM down	A28(3)
A4	foR4	0	DMA or Interrupt vector error	TIC retry	no (2)
A4	foR4	0	DMA or Interrupt vector error	TIC down	A29(3)
A5	foR4	0	DMA or Interrupt vector error	TRM down	A28(3)
A7	foR4	0	PIO-MMIO error	TIC retry	no (2)
A7	foR4	0	PIO-MMIO error	TIC down	A29(3)
A8	foR4	0	PIO-MMIO error	TRM down	A28(3)
AC	foR5	0	TIC adapter check	TIC down	A29(3)
AF	foR6	0	TIC check at Open time	TIC down	A29(3)
B2	foR7	0	TIC check at Initialization time	TIC retry	no (2)
B2	foR7	0	TIC check at Initialization time	TIC down	A29(3)
B3	foR8	0	Back-up Time out	TIC down	A29(3)
B4	foR8	0	Deadman Time out	TIC down	A29(3)
B5	foR8	0	Back-up Time out	TIC down	A29(3)
B6	foR8	0	Incomplete frame Time out	TIC down	A29(3)

Notes:

1. BERs have different formats and different BER DETAIL screen layouts, according to the type of error reported:

   foR1: Level 1 during an AIO operation
   foR2: Level 1 during a PIO operation
   foR3: Error reported by TRM on level 1
   foR4: Error detected by TRM on level 2
   foR5: TIC error reported on level 2
   foR6: TIC error at open time reported on level 2
   foR7: TIC error reported on level 3
   foR8: TRM error reported on level 3

2. The control program maintains an error counter. When the threshold is reached, the control program action is as indicated in the table.

3. The control program continues in degraded mode, keeping track of the lost resources, if any.

4. The alert/alarm is triggered by MOSS BER ID 06, error code 05.

TRSS BER, Type 15 - IDs 14, 16, 91, 92, 93 (foR1)

Program level 1 generates one of these BERs when an error occurs during a AIO operation on a TRA.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:hh  LOST:ddd CP-ABEND:hhhh
TRMnn TICn < error description >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  ETA:hhhh  RHB:hh  X3F:hhhhhhhh X75:hhhh

 X76     TRM STATUS1    CLA1 CLA2 LAB3 CAB  FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
```

TRSS BERs, Type 15 - IDs 18, 97, 98, 9C (foR2)

Program level 1 generates one of the following BERs when an error occurs during an PIO operation on a TRA.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:hh  LOST:ddd  CP-ABEND:hhhh
TRMnn TICn < error description >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  ETA:hhhh  RHB:hh  X74:hhhhhhhh
 X79:hh  IAR:hhhhhh  I:hhh  TA:hhhh  TD:hhhh

 X76     TRM STATUS1    CLA1 CLA2 LAB3 CAB  FRDV LAB6 LAB5 LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
```

TRSS BER, Type 15 - ID 96, 99, 9A, 9B (foR3)

Program level 1 generates one of the following BER when a TRM is disconnected by MOSS, or when an error is exported by a TRM on level 1.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd: TYPE:15  ID:96
TRMnn TICn < error description >
 F:bbbbbbbb
 X7E:hhhh  X76U:hhhh  RHB:hh  TRMA:hh  BRR:hhhh

 X76     TRM STATUS1    CLA1 CLA2 LAB3 CAB  FRDV LAB6 LAB5LAB4 LAB7 LAB8
hhhh bbbbbbbb bbbbbbbb hhhh hhhh hhhh hhhh hhhh hhhh hhhhhhhh hhhh hhhh
```

TRSS BER, Type 15 - IDs A3, A4, A5, A7, A8 (foR4)

Program level 2 generates one of the following BERs when an error occurs when internal TRM error or TIC.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:hh
TRMnn TICn < error description >
 F:bbbbbbbb
 TA:hhhh TICA:hh
 TRM STATUS2
 bbbbbbbb bbbbbbbb
```

TRSS (Type 15) BER Detail Display (Part 2 of 3)

TRSS BER, Type 15 - IDs AC (foR5)

Program level 2 generates the following BER when a TIC adapter check occurs on a TIC.

```
                                   BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:AC
TRMnn TICn < error description >
 F:bbbbbbbb
 TA:hhhh TICA:hh
 TRM STATUS2
 bbbbbbbb bbbbbbbb
 TIC ADAPTER CHECK STATUS:
 bbbbbbbb bbbbbbbb hhhh hhhh hhhh
```

TRSS BER, Type 15 - IDs AF (foR6)

Program level 2 generates the following BER when a TIC check occurs at open time.

```
                                   BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:AF
TRMnn TICn < error description >
 F:bbbbbbbb
 TA:hhhh TICA:hh
 TRM STATUS2
 bbbbbbbb bbbbbbbb
 bbbbbbbb bbbbbbbb
```

TRSS BER, Type 15 - IDs B2 (foR7)

Program level 3 generates the following BER when a TIC/TRM check occurs on a command seat to a TRM.

```
                                   BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:B2
TRMnn TICn < error description >
 F:bbbbbbbb
 TA:hhhh               TICA:hh
 TRM IIR               TIC CTL REGISTER
 bbbbbbbb bbbbbbbb     bbbbbbbb bbbbbbbb
```

TSS BER, Type 15 - IDs B3, B4, B5, B6 (foR8)

Program level 3 generates one of the following BERs when a time-out occurs on a command seat to a TRM.

```
                                   BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:15  ID:hh
TRMnn TICn < error description >
 F:bbbbbbbb
 TA:hhhh               TICA:hh
 TRM IR/BR             TIC CTL REGISTER
 bbbbbbbb bbbbbbbb     bbbbbbbb bbbbbbbb
```

TRSS BER, Type 15 - Field Explanation

Field Name	Meaning	Details on Page
BRR	Board RDV response to poll Contains the RDV address and error register	2-182
CABR CLA1 CLA2	CAB RDV address and error register CLAB1 RDV address and error register (see Note) CLAB2 RDV address and error register (see Note)	2-182 2-182 2-182
ETA	TA field of IOH failure in level 1	
F	Indicator Flag at level 1 x... .... 1 Control program is NCP or PEP 0 Control program is EP .1.. .... Adapter down ..1. .... Control program put adapter down ...1 .... Redrive disabled .... 1... Reserved .... .1.. Error on 'Get error status' .... ..1. CA is being disabled ....1 IOH or IOHI on level 1 failed twice Indicator Flag at level 2 and 3 x... .... 1 Control program is NCP or PEP 0 Control program is EP .1.. .... Adapter down ..1. .... Reserved ...1 .... Reserved .... 1... TIC dump requested .... .1.. Reserved .... ..1. Reserved ....1 Reserved	
FRDV	Frame RDV address and error register (see Note)	2-182
I	First two bytes of instruction	
IAR	IAR of interrupt level	
IDR	Get line ID response	
LABn	LAB position n RDV address and error register (see Note) (where n is 3, 4, 5, 6, 7, and 8)	2-182 2-182
LOST NW	Lost record count (LRC) Network address (NCP)	
RHB	RDV hash byte is the OR of byte 1 of all read 'RDV address and error register' commands	
SSB	System Status Block	
TA	IOH/IOHI image -- TA data registers X'50', X'70' (TA:hh means TD data byte 1)	11-040
TD	IOH/IOHI image -- TD data adpter specific bytes (TD:hh means TD data byte 1)	11-040
TICA	TIC internal address 00-03 (within the TRM)	
TRM STAT2	TRA Level 2 error status	15-107

continued on next page

Field Name	Meaning	Details on Page
TRMnn	TRM number (decimal in error description field This TRM number is derived from: - field TA for PIO operation for CS error reported at level 2 for CA error reported at level 3 - field X75 for AIO operation - field TRM Status LVL1 for TRM adapter error reported at LVL1 If no nn is specified (blank), problem isolation by program was not possible.	
TICn	TIC number 1-4 within the TRM	
TIC ADPT CHECK STAT	Four halfwords giving reason for TIC microcode ABEND	15-137
TRM STAT1	TRA level 1 error status	15-107
TRM IR/ BR	Interrupt request/Bus request flags	15-108
TIC CTL REG	TIC control register	15-106
TRM IIR	TIC interrupt register (initialize)	15-170
X3F	CSP shared pointer register	2-182
X74	X'74' - LAR bytes	10-230
X75	X'75' - Cycle steal control word register	10-230
X76	X'76' - IOC error summary register	10-230
X76U	X'76' - Cause of error not found (PIO to read error register failed)	10-230 2-182
X77	X'77' - Interrupt request reg - adapter level 2 and 3	10-230
X79	X'79' - Interrupt level	10-230
X7E	X'7E' - CCU level 1 interrupt	10-230
X7F	X'7F' - Interrupt request reg - CCU level 2, 3, and 4	10-230

Notes:

1. PF keys and header fields (such as SEL) are explained on page 2-181.
2. All values are in hexadecimal format (X'0' to X'F'), except for:
   a. The flag byte F and TIC ADPT CHECK STAT, SSB, TRM IR/BR, TIC CTL Register, TRM IIR, TRM status 1, TRM status 2, which are in bit format (8 or 16 bits, 0 or 1)
   b. The error description line with a TRM number and TIC number, which are in decimal.

MOSS (Type 01) BER Detail Display (Part 1 of 3)

MOSS BER, Type 01 - Summary

BER ID	MOSS Check or Error Code	BER Format (1)	Error Description	Recovery or Control Pgm /Microcode Action	Alarm	Alert	Error Count (6)
00	02	foM0	Storage parity check on data fetch. Register space parity error. Detected by level 0 (MCPC register bit 2).	MOSS re-IML	no	no	Y
00	03	foM0	TTA parity error MOSS level 0. Detected by level 0 (MCPC register bit 2).	MOSS re-IML	no	no	Y
00	04	foM0	Storage parity check on I fetch. Detected by level 0 (MCPC register bits 2).	MOSS re-IML	no	no	Y
00	06	foM0	I/O error on CCA. PIO time out or inbound parity error. Detected by level 0 (MCPC register bits 0 or 1).	MOSS re-IML	no	no	Y
00	07	foM0	Level 0 I/O error on MCC. PIO time out or inbound parity error (MCPC register bit 2 and MCC Status reg 2, bit 5). CCU time out on MIOC command (MCC Status reg 2, bits 1 and 5). CCU interface parity error on MIOC command (MCC Status reg 2, bits 5 and 7) MIOC Interface parity error on MIOC command (MCC Status reg 2, bits 4 and 5) Invalid command issued by MOSS microcode (MCC Status reg 2, bit 5).	MOSS re-IML	no	no	Y
00	08	foM0	Level 0 I/O error on diskette adapter. PIO time-out or inbound parity error on command to the diskette (Diskette Adapter Status reg, bit 5).	MOSS re-IML	no	no	Y
00	0C	foM0	CCU time-out unrecoverable (MCC Status reg 2, bits 1 and 5).	MOSS re-IML	no	no	Y
00	0D	foM0	CCU-MOSS connection parity error (MCC Status reg 2, bits 5 and 7).	MOSS re-IML	no	no	Y
00	0E	foM0	MIOC interconnection parity error (MCC Status reg 2, bits 5 and 6).	MOSS re-IML	no	no	Y
00	0F	foM0	PIO retry threshold on MCC error (MCC Status reg 2, bit 5).	MOSS re-IML	no	no	Y

BER ID	MOSS Check or Error Code	BER Format (1)	Error Description	Recovery or Control Pgm /Microcode Action	Alarm	Alert	Error Count (6)
00	all other	foM0	MOSS level 0 reported error. All these errors correspond to MOSS CHECK situations. The complete list is given in the MIM Part 2, Chapter R5. They trigger MOSS complete recovery. Origin : Level 0 Level 1 Level 2 (unexpected interrupts) MOSS supervisor microcode Console support microcode Diskette support microcode MCC support microcode Operator control microcode Mailbox microcode MOSS applications	MOSS dump and reIML	A2	A2	Y
00	any	foM0	MOSS level 0 hardstop (limit threshold). On all the above MOSS CHECK errors, the MOSS attempts recovery by re-IMLing itself. If there are more than 10 such recoveries within 1 hour, the MOSS declares itself down and sends MOSS Inop to NCP/EP (MCC Status Reg 1, bit 3). A HEX Code is displayed on the Ctrl Panel. The Control Program then creates a BER 01 ID 91 and sends Alert A1 to the HOST (NCP only).	MOSS down	no	A1	
01	02	foM1	IOC operation error during MIOH (CCU to MOSS Status A reg, X'11', bit 0)	MOSS reset	no	no	Y
01	02	foM1	IOC operation error (limit threshold)	MOSS down	no	A1	
01	03	foM1	Adapter clock check (MCC Status Reg 2, bit 4)	MOSS reset	no	no	Y
01	03	foM1	Adapter clock check (limit threshold).	MOSS down	no	A1	
01	04	foM1	CCU clock check (MCC Status Reg 2, bit 3).	MOSS reset	no	no	Y
01	04	foM1	CCU clock check (limit threshold).	MOSS down	no	A1	
01	05	foM1	CCU hardcheck detected (CCU to MOSS Status A reg, X'11', bit 6) Upon detection of this event, MOSS will start a CCU automatic re-IPL. See Specific Mechanisms below.	3725 re-IPL	(7)	(7	
01	07	foM1	Control program abend (CCU to MOSS Status A reg, X'11', bit 1 corresponding to X'79' bit 0.2) Upon detection of this event, MOSS will start a CCU automatic re-IPL. See "BER/Alarm/Alert Mechanism" page 2-250.	3725 re-IPL	(7)	(7	

For notes, see page 2-242

MOSS BER, Type 01 - Summary (Continued)

BER ID	MOSS Check or Error Code	BER Format (1)	Error Description	Recovery or Control Pgm /Microcode Action	Alarm	Alert	Error Count (6)
01	09	foM1	Address exception check in CCU (CCU to MOSS Status A reg, X'11', bit 5).	MOSS down	no	A1	
01	0A	foM1	MOSS/MIOC operation check, CCU detected (CCU to MOSS Status A reg, X'11', bit 7).	MOSS down	no	A1	
02	any	foM2	CCU logical interface. (2)	MOSS down	no	A1	
02	any	foM2	CCU logical interface. (2)	MOSS fnct message	no	no	
03	any	foM3	Diskette drive and/or adapter error. CNT = 10 and ERROR = X'8x'.	MOSS inop	A3	A3	Y
03	any	foM3	Diskette file error (3). CNT not 10 and ERROR = X'4x'.	-	A4	A4	Y
04	0A	foM4	Console CAC detected exception.	Console unavailable	no	A5	
04	0C	foM4	Console CAC detected error.	unavailable	no	A5	
04	40	foM4	Console error (CCA Basic Status Reg bits 4 and 5).	unavailable	no	A5	
05	any	foM5	MOSS-Scanner interface error. Error detected by MOSS levels 1 or 4, when communicating with a scanner. (MCC Status reg 1, bit 6, at level 4) (CCU to MOSS Status A reg X'11' bit 0, and X'76' bits 0.6 or 0.7, at level 1).	MOSS fnct message	no	no	
06	01	foM7	BER file deleted (via MOSS command)	File purged	no	no	
06	02	foM7	BER stack overflow in MOSS storage. MOSS maintains a 256 byte buffer to stack incoming BERs, before logging on the diskette. Some BERs have been lost.	BERs lost	no	no	
06	03	foM6	3725 IPL error (IPL not stopped). (4) Some errors do not prevent the completion of IPL :console msg -scanner not IMLed successfully -bad parameters passed by Control Program -errors in CA monitoring task -error found on the diskette which is not detrimental for the IPL -console or console adapter error. Corresponding BERs are in the BER File. There is a message on the Console.	IPL completion	no	no	
06	04	foM7	Scanner/IOC Bus error during 3725 IPL (IPL not stopped). This BER complements BER 01 03 above, and is specific of one scanner in error. Created upon Checkout results (found in CS field). There is a message on the Console.	IPL Completion Console Msg	A11	A11	
06	05	foM7	3725 re-IPL end. MOSS creates this entry to end the re-IPL and generate the Alert reporting the error that caused the re-IPL. See Specific Mechanisms below.	-	no	(5)	
06	06	foM6	3725 IPL check. The MOSS Microcode action is dependent upon the kind of 3725 IPL or IML error found, see Hex Display (MIM Part 2 Chapter R4).	IPL stopped Hex Display	A10	no	
06	07	foM7	MOSS offline request by operator.	MOSS offline	A6	A6	
06	08	foM9	3725 re-IPL for CCU hardcheck (CCU to MOSS Status A reg, bit 6). See BER 01 01 05 which precedes it. This BER allows MOSS to create an Alarm. See "BER/Alarm/Alert Mechanism" page 2-250 below.	IPL process Phase 1B	A7	no	
06	08	foM10	3725 re-IPL for Control Program Abend, no BER in CRP, (Ext. reg X'79' bit 0.2, raising CCU to MOSS reg X'11' bit 1 in MOSS) see BER 01 01 07 which precedes it. This BER allows MOSS to create an Alarm. See "BER/Alarm/Alert Mechanism" page 2-250.	IPL process Phase 1B	A8	no	
06	09	foM11	CLDP check (Output X'70' with cause of check in External Reg X'72' bytes 0 and 1). Hex Display indication at Control Panel.				
06	0A	foM12	Unexpected level 1 due to a CA error detected by MOSS during CA monitoring task. (CA level 1 reg X'D', raising CCU level 1 reg X'7E' bit 0.5).		no	no	
07	any	foM13	Moss/TRA interface error Error detected by MOSS level 1, 4 or 7 when communicating with a TRA	Moss appl Message	no	no	

For notes, see page 2-242

MOSS (Type 01) BER Detail Display (Part 3 of 3)

MOSS BER, Type 01 - Summary (Continued)

BER ID	MOSS Check or Error Code	BER Format (1)	Error Description	Recovery or Control Pgm /Microcode Action	Alarm	Alert	Error Count (6)
The BER IDs that follow are generated by NCP/EP (8)							
91		foM8	Level 1 interrupt MOSS Down passed to Control Program, by MOSS (MCC Status reg 1, bit 3 giving a X'7E' input reg bit 0.0 in the CCU). BER built by Control Program, and saved in the CRP. If this BER is in the diskette BER File, it means that it has been passed to MOSS, when MOSS was re-IMLed and set Online. Reason for MOSS down might be found in the BER File itself, by looking at other BERs built by MOSS, which triggered the MOSS Inop bit in MCC Status reg.	MOSS down	no	A1	
B3		foM8	CP/MOSS connection Out Mailbox command time-out at level 3 in Control Program	MOSS down	no	A1	
C1		foM8	CP/MOSS connection Out Mailbox request error at level 4 in Control Program	MOSS down	no	A1	
C2		foM8	CP/MOSS connection In Mailbox command error at level 4 in Control Program	MOSS down	no	A1	

Notes:

1. BERs have different formats and different BER DETAIL screen layouts, according to the type of error reported:

   foM0: Error generated by MOSS microcode level 0
   foM1: Error generated by MOSS microcode level 1
   foM2: Error occurred during CCU/MOSS exchanges
   foM3: Error occurred on diskette drive or diskette drive adapter
   foM4: Error occurred on console or console adapter card
   foM5: Error occurred on a scanner/TRA
   foM6: Error occurred in the BER file during controller initialization
   foM7: Error occurred in the BER file outside controller initialization
   foM8: Error generated by NCP/EP level 3 and 4 (mailbox exchanges)
   foM9: Error generated by MOSS when a re-IPL is started after a CCU hardcheck
   foM10: Error generated by MOSS when the control program abends
   foM11: Error generated by MOSS when a CLDP ends
   foM12: Error generated by MOSS when a channel adapter level 1 error is detected during CA monitoring
   foM13: Error occurred on a TRA

2. MOSS microcode action depends on the logical command content (see page 2-280 for details).

3. Alert/alarm depends on the value of the adapter return code (see page 2-290 for details). These alerts/alarms are sent when the threshold is reached (I/O retries). The number of retries is written in the count (CNT) field of the BER.

4. MOSS microcode action depends on the kind of IPL error found (see page 2-320 for details).

5. BER which triggers the alerts/alarms according to BER ID bit 0 generated by the control program. Bit 0 on causes A7. Bit 0 off causes A8. If no BER is found in the CRP, the alert is A8.

6. A 'Y' in the error count column means that the MOSS microcode maintains an error counter. On reaching the threshold, the action taken by the MOSS microcode is as indicated in the table. The threshold is 10 errors per hour.

7. The alert/alarm is delayed and is triggered later in the re-IPL process:

   a. Alert is triggered by MOSS BER ID 06, error code 05.

   b. Alarm is triggered by MOSS BER ID 06, error code 08.

8. NCP/EP program level 4 generates this BER if an error occurs during mailbox exchanges.

   ID 91 is set when the MOSS signals that it is down (MOSS level 1). IDB3, C1, and C2 are set when NCP/EP detects an error on the MIOC card.

   All these BERs are logged on the diskette by the MOSS:

   a. After a MOSS intermittent error when the MOSS has successfully completed its own re-IML. The MOSS can retrieve the BERs recorded in the NCP/EP check record pool (CRP).

   b. After a MOSS error has been fixed without powering down the entire controller (for example, a diskette error). BERs stored in the CCU main storage are lost if power down occurs.

Time and date stamping, which is performed by the MOSS, reflects the sequence of events as described above.

BER/Alarm/Alert Mechanism (Part 1 of 2)

BER/ALARM/ALERT MECHANISM ON 3725 CATASTROPHIC ERRORS (3725 DOWN)

Whenever a 3725 down condition is detected, there is a BER/alert/alarm generation mechanism during the automatic 3725 re-IPL initiated by MOSS. The possible causes of the 3725 down condition are:

- CCU hardcheck
- Hardware error
- Software error, hardware detected
- Software error, software detected

For each of these cases the BER/alert/alarm mechanism differs slightly.

CCU Hardcheck

No CP abend

No BER created at detection time

1. MOSS BER type 01, ID 01 (level 1), error code 05 (CCU hardcheck) is created. MOSS initiates re-IPL.
2. MOSS BER (post mortem) type 01, ID 06, error code 08 (3725 re-IPL) is created.
3. MOSS triggers alarm A7 during Phase 1B and stores it in the BER file.
4. MOSS BER type 01, ID 06, error code 05 (automatic re-IPL end) is created. The origin (CCU hardcheck) is displayed on the error description line of the screen (byte 13 of BER contains X'05').

Hardware Error

CP abend.

1. A CP BER is stored in the check record pool (CRP).
2. MOSS BER type 01, ID 01 (level 1), error code 07 (control program abend) is created. MOSS initiates re-IPL.
3. MOSS retrieves the CP BER from the CRP, formats it, and stores it in the BER file.
4. MOSS triggers alarm A7 during Phase 1B and stores it in the BER file.
5. MOSS BER type 01, ID 06, error code 05 (automatic re-IPL end) is created. The origin (CP abend) is displayed on the error description line of the screen (byte 13 of BER contains X'07', bytes 14 and 15 contain the CP abend code)

Software Error, Hardware Detected

CP abend

1. A CP BER is stored in the CRP MOSS BER type 01, ID 01 (level 1), error code 07 (control program abend) is created. MOSS initiates re-IPL.
2. MOSS retrieves the CP BER from the CRP, formats it, and stores it in the BER file.
3. MOSS triggers alarm A8 during Phase 1B and stores it in the BER file
4. MOSS BER type 01, ID 06, error code 05 (automatic re-IPL end) is created. The origin (CP abend) is displayed on the error description line of the screen (byte 13 of BER contains X'07', bytes 14 and 15 contain the CP abend code)

Software Error, Software Detected

CP abend

No BER created at detection time

1. MOSS BER type 01, ID 01 (level 1), error code 07 (CP abend) is created. MOSS initiates re-IPL.
2. MOSS BER (post mortem) type 01, ID 06, error code 08 (3725 re-IPL) is created.
3. MOSS triggers alarm A8 during Phase 1B and stores it in the BER file.
4. MOSS BER type 01, ID 06, error code 05 (automatic re-IPL end) is created. The origin (CP abend) is displayed on the error description line of the screen (byte 13 of BER contains X'07', bytes 14 and 15 contain the CP abend code).

BER/Alarm/Alert Mechanism (Part 2 of 2)

BER/ALARM/ALERT MECHANISM ON 3725 CATASTROPHIC ERRORS (3725 DOWN)

The following table summarizes the BER/ALARM/ALERT generation mechanism during the automatic 3725 re-IPL initiated by MOSS, whenever a 3725 down condition is detected. The step numbers refer to the sequence of successive events.

STEP		CCU HARDCHECK	HARDWARE ERROR CAUSING A 3725 re-IPL	SOFTWARE ERROR CAUSING A 3725 DOWN HARDWARE DET.	SOFTWARE ERROR CAUSING A 3725 DOWN SOFTWARE DET.
	CP Abend	no	yes	yes	yes
1	BER created by	no BER at detect. time	CP (BER in CRP)	CP (BER in CRP)	no BER at detection time
2	BER signaling a Level 1 from CCU; MOSS then initiates re-IPL	01 01 05	01 01 07	01 01 07	01 01 07
3	BER triggering the ALARM during Phase 1B	No BER exists in CCU; MOSS builds a BER (post mortem) 01 06 08 05	BER retrieved by MOSS from CRP	BER retrieved by MOSS from CRP	No BER found in CCU; MOSS builds a BER (post mortem) 01 06 08 07
4	ALARM logged in BER file	A7	A7	A8	A8
5	BER signaling the end of 3725 re-IPL, and triggering the ALERT	01 06 05 05	01 06 05 07	01 06 05 07	01 06 05 07
6	ALERT sent to the Host	A7	A7	A8	A8

Note: In the above table, the BERs are identified by the string :

- Type, ID, Error code, (plus Error code extension, when applicable) see MOSS BER list for details.

Analysis of a BER/ALARM/ALERT Sequence

Any error detected by MOSS during the reIPL checkout tests and the reIPL process will be also logged in between the BERs signaling the start and the end of re-IPL (Steps 2 and 5 in the table on your left).
Also any pending BER found by MOSS in the CRP will be fetched and logged during the re-IPL phase 1B.

Therefore a typical sequence would appear like this, as seen in the BER File retrieval screen, option "ALL" :

```
MOSS BER, "ReIPL end"
....                                               <----------------|  possible additional
....                                               <----------------|  BERs likely to be
ALARM                                  <-----                       |  related to the error,
BER related to the detected error <--      |                        |  but not necessary
....                                  |    |       <----------------|  for first level
....                                  |    |       <----------------|  troubleshooting.
MOSS BER, level 1 received            |    |
     (CCU Hardcheck or CP Abend)      |    |
.                                     |  ALARM notifying the user about the problem
.                                     |
                                      BER to consider in order to start the
                                      troubleshooting ( MIM-2).
```

Note that BERs are displayed in inverted chronological sequence (most recent first).

MOSS BER, Type 01 - ID 00 (foM0)

MOSS microcode level 0 generates the following BER:

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:00
LVL0 < error description line >
 MOSS-CHECK:hh  LL:hh  MCPC:hh  IOIR:hh  PIRR:hh  CM:hh  MEF:hh
 DATA:hhhhhh  TTA:hh  PSW:hhhh hh hh  I:hhhh  CNT:hh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER (Type 01) ID 00 - Field Explanation

Field Name	Meaning	Details on page
CM	Common mask register (bits 0 thru 7 = levels 0 thru 7)	
CNT	Current error counter (X'00' to X'FF')	This page
DATA	Three bytes. Contents depend on MOSS Check code	Next page
I	Hexa code of failing MOSS instruction (reserved)	
IOIR	IOIR register	14-160
LL	Last level interrupt (bits 0 thru 7 = levels 0 thru 7)	
MCPC	MCPC register	14-160
MEF	Storage expansion feature status byte	This page
MOSS-CHECK	MOSS processor check (abend) code (explained in the error description line) (MIM Part 2 lists all MOSS Checks)	Next page
PIRR	PIRR register (bits 0 thru 7 = levels 0 thru 7)	
PSW	IAR of interrupt level (bytes 0 and 1 of PSW) Condition code and page pointer (PSW bytes 2 and 3)	This page
TTA	Current TTA entry byte	This page

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.
2. All values are in hexadecimal format (X'0' to X'F').

MEF Status Byte

Bit	Meaning
0	Inhibit latch on
1	TTA parity error
2	Write protect violation
3	16K module installed
4	MEF enabled
5	(not used)
6	(not used)
7	(not used)

PSW (Condition Codes and Page Pointer)

(Bytes 2 and 3 of PSW field)

Bit	Meaning
0-0	Z Condition code
0-1	H Condition code
0-2	Secondary page pointer-bit 0
0-3	Secondary page pointer-bit 1
0-4	Secondary page pointer-bit 2
0-5	Secondary page pointer-bit 3
0-6	Secondary page pointer-bit 4
0-7	Secondary page pointer-bit 5
1-0	C condition code
1-1	V condition code
1-2	Primary page pointer-bit 0
1-3	Primary page pointer-bit 1
1-4	Primary page pointer-bit 2
1-5	Primary page pointer-bit 3
1-6	Primary page pointer-bit 4
1-7	Primary page pointer-bit 5

TTA (Current TTA Entry Byte)

Bit	Meaning
0	0=0 write allowed 0=1 write protected
1	Real 4K block number-bit 0
2	Real 4K block number-bit 1
3	Real 4K block number-bit 2
4	Real 4K block number-bit 3
5	Real 4K block number-bit 4
6	Real 4K block number-bit 5
7	Real 4K block number-bit 6

CNT (Current Error Counter)

Bit	Meaning
0	MOSS re-IML requested
1	MOSS dump requested
2	(not used)
3	(not used)
4	Current error count-bit 0
5	Current error count-bit 1
6	Current error count-bit 2
7	Current error count-bit 3

The current error count may have values between X'0' and X'A'.

MOSS BER, ID 00 (Part 2 of 2)

Data (Contents of Three-Byte Field)

```
DATA :    hh  hh  hh
          --  --  --
           |   |   |
 Byte 0 --┘   |   |
 Byte 1 ------┘   |
 Byte 2 ----------┘
```

MOSS Check	Data Byte 0 Contents	Data Byte 1 Contents	Data Byte 2 Contents
00	X'FF'	X'FF'	X'FF'
01	CCA basic status reg	MCC status reg 2	Diskette status reg
02	Store addr byte 0	Store addr byte 1	Real 4K block numb
02	Reg addr byte 0	Reg addr byte 1	X'FF'
03	X'FF'	X'FF'	X'FF'
04	Store addr byte 0	Store addr byte 1	Real 4K block numb
05	X'FF'	X'FF'	X'FF'
05	Store addr byte 0	Store addr byte 1	X'FF'
05	Store addr byte 0	Store addr byte 1	X'98'
06	CCA basic status reg	X'FF'	X'FF'
07	X'FF'	MCC status reg 2	X'FF'
08	X'FF'	X'FF'	Diskette status reg
09	X'FF'	X'FF'	X'FF'
0A	X'FF'	X'FF'	X'FF'
0B	KBD status reg	MCC status reg 2	Diskette status reg
0C	X'FF'	MCC status reg 2	X'FF'
0D	X'FF'	MCC status reg 2	X'FF'
0E	X'FF'	MCC status reg 2	X'FF'
0F	X'FF'	MCC status reg 2	X'FF'
10	X'FF'	X'FF'	X'FF'
E1	X'FF'	X'FF'	X'FF'

MCC status register 2: see page 14-030

Diskette adapter status register: see page 14-080

CCA basic status register: see page 14-090

MOSS BER, Type 01 - ID 01 (foM1)

MOSS microcode level 1 generates the following BER:

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:01
LVL1 < error description line >
 ERROR:hh  AREG:hh  X75:hhhhhh  X76:hhhhhh  STAT:bbbbbbbb  CP-ABEND:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER (Type 01) ID 01 - Field Explanation

Field Name	Meaning	Details on page
AREG	CCU/MOSS status A register	This page
CP-ABEND	CP abend code (see corresponding CP BER) (used only with ERROR code 07, program request IPL; otherwise: 'FFFF')	
ERROR	Error code	This page
STAT	MIOC status register 1	This page
X75	X'75' - AIO CSCW byte X, byte 0, byte 1 (only used with ERROR code 07, program request IPL)	10-230
X76	X'76' - IOC level 1 interrupt request (only used with ERROR code 07, program request IPL)	10-230

Notes:

1. When AREG bit 0 is on, X75 and 76 are meaningful.
2. PF keys and header fields (such as SEL#) are explained on page 2-181.
3. All values are in hexadecimal format (X'0' to X'F').

AREG (CCU/MOSS Status A Register)

Bit	Meaning
0	IOC operation error
1	Program request IPL
2	CA request IPL
3	CCU hardstop (no HILR)
4	Program output X'70'
5	Address exception check
6	CCU hardcheck
7	MOSS operation check

The contents of the AREG (MOSS status A register and MCC status register 2, bits 3-7) cause the MOSS level 1 microcode to process the request. Any request processed successfully causes the corresponding error code to be as follows:

Error (Error Codes)

Value	Meaning
01	Scanner IOH error detected
02	IOC operation error
03	Adapter clock check
04	CCU clock check
05	CCU hardcheck detected
06	Output X'70' issued by control program
07	Control program abend
08	Channel (host) IPL request
09	Address exception check in CCU
0A	MOSS/MIOC operation check (CCU detected)

Status

Bit	Meaning
0	Enable timer
1	Enable CCU interrupts
2	Enable scanner interrupts
3	MOSS inoperative
4	Timer interrupt
5	CCU high-level interrupt
6	Scanner interrupt
7	CCU low-level interrupt

MOSS BER, ID 02 (Part 1 of 2)

MOSS BER, Type 01 - ID 02 (foM2)

The MOSS microcode generates the following BER when an error occurs during CCU/MOSS exchanges.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:02
MIOC < error description line >
 ERROR:hh  CMD:hh  PCW:hh hhhh hhhh hhhh hh
 MB:hh hh hhhh hh hhhhhh hhhh hhhh hhhh hhhh
     hhhh hh hhhhhh hhhh hhhhhhhh hhhhhhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER (Type 01) ID 02 - Field Explanation

Field Name	Meaning	Details on page
CMD	Logical command (used in the error description line)	This page
ERROR	Error code (used in the error description line)	This page
MB or	Mailbox contents (16 bytes + 16 bytes)	14-141
PCW	Panel control word byte definition (8 bytes)	Next page

Notes:

1. The logical command (CMD) indicates which field (PCW or MB) is concerned:
   a. If the first byte of CMD is 0 or 2, the PCW contents are displayed.
   b. If the first byte of CMD is 4 or 8, the MB contents are displayed.
2. All values are in hexadecimal format (X'0' to X'F').
3. PF keys and header fields (such as SEL#) are explained on page 2-181.

CMD (Logical Command)

CMD	Meaning
80 81	In mailbox request In mailbox response
40 41	Out mailbox request Out mailbox response
20 21	Control Program buffer reading Control Program buffer writing
04 02 01	Interrupt level 4 processing MIOC request Read MCC status register 1 impossible

Error (Error Codes)

Err	Meaning
80 40 20 10	Physical error reported (no answer from scanner when the operator performs a SELECT or RELEASE action). Busy bit error Unresolved interrupt L4 cause Unexpected in-mailbox response from control program
08 04 02 01	In mailbox timeout response Invalid out-mailbox request Invalid parameters in microcode request LSSD string select error

MOSS BER, ID 02 (Part 2 of 2)

PCW (Processor Control Word) Byte Definition

Op type Byte 1 (Note 1)	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
RD Reg CMDDR-44				XR @	AC MOD		Value
WR Reg CMDDW-45				XR @	AC MOD		Pattern
W LSSD CMDWL-C9			CLKON/ CLKOFF (Note 2)	DIAG/ NODIAG		String TBL @	
R LSSD CMDRL-C8		ADJON/ ADJOFF (Note 3)	CLKON/ CLKOFF (Note 3)	DIAG/ NODIAG		String TBL @	
EXEC RD CMDER-04		ROS @			Read Value		
EXEC WR CMDEW-05		ROS @			Data to Write		
RD LSR CMDRR-06	ADDR (Note 4)	ROS @		LSR @	Read Value/ Data MOSS ADDR		
WR LSR CMDWR-07	Count (Note 5)	ROS @		LSR @	Data to Write		
RD RAM CMDRM-08	NCP RAM Address			(Note 6)	Read Value		
RD RAM MULT CMDMR-09	NCP RAM Address			Count	MOSS BUF @		
WR RAM CMDWM-0A	NCP RAM Address			(Note 6)	Data to Write		
WR RAM MULT CMDMW-0B	NCP RAM Address			Count	MOSS BUF @		
IOH CMDIR-03	CAIOHSW/SCAIOHSW: TA value (Note 7)				TD Value		
RD PAN CMDRP-C6				CMD Type	Adapter address		Value
WR PAN CMDWP-C7			SET/ RESET (Note 8)	CMD Type	Adapter address		Data

Notes:

1. In byte 1, bit 0 means 'no adapter check'.
2. CLKON: allow set clock on after LSSD operation.

   CLKOFF: CAC leave clock off after LSSD operation.
3. ADJON: Last scan out to readjust LSSD strings is executed.

   ADJOFF: Last scan out is not executed (used by diagnostics).
4. If ADDR = 00, data read is in data/value of PCW.

   If ADDR = 80, data read is at address defined in PCW

   (ADDR = number of LSRs to read).
5. If count = 0, only one write LSR operation is executed.
   If count = 1, it is a count of LSRs to be written with same data (in 3 bytes of data/value) operation starting at LSR address defined in PCW.
6. Only one halfword is read or written.
7. CAIOHSW: Indicate IOH for channel adapter.
   SCAIOHSW: Indicate IOH for scanner.
8. SET/RESET: Usable only with 'WRMIOCSR' or 'WRPANSR' command type.

MOSS BER, ID 03

MOSS BER, Type 01 - ID 03 (foM3)

The MOSS microcode generates the following BER when an error occurs in the diskette, diskette drive or diskette drive adapter.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:03
DISK < error description line >
 ERROR:hh  CMD:hh  REQ:hh
 CAC= F:hh  RCNT:hh  ARC:hh  STAT:hh  TTA:hh  ADDR:hhhh
 BCLE= F:hh  CMD:hh  BCNT:hhhh  ADDR:hhhhhhhh
 FILE=eeeeeeee  CYL:hh HD:hh REC:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER (Type 01) ID 03 - Field Explanation

Field Name	Meaning	Details on page
CMD	Logical command	This page
ERROR	Error code - X'80' = adapter (only this table) suspect DAC or diskette drive X'40' = diskette drive (add next table) suspect diskette drive: replace it with the spare one	
REQ	Function request code (reserved)	
F	Error record flag from CAC (reserved)	
RCNT	Retry count from CAC (see Note 3)	
ARC	Adapter return code from CAC	This page
STAT	DAC basic status register	14-080
TTA ADDR	TTA byte related to ADDR Storage address register (virtual storage)	2-260

The following additional fields appear when the ERROR code is X'40' (diskette drive)

BCLE F CMD BCNT ADDR	Last executed buffer control list element (CAC related information) Flag indicator, last BCLE executed Last BCLE command BCLE related byte count Last BCLE related address	
FILE CYL HD REC	File name or load module (in EBCDIC) Cylinder number Header number Record number	

CMD (Logical Commands)

Value	Meaning
01	Open
02	Write
03	Read
04	Close
05	Load
06	Direct execute

ARC (Adapter Return Codes)

The error description line is built from the contents of the ARC.

Value	Meaning
20	Indeterminate equipment check
28	Seek check
29	Head check
2A	DMA check during read
2B	DMA check during write
2C	Write current during read
2D	Write current during write
2E	Write control error
34	Overrun
38	MOSS internal bus parity error
3A	CRC error ID
3B	Data CRC error
3C	CRC error on ID control
3D	CRC error on data control
3E	Exception/record not found
3F	Data not extracted
62	Diskette not ready
6D	Diskette speed too low or not running
6E	Diskette speed too high
6F	Invalid diskette format

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.

2. All values are in hexadecimal format (X'0' to X'F'), except for the file name or module name (FILE), which is in EBCDIC.

3. The CAC will make several retries (up to 10). The retry count contains the number of retries before the diskette operation was successfully terminated.

   If RCNT is lower than 10, the last I/O operation was successful. The error was intermittent.
   If RCNT = 10, the decision (recovery or program action) will be taken by the MOSS application that activated the diskette operation. The error is solid.

MOSS BER, ID 04

MOSS BER, Type 01 - ID 04 (foM4)

The MOSS microcode generates the following BER when an error occurs on the console or on its adapter cards:

```
                           BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:04
DPLY <error description line >
 ERROR:hh  CMD:hh  BSTAT:hh  ASTAT:hh  CSTAT:hhhh  MSTAT:hh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER (Type 01) ID 04 - Field Explanation

Field Name	Meaning	Details on page
ASTAT	Adapter error status register	This page
BSTAT	CCA card basic status register	This page
CMD	Logical command	This page
CSTAT	Console status	This page
ERROR	Error code	This page
MSTAT	M status register	This page

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.
2. All values are in hexadecimal format (X'0' to X'F').

ERROR (Error Codes)

Value	Meaning
40	Console error
0C	CAC detected error ASTAT = adapter error
0A	CAC detected exception ASTAT = adapter exception status

CMD (Logical Commands)

CMD	Meaning
81	Open console
80	Open CCA adapter
40	Write adapter
20	Read/write adapter
10	Close adapter
08	Lock keyboard

ASTAT - ERROR: X'0C' (Adapter Error)

Bit	Meaning
0	Parity error on receive data
1	DCE error
2	RCV line at space
3	RCV data buffer too short (overflow)
4	Reserved
5	Machine check error
6	RCV text timeout
7	Lost data (overrun)

ASTAT- ERROR: X'0A' (Adapter Exception Status)

Bit	Meaning
0	Read/open halted
1	XMIT/RCV contention occurred
2	BREAK character received
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved

BSTAT (Sense Register 3)

Value	Meaning
80	CSR - input request
40	CSR - output request
20	Modem interrupt
10	Timer interrupt
08	Exception interrupt
04	MCPC interrupt
02	Adapter enabled
01	Adapter interrupt pending

CSTAT (Console Status - ERROR: X'40')

Bit	Meaning
0-0	Parity bit
0-1	Not bit 2
0-2	Communication buffer overrun
0-3	Line parity error detected
0-4	Command error detected
0-5	Reserved
0-6	Keyboard locked
0-7	Reserved
1-0	Parity bit
1-1	Not bit 2
1-2	Block mode
1-3	Half-duplex mode
1-4	Reserved
1-5	Reserved
1-6	Program mode
1-7	Reserved

The correct console status is X'4030'

MSTAT (Sense Register 4)

Value	Meaning
80	Data set ready (DSR)
40	Clear to send (CTS)
20	Received line signal detector (RLSD)
10	Ring indicator
08	DSR transitioned
04	Reserved
02	RLSD transitioned
01	CTS transitioned

MOSS BER, ID 05 (Part 1 of 2)

MOSS BER, Type 01 - ID 05 (foM5)

The MOSS microcode generates the following BERs when an error occurs on a scanner or on the MOSS/scanner connections.

MOSS BER, Error Code 00 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR SCANNER DUMP COMPLETE
 ERROR:00  ADDR:hh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Code 01 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR CHECK OUT FAILURE
 ERROR:01  ADDR:hh CSCHK:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Code 02 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR MAILBOX ERROR STATUS
 ERROR:02  ADDR:hh MBST:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Code 04 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR UNRESOLVED INTERRUPT
 ERROR:04  ADDR:hh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Code 05 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR INOPERATIVE
 ERROR:05  ADDR:hh TD:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Codes: 10, 20, and 40 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR ERROR DETECTED ON LVL4
 ERROR:hh  ADDR:hh X76:hhhhhh  STAT:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Codes: 08, and 80 (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR ERROR DETECTED ON LVL1
 ERROR:hh  ADDR:hh X76:hhhhhh  STAT:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, Error Code FF (foM5)

```
                               BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:05
SCNR DUMP FAILURE
 ERROR:FF  ERR-EXT:hh  ADDR:hh  TD:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY  PF2: BER LIST  PF4: PREVIOUS BER  PF5: NEXT BER
```

MOSS BER, ID 05 (Part 2 of 2)

MOSS BER (Type 01) ID 05 - Field Explanation

Field Name	Meaning	Details on page
ADDR	Scanner address as shown in "Scanner Addressing" (Hex)	11-050
X76	X'76' (bytes X, 0, and 1 of field X76 on screen) or MOSS command completion (bytes 0 and 1; X not used) depending on the error code (see "ERROR", on this page)	10-230 13-352
STAT	Error status or mailbox status depending on the error code (see "ERROR", on this page)	13-352
TD	Last command (DB0 and DB1 at TD time)	13-122
MBST	Mailbox error status	14-141
CSCHK	Scanner checkout code (microcode)	

Notes:

1. PF keys and header fields (such as SEL#) are explained on page 2-181.
2. All values are in hexadecimal format (X'0' to X'F').
3. For details of scanner/MOSS communication, see page 14-150.
4. When the error is found during a scanner IML, the following message is displayed:

   SCANNER CHECKOUT FAILED: RETURN CODE = xxxx

   In this case, return code xxxx is the value of the STAT field of the BER with the error status condition. This STAT field is also displayed on the CE latched indicator (CELIA) card, which allows the error to be isolated. See MIM Part 2, Chapter R3, under FIC and BER 'STAT' Field Index.

BERs Printed on Host

The length of the BERs printed from the diskette on the host is not significant. When the BER detail is displayed on the console display, only the useful information is given. The remaining BER bytes, if any, printed but not displayed have no meaning. Do not try to interpret them, they may lead to erroneous actions.

ERROR (Error Codes)

Code	Meaning
FF	Scanner dump request failed ADDR = scanner address ERR-EXT = error code extension (this page) TD = last command
80	Error detected by level 1 X76 = Register X'76' (bytes X, 0, and 1) STAT = MOSS status (page 13-352)
40	Error detected by level 4 X76 = MOSS command completion (bytes 0 and 1) STAT = MOSS status (page 13-352)
20	Error detected by level 4 X76 = MOSS command completion (bytes 0 and 1) STAT = mailbox status (page 14-141)
10	Error detected by level 4 without information STAT = FFFF
08	Error detected by Level 1 during MIOH X76 (bytes X, 0, 1 = X'000000' STAT = MOSS status (page 13-352)
05	Scanner set inoperative, expected interrupt not received TD = last command (page 13-122)
04	Error detected by TSS functions, unexpected interrupt received
02	Error detected by TSS functions, MBST = mailbox status (page 14-141)
01	Logical error detected by scanner IML CSCHK = scanner checkout code
00	Scanner dump request fulfilled

ERR-EXT (Error Code Extension)

ERR-EXT	Decoding for Error Code FF
01	Dump failure due to file full
02	Dump failure due to diskette error
03	Dump failure due to hardware error (MIOC/TSS)

MOSS BER, ID 06 (Part 1 of 5)

MOSS BER, Type 01 - ID 06 (IPL) (foM6)

The MOSS microcode generates the following BER when an error occurs in the BER file during controller initialization.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:hh
APPL  < error description line >
 ERROR:hh  IPLREQ:hh  C REQ:hh  STAT:hh  IPL-CHECK:hhhh
 SCB:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
     hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
 DISK:hhhh hhhh hhhh hhhh hhhh
 CS:hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh  F:hh
 X71:hhhhhh  X72:hhhhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER, Type 01 - ID 06 (not IPL) (foM7)

The MOSS microcode generates the following BER when an error occurs in the BER file outside controller initialization.

The error description line contains information such as the CP abend code, the scanner address, or the number of BERs lost.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:06
APPL  < error description line >
 ERROR:hh




 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Note: For abends, see ACF/NCP for the 3725, Emulation Program for the 3725 Reference Summary and Data Areas, LY30-3070, and ACF for System Support Programs, Diagnosis Reference, LY30-3060.

MOSS BER (Type 01) ID 06 - Field Explanation

foM6 format displays all fields described below.

foM7 format displays only the ERROR field.

Field Name	Meaning	Details on page
C REQ	Cancel request	2-322
CS	Scanner error	2-323
DISK	Diskette error	2-322
ERROR	Error code	2-321
IPL-CHECK	IPL CHECK code assigned by MOSS (corresponds to hex display value preceded by 0)	
IPL REQ	Controller IPL type	2-322
F	IPL error flag	2-323
SCB	Scanner control block	2-323
STAT	System status	2-322

FoM9, foM10, foM11 and foM12 may display the following additional fields:

Field Name	Meaning	Details on page
CCUI	CCU user indicator	2-324
CP-ABEND	Control program abend code	(see Note)
ERROR-EXT	Error code extension	2-322
HDCK	Hardcheck register	2-324
HKNG	Register HKNG	2-324
IAR	CCU instruction address register	10-030
IPL-CHECK	IPL application abend code (0F1B: CLDP abend)	
LAR	Lagging address register	10-030
PARITY	Parity byte (0 to 7) associated with the previous field (SAR, IAR, or LAR)	
SAR	Storage address register	10-030
STUI	Storage user indicator	2-324
WKRx	CCU work registers 1 to 7 (work register 0: IAR)	10-030
X71,72	Registers	10-230
X76,7D,7E	Registers	10-230
X0-X7 XB-XF	Channel adapter registers	12-025

MOSS BER, ID 06 (Part 2 of 5)

MOSS BER, Type 01 - ID 06 (foM9)

The MOSS microcode generates the following BER when a CCU hardcheck occurs and a Re-IPL is started.

The error description line contains information fetched from the LSSD strings saved when the error occurs.

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:06
APPL   < error description line >
 ERROR:hh  ERROR-EXT:hh HKNG:hhhhhh SAR:hhhhhh PARITY:hh
 IAR:hhhhhh PARITY:hh LAR:hhhhhh PARITY:hh
 HDCK:hhhhhh CCUI:hh STUI:hh
 X7D:hhhh  X7E:hhhh  X76:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Error description line: '3725 RE-IPL STARTED FOR CCU HARDCHECK'

MOSS BER, Type 01 - ID 06 (foM10)

The MOSS microcode generates the following BER when the control program abends:

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:06
APPL   < error description line >
 ERROR:hh ERROR-EXT:hh CP-ABEND:hhhh



 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Error description line: '3725 RE-IPL STARTED FOR CP ABEND hhhh'

MOSS BER, Type 01 - ID 06 (foM11)

The MOSS microcode generates the following BER when the CLDP dump abends:

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:06
APPL   < error description line >
 ERROR:hh IPL-CHECK:hhhh X71:hhhhhh X72:hhhhhh IAR:hhhhhh
 WKR1:hhhhhh WKR2:hhhhhh WKR3:hhhhhh WKR4:hhhhhh WKR5:hhhhhh
 WKR6:hhhhhh WKR7:hhhhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Error description line: '3725 CLDP CHECK hhhh' (codes given in MIM2)

Notes:
1. Use CCU Function "10" to display the CA regs; if reg "E" indicates a CA Int. lvl 1, then record the contents of all the CA registers.
2. The contents of WKRs with useful information when X72=001002 are listed below:

Field name	Content
WKR 3	IN '7E'
WKR 4	IN '7D'
WKR 5	IN '76'

3. If the abend is caused by a CA Level 1 error, WRK 6 will contain in 'D' and WRK 7 will contain in 'E'.

MOSS BER, Type 01 - ID 06 (foM12)

The MOSS microcode generates the following BER when a channel adapter level 1 error occurs during CA monitoring:

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:06
APPL   < error description line >
 ERROR:hh X0:hhhh X1:hhhh X2:hhhh X3:hhhh X4:hhhh
 X5:hhhh  X6:hhhh X7:hhhh XB:hhhh XC:hhhh XD:hhhh
 XE:hhhh  XF:hhhh


 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Error description line: 'CAn LVL1 ERROR'

ERROR (Error Codes)

Error code	Meaning	Fields on Screen
03	IPL complete (with errors)	Format foM6 (all fields)
06	IPL not complete (with errors)	Format foM6 (all fields)
0A	IPL not complete	Format foM6
01	BER file deleted	Format foM7
07	MOSS offline	Format foM7
02	BER lost, count purged	Format foM7 Number of BERs lost in the error description line
04 '10')	Scanner not IMLed	Format foM7 Scanner address (X'01' to in the error description line
05	CCU automatic re-IPL	Format foM7
08	3725 re-IPL started	Format foM9 CCU hard check, program request IPL, and) CP abend code in the) foM10 error description line)
09	CLDP check	Format foM11 3725 loader/dump abend (1)
0A	CA monitoring level 1 error	Format foM12 3725 channel adapter registers

Note 1: If register E indicates a CA level 1 interrupt, display and record the CA registers 6D and 6F.

ERROR-EXT (Error Code Extension)

Error code	Meaning	Fields on Screen
05	Re-IPL started for CCU hardcheck	Format foM9
07	Re-IPL started for a CP abend	Format foM10

IPL REQ

Bit	Function
0	Spare
1	Spare
2	Spare
3	Power on IPL
4	Function switch on NORMAL
5	Spare
6	I from console (CCU/Scanners)
7	Cancel request (see C REQ field)

C REQ (Cancel Request)

Byte value	Meaning
05	CCU hardcheck
07	Program request IPL
08	CA request IPL

STAT (System Status)

Bit	Function
0	Reserved
1-2	00 MOSS alone 01 MOSS offline 10 3725 operational 11 Reserved
3	MOSS IMLed
4	Reserved
5	CCA card down
6	Console not connected (power off or in test mode)
7	Reserved

DISK (Diskette Errors)

Five halfwords, all having the same bit use and meaning (see below), record diskette errors during IPL. Their content is as follows:

HW1 Errors during Open commands
HW2 Errors during Read commands
HW3 Errors during Load commands
HW4 Errors during Write commands
HW5 Errors during Close commands

Halfword Contents	File Name	Module Name	IPL Error Description	IPL Check
1...	CHGCDS	--	CDF not accessible	F14
.1..	CHGROA	--	Roll-in not available	(None)
..1.	CHGMOD37	CHIGDP00	CCU test not performed	(None)
...1	CHGMOD37	CHIGJBCK	IOC bus checkout test failed	F18
.... 1...	CHGCDSP	--	IPL ports table not accessible	F19
.... .1..	CHGLSR	--	LSR not saved	(None)
.... ..1.	CHGMOD37	CHGCLDP	CLDP not accessible	F1A
....1	CHGMOD37	CHIIPMVR	First 16K of storage not saved on diskette	F23
.... 1...	CHGMDJIB	CHHMCSP	IPL fails on all scanners	F24
.... .XXX XXXX	-	--	(spare)	

The IPL check codes are both displayed on the hex display of the control panel, and the field 'W' of the MSA (IPL CHECK xxx). The IPL abends on IPL check.

The file or module location and contents are as follows:

File or Module Name	Diskette	Contents
CHGCDS	Both	Configuration data file
CHGROA	Controller	CCU roll-in/roll-out area (file)
CHIGDP00	Controller	CCU full instruction test module
CHIGJBCK	Controller	IOC bus test module
CHGCDSP	Controller	IPL port table (file)
CHGLSR	Controller	Local store save area (file)
CHGCLDP	Controller	3725 load/dump module
CHIIPMVR	Controller	IPL mover module
CHHMCSP	Controller	Scanner load module

The CHGxxx files can be displayed using the 'DUMP DPLY/DEL' utility program (see page 2-391). This function despite its name, can be used for displaying, but not deleting the files.

The CHxxx modules can be displayed using the 'MODULE DPLY' utility program (see page 2-393).

MOSS BER, ID 06 (Part 4 of 5)

SCB (Scanner Control Block)

Each of the 16 bytes gives information concerning one of the scanners (from 1 to 16 except 2 and 4, which are not valid).

The position of the byte gives the corresponding scanner number.

Byte Contents	Meaning
1...	Scanner present physically during scanner IML.
.1..	Scanner/TRA is the one currently selected by the scanner task.
..1.	Scanner/TRA is on CLAB or on a LAB type A (set up during scanner IML).
...1	Scanner went down: an automatic dump request is pending or in process (set up in error log function).
.... 1...	Automatic scanner IML has failed, or scanner went down twice in the minimum time range, or scanner could not be set up by scanner task or during general IPL.
.... .1..	CSP reset has been done by the control program
.... ..1.	Command engaged with scanner has failed with a level 1 interrupt to MOSS: Interrupt handler has tried a get error status that failed.
....1	Scanner has been succesfully IML'd, and no action (stop, go, connect, disconnect, or reset) has been performed and no scanner error has been detected. If TRA: No error found for this TRA.
.... 1...	TIC 1 is physically present.
.... .1..	TIC 2 is physically present.
....1.	TIC 3 is physically present.
....1	TIC 4 is physically present.
.... 1...	TRA is physically present.
.... .xxx	Spare

CS (Scanner Errors)

In each halfword, the bit position gives the scanner number (bit 0 = scanner 1 ... bit 15 = scanner 16 except scanners 2 and 4, which do no exist).

Scanner error (eight halfwords) description by halfword:

HW1	Not present (according to "NCP to Scanner Load Module ID" table)
HW2	Bad IOC bus test result
HW3	Error during scanner load module load
HW4	Bad scanner checkout result
HW5	Timeout during MIOH on scanner (could be a bad checkout result)
HW6	Bad block transfer between CCU and scanner
HW7	Bad scanner initialization
HW8	Reserved

Example: CS: 0000 8000 0000 0000 0000 0000 0000 0000
The meaning of this line is: scanner 1 has a bad IOC test result.

F IML Error Flag

Byte contents:

1...	Bad branch trace buffer length
.1..	Bad check record pool
..1.	Bad control program interconnection table
...1	Level 1 on CA during CA monitoring (see HW8)
.... 1...	MIOC error during CA monitoring
.... .1..	CCA down flag
.... ..1.	Error when reading X 71
....1	CLDP reload request

REGISTER DESCRIPTIONS ON IPL CHECK

X71

Byte X

0 1	2	3	4	5	6	7
Not used	CLDP abend	RPO detected	Load	Dump	CA IPL	Link IPL

Byte 0 | Byte 1

0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

CA or link address, according to IOC bus format

X72

This register contains the CLDP codes. For detailed information, see MIM Part 2 vol. A01, Section R-2, CLDP table.

CCU User Indicator

Bits 0 1 2 3 4 5 6 7	Meaning
x x x x x 0 0 0	Idle
x x x x x 0 0 1	Spare
x x x x x 0 1 0	MOSS using MIOC
x x x x x 0 1 1	Branch trace
x x x x x 1 0 0	Branch trace wrap
x x x x x 1 0 1	Error during interrupt
x x x x x 1 1 0	IOC during AIO
x x x x x 1 1 1	Error during program instruction execution

Storage User Indicator

Bits 0 1 2 3 4 5 6 7	Meaning
x x x x x 0 0 0	Storage idle
x x x x x 0 0 1	Spare
x x x x x 0 1 0	MOSS using storage
x x x x x 0 1 1	Branch trace
x x x x x 1 0 0	Error during IPF
x x x x x 1 0 1	IPF during interrupt handling
x x x x x 1 1 0	IOC using storage
x x x x x 1 1 1	Error during program execution

HKNG Register

CCU errors from register X7D

Byte X

Bit	Function
0	ALU compare error on byte x
1	ALU compare error on byte 0
2	ALU compare error on byte 1

Byte 0

Bit	Function
0	POP parity error
1	MDOR parity error
2	MIOC error latch
3	Double-bit error detected
4	BSM control error
6	Storage address/data parity error
7	Local store parity error

Byte 1

Bit	Function
1	A/B bus parity error
2	IOC parity error
4	SAR parity error
5	ROS parity error
6	ZR parity error
7	Level 1 error re-entry

HDCK Register

Byte X

Bit	Function
0	MDOR parity error
1	A/B bus parity error
2	Level 1 error re-entry
3	BSM control error
4	Double-bit error detected
5	MIOC error latch
6	Spare
7	Spare

Byte 0

Bit	Function
0	Spare
1	IOC CCU error
2	IOC timeout error
3	IOC bus in parity error
4	Spare
5	Spare
6	IOC address exception
7	IOC storage protection

Byte 1

Bit	Function
0	LS parity error
1	Storage address/data parity error
2	POP parity error
3	ROS parity error
4	SAR parity error
5	ZR parity error
6	IOC parity error
7	Spare

MOSS BER, ID 07

MOSS BER, Type 01 ID 07 (foM13)

The MOSS generates the following BERs when an error occurs on a TRA or on the MOSS/TRA connections.

MOSS BER, Type 01-ID 07 Error 04/08/40/80 (foM13)

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:01  ID:07
TRM < description of the error >
ERROR:hh         ADDR:hhhh    X76:hhhhhh
MOSS    ERROR STATUS:hhhh
LEVEL1 ERROR STATUS:hhhh
LEVEL2 ERROR STATUS:
TIC1:hhhh   TIC2:hhhh   TIC3:hhhh   TIC4:hhhh
TIC CTL REGISTER:
bbbbbbbb bbbbbbbb


OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER, Type 01-ID 07 Error FF (foM13)

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:01  ID:07
TRM  TIC DUMP FAILURE
ERROR:FF   ERROR-EXT:hh   ADDR:hh  TIC NBR:hh


OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER, Type 01-ID 07 Error 00 (foM13)

```
                              BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:01  ID:07
TRM  TIC DUMP COMPLETE
ERROR:00   ADDR:hh  TIC NBR:hh


OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER, Type 01-ID 07 Error FE (foM13)

```
                                   BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd TYPE:01  ID:07
TRM  TIC SET STG BLK FAILURE
ERROR:FE   TRM INPUT ADDR:hhhh  TRM OUTPUT ADDR:hhhh
TIC ADDR:hh
2K BLOCK:hh    INITIAL    REQUESTED    FINAL
                hhhh        hhhh        hhhh
STOP COMMAND CNT:hh


OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

MOSS BER (type 01) ID 07 Field explanation

Field Name	Meaning	Details on Page
ADDR	TRA address TA field	15-105
GET COMMAND COMPLETION	TRA interrupt information	15-120
MOSS ERROR STATUS	MOSS/TRA error information	15-108
LEVEL1 ERROR STATUS	TRA error information	15-107
LEVEL2 ERROR STATUS	TIC error information	15-107
TIC CTL REGISTER	TIC Control Register	15-106
TIC NBR/TIC ADDR	TIC number (1-4)	
TRM INPUT ADDR	TA of last input MIOH	15-105
TRM OUTPUT ADDR	TA of last output MIOH	15-105
2K BLOCK	Initial, requested and final 2K byte block of TIC storage	
STOP COMMAND CNT	Number of increments of 2K block Storage pointer done (Subtract 1 from this number)	

ERROR (Error Code)

Bit	Meaning
00	Automatic TIC dump request complete
04	Error detected by TRSS services Expected interrupt not received from TRA
08	Error detected by Level 1 with get error status MIOH
40	Error detected by level 4 with get error status MIOH
80	Error detected by Level 1
FE	Error setting TIC 2K storage block during dump or display
FF	Automatic TIC dump failed

ERR-EXT (Error Code Extension)

ERR-EXT	Decoding for Error Code FF
01	Dump failure due to file full
02	Dump failure due to diskette error
03	Dump failure due to hardware error (MIOC/TRA)
04	Dump failure due to select error

MOSS BER, ID 91, B3, C1, C2

MOSS BER, Type 01 - IDs 91 B3 C1 C2 (foM8)

NCP/EP program level 1 generates BER 91 when the MOSS goes down.

NCP/EP program level 4 generates BERs B3, C1, and C2 if a MOSS error occurs during a mailbox exchange. This BER will be transferred to MOSS if MOSS successfully recovers from the MOSS error. These BERs should always be accompanied by MOSS BER IDs 00, 01, 02, or 03. When the BER ID 91 is not accompanied by one of these BERs, it only means that the MOSS has been inoperative during a period of time (MOSS re-IML, MOSS dump) and the BER ID is logged for information only.

```
                                BER DETAIL
SEL#:ddd FLAG:hh  DATE:dd/dd TIME:dd:dd  TYPE:01  ID:hh
CP < error description line >
 MB:hh hh hhhh hh hhhhhh hhhh hhhh hhhh hhhh
     hhhh hh hhhhhh hhhhhhhhhhhhhhhhhhhh



 OVERRIDE FLAG VALUE WITH NEW HEXADECIMAL VALUE
PF1: BER SUMMARY   PF2: BER LIST   PF4: PREVIOUS BER   PF5: NEXT BER
```

Field Explanation (Type 01 IDs 91 B3,C1,C2, NCP/EP)

Field Name	Meaning	Details on page
MB	bytes 1 thru 16 (hex 0 thru F): Mailbox REQUEST zone (in/out) (first line on the screen) bytes 17 thru 32 (hex 10 thru 1F): Mailbox RESPONSE zone (in/out) (second line of the screen)	14-140 14-140

BER Layout on Diskette (Part 1 of 3)

CA BERs (Type 10)

foC1 (page 2-190)

TYPE: 10
ID: 18 1C 1E 97 9B

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19-20	I
21-24	x74
25-26	xD
27-28	x76U
29-30	ETA
31	n/a
32	CAA
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/a
57-60	IAR
61-62	TA
63-64	TD
65-112	CAB/CHCB
113-114	CABCNTL
115-140	CA Regs x0-xF

foC2 (page 2-190)

TYPE: 10
ID: 14 16 91 9A

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19-20	x75
21-22	n/a
23-24	ETA
25-26	x6D
27-28	x76U
29-32	x3M
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/a
57-104	CAB/CHCB
105-106	CABCNTL
107-132	CA Regs x0-xF

foC3 (page 2-190)

TYPE: 10
ID: 10 1B IF 90 92 93 94 95 96 98 99 9C 9E 9F

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19	CAA
20	n/a
21-24	x74
25-26	xD
27-28	x76U
29-30	BRR
31-32	xE
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/a
57-58	ETA
59-106	CAB/CHCB
107-108	CABCNTL
109-134	CA Regs x0-xF

foC4 (page 2-190)

TYPE: 10
ID: 33 34 35 B1 B2 B5 B6

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x77
17-18	x7F
19-20	x0
21-22	x1
23-24	x2
25-26	x3
27-28	x4
29-30	x5 CA
31-32	x6 Regs
33-34	x7
35-36	xB
37-38	xC
39-40	xF
41-88	CAB/CHCB
89-90	CABCNTL

TSS BERs (Type 11)

foT1 (page 2-200)

TYPE: 11
ID: 14 16 91 92 93

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19-20	x75
21-22	n/a
23-24	ETA
25-26	CS STATUS2
27-28	x76U
29-32	x3F
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8

foT5 (page 2-200)

TYPE: 11
ID: A2 A4

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	n/a
17-18	IDR
19-46	PSA
38	LCS
47	TA (byte 0)
48	TD (byte 1)
49-50	NW
51-86	IOB/LXB
87-150	CCB
151-164	AXB IOB Trace
165-181	AXB PSA Trace
182-197	SCB
198	SCBCSCF

foT2 (page 2-200)

TYPE: 11
ID: 18 1B 97 98 9C

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19-20	I
21-24	x74
25-26	CS STATUS1
27-28	x76U
29-30	ETA
31-32	n/a
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/a
57	x79
58-60	IAR
61-62	TA
63-64	TD

foT6 (page 2-200)

TYPE: 11
ID: B1

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	n/a
17-18	LNVT
19-46	PSA
38	LCS
47	TA (byte 0)
48	TD (byte 1)
49-50	NW
51-86	IOB/LXB
87-150	CCB
151-164	AXB ACB Trace
165-181	AXB PSA Trace
182-197	SCB
198	SCBCSCF

foT3 (page 2-200)

TYPE: 11
ID: 1E 1F 95 96 99 9A 9B

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19	CSPA
20	N/A
21-24	x74 LAR
25-26	CS STATUS3
27-28	x76U
29-30	BRR
31-32	xE
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/a
57-58	ETA

foT7 (page 2-200)

TYPE: 11
ID: 1C

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	Int. Lvl1
17-18	LNVT
19-46	PSA
19-34	Parameter Area
35	Previous SCF
36	Previous LCS
37-38	Lvl1 Get Error Status
39-40	Lvl1 Get and Reject Status
41-44	Logging IAR
45-46	n/a
47	TA (byte 0)
48	TD (byte 1)
49-50	n/a

foT4 (page 2-200)

TYPE 11, ID A1

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	n/a
17-18	IDR
19-46	PSA
38	LCS
47	TA (byte 0)
48	TD (byte 1)
49-50	NW
51-54	LNVT
55-90	IOB/LXB
91-154	CCB
155-168	AXB ACB Trace
169-185	AXB PSA Trace
186-201	SCB
202	SCBCSCF

BER Layout on Diskette (Part 2 of 3)

NCP-EP BER (Type 12)

foN1 (page 2-210)

TYPE: 12
ID: 11 thru 19

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	X7E
17-20	X74
21	X79, byte 1
22-24	IAR
25-26	I

foN2 (page 2-210)

TYPE: 12
ID: 21

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	X7F
17-20	IAR3
21-24	IAR4

CCU BER (Type 13)

foU1 (page 2-220)

TYPE: 13
ID: 91 thru 95

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	X7E
17-20	X74
21	X79, byte 1
22-24	IAR
25-26	X7D
27-28	CA Reg X'D'
29-30	CA Reg X'E'

foU2 (page 2-220)

TYPE: 13
ID: C1 thru C4

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	X'0000'
15-16	X77
17-18	X7F
19-26	RCB

foU3 (page 2-220)

TYPE: 13
ID: 32, B1

Byte	Field	
1-9	Header	
10-11	TYPE-ID	
12	LOST	
13-14	Abend	
15-16	X77	
17-18	X7F	
19-20	X0	
21-22	X1	
23-24	X2	
25-26	X3	
27-28	X4	
29-30	X5	> CA Regs
31-32	X6	
33-34	X7	
35-36	XB	
37-38	XC	
39-40	XF	
41-42	CA Reg XD	
43-44	CA Reg XE	

IOC BERS (Type 14)

foI1 (page 2-230)

TYPE: 14
91 thru 95

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	X7E
17-18	X76
19-20	X75
21-24	X74
25-26	n/a
27-28	X76U
29-32	n/a
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB6
47-48	LAB5
49-50	LAB4
51-52	LAB7
53-54	LAB8

MOSS BERs (Type 01)

foM0 (page 2-240)

TYPE: 01, ID: 00

Byte	Field
1-9	Header
10-11	TYPE-ID
12	CHECK
13	LL
14	MCPC
15	IOIR
16	PIRR
17	CM
18-20	DATA
21	MEF
22	TTA
23-24	I
25-28	PSW
29	CNT

foM1 (page 2-240)

TYPE: 01, ID: 01

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13	AREG
14-16	X75
17-19	X76
20	STATUS
21-22	Abend

foM2 (page 2-240)

TYPE: 01, ID: 02

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13	CMD
14-21	PCW
or 14-45	MB

foM3 (page 2-240)

TYPE: 01, ID: 03

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13	CMD (CAC)
14	REQ
15	F (CAC)
16	CNT (CAC)
17	n/a
18	ARC
19	BSTAT
20	SENSE
21-23	n/a
24	TTA
25-26	ADDR (CAC)

If ERROR: X'40' (diskette drive) add:

27	F (BCLE)
28	CMD (BCLE)
29	CNT (BCLE)
31-34	ADDR (BCLE)
35	CYL
36	HD
37-38	REC
39-46	FILE

foM4 (page 2-240)

TYPE: 01, ID: 04

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13	CMD
14	BSTAT
15	ASTAT
16-17	CSTAT
18	MSTAT

foM5 (page 2-240)

TYPE: 01, ID: 05
ERROR: 08 10 20 40 80

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13	ADDR
14-16	x76
17-18	STATUS

or
(see next column)

foM5 (page 2-240)

TYPE: 01, ID: 05
ERROR: 00 04

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 00,04
13	ADDR

or

TYPE: 01, ID: 05
ERROR: 01 02 05

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 01, 02,05
13	ADDR
14-15	CSCHK or TD or MBST

or

TYPE: 01, ID: 05
ERROR: FF

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR FF
13	ERR-EXT
14	ADDR
15-16	TD

foM6 (page 2-240)

TYPE: 01, ID: 06
ERROR: 03 06

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 03 06
13	IPL-REQ
14	CREQ
15	STAT
16-17	IPL-CHECK
18-49	SCB
50-59	DISK
60-75	CS
76	F
77-79	x71
80-82	x72

foM7 (page 2-240)

TYPE: 01, ID: 06
ERROR: 01 07

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 01 07

or

TYPE: 01, ID: 06
ERROR: 02 04

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 02 04
13	LOST, ERR 2 or CSPA, ERR 04

foM8 (page 2-240)

TYPE: 01
ID: 91 B3 C1 C2

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	x'0000'
15-46	MB
31-32	Status

foM9 (page 2-240)

TYPE: 01, ID: 06
ERROR: 08, EXT:05

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 08
13	05 = CCU hardcheck
14	IAR parity
15-17	IAR
18	LAR parity
19-21	LAR
22	SAR parity
23-25	SAR
26-28	X76
29-31	X7D
32-34	X7E
35-37	HKNG
38-40	HDCK
41	CCUI
42	STUI

foM10 (page 2-240)

TYPE: 01, ID: 06
ERROR: 08, EXT:07

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 08
13	07=CP Request IPL
14-15	CP CHECK

foM11 (page 2-240)

TYPE: 01, ID: 06
ERROR: 09

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR 09
13-14	IPL-CHECK
15-17	x71
18-20	x72
21-23	WKR0=IAR
24-26	WKR1
27-29	WKR2
30-32	WKR3
33-35	WKR4
36-38	WKR5
39-41	WKR6
42-44	WKR7

foM12 (page 2-240)

TYPE: 01, ID: 06
ERROR: 0A

Byte	Field	
1-9	Header	
10-11	TYPE-ID	
12	ERROR 0A	
13-14	x0	
15-16	x1	
17-18	x2	
19-20	x3	
21-22	x4	
23-24	x5	CA
25-26	x6	Regs
27-28	x7	
29-30	xB	
31-32	xC	
33-34	xD	
35-36	xE	
37-38	xF	
39	CAn	

MOSS BERS (TYPE 01) (CONTINUED)

foM13 (page 2-240)

TYPE: 01 ID: 07
ERROR: 04 08 40 80

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13-14	TRA ADDR
15-16	Get Cmd Compl.
17-18	Lvl 2 Error Status TIC1
19-20	Lvl 2 Error Status TIC2
21-22	Lvl 2 Error Status TIC3
23-24	Lvl 2 Error Status TIC4
25-26	MOSS ERROR STATUS
27-29	x76

TYPE: 01 ID: 07
ERROR: FE

Byte	Field
1-9	Header
10-11	TYPE-ID
12	error FE
13-14	TRA input addr
15-16	TRA output addr
17	TIC number
18-19	Initial block number
20-21	Requested block number
22-23	Final block number
24	Stop CMD count

TYPE: 01 ID: 07
ERROR: 00 FF

Byte	Field
1-9	Header
10-11	TYPE-ID
12	ERROR
13	ERROR EXT.
14	TRA number
15	TIC number

TRSS BERs (Type 15)

foR1 (page 2-231)

TYPE: 15
ID: 14 16 91 92 93

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19-20	x75
21-22	n/a
23-24	ETA
25-26	TRM STATUS1
27-28	x76U
29-32	x3F
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8

foR2 (page 2-231)

TYPE: 15
ID: 18 97 98 9C

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19-20	I
21-24	x74
25-26	TRM STATUS1
27-28	x76U
29-30	ETA
31-32	n/a
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/u
57	x79
58-60	IAR
61-62	TA
63-64	TD

foR3 (page 2-231)

TYPE: 15
ID: 96 99 9A 9B

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15-16	x7E
17-18	x76
19	TRM Address
20-24	n/a
25-26	TRM STATUS1
27-28	x76U
29-30	ETA
31-32	n/a
33	F
34	RHB
35-36	CLA1
37-38	CLA2
39-40	LAB3
41-42	CABR
43-44	FRDV
45-46	LAB4
47-48	LAB5
49-50	LAB6
51-52	LAB7
53-54	LAB8
55-56	n/u
57-58	ETA

foR4 (page 2-231)

TYPE: 15
ID: A3... A8

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	TIC number
17-18	TA data
19-20	TRM STATUS2

foR5 (page 2-231)

TYPE: 15
ID: AC

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	TIC number
17-18	TA data
19-20	TRM STATUS2
21-28	Adpt check Status

foR6 (page 2-231)

TYPE: 15
ID: AF

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	TIC number
17-18	TA data
19-20	TRM STATUS2
21-24	SSB Open Completion

foR7 (page 2-231)

TYPE: 15
ID: B3... B6

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	TIC number
17-18	TA data
19-20	TRM IR/BR Register
21-22	TIC Control Register

foR8 (page 2-231)

TYPE: 15
ID: B2

Byte	Field
1-9	Header
10-11	TYPE-ID
12	LOST
13-14	Abend
15	F
16	TIC number
17-18	TA data
19-20	TIC Init Interrupt Register
21-22	TIC Control Register

Machine Status Area (Part 1 of 5)

You are permanently informed of the 3725 status by the information displayed on the first three lines of the operator console screen: the machine status area (MSA).

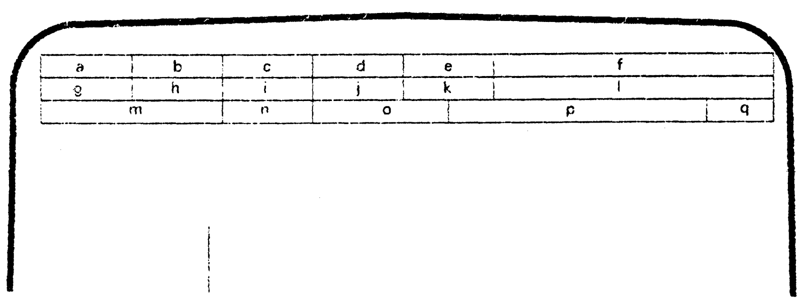
The first two lines of the MSA show CCU and MOSS information. The third one shows:

- Selected scanner information (service personnel only), or
- CCU/Scanner IPL information, or
- Selected TRA information

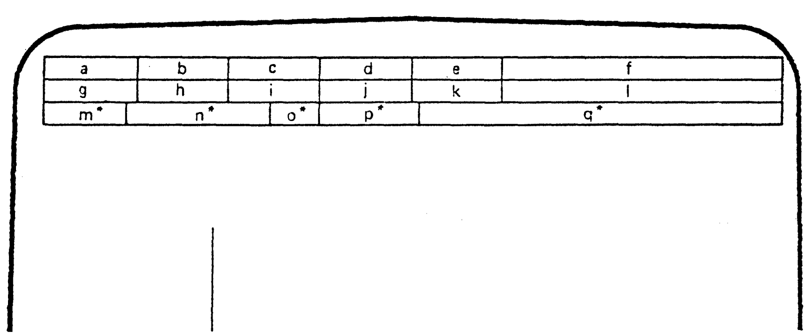
In the three screens shown on the right, each letter is a key that refers to the explanation following the three figures.

The MSA is updated every 500ms.

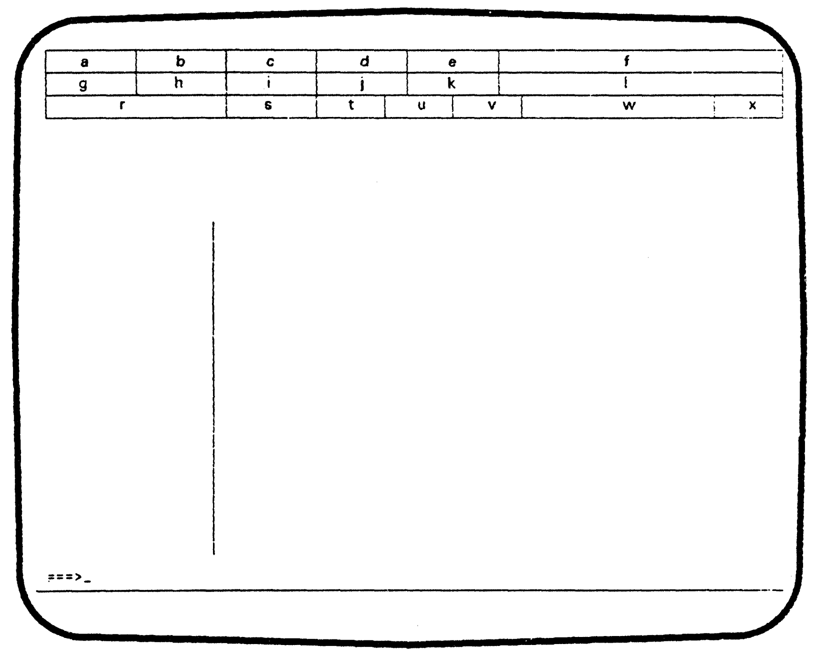
MSA WITH SCANNER INFORMATION



MSA WITH TRA INFORMATION



MSA WITH CCU/SCANNER IPL INFORMATION



GENERAL INFORMATION

a	b	c	d	e	f	
g	h	i	j	k	l	
m		n	o	p		q

Field a

Field 'a' displays the CCU mode:

PROCESS Normal processing
I-STEP Instruction step

Field b

Field 'b' displays the CCU check mode:

STOP-CCU-CHK The system will stop on a CCU check (default or after function RESET BYPASS CCU CHECK).
BYP-CCU-CHK You initiated function SET BYPASS CCU CHECK so the system will not stop on a CCU check.

Field c

Field 'c' shows whether MOSS is connected to the CCU control program:

MOSS-ONLINE MOSS is connected to the CCU control program.
MOSS-OFFLINE MOSS is not connected to the CCU control program.
MOSS-ALONE MOSS is operational while the CCU control program is not loaded or no longer operational.
SERVICE-MODE MOSS is in service mode (service personnel only).

The statuses of the MOSS after the different IMLs and IPLs are as follows:

After a:	MOSS Status	Hex Display Code
Initialization (general IPL)	MOSS-ONLINE	X'000'
MOSS IML	MOSS-OFFLINE if CP loaded	X'FEE'
	MOSS-ALONE if CP is not loaded	X'FEF'
CCU/Scanner IPL	MOSS-ONLINE	X'000'
STEP BY STEP IPL	MOSS-ONLINE	X'000'
BYPASS PHASE 1 IPL	MOSS-ONLINE	X'000'
BYPASS PHASE 3 IPL	MOSS-ONLINE	X'000'

a	b	c	d	e	f	
g	h	i	j	k	l	
m		n	o		p	q

Field d

Field 'd' displays information on the CCU address compare function:

AC   the Address Compare function is active.

If you selected MOSS INTERRUPT=Y and/or CCU STOP=Y when defining the address compare, the following are displayed:

AC HIT	A single or double address compare is successful.
AC HIT1	A two-single address compare is successful on the first address.
AC HIT2	A two-single address compare is successful on the second address.

Field e

Field 'e' is updated each time an output X'71' instruction is executed, by the control program, for example, when using the CCU data exchange function or the control program procedures.

Output X'71' contents are buffered. If the buffers are overrun due to intensive outputting, some data may be lost; however, the last value outputted will be displayed.

X71:xxxxxx	Contents of CCU X'71' output register
X71:ERROR	Error when accessing the register. Register contents cannot be displayed.

Field f

Field 'f' is displayed, along with field 'l', when the CCU status is STOP X'70', STOP PGM, STOP BT, STOP AC, or HARD-STOP (see field g)

```
LAR:xxxxxx  OP:xxxx    C:x    (field f)
IAR:xxxxxx  ILVL:xxxx  Z:x    (field l)
```

LAR:xxxxxx	Address of the last executed instruction
OP:xxxx	Last executed instruction
C:x	Value of the C-latch (0 or 1)
IAR:xxxxxx	Address of the next instruction to be executed
ILVL:xxxx	Active CCU interrupt levels
Z:x	Value of the Z-latch (0 or 1)

```
CCU INTERRUPTS DISABLED    (field f)
  nothing displayed        (field l)
```

No interrupts can be received from the CCU:

- During a MOSS IML from the control panel, just after power on
- While performing CCU IPL to avoid automatic CCU re-IPL in case of HARDCHECK (see field g)
- While mounting a new diskette (service personnel only)
- While performing some utility programs (service personnel only) to prevent interference with the utility program. All communications between the CCU and MOSS are delayed. For example, a BER generated by the control program is kept until the utility program ends and MOSS is back online.

```
CCU REGISTERS      (in field f)
NOT ACCESSIBLE     (in field l)
```

Appropriate registers cannot be read, so it is impossible to display LAR, OP, C, IAR, ILVL, and Z information.

Field g

Field 'g' displays the CCU status:

RUN	Instructions are being executed or data transferred.
RESET	The control program stopped since you initiated function RESET CCU; to restart the CCU, perform an IPL.
HARDCHK	The control program stopped on a hardcheck error. An automatic re-IPL is attempted. In certain cases, however, (for example if the hardcheck occurs during a general IPL) there is no re-IPL.
HARDSTOP	You selected the CCU check reset function to reset the CCU check condition. To restart, select the CCU Start function from the primary menu or press PF3:CCU START or PF3:ST if displayed on the screen.
IPL-REQ	A CCU IPL was requested and is in progress.
STOP-X70	The control program stopped on an output X'70' instruction executed by the control program.
STOP-PGM	The control program stopped because you initiated function CCU STOP or function SET I-STEP.
STOP-BT	The control program stopped because the Branch Trace function that you initiated with CCU STOP is deactivated.
STOP-AC	The control program stopped because the address compare function that you initiated with CCU STOP (CCU ACTION=S) is successful.

Field h

Field 'h' shows whether the 3725 will stop on an IOC check.

BYP-IOC-CHK	The system will not stop on an IOC check. (default or after a RESET IOC CHECK STOP).
STOP-IOC-CHK	You initiated the function SET IOC CHECK STOP to force the system stop on an IOC check.

Field i

Field 'i' displays the last MOSS check code (See Chapter R1 in MIM Part 2, Vol. A01).

LASTMCHK:xxx   last MOSS check code

Field j

Field 'j' displays BT when the Branch Trace function is active.

Machine Status Area (Part 3 of 5)

a	b	c	d	e	f		
g	h	i	j	k	l		
m		n	o		p		q

Field k

Field 'k' is updated each time an output X'72' instruction is executed by the control program, for example, when using the CCU data exchange function or the control program procedures.

Output X'72' contents are buffered. If the buffers are overrun due to intensive outputting, some data may be lost; however, the last value outputted will be displayed.

X72:xxxxxx	Contents of CCU X'72' output register.
X72:ERROR	Error when accessing the register. Register contents cannot be displayed.

Field l

Field 'l' is displayed along with field f. See field 'f' description.

SCANNER INFORMATION

Field m

Field 'm' displays information on the selected scanner:

NO SCANNER SELECTED
You selected a scanner function before selecting a scanner

SCANNER XX yyyyyyyyyyyy

where xx is the number of the selected scanner (1 to 16), and yyyyyyyyyyyy is any of the following:

CONNECTED	The scanner is operational and under control of the CCU control program.
INITIALIZED	The control code is loaded and the front-end adapter is operational.
INOPERATIVE	The scanner is inoperative, or the CCU is not in RUN status.
DISCTD-STOP	Disconnected-stop: The control code is no longer under control of the CCU control program, either after command STOP or after a scanner address compare hit.
DISCTD-GO	Disconnected-go: You entered command GO while in status DISCTD/STOP. The scanner remains disconnected but the control code execution continues.
RESET	You entered command RESET, and you may initiate an IML or a DUMP.
UNKNOWN-MODE	The scanner is selected but it is impossible to identify its status.

Field n

Field 'n' displays the scanner option:

IML	A scanner IML is being started
DUMP	A dump is in progress

Field o

Field 'o' displays the function for which you requested a delay in the execution (scanner display/alter functions):

DELAYED-ALTER

or

DELAYED-DISPLAY

Field p

Field 'p' displays the scanner address compare parameters that you specified:

AC xxxx yyyy zzzzzzz

where:

xxxx	is the address
yyyy	is the type of access:

F for I-fetch or data-fetch
S for data store
R for cycle steal read
W for cycle steal write

zzzzzzz is the action:

DISPLAY
ALTER
STOP
OP-MSG (no action)

Field q

Field 'q' shows that the scanner address compare function is:

HIT-FS	Successful on I-fetch, load, or store
HIT-RW	Successful on read or write
ERROR	Successful but an error is encountered while performing the action you specified

CCU/SCANNER IPL INFORMATION

CCU/scanner IPL information instead of scanner information is displayed on the third line.

A short time after successful completion of the IPL, the third line of the MSA is cleared.

<table>
<tr><td>a</td><td>b</td><td>c</td><td colspan="2">d</td><td colspan="2">e</td><td colspan="2">f</td></tr>
<tr><td>g</td><td>h</td><td>i</td><td colspan="2">j</td><td colspan="2">k</td><td colspan="2">l</td></tr>
<tr><td colspan="2">r</td><td>s</td><td>t</td><td colspan="2">u</td><td>v</td><td>w</td><td>x</td></tr>
</table>

Field r

IPL ENTERED Shows that a CCU IPL is started.

Field s

PHASE 1 Indicates the start of phase 1 (CCU test and initialization). This field is blank when phase 1 is bypassed.

Field t

PHASE 2 Shows the start of phase 2 (load from the diskette and start the control program loader/dump). This field is always present.

Field u

PHASE 3 Shows the start of phase 3 (load and initialize the scanners). This field is blank when phase 3 is bypassed.

Field v

PHASE 4 Shows the start of phase 4 (load from the host and initialize the control program). This field is always present.

Field w

CA IPL DETECTED ON CA x
The control program loading/dumping is started on a channel-attached 3725. x is the channel adapter number.

CONTROL PROGRAM LOADED
The control program is loaded.

DUMP IN PROGRESS ON CA x
A control program dump is being taken on a channel-attached 3725. The progression of the dump is indicated in MSA field k that displays control program storage addresses. x is the channel adapter number.

DUMP IN PROGRESS ON L xxx
A control program dump is being taken on a link-attached 3725. The progression of the dump is indicated in MSA field k that displays control program storage addresses. xxx is the channel adapter number.

ENABLED PORTS CA xxxxxx L xxxxxxxx
Indicates which channel adapters or link IPL ports are enabled. x can be either Y or N.

In the CA field, Ys indicate which channel adapters are enabled, and Ns which channel adapters are not enabled.

In the L field, Ys indicate which link IPL ports are enabled. N is used for the link IPL ports not enabled.

IPL CANCELED The 3725 initialization is canceled by:

- The operator (immediate function Terminate).
- 3727 power-off when the IPL was requested from the console.
- Switching from one console to the other (primary/alternate) when the IPL was requested from the initial console.
- The operator console switching from normal mode to test mode.
- MOSS automatic re-IML during a CCU/scanner step-by-step IPL, or
- Two MOSS automatic re-IMLs during a CCU/ scanner IPL.

IPL CHECK xxx
The IPL ends abnormally. The check code (xxx) is also displayed on the hex display of the control panel.

IPL CHECK F1B CLDP ABEND xxxx
The IPL ends abnormally. xxxx is the hexa-decimal control program loader/dump abend code.

IPL COMPLETE The IPL is successfully completed.

IPL COMPLETE + ERRORS
The IPL is complete although an error has been encountered. If the error comes from a scanner, Alarm A11 is displayed.

For any other intermittent errors (for example, diskette errors) no alarm is displayed. The 3725 should run normally.

LINK IPL DETECTED ON L xxx
The control program loading/dumping is started on a link-attached 3725.

LINK IN PROGRESS ON CA x
The control program is being loaded on a channel-attached 3725. The progression of the load is addresses are displayed.
x is the channel adapter number.

LOAD IN PROGRESS ON L xxx
The control program is being loaded on a link-attached 3725. The progression of the load is indicated in MSA field k where CCU storage addresses are displayed.
xxx is the decimal communication line address.

RPO DETECTED ON L xxx
The Remote Power Off (RPO) command is detected on the communication line xxx.
xxx is the decimal communication line address.

SCANNER(S) NOT IMLED: xxxx
Indicates that one or more scanners are not IMLed. xxxx consists of four hexadecimal digits (16 bits). Each bit corresponds to a scanner (CS) number. This bit on (1) corresponds to a scanner not IMLed.

Field x

IPL STOP Indicates that the IPL stopped at the beginning of a phase or on operator's request (PF1:STOP).

TRA/TIC INFORMATION

a	b	c	d	e	f
g	h	i	j	k	l
m*	n*	o*	p*	q*	

Field m*

TRA Number

- TRA xx: where xx is 6-16. Indicates which TRA has been selected. The same number as for scanners is used.

Field n*

TRA Mode

This field indicates the mode of the selected TRA. If none is selected, it is left blank. This field is updated after each TRA select and after a connect/disconnect operation. See "TRSS Modes" on page 2-387 for a description of the modes.

- CONNECT
- DISCONNECT
- UNKNOWN

If field f indicates 'CCU INTERRUPTS DISABLED' then the TRA Mode has no meaning.

Field o*

TIC Selected

- TIC x: where x is 1-4. Identifies the TIC selected. This field is updated after each TIC select.

Field p*

TIC Mode

This field displays the current mode of the selected TIC. If no TIC is selected or if NTRI is OFFLINE, it is blank. This field is updated after each TIC Select. See "TRSS Modes" on page 2-387 for a description of the modes.

- IDLE
- RESET
- INITIALIZED
- OPEN
- CLOSED
- FROZEN
- DISABLED

Field q*

NRTI OFFLINE: Indicates that:

- At the IPL of NCP, NTRI was not available and did not pass necessary TRSS information to MOSS.

OR

- An error has occured when trying to access NTRI control blocks needed by TRSS services.

Several functions which depend upon NTRI will not be available. This field is updated after each function selection from the secondary menu.

Reset CCU/LSSD (Part 1 of 2)

All CCU functions except reset CCU/LSSD are described in the 3725 Problem Determination and Extended Services, (Vol. A06).

Use the reset CCU/LSSD function to reset:

- The entire CCU (LSSD, IOC, local store registers, storage protect/address exception keys, and 3725 storage), or
- The LSSD only

the channel adapter registers are not reset.

Warning: This function destroys the current state of the CCU control program.

SELECTION

Press the CCU FNCTN key to display the CCU function menu.

Type 11 followed by SEND to select RESET CCU/LSSD.

```
WARNING: THIS FUNCTION DESTROYS THE CCU CONTROL PROGRAM


- ENTER R OR L                  ==>

     R = TO RESET ALL THE CCU
     L = TO RESET THE LSSD ONLY




< Function message line >
```

FUNCTION MESSAGE LINE

The Following messages may be displayed in the function message line:

INVALID INPUT:

Neither 'R' nor 'L' has been selected.

ENTER 'R' or 'L' according to desired function, or press SELECT AREA key either to select another CCU function or leave CCU functions.

FUNCTION IN PROGRESS

RESET CCU/LSSD function is running. The function cannot be stopped or canceled during its processing.

FUNCTION COMPLETED

RESET CCU/LSSD function is completed.

CCU/MOSS PARITY ERROR: RESET CCU FUNCTION CANCELED

A CCU/MOSS parity error occurred during the function processing.

The function is canceled. You should re-IML the MOSS before retrying the function.

DISKETTE ERROR: RESET CCU FUNCTION CANCELED

Message sent when any diskette error occurred during the function processing.

The function is canceled. You should re-IML the MOSS before retrying the function.

Reset CCU/LSSD (Part 2 of 2)

MODE OF OPERATION

The different operations performed by reset CCU/LSSD are listed in the following table.

Reset CCU	Reset LSSD	Operation Description
X	X	1. Force channel monitoring task to stop if MOSS IML has been performed with the controller diskette.
X	X	2. Reset panel adapter (adapter down, mailbox in indicator, panel timer, I/O request block queues).
X	X	3. Reset MOSS inoperative bit in the MIOC status register 1, disable CCU and scanner interrupts, reset instruction step mode.
X	X	4. Set power on remember bit, AIO and program stop in mode control register B.
X	X	5. Reset LSSD : a. Read CCU LSSD latches and write them on diskette in CHGCDS file (1st sector). b. Read LSSD initialization out of diskette from CHGCDS file (2nd sector) and write them to CCU. c. Read CCU LSSD latches written in operation 'b' and compare them with LSSD initialization for write error detection.
X	X	6. Reset clock step control register.
X	X	7. Reset IOC.
X		8. Initialize 128 local store registers with correct parity, reset CCU hardcheck, enable CCU interrupts, and disable ECC mechanism (local store 74).
X		9. Read In X'70' to get CCU storage size installed.
X		10. Set SP/AE keys: storage keys, read keys, user keys, cycle steal keys, address exception keys for installed storage and address exception keys for non-installed storage.

(Continued)

Reset CCU	Reset LSSD	Operation Description
X		11. Enable storage protection and address exception mechanism.
X		12. Set on bypass CCU check.
X		13. Issue storage test pattern to align parity and ECC bits (ECC mechanism being disabled at the operation 8), write zeroes in the whole storage, start a timer for 1.3 seconds, wait for high level interrupt request or timer completion.
X		14. Stop ROS task by resetting CCU busy bit in CCU to MOSS B register, test if address exception is on in CCU to MOSS A register, and reset it.
X		15. Reset CCU hardcheck and MOSS disable bit, and enable CCU interrupts.
X		16. Set off bypass CCU check and re-init CCU LSSD strings to disable storage protection and address exception mechanism.
X	X	17. Reset CCU hardcheck and MOSS disable bits if set on during LSSD initialization, and enable CCU interrupts and scanner interrupts.
X	X	18. Enable ECC mechanism.
X	X	19. Signal to machine status display task that CCU is now initialized, which in turn displays on status line 1 'PROCESS', 'CCU/MOSS ENABLED', and on status line 2 'RESET'.
X	X	20. Reset picture image registers.

IPL CCU/TSS (Part 1 of 2)

Use the IPL functions to IML one scanner or to IPL the CCU and scannners of the 3725. Options are available to the CE only for the 3725 IPL: normal IPL, step-by-step, or bypass phase 1.

To perform any of the IPL functions:

- The MOSS must be running (MOSS-alone status).
- The controller diskette must be in the disk drive.

The IPL CCU/TSS messages are listed starting on page 2-490.

IPL MENU

Selection

1. Press SELN AREA to position the cursor.
2. Press M followed by SEND to display the maintenance primary menu.
3. Press I followed by SEND to display the IPL CCU/TSS secondary menu.

The screen is displayed as follows:

```
                  (Machine Status Area)

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 ONE SCANNER IML  |
2 3725 IPL         |
3 LINK TEST REQ    |
4 LINK TEST RESP   |
                   |
                   |
                   |
                   |
 ===>
```

Available Functions

The link test requester (REQ) and link test responder (RESP) functions are documented in 3725 Problem Determination and Extended Services, (Vol. A06).

The only functions that can be performed while IPLing the CCU are the CCU functions.

Notes:

1. No CCU function can be selected before IPL phase 2 (hex display = FF2).
2. When an IPL CCU/TSS function is already selected the Terminate (T) function (see 3725 Problem Determination and Extended Services, Vol. A06, for details) must be used before selecting another IPL function.
3. The IPL/IML is canceled if one of the following occurs before the IPL/IML is complete.
   - The immediate function Terminate is selected.
   - The operator console is switched from normal mode to test mode.
   - The other operator console is selected.
   - The operator console is powered off.

ONE SCANNER IML

Use this function to IML only one scanner.

Warning: Before IMLing a scanner, stop all the lines on that scanner, using the NCP facilities.

Selection

1. Press SELN AREA to position the cursor.
2. Press I followed by SEND to display the IPL CCU/TSS secondary menu.
3. Press 1 followed by SEND to select One Scanner IML.

For the 3725/3726, you are requested to enter the scanner number preceded by S (S1 to S16) or the line address (0 to 255).

For the 3725 Model 2, you are requested to enter the scanner number preceded by S (S1 to S6) or the line address (0 to 95).

IML Termination

When the IML is complete, the following message is displayed:

IML FOR SCANNER XX COMPLETED - SCANNER IS CONNECTED

To terminate the One Scanner IML function when the IML COMPLETE message is displayed in the MSA use the Terminate function.

3725 IPL

Use this function to IPL the CCU and IML the scanners.

Selection

1. Press SELN AREA to position the cursor.
2. Press I followed by SEND to display the IPL CCU/TSS secondary menu.
3. Press 2 followed by SEND to select 3725 IPL.

You are then requested to select one IPL option:

1 = NORMAL
2 = STEP-BY-STEP
3 = BYPASS PHASE 1

These options are only available in the maintenance menu; they are not available in the customer menu.

IPL Phases

During 3725 IPL, with any options selected, the IPL phases are indicated on:

- The third line of the MSA (fields r to x)
- The hex display on the control panel

(See the 3725 Problem Determination and Extended Services, Vol. A06, for details.)

To stop the IPL during a phase, press PF1. To resume, press PF2.

To terminate the IPL function, when the IPL COMPLETE message is displayed in the MSA, use the Terminate function.

Normal IPL (Option 1)

Use this option to normally IPL the CCU and IML the scanners. When you select 1 in th 3725 IPL menu, the IPL starts immediately.

The following message is displayed while the IPL is in progress:

CCU AND SCANNER IPL

Step-by-Step IPL (Option 2)

Use this option to IPL the 3725 in step-by-step mode. When you select 2 in the 3725 IPL menu, the IPL stops automatically at the start of each phase, so that you may take appropriate action, such as executing a CCU function. To continue, press PF2.

The following message is displayed while the IPL is in progress:

STEP-BY-STEP IPL

Bypass Phase 1 (Option 3)

Use this option to IPL to CCU without CCU test and initialization, and IML the scanners. When you select 3 in the 3725 IPL menu, the IPL bypasses phase 1 and stops automatically at the beginning of the following phases.

The following message is displayed while the IPL is in progress:

BYPASS PHASE 1 IPL

TSS Functions

TSS functions help you debug the 3725 scanners.

They can be selected only from controller diskette.

The TSS functions that can be selected depend on the diskette installed.

SELECTION FROM THE CONTROLLER DISKETTE

1. Press SELN AREA to position the cursor.
2. Press M followed by SEND to display the MAINTENANCE primary menu.
3. Press S followed by SEND to display the TSS FNCTN (functions).

All TSS functions are then displayed in the secondary menu:

MENU	See Page
1 SELECT/RELEASE	2-370
2 DUMP/IML	2-371
3 MODE CONTROL	2-372
4 DPLY/ALT STORE	2-373
5 DPLY/ALT BLOCKS	2-375
6 DPLY/ALT LSR	2-376
7 DPLY/ALT XREG	2-376
8 ADDRESS COMPARE	2-377
9 CHK-POINT TRACE	2-378

SELECTION FROM THE SERVICE DISKETTE

1. Press SELN AREA to position to cursor.
2. Press V followed by SEND to select the scanner dump function.

The only TSS functions that you can use when the service diskette is mounted are:

- Select/release
- Dump

  Only one dump file (CHJDMP) is defined on the service diskette. This file is used to dump MOSS or a scanner.

Warning: TSS functions may disrupt communications on the lines attached to the selected scanner.

The following table identifies the potential risks:

Secondary Selection	Disruptive	Functions
1	No	Select/Release
2	Always	Dump/iml
3	Always	Stop reset
4	May be	Alter control store
5	May be	Alter control blocks
6	May be	Alter LSR
7	May be	Alter XREG
8	Always	Address compare stop
9	May be	Chk-point trace

MESSAGES

Refer to page 2-480 onwards for the message explanations and for the action to be taken for each message displayed when TSS functions are run.

SELECT/RELEASE SCANNER

Selection

Select TSS function menu then enter 1 followed by SEND

Before you call any TSS function (except for checkpoint trace where the selection is made automatically), you must select a scanner. If you try to call a TSS function before selecting a scanner, the message SELECT A SCANNER is displayed.

```
- TO SELECT A SCANNER, ENTER:

    THE SCANNER NUMBER PRECEDED BY S (S1 TO S16)
                                     (S1 TO  S6) *
    OR
    THE LINE ADDRESS (0 TO 255)
                     (0 TO  95) *
                                                  ==> S1
- TO RELEASE SELECTED SCANNER, ENTER REL
```

* For the 3725 Model 2

The correspondence between line address and scanner number is given under "Scanner Board Information" starting on page 4-120.

Select a Scanner

To select a scanner you may enter either its number or the address of one of its lines.

Note: Scanners number 2 and 4 are not used.

Release a Scanner

To release the scanner previously selected, enter REL.

Dump/IML Scanner

Warning: IML and dump functions are always disruptive to the selected scanner.

| Before doing a CSP dump, it is necessary to disconnect the scanner, (as explained on page 2-372).

SELECTION:

Select a scanner (as explained on page 2-370), then enter 2 followed by SEND.

```
- ENTER D FOR DUMP OR I FOR IML              ==>
```

DUMP A SCANNER

Note: Do not change the diskette once a dump has been requested, and until this dump is completed.

To take a scanner dump, enter D folowwed by SEND.

The following screen is then displayed:

```
                        SCANNER DUMP
 - ENTER DUMP LIMITS:

       LOWER LIMIT ADDRESS (HALFWORDS)   ==> 8000
       UPPER LIMIT ADDRESS (HALFWORDS)   ==> FFFF

A      HEX ROS LIMITS:  000 - FFF  (4K)
A      HEX RAM LIMITS: 8000 - FFFF (32K)
```

A gives the dump limit ranges

Once you have entered the dump limits and pressed SEND, the dump is immediately taken and filed in the CHGDMP (control- | ler diskette), and the following message is displayed:

| DUMP FILED IN CHGDMP. TO PRINT DUMP, TRANSFER IT TO HOST

Refer to next page for dump transfer to the host.

| If the CHGDMP dump file is already occupied with a previous dump, the following frame is displayed:

```
- TO CLEAR DUMP FILE, ENTER C, OTHERWISE PRESS SEND ==>

| A  CHGDMP MOSS/SCANNER DUMP FILE IS NOT EMPTY
```

You may either erase the previous dump or keep it.

- If you clear the dump file, the new dump is immediately taken.
- If you keep the dump, you may either display it at the operator console, transfer it to the host in order to print it, or transfer it to a support function, using an MD.
  - To display the dump, use the DUMP/DPLY/DEL utility program:

    SELN AREA T SEND (to cancel the DUMP function)

    SELN AREA U SEND 1 SEND (to select the utility program)

    Once you have displayed the dump, you may erase it using the same utility program, or transfer it to the host.
  - To transfer the dump to the host, refer to page 2-450.
  - To transfer the dump using an MD, refer to page 2-451.

IML A SCANNER

To IML the selected scanner enter I followed by SEND.

You are informed that the IML is complete by the message:

IML FOR SCANNER XX COMPLETE - SCANNER CAN BE CONNECTED

If an error prevents a scanner from being re-IMLed, the following message is displayed:

SCANNER CHECKOUT FAILED: RC=xxxx

This return code (RC) is found in the STAT field of the BER type 01, ID05, that has been created. See page 2-310 for further information.

Mode Control (Scanner)

Warning: Some mode control commands are disruptive to the selected scanner.

SELECTION

Select a scanner (as explained on page 2-370), then enter 3 followed by SEND.

Use this function to modify the mode of the scanner.

```
-SELECT SCANNER CONTROL COMMAND (SP, ST, CT, DS, RT)==>

      SP = STOP
      ST = START
      CT = CONNECT
      DS = DISCONNECT
      RT = RESET
```

The following table lists the scanner commands that you may use to modify the scanner mode. It also gives the new mode resulting from the command, and the indications that appear in the machine status area of the screen. DUMP and IML commands can be used by selecting dump/IML on the TSS function menu. The START, STOP, CONNECT, and RESET commands can be used by selecting mode control on the TSS function menu.

MOSS must be in ONLINE mode:

- to control a scanner fully,
- to IML a scanner

With MOSS in OFFLINE mode, only START, STOP, RESET, and DUMP, commands can be executed.

With MOSS in ALONE mode, only the RESET, DUMP, and IML commands can be executed.

Current Mode	Possible Scanner Commands	Resulting Mode	MSA Field m
Connected	STOP DISCONNECT RESET DUMP IML	Disconnected/stop Disconnected/stop Reset Reset Initialized	DISCTD/STOP DISCTD/STOP RESET RESET INITIALIZED
Disconnected/go	STOP DISCONNECT RESET DUMP IML	Disconnected/stop Disconnected/stop Reset Reset Initialized	DISCTD/STOP DISCTD/STOP RESET RESET INITIALIZED
Disconnected/stop	START RESET DUMP IML	Disconnected/go Reset Reset Initialized	DISCTD/GO RESET RESET INITIALIZED
Reset (or unknown mode)	RESET DUMP IML	Reset Reset Initialized	RESET RESET INITIALIZED
Initialized	STOP DISCONNECT CONNECT RESET IML DUMP	Disconnected/stop Disconnected/stop Connected Reset Initialized Reset	DISCTD/STOP DISCTD/STOP CONNECTED RESET INITIALIZED RESET
Inoperative	RESET DUMP IML	Reset Reset Initialized	RESET RESET INITIALIZED

CONNECTED

The scanner is connected when it runs under the control of the control program. The errors on CCU I/O instructions are reported to the control program, and the errors on MOSS I/O instructions are reported to the MOSS.

DISCONNECTED

The scanner is disconnected when it does not run under the control of the control program but under the control of the MOSS microcode. Only the MOSS I/O instructions are executed. Any instructions from the CCU are rejected (IOC timeout), or not answered. Warning: DISCONNECT, STOP, RESET, IML, and DUMP are always disruptive.

Warning: Any Alter may be disruptive

SELECTION:

Select a scanner (as explained page 2-370), then enter 4 followed by SEND

```
 |- ENTER HALFWORD STORAGE ADDRESS                 ==> 8000
A|    ROS: 000 TO FFF  -  RAM: 8000 TO FFFF
 |- ENTER NUMBER OF HALFWORDS TO DISPLAY (UP TO 32)==> 32
 |
B|- ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED ==> I
 |
C|TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY
```

A This gives the limits of the storage you can display.

B If you enter D, the execution of the display is delayed. See "Address Compare (Scanner)", page 2-377.

C This reminds you that, if you want to alter data, you must first perform an immediate display of the data to be altered.

DISPLAY

Data is displayed as follows:

```
 |-ENTER HALFWORD STORAGE ADDRESS                 ==> A700
 |     ROS: 000 TO FFF  -  RAM: 8000 TO FFFF
 |-ENTER NUMBER OF HALFWORDS TO DISPLAY (UP TO 32)==> 32
 |
 |-ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED ==> I
 |
A|A700  2BF8 33FE 5072 67FD 5272 671D 50C2 686A
 |A708  8A64 CB25 8A30 4A20 510E 9638 F76F 8C60
 |A710  4B0B 33E1 51C6 E870 4318 31EE 219E 0700
 |A718  31EE 0700 B10F 4820 67C9 D17F 4A82 CB05
 |
 | PF1:ALTER    PF4:BACKWARD   PF5:FORWARD    PF2:REFRESH
```

The cursor is positioned so that you can select another address.

A The first four characters of each displayed line give the storage addresses.

ALTER

To alter data, press PF1. The following frame is displayed:

```
 | - ENTER HALFWORD STORAGE ADDRESS                 ==>A700
 |      ROS: 000 TO FFF  -  RAM: 8000 TO FFFF
 | - ENTER NUMBER OF HALFWORDS TO DISPLAY (UP TO 32) ==>32
 |
A| - ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED  ==>I
 |
 |A700  2BF8 33FE 5072 67FD 5272 671D 50C2 686A
 |A708  8A64 CB25 8A30 4A20 510E 9638 F76F 8C60
 |A710  4B0B 33E1 51C6 E870 4318 31EE 219E 0700
 |A718  31EE 0700 B10F 4820 67C9 D17F 4A82 CB05
 |
 |PF3:IGNORE ALTER
B|TO DELAY ALTER, CHANGE I TO D.  ENTER NEW DATA, PRESS SEND
```

A if you enter D, the execution of the alter is delayed. See "Address Compare (Scanner)", page 2-377.

B This reminds you that you can delay the execution of the alter function (See function "Address Compare (Scanner)".

The cursor is automatically positioned below the first character of the displayed data. If you wish to delay the alter, replace I by D on line A, then press --> to move the cursor back to the data you want to alter. When you have altered all desired characters, press SEND. All displayed data, altered or not, is transmitted to the scanner.

PF KEYS

PF1:ALTER - See "Alter" above.

PF2:REFRESH - Redisplays data every 500ms. This allows you to view data in its most updated state. To stop the refresh, press ATTN.

PF3:IGNORE ALTER - Cancels alter mode. The modifications you have already entered on the screen are ignored.

PF4:BACKWARD - Displays preceding data. The amount of data that will be displayed has already been specified when defining the Display function.

PF5:FORWARD - Displays next data. The amount of data that will be displayed has already been specified when defining the Display function.

DPLY/ALT Blocks (Scanner)

SELECTION (3725/3726)

Select a scanner (as explained page 2-370), then enter 5 followed by SEND.

```
A|- ENTER HEX LINE INTERFACE ADDRESS (0 TO 3F)        ==>
B|- ENTER HALFWORD TO DISPLAY FIRST                   ==> 0
C|- ENTER NBR OF HALFWORDS TO DISPLAY (OPTIONAL)      ==>
D|- ENTER BLOCK IDENTIFICATION (1 TO 10)              ==>
 |      1=ICB   3=LIB   5=RAMA   7=RAMC   9=LIC
 |      2=PSA   4=LCB   6=RAMB   8=ICC   10=FPS
E|- ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED   ==> I

F|TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY.
```

A Specify a hexadecimal interface address, between 0 and 1F for scanners installed on LABs type B, and between 0 and 3F for scanners installed on LAB type A and CLAB.

B Specify the halfword from which the block will be displayed; if you enter no operand, the block will be displayed from its first halfword.

C Specify the number of halfwords that you want to display, starting from the halfword specified on line B. The message INVALID INPUT is displayed when the input is incorrect (for example, 0 to specify the number of halfwords to display).

The size of each block is:

ICB = 16	RAMB = 4
PSA = 16	RAMC = 4
LIB = 32	ICC = 1
LCB = 16	LIC = 2
RAMA = 4	FPS = 16

For ICC and LIC, you may ignore this request.

D Specify the block that you want to display:

ICB: interface control block
PSA: parameter/status area (copy of CCU PSA for this line)
LIB: line interface buffer
LCB: line control block
RAMA: random access memory A
RAMB: random access memory B
RAMC: random access memory C
ICC: internal clock circuit
LIC: line interface card
FPS: FES parameter/status

Refer to Chapter 13 for a detailed description of these blocks.

E If you enter D, the execution of the display is delayed. See "Address Compare (Scanner)", page 2-377.

F This message reminds you that, if you want to alter data, you must first perform an immediate display of the data to be altered.

The display/alter block function, and the descriptions of the PF keys available, are similar to those of the display/alter storage function. However, the first four characters of each displayed line give:

- The address of the ICB, PSA, LIB, LCB, or FPS block, or
- The name of the RAMA, RAMB, RAMC, ICC, or LIC block

SELECTION (3725 MODEL 2)

Select a scanner (as explained page 2-370), then enter 5 followed by SEND.

```
A|- ENTER HEX LINE INTERFACE ADDRESS (0 TO 17)        ==>
B|- ENTER HALFWORD TO DISPLAY FIRST                   ==> 0
C|- ENTER NBR OF HALFWORDS TO DISPLAY (OPTIONAL)      ==>
D|- ENTER BLOCK IDENTIFICATION (1 TO 10)              ==>
 |      1=ICB   3=LIB   5=RAMA   7=RAMC   9=LIC
 |      2=PSA   4=LCB   6=RAMB   8=ICC   10=FPS
E|- ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED   ==> I

F|TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY.
```

A Specify a hexadecimal interface address, between 0 and 17 for scanners installed on C2LB board.

B, C, D , E, and F same as for 3725/3726.

DPLY/ALT LSR

Select a scanner (as explained page 2-370), then enter 6 followed by SEND.

```
A| - ENTER HEXADECIMAL PAGE NUMBER                    ==>
 |
B| - ENTER ADDRESS OF LSR TO DISPLAY (0 TO 7)         ==>
 |      (FOR ALL LSRs OF THE PAGE, ENTER NOTHING)
C| - ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED ==> I
D|LSR    0 1  2 3  4 5  6 7  8 9  A B  C D  E F
E|DATA  1914 9914 0000 0000 0000 0000 C6EB 07AB
 |
F|TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY
```

XXXX = Contents of a register pair (hexadecimal)

A Enter 'X' (when X = 0 through F) to select one of the 16 LSR pages (one LSR page = 8 one-byte registers).

B Enter the address of the register to be displayed, or press SEND.

- If a register address is entered, a single even/odd register pair is displayed. The least significant bit of the register address is ignored.
- If SEND is pressed, and the page number entered in step A was even, then all 16 registers of the even/odd pages are displayed, numbered 0 through F.
- If SEND is pressed, and the page number entered in step A was odd, only the eight registers of the odd page are displayed, numbered 0 through 7.

C If you enter D, the execution of the display is delayed. See function "Address Compare (Scanner)", page 2-377.

D Line D gives the LSR numbers.

E Line E gives the LSR contents.

F This message reminds you that, if you want to alter data, you must first perform an immediate display of the data to be altered.

The display/alter of LSR function, and the descriptions of the PF keys available, are similar to those of the display/alter storage function.

DPLY/ALT XREG

Select a scanner (as explained page 2-370), then enter 7 followed by SEND.

```
A| - ENTER HEX ADDRESS OF XREG TO DISPLAY FIRST     ==>
B| - ENTER NUMBER OF XREGS TO DISPLAY               ==>
 |
 |
C| - ENTER I FOR IMMEDIATE EXECUTION, D FOR DELAYED ==> I
 | XREG 00 01 02 03 04 05    07 08
 | DATA xx xx xx xx xx xx ** xx xx ** ** ** ** ** ** **
 | XREG 10    12 13 14 15 16 17    19 1A 1B 1C 1D 1E 1F
 |      xx ** xx xx xx xx xx xx ** xx xx xx xx xx xx xx
D| TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY
```

A Specify the hexadecimal address of the external register you want to display first. This parameter is mandatory.

B Specify the number of external registers that you want to display. If SEND is pressed, all 32 registers are displayed.

C If you enter D, the execution of the display is delayed. See function "Address Compare (Scanner)", page 2-377.

D This message reminds you that, if you want to alter data, you must first perform an immediate display of the data to be altered.

The display/alter external registers function, and the descriptions of the PF keys available are similar to those of the display/alter storage function.

Notes:

1. Independent of the register specified or the number of registers displayed, the display always starts with an even register and ends with an odd register.
2. A pair of asterisks under a register position indicates that the register does not exist.

Address Compare (Scanner)

You execute a scanner address compare to force the scanner to perform an action when a storage address detected during a specific access operation matches the contents of a register.

You must specify the address, the access operation, and the scanner action.

Warning: The address compare function with action STOP (line D) is always disruptive.

SELECTION

Select a scanner (as explained page 2-370), then enter 8 followed by SEND.

```
A - ENTER A TO ACTIVATE AC OR D TO DEACTIVATE    ==> A
B - ENTER HALFWORD STORAGE ADDRESS (8000 TO FFFF)==> 8000
C - SELECT 1 TO 4 STORAGE ACCESSES (F, S, R, W)  ==> RW
        F = I-FETCH OR DATA LOAD    S = DATA STORE
        R = CYCLE STEAL READ        W = CYCLE STEAL WRITE
D - SELECT ONE SCANNER ACTION (1, 2, 3, 4, 5)    ==>
        1 = NO ACTION             2 = START DELAYED DISPLAY
        3 = START DELAYED ALTER  4 = STOP SCANNER
        5 = STOP SCANNER BUT LEAVE AC ACTIVE
```

A Activate or deactivate the address compare. Refer to "Deactivating the Scanner Address Compare" on the same page.

B Specify an address within the range indicated.

C Specify any combination of the following storage access operations. When the address specified on line B is detected during any one of these operations, the address compare is successful.

F: Address detected during I-fetch or load
S: Address detected during store
R: Address detected during cycle steal read
W: Address detected during cycle steal write

The scanner action you specify on line C is executed immediately after the execution of the storage access operation (F, S, R, W).

D You can specify only one scanner action:

1. NO ACTION: You just want to be informed of the completion of the address compare in field q of the MSA.

   After completion, the address compare is automatically deactivated.

2. START DELAYED DISPLAY: When the address compare is successfully completed, the delayed display that you specified in a display/alter function is performed and the address compare is automatically deactivated. The keyboard is locked until the address compare is successfully completed. If you want to unlock the keyboard, press ATTN. This action also deactivates the address compare.

   If you specified a delayed display, field o of the MSA displays DELAYED-DISPLAY.

   If you forgot to specify a delayed display and you specified in the address compare ACTION ==> 2, the following message is displayed:

   NO DELAYED DISPLAY. SPECIFY IT IN A DISP/ALT FUNCTION

3. START DELAYED ALTER: When the address compare is successfully completed, the delayed alter that you specified in a display/alter function is executed and the address compare is automatically deactivated. The keyboard is locked until the address compare is successfully completed. If you want to unlock the keyboard, press ATTN. This action also deactivates the address compare.

   If you specified a delayed alter, field o of the MSA displays DELAYED-ALTER.

   If you forgot to specify a delayed alter and you specified ACTION ==> 3 in the address compare, the following message is displayed:

   NO DELAYED ALTER. SPECIFY IT IN A DISP/ALT FUNCTION

4. STOP SCANNER: When the address compare is successfully completed, the scanner is no longer under control of the CCU control program and the address compare is automatically deactivated. The scanner is in DISCONNECTED/STOP state (see field m of the MSA).

5. STOP SCANNER BUT LEAVE AC ACTIVE: When the address compare is successfully completed, the scanner, in DISCONNECTED/STOP state, is no longer under control of the CCU control program but the address compare remains active.

   To restart the scanner, use scanner command START:

   SELN AREA
   3 followed by SEND
   ST followed by SEND

DEACTIVATING THE SCANNER ADDRESS COMPARE

- Scanner address compare is automatically deactivated after successful completion for address compare with action 1, 2, 3, or 4.
- To deactivate the address compare function with action 5, press D followed by SEND.
- To deactivate the address compare function before completion of the address compare, proceed according to the type of address compare action:
  - Action 1, 4, or 5: press D SEND
  - Action 2 or 3: press ATTN

    If the address compare frame is no longer displayed, you must call again the Address Compare function to deactivate it:

    SELN AREA
    8 followed by SEND
    D followed by SEND
- The scanner address compare is also deactivated when:
  - You release the scanner.
  - You select the Terminate (T) FUNCTION.

Checkpoint Trace (Scanner)

SELECTION

1. Press SELN AREA to position the cursor.
2. Press M followed by SEND to display the MAINTENANCE primary menu.
3. Press 9 followed by SEND to select the scanner checkpoint trace.

The checkpoint trace is always ready to start at the same time as the SIT trace starts. Use this function to stop the checkpoint trace. To perform the checkpoint trace function, you need not select a scanner. The checkpoint trace is described on page 2-040.

A single screen is displayed:

```
 - ENTER A DECIMAL LINE ADDRESS FROM 0 to 255  ==>
                            OR FROM 0 to  95* ==>

      ENTER T FOR TRANSMIT, R FOR RECEIVE

 - ENTER ON OR OFF                             ==>

      ON  - CHECKPOINT TRACE WILL START WITH
            SCANNER INTERFACE TRACE (SIT)
      OFF - CHECKPOINT TRACE NOT EFFECTIVE

ENTER ANY INTERFACE:RELEASE/SELECT SCANNER IS AUTOMATIC
```

* For the 3725 Model 2

TRA Select, Connect/Disconnect

INTRODUCTION

TRSS functions are designed to provide debugging facilities for the token ring subsystem. Supported adapters are the token ring adapters (TRA), which are composed of the token ring multiplexer card (TRM) and the token ring interface coupler card (TIC).

SELECTION FROM THE CONTROLLER DISKETTE

1. Press SELN AREA to position the cursor.
2. Press M followed by SEND to display the MAINTENANCE primary menu.
3. Press R followed by SEND to display the TRSS FNCTN (functions).

All TRSS functions are then displayed in the secondary menu:

Menu	See Page	Disruptive
1 SELECT	2-380	no
2 CONNECT/DISC	2-380	yes
3 TRM REGS	2-381	yes (alter)
4 TIC INTR REG	2-382	yes (alter)
5 DPLY STORAGE	2-383	yes
6 DUMP	2-384	yes
7 DPLY SCB, SSB	2-385	no
8 DPLY PARM BLK	2-385	no
9 TIC ERR STAT	2-386	no

Warning: TRSS functions may disrupt communications on the ring attached to the selected TRA. See the table above to identify the potential risks.

MESSAGES

Refer to page 2-520 onwards for the message explanations and for the action to be taken for each message displayed when TRSS functions are run.

TRA SELECT (1)

Select TRSS function menu, then enter "1" followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE       X71:hhhhhh
RUN       BYP-IOC-CHK                   X72:hhhhhh
TRA nn   xxxxxxxxxx                     xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT         |                 SELECT
2 CONNECT/DISC   |
3 TRM REGS       | ENTER THE TRA # ==> nn    TRA # LINE ADDRESS    TIC(S)
4 TIC INTR REG   |                            nn  nnn nnn nnn nnn nnnn
5 DPLY STORAGE   |
6 DUMP           |
7 DPLY SCB, SSB  |
8 DPLY PARM BLK  |
9 TIC ERR STAT   |
                 |
                 | PRESS SEND TO CONFIRM
                 | TRA nn SELECTED: LOOK IN MSA FOR MODE
===>
```

Before selecting any service, the maintenance operator must choose a TRA by entering TRA number (6 - 16). A table is provided in the work area to assist the operator in making a selection. The line numbers associated with the available TRAs are shown. The TICs attached to each TRM are also given. MOSS builds this table from the hardware CDF.

All maintenance operator requests will then be routed to this TRA, known as the "selected TRA".

To access a different TRA, the operator must repeat the selection process.

The mode of the selected TRA is shown in the MSA line 3.

TRA Connect/Disconnect (2)

Enter "2" in the selection area followed by SEND.

```
                       TRA CONNECT/DISCONNECT


   TYPE CT TO CONNECT
        DS TO DISCONNECT ==> DS


   PRESS SEND TO CONFIRM
```

The maintenance operator can change the mode of the selected TRA. See "TRSS Modes" on page 2-387 for a definition of these modes.

CONNECT: To connect a TRA, enter "CT" followed by SEND.

DISCONNECT: To disconnect a TRA, enter "DS" followed by SEND.

Display/Alter TRM Registers (3)

Enter "3" in the selection area followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN       BYP-IOC-CHK LASTMCHK:hhh     X72:hhhhhh
TRA nn   xxxxxxxxxx                    xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP   Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START  T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT         |          DISPLAY/ALTER TRM REGISTERS (1)
2 CONNECT/DISC   |
3 TRM REGS       | TRM CONTROL:           TIC CONTROL (R/W):  1 2 3 4
4 TIC INTR REG   |    RESET (R):        n    RESET        ==> n n n n
5 DPLY STORAGE   |    HI PRIO (R/W) ==> n    INH INTR     ==> n n n n
6 DUMP           |                           INH DMA      ==> n n n n
7 DPLY SCB, SSB  |                           MOSS CONTROL ==> n n n n
8 DPLY PARM BLK  | DIAG (R/W): TRM WRAP ==> n   DMA R(1)/W(0)      ==> n
9 TIC ERR STAT   |    PIO(1) DMA(0)     ==> n   ODD(1)/EVEN(0)     ==> n
                 |    TA,TD BAD PARITY  ==> nn  BYTE 0,1           ==> nn
                 |    FORCE TIMEOUT     ==> n   DMA COUNTER        ==> n
                 |    FORCE IDLE ERROR  ==> n   START              ==> n
                 |    FORCE BAD PTY INT ==> n   CSCW,BUS BAD PTY   ==> nn
                 | PF1: ALTER  PF2: REFRESH  PF5: FORWARD
                 |
===>
```

Press PF5: FORWARD

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN       BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx                    xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP   Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START  T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN  RS: CCU RESET

1 SELECT         |          DISPLAY/ALTER TRM REGISTERS (2)
2 CONNECT/DISC   |
3 TRM REGS       | LID BASE (R/W) ==> nnnn
4 TIC INTR REG   | DATA REGISTER (R/W) ==> nn nnnn
5 DPLY STORAGE   |
6 DUMP           | IR/BR (R/W):
7 DPLY SCB, SSB  |    IR1 ==> n  IR2 ==> n  IR3 ==> n  IR4 ==> n
8 DPLY PARM BLK  |    BR1 ==> n  BR2 ==> n  BR3 ==> n  BR4 ==> n
9 TIC ERR STAT   |
                 | CSCW (R): nnnn
                 |
                 | LEVEL 1 ERROR STATUS (R): nnnn nnnn nnnn nnnn BINARY
                 |
                 | PF1: ALTER  PF2: REFRESH  PF4: BACKWARD
```

The following table shows the TRM registers that may be displayed or altered:

Register	Read	Write	For details see pages
TRM state control	X	W	15-106
TIC state control	X	W	15-106
Level 1 error status	X		15-107
Line ID base register	X	W	15-120
IR/BR	X	W	15-106
Diag register	X	W	
Data buffer register	X	W	15-106
CSCW	X		15-121

X : Display function available

W : Alter function available and preceded by a warning

Detail : Contents are shown in bit format with meaning of each bit given

ALTER:

To alter the contents of a register, the operator must press PF1 twice: once to select alter mode and once to confirm. A warning message is displayed after the first PF1. The alterable fields will be highlighted. The operator may update these fields and press SEND to alter the register contents, or press PF3 to ignore the alter.

After the alter is complete, the contents of the registers are read and displayed again. This allows the operator to verify that the contents were actually updated.

The register contents are updated on the screen whenever the SEND key is pressed (but not in alter mode).

REFRESH: A refresh option is available, which updates the screen periodically.

PRESS PF2 to start refresh, ATTN to stop the refresh.

Display/Alter TIC Interrupt Register (4)

Enter "4" in the selection area, followed by SEND.

The maintenance operator can write or read the TIC interrupt register. The significance of each bit is given.

REFRESH: A refresh option is available, which updates the screen periodically.

Press PF2 to start refresh, ATTN to stop refresh.

ALTER: The alter procedure is the same as in "Display/Alter TRM Registers".

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN        BYP-IOC-CHK                 X72:hhhhhh
TRA nn   xxxxxxxxxx                    xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |
2 CONNECT/DISC    |
3 TRM REGS        |
4 TIC INTR REG    |
5 DPLY STORAGE    |
6 DUMP            |      ENTER THE TIC ID (1, 2, 3 OR 4) ==> n
7 DPLY SCB, SSB   |
8 DPLY PARM BLK   |       VALID CHOICES ARE: 1    2    3    4
9 TIC ERR STAT    |               LINE #   : nnn nnn nnn nnn
                  |
                  |
                  |
                  |
==>
```

Enter the TIC ID followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN        BYP-IOC-CHK                 X72:hhhhhh
TRA nn   xxxxxxxxxx                    xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |          DISPLAY/ALTER TIC INTERRUPT REGISTER
2 CONNECT/DISC    |
3 TRM REGS        | INTERRUPT ==> hhhh  OR  INTERRUPT ADAPTER  ==>   n
4 TIC INTR REG    |                         RESET              ==>   n
5 DPLY STORAGE    |                         SSB CLEAR          ==>   n
6 DUMP            |                         EXECUTE            ==>   n
7 DPLY SCB, SSB   |                         SCB REQUEST        ==>   n
8 DPLY PARM BLK   |                         RECEIVE CONTINUE   ==>   n
9 TIC ERR STAT    |                         RECEIVE VALID      ==>   n
                  |                         XMIT VALID         ==>   n
                  |                         RESET SYSTEM INTR  ==>   n
                  |                         INITIALIZE CODE(R)       nnn
                  |                         INTERRUPT CODE(R)        nnn
                  |
                  | PF1: ALTER  PF2: REFRESH
==>
```

See page 15-170 for further description of the TIC interrupt resister.

Display TIC Storage (5)

The operator can display TIC storage in hex and EBCDIC format.

The selected TRA must be in DISCONNECT mode for this operation.

Enter "5" in the selection area, followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN       BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx         TIC n        xxxxxxxxxxxx


I: IPL CCU/TSS     G: GCF/IPL Ports    S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN      C: CNTRL PGM PROC   U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG       N: CUSTOMER MENU    R: TRSS FNCTN   RS: CCU RESET


1 SELECT           |              DISPLAY TIC STORAGE
2 CONNECT/DISC     |
3 TRM REGS         | - ENTER ADDRESS OF START OF DISPLAY ==> h  (HEX)
4 TIC INTR REG     |     (RAM: 0 TO FFF)
5 DPLY STORAGE     | - ENTER NBR OF HALFWORDS TO DPLY (UP TO 48) ==> nn (DEC)
6 DUMP             |
7 DPLY SCB, SSB    |
8 DPLY PARM BLK    |
9 TIC ERR STAT     |
                   |
                   |
==>
```

Display

The maintenance operator must specify the address limits of storage (0 to x 'FFF') to be displayed. Scrolling is permitted. From 1 to 48 halfwords may be displayed at one time.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN       BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx         TIC n        xxxxxxxxxxxx


I: IPL CCU/TSS     G: GCF/IPL Ports    S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN      C: CNTRL PGM PROC   U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG       N: CUSTOMER MENU    R: TRSS FNCTN   RS: CCU RESET


1 SELECT           |              DISPLAY TIC STORAGE
2 CONNECT/DISC     |
3 TRM REGS         | - ENTER ADDRESS OF START OF DISPLAY ==> n  (HEX)
4 TIC INTR REG     |     (RAM: 0 TO FFF)
5 DPLY STORAGE     | - ENTER NBR OF HALFWORDS TO DPLY (UP TO 48) ==> nn (DEC)
6 DUMP             | 0000 hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh ................
7 DPLY SCB, SSB    | 0010 hhhhhhhh hhhhhhhh hhhhhhhh hhhhhhhh ................
8 DPLY PARM BLK    | 0020 hhhhhhhh hhhhhhhh                   ........
9 TIC ERR STAT     |
                   |
                   |
                   |
                   | PF4: BACKWARD PF5: FORWARD
                   |
==>
```

TIC INTERNAL RAM FORMAT

```
  EBCDIC Format             COMMENTS
*----------------*
|xxxxxxxxxxxxxxx | - 000     Start of TIC RAM
| .              |
| .              |
| .              |
|                |
|xxxxxxxxxxxxxxx |
|szzzzzzzzzlluuTR| - x'1000' Start of header
|A:dd TIC:d    CC|             info
|UID:xxxxxxxx  TI|
|ME:mm/dd/yy hh:m|
|m:ss LID:xxxx BU|
|FFER:xxxxxx   CO| -  Data Buffer Register
|INTROL:xxxx   DI| -  TIC control 4 bits right justified
|AG:xxxx       IR| -  Diagnostic Register
|/BR:xx        L1| -  IR/BR 2 bits right justified
|ERR:xxxx      IN| -  IR/BR 2 bits right justified
|TR:xxxx       IP| -  TIC interrupts Register
|B:xxxxxxxxxxxxxx| -  Unit Parameter Block
|xxxxxxxxxxxxxxxx|
|xxxxxxxxxxxxxxOP| -  Open Parameter Block
|B:xxxxxxxxxxxxxx|
|xxxxxxxxxxxxxxxx|
|xxxxxxxxxxxxxxxx|
|xxxxxxxxxxxxxxxx|
|xx            CH|
|KSTAT:xxxxxxxxxx| -  Adapter Check Status
|xxxxxx        RI|
|INGSTAT:xxxx    | -  Ring Status
*----------------*
```

Notes:

Bit 0=1 of "s" indicates an automatic TIC dump.
Bit 1=1 of "s" indicates the dump was truncated due to error.

"ll" contains the TIC lower dump limit.

"uu" is the upper bound of the TIC dump.

'OFFF'x is normal and means that a complete TIC dump was taken.

Characters in capital letters are inserted literally into the dump.

"x" indicates an EBCDIC hex value substitution. (i.e., 2 chars/byte).

A blank indicates an EBCDIC blank character x'40'.

"z" is non-essential data.

Dump TIC Storage (6)

The dump function dumps all installed RAM of the selected TIC. The following information is also provided:

```
     Related TRM registers: Line ID base, data buffer, TIC state,
                            diag, IR/BR, level 1 error status
     TIC interrupt register
     Init and open parameter blocks
     TIC adapter check status
     TIC token-ring status
```

Four TIC dumps may be stored on the CHGTRSS dump file on the controller diskette as shown below. A fixed portion of CHGTRSS is statically allocated to a TIC dump from each of the four possible TIC positions (1-4). The TRA position is not considered in determining TIC dump placement within CHGTRSS. The chart below describes CHGTRSS.

```
  Sector in CHGTRSS
             1    ---------------------------
                 | TRSS Dump                 |
                 |   Header                  |
             2   |---------------------------|
                 | TRA x TIC 1 dump          |
                 |   (RAM)                   |
            18   |---------------------------|
                 | TRA x TIC 1 dump   spare  |
                 |   header                  |
            20   |---------------------------|
                 | TRA x TIC 2 dump          |
                 |   (RAM)                   |
            36   |---------------------------|
                 | TRA x TIC 2 dump   spare  |
                 |   header                  |
            38   |---------------------------|
                 | TRA x TIC 3 dump          |
                 |   (RAM)                   |
            54   |---------------------------|
                 | TRA x TIC 3 dump   spare  |
                 |   header                  |
            56   |---------------------------|
                 | TRA x TIC 4 dump          |
                 |   (RAM)                   |
            72   |---------------------------|
                 | TRA x TIC 4 dump   spare  |
                 |   header                  |
     74 (73 last) ---------------------------
```

The TRSS dump header is necessary to indicate the presence, timestamp, and characteristics of a TIC dump within CHGTRSS.

When a TIC dump area contains a dump, the operator is given a choice of overwriting or canceling the dump request.

A TIC dump may be deleted or examined using utility programs (See "DUMP DISPLAY/DELETE UTILITY").

The TRA must be in DISCONNECT mode for this operation.

Enter "6" in the selection area, followed by SEND.

TIC select screen is displayed first

TIC select screen

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN        BYP-IOC-CHK                 X72:hhhhhh
TRA nn   xxxxxxxxxx        TIC n         xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP   Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START  T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |                DUMP TIC STORAGE
2 CONNECT/DISC    |
3 TRM REGS        |
4 TIC INTR REG    |
5 DPLY STORAGE    | - ENTER "Y" TO DUMP TIC RAM ==> Y
6 DUMP            |
7 DPLY SCB, SSB   |
8 DPLY PARM BLK   |
9 TIC ERR STAT    |
                  |
                  |
                  |
                  | DUMP IS COMPLETE
==>
```

Enter the TIC ID, followed by SEND.

Enter "Y", followed by SEND

If disk file contains a dump, the following prompt will appear in a clear work area:

```
THE DUMP AREA CONTAINS A TIC DUMP.
TYPE C TO CLEAR FILE, OTHERWISE PRESS SEND ==> _
```

The message "DUMP IS COMPLETE" is displayed after approximately 30 seconds.

TIC Functional Blocks

The maintenance operator can display parameters related to a selected TIC. These blocks are located in CCU storage and are controlled by NTRI.

Item	See note
Init parameter block contents	1
Open parameter block contents	1
RCV list chain address	2
XMIT list chain address	2
SCB address and contents	1
SSB address and contents	1

Notes:

1. The meaning of each byte, halfword, or word in the block is given.
2. An address of one of the lists in the chain is given.

Display SCB, SSB and Parameter Block (7, 8)

Display SCB, SSB (7)

Enter "7" in the selection area, followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE       X71:hhhhhh
RUN        BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx

I: IPL CCU/TSS     G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN      C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG       N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |
2 CONNECT/DISC    |
3 TRM REGS        |
4 TIC INTR REG    |
5 DPLY STORAGE    |
6 DUMP            |         ENTER THE TIC ID (1, 2, 3 OR 4) ==> 1
7 DPLY SCB, SSB   |
8 DPLY PARM BLK   |          VALID CHOICES ARE: 1    2    3    4
9 TIC ERR STAT    |                   LINE #  : nnn nnn nnn nnn
                  |
                  |
                  |
==>
```

Enter the TIC ID, followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE       X71:hhhhhh
RUN        BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx        TIC n          xxxxxxxxxxxx

I: IPL CCU/TSS     G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN      C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG       N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |         DISPLAY TIC SCB, SSB (FROM NTRI)
2 CONNECT/DISC    |
3 TRM REGS        |  SCB ADDRESS:       nnnnnn
4 TIC INTR REG    |      CONTENTS:      nnnn
5 DPLY STORAGE    |                     nnnn
6 DUMP            |                     nnnn
7 DPLY SCB, SSB   |
8 DPLY PARM BLK   |  SSB ADDRESS:       nnnnnn
9 TIC ERR STAT    |     CONTENTS:       nnnn
                                        nnnn
                  |                     nnnn
                  |
                  |  PF2: REFRESH
==>
```

Refresh:
Press PF2 to start refresh mode.
Press ATTN to stop refresh mode.

Display Parameter Block (8)

Enter "8" in the selection area, followed by SEND

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE       X71:hhhhhh
RUN        BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx        TIC n          xxxxxxxxxxxx

I: IPL CCU/TSS     G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN      C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG       N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |             DISPLAY TIC
2 CONNECT/DISC    |    INITIALIZE PARAMETER BLOCK (FROM NTRI)
3 TRM REGS        |
4 TIC INTR REG    |  OPTIONS:           nnnn     DMA ABORT THRESH: nnnn
5 DPLY STORAGE    |  INTR VECT CMD:     nn       SCB ADDRESS:   nnnnnnnn
6 DUMP            |  INTR VECT XMIT:    nn       SSB ADDRESS:   nnnnnnnn
7 DPLY SCB, SSB   |  INTR VECT RCV:     nn
8 DPLY PARM BLK   |  INTR VECT RING:    nn
9 TIC ERR STAT    |  INTR VECT SCB:     nn
                  |  INTR VECT ADPT:    nn
                  |  RCV BURST SIZE:    nnnn
                  |  XMIT BURST SIZE:   nnnn
                  |
                  |  PF5: FORWARD
==>
```

Enter PF5: FORWARD

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE       X71:hhhhhh
RUN        BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx        TIC n          xxxxxxxxxxxx

I: IPL CCU/TSS     G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN      C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG       N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |             DISPLAY TIC
2 CONNECT/DISC    |    OPEN PARAMETER BLOCK (FROM NTRI)
3 TRM REGS        |
4 TIC INTR REG    |  OPEN OPTIONS:    nnnn           BUFFER SIZE:     nnnn
5 DPLY STORAGE    |  NODE ADDRESS:    nnnnnnnnnnnn   EXT RAM START:   nnnn
6 DUMP            |  GROUP ADDRESS:   nnnnnnnn       EXT RAM END:     nnnn
7 DPLY SCB, SSB   |  FUNCT ADDRESS:   nnnnnnnn       XMIT BUF COUNT:  nnnn
8 DPLY PARM BLK   |  RCV LIST SIZE:   nnnn           PROD ID ADDR:    nnnnnnnn
9 TIC ERR STAT    |  XMIT LIST SIZE:  nnnn
                  |
                  |      XMIT LIST CHAIN ADDR:   nnnnnn
                  |      RCV LIST CHAIN ADDR:    nnnnnn
                  |
                  |  PF4: BACKWARD
==>
```

Display Token Ring Status (9)

Token Ring Status

The operator can display the Token Ring status of the selected TIC. The bits are shown in detail with meanings.

Enter "9" in the selection area, followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN       BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |
2 CONNECT/DISC    |
3 TRM REGS        |
4 TIC INTR REG    |
5 DPLY STORAGE    |
6 DUMP            |     ENTER THE TIC ID (1, 2, 3 OR 4) ==> 1
7 DPLY SCB, SSB   |
8 DPLY PARM BLK   |      VALID CHOICES ARE: 1   2   3   4
9 TIC ERR STAT    |               LINE #  : nnn nnn nnn nnn
                  |
                  |
                  |
==>
```

Enter the TIC ID, followed by SEND.

```
PROCESS  STOP-CCU-CHK MOSS-ONLINE      X71:hhhhhh
RUN       BYP-IOC-CHK                  X72:hhhhhh
TRA nn   xxxxxxxxxx       TIC n          xxxxxxxxxxxx

I: IPL CCU/TSS    G: GCF/IPL Ports   S: TSS FNCTN    SP: CCU STOP    Q: DATE/TIME
L: LINE FNCTN     C: CNTRL PGM PROC  U: UTILITY PGM  ST: CCU START   T: TERMINATE
E: ERROR LOG      N: CUSTOMER MENU   R: TRSS FNCTN   RS: CCU RESET

1 SELECT          |          TOKEN RING STATUS (FROM NTRI)
2 CONNECT/DISC    |
3 TRM REGS        |  SIGNAL LOSS:                 n
4 TIC INTR REG    |  HARD ERROR:                  n
5 DPLY STORAGE    |  SOFT ERROR:                  n
6 DUMP            |  TRANSMIT BEACON:             n
7 DPLY SCB, SSB   |  LOBE WIRE FAULT:             n
8 DPLY PARM BLK   |  AUTO-REMOVAL ERROR 1:        n
9 TIC ERR STAT    |  REMOVE RECEIVED:             n
                  |  COUNTER OVERFLOW:            n
                  |  SINGLE STATION:              n
                  |  RING RECOVERY:               n
                  |  PF2: REFRESH
==>
```

TRSS Modes

TRSS Functions are based on the concept of modes.

Each TRA must be in one of the three following modes:

DISCONNECT: The TRA is under MOSS control. Moss is expected to handle all interrupts and PIO to/from the TIC.

CONNECT: The TRA is under the NCP Token-Ring Interconnection (NTRI) control. NTRI is expected to handle all interrupts (except in the case of an MIOH error)

UNKNOWN: A non-recoverable error occurred during the connect or disconnect process, or an MIOC/IOC error occurred while getting level 1 error status during TRA select. connect/disconnect may be retried.

Each TIC must be in one of seven following modes (as reported by NTRI):

IDLE: The TIC has not yet been reset by NTRI.

RESET: The TIC has been reset by NTRI but not yet initialized.

INITIALIZED: The TIC has been initialized but not yet OPEN or DISABLED. Initialization parameters have been passed to the TIC by NTRI.

OPEN: The TIC has been inserted into the token ring and is in normal operation. Open parameters have been passed and received and transmit operations have been started.

CLOSED: The TIC has been opened since initialization but has been closed (by the host).

FROZEN: An error was detected and the following actions were taken by NTRI:

- Interrupts from this TIC are disabled.
- DMA from this TIC is disabled.
- The TIC is reset.

DISABLED: The associated TRA has been disconnected by MOSS. NTRI will send no PIO to this TIC.

(blank): There is no TIC mode if NTRI is not online.

Note: The TIC Mode is derived from the NTRI medium access control (MAC) Layer status obtained from NTRI.

NTRI MAC STATUS AND CORRESPONDING TIC MODE

Medium Access Control Status	TIC Mode
Idle	IDLE
TIC resetting hard	"
TIC resetting soft	"
Initialization list xfer	RESET
Initialized	INITIALIZED
Open started	"
Receive initialization	"
Transmit initialization	"
Started	OPEN
Transmit in progress	"
Close in progress	"
Closed	CLOSED
Frozen	FROZEN
Disconnected	DISABLED

Utility Programs

The procedure for selecting the utility programs depends on the diskette installed.

SELECTION FROM THE CONTROLLER DISKETTE

1. Press SELN AREA to position the cursor.
2. Press M followed by SEND to display the MAINTENANCE primary menu.
3. Press U followed by SEND to display the UTILITY PGM (programs).

All the utility programs are then displayed in the secondary menu:

MENU	See Page
1 DUMP DPLY/DEL	2-391
2 MOSS STORE DPLY	2-393
3 MODULE DPLY	2-393
4 ZAP	2-394
5 CDF	2-400
6 MLT	2-407
7 DISKETTE SWAP	2-408

SELECTION FROM THE SERVICE DISKETTE

1. Press SELN AREA to position the cursor.
2. Press U followed by SEND to select the utility programs.

All utility programs are then displayed in the secondary menu (see above).

MESSAGES

Refer to page 2-480 for the message explanations and for the action to be taken for each message displayed when utility programs are run.

MOSS, Scanner and TRSS Dump Display/Delete (Part 1 of 2)

This function allows you to display or delete a MOSS or scanner dump from the controller diskette. It also allows you to delete the contents of the BER file from the diskette.

Refer to page 2-440 for the MOSS, scanner, or TRSS dump procedure.

There is no dump file on the service diskette. (Refer to page 14-081 for diskette mapping).

SELECTION

1. Select the utility programs as explained page 2-390.
2. Enter 1 followed by SEND.

When you select the function, it is in display mode.

```
 - ENTER FILE NAME ==>

 CHGDMP  = CS   DUMP FILE (Note)
 CHGTRSS = TRSS DUMP FILE






PF3:DELETE FUNCTION
PRESS SEND TO DISPLAY DUMP TITLES
```

Note: The CHGDMP dump area may contain a MOSS dump. In this case, "MOSS DUMP" is displayed.

If you press SEND, the following information on the dump files is displayed:

- Whether a dump exists
- Date and time of the dump (if it exists)
- Reasons for taking the dump

MOSS OR SCANNER DUMP DISPLAY

If you enter CHGDMP (and the dump area contains a MOSS dump file), you may display either the full dump file or only a specified area.

```
- SELECT AN ITEM (0 TO 19)  ==>
CHGDMP    DATE/TIME:07/28/82 18:27:26 TRS:BAD CP ANS

                              ---TCB---     ---ACB---
0 TO 7: INTERRUPT DATA     11: BER         17: CNSL
     8: ERROR COUNTERS     12: MSA         18: MIOC
     9: SVT                13: CCUBG       19: DISK
    10: BER STACK          14: CAM
                           15: OPCTL
                           16: IPL


PF1:ITEM SELECT            PF4:BACKWARD      PF5:FORWARD
PRESS SEND TO DISPLAY FILE
```

The dump is displayed in hexadecimal format, as follows:

```
- ENTER FILE NAME ==>

036E0 000065B8 11104000 00040000 65B80000 ..... .........
036F0 52ED1312 20000000 00005000 00007654 .........&.....
03700 15141000 20000000 74940000 81C41716 ........M..AD..
03710 08000000 000081C4 0000995C 59180400 .....AD..R*....
03720 00000000 0FA80168 B9469B1A 02000000 ....Y..........
03730 0000AF2C 016809CC 0768026E 025026D4 .........>.&.M.
03740 27982828 28E82914 26FE29A8 2AF00A16 Q...Y.....Y.0..
03750 00000000 40000000 8000375C 376600FB ..........*....
03760 00000000 00000000 00000000 00000000 ...............
03770 00000000 00000000 00000000 00000000 ...............
PF1:ITEM SELECT PF3:DELETE FNCTN PF4:BACKWARD PF5:FORWARD
SET NEW START ADDRESS ON ANY LINE, PRESS SEND
```

If you enter CHGDMP and the dump area contains a scanner dump file, the following screen is displayed:

```
- SELECT AN ITEM (0 TO 1)  ==>
CHGDMP    DATE/TIME:00/00/00 00:31:11 SCANNER 01
                           16: IPL
0: PAGES 0 TO B AND PSWS
1: EXTERNAL REGISTERS







PF1:ITEM SELECT            PF4:BACKWARD      PF5:FORWARD
PRESS SEND TO DISPLAY FILE
```

TRSS DUMP DISPLAY

The TRSS Dump file may contain up to 4 TIC dumps and 4 TIC REGs and STATUS. Enter CHGTRSS to display the TRSS Dump file contents and select one of these 8 items.

```
- SELECT AN ITEM (0 TO 7)  ==> 5
CHGTRSS   TRSS DUMP FILE


0: EMPTY
1: EMPTY
2: EMPTY
3: EMPTY
4: TRA:06  TIC:3  RAM DATE/TIME:00/00/00/ 00:00:56
5: TRA:06  TIC:3  REGS & STATUS
6: TRA:06  TIC:4  RAM DATE/TIME:00/00/00/ 00:01:41
7: TRA:06  TIC:4  REGS & STATUS


PF1:ITEM SELECT
```

If you select 5 (TRA:06 TIC:3 REGS & STATUS), the following screen is displayed:

```
- SELECT AN ITEM (0 TO 7)  ==> 5
CHGTRSS   TRSS DUMP FILE
TRA:06  TIC:3   CCUID:00000000
TIME:00/00/00  00:00:56  LID:0000
BUFFER:000000    CONTROL:0110
DIAG:0000        IR/BR:00
L1ERR:0110       INTR:0000
IPB:00000000000000000000000000000
0000000000000000000PB:00000000000
00000000000000000000000000000000
0000000000000000000000
CHKSTAT:00000000000000000
RINGSTAT:0000
PF1:ITEM SELECT
```

If you select 4 (TRA:06 TIC:3 RAM etc...), the following screen is displayed:

```
- ENTER FILE NAME ==>
CHGTRSS   TRSS DUMP FILE
00000 D0E00C4D D0E48C8D D07E8C8D D07E0C8D ...(.U...=...=..
00010 D07E0C8D D07E0C8D D07E0C8D D07E0C8D .=...=...=...=..
00020 00000000 00000000 00000000 00000000 ................
00030 00000000 00000000 00000000 00000000 ................
00040 00000000 00000000 00000000 00000000 ................
00050 00000000 00000000 00000000 00000000 ................
00060 00000000 00000000 00000000 00000000 ................
00070 00000000 00000000 00000000 00000000 ................
00080 00000000 00000000 00000000 00000000 ................
00090 00000000 00000000 00000000 00000000 ................
000A0 00000000 00000000 00000000 00000000 ................
PF1:ITEM SELECT PF3:DELETE FNCTN PF4:BACKWARD PF5:FORWARD
SET NEW START ADDRESS ON ANY LINE, PRESS SEND
```

MOSS, Scanner, and TRSS Dump Display/Delete (Part 2 of 2)

MOSS OR SCANNER DUMP DELETE

If you press PF3, the following screen is displayed:

```
- ENTER FILE NAME TO BE DELETED ==>


CHGDMP    = CS    DUMP FILE
CHGTRSS   = TRSS  DUMP FILE
CHGCIL    = BER FILE









PF3: DUMP DISPLAY FUNCTION
```

Enter the name of the file to be deleted. To return to the file selection screen, press PF3.

There is no MOSS or CS Dump file on the service diskette. Refer to page 14-081 for diskette mapping.

TRSS DUMP DELETE

If you press PF3, the following screen is displayed:

```
- ENTER FILE NAME TO BE DELETED ==> CHGTRSS


CHGDMP    = CS    DUMP FILE
CHGTRSS   = TRSS  DUMP FILE
CHGCIL    = BER FILE









PF3: DUMP DISPLAY FUNCTION
```

Enter the name of the file to be deleted. To return to the file selection screen, press PF3.

If CHGTRSS has been entered, the following screen is displayed:

```
- SELECT AN ITEM (0 TO 3)  ==> 3


0: EMPTY
1: EMPTY
2: TRA:06  TIC:3
3: TRA:06  TIC:4







PF3:QUIT
```

If you want to erase TIC 4 Dump, enter 3 and the following screen is displayed:

```
- SELECT AN ITEM (0 TO 3)  ==> 3
TIC 4 DUMP NOW EMPTY
0: EMPTY
1: EMPTY
2: TRA:06  TIC:3
3: EMPTY






PF3:QUIT
```

MOSS Store and Module Display

MOSS STORE DISPLAY (MOSS STORAGE DISPLAY)

SELECTION

1. Select the utility programs as explained page 2-390.
2. Enter 2 followed by SEND.

```
- SELECT AN ITEM (0 TO 19)  ==>

                             ---TCB---      ---ACB---
0 TO 7: INTERRUPT DATA     11: BER         17: CNSL
     8: ERROR COUNTERS     12: MSA         18: MIOC
     9: SVT                13: CCUBG       19: DISK
    10: BER STACK          14: CAM
                           15: OPCTL
                           16: IPL

PF1:ITEM SELECT             PF4:BACKWARD     PF5:FORWARD
PRESS SEND TO DISPLAY FILE
```

The next screen depends on the selected item. If, for example, 11 was entered, the following screen is displayed:

```
- SELECT AN ITEM (0 TO 19) ==> 11

BER  TCB AT 03762 PSW: 065B8 11 10  ECF:0004
FLAG:00 EP: 065B8 END: 80000 MASK:0000
  0-14 0000 0000 0000 0000 0000 0000 0000 0000
  16-30 0000 0000 0000 0000 0000 0000 0000 0000
TTA 0B 0C 02 03 04 0D 0E 0F 10 11 12 13 14 15 16 17

PF1:ITEM SELECT             PF4:BACKWARD     PF5:FORWARD
PRESS SEND TO DISPLAY FILE
```

The dump is displayed in hexadecimal format as follows:

```
                        MOSS STORE
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
HHHHH .......  .......  ........  ........  interpretation
PF1:ITEM SELECT  PF3:DELETE  PF4:BACKWARD  PF5:FORWARD
 SET NEW START ADDRESS ON ANY LINE, PRESS SEND
```

MODULE DPLY (MODULE DISPLAY)

SELECTION

Enter 3 followed by SEND.

```
ENTER FILE NAME ==> CHGUCMOD  AND MODULE NAME ==>

CHGUCMOD=  MOSS MODULES
CHGMDJIB=  CS   MODULES
CHGMOD37=  CCU  MODULES
```

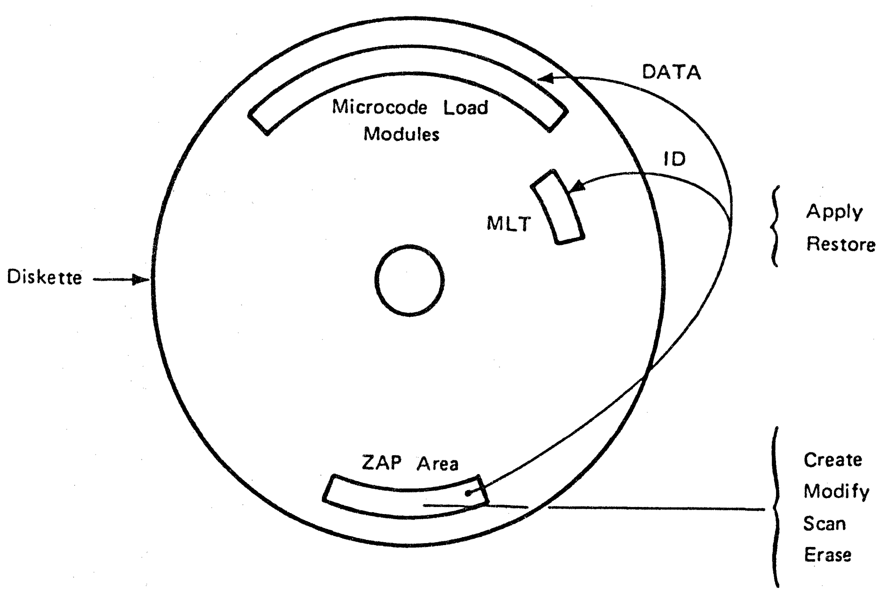
ZAP Area on Diskette

The ZAP utility programs are used to make microcode changes to the diskette. ZAPs are temporary changes to the microcode released by engineering and installed in the field by CEs. They provide immediate fixes to problems that will be permanently fixed on the next possible EC-updated diskette.

The ZAPs are entered into a work area of the diskette (ZAP area). This ZAP area is acted upon by the ZAP functions Create, Modify, Scan, and Erase. The actual microcode load modules on the diskette are not changed by anything in the ZAP area until the ZAP function Apply is used. The microcode load modules can be restored to their original condition after the ZAP is applied by using the ZAP Restore function.

Once the microcode load modules are changed, an IML is required to get the changed microcode from the diskette into the various areas of the machine. This should be done by putting the Function Select switch to Normal and pressing the Power On Reset switch.

Restriction: The ZAP function must be terminated (enter T) before the CCU functions are used, otherwise an unpredictable error occurs.



ZAP IDENTIFICATION

Note: The ZAP identification area can handle or contain twelve characters, but the ZAP identification format is as follows: PXXXYZZZ (eight characters)

- P is for "patch"
- XXX are the last three digits of the EC number
- Y is the code area
- ZZZ is the ZAP sequence number

CREATING A ZAP

Before you create a ZAP, make sure that:

1. The EC level of the diskette is correct. Use the MLT function to display the EC level and ZAPs previously applied or restored.
2. The prerequisite ZAPs have been applied. If not, apply them.

To correct one error, you may have to modify the microcode in several locations. Each modification corresponds to one ZAP record.

When you create a ZAP, the microcode is not modified immediately.

Each ZAP is stored in the ZAP area. It may contain one or more ZAP records.

Example:

ZAP P123T003

ZAP record 1
ZAP record 2

ZAP P123T004

ZAP record 1
ZAP record 2
ZAP record 3

To perform the modification requested in each record, you must apply the ZAP.

To create a ZAP record, you have to know:

- The ZAP-ID (up to 12 characters, ZAP identification)
- The names of the file and module that are to be modified
- The address of the data to be modified
- The data to be modified, called the verify data
- The new data, called the replace data
- The ZAP checksum (computed from all the ZAP records, including the ZAP-ID)

Once applied, the ZAP remains in the ZAP area.

ERASING A ZAP

It is not recommended to erase a ZAP just after it has been applied. You may have to restore it if the result of the apply is not as expected.

Erasing a ZAP removes it from the ZAP area only. However, the ID for it remains in the MLT ZAP history table. The microcode load modules are not changed by the erase command. They are changed only by Apply or Restore commands.

Selecting the ZAP Functions

SELECTION

1. Select the utility programs as explained page 2-390.
2. Enter 4 followed by SEND.

To use the ZAP utility program, the MOSS must not be online. If it is, the following message is displayed just after you have selected the ZAP utility program:

ZAP FUNCTION CANNOT BE PERFORMED WHEN MOSS IS ONLINE

Then do the following:

1. Press CCU FNCTN
2. Enter 5 followed by SEND
3. Enter 12 followed by SEND.

The MOSS is then offline and you can select the ZAP utility program.

Note: The message CCU INTERRUPTS DISABLED appears on the screen when the ZAP function is active. It means that any interrupts generated by the CCU to the MOSS are stacked until the ZAP function terminates.

You are first requested to enter the date. Use the slash (/) to separate each element of the date (mm/dd/yy). You can then select one of the ZAPs and one of the ZAP functions displayed on the screen.

Depending upon the number of ZAPs entered on the diskette, the screen that appears is as follows:

1. Sixteen (or less) ZAPs entered on the diskette

```
A|APPL = APPLIED   N-A = NON-APPLIED  BAD = BAD  CHECKSUM
B|                  SCREEN 1 OF 1
 |
C|PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ N-A  ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ BAD  ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |
D|- ENTER A COMMAND AGAINST ONE ZAP-ID, OR PRESS A PF KEY
 |A = APPLY  R = RESTORE  M = MODIFY  S = SCAN  E = ERASE
E|PF1:CREATE A ZAP  PF2:UPDATE SPARE DISKETTE
 | message area
```

2. More than sixteen and up to a maximum of thirty-two ZAPs entered on the diskette. On this screen, PF5 appears to indicate that screen 2 will display the remaining ZAPs.

```
A|APPL = APPLIED   N-A = NON-APPLIED  BAD = BAD  CHECKSUM
B|                  SCREEN 1 OF 2
 |
C|PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ N-A  ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ BAD  ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |
D|- ENTER A COMMAND AGAINST ONE ZAP-ID, OR PRESS A PF KEY
 |A = APPLY  R = RESTORE  M = MODIFY  S = SCAN  E = ERASE
E|PF1:CREATE A ZAP PF2:UPDATE SPARE DISKETTE PF5:SCREEN 2
 | message area
```

When you press PF5, screen 2 appears (see below). On screen 2, PF4 is used to go back to screen 1.

```
A|APPL = APPLIED   N-A = NON-APPLIED  BAD = BAD  CHECKSUM
B|                  SCREEN 2 OF 2
 |
C|PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ N-A  ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ BAD  ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>              PXXXYZZZ APPL ==>
 |PXXXYZZZ APPL ==>
 |
D|- ENTER A COMMAND AGAINST ONE ZAP-ID, OR PRESS A PF KEY
 |A = APPLY  R = RESTORE  M = MODIFY  S = SCAN  E = ERASE
E|PF1:CREATE A ZAP PF2:UPDATE SPARE DISKETTE PF4:SCREEN 1
 | message area
```

In the above example the diskette contains twenty-nine ZAPs.

A Meaning of ZAP statuses. See page 2-397 for details about the BAD CHECKSUM status.

B Indicates the screen on which an entered ZAP is shown.

C Example of list of ZAPs, each with its identification and its status. Up to sixteen ZAPs can be listed on each screen.

D The available ZAP functions.

E PF4 and PF5 are used to go back and forth between screen 1 and 2.
PF4:SCREEN 1 highlighted; PF5:SCREEN 2 highlighted.

ZAP FUNCTIONS

ZAP Functions	Selection	See Page
APPLY	A	2-396
RESTORE	R	2-396
MODIFY	M	2-396
SCAN	S	2-397
ERASE	E	2-397
CREATE A ZAP	PF1	2-398
UPDATE SPARE DISKETTE	PF2	2-399

Apply, Restore, and Modify (ZAP)

APPLY (ZAP)

This function allows you to apply a ZAP from the ZAP area to the microcode load modules.

When you apply a ZAP, an ID record is put into the MLT. This MLT record becomes permanent, and if the ZAP is restored the ID record indicates restored status for that ZAP.

After ZAPs are applied to the microcode load modules, the machine must be IMLed to get the changed microcode into the various areas of the machine.

When ZAPs are applied, re-IML MOSS.

Prerequisite ZAPs: These must be applied before the ZAPs for which they are prerequisite (see ZAP history table on page 2-407 for a complete ZAP history of this diskette).

Process: Refer to "ZAP Selection." You entered the command A against the ZAP-ID of the ZAP to be applied. To apply this ZAP, press SEND.

RESTORE (ZAP)

This function removes a ZAP by restoring the original ZAP verify data to the microcode load modules.

If the ZAP you applied does not give the results expected, you have to restore it.

Prerequisite ZAPs: These must be restored (removed) in the reverse order to that in which they were originally applied on page 2-407.

Process: Refer to "ZAP Selection." You entered the command R against the ZAP-ID of the ZAP to be restored. To restore this ZAP, press SEND.

After ZAPs are removed (restored) from the microcode load modules, the machine must be IMLed to get the changed microcode into the various areas of the machine.

MODIFY (ZAP)

Selection

This function allows you to modify a ZAP in the ZAP area.

You can modify only non-applied ZAPs.

You are first requested to enter the identification of the ZAP (12 characters maximum); then the following screen is displayed:

```
A  ZAP PXXXYZZZ          ZAP RECORD: 01

  -FILE NAME    = CHGUCMOD
  -MODULE NAME  = CHGIPL2

  -ADDRESS      = 7FE

  -VERIFY DATA  = D740 .... .... .... .... .... .... ....
  -REPLACE DATA = FFFF .... .... .... .... .... .... ....


B -AVAILABLE COMMANDS: A=ALTER, D=DELETE, I=INSERT ==>

   PF2:FILE  PF3:QUIT  PF4:CHANGE ZAP-ID  PF5:NEXT RECORD
                           PREVIOUS RECORD
```

A The first ZAP record is displayed. Use the PF5 key to locate the record that you want to modify, or before which you want to insert a new record. When the last ZAP record is displayed, LAST RECORD appears on this line.

B When the ZAP record is located, select a modify command on line B. You may alter, delete, and insert several records in the same ZAP. See this page (right) for detailed commands.

PF2:FILE - Must be used at the completion of any modify command to file (write) the modifications in the ZAP area.

PF3:QUIT - Used to return to ZAP function menu.

PF4

First record: CHANGE ZAP-ID	Display the selected ZAP identification. You may modify it
Other records: PREVIOUS RECORD	Display previous record.

Once a ZAP has been modified, file it (PF2:FILE). If you quit (PF3:QUIT) or select the Terminate (T) function before filing the ZAP, all the modifications that you entered are lost.

ALTER Command

You can modify any data: file name, module name, address, verify data, and replace data, in the ZAP records.

```
 ZAP PXXXYZZZ       ZAP RECORD: XX               ALTER

- FILE NAME      ==> CHGUCMOD
- MODULE NAME    ==> CHGIPL2

- ADDRESS        ==> 7FE

- VERIFY DATA    ==> D740 .... .... .... .... .... ....
- REPLACE DATA   ==> FFFF .... .... .... .... .... ....


PF1:IGNORE ALTER
```

PF1: IGNORE ALTER - Cancels the altered ZAP record and returns to display mode.

DELETE Command

Once you have entered D for delete, the displayed ZAP record to be deleted is erased from the screen and the next ZAP record, if any, is displayed.

To delete an entire ZAP, use an erase function. Also, if all of its ZAP records are deleted, the entire ZAP is deleted.

INSERT Command

To insert a ZAP record in an existing ZAP, follow the procedure you used to enter a ZAP record when creating a ZAP.

```
 ZAP PXXXYZZZ       ZAP RECORD: XX              INSERT

- FILE NAME      ==> CHGUCMOD
- MODULE NAME    ==> CHGIPL2

- ADDRESS        ==>

- VERIFY DATA    ==> D740 .... .... .... .... .... ....
- REPLACE DATA   ==> FFFF .... .... .... .... .... ....


PF1:IGNORE INSERT
```

PF1: IGNORE INSERT - Cancels the inserted ZAP record and displays the previous ZAP record.

Scan and Erase ZAP

SCAN (ZAP)

This function allows you to display applied or non-applied (including "bad-checksum") ZAPs from the ZAP area.

__Process:__ Refer to "ZAP Selection." You entered the command S against the ZAP-ID of the ZAP to be displayed.

The following screen appears:

```
ZAP PXXXYZZZ                          ZAP RECORD: 02

-FILE NAME    = CHGMDJIB
-MODULE NAME  = CHHMCSP

-ADDRESS      = 1608

-VERIFY DATA  = 4A04 .... .... .... .... .... .... ....
-REPLACE DATA = 4A84 .... .... .... .... .... .... ....



     PF3:QUIT  PF4:PREVIOUS RECORD   PF5:NEXT RECORD
   message area
```

PF3:QUIT - Cancels the scan function.

PF4:PREVIOUS RECORD - Displays the previous ZAP record.

PF5:NEXT RECORD - Displays the next ZAP record.

ERASE (ZAP)

This function allows you to erase a ZAP of any status from the ZAP area.

__Process:__ Refer to "ZAP Selection." You entered the command E against the ZAP-ID of the ZAP to be erased.

Depending upon the number of ZAPs entered on the diskette, the screen that appears is as follows:

1. If sixteen (or less) ZAPs are entered on the diskette

```
APPL = APPLIED  N-A = NON-APPLIED  BAD = BAD CHECKSUM
                    SCREEN 1 OF 1

PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ N-A  ==>            PXXXYZZZ APPL ==>
PXXXYZZZ BAD  ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>E           PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>

- ENTER "Y" TO CONFIRM ERASE AND "N" OTHERWISE ==> _

message area
```

If you enter Y and press SEND, the selected ZAP is __immediately__ erased from the ZAP area on the diskette, and the number of ZAPs on this screen is decreased by one.

2. Up to sixteen ZAPs on the first screen, if the number of ZAPs entered on the diskette is more than sixteen.

```
APPL = APPLIED  N-A = NON-APPLIED  BAD = BAD CHECKSUM
                    SCREEN 1 OF 2

PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ N-A  ==>            PXXXYZZZ APPL ==>
PXXXYZZZ BAD  ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>E           PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>

- ENTER "Y" TO CONFIRM ERASE AND "N" OTHERWISE ==> _

message area
```

If you enter Y and press SEND, the selected ZAP is __immediately__ erased from the ZAP area on the diskette, and the seventeenth ZAP appears at the end of the list.

```
APPL = APPLIED  N-A = NON-APPLIED  BAD = BAD CHECKSUM
                    SCREEN 2 OF 2

PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ N-A  ==>            PXXXYZZZ APPL ==>
PXXXYZZZ BAD  ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>E           PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
PXXXYZZZ APPL ==>

- ENTER "Y" TO CONFIRM ERASE AND "N" OTHERWISE ==> _

message area
```

If you enter Y and press SEND, the selected ZAP is __immediately__ erased from the ZAP area on the diskette, and the number of ZAPs on this screen is decreased by one.

Create a ZAP

SELECTION

This function allows you to create a ZAP in the ZAP area. (See page 2-394 for ZAP area details.)

You are first requested to enter the ZAP identification (see Note); then the following screen is displayed:

```
A|ZAP PXXXYZZZ                ZAP RECORD: 01
 |
B|- FILE NAME   ==>
B|- MODULE NAME ==>
 |
 |- ADDRESS     ==>
 |
C|- VERIFY  DATA==>.... .... .... .... .... .... .... ....
D|- REPLACE DATA==>.... .... .... .... .... .... .... ....
 |
E|        PF3:QUIT  PF4:CHANGE ZAP-ID
 |
F|PF2:FILE  PF3:QUIT  PF4:PREVIOUS RECORD
 |    message area
```

A The ZAP identification you entered on the preceding screen.

The number of the ZAP record that you are creating is automatically displayed.

B The file and module names are repeated from the previous ZAP record. You do not have to enter them again if you create a ZAP record on the same file and same module.

C Verify data (hexadecimal). This is used to verify whether data at this location is the data that you want to modify.

D Replace data: new hexadecimal data.

The verify and replace data must have the same number of characters.

The periods (.) on lines C and D indicate where you enter the verify and replace characters.

Blank characters and embedded periods are invalid. To remove the last characters that you may have entered on line C or D, replace them by periods.

E For the first record (01) of the ZAP:

PF3:QUIT - Used to return to ZAP function menu.
PF4:CHANGE ZAP-ID Display the selected ZAP identification. You may modify it.

F For the other records of the ZAP:

PF2:FILE - Must be used at a completion of a create function to file (write) the created ZAP in the ZAP area.
PF3:QUIT - Used to return to ZAP function menu.
PF4:PREVIOUS RECORD Display previous record.

When a ZAP record is created, press SEND. You will be prompted to create another one.

When you have created all the records of a ZAP, you should file it. If you quit (PF3) or select the Terminate (T) function before filing, the ZAP is lost.

FILE ZAP IN ZAP AREA

To file a ZAP, press PF2. You are first requested to enter the ZAP checksum. This checksum is automatically verified.

If it is correct, the previous ZAP screen is displayed with the ZAP FILED message.

If it is not, the following message is displayed:

INPUT CHECKSUM DOES NOT MATCH THE COMPUTED ONE

You may then:

- Try to correct the error:
  - Correct the entered checksum if it is wrong.
  - Press PF1 to check the ZAP and correct the error if any (the checksum is computed with all records including the ZAP identification itself). Verify that all the records, including the last one, have been entered. Remember that, if you have entered parameters or modified data on a screen, you must first press SEND to transmit what you entered, then press the PF key.
- If the error cannot be corrected, press PF2 to file the ZAP with the BAD CHECKSUM status. This ZAP is filed, but is not applicable until you have found the error and corrected it.

Update Spare Diskette

SELECTION

Use this function to update the spare diskette, that is, to copy the same ZAPs that you have in the ZAP area of the original diskette. You are first requested to mount the spare diskette:

- MOUNT SPARE DISKETTE, THEN PRESS SEND

Note: From now on, and until you return to the original diskette, you are not allowed to terminate the function, nor to invoke CCU functions. If you try to do so, one of the following messages is displayed:

ZAP FUNCTION TERMINATION NOT ALLOWED, or
CCU FUNCTION NOT ALLOWED

At this time, the MOSS verifies that the EC level (number and suffix) of the spare diskette matches the original (IML) diskette. A mismatch would cause the following error message to be displayed:

"MOUNTED DISKETTE LEVEL IS DIFFERENT FROM ORIGINAL ONE"

If this occurs, UPDATE is not possible. You should then exit this function by re-installing the original diskette then, either:

- IML the MOSS, or
- Press SEND; then when the "spare" screen appears, press PF2.

If the EC levels match, you can then select any displayed ZAP function except the Create and Modify functions.

Refer to "Function Selection" page 2-395. You pressed PF2: UPDATE SPARE DISKETTE but you did not select any ZAP. The following screen is displayed:

```
A  SPARE DISKETTE        nn ZAP(S) QUALIFIED FOR COPY
B                     SCREEN 1 OF 1

   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ N-A  ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ BAD  ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>

   -ENTER A COMMAND AGAINST ONE ZAP-ID,OR PRESS A PF KEY

   A = APPLY   R = RESTORE         S = SCAN     E = ERASE

E  PF1:COPY ZAPS PF2:RETURN TO NORMAL DISKETTE
   message area
```

The functions Apply ZAP, Restore ZAP, Scan ZAP, and Erase ZAP are identical to those described previously.

A "nn" indicates the number of ZAPs present on the normal diskette and missing on the spare one. If line A does not display "nn ZAP(S) QUALIFIED FOR COPY", this means that the spare diskette contains the same ZAPs as the normal diskette. Press PF2 (copy has already been done).

B/E In case the number of ZAPs present on the spare diskette are sixteen or less, line B displays: "SCREEN 1 of 1", and line E displays: "PF1:COPY ZAPS PF2:RETURN TO NORMAL DISKETTE".
When the ZAPs present on the spare diskette are more than sixteen, line B displays: "SCREEN 1 OF 2", and line E displays: "PF1:COPY ZAPS PF2:RETURN TO NORMAL DISKETTE PF5:SCREEN 2". For the use of PF5 and PF4 see page 2-395.

COPY ZAPS ON SPARE DISKETTE

You must not create and modify ZAPs on the spare diskette, but only copy them from the original diskette.

When you select the copy function, all ZAPs from the ZAP area of the original diskette, which are not yet present on the spare diskette, are displayed. Enter any character against those that you want to copy.

Only sixteen ZAPs can be displayed on one frame. So, if more than sixteen ZAPs have to be copied from the normal diskette, line B displays: "SCREEN 1 of 2", and line E displays: "PF3:QUIT PF5:SCREEN 2" (see screen below).
The remaining ZAPs will be listed in a second frame. Line B will display: "SCREEN 2 of 2", and line E will display: "PF3:QUIT PF4:SCREEN 2".
If less than sixteen ZAPs have to be copied on the spare diskette, line B will display: "SCREEN 1 of 1", and line E will display: "PF3:QUIT" only.
For use of PF5 and PF4, if necessary, see page 2-395.

```
   ZAPS OF NORMAL DISKETTE NOT PRESENT ON SPARE ONE:
B                      SCREEN 1 OF 2

   PXXXYZZZ APPL ==> _          PXXXYZZZ APPL ==>
   PXXXYZZZ N-A  ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ BAD  ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>
   PXXXYZZZ APPL ==>            PXXXYZZZ APPL ==>

   - ENTER ANY CHARACTER AGAINST ZAP(S) TO BE COPIED

E  PF3:QUIT                               PF5:SCREEN 2
   message area
```

The copied ZAPs will not be automatically applied on the spare diskette. They must be specifically applied.

Before applying ZAPs on the spare diskette, make sure that the microcode modified by the same ZAP on the original diskette is running correctly.

When the spare diskette is updated, select PF2 to the return to original diskette.

The statuses of copied ZAPs are as follows:

- APPL becomes N-A
- N-A remains N-A
- BAD remains BAD

CDF: Select and Create

SELECTION

1. Select the utility programs as explained page 2-390.
2. Enter 5 followed by SEND.

The configuration data file (CDF), located on the diskette, contains the hardware description of the 3725. The 3725 CDF is used by the diagnostics and at 3725 initialization time. You can at any time:

- Create a new CDF to reflect the latest hardware modifications of the 3725
- Verify that the CDF is the exact image of the 3725
- Update and modify the CDF

Note: This function allows you to deactivate an RDV card in the CDF.

The CDF gives information on CCU/MOSS, LAB/CAB, channel adapters, scanners, and LSSD strings.

An additional screen, referred to as CDF information, explains some CDF data that you may have to update.

Once you have selected the CDF, the following screen is displayed:

```
- SELECT CDF OPTION (1, 2, 3)      ==>

       1 = CREATE
       2 = VERIFY
       3 = DISPLAY/UPDATE


WARNING: CREATE DESTROYS ALL MANUALLY ENTERED DATA

                    function message line
```

CREATE

Warning: When you select the CDF create option, all fields are reset. Fields that reflect the machine configuration (hardware) are reinitialized accordingly. Conversely, the fields that have been manually initialized stay DESTROYED, and have to be manually initialized again.

If necessary, the spare diskette, which should be at the same level, might be used to retrieve the lost information.

To create the CDF, the MOSS must be in MOSS alone state. Field c of the MSA displays MOSS-ALONE (see page 2-350 for field c breakdown).

The creation of the CDF is automatic. You are informed of the progression as follows:

```
CDF CREATE STARTED

   CCU INFORMATION FETCHED
   CHANNEL ADAPTER INFORMATION FETCHED
   SCANNER AND TRSS INFORMATION FETCHED

CDF CREATE COMPLETED
```

A CDF CREATE does not initialize the channel adapter addresses (ESCL, ESCH, NSC), but it initializes the line clocking information to the default value (external clock).

To initialize the channel adapter addresses and/or to modify the cable clocking information, the CDF must be updated using the CDF display/update function.

VERIFY

Once the 3725 is installed, you should verify that the CDF reflects exactly the hardware configuration of the 3725.

The VERIFY OPTION does not handle the cable clocking information nor the channel adapter addresses (ESCL, ESCH, NSC).

You may verify the CDF at any other time to check whether the CDF corresponds to the actual 3725.

The verification phase is automatic. Once you have selected VERIFY, the first difference, if any, is displayed. You are requested to modify the diskette to reflect the actual machine configuration. Enter either Y or N, then press SEND. The next difference, if any, is displayed, and so on.

When you reach the end of the verification phase, the message VERIFY COMPLETED is displayed and the CDF, if updated, is automatically filed on the diskette.

```
                 CDF - VERIFY OPTION IN PROGRESS

A    SCANNER:                    01
A    LIC POS:                    04

     DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE:

B       VALUE FROM THE MACHINE:     01
B       VALUE FROM THE DISKETTE:    00

   - TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y ==>
        OTHERWISE ENTER N
```

A. This information varies according to the various frames displayed and the verified information. In the example given, LAB/CAB screen is presented.

B. A machine failure may cause different values in "machine" and "diskette" fields. Before updating the diskette, make sure that the difference shown by the verify process is valid.

If during the verification phase, cable and/or channel adapters are modified on the diskette CDF, the corresponding cable information and channel adapter addresses must be manually updated, using the CDF display/update option.

After the preceding screen has been displayed, and if the LIC cables are not updated, the following screen will be displayed line-by-line.

__Note:__ The LIC position is always referenced by the physical location (1 to 8) on the LAB, regardless of the LAB type (see page 4-062).

On the following example the cables on ports 2 and 3 are not present on the diskette but exist on the machine. Their code (4) means that they are modem attached (see page 2-405 for code details).

```
                 CDF - VERIFY OPTION IN PROGRESS

A    SCANNER:                    01
A    LIC POS:                    04
     CABLE ID

     DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE:

B       VALUE FROM THE MACHINE:     0440
B       VALUE FROM THE DISKETTE:    0000

   - TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y ==>
        OTHERWISE ENTER N
```

CDF: Display/Update (Part 1 of 4)

DISPLAY/UPDATE MENU

```
              CDF - DISPLAY OPTION

 - SELECT ONE DISPLAY OPTION (1 TO 7)  ==>

        1 = ALL (2 TO 6)
        2 = CCU/MOSS
        3 = LAB/CAB
        4 = CHANNEL ADAPTERS
        5 = SCANNER/TRSS
        6 = LSSD
        7 = CDF INFORMATION

              PF3:QUIT
```

When selecting display/update, the default is display mode.

To update the CDF press PF1:UPDATE. This is possible only when PF1:UPDATE is displayed. You are informed that you are in update mode by the term UPDATE displayed on the first line of the work area.

The cursor is positioned at the first UPDATABLE character. Use the tab key (-->) to move from one updatable character to another. When all fields have been updated, press SEND to enter the data.

To file the updated CDF on the diskette, press PF5:FILE, when this key is displayed.

If you select the terminate (T) function before filing the updated CDF, the modifications you entered are lost.

<u>Warning:</u>

If the CDF has been changed for maintenance, it is possible that bad board swaps may be made while reloading the box after CDF maintenance. That may require changes in the CDF for rectification. Unpredictable results may occur from changes in the CDF if they affect port swapped lines.

<u>ALL</u>

You select ALL to display all the CDF: CCU/MOSS, LAB/CAB, channel adapters, scanners, and LSSD. To go from this screen to the following one, press PF5:FORWARD.

Once an update has been performed, PF5:FILE is displayed. It is recommended to perform all the updates before pressing this key.

CCU/MOSS

```
CONTROLLER TYPE: 3725     MODEL: 01 (3725 Model 1)
                                 02 (3725 Model 2)
CCU STORAGE SIZE:  768 K


MOSS SIZE: 128 K

DISKETTE: DS2D

OPERATOR CONSOLE: 3727

PF1:UPDATE  PF3:QUIT  PF5:FORWARD
```

DISPLAY/UPDATE LAB/CAB (3725/3726)

```
 A     B       C         D          E             F

RDV BOARD   RDV ADAPTER 1  ADAPTER 2  LIC/LINE, OR TIC
NBR TYPE    ADDR     # ADDR     # ADDR L1L2L3L4 L5L6L7L8
*1  CLAB 1 4000 *CS 01 10  *CA 01 08  F F F F  F F F F
*2  CLAB 2 4002  CS 03 11   CA 02 08
*3  LABC 3 4004 *CS 05 12  *RA 06 4A  F 8 F F  * *
 4  FRDV   4100
 5  LABx 6 410A  CS 11 15   CS 12 25
 6  LABx 5 4108  CS 09 14   CS 10 24
 7  LABx 4 4106  CS 07 13   CS 08 23
 8  LABx 7 410C  CS 13 16   CS 14 26
 9  LABx 8 410E  CS 15 17   CS 16 27
10  CAB    4006  CA 03 08   CA 04 08
                 CA 05 08   CA 06 08
PF1:UPDATE   PF3: QUIT
```

The * means present.

A Redrive number. If a redrive has been deactivated (jumper on RDV card, pin D11 to ground) and is still recorded as present (*), delete the (*).

<u>Note:</u> The RDV will also have to be in disconnected state to prevent failures on some IOC bus IFTs. For more information on redrive states, refer to page 11-090.

B Board type

x = A, B, or C according to the type of LAB installed

C Redrive address (for board address jumper, see page 4-270)

D and E
Give the number and the address of the channel adapters (CA), communication scanners (CS) and token-ring adapters (TRA).

F LIC/line installed (see CDF information on page 2-405). When TICs are installed, the hexadecimal code is replaced by an asterisk.

The codes in zone F of the screen are interpreted as follows:
L1L2L3...L8: LIC position 1 through 8.

```
F(hexa code):
  Port number    1 2 3 4
  Line status    1 1 1 1
  Legend:
     1 means line present
     0 means line absent
8(hexa code):
  Port number    1 2 3 4
  Line status    1 0 0 0
```

Note: When a LIC is absent, the hexa code (0 through F) is replaced by a point (.).

* means a TIC is present in this position.

Press PF1:UPDATE, and enter an asterisk at the left of the redrive sequence number to indicate that the redrive is present. No asterisk means not present.

DISPLAY/UPDATE C2LB/LAB (3725 MODEL 2)

```
 A     B       C         D          E             F

RDV BOARD   RDV   ADAPTER 1 ADAPTER 2  LIC/LINE, OR TIC
NBR TYPE    ADDR      # ADDR     # ADDR L1L2L3L4 L5L6L7L8
*1  C2LB    4000 *CS 01 10 *CA 01 08  F F F F  F F F F
                           *CA 02 08
*2  C2LB2   4002 *CS 03 11 *CA 03 08  F 8 4 F  2 2
                           *CA 04 08
*3  LABC3   4004 *CS 05 12 *RA 06 4A  F F F 0  * *
                           *CA 02 08


PF1: UPDATE   PF3: QUIT    PF5: FORWARD
```

The * means present.

CHANNEL ADAPTERS (3725/3726)

```
    A      B       C       D       E
                      CHANNEL ADAPTER

   CA   RDV     CAB     TPS     INTERFACE A    INTERFACE B
   #    ADDR    TYPE            NSC  ESCL ESCH     NSC

 * 1    4000    CLAB    Y       00   00   00       00
 * 2    4002    CLAB    Y       00   00   00       00
   3    4006    CAB     N       00   00   00       00
   4    4006    CAB     N       00   00   00       00
   5    4006    CAB     -       00   00   00       00
   6    4006    CAB     -       00   00   00       00

 PF1:UPDATE  PF3:QUIT
```

The * means present

CHANNEL ADAPTERS (3725 MODEL 2)

```
    A      B       C       D       E
                      CHANNEL ADAPTER

   CA   RDV     BOARD
   #    ADDR    TYPE    TPS  NSC  ESCL ESCH

 * 1    4000    C2LB     -   00   00   00
 * 2    4000    C2LB     -   00   00   00
 * 3    4002    C2LB2    -   00   00   00
 * 4    4002    C2LB2    -   00   00   00

 PF1:UPDATE  PF3:QUIT
```

The * means present

A Channel adapter number. The * indicates that the channel adapter is present. You can update this character. To deactivate a CA, delete the *.

B Redrive address. See line C on the above screen.

C Board type: C2LB, C2LB2, CLAB1, CLAB2, or CAB.

D Two processor switch. Y means present, N means not present, and - means not applicable. You can update Y and N but not -. No TPS for the 3725 Model 2.

E NSC: native subchannel address.

The range of emulated subchannel addresses:

ESCL: emulated subchannel address low (ESC lo)
ESCH: emulated subchannel address high (ESC hi)

For ESC and NSC address jumpering on cards CADR and CHIN, refer to pages 4-281 and 4-282. These addresses have to be entered manually.

SCANNERS/TRAS

Before displaying or updating the scanners, you are requested to enter the scanner number:

- ENTER CSP/TRA NUMBER (0 FOR ALL) ==>
  (scanner/TRA number is 1, 3, 5 through 16;
  enter 0 for all scanners/TRAs)

Typical scanner/TRA screens are shown below:

3725/3726 Model 1 LABs

```
A SCANNER: 01 ADDR: 10   LAB: A    ICC-1: 11
B     CS:  10 RDV: 4000 FES: 10   ICC-2: 11

C LIC POS:    1     2     3     4     5     6     7     8
D LIC TYPE:  01    01    01    01    01    01    01    01

  CLOCK (C) AND CABLE ID INFO (I)
             C I   C I   C I   C I   C I   C I   C I   C I
E PORT 1:    2 4   2 4   2 4   2 4   2 4   2 4   2 4   2 4
E PORT 2:    2 4   2 4   2 4   2 4   2 4   2 4   2 4   2 4
E PORT 3:    2 4   2 4   2 4   2 4   2 4   2 4   2 4   2 4
E PORT 4:    2 4   2 4   2 4   2 4   2 4   2 4   2 4   2 4

  PF1:UPDATE    PF3:QUIT
```

3725 Model 2 C2LB and C2LB2

```
A SCANNER: 01 ADDR: 10   LAB:C2LB ICC-1: 10
B     CS:  10 RDV: 4000 FES: 10   ICC-2: 10

C LIC POS:    1     2     3     4     5     6
D LIC TYPE:  01    01    01    01    01    01

  CLOCK (C) AND CABLE ID INFO (I)
             C I   C I   C I   C I   C I   C I
E PORT 1:    2 4   2 4   2 4   2 4   2 4   2 4
E PORT 2:    2 4   2 4   2 4   2 4   2 4   2 4
E PORT 3:    2 4   2 4   2 4   2 4   2 4   2 4
E PORT 4:    2 4   2 4   2 4   2 4   2 4   2 4

  PF1:UPDATE    PF3:QUIT
```

3725/3726 Model 1 and Model 2 LAB type C

```
A      TRA: 6   ADDR:    4A   LAB: C
B  TRA TYP: 10 RDU:  40004

C  TIC POS:                               5     6     7     8
D  TIC TYPE:                             01    01    01    01


   PF1:UPDATE  PF3:QUIT          PF4:BACKWARD  PF5:FORWARD
```

A Gives the scanner or TRA number, the scanner or TRA adress, the LAB type (A, B, or C), the ICC presence, and the ICC type.

SCANNER or TRA number	1	3	5	6	7	8	9	10	11	12	13	14	15	16
SCANNER ADDR:	10	11	12	22	13	23	14	24	15	25	16	26	17	27
TRA ADDR:				4A		4B		4C		4D		4E		4F

B Gives the scanner or TRA presence, the redrive address, the FES and ICC presence, and the ICC type (00 = not present, 10 = present and ICC type 1, 11= present and ICC type 2

Any other value indicates a possible error.

C LIC position: 1 to 8 or TIC position 5 to 8.

D LIC or TIC type for each LIC position as follows:

Value	LIC Type
00	(No LIC)
01	1 *
02	2
03	3
04	4A
0C	4B

* There is only one TIC type=01

E Gives the clock and cable information for each port of a LIC, as follows:

Clock

C	Function
0	Not defined clock
1	Business machine clock
2	External clock (default)
3	Direct attachment

Cable Information

I	Function
0	Cable not installed
1	LIC type 1,2,4 wrap block
2	LIC type 3 wrap cable
4	Modem attachment
5	Direct attachment
6	Autocall (See Note 1)

See notes on next page.

CDF Display/Update (Part 3 of 4)

Notes:

1. For autocall units, the clock must be set to 0 (not defined).
2. Place "C" and "I" information in port 1 for the first line attached to a LIC (type 3, direct attachment) even if this line physically connects to another port of the LIC.

PF4:BACKWARD
PF5:FORWARD

This PF key information appears on the screen when it is possible to page backward or forward with the PF keys.

LSSD

For detailed information on level sensitive scan design (LSSD), see page 14-070.

Two sectors of LSSD can be displayed:

1. LSSD skeleton block sector 1: This is the LSSD saved by the MOSS during phase 1b of a controller re-IML when a CCU hardcheck occurs. If several CCU hardchecks occur, the LSSD skeleton kept corresponds to the latest hardcheck. Troubleshooting procedures for CCU hardchecks are provided in MIM Part 2.
2. LSSD init block sector 2: This is the actual CCU value for initializing the CCU.

Before displaying LSSD, you are requested to enter the LSSD block number:

- ENTER LSSD BLOCK NUMBER (0 FOR BOTH) ==>
  (enter 1 or 2, or 0 for both)

The following screen is then displayed in hexadecimal format (H):

```
          LSSD SKELETON BLOCK    -   CDF SECTOR 1
    0        4        8        C        10       14
00 H....... H....... H....... H....... H....... H.......
18 H....... H....... H....... H....... H....... H.......
30 H....... H....... H....... H....... H....... H.......
48 H....... H....... H....... H....... H....... H.......
60 H....... H....... H....... H....... H....... H.......
78 H....... H....... H....... H....... H....... H.......
90 H....... H....... H....... H....... H....... H.......
A8 H....... H....... H....... H....... H....... H.......
C0 H....... H....... H....... H....... H....... H.......
D8 H....... H....... H....... H....... H....... H.......
F0 H....... H....... H....... H.......

                       PF3:QUIT
```

LSSD strings are displayed in hexadecimal. Every string has a 3-byte header added that indicates:

N String number
L String length in bytes
R Remaining string bits (0 ≤ L < 7)

Strings appear as follows on the console screen. FF is displayed after the last bit of the last string.

```
 N L R String 1 Data   N L R String 2 Data
|-|-|-|---------------|-|-|-|-----------------|

         N L R      Last String Data       FF
|-------|-|-|-|--------------------------|--|
```

LSSD Bit Identification

Register HDCK String Bits		
1 094	0	+Level 1 error reentry
1 069		+MDOR parity error
1 068		+MIOC error latch
4 058		+BSM control error
4 056		+Double-bit error detected
4 057		+Storage address/data parity error
4 059		+POP parity
C 092		(not used)
C 091		(not used)
C 083		(not used)
C 076		+IOC1 CCW error
C 067		+IOC1 timeout error
C 077		+IOC1 bus in error
C 094		(not used)
C 093		(not used)
C 079		+IOC1 address exception
C 078		+IOC1 storage protect
4 016		+LS parity error
4 015		+ROS parity error
6 101		+A/B bus parity error
6 100		+IOC1 parity error
8 101		+SAR parity error
8 100		+ZR parity error
A 100		(not used)

```
- ---
A  A
|  L---- LSSD bit number in string
L------- LSSD string number
```

Register HKNG String Bits (In '7D') Level 1 Interrupts	
4 059	+POP parity error
1 069	+MDOR parity error
1 068	+MIOC error
4 056	+Double-bit error
4 058	+Storage control error
4 057	+Storage addr/data parity error
4 016	+LS parity error
6 101	+A/B bus parity error
6 100	+IOC parity error
8 101	+SAR parity error
4 015	+ROS parity error
8 100	+Z reg parity error
1 094	+Level 1 error reentry
B 067	-ALU compare error X
B 099	-ALU compare error 0
B 131	-ALU compare error 1

```
- ---
A  A
|  L---- LSSD bit number in string
L------- LSSD string number
```

Register INT1 String Bits Level 1 Interrupts (In X'76', In X'7E')	
C 079	+IOC address exception
C 078	+IOC storage protect
C 076	+IOC CCW error
C 067	+IOC timeout error
C 077	+IOC bus in error
1 034	+MOSS Inop level 1 interrupt request
1 079	+Level 5 I/O check
1 081	+Invalid Op code
A 025	+IOC1 interrupt bit 0.5
2 121	+address compare level 1 int request
4 067	+Prog EX AE
4 068	+Prog EX SP
4 069	+Instruction fetch AE
4 070	+Instruction fetch SP
1 028	+MOSS to CCU status register bit 1

Register INTA String Bits Adapter Level 2, 3 Interrupts (In X'77')	
6 058	+IOC1 interrupt bit 0.1
6 026	+IOC1 interrupt bit 1.0

Register INTC String Bits CCU level 2, 3, 4 Interrupts (In X'7F')	
1 075	+PCI level 2
1 027	+MOSS-to-CCU status register bit 0
1 029	+MOSS-to-CCU status register bit 2
1 030	+MOSS-to-CCU status register bit 3
1 031	+MOSS-to-CCU status register bit 4
1 033	+MOSS-to-CCU status register bit 6
1 077	+PCI level 4
1 078	+timer level 3
1 076	+PCI level 3
1 095	+SVC level 4

```
- ---
A  A
|  └---- LSSD bit number in string
└------- LSSD string number
```

CDF INFORMATION

The following screen, obtained by entering 7 followed by SEND in the CDF menu, is to be used as a HELP for the CDF information:

```
TYPE (CS/FES/ICC-1/ICC-2) ===> 00 : NOT INSTALLED
                             =  10 : INSTALLED
LIC TYPES  CLOCK INFO (C)          CABLE ID INFO(I)
00:NO LIC 0:NOT DEFINED CLOCK     0:CABLE NOT INSTALLED
01:LIC1   1:BUSINESS MACHINE CLOCK 1:LIC1/2/4 WRAP BLOCK
02:LIC2   2:EXTERNAL CLOCK(DEFAULT 2:LIC3 WRAP BLOCK
03:LIC3     FOR INSTALLED CABLE)   4:MODEM ATTACHMENT
04:LIC4A  3:DIRECT ATTACHMENT      5:DIRECT ATTACHMENT
0C:LIC4B                           6:AUTOCALL
                                   7:RPQ8J5080,1,2
-LAB/CAB:LIC/LINE POS.GIVES BINARY PORT POSITION INSIDE
         LIC  (A = 1010 LINES ON PORT 1 AND 3)
-UPDATED INFO.IS FILED ONLY AFTER "PF5=FILE" IS PRESSED
            PF3:QUIT
```

Note: See pages 13-540 and 13-541 for register bit details about LIC types and clock and cable information for specific LIC types.

MLT

The machine load table (MLT) provides the control program with:

- Customer identification
- 3725 serial number
- A record of the applied and restored ZAPs

The customer identification and machine serial number identify 3725 dumps on the host system.

SELECTION

1. Select the utility programs as explained page 2-390.
2. Enter 6 followed by SEND.

To initialize the MLT, enter the customer identification (any number of alphameric characters or blanks up to the end of the line), and the 3725 serial number (1 to 7 hex characters). These two fields are unprotected, and can be changed at any update if necessary. The MLT function is always in update mode.

To file the MLT once it is initialized or updated, press SEND, then terminate the function.

```
CUSTOMER ID: CONTROLLER

CONTROLLER TYPE: 3725  MODEL: 01   SERIAL NBR:  123
                    OR MODEL: 02

 DISKETTE EC:    873051       CONTROL PROGRAM:  0000





                            PF5:ZAP HISTORY TABLE
```

ZAP HISTORY TABLE

If there are applied or restored ZAPs, PF5:ZAP HISTORY TABLE is displayed and ZAP HISTORY TABLE IS EMPTY is erased. Pressing PF5 displays ZAPs as follows:

```
ZAP HISTORY TABLE (A:APPLIED, R:RESTORED)

  ZAP ID   A/R   MM/DD/YY       ZAP ID  A/R    MM/DD/YY

PXXXYZZZ    R     07/22/82
PXXXYZZZ    A     07/27/82
PXXXYZZZ    A     07/27/82
PXXXYZZZ    A     07/27/82
PXXXYZZZ    A     07/29/82
PXXXYZZZ    A     07/29/82
PXXXYZZZ    A     07/29/82
PXXXYZZZ    A     07/29/82

             PF4:BACKWARD
```

SELECTION

1. Select the utility programs as explained page 2-390.
2. Enter 7 followed by SEND.

Use the diskette swap function to:

- Copy all or some of the following files from one diskette to another: MLT, CDF, BER file, GCF, IPL ports, and the control program procedures
- Save selected BERs from the controller diskette to the service diskette BER file
- Purge selected BERs from the service diskette

```
- SELECT SWAP OPTION (1, 2, 3, 4, 5, 6)  ==>

      1 = CONTROLLER TO CONTROLLER DISKETTE
      2 = CONTROLLER TO SERVICE DISKETTE
      3 = SERVICE TO CONTROLLER DISKETTE
      4 = SERVICE TO SERVICE DISKETTE
      5 = SAVE BER (CONTROLLER TO SERVICE DISKETTE)
      6 = PURGE BER (SERVICE TO SAME SERVICE DISKETTE)
```

If you selected:

1. Controller to controller, you can copy any file displayed (see screen below).
2. Controller to service, you can copy only the MLT, the CDF, and the BER file. No file selection is required. (see Note).
3. Service to controller, you can copy only the MLT and the CDF.
4. Service to service, same possibilities as option 2. (see Note).
5. Save BER, you save the selected BERs on the service diskette BER file. The saved BERs are those with the 'save' flag set using the 'ERROR LOG' function (refer to page 2-172).
6. Purge BER, you purge the selected BERs from the service diskette BER file. The purged BERs are those with the 'purge' flag set with the 'ERROR LOG' function (refer to page 2-172).

The controller-to-service and service-to-controller options require no selection from the operator. Files are copied automatically. The save and purge functions are described on pages 2-409 and 2-410.

Note: When option 2 or 4 above has been selected, a message reminds you that "BERs saved on Service diskette may be erased". You are therefore resquested to confirm your selection.

The following screens apply to the CONTROLLER-TO-CONTROLLER option.

```
- SELECT FILES TO BE COPIED (Y=COPY, N=NO COPY)

                  MLT  ==> N
                  CDF  ==> N
             BER FILE  ==> N
                  GCF  ==> N
            IPL PORTS  ==> N
       CNTRL PGM PROC  ==> N
                  LDF  ==> N
       PORT SWAP FILE  ==> N
```

Once the files to be copied are selected, you are given the size and the status of each file. The maximum length of each file is given below, in sectors:

- MLT: 1 (when the MLT is selected, only the customer ID and the serial number are copied from one diskette to the other).
- IPL ports: 1
- CDF: 4 (LSSD records are not included because they are not copied)
- GCF: 3
- BER file: 26
- Control program procedures: 78
- LDF: 16
- Port swap file: 4

At this point in the procedure, the status can only be NOT TO BE COPIED, to identify the files that you did not select.

The size is given in sectors.

```
                                  SIZE  STATUS
                  MLT      ==> N  000   NOT TO BE COPIED
                  CDF      ==> Y  004
             BER FILE      ==> N  000   NOT TO BE COPIED
                  GCF      ==> Y  003
            IPL PORTS      ==> Y  001
       CNTRL PGM PROC      ==> N  000   NOT TO BE COPIED
                  LDF      ==> N  000
       PORT SWAP FILE      ==> N  000

 - CHANGE DISKETTE, THEN PRESS SEND
```

Warning: Once you have been requested to change the diskette, and until you return to the original diskette, you must not terminate the function. If, for any reason, you do not want to continue the function, do the following:

1. Mount the original diskette.
2. Re-IML the MOSS.

When you have mounted the new diskette, press SEND. A screen similar to the following is displayed:

```
                              SIZE  STATUS
              MLT    ==> N    000   NOT TO BE COPIED
              CDF    ==> Y    004   COPIED
         BER FILE    ==> N    000   NOT TO BE COPIED
              GCF    ==> Y    003   COPIED
        IPL PORTS    ==> Y    001   COPIED
   CNTRL PGM PROC    ==> N    000   NOT TO BE COPIED
              LDF    ==> N    000   FILE EMPTY/NOT COPIED
   PORT SWAP FILE    ==> N    000   FILE EMPTY/NOT COPIED
```

The status may be:

- NOT TO BE COPIED, if you did not select the file
- COPIED, when the file is copied
- NOT COPIED with an error statement XXXXX, which gives the reason for not copying the file, such as:
  - READ ERROR
  - WRITE ERROR
  - FILE EMPTY

If the swap is successfully completed, you are requested to mount the original diskette:

- MOUNT ORIGINAL DISKETTE, THEN PRESS SEND

Note: The original diskette is the diskette that was mounted during the MOSS IML.

Diskette Swap (Part 2 of 3)

SAVE BER

The following screens apply to the SAVE BER option.

```
- DID YOU SELECT BER(S) WITH FLAG 'SAVE' (Y OR N) ==>



SAVE IS STARTED
```

If 'N' is selected, the new screen is:

```
- USE ERROR LOG DISPLAY TO SELECT BER(S)



SAVE COMPLETED
```

If 'Y' is selected, the new screen is either:

```
- NO BERS FLAGGED
- USE ERROR LOG DISPLAY TO SELECT BER(S)



SAVE COMPLETED
```

When no BERs are found with the 'SAVE', flag ON, or:

```
- XXX BERS TO BE SAVED



MOUNT SERVICE DISKETTE, THEN PRESS SEND
```

when XXX BERs are found with the 'SAVE' flag ON.

Once the service diskette has been mounted, press SEND.

If the 'SAVE' on the service diskette was successful, the following screen is displayed:

```
     CONTROLLER                        SERVICE
- XXX BERS TO BE SAVED            - XXX BERS SAVED


MOUNT ORIGINAL CONTROLLER DISKETTE, THEN PRESS SEND
```

If the BER file on the service diskette is found full, the following screen is displayed:

```
     CONTROLLER                        SERVICE
- XXX BERS TO BE SAVED            - YYY BERS SAVED

BER FILE IS FULL
- DO YOU WANT TO PURGE THE BER FILE (Y OR N) ==>
```

If 'N' is selected, a screen similar to the one at the top of this column is displayed again.

If 'Y' is selected, a caution message is added to the above screen, as follows:

```
     CONTROLLER                        SERVICE
- XXX BERS TO BE SAVED            - YYY BERS SAVED

BER FILE IS FULL
- DO YOU WANT TO PURGE THE BER FILE (Y OR N) ==>

                *** CAUTION ***
     YOU SELECTED THE PURGE OF THE WHOLE BER FILE

- TO CONFIRM SELECTION ENTER Y, OTHERWISE ENTER N ==>
```

If 'N' is entered, a screen similar to the one at the top of this column is displayed.

If 'Y' is entered, the BER file is purged and the BERs to be saved are written in this file. A screen similar to the one at the top of this column is then displayed.

Once you have mounted the original controller diskette, press SEND. A screen similar to the following one is displayed:

```
     CONTROLLER                        SERVICE
- XXX BERS TO BE SAVED            - XXX BERS SAVED
- XXX BERS FLAGGED 'SAVED'


SAVE COMPLETED
```

The SAVE operation is complete and the BERs to be saved are flagged 'SAVED'.

Diskette Swap (Part 3 of 3)

PURGE BER

If 'Y' is selected, the new screen is either:

```
- NO BERS FLAGGED
- USE ERROR LOG DISPLAY TO SELECT BERS(S)


PURGE COMPLETED
```

When no BERs are found with flag 'PURGE', or:

```
      SERVICE
- XXX BERS TO BE PURGED


- TO CONFIRM SELECTION ENTER Y, OTHERWISE ENTER N ==>
```

when XXX BERs are found with flag 'PURGE'.

If you enter 'N', the following screen is displayed:

```
      SERVICE
- XXX BERS TO BE PURGED
- 000 BERS PURGED

PURGE COMPLETED
```

If you enter 'Y', the following screen is displayed:

```
      SERVICE
- XXX BERS TO BE PURGED
- XXX BERS PURGED


PURGE COMPLETED
```

MOSS, Scanner, and TRSS Dumps

MOSS DUMP

A MOSS dump is the contents of MOSS microcode storage (see MOSS storage layout in Chapter 14) transferred to the diskette buffer area. With the use of System Support Program (SSP) facilities, the common buffer area CHGDMP of the controller diskette may be transferred to the host for printing. Using a Maintenance Device 2 (MD) and acoustic coupler, it can be transmitted from the controller diskette to plant engineering.

A MOSS dump may be started automatically or manually.

Automatic MOSS Dump

The automatic MOSS dump is started when MOSS abends taking a MOSS level 0 interrupt. A MOSS re-IML occurs after this dump. An alert A1 or A2 is then sent to the host. An alert A1 is sent by NCP to the host if the MOSS cannot successfully re-IML before a re-IML retry threshold is reached. An alert A2 is sent by the MOSS to the host if the MOSS is successfully IMLed. If another MOSS automatic dump is attempted before a previous dump is either transferred to the host or manually deleted, the previous dump remains protected and the following one is lost. This previous dump may have been taken manually or automatically.

Manual MOSS Dump

The MOSS must be set offline. Failure to do so results in a 3725 system abend.

The manual MOSS dump is started by placing the Function Select switch in the MOSS Dump position and pressing the Function Start switch on the control panel. Successful completion of the manual dump is indicated by the hex display D00. MOSS should then be manually re-IMLed using the control panel function MOSS IML. The manual MOSS dump always overlays any previous dump on the diskette.

You can perform this procedure while NCP is loaded and active without affecting NCP operation.

Performing a MOSS dump automatically places MOSS offline. To bring MOSS online after the dump is completed, use CCU FNCTN 5 (system control) and system control function 11.

SCANNER DUMP

A scanner dump is the contents of one scanner microcode storage transferred to the diskette buffer area. With the use of System Support Program (SSP) facilities the dump buffer area of the controller diskette may be transferred to the host for printing. Using a Maintenance Device 2 (MD) and acoustic coupler it can be transmitted from the diskette to plant engineering.

The scanner dump is put on the controller diskette. Field 'N' of the machine status area (MSA) on the 3727 screen will display 'DUMP' while a scanner dump is in progress.

A scanner dump may be started automatically or manually.

Automatic Scanner Dump

The automatic scanner dump is started whenever a condition exists that generates an alarm 12 or 14. Command reject by the scanner causes an alarm 14. A scanner AIO error, scanner adapter error, or scanner hardstop causes an alarm 12. (See page 2-200). The scanner must be manually re-IMLed and the 3725 Problem Determination and Extended Services, Vol. A06. gives the procedure under the alarm 12 and 14. If another scanner dump is attempted by this automatic method before a previous dump is either transferred to the host or manually deleted, the previous dump remains protected and the following one is lost. This previous dump may have been taken manually or automatically. Automatic scanner dump can also be started at NCP request by a specific command (F2). (Contact your Programming Service Representative.)

Manual Scanner Dump

The manual scanner dump may be started on the controller. A scanner dump is disruptive to the scanner and its link. On the controller diskette enter 'M' for the maintenance screen then 'S' for TSS functions. Select the desired scanner using function 1, then dump that scanner using function 2. The scanner must be re-IMLed using the TSS functions or IPL CCU/TSS functions.

If a scanner dump is attempted by the manual method before a previous dump is either transferred to the host or manually cleared (deleted), a message is displayed that the scanner dump file is not empty. If you respond with a 'C' to this message, the previous dump is cleared and the following dump is taken. The previous scanner dump may also be manually deleted (cleared) using the utility program function 1 (dump display/delete). The first screen in this function defines PF3 as the delete function (page 2-391). The next screen displayed after you press PF3 allows you to enter the file name to be deleted, and displays the choices available. Enter the file name desired, then press SEND.

TRSS TIC DUMP

A TIC dump is the contents of one token-ring interface coupler card (TIC card) storage, status and registers, transfered to the diskette buffer area.
With the use of system support program (SSP) facilities, the dump buffer area of the controller diskette may be transferred to the host for printing. Using the Maintenance Device 2 (MD-2) and accoustic coupler, it can be transferred from the diskette to plant engineering.
The TIC dump is put into the buffer area for TRSS dump (CHGTRSS) on the controller diskette, which is used only by the TRSS.
A TIC dump may be started manually or automatically.
A dump for each of TIC 1 to 4, regardless of the TRA number, may be taken and stored in the TRSS dump file CHGTRSS.
The CHGTRSS dump file is only transferred to the host if the control program is NCP V4R2.

MANUAL TIC DUMP

The manual TIC dump can be started on the controller diskette. Only a manual TIC dump is disruptive to the TRA on which it is installed. The TRA must be disconnected.
With the controller diskette loaded, enter 'M' for the maintenance screen, then "R" for TRSS functions. Select the desired TRA using function 1, disconnect the TRA using function 2, then dump the TIC using function 6; when the dump is taken, reconnect the TRA using function 2.
Then all TICs must be reactived from the host.

If TIC dump is attempted before a previous dump is either transferred to the host or manually cleared (deleted), a message is displayed that the TIC dump file is not empty. If you respond with a 'C' to this message, the previous dump is cleared and the following dump is taken. The previous TIC dump may also be manually deleted (cleared) using the utility program function 1 (dump display/delete). The first screen in this function defines PF3 as the delete function (page 2-391). The next screen displayed after you press PF3 allows you to enter the file name to be deleted, and displays the choices available. Enter the file name desired, then press SEND.

AUTOMATIC TIC DUMP

The automatic TIC dump is started whenever a condition exists that generates an alarm A29.
Any unrecoverable TIC error that brings the TIC down causes this alarm. The TIC must be reactived from the host.
If another TIC dump is attempted manually or automatically before a previous dump is either transferred to the host or manually cleared (deleted), a message is displayed that the TIC dump file is not empty. If you respond with a 'C' to this message, the previous dump is cleared and the following dump is taken. The previous TIC dump may also be manually deleted (cleared) using the utility program function 1 (dump display/delete). The first screen in this function defines PF3 as the delete function (page 2-391). The next screen displayed after you press PF3 allows you to enter the file name to be deleted, and displays the choices available. Enter the file name desired, then press SEND. Then, enter the number corresponding to the TIC to be deleted.

File Transfer

The 3725 files that can be transferred are:

- MOSS dump or scanner dump
- Configuration data file (CDF)
- ZAP
- Machine load table (MLT)
- Graphic configuration file (GCF)
- BER file
- Cataloged control program procedures
- TIC dump

Refer to page 14-081 for file mapping on both controller and service diskettes.

The last three files above are described in the <u>3725 Problem Determination and Extended Services, Vol. A06.</u>

To print the 3725 files listed above, you must transfer them to the host.

The controller diskette holds up to 4 TIC dumps and either a MOSS dump or a scanner dump.

The TIC dump file, CHGTRSS, is only transferred if the control program is NCP V4R2.

Once a dump is taken to the diskette buffer area for dump, there are two ways to transfer dump files from this diskette. They may be transferred to the host for printing, or they may be transferred directly to your support function from the diskette using a maintenance device (MD).

TRANSFERRING DUMP FILES TO THE HOST

A dump can be transferred to the host from the controller diskette only.

Functions at the host are used to transfer the dump files from the controller diskette into the host and also to print them. These host functions are described in <u>Advanced Communications Functions for Network Control Program and System Support Programs for the 3725 Diagnosis Guide,</u> SC30-3181.

When a scanner or MOSS dump is transferred to the host, it is deleted automatically from the dump buffer of the diskette. The diskette is then ready to receive another scanner or MOSS dump if necessary.

The TRSS dump file, which can hold up to 4 TIC dumps, is also deleted automatically after the transfer to the host.

TRANSFERRING OTHER 3725 FILES TO THE HOST

The file transfer procedure is described in <u>Advanced Communication Functions for Network Control Program and System Support Programs for the 3725 Diagnosis Guide,</u> SC30-3181.

TRANSFERRING DUMP FILES USING A MAINTENANCE DEVICE

You may have to transmit a dump file using an MD to:

- A dial-up port on a VM system (see page 2-451).
- Another MD at the support function (see page 2-451).

When a dump is transferred using the MD, it has to be manually deleted from the dump buffer of the diskette. To delete manually a dump from the diskette, use the MOSS utility program function 1 (Dump Display /Delete). The first screen in this function defines PF3 as the delete function (page 2-391). The next screen displayed after you press PF3 allows you to enter the file name to be deleted, and displays the choices available. Enter the file name desired and press SEND. This manual deletion procedure may be used at any time and deletes whichever file is entered, regardless of any other factors. Be careful not to delete a file that may be needed and has not been saved.

RECEIVING FILES USING A MAINTENANCE DEVICE

You may have to receive a patch or ZAP file on a MD from:

- A data base through a dial-up port (see page 2-452).
- Another MD at the support function (see page 2-458).

COPYING A DISKETTE USING TWO MAINTENANCE DEVICES

In an emergency, you may copy a diskette from a MD to another MD (see page 2-459).

Transferring a File: MD to VM and/or MD to MD

MD TO VM FILE TRANSFER

This procedure is used when transferring files to your support function. This will be done only at the request of the suppport function.

1. Load MD utility diskette into the MD, then IPL reset

	MD Messages	Action/Response
2.	"MAINTENANCE DEVICE MAINTENANCE AND APPLICATION DISKETTE"	FWD
3	"DO YOU WANT TO REPAIR/TEST THIS MD?"	NO
4.	"DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
5.	"SELECT ACTIVITY 1 = MAP EXERCISE 2 = APPLICATIONS 3 = END"	2 ENTER
6.	"SELECT UTILITY TYPE 1. DISPLAY 2. REMOTE 3. DISKETTE"	2 ENTER
7.	"1. REMOTE PROCESSOR 2. DUMP XMIT PROGRAM 3. PRINT DISKETTE 4. BYSYNC RFT TEST"	3 ENTER
8.	"ARE YOU CONNECTING TO A VM/370 SYSTEM?"	YES
9.	"SELECT PRINT FORMAT: 1 = 16 BYTE HEX/CHAR 2 = 32 BYTE HEX"	1 ENTER
10.	"xxxxxx = MD NODE ID xxxxxxxx = DEST xxxxxxxxxxxxxxxxxx IS THIS VALID? "	NO
11.	"ENTER NODE ID (8MAX) EG: DPCXSUPP"	Enter the data given to you by your support function.
12.	"ENTER- USERID -OR- LOCID/USERID EG: DPCXDUMP	Enter the data given to you by your support function.
13.	"XXXXXX = MD NODE ID xxxxxxxx =DEST xxxxxxxxxxxxxxxxxxxx IS THIS VALID?"	Check with the data you were given. YES or NO
14.	"xxx DSKT DUMP PRG PASS WORD ="	No password required. ENTER
15.	"xx ARE YOU ATTACHING TO A MODEM?"	YES
16.	"xx DOES YOUR MODEM REQUIRE BUSINESS MACHINE CLOCKING?"	YES
17.	"xx PLUG THE MD'S EIA CABLE INTO THE MODEM"	No keyboard action required.
18.	"xx WHEN THE DATA CONNECTION IS COMPLETED.. PRESS ENTER TO CONTINUE."	Dial the phone number you were given. ENTER
19.	"xxDSKT DUMP PROGRAM .. WAITING FOR SYSTEM"	No action needed
20.	"DO YOU WISH TO CHANGE DISKETTE?"	YES
21.	"INSERT NEW DUMP DISKETTE . . ."	Put 3725 diskette into the MD.
22.	"xxSIGNON COMPLETE . . ENTER EXTENTS EXAMPLE = 01010101"	Enter the 8 digit extents given to you by your support function. ENTER
23.	"xxDSKT DUMP PROGRAM SENDING ID CARD (PF - ABORT)"	No action required.
24.	"xxDSKT DUMP PROGRAM SENDING DUMP DATA (PF - ABORT) SECTOR = XXXX"	No action required.
25.	"xxDSKE DUMP PROGRAM ..DUMP COMPLETE ANY MORE TO SEND? (PF = RESTART)-"	Transfer of data complete.

MD TO MD FILE TRANSFER

This procedure is used when transferring files to your support function. This will be done only at the request of the support function.

1. Load MD utility diskette into the MD.

	MD Messages	Action/Response
2.	"MAINTENANCE DEVICE MAINTENANCE AND APPLICATION DISKETTE"	FWD
3	"DO YOU WANT TO REPAIR/TEST THIS MD?"	NO
4.	"DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
5.	" SELECT ACTIVITY 1 = MAP EXERCISE 2 = APPLICATIONS 3 = END"	2 ENTER
6.	"SELECT UTILITY TYPE 1. DISPLAY 2. REMOTE 3. DISKETTE"	3 ENTER
7.	"1. DISPLAY ALTER 2. COPY DISKETTE 3. DISK ANALYSIS 4. HEAD ALIGNMENT"	2 ENTER
8.	"ARE YOU USING TWP MD'S?"	YES
9.	"ARE YOU USING EITHER AN ACOUSTIC COUPLER OR A MODEM?"	YES
10.	"IS BUSINESS MACHINE CLOCKING REQUIRED?"	YES
11.	"SELECT CLOCK SPEED. 1. 600 BPS OR 2. 1200 BPS"	2 ENTER
12.	"IF USING FE UPAC OR EPAC SET THE MODE SWITCH TO 0 -1200 NO EIA CLOCK"	Set switch then, ENTER
13.	"ARE YOU THE SENDER?"	YES
14.	"DO YOU WISH TO CHANGE DISKETTE?"	YES
15.	"INSERT NEW DISKETTE."	Put 3725 diskette
16.	"ENTER DISK TYPE 1. DISKETTE 1 33FD 2. DISKETTE 2 43FD 3. DISKETTE 2D 53FD"	3 ENTER
17.	"CONNECT EIA CABLE TO COUPLER OR MODEM AND DIAL UP OTHER MD. FWD WHEN DONE."	Dial number given to you by the support function. FWD
18.	"DO YOU WANT TO COPY THE ENTIRE DISKETTE?"	NO
19.	"ENTER DISK EXTENTS IN HEX: EXAMPLE 0101 0C01"	Enter the 8 digit extents given to you by the support function. ENTER
20.	"MAKE RECEIVING MD READY TO RECEIVE, PRESS FWD."	Place handset in coupler then FWD
21.	"OPENING EIA PORT"	No action required.
22.-	"SENDING DATA FOR EXTENTS xxxxx---x"	No action required.
23.	"DISKETTE COPIED DO YOU WANT TO COPY ANOTHER DISKETTE"	YES -if you have more to copy, NO -to end operation.
24	"DO YOU WANT TO CHANGE DISKETTE"	NO
25.	Go back to step 16.	

3725 DISKETTE LABEL FORMAT AND DEFINITIONS

```
MACH: 3725    MOD: ALL    SER: Fnnn    DATE: YYMMDD
BM: 1733981            EC: nnnnnn      REA:
GID: RAnnnnnn

COMMENTS:              A23        MM DD YY    HH:MM
CONTROLLER DISKETTE               Lnnn - Lnnn
                                       nnnn
```

Description of fields

MACH:	Machine type
MOD:	Machine Model this diskette can be used on.
SER:	Serial number this diskette was written for, (in the case of 3725's all diskettes except RPQ diskettes will be zero's.)
DATE:	The date the EC was released to manufacturing.
BM:	B/M number for this diskette.
EC:	The engineering change number of this diskette.
REA:	If the diskette is released by an REA rather than an EC, this field will contain the REA number.
GID:	The GID number is always RAnnnnnn on 3725 diskettes.
COMMENTS:	A23 ID of diskette writer.

CONTROLLER DISKETTE: Define the function of this diskette.

Lnnn-Lnnn: Indicates the first and last patches in the ZAP area of this diskette.

DATE AND TIME WRITTEN: MM DD YY HH:MM

nnnn = MFG. SEQ. NO.

MICROCODE PATCH STRATEGY

The microcode patch strategy has been changed because manufacturing now uses a microcode image format process (MIF) which allows them to ship current level microcode. With the new MIF process, controller diskettes are within two or three patches (normally) of being current. This applies to new machines, EC's, MES's and diskettes from parts.

WHEN TO PATCH

Always patch to the highest level when the symptom of the customer's problem fits the description. It is not necessary to pull patches for new machines or EC's unless there is an excessive delay between the time you received the machine or EC and the time it takes you to install it; however, patches on the diskette you receive must be applied.

The other important time to patch is when there is a co-requisite patch released against an existing patch on your system. To keep you informed of these conditions, there is a tip maintained in RETAIN for each level of microcode. This RETAIN can be found by entering the SAS keyword P:3725UCODE.

MICROCODE DOWNLOAD PROCEDURE

This procedure is used to transmit microcode patches (ZAPS) from a data base to the Maintenance Device (MD) and has been updated to include the following:

- Boulder phone number change.
- New MD diskette.
- New Boulder messages.
- Corrections to known problems.

Definitions of the terms used in this section are as follows:

- Normal diskette: The diskette normally used to operate the machine.
- Spare diskette: The diskette used when receiving patches from the data base, and also used as a backup.
- Accumulator diskette: A diskette used to pull and accumulate patches from the data base. Use of this diskette is optional, as it is intended to be used for applying patches to more than one machine.
- Sequence number: A number written on the spare diskette when pulling patches from the data base. This number is also written by Manufacturing on diskettes obtained from Raleigh.
- Boundary: Used to define the beginning and end of the ZAP area on the diskette. The maximum number of ZAPS this area can hold is 32.
- ZAP: The term "ZAP" is used interchangeably with "Patch".
- Data base: In the United States, this is the Boulder RETAIN system.

If an accumulator diskette is always used to pull patches and the spare and normal diskettes are updated by copying from the accumulator, the spare and normal diskettes cannot be used to pull patches fron the data base.

Patches should always be pulled and applied sequentially. Patches should not be removed (restored) once applied, unless instructed to do so by Engineering or the field support center.

Receiving a File: Data Base to MD (Part 2 of 6)

3725 DISKETTE REQUIREMENTS

The service procedure for this machine requires two controller diskettes and two service diskettes. A total of four diskettes ship with each machine. (Engineering changes to diskettes will contain two diskettes).

The spare controller diskette is used to pull patches from the data base. The spare diskettes are also the backup diskettes in the event the normal diskettes are damaged.

The normal controller diskette is used when running under customer operation. Updating of the normal diskette is accomplished by copying from the spare diskette to the normal diskette.

The normal and spare service diskettes are used by service personnel for diagnostic purposes and are used in the same manner as the controller diskette.

MD DISKETTE REQUIREMENTS

MD diagnostic diskette P/N8309864 at ECA33591E should be used when pulling patches from the data base. (This replaces MD diagnostic diskette P/N8547642 at EC339660E)

If the new diskette is not available, P/N8547642 at EC339660E can be used after applying MD diskette patches (using the Boulder system). There are several communication errors that are fixed by the patches.

To receive patches for the MD diagnostic diskette, hook up the MD per the 3725 ZAP update instructions and enter the P/N of the MD diskette to be updated.

Note: When the MD asks you to insert the diskette to be updated, open and close the diskette door on the MD. Unlike the 3725, the patches for the MD diskette will be applied directly to the diskette. Once hooked up, you should pull all patches (sequences), available.

SEQUENCE NUMBERS

A key point is that when pulling patches from the data base, the sequence number is updated on the diskette receiving the patches, (the spare diskette or the accumulator diskette).

When copying from the spare to the normal diskette, the sequence number is not copied. Since the data base always looks at the sequence number to determine the next sequence number to be transmitted, the same diskette must always be used to pull patches from the data base.

DISKETTE BOUNDARIES

The patch (ZAP) area on a diskette has fixed boundaries. When the number of patches exceeds the boundary of the ZAP area, you will have to apply, and erase the patches from the spare diskette to continue pulling patches.

The exception to this is when the boundary of a diskette is reached when connected to the data base and you receive a message which states "STOP-WARNING-STOP APPLY AND ERASE ALL PATCHES". When this occurs, you will be given the option to apply and erase the patches or to insert another diskette and continue to receive patches. This will be explained further in the step-by-step procedure.

The boundaries on diskettes at EC873052 and above are as follows:

First diskette	00 thru 1F
Second diskette	20 thru 3F
Third diskette	40 thru 5F

Note: A patch may require more than one address, so normally there will not be 32 patches before the end boundary is reached. Do not apply patches to the spare diskette until the boundary of the diskette has been reached otherwise the directory in the MLT may be adversly affected.

TOOLS REQUIRED

Spare 3725 controller diskette
Maintenance Device II
MD diagnostic diskette, P/N 83098640 at EC A33591E E/UPAC (acoustical coupler), or Portable Modem P/N 8309870.

Note: Problems have been experienced using the portable modem P/N8309870 on "digital" telephone systems. THE MODEM MAY BE DAMAGED. Verify that your telephone system is not a digital system before connecting the modem.

DATA BASE TELEPHONE NUMBERS

US

WATS LINE	1-800-525-7993
TIE LINE	8-347-2107
INSIDE COLORADO	1-303-441-2107

EMEA-AFE

Refer to your support function.

TIME RECORDING

All times associated with pulling and applying microcode patches should be written Service Code 33 ECA 999. The estimated time required to pull an apply patches is 1.5 hours.

TROUBLE REPORTING

All problems with this utility should be reported to the 3725 FSC. You should verify your UPAC, MD, and Phone Equipment before calling.

This procedure is used to receive a microcode ZAP from a data base to the maintenance device (MD).

STEP-BY-STEP PROCEDURE

The following procedures will allow authorized users to receive the latest microcode ZAPs (patches) via the MD (Maintenance Device). This utility will only provide ZAPs that pertain to the EC level of the controller diskette that you are using. It will not cross EC levels or suffix ECs. In other words, if you are running on a down-level diskette and want the latest ZAPs, you will have to upgrade to the latest EC level microcode.

After you have established communications with the data base system, the system will ask for the ZAP level if it is the first time (transmission) for this diskette. You will have to tell what level you are. As long as you use the same diskette, the system will write a sequence number on your diskette and update you automatically to the latest ZAPs available for that EC level. The ZAPs are transmitted to the ZAP data file on the diskette and are not yet applied.

When using the procedures, remember, the column on the left is what the MD is displaying, and the column on the right is the response or action you need to perform.

	MD Message/Display	Action/Response
1.	Blank	Load MD diagnostic diskette into the MD and press IPL RESET.
2.	"MD MAINTENANCE DISK PN: XXXXXXXX REL: X SEQUENCE NO: XX "DATE XX/XX (ENTER)"	Press ENTER.
3	"DO YOU WANT TO REPAIR/TEST THIS MD└"	Press NO.
4.	"DO YOU WANT TO RUN THE MD EDUCATION MODULE└"	Press NO.
5.	"SELECT ACTIVITY 1 = MAP EXERCISE 2 = APPLICATIONS 3 = END"	Press NO.

Receiving a File: Data Base to MD (Part 4 of 6)

	MD Message/Display	Action/Response
8.	Either the step 10 message will be displayed. Go to the appropriate step.	
9.	"SERIAL # = XXXXXX BRANCH # = XXX IS THIS CORRECT└"	If you press YES, go to step 12, or else press NO.
10.	"ENTER YOUR SERIAL # NNNNNN"	Type in your serial number and press ENTER.
11.	"ENTER YOUR BRANCH # BBB"	Type in your branch number, press ENTER and go to Step 9.
12.	"ENTER SECURITY CODE SSS"	Type in your security code and press ENTER.
13.	"DO YOU WANT THE MD TO PROVIDE CLOCKING└	Press YES.
14.	"SET MODE SWITCH ON E/UPAC TO: 0-1200 NO EIA CLOCK (ENTER)"	If using a UPAC, set MODE to 0-1200 (NO EIA CLOCK) and press ENTER. If using a PORTABLE MODEM, switch AUTO ANSWER to OFF and press ENTER.
15.	"INSERT DISKETTE TO BE UPDATED ..."	Load the Accumulator (or spare) 3725 controller diskette you want to pull patches to.
16.	"DO YOU WANT TO RETRIEVE A FIRST LEVEL RELEASE "	If you want to start pulling patches at one sequence number higher than the highest number in the patch area of the loaded diskette, press NO. If you want to start at sequence number 0 (has the effect of erasing the existing patch area), press YES and go to step 37.
17.	"CURRENT DISKETTE IS: PN=XXXXXXXX SEQ=XX IS THIS CORRECT "	The EC to PN translation is explained in step 39. If correct, press YES, or else press NO and go to step 15.
18.	If this is NOT your first pass through these instructions AND the communication link was NOT terminated, go to step 24.	
19.	"CONNECT EIA CABLE TO E/UPAC FROM MD'S DTE CONNECTION. (ENTER)"	Naturally, if you are using a portable modem, connect the EIA cable between it and the MD's DTE connector. Press ENTER.
20.	"DIAL DISTRIBUTION SYSTEM. AT SOUND OF TONE PLACE PHONE IN E/UPAC. (ENTER)"	Dial either 1-800-525-7993 or 1-303-924-2107. When you hear the tone you will have 10 seconds to do one of the following: If you are using a UPAC, place the handset in the UPAC, attach the cover and press ENTER. If you are using a PORTABLE MODEM, press ENTER and hang up the telephone.
21.	"OPENING EIA PORT RESET=ABORT"	No action is required.
22.	"SIGN-ON IN PROGRESS RESET=ABORT"	No action is required.

Notes:

1. Messages indicating communication errors are normally caused by poor connections. If this message is still being displayed after one minute, restart the procedure from the beginning.
2. When any message starting with "I/E DSTXXX" is on the display, the ENTER key must be pressed. XXX represents the message number.

23.	"I DST001 IBM CORP. PT-2 PROGRAM DISTRIBUTION SYSTEM - LINE=XXX"	No action is required.
24.	"VERIFYING PART NUMBER AVAILABILITY. RESET=ABORT"	No action is required.
25.	"RETRIEVING: PN=XXXXXXXX SEQ=XX RESET=ABORT"	If the step 26 message does not follow this one, go to step 40.
26.	"PN=XXXXXXXX SEQ=XX CYL XX SEC XX COUNT REMAINING XXXX RESET=ABORT"	No action is required. This message will be refreshed as the COUNT REMAINING field decrements to 0000.
27.	Either the step 28 or the step 30 message will be displayed. Go to the appropriate step.	
28.	"PN=XXXXXXXX SEQ=XX TRANSFER COMPLETE. DO YOU WANT TO GET THE NEXT SEQ^{L}"	If you press YES, go to step 25, or else press NO.
29.	"DO YOU WANT TO RETRIEVE ANOTHER PN^{L}"	If you press YES, go to step 15, or else press NO and go to step 41.
30.	"******************** * MESSAGE RECEIVED * ******************** (ENTER)"	Press ENTER.
31.	"STOP-WARNING-STOP APPLY AND ERASE ALL PATCHES"	Press ENTER.
32.	"NEXT SEQ - WILL OVERLAY PRESENT PATCHES"	Press ENTER.
33.	"USING SECOND DISK^{LL} SWAP DISK ONLY WHEN ... RETRIEVING PN= .. IS DISPLAYED"	Press ENTER.
34.	"******************** * END OF MESSAGE * ******************** REDISPLAY MESSAGES^{L}-"	Press NO.
35.	"PN=XXXXXXXX SEQ=XX TRANFER COMPLETE. DO YOU WANT TO GET THE NEXT SEQ^{L} - "	If you want to continue, then when you press YES, you will have 15 seconds before the MD will attempt to start writing on a diskette, so be prepared to remove the 'patch full' diskette and load a 'patch empty' diskette at the next step. If you do not want to continue, press NO and go to step 29.
36.	"RETRIEVING: PN=XXXXXXXX SEQ=XX RESET=ABORT - "	Swap diskettes now and go to step 25.
37.	"==== WARNING ==== RETRIEVING THE FIRST LEVEL RELEASE WILL WRITE OVER THE ..."	Press ENTER.
38.	"CONTENTS OF DISK. ENTER TO CONTINUE RESET TO ABORT - "	Press ENTER.
39.	"ENTER THE PN TO BE RETRIEVED PPPPPPPP" -	Type in a 0, then the six numerals in the EC level, followed by a numeral from below corresponding to the suffix. no suffix=0 J=5 E=1 K=6 F=2 L=7 G=3 M=8 H=4 N=9 For example: EC873053E would be entered as 08730531.
40.	"PN=XXXXXXXX SEQ=XX NOT IN LIBRARY. WANT TO RETRIEVE ANOTHER PN^{L} - "	If you press YES, go to step 15, or else press NO.
41.	"SENDING: SIGNOFF REQUEST - "	No action is required.
42.	"SESSION TERMINATED. REMOVE PHONE FROM E/UPAC. (ENTER)"	You should have successfully pulled all of the desired patches. If you have not, press ENTER and return to step 9.

Receiving a File: Data Base to MD (Part 6 of 6)

43. Remove the updated diskette.
    Copy the ZAPs to the primary controller diskette and then apply them to the primary controller diskette (see pages 2-395 and 2-398 for procedures).

Note:

Because the update function has been designed to update the spare diskette, any mention of the spare diskette in the displayed messages must be understood to mean the primary controller diskette.

Do not apply the ZAPs to the spare controller diskette until you receive a full ZAP data file (00 through 0A, 0B through 14, etc). If you receive a partial ZAP data file and apply it to the spare controller diskette, on your next update your directory in the ZAP area will be wrong.

Always use the same spare controller diskette to receive ZAPs, because the system will read the sequence number last sent to you. Use a felt-tip pen to mark the diskette with.
Never use a service diskette, because the ZAP area has a different physical location.

UPDATING MACHINE DISKETTES FROM MD DISTRIBUTION DISKETTES

This is a step-by-step procedure to update primary and secondary controller diskettes with ZAPs retrieved from the Distribution System from extra diskettes. Messages on the 3727 screen referring to SPARE means primary or secondary controller diskettes and NORMAL refers to the diskette(s) that was used to retrieve the ZAPs.

1. Take MOSS offline: Press CCU FNCTN key Enter 5, Press SEND Enter 12, MOSS is now offline.
2. Insert diskette with new ZAPs into 3725.
3. Select Utility program.
4. Select 4 ZAPs.
5. Enter date MM/DD/YY. ZAPs are now displayed.
6. Press PF2 (update spare diskette). ZAPs go into storage.
7. Insert primary diskette, press SEND. Message ZAP AREA EMPTY should appear on screen.
8. Press PF1 (copy ZAPs).
9. Enter any character next to each ZAP on the screen.
10. Press SEND.
11. Enter character A next to the first ZAP.
12. Press SEND. Repeat steps 11 and 12 until all ZAPs on the screen have been applied.
13. Enter character E next to the first ZAP.
14. Press SEND.
15. Enter character Y to confirm. Press SEND. Continue this sequence until all ZAPs have been erased.
16. Press PF2 (return to normal diskette). Message MOUNT NORMAL DISKETTE..etc., appears on the screen.
17. Insert diskette with the next group of ZAPs to be copied.
18. Press SEND.
19. Repeat steps 6 thru 18 until all ZAPs have been copied and applied to both primary and secondary controller diskettes, then insert the primary diskette.
20. Press SEND. Message ZAP AREA EMPTY appears on the screen.
21. Press SELN AREA.
22. Enter 6, press SEND.
23. When MLT screen appears, press PF5. All ZAPs on this diskette will now be displayed.
24. Press SELN AREA. Enter character T, press SEND.
25. Repeat step 1 and put MOSS online. You are now finished.

ERRORS AND WARNINGS

Error statuses and warnings dealing with the MD communications are given in the IBM Maintenance Device System Programmer Reference Manual, ZZ09-1500.

Receiving a File: MD to MD

This procedure is used when the support function wants to transfer a large patch file to the field.

1. Load MD utility diskette into the MD.

	MD Messages	Action/Response
2.	"MAINTENANCE DEVICE MAINTENANCE AND APPLICATION DISKETTE"	FWD
3	"DO YOU WANT TO REPAIR/TEST THIS MD?"	NO
4.	"DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
5.	" SELECT ACTIVITY 1 = MAP EXERCISE 2 = APPLICATIONS 3 = END "	2 ENTER
6.	"SELECT UTILITY TYPE 1. DISPLAY 2. REMOTE 3. DISKETTE"	3 ENTER
7.	"1. DISPLAY ALTER 2. COPY DISKETTE 3. DISK ANALYSIS 4. HEAD ALIGNMENT"	2 ENTER
8.	"ARE YOU USING TWO MD'S?"	YES
9.	"ARE YOU USING EITHER AN ACOUSTIC COUPLER OR A MODEM?"	YES
10.	"IS BUSINESS MACHINE CLOCKING REQUIRED?"	YES
11.	"SELECT CLOCK SPEED. 1. 600 BPS OR 2. 1200 BPS"	2 ENTER
12.	"IF USING FE UPAC OR EPAC SET THE MODE SWITCH TO 0 -1200 NO EIA CLOCK"	Set switch, then press ENTER
13.	"ARE YOU THE SENDER?"	NO
14.	"DO YOU WISH TO CHANGE DISKETTE?"	YES
15.	"INSERT NEW DISKETTE."	Put 3725 diskette into MD and close the handle.
16.	"ENTER DISK TYPE 1. DISKETTE 1 33FD 2. DISKETTE 2 43FD 3. DISKETTE 2D 53FD"	3 ENTER
17.	"CONNECT EIA CABLE TO COUPLER OR MODEM AND DIAL UP OTHER MD. FWD WHEN DONE."	Dial the phone number given to you by the support function. FWD
18.	"OPENING EIA PORT"	No action required.

The transmit MD should take control and send the required data.

19.	"WAITING FOR DATA FOR EXTENTS xxx----x"	No action required.
20.	"DISKETTE COPIED DO YOU WANT TO COPY ANOTHER DISKETTE"	YES -if you have more, NO -end of operation.
21.	"DO YOU WISH TO CHANGE DISKETTE"	NO
22.	"ENTER DISK TYPE 1. DISKETTE 1 33FD 2. DISKETTE 2 43FD 3. DISKETTE 2D 53FD"	3 ENTER
23.	"WAITING FOR DISK EXTENTS FROM SENDING MD."	No action required.
24.	Go back to step 19.	

Copying a Diskette: MD to MD

The following procedure should be used only in an emergency to copy a 3725 diskette. One MD can be used, but it is a long and complicated process and susceptible to errors. Two MDs connected via the EIA ports allow the diskette to be copied with minimum of intervention.

1. Load MD utility diskette into the MD, then IPL reset.

	MD Messages	Action/Response
2.	"MAINTENANCE DEVICE MAINTENANCE AND APPLICATION DISKETTE"	FWD
3	"DO YOU WANT TO REPAIR/TEST THIS MD?"	NO
4.	"DO YOU WANT TO RUN THE MD EDUCATION MODULE?"	NO
5.	" SELECT ACTIVITY 1 = MAP EXERCISE 2 = APPLICATIONS 3 = END"	2 ENTER
6.	"SELECT UTILITY TYPE 1. DISPLAY 2. REMOTE 3. DISKETTE"	3 ENTER
7.	"1. DISPLAY ALTER 2. COPY DISKETTE 3. DISK ANALYSIS 4. HEAD ALIGNMENT"	2 ENTER
8.	"ARE YOU USING TWO MD'S?"	YES
9.	"ARE YOU USING EITHER AN ACOUSTIC COUPLER OR A MODEM?"	NO
13.	"ARE YOU THE SENDER?"	YES - on the "from" MD NO - on the "to" MD
14.	"DO YOU WISH TO CHANGE DISKETTE?"	YES
15.a	"INSERT NEW DISKETTE."	Put a 2D type diskette into the "to" MD.
15.b	"INSERT NEW DISKETTE."	Put the 3725 diskette to be copied into the "from" MD.
16.	"ENTER DISK TYPE 1. DISKETTE 1 33FD 2. DISKETTE 2 43FD 3. DISKETTE 2D 53FD"	3 ENTER
17.a	(From MD) "CONNECT EIA CABLE FROM SENDOR DTE TO RECEIVER DCE FWD WHEN DONE"	Do function, then FWD
17.b	(To MD) "OPENING EIA PORT"	Time out will display an error. Operation will retry.

At step 18 if you answer with a YES, you will copy a complete diskette without stopping and skip step 19. If you answer with a NO, you copy the areas that are requested. The extents required to do this change with each "EC". Your support function will have the required information.

18.	"DO YOU WANT TO COPY THE ENTIRE DISKETTE ?"	NO
19.	"ENTER DISK EXTENTS IN HEX: EXAMPLE 0101 0C01"	Enter the 8-digit extents given to you by the support function. Press ENTER
20.	"MAKE RECEIVING MD READY TO RECEIVE, PRESS FWD."	FWD
21.	"OPENING EIA PORTS"	No action.
22.	"SENDING DATA FOR EXTENTS X----X"	No action.
23.	"SENDING DATA FOR EXTENTS X----X"	No action.
24.	"DISKETTE COPIED. DO YOU WANT TO COPY ANOTHER DISKETTE?"	NO will end operation.

File Printing: MLT File

The file printing procedure is described in Advanced Communications Function for Network Control Program and System Support Programs Diagnosis Guide.

A sample of each printout is given in the following pages.

MLT FILE

The MLT information identifies the file printout on the host side.

```
                              "PRINT MOSS/CSP FILES" UTILITY

DATA WAS TRANSFERRED ON: 03/14/84 AT: 18:05:37

THE FOLLOWING DATA WILL BE FORMATTED:
                                    GCF (GRAPHIC CONFIGURATION FILE)

CUSTOMER IDENTIFICATION: E52B CONTROLLER 03/01/84 TSS03/07 PE3

CONTROLLER TYPE: 3725   MODEL: 01   CCU IDENTIFICATION: 000230

MICROCODE LEVEL: 873051
```

For the MLT function description, see page 2-407.

For the GCF (graphic configuration file) description, refer to the 3725 Problem Determination and Extended Services, Vol. A06.

File Printing: CDF (Part 1 of 3)

CONFIGURATION DATA FILE (CDF)

```
                         CONFIGURATION DATA FILE                                        PAGE 10

             SECTOR 1                                                                                     S1:
CCU              00   0400 00F3 F7F2 F5F0 F1FF 3725 0002 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000   R0
MOSS             24   0060 F3F7 F2F7 C4E2 F2C4 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
RDV 1            48   1140 0021 4002 3140 0440 4100 5041 0A60 4108 7041 0680 410C 9041 0EA0 4006 0000 0000 0000    |
RDV 2            6C   1008 0811 0808 124A 0000 0000 1525 0014 2400 1323 0016 2600 1727 0008 0808 0800 0000 0000    |
NOT USED         90   0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CA 1             B4   8111 0800 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
CA 2             D8   1000 0000 0000 0000 0010 0000 0000 0000 0000 1000 0000 0000 0000 0010 0000 0000 0000 0000   R6
SPARE            FC   0000 0000

             SECTOR 2                                                                                     S2:
T(R)SS CONF 1    00   AC00 0100 0100 0101 0101 0101 0101 0101 0101 0000 0000 0000 0000 0000 0000 0000 0000 0000   R0
  "    "    2    24   8010 3FFF FFFF FFFF 0000 0000 0000 0000 0000 8211 3FFF 0000 0000 0000 0000 0000 0000 0000    |
  "    "    3    48   9412 3CF0 0000 0000 0055 4A00 F000 0000 0000 0613 0000 0000 0000 0017 2300 0000 0000 0000    |
  "    "    4    6C   0814 0000 0000 0000 0019 2400 0000 0000 0000 0A15 0000 0000 0000 001B 2500 0000 0000 0000    |
  "    "    5    90   0C16 0000 0000 0000 001D 2600 0000 0000 0000 0E17 0000 0000 0000 001F 2700 0000 0000 0000    |
CSP 1            B4   8010 4000 8088 1111 1111 AAAA AAAA AAAA AAAA CCCC CCCC CCCC CCCC CCCC CCCC CCCC CCCC 0000
CSP 2            D8   0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000   R6
SPARE            FC   0000 0000

             SECTOR 3                                                                                     S3:
CSP 3            00   8011 4002 8088 1111 1111 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000   R0
CSP 4            24   0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CSP 5            48   9012 4004 8080 3333 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0600    |
TRA 6            6C   504A 4004 0000 1111 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0600    |
CSP 7            90   0013 4106 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CSP 8            B4   1023 4106 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
CSP 9            D8   0014 4108 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000   R6
SPARE            FC   0000 0000

             SECTOR 4                                                                                     S4:
CSP 10           00   1024 4108 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000   R0
CSP 11           24   0015 410A 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CSP 12           48   1025 410A 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CSP 13           6C   3016 410C 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CSP 14           90   1026 410C 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000    |
CSP 15           B4   0017 410E 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
CSP 16           D8   1027 410E 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000   R6
SPARE            FC   0000 0000
```

CDF DATA ORGANIZATION

Each sector of the CDF is divided into 7 records of 36 bytes each. Each sector can be selectively retrieved from the diskette and placed at a specific storage area.

Each record has a predefined format as follows.

	R0	R1	R2	R3	R4	R5	R6	Last 4 bytes
S1	CCU	MOSS	RDV1	RDV2	Not Used	CA1	CA2	Spare
S2	General Scanner or TRA Configuration Frame					CSP1	CSP2	Spare
S3	CSP3	CSP4	CSP5	CSP6 or TRA6	CSP7	CSP8 or TRA8	CSP9	Spare
S4	CSP10 or TRA10	CSP11	CSP12 or TRA12	CSP13	CSP14 or TRA14	CSP15	CSP16 or TRA16	Spare

<u>CCU Record (S1,R0)</u>

Only the following bytes are used in this record.

0 : Storage size by increments of 128K (byte value: hex 02 to hex 08)

1 : Storage type (byte value: hex 00)

2 : Not used (byte value: hex 00 must be 00)

3,4,5,6 : Control unit type number (defined as a constant in microcode)

7,8 : Model (defined as a constant in microcode)

9,10,11,12: Sense data information for host (defined as a constant in microcode)

File Printing CDF (Part 2 of 3)

MOSS Record (S1,R1)

Only the following bytes are used in this record:

0 and 1: Storage size

2 to 5 : Keyboard/display identification

6 to 9 : Diskette identification

10 : CPA information (3 bits right justified)

Redrive Records (S1,R2, R3)

The first record (RDV1) deals with redrive information and the second (RDV2) gives addresses of adapters.

RDV1 (S1,R2)

This record gives redrive information. A group of 3 bytes are defined for each redrive card.

```
Byte 0  bits 0 to 3:  Redrive number
              Value :   1 = CLAB1 or C2LB
                        2 = CLAB2 or C2LB2
                        3 = LAB Position 3
                        4 = Frame RDV
                        5 = LAB Position 6
                        6 = LAB Position 5
                        7 = LAB Position 4
                        8 = LAB Position 7
                        9 = LAB Position 8
                       10 = CAB
        bits 4 to 6:  Not used
        bit 7      :  0 = Not present
                      1 = Present
```

Byte 1 TA byte 0 : Redrive address

Byte 2 TA byte 1 : Redrive address

The last 6 bytes of this record are not used.

RDV2 (S1,R3)

Three bytes per redrive give the addresses of the adapters linked to each redrive.

Model 1

Redrive #	Byte #	Adapters
1	0 1 2	scanner 1 CA 1
2	3 4 5	scanner 3 CA 2
3	6 7 8	scanner 5 scanner/TRA 6
4	9 10 11	
5	12 13 14	scanner 11 scanner/TRA 12
6	15 16 17	scanner 9 scanner/TRA 10
7	18 19 20	scanner 7 scanner/TRA 8
8	21 22 23	scanner 13 scanner/TRA 14
9	24 25 26	scanner 15 scanner/TRA 16
10	27 28 29	CA 3 CA 4 CA 5 CA 6

Model 2

Redrive #	Byte #	Adapters
1	0 1 2	scanner 1 CA 1 and CA 2
2	3 4 5	scanner 3 CA 3 and CA 4
3	6 7 8	scanner 5 scanner/TRA 6

Channel Adapter Records (S1,R5, R6)

R5 deals with the basic frame of Model 1, or with Model 2. R6 deals with the expansion frame.

A group of 9 bytes is defined for each of the possible channel adapters.

```
Byte 0  Bit 0       :  0 = CA not installed
                    :  1 = CA installed
        Bits 2 to 3:   CAB type
                       00 = CLAB
                       01 = CAB
                       10 = C2LB or C2LB2
        Bits 4 to 7:   CA position (right justified)

Byte 1  Bits 0 to 3:   CA type
        Bits 4 to 6:   Not used
        Bit 7       :  0 = TPS feature not installed
                           (always 0 for the 3725 Model 2)
                       1 = TPS feature installed
```

Byte 2 Channel adapter address

Byte 3 NSC address in hex (Interface A)

Byte 4 ESC low address in hex (Interface A)

Byte 5 ESC high address in hex (Interface A)

Byte 6 NSC address in hex (Interface B if any)

Byte 7 Reserved

Byte 8 Reserved

Note: The NSC and ESC addresses can be entered only by the CE using the CDF UPDATE command. A VERIFY command does not address or change the contents of these 4 bytes.

General Scanner Configuration Frame (S2,R0-R4)

The five records in this second sector give the installed/not installed information for all possible elements of each scanner/TRA.

Record 0: Scanner/TRA summary

Bytes 0 and 1:

Scanners/TRA 1 to 8	Scanners/TRA 9 to 16

0 = scanner/TRA not installed
1 = scanner/TRA installed

Bytes 2 to 17: scanner load module identification. (1 byte per scanner to be defined)

The load module identification table is created and maintained by the system IPL phase 4.

The other bytes are not used.

Records 1 to 4: Scanner/TRA information

Record 1 contains information on scanners 1 to 4
Record 2 contains information on scanners/TRA 5 to 8
Record 3 contains information on scanners/TRA 9 to 12
Record 4 contains information on scanners/TRA 13 to 16

Each scanner/TRA is represented by a group of 9 bytes as follows:

```
Byte 1  |.|.|.|.|.|.|.|.|
         - - --- -------
         | |  |     |
         | |  |     |------- Scanner/TRA number
         | |  |               (4 bits right justified)
         | |  |
         | |  |------------- LAB type : 00 LAB type A
         | |                            01 LAB type B
         | |                            01 plus byte 1
         | |                               bit 1 on
         | |                               means LAB
         | |                               type C
         | |                               installed
         | |                            10 C2LB or C2LB2
         | |                               (3725 Model 2)
         | |
         | |--------------------------- 1 = TRA installed
         |                              0 = TRA not
         |                                  installed
         |
         |------------------ 0 = Scanner not installed
                             1 = Scanner installed

Byte 2  |.|.|.|.|.|.|.|.|
         ---------------
               |
               |------------ Scanner/TRA address
                             (7 bits right justified)
```

File Printing: CDF (Part 3 of 3)

```
Byte 3  |.|.|.|.|.|.|.|.|
         --- --- --- ---
          |   |   |   |
          |   |   |   |------ 00 = ICC2 not installed
          |   |   |           11 = ICC2 installed (see
          |   |   |                note)
          |   |   |---------- 00 = ICC1 not installed
          |   |               11 = ICC1 installed (see
          |   |                    note)
          |   |-------------- 00 = FES not installed
          |                   11 = FES installed
          |------------------ 00 = not used
```

Note: For the 3725 Model 2 the ICC1 and ICC2 are always present on the C2LB board.

```
Byte 4  |.|.|.|.|.|.|.|.|
         -       -   -
         |       |   |
         |       |   |----- LIC/TIC number 8
         |       |--------- LIC/TIC number 6 (see note)
         |----------------- LIC/TIC number 1 (see note)

        0 = LIC/TIC not installed
        1 = LIC/TIC installed
```

Note: For the 3725 Model 2 only LIC1 through 6 are present.

```
Byte 5  |.|.|.|.|.|.|.|.|
         POS 1  |  POS 2

Byte 6  |.|.|.|.|.|.|.|.|
         POS 3  |  POS 4

Byte 7  |.|.|.|.|.|.|.|.|
         POS 5  |  POS 6

Byte 8  |.|.|.|.|.|.|.|.|
         POS 7  |  POS 8
```

Byte 9 Reserved

For each LIC, a half byte indicates the possible line position, as follows:

0 = Modem cable not plugged
1 = Modem cable plugged

Scanner/TRA Detailed Information Records (S2,R5-R6,S3,S4)

Each record of the TSS detailed information area (records CSP1 through CSP16) is associated with a specific scanner, and provides detailed information on it.

```
Byte 0   Bit 0      :  0 = Scanner not installed
                    :  1 = Scanner installed
         Bit 1      :  0 = TRA not installed
                    :  1 = TRA installed
         Bits 2,3   :  LAB type
                       00 = LAB type A
                       01 = LAB type B
                       01 + bit 1 ON=LABC
                       10 = C2LB or C2LB2 (3725 Model 2)
         Bits 4,5   :  Not used
         Bits 6,7   :  Scanner type
```

Byte 1 Scanner/TRA address (7 bits right justified)

Bytes 2,3 Redrive address as shown in TA bytes 0 and 1

Byte 4 FES identification (N/A for TRA)

```
         Bit 0 value:     0 = FES not installed
               value:     1 = FES installed
         Bit 4 to 7 :  0000 = FES type 1
                       0001 = FES type 2 (PRPQ)
```

Byte 5 ICC identification (N/A for TRA)

```
         0 1 2 3 4 5 6 7
        |.|.|.|.|.|.|.|.|
         |  ---  |  ---
         |   |   |   |
         |   |   |   |------ 000 = ICC type 1
         |   |   |           001 = ICC type 2
         |   |   |---------- 0 = ICC position 2 not installed
         |   |               1 = ICC position 2 installed
         |   |-------------- 000 = ICC type 1
         |                   001 = ICC type 2
         |------------------ 0 = ICC position 1 not installed
                             1 = ICC position 1 installed
```

Note: For the 3725 Model 2, ICC1 and ICC2 are always installed on the C2LB board.

Bytes 6,9 LIC/TIC information

Eight identical half-bytes provide the LIC/TIC information for the installed LIC/TIC as follows:

```
 <-- byte 0 --->                <-- byte 3 --->
|.|.|.|.|.|.|.|.|--------------|.|.|.|.|.|.|.|.|
| Pos 1 | Pos 2 |              | Pos 7 | Pos 8 |
```

0000 = No LIC
0001 = LIC/TIC type 1
0010 = LIC type 2
0011 = LIC type 3
0100 = LIC type 4A
1100 = LIC type 4B

Bytes 10 to 17 (N/A if TRA installed)

Cable clocking information.

These 8 bytes give clocking information on the lines attached on each LIC. Each byte corresponds to one LIC and provides the following information:

```
Bits 0,1  :  Line position 0
Bits 2,3  :  Line position 1
Bits 4,5  :  Line position 2
Bits 6,7  :  Line position 3
```

Values:
  00 = Undefined
  01 = Internal clock (ICC)
  10 = External clock (default value)
  11 = Local attachment

Note: This clocking information can be entered only by the CE using the CDF UPDATE command. A CREATE command resets this information to its default value. A VERIFY command does not address or change the contents of these 8 bytes.

Bytes 18 to 33 (N/A if TRA installed)

Cable identification

Eight halfwords of identical format give information on cables that can be installed on the four line positions of each LIC.

```
 <-- byte 0 --->|<-- byte 3 --->
|.|.|.|.|.|.|.|.|.|.|.|.|.|.|.|.|
| Pos 0 | Pos 1 | Pos 2 | Pos 3 |
```

For each line position:

```
Bit 0 value 0 = cable not installed
      value 1 = cable installed

Bits 1 to 3 cable identifier
            001 = LIC type 1/2/4 wrap block
            010 = LIC type 3 wrap cable
            100 = Modem attachment or Bell 303 type
            101 = Local attachment
            110 = Autocall equipment
            111 = VHSA
```

Byte 34-35 not used

Byte 36 LAB type

```
|.|.|.|.|.|.|.|.|
 0 0 0 0 0 0 0 0 = No LAB type C installed
 0 0 0 0 1 1 0 0 = LAB type C installed
```

For ZAP function description, see page 2-393

```
                                        ZAP HISTORY TABLE

CPL4420    APPLIED ON  11/05/82     CE050058    APPLIED ON  11/05/82     CE059060    APPLIED ON  11/05/82
CE061061   APPLIED ON  11/05/82     CE062062    APPLIED ON  11/05/82     BE047048    APPLIED ON  11/10/82
CE054058   APPLIED ON  11/10/82     BE21A063    APPLIED ON  11/16/82     BE21A064    APPLIED ON  11/16/82
CE21A065   APPLIED ON  11/16/82

                                         ZAP AREA CONTENTS

---ZAP-ID--------STATUS----------------FILE------MODULE----DISPL--------VERIFY/REPLACE DATA--------------------


BE21A063      APPLIED              CHGUCMOD   CHGBLMOD    00F54    VER: A3CB 2303 9616
                                                                   REP: 4AD5 4B60 A9A3

                                   CHGUCMOD   CHGBLMOD    04560    VER: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
                                                                   REP: A3CB 5300 910C 2303 9602 AF90 4A9F 4B70

                                   CHGUCMOD   CHGBLMOD    04570    VER: FFFF FFFF FFFF FFFF
                                                                   REP: AFA0 4A9F 4B3E AFA0


BE21A064      APPLIED              CHGUCMOD   CHGBLMOD    01CE2    VER: 0304 0506 0709 0A0B 0C0D 0E0F 1011 1213
                                                                   REP: 0B0C 0D0E 0F11 1213 1415 1617 1819 1A1B

                                   CHGUCMOD   CHGBLMOD    01CF2    VER: 1415 1617 1819 1B1D 1F21 2325 2729 2B2D
                                                                   REP: 1C1D 1E1F 2021 2325 2729 2B2D 2F31 3335

                                   CHGUCMOD   CHGBLMOD    01D02    VER: 2F31 330B
                                                                   REP: 3739 3B0B


CE21A065      APPLIED              CHGMDJIB   CHHMCSP     04068    VER: 55C2
                                                                   REP: 54C2


CE21A067      NON-APPLIED          CHGMDJIB   CHHMCSP     07D1A    VER: 23E6 4A24
                                                                   REP: 6227 6459
```

File Printing: BER List

```
ERROR LOG---------------------------------------BER  LIST-----------------------------------------------------PAGE 15
----DATE/TIME----SIZE FLAG TYPE ID-----------------------------------ERROR DATA--------------------------------------
05/08/82 11:03:27 1F        11  8A  00000000 00000000 00000000 00000000 0000F4F1
05/08/82 11:03:24 15        10  B2  00000000 00000000 F3F1
05/08/82 11:03:23 13        13  FE  00000000 0000F2F3
05/08/82 11:03:22 10        12  21  000000F1 F4
05/08/82 11:03:21 11        11  8A  00000000 F1F3
05/08/82 11:03:18 13        10  B2  00000000 0000F1F1
05/08/82 11:02:56 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:54 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:52 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:50 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:48 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:46 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:44 0D        01  06  0202
05/08/82 11:02:40 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:38 52        12  21  000000C1 E2D7C9C3 40404040 40404040 40404040 40404040 40404040 40404040 40404040
                                    40404040 40404040 40404040 40404040 404040C1 E2D7C9C3 40404040 40404040 404040
05/08/82 11:02:36 1A        13  C3  000000C1 E2D7C9C3 40404040 404040
05/08/82 11:02:34 1A        13  C3  000000C1 E2D7C9C3 40404040 404040
05/08/82 11:02:32 1A        13  C3  000000C1 E2D7C9C3 40404040 404040
```

Note: Due to the host program, a BER type 02 may appear on the BER list. This type 02 does not appear on any 3725 BER lists and should be ignored.

```
MOSS DUMP TAKEN ON: 05/08/82  AT: 11:03:30  ABEND CODE 4B: PROGRAM ERROR DETECTED BY CAC                PAGE 29

THE SVT IS ASSUMED TO BE AT: 2486
CONTENTS OF THE MOSS LEVEL0 BER AT: 2152
INTERRUPTED LEVEL: 5    PSW: 531E 8D 0C   ON INSTRUCTION: 6004   AT ADDRESS: (08)531E
MCPC: 00000000
PIRR: 10000100
CMSK: 11111111
IOIR: 00000000
 MEF: 00001000
ADAPTERS STATUS (KEYBOARD-DISPLAY: 11111111  PANEL: 11111111  DISKETTE: 11111111)
IPL COUNTER: 11000001
```

```
MOSS DUMP TAKEN ON: 05/08/82  AT: 11:03:30  ABEND CODE 4B: PROGRAM ERROR DETECTED BY CAC                PAGE 30

         -----PSW-----          ------------------------------------REGISTERS-------------------------------------
         IAR PSC SP PP          0    2    4    6    8    10   12   14        16   18   20   22   24   26   28   30

LEVEL0   0A9E  0 03 02          BF98 FE01 0007 2327 5204 11CD FCD1 001B      5464 FE01 538A 5442 5204 FCAB 2152 3264
                            TTA 80   81   02   03   04   05   06   07        10   11   12   13   14   15   16   98

LEVEL1   580A  8 05 04          BF80 2100 248A 9B82 1000 5C40 21C2 2486      5C74 0000 248F 5C52 5A2A 0000 5C52 2B4C
                            TTA 80   81   02   03   04   05   06   07        10   11   12   13   14   15   16   98

LEVEL2   5C80  0 07 06          0000 0000 0000 0000 0000 0000 0000 0000      0000 0000 0000 0000 0000 0000 0000 0000
                            TTA 98   0C   02   03   04   98   98   98        98   98   98   98   98   98   98   98

LEVEL3   663C  0 09 08          EF00 8043 2DF0 0000 2486 67A6 0054 248A      0000 5F8C 087A 67D0 64BE 5ECA 67D0 2C58
                            TTA 98   0C   02   03   04   05   06   98        10   11   12   13   14   15   16   17

LEVEL4   7C62  8 0B 0A          F703 8000 7ED8 7EE4 797C 7ADA 3264 81B0      7EE4 21C2 0040 7EA6 797C 0000 2486 248A
                            TTA 98   0C   02   03   04   98   06   07        10   11   12   13   14   15   16   17

LEVEL5   5320  8 0D 0C          8000 0C12 4B00 000A 8100 539E 32E0 2486      0100 335C 1E92 5C26 1F7C 1764 218C 400A
                            TTA 80   81   02   03   04   08   0E   0F        10   11   12   13   14   15   16   17

LEVEL6   7838  8 0F 0E          FD88 0000 0006 1000 0003 7AFE 7FB2 2486      256E 0000 37FE 7F42 7888 252E 7F42 81B6
                            TTA 80   81   02   03   04   08   09   0A        08   11   12   13   14   15   16   17

LEVEL7   8320  4 17 16          FE07 8B74 8B06 0000 8042 8332 218C 81B0      0000 0007 84D4 0000 8314 8314 801A 2486
                            TTA 03   0C   02   03   04   0D   0E   0F        10   11   12   13   14   15   16   17
```

```
MOSS DUMP TAKEN ON: 05/08/82  AT: 11:03:30  ABEND CODE 4B: PROGRAM ERROR DETECTED BY CAC                PAGE 31

          ------TASK NAME------  ------------------------------------REGISTERS-------------------------------------
                                 0    2    4    6    8    10   12   14        16   18   20   22   24   26   28   30

PAGE 10-11 BER LOGGING           FEBF 0004 249F 6982 3662 682A 3662 237E      6B1C 001A 23BA 6AEA 671A 23D3 6AEA 237E

PAGE 12-13 MACHINE STATUS        FE08 3000 0008 5CD3 3F20 3F00 2486 21C2      0020 3DC4 3C02 0903 5294 0000 5D7C 3E54

PAGE 14-15 CCU BACKGROUND        0000 0000 0000 0000 0000 0000 0000 0000      0000 0000 0000 0000 0000 0000 0000 0000

PAGE 16-17 CHANNEL MONITORING    FE07 8B74 8B06 0000 8042 8332 218C 81B0      0000 0007 84D4 0000 8314 8314 801A 2486

PAGE 18-19 OPERATOR CONTROL      FE56 03A4 118F 9BC4 1014 1498 400A 113C      1EF2 9B1A 9B18 1556 1516 9B33 1554 2486

PAGE 1A-1B IPL SERVICES          FE00 2400 B700 2BD4 B0EE 2518 24C5 96FA      B962 0006 B6F0 B8C6 B6A4 B0CE 218C 2486

PAGE 1C-1D DMP SV L5             FB00 0800 1000 0000 8100 0000 20CE 1152      0B01 0000 1E92 0000 1F00 1764 218C 2152

PAGE 1E-1F DMP SV L6             0400 0006 0400 311D 0008 10DE 01ED 01EF      01F2 8000 5410 0000 0FB8 FFFE 2152 20CE

PAGE 28-29 DIAGNOSTICS           0000 0000 0000 0000 0000 0000 0000 0000      0000 0000 0000 0000 0000 0000 0000 0000

PAGE 2C-2D LOOP DETECTION        FE00 232C 2000 0000 0000 0000 2486 0000      0000 0000 0000 0000 0000 0000 2486 37FE
```

File Printing: MOSS Dump (Part 2 of 2)

```
MOSS DUMP TAKEN ON: 05/08/82  AT: 11:03:30  ABEND CODE 4B: PROGRAM ERROR DETECTED BY CAC          PAGE 32

                         -------------------OTHER REGISTER SPACES----------------------
 PAGE 2A                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 2B                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 2E                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 2F                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 30                 02  19  00  2C  00  00  00  80  5C  80  11  00  A1  00  00  0E
 PAGE 31                 54  6E  5C  20  59  EE  00  00  07  46  00  00  21  8C  00  68
 PAGE 32                 0B  05  08  00  09  20  00  00  30  1C  EF  EE  A0  00  00  00
 PAGE 33                 60  64  00  00  60  C8  00  00  5A  F8  60  A8  58  D4  58  E0
 PAGE 34                 01  01  68  05  08  31  2F  FF  FE  01  56  5C  20  00  00  17
 PAGE 35                 00  00  00  18  56  42  00  00  00  00  00  00  00  00  00  00
 PAGE 36                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 37                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 38                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 39                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 3A                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 3B                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 3C                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 3D                 00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
 PAGE 3E                 0A  9E  83  02  10  0A  43  02  00  00  00  00  00  00  00  00
 PAGE 3F                 00  00  00  00  1F  F0  1D  1C  53  5E  1F  9E  00  00  00  00
```

```
MOSS DUMP TAKEN ON: 05/08/82  AT: 11:03:30  ABEND CODE 4B: PROGRAM ERROR DETECTED BY CAC          PAGE 33

002000   20628183 08000000 00001764 206C0000   20AA0000 00000000 81A30800 00000000   *..AC...................AT......*
002020   1764206C 000020AA 00000000 00008100   000020F2 00001764 206C0000 20AA0000   *..............A....2...........*
002040   00000000 81000000 00000000 0000206C   000020AA 00000000 00000021 01000000   *....A...........................*
002060   FF0020CE 204420F2 2152218C B5201380   F1300060 09AD09AD 071A0014 30010801   *.......2........1..-...........*
002080   00000000 C100A622 81F687B0 80002080   0000202E 00001F00 137C1636 202E0000   *......W.A6G....................*
0020A0   000015C3 F6000000 00000000 00000000   00100000 20FA0000 00000000 00000000   *...H6..........................*
0020C0   20C20000 00000000 00000000 00000000   00001D4C 00000000 00001EE0 00000000   *.B...............<.............*
0020E0   00000000 202E2044 00000000 00000000   00000193 00040000 09AC0022 60000000   *.................L........-...*
002100   80000193 00040000 0A0C0022 80000000   80000193 00040000 0A8C0022 80000000   *...L..............L...........*
002120   80000193 00040000 09A80022 04000000   800001E3 00000000 00150001 00800000   *...L.....Y.........T...........*
002140   800001E3 00000000 00150022 00800000   80001501 004B0500 0084FFFF FFFF0808   *...T....................D......*
002160   6004531E 8D0CC105 00005320 8D0C7838   8F0E0AA0 03020AA0 03025B0A 85045000   *-.....A...................$.E.&.*
002180   500020CE 0E4C0886 0DCA0000 00004000   2480A100 00010488 00781000 00000000   *&....<.F...... .......H........*
0021A0   00000000 00000000 00000000 00000000   00000000 00000080 FF372500 00000000   *...............................*
0021C0   00000000 00000000 80800000 10000140   00000000 00000000 0040F90B C03E0070   *............... .......... 9.....*
0021E0   040BC040 97E20000 004040FF 4B4B4B4B   4B000000 00000000 00000000 00000000   *... PS...  .....................*
002200   00010000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   *...............................*
002220   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   *...............................*
0022E0   DATA SAME AS ABOVE
002300   0000A001 08000800 08008001 80010800   08000800 08000800 08000800 08000800   *...............................*
002320   08000100 0000000A 00000E10 0004000A   00000000 00000000 00000000 000081B0   *.............................A.*
002340   80420403 02010F00 4AEE1300 4B2A1700   4B632100 4B914800 00000800 08000600   *.....................J.........*
002360   67280600 0000F100 0000FF00 00000E00   00000000 00000000 00000000 000023D3   *......1.......................L*
002380   24080040 40404040 0000009B 77050882   13C30000 00C1E2D7 C9C34040 40404040   *...       .......B.C...ASPIC     *
0023A0   40000000 9B790508 8213C300 0000C1E2   D7C9C340 40404040 40400000 009B7B05   * .......B.C...ASPIC        ......*
0023C0   088213C3 000000C1 E2D7C9C3 40404040   40404019 00009B7D 05088213 C3000000   *.B.C...ASPIC        .......B.C...*
0023E0   C1E2D7C9 C3404040 40404040 1C00009B   82050882 01004B05 000084FF FFFFFF08   *ASPIC       ....B..B......D.....*
002400   08600453 1E3D0CC1 009B6D05 088213C3   000000C1 E2D7C9C3 40404040 40404000   *.-.....A.....B.C...ASPIC        .*
002420   00009B6F 05088213 C3000000 C1E2D7C9   C3404040 40404040 0000009B 71050882   *...?..B.C...ASPIC        .......B*
002440   13C30000 00C1E2D7 C9C34040 40404040   40000000 9B730508 8213C300 0000C1E2   *.C...ASPIC        .......B.C...AS*
002460   D7C9C340 40404040 40400000 009B7505   088213C3 000000C1 E2D7C9C3 40400000   *PIC        .......B.C...ASPIC  ..*
002480   422D43DC AF204000 00000000 81B04B00   00592BD4 326432E0 00009B82 0508820B   *...... .....A......M.......B..B.*
0024A0   FFFF3654 36623670 367E368C 369A36A8   368C8000 00000000 00000000 40404040   *.........=....Y..........       *
0024C0   40404040 00A0C3C8 C7E4E3D4 D6C468BC   804236B6 40CC0000 2D5C252E 253E254E   *    ..CHGUTMOD...... ....*.....+*
0024E0   255E0000 000BFF00 80B031DC 80004000   20001000 08000400 02000100 00800040   *...............................*
002500   00200010 00080004 00020001 01012233   F3F7F3F0 F4F44090 0000FFFF FFFFFFFF   *................873044 ........*
002520   FFFFFFFF FFFFFFFF FFFFFFFF FFFF07C0   00000000 61B00000 00000000 00000000   *..................../..........*
002540   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00002500   *...............................*
002560   00000000 00000000 00000000 00008400   00000000 00000000 00000000 00000000   *..............D................*
002580   9F16C9D9 C5E2C5C3 C8E640F8 F04BF0F2   F140F1F3 4BF1F300 CF73BFC3 81055140   *..IRESECHW 80.021 13.13....CA.. *
0025A0   9402B2CE C2135303 9A02B9C7 53049A02   BBC9BDCB 52209A02 B4D15210 9A02B6D3   *M...B......G.....I.......J.....L*
0025C0   52089A02 B8D55202 9A02BCD9 52019A02   BED85380 9A02B1DD 53409A02 B3DF5320   *.....N.....R....................*
0025E0   9A02B5E1 B2CFC7F3 AFF9AF90 9F16C9D9   C5E2C5D5 C3E640F8 F04BF0F2 F140F1F3   *......G3.9....IRESENCW 80.021 13*
002600   4BF3F600 CF733B05 5B409402 B2CEC213   53089A02 B9C75304 9A02BBC9 BDCB5220   *.36.....$ M...B.......G.....I....*
002620   9A02B4D1 52109A02 B6D35208 9A02B8D5   52029A02 BCD95201 9A02BEDB 53809A02   *...J.....L.....N.....R.........*
002640   B1DD5340 9A02B3DF 53209A02 B5E1B2CF   C7F3AFF9 AF900000 9F16C9D9 C5E2D7C3   *...  ...............G3.9......IRESPC*
002660   C8E640F8 F04BF0F2 F140F1F9 4BF0F600   AF7ACF73 B9C6BBC8 BDCAB2CE B4D0B6D2   *HW 80.021 19.06..:...F.H.......K*
002680   B8D4BCD8 BEDAB1DC B3DEB5E0 CD03BDC4   BF42C7D3 BDCBAFF9 AFA00000 9F16C9D9   *.M.Q...........D..GL...9......IR*
0026A0   C5E2D7D5 C3E640F8 F04BF0F2 F140F1F9   4BF1F900 AF7ACF73 B9C6BBC8 BDCAB2CE   *ESPNCW 80.021 19.19..:...F.H....*
0026C0   B4D0B6D2 B8D4BCD8 BEDAB1DC B3DEB5E0   AFF9AFA0 9F16C3C8 C7C3E5C2 C9C440F8   *...K.M.Q.........9....CHGCVBID 8*
0026E0   F24BF0F7 F540F2F3 4BF2F800 4A264B9C   AAA3A519 CE13B383 B9854101 9F104A26   *2.075 23.28.......TV....C.E......*
002700   4B9CAAA3 A519CE13 B383B985 41004200   43019F0C 4B40C433 C428C14F AB48C12D   *...TV....C.E......... D.D.A...A.*
```

MOSS Storage Address

Hexadecimal/Decimal Conversion

CONVERSION RULES

From Hex

Locate each hex digit in its corresponding column position and note the decimal equivalents. Add these to obtain the decimal value.

From Decimal

1. Locate the largest decimal value in the table that will fit into the decimal number to be converted.
2. Note its hex equivalent and hex column position.
3. Find the decimal remainder. Repeat the process on this and subsequent remainders.

HEXADECIMAL COLUMNS											
6		5		4		3		2		1	
HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC
0	0	0	0	0	0	0	0	0	0	0	0
1	1 048 576	1	65 536	1	4 096	1	256	1	16	1	1
2	2 097 152	2	131 072	2	8 192	2	512	2	32	2	2
3	3 145 728	3	196 608	3	12 288	3	768	3	48	3	3
4	4 194 304	4	262 144	4	16 384	4	1 024	4	64	4	4
5	5 242 880	5	327 680	5	20 480	5	1 280	5	80	5	5
6	6 291 456	6	393 216	6	24 576	6	1 536	6	96	6	6
7	7 340 032	7	458 752	7	28 672	7	1 792	7	112	7	7
8	8 388 608	8	524 288	8	32 768	8	2 048	8	128	8	8
9	9 437 184	9	589 824	9	36 864	9	2 304	9	144	9	9
A	10 485 760	A	655 360	A	40 960	A	2 560	A	160	A	10
B	11 534 336	B	720 896	B	45 056	B	2 816	B	176	B	11
C	12 582 912	C	786 432	C	49 152	C	3 072	C	192	C	12
D	13 631 488	D	851 968	D	53 248	D	3 328	D	208	D	13
E	14 680 064	E	917 504	E	57 344	E	3 584	E	224	E	14
F	15 728 640	F	983 040	F	61 440	F	3 840	F	240	F	15
0123		4567		0123		4567		0123		4567	
BYTE				BYTE				BYTE			

CONVERSION TABLES

Position Dec	Hex
0000	000
0001	001
0002	002
0003	003
0004	004
0005	005
0006	006
0007	007
0008	008
0009	009
0010	00A
0011	00B
0012	00C
0013	00D
0014	00E
0015	00F
0016	010
0017	011
0018	012
0019	013
0020	014
0021	015
0022	016
0023	017
0024	018
0025	019
0026	01A
0027	01B
0028	01C
0029	01D
0030	01E
0031	01F
0032	020
0033	021
0034	022
0035	023
0036	024
0037	025
0038	026
0039	027
0040	028
0041	029
0042	02A
0043	02B
0044	02C
0045	02D
0046	02E
0047	02F
0048	030
0049	031
0050	032
0051	033
0052	034
0053	035
0054	036
0055	037
0056	038
0057	039
0058	03A
0059	03B
0060	03C
0061	03D
0062	03E
0063	03F
0064	040
0065	041
0066	042
0067	043
0068	044
0069	045
0070	046
0071	047
0072	048
0073	049
0074	04A
0075	04B
0076	04C
0077	04D
0078	04E
0079	04F
0080	050
0081	051
0082	052
0083	053
0084	054
0085	055
0086	056
0087	057
0088	058
0089	059
0090	05A
0091	05B
0092	05C
0093	05D
0094	05E
0095	05F
0096	060
0097	061
0098	062
0099	063
0100	064
0101	065
0102	066
0103	067
0104	068
0105	069
0106	06A
0107	06B
0108	06C
0109	06D
0110	06E
0111	06F
0112	070
0113	071
0114	072
0115	073
0116	074
0117	075
0118	076
0119	077
0120	078
0121	079
0122	07A
0123	07B
0124	07C
0125	07D
0126	07E
0127	07F
0128	080
0129	081
0130	082
0131	083
0132	084
0133	085
0134	086
0135	087
0136	088
0137	089
0138	08A
0139	08B
0140	08C
0141	08D
0142	08E
0143	08F
0144	090
0145	091
0146	092
0147	093
0148	094
0149	095
0150	096
0151	097
0152	098
0153	099
0154	09A
0155	09B
0156	09C
0157	09D
0158	09E
0159	09F
0160	0A0
0161	0A1
0162	0A2
0163	0A3
0164	0A4
0165	0A5
0166	0A6
0167	0A7
0168	0A8
0169	0A9
0170	0AA
0171	0AB
0172	0AC
0173	0AD
0174	0AE
0175	0AF
0176	0B0
0177	0B1
0178	0B2
0179	0B3
0180	0B4
0181	0B5
0182	0B6
0183	0B7
0184	0B8
0185	0B9
0186	0BA
0187	0BB
0188	0BC
0189	0BD
0190	0BE
0191	0BF
0192	0C0
0193	0C1
0194	0C2
0195	0C3
0196	0C4
0197	0C5
0198	0C6
0199	0C7
0200	0C8
0201	0C9
0202	0CA
0203	0CB
0204	0CC
0205	0CD
0206	0CE
0207	0CF
0208	0D0
0209	0D1
0210	0D2
0211	0D3
0212	0D4
0213	0D5
0214	0D6
0215	0D7
0216	0D8
0217	0D9
0218	0DA
0219	0DB
0220	0DC
0221	0DD
0222	0DE
0223	0DF
0224	0E0
0225	0E1
0226	0E2
0227	0E3
0228	0E4
0229	0E5
0230	0E6
0231	0E7
0232	0E8
0233	0E9
0234	0EA
0235	0EB
0236	0EC
0237	0ED
0238	0EE
0239	0EF
0240	0F0
0241	0F1
0242	0F2
0243	0F3
0244	0F4
0245	0F5
0246	0F6
0247	0F7
0248	0F8
0249	0F9
0250	0FA
0251	0FB
0252	0FC
0253	0FD
0254	0FE
0255	0FF
0256	100
0257	101
0258	102
0259	103
0260	104
0261	105
0262	106
0263	107
0264	108
0265	109
0266	10A
0267	10B
0268	10C
0269	10D
0270	10E
0271	10F
0272	110
0273	111
0274	112
0275	113
0276	114
0277	115
0278	116
0279	117
0280	118
0281	119
0282	11A
0283	11B
0284	11C
0285	11D
0286	11E
0287	11F
0288	120
0289	121
0290	122
0291	123
0292	124
0293	125
0294	126
0295	127
0296	128
0297	129
0298	12A
0299	12B
0300	12C
0301	12D
0302	12E
0303	12F
0304	130
0305	131
0306	132
0307	133
0308	134
0309	135
0310	136
0311	137
0312	138
0313	139
0314	13A
0315	13B
0316	13C
0317	13D
0318	13E
0319	13F
0320	140
0321	141
0322	142
0323	143
0324	144
0325	145
0326	146
0327	147
0328	148
0329	149
0330	14A
0331	14B
0332	14C
0333	14D
0334	14E
0335	14F
0336	150
0337	151
0338	152
0339	153
0340	154
0341	155
0342	156
0343	157
0344	158
0345	159
0346	15A
0347	15B
0348	15C
0349	15D
0350	15E
0351	15F
0352	160
0353	161
0354	162
0355	163
0356	164
0357	165
0358	166
0359	167
0360	168
0361	169
0362	16A
0363	16B
0364	16C
0365	16D
0366	16E
0367	16F
0368	170
0369	171
0370	172
0371	173
0372	174
0373	175
0374	176
0375	177
0376	178
0377	179
0378	17A
0379	17B
0380	17C
0381	17D
0382	17E
0383	17F
0384	180
0385	181
0386	182
0387	183
0388	184
0389	185
0390	186
0391	187
0392	188
0393	189
0394	18A
0395	18B
0396	18C
0397	18D
0398	18E
0399	18F
0400	190
0401	191
0402	192
0403	193
0404	194
0405	195
0406	196
0407	197
0408	198
0409	199
0410	19A
0411	19B
0412	19C
0413	19D
0414	19E
0415	19F
0416	1A0
0417	1A1
0418	1A2
0419	1A3
0420	1A4
0421	1A5
0422	1A6
0423	1A7
0424	1A8
0425	1A9
0426	1AA
0427	1AB
0428	1AC
0429	1AD
0430	1AE
0431	1AF
0432	1B0
0433	1B1
0434	1B2
0435	1B3
0436	1B4
0437	1B5
0438	1B6
0439	1B7
0440	1B8
0441	1B9
0442	1BA
0443	1BB
0444	1BC
0445	1BD
0446	1BE
0447	1BF
0448	1C0
0449	1C1
0450	1C2
0451	1C3
0452	1C4
0453	1C5
0454	1C6
0455	1C7
0456	1C8
0457	1C9
0458	1CA
0459	1CB
0460	1CC
0461	1CD
0462	1CE
0463	1CF
0464	1D0
0465	1D1
0466	1D2
0467	1D3
0468	1D4
0469	1D5
0470	1D6
0471	1D7
0472	1D8
0473	1D9
0474	1DA
0475	1DB
0476	1DC
0477	1DD
0478	1DE
0479	1DF
0480	1E0
0481	1E1
0482	1E2
0483	1E3
0484	1E4
0485	1E5
0486	1E6
0487	1E7
0488	1E8
0489	1E9
0490	1EA
0491	1EB
0492	1EC
0493	1ED
0494	1EE
0495	1EF
0496	1F0
0497	1F1
0498	1F2
0499	1F3
0500	1F4
0501	1F5
0502	1F6
0503	1F7
0504	1F8
0505	1F9
0506	1FA
0507	1FB
0508	1FC
0509	1FD
0510	1FE
0511	1FF
0512	200

Message Directory (Part 1 of 4)

The following sections describe the messages displayed on the operator console. The sections are organized as follows:

The message directory lists messages in alphabetical order and indicates where they are documented:

- The following messages are documented in the 3725 Communication Controller, Problem Determination and Extended Services: Vol. A06.
  - Messages intended for customer personnel
  - Messages for Wrap tests at tail-gate level
  - Messages for Stand-Alone link tests They are indicated by "PD and ES" in the directory.
- Messages intended for the service personnel are documented respectively in the following three sections:
  - Utility Program Messages (page 2-500)
  - TSS Function Messages (page 2-510)
  - TRSS Function Messages (page 2-520)
- Some messages are intended for both customer and service personnel. These are documented in the 3725 Problem Determination and Extended Services manual. and also in the following sections.
- Some messages belong to more than one group, for example: "INVALID INPUT". They are documented in one group only, to avoid duplication.

Messages	Details in:
A0 MOSS IML EXCEPTION XXX YYY ZZZ	PD and ES
A2 MOSS RECOVERABLE ERROR, TRANSFER DUMP	PD and ES
A3 DISKETTE DOWN, DO NOT ATTEMPT TO IPL	PD and ES
A4 DISKETTE MEDIA ERROR	PD and ES
A6 MOSS OFFLINE, ALERT SENT	PD and ES
A7 HARDWARE ERROR, 3725 RE-IPL	PD and ES
A8 CONTROL PROGRAM ABEND XXXX, 3725 REIPL	PD and ES
A9 CHANNEL ADAPTER X DOWN	PD and ES
A10 GENERAL IPL CHECK	PD and ES
A11 SCANNER XX DOWN (LINES XXX-YYY) IML SCANNER	PD and ES
A12 SCANNER XX DOWN (LINES XXX-YYY) IML SCANNER	PD and ES
A13 SCANNER XX DOWN (LINES XXX-YYY) IML SCANNER	PD and ES
A14 SCANNER XX DOWN (LINES XXX-YYY) IML SCANNER	PD and ES
A15 LINE ADAPTER XXX DOWN	PD and ES
A28 TRM XX DOWN (TIC 1-4)	PD and ES
A29 TIC X DOWN ON TRM XX	PD and ES
A DELAYED DISPLAY OR ALTER HAS BEEN SPECIFIED	2-510
A SCANNER IS ALREADY SELECTED: RELEASE IT TO SELECT ANOTHER	2-510
ADDRESS COMPARE ALREADY SET: CANCEL IT OR WAIT FOR HIT	2-510
ADDRESS COMPARE ANOMALY: CANCEL ADDRESS COMPARE AND RETRY	2-510
ADDRESS COMPARE CANCELED ON OPERATOR REQUEST	2-510
ALL OR PART OF 'VERIFY DATA' IS OUTSIDE MODULE	2-500
ALTER COMPLETE	2-520
APPLIED ZAP CANNOT BE MODIFIED	2-500
AUTOMATIC DISPLAY BECAUSE OF ADDRESS COMPARE HIT	2-510
BER FILE IS UPDATED	2-500
BT BUFFER INCORRECTLY DEFINED	PD and ES
BUFFERS NOT AVAILABLE: WRAP TEST STOPPED	PD and ES
BUFFERS TEMPORARILY NOT AVAILABLE: WRAP FUNCTION CANCELED	PD and ES
CABLE DOES NOT EXIST	PD and ES
CABLE NOT INSTALLED	PD and ES
CA IPL DETECTED ON CA X	PD and ES
CANCELED: TARGET VALUE > END STEP NUMBER	PD and ES
CCU ERROR: WRAP TEST STOPPED	PD and ES
CCU FUNCTION NOT ALLOWED	2-500
CCU FUNCTION NOT ALLOWED NOW: MOUNT DISKETTE FIRST	2-500
CCU FNCTN REFUSED	PD and ES
CCU NOT IN THE RUN STATE (SEE MSA) - FUNCTION CANCELED	PD and ES
CCU/MOSS ERROR: AUTO SELECT NOT DISABLED	PD and ES
CCU/MOSS ERROR: AUTO SELECT NOT ENABLED	PD and ES
CCU/MOSS ERROR: BT BUFFER NOT ACCESSIBLE	PD and ES
CCU/MOSS ERROR: BT BUFFER NOT UPDATED	PD and ES
CCU/MOSS ERROR: CA CANNOT BE SELECTED	PD and ES
CCU/MOSS ERROR: CA REGISTER X'E' NOT ACCESSIBLE	PD and ES
CCU/MOSS ERROR: CA REGISTERS NOT ACCESSIBLE	PD and ES
CCU/MOSS ERROR: CA STATE NOT ACCESSIBLE	PD and ES
CCU/MOSS ERROR: CDF CREATION CANCELED	2-500
CCU/MOSS ERROR: CDF VERIFICATION CANCELED	2-500
CCU/MOSS ERROR: DISKETTE SWAP FAILED	2-500
CCU/MOSS ERROR: DUMP MAY BE INCOMPLETE	2-520
CCU/MOSS ERROR: FUNCTION NOT PERFORMED	2-510
CCU/MOSS ERROR: INITIAL CA CANNOT BE RESELECTED	PD and ES
CCU/MOSS ERROR: INPUT X'71', X'72' REG NOT ACCESSIBLE	PD and ES
CCU/MOSS ERROR: LINK TEST FUNCTION CANCELED	PD and ES
CCU/MOSS ERROR: MODE NOW UNKNOWN	2-520
CCU/MOSS ERROR: NOT CONNECTED	2-520
CCU/MOSS ERROR: STEP NOT EXECUTED	PD and ES
CCU/MOSS ERROR: TIC MODE NOT REPORTED	2-520
CCU/MOSS ERROR: TRA INTERRUPTS NOT ENABLED	2-520
CCU/MOSS ERROR: TRA SELECTED WITH UNKNOWN MODE	2-520
CCU/MOSS ERROR: WORK REGISTERS CANNOT BE ALTERED	PD and ES
CCU/MOSS ERROR: WRAP FUNCTION CANCELED	PD and ES
CCU/MOSS ERROR: ZAP FUNCTION CANNOT BE PERFORMED	2-500
CDF NOT CREATED: IPL PORT FUNCTION CANCELED	PD and ES

Messages	Details in:
CHANNEL ADAPTER NOT INSTALLED	PD and ES
CHECKPOINT TRACE SET XXX FOR LINE ADDRESS XXXX YYYYYYYY	2-510
CHJDMP DUMP FILE ALREADY CONTAINS A XXXX DUMP	2-510
COMMAND INCOMPATIBLE WITH SCANNER MODE: LOOK AT MSA	2-510
COMMAND REJECT RECEIVED DUE TO BUFFER OVERRUN	PD and ES
COMMAND REJECT RECEIVED DUE TO INVALID COMMAND	PD and ES
CONTROL PROGRAM LOADED	PD and ES
CONTROLLER DATA UNAVAILABLE, FUNCTION CANCELED	PD and ES
COPY COMPLETED	2-500
CS INOPERATIVE: CHECK CCU STATE AND IF NEEDED RE-IML CS	2-510
DATA MUST BE PAIRS OF HEX CHARS SEPARATED BY 1 BLANK	PD and ES
DATA RATE MUST NOT BE SPECIFIED WITH DIRECT-ATTACH	PD and ES
DELAYED ALTER PERFORMED BECAUSE OF ADDRESS COMPARE HIT	2-510
DISKETTE ERROR: BER FILE INCOMPLETELY RESTORED,	2-520
DISKETTE ERROR: CDF CREATION CANCELED	2-500
DISKETTE ERROR: CDF DISPLAY CANCELED	2-500
DISKETTE ERROR: CDF VERIFICATION CANCELED	2-500
DISKETTE ERROR: FUNCTION NOT PERFORMED	2-520
DISKETTE ERROR: DIRECTORY MAY BE DAMAGED	PD and ES
DISKETTE ERROR: DIRECTORY NOT ACCESSIBLE	PD and ES
DISKETTE ERROR: DUMP FUNCTION NOT AVAILABLE	2-520
DISKETTE ERROR: DUMP MAY BE INCOMPLETE	2-510
DISKETTE ERROR: FILE NOT FOUND	2-500
DISKETTE ERROR: FUNCTION CANCELED	PD and ES
DISKETTE ERROR: FUNCTION NOT AVAILABLE	2-510
DISKETTE ERROR: CLOSE NOT PERFORMED	2-520
DISKETTE ERROR: IML CANCELED	2-510
DISKETTE ERROR: IPL PORT FUNCTION CANCELED	PD and ES
DISKETTE ERROR: MLT FAILED	2-500
DISKETTE ERROR: PROCEDURE CANNOT BE FILED/MODIFIED	PD and ES
DISKETTE ERROR: PROCEDURE FILE MAY BE DAMAGED	PD and ES
DISKETTE ERROR: PROCEDURE NOT AVAILABLE	PD and ES
DISKETTE ERROR: REQUEST IGNORED	PD and ES
DISKETTE ERROR: SCANNER DUMP NOT AVAILABLE	2-510
DISKETTE ERROR: UNABLE TO LOAD FUNCTION MODULE	2-500
DISKETTE ERROR: WRAP FUNCTION CANCELED	PD and ES
DISKETTE ERROR: ZAP FNCTN CANCELED - MOUNT NORMAL DISKETTE	2-500
DISKETTE ERROR: ZAP FUNCTION CANCELED	2-500
DISKETTE STARTING	PD and ES
DISKETTE UNUSABLE	PD and ES
DISPLAY ADDRESS MODIFIED TO XXXX	2-520
DUMP CANCELED AS REQUESTED	2-520
DUMP COMPLETE	
DUMP IN PROGRESS	2-520
DUMP IN PROGRESS ON CA XX	PD and ES
DUMP IN PROGRESS ON L XXX	PD and ES
DUMP FILE BEING TRANSFERRED: TRY LATER	2-510
DUMP FILED IN CHGTRSS: TO PRINT DUMP, TRANSFER IT TO HOST	2-520
DUMP FILED IN CHGDMP: TO PRINT DUMP, TRANSFER IT TO HOST	2-510
ENABLE COMMAND FAILED - LINK TEST FUNCTION CANCELED	PD and ES
ENABLE NOT ALLOWED: STOP THE CCU	PD and ES
ENABLED PORTS CA XXXXXX L XXXXXXXX	PD and ES
ENTER A DISPLAYED LINE PROTOCOL	PD and ES
ENTER A DISPLAYED LINE SPEED	PD and ES
ENTER A LINE ADDRESS WITHIN THE RANGE 0 TO 23	PD and ES
ENTER A LINE ADDRESS WITHIN THE RANGE 0 TO 255	PD and ES
ENTER ADDRESS WITHIN THE RANGE 0 TO 23	PD and ES
ENTER ADDRESS WITHIN THE RANGE 0 TO 255	PD and ES
ENTER ZAP IDENTIFICATION	2-500
ENTER MES NUMBER	PD and ES
ERROR DURING ERROR RECOVERY	PD and ES
ERROR GETTING TIC MODE: NOT REPORTED	2-520

Messages	Details in:
ERROR IN FRONT END SCANNER PROCESSOR	2-510
ERROR IN SCANNER DURING COMMAND PROCESSING	2-510
ERROR IN SCANNER: ICC/LIC FAILED OR IS NOT PRESENT	2-510
EXEC CANCELED ON OPERATOR REQUEST	PD and ES
EXEC CANCELED: OUTPUT X'71' REGISTER NOT ACCESSIBLE	PD and ES
'EXPECTED DATA' CANNOT BE ENTERED AFTER 'Y'	PD and ES
EXPECTED INTERRUPT NOT RECEIVED: FUNCTION CANCELED	2-520
FIRST STOP THE CCU	PD and ES
FORMAT CHECK	PD and ES
FUNCTION COMPLETED	PD and ES
FUNCTION IN PROGRESS	PD and ES
FUNCTION NOT AVAILABLE: TRY LATER	PD and ES
FUNCTION XX COMPLETED	PD and ES
FUNCTION XX IN PROGRESS	PD and ES
GCF IS INITIALIZED AND FILED	PD and ES
GCF UPDATE COMPLETED, GCF FILED ON DISKETTE	PD and ES
HARDWARE ERROR ON RECEIVE	PD and ES
HARDWARE ERROR ON TRANSMIT	PD and ES
IML FOR SCANNER XX COMPLETED	2-510
IML FOR SCANNER XX COMPLETED: SCANNER CAN BE CONNECTED	2-510
IML FOR SCANNER XX COMPLETED: SCANNER IS CONNECTED	2-510
IML FOR SCANNER XX IN PROGRESS	2-510
IML FOR SCANNER XX IN PROGRESS: CHECKOUT RETURN CODE= XXXX	2-510
INCOMPATIBLE OPTIONS: FULL DUPLEX AND NO DX FACILITY	PD and ES
INCOMPATIBLE OPTIONS: NON-SWITCHED LINE AND ANSWER TONE	PD and ES
INCOMPATIBLE OPTIONS: NON-SWITCHED LINE AND RING INDICATOR	PD and ES
INCOMPATIBLE OPTIONS: SWITCHED LINE AND DIRECT-ATTACH	PD and ES
INPUT CHECKSUM DOES NOT MATCH COMPUTED ONE	2-500
INPUT FOUND AGAINST MORE THAN ONE ZAP-ID	2-500
INPUT MUST BE PAIRS OF HEX CHARACTERS SEPARATED BY BLANKS	PD and ES
INPUT MUST BE 8 BINARY DIGITS	PD and ES
INSERT	PD and ES
INVALID	PD and ES
INVALID ACTION	PD and ES
INVALID ADDRESS FIELD RECEIVED	PD and ES
INVALID ADDRESS - RANGE IS 0 TO FFF (HEX)	2-520
INVALID ALTER REQUEST ON READ-ONLY STORAGE	2-510
INVALID BER RECORD n	2-500
INVALID CHANNEL ADAPTER NUMBER	PD and ES
INVALID CONTROL FIELD RECEIVED	PD and ES
INVALID DATA RECEIVED	PD and ES
INVALID DATA RECEIVED - TOO MUCH DATA RECEIVED	PD and ES
INVALID DATE	2-500
INVALID FILE NAME	2-500
INVALID FLAG VALUE	2-500
INVALID INPUT	2-500
INVALID INPUT: RE-ENTER FIELDS IN ERROR	2-520
INVALID INTERRUPT RECEIVED FROM TRA: FUNCTION CANCELLED	2-520
INVALID LINE ADDRESS	2-510
INVALID MODULE NAME	2-500
INVALID NUMBER OF HALWORDS: RANGE IS 1-48	2-520
INVALID SEL#	PD and ES
INVALID TTA DATA	2-500
IOC ERROR DURING ERROR RECOVERY	2-510
IOC/SCANNER ERROR: FUNCTION NOT PERFORMED	2-510
IOC/TRA ERROR: TRA SELECTED WITH UNKNOWN MODE	2-520
IOC/TRA ERROR: DUMP MAY BE INCOMPLETE	2-520
IOC/TRA ERROR: FUNCTION NOT PERFORMED	2-520
IOC/TRA ERROR: MODE NOW UNKNOWN	2-520
IOC/TRA ERROR: NOT CONNECTED	2-520
IOC/TRA ERROR: TRA INTERRUPTS NOT ENABLED	2-520
IPL CANCELED	PD and ES
IPL CHECK XXX	PD and ES
IPL CHECK F1B CLDP ABEND XXXX	PD and ES
IPL COMPLETE	PD and ES
IPL COMPLETE + ERRORS	PD and ES
IPL PORT TABLE UPDATED AND FILED	PD and ES
IPL STOP	PD and ES

Message Directory (Part 3 of 4)

Messages	Details in:
LASTMCHK: XXXX	PD and ES
LIC NOT INSTALLED	PD and ES
LINE ADDRESS DOES NOT BELONG TO AN INSTALLED SCANNER	2-510
LINE ADDRESS HAS ALREADY BEEN USED FOR ANOTHER LINK	PD and ES
LINE ADDRESS XXX IS ZZ IN SELECTED SCANNER XX	2-510
LINE CHECK 1	PD and ES
LINE CHECK 2	PD and ES
LINE NOT DISABLED /DEACTIVATED: WRAP FUNCTION CANCELED	PD and ES
LINE NOT YET INITIALIZED	PD and ES
LINE SPEED MAY BE 230 KBPS OR ABOVE	PD and ES
LINE SPEED MAY BE 230 KBPS OR ABOVE LEAD STATE NOT ACCIBLE	PD and ES
LINE NOT SYSTEM GENERATED: WRAP FUNCTION CANCELED	PD and ES
LINE TEMPORARILY NOT AVAILABLE: WRAP FUNCTION CANCELED	PD and ES
LINE TEST ACTIVE: WRAP FUNCTION CANCELED	PD and ES
LINE TRACE ACTIVE: WRAP FUNCTION CANCELED	PD and ES
LINK DISABLED - LINK TEST FUNCTION CANCELED	PD and ES
LINK IPL DETECTED ON L XXX	PD and ES
LINK NOT DEFINED IN IPL PORT TABLE	PD and ES
LINK TEST PROGRAM ABEND	PD and ES
LINK TEST PROGRAM LOADED	PD and ES
LINK TEST PROGRAM NOT LOADED - FUNCTION CANCELED	PD and ES
LOAD IN PROGRESS ON CA X	PD and ES
LOAD IN PROGRESS ON L XXX	PD and ES
LOCK-FORMAT CHECK	PD and ES
LOCK-LINE CHECK 1	PD and ES
LOCK-LINE CHECK 2	PD and ES
LOCK-RE-KEY	PD and ES
LOCK-SENDING	PD and ES
LOCK-SYSTEM COMMAND	PD and ES
LOOK AT MSA FOR ADDRESS COMPARE STATUS	2-510
LSSD NOT ON DISKETTE: CDS CREATION CANCELED	2-500
LSSD NOT ON DISKETTE: CDS VERIFICATION CANCELED	2-500
MICROCODE DETECTED ERROR DURING COMMAND PROCESSING	PD and ES
MLT ALREADY IN USE	2-500
MORE THAN 128 BYTES RECEIVED	PD and ES
MOSS IS NOT ALONE: 'CREATE' CDF NOT ALLOWED	2-500
MOSS IS NOT ALONE: 'VERIFY' CDF NOT ALLOWED	2-500
MOSS/TIC ERROR: FUNCTION CANCELLED	2-520
MOUNTED DISKETTE EC LEVEL IS DIFFERENT FROM ORIGINAL ONE	2-500
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RESET COMPLETED	PD and ES
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Messages	Details in:
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SCANNER DUMP STARTED	2-510
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SCANNER SELECTED BUT NO STATUS RECEIVED	2-510
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SCROLL IGNORED	2-520
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SELECT A FILE	2-500
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SELECT A TRA	2-520
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SET MODE COMMAND FAILED - LINK TEST FUNCTION CANCELED	PD and ES
SPECIFY A DELAYED ALTER	2-510
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START CCU FAILED	PD and ES
START CCU IGNORED	PD and ES
START COMPLETED	PD and ES
START NOT ALLOWED	PD and ES
STEP 255 MUST BE THE END STATEMENT	PD and ES
STOP CCU COMPLETED	PD and ES
STOP CCU FAILED	PD and ES
STOP CCU IGNORED	PD and ES
STOP IGNORED	PD and ES
STOP NOT ALLOWED	PD and ES
STOP THE CCU THEN PRESS PF1 TO DISPLAY CA REGISTERS	PD and ES
STORE EXCEEDED (MAX 80 SECT.): USE 2 RUNS TO COPY FILES	2-500
SWAP COMPLETED	2-500
SWAP IS NOT ALLOWED, MOSS IS NOT OFFLINE	2-500
SWAP IS STARTED	2-500
a SWAP TO b	PD and ES
SYSTEM COMMAND	PD and ES
THE NAME OF THE PROCEDURE TO BE CATALOGED IS: XXXX	PD and ES
THIS BER IS NO LONGER IN THE BER FILE	2-500
TIC DUMP ALREADY EXISTS: AUTODUMP CANCELED	2-520
TIMEOUT ON RECEIVE	PD and ES
TIMEOUT ON TRANSMIT	PD and ES
TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY	2-510
TO DELAY ALTER, ENTER NEW DATA, CHANGE I TO D, PRESS SEND	2-510
TOO MANY ZAPS SELECTED (WOULD EXCEED ZAP AREA CAPACITY)	2-500

Messages	Details in:
TOO MUCH DATA RECEIVED	PD and ES
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TRA ALREADY DISCONNECTED: FUNCTION IGNORED	2-520
TRA CAN NOT BE CONNECTED. MOSS IS NOT ONLINE.	2-520
TRA CONNECTED	2-520
TRA CONNECTION REJECTED BY CONTROL PROGRAM	2-520
TRA DISCONNECTED	2-520
TRA DISCONNECTED BUT ERROR RESETTING TRM REGS	2-520
TRA DISCONNECTED BUT NO CCU ACKNOWLEDGE	2-520
TRA DISCONNECTED BUT SOME TIC'S COULD NOT BE RESET	2-520
TRA DISCONNECTED WITH UNEXPECTED STATUS	2-520
TRA NOT DISCONNECTED: FUNCTION IGNORED	2-520
TRA SELECTED IS NOT INSTALLED: REQUEST REJECTED	2-520
TRA XX SELECTED: LOOK IN MSA FOR MODE	2-520
TRANSMISSION ERROR ON RECEIVE	PD and ES
TRANSMISSION ERROR ON TRANSMIT	PD and ES
UNABLE TO SET LINE TO WRAP MODE: WRAP FUNCTION CANCELED	PD and ES
UNABLE TO SET TIC STORAGE BOUNDARY	2-520
UNDEFINED PF KEY	2-500
UNEXPECTED SCANNER INTERRUPT: PRESS SEND TO RETRY	2-510
UNEXPECTED INTERRUPT RECEIVED: KEYBOARD INPUT IGNORED	2-520
UPDATE HIGHLIGHTED FIELDS, PRESS SEND	2-520
UPSHIFT	PD and ES
VERIFICATION NOT ALLOWED: MOSS MUST BE IN ALONE STATUS	2-500
'VERIFY DATA' AND 'REPLACE DATA' HAVE DIFFERENT LENGTHS	2-500
'VERIFY DATA' DOES NOT MATCH MODULE DATA	2-500
WARNING: AT LEAST ONE TARGET VALUE > END STEP NUMBER	PD and ES
WARNING: INCOMPATIBLE LINE PROTOCOLS, PRESS SEND TO BYPASS	PD and ES
WRAP FUNCTION CAN BE TERMINATED ONLY BY USING PF2	PD and ES
WRAP FUNCTION CANCELED ON OPERATOR REQUEST	PD and ES
WRAP FUNCTION COMPLETED	PD and ES
WRAP TEST COMPLETED	PD and ES
WRAP TEST STOPPED ON OPERATOR REQUEST	PD and ES
YOU CANNOT TERMINATE WRAP FUNCTION	PD and ES
ZAP ALREADY APPLIED	2-500
ZAP ALREADY EXISTS	2-500
ZAP APPLIED	2-500
ZAP APPLIED BUT NOT RECORDED IN HISTORY TABLE (TABLE FULL)	2-500
ZAP AREA IS NOW FULL	2-500
ZAP AREA OF NORMAL DISKETTE IS EMPTY	2-500
ZAP FILED	2-500
ZAP FUNCTION CANNOT BE PERFORMED WHEN MOSS IS ONLINE	2-500
ZAP FUNCTION TERMINATION NOT ALLOWED	2-500
ZAP IS NOT APPLIED	2-500
ZAP NOT APPLICABLE: BAD CHECKSUM	2-500
ZAP NOT APPLIED: DISKETTE ERROR WHILE CHECKING ZAP DATA	2-500
ZAP NOT APPLIED: ZAP DATA DO NOT MATCH MODULE DATA	2-500
ZAP NOT RESTORED: DISKETTE ERROR WHILE CHECKING ZAP DATA	2-500
ZAP NOT RESTORED: ZAP DATA DO NOT MATCH MODULE DATA	2-500
ZAP RESTORED	2-500
ZAPS OF NORMAL DISKETTE ARE ALL PRESENT ON SPARE DISKETTE	2-500
ZAP XXXXXXXXXXXX ERASED	2-500
XX BYTES ALTERED	2-510

Utility Program Messages (Part 1 of 5)

ALL OR PART OF 'VERIFY DATA' IS OUTSIDE MODULE

Explanation: Considering the specified address, the 'VERIFY' data is outside the module.

Action: Either you entered too many bytes of 'VERIFY' data or the specified address is wrong. Make appropriate changes.

APPLIED ZAP CANNOT BE MODIFIED

Explanation: You entered 'M' against the ZAP-ID of an applied ZAP. The command is ignored.

Action: Enter 'R' to restore the ZAP, then enter 'M' to modify it.

BER FILE IS UPDATED

Explanation: BER flag is updated on diskette

Action: None

CCU FUNCTION NOT ALLOWED

Explanation: CCU functions are not available from the time the diskette mounting is requested until the original diskette is remounted.

Action: None.

CCU FUNCTION NOT ALLOWED NOW: MOUNT DISKETTE FIRST

Explanation: CCU functions are not allowed when diskette mounting is requested.

Action: Mount appropriate diskette.

CCU/MOSS ERROR: CDF CREATION CANCELED

Explanation: Error in hardware feature description (type, address, characteristics) when creating the configuration data file.

Action: See BER file.

CCU/MOSS ERROR: CDF VERIFICATION CANCELED

Explanation: Error in hardware feature description (type, address, characteristics) when verifying the configuration data file.

Action: See BER file

CCU/MOSS ERROR: DISKETTE SWAP FAILED

Explanation: MIOC end occurred. A BER is created.

Action: See BER type and ID

CCU/MOSS ERROR: ZAP FUNCTION CANNOT BE PERFORMED

Explanation: Self-explanatory.
A BER is created.

Action: Power-off the machine then power-on and perform a general IPL. If a CCU/MOSS error is detected during IPL then the MIOC adapter must be fixed.

COPY COMPLETED

Explanation: Self-explanatory.

Action: Apply ZAPs to be applied, and press PF2 to come back to the normal diskette.

DISKETTE ERROR: CDF CREATION CANCELED

Explanation: Error when using diskette

Action: See BER file

DISKETTE ERROR: CDF DISPLAY CANCELED

Explanation: Error when using diskette

Action: See BER file

DISKETTE ERROR: CDF VERIFICATION CANCELED

Explanation: Error when using diskette

Action: See BER file

DISKETTE ERROR: FILE NOT FOUND

Explanation: This file does not exist

Action: Enter the correct file name

DISKETTE ERROR: MLT FAILED

Explanation: Diskette error occurred while accessing the MLT file. The MLT function is canceled.

Action: Retry. If still unsuccessful, check the diskette.

DISKETTE ERROR: UNABLE TO LOAD FUNCTION MODULE

Explanation: Something is wrong with the diskette drive or the diskette.

Action: See BER file.

DISKETTE ERROR: ZAP FNCTN CANCELED - MOUNT NORMAL DISKETTE

Explanation: A physical error occurred when using the SPARE diskette. The ZAP function is canceled. A BER is created.

Action: Mount normal diskette, select ZAP function, and retry the operation during which the error occurred. If the error occurs again, the spare diskette is out of order.

DISKETTE ERROR: ZAP FUNCTION CANCELED

Explanation: A physical error occurred when accessing the diskette. The ZAP function is canceled. A BER is created.

Action: Select ZAP function again. If the problem recurs, the diskette is out of order. Mount the SPARE diskette and re-IML MOSS.

ENTER ZAP IDENTIFICATION

Explanation: The ZAP create function has been selected. You are requested to enter the ZAP identification.

Action: Enter the ZAP identification, then press ENTER, or press QUIT (PF3) to leave the create function.

INPUT CHECKSUM DOES NOT MATCH COMPUTED ONE

Explanation: The checksum you entered does not match the checksum that has been calculated by the ZAP utility program using the ZAP data and ZAP identification.

Action: Correct the checksum if it is wrong, or:

- Press PF1 to check the ZAP records and correct error if any, or
- Press PF2 to file the ZAP with the BAD CHECKSUM status

INPUT FOUND AGAINST MORE THAN ONE ZAP-ID

Explanation: You tried to select several ZAPs.

Action: Blank out all your commands except one.

INVALID BER RECORD

Explanation: The BER record is too short or too long.

Action: None.

INVALID DATE

Explanation: Self-explanatory.

Action: Enter today's date.

INVALID FILE NAME

Explanation: The name you entered is not the name of a module file.

Action: Provide a correct file name.

INVALID FLAG VALUE

Explanation: You entered a non-hexadecimal value.

Action: Enter the correct value.

INVALID INPUT

Explanation: You did one of the following:

- You pressed SEND before entering the requested input on a screen
- You entered one or more invalid characters
- You entered an invalid value, for example, an address outside the specified range,
- You made a formatting error, or
- You entered a command which is not valid at this time.

Action: Do one of the following:

- Correct the erroneous input, or
- Press one of the PF keys displayed on the screen, if any.

INVALID MODULE NAME

Explanation: The module you does not exist in the specified file.

Action: Provide a correct module name or change the file name.

INVALID TTA DATA

Explanation: The conversion of data through the translate table area (TTA) is not possible.

Action: None.

LSSD NOT ON DISKETTE: CDF VERIFICATION CANCELED

Explanation: Level-sensitive scan design (LSSD) is not on diskette (should never occur).

Action: Return the diskette to manufacturing.

LSSD NOT ON DISKETTE: CDF CREATION CANCELED

Explanation: Level-sensitive scan design (LSSD) is not on diskette (should never occur).

Action: Return the diskette to manufacturing.

MLT ALREADY IN USE

Explanation: MLT file is being tranferred to the host, so it cannot be accessed by the MLT function.

Action: None

MOSS IS NOT ALONE: 'CREATE' or 'VERIFY' CDF NOT ALLOWED

Explanation: Self-explanatory

Action: Perform a power-on reset (POR)

Utility Program Messages (Part 3 of 5)

MOUNTED DISKETTE EC LEVEL IS DIFFERENT FROM ORIGINAL ONE

Explanation: You mounted a diskette that does not have the same EC level as the diskette from which MOSS was IMLed.

Action: Mount correct diskette or, if none is available, remount original diskette and press PF2 again.

MOUNTED DISKETTE TYPE IS DIFFERENT FROM ORIGINAL ONE

Explanation: You mounted a diskette that is not of the same type (CONTROLLER or SERVICE) as the diskette from which MOSS was IMLed.

Action: Mount correct diskette or, if none is available, remount original diskette and press PF2 again.

NO FILE TO SWAP - SWAP IS COMPLETED

Explanation: You did not specify a file to be copied. The swap function is completed.

Action: None.

NO SELECTION MADE

Explanation: You did not specify which ZAPs you want to COPY or RESTORE.

Action: Specify ZAPs as indicated on the screen.

NO VALID SCANNER INSTALLED: CDF CREATE CANCELED

Explanation: Following a CDF create function, no scanner has been found on the machine.

Action: Check the machine configuration.

NOT ENOUGH SPACE IN ZAP AREA FOR ALL DATA

Explanation: The ZAP record you have just entered is not accepted as there is not enough room left in the ZAP area.

Action: Press PF2 to save the ZAP records that have already been entered. Use the ERASE function to make room in the ZAP area, then select the MODIFY function to complete the ZAP.

NOT ENOUGH SPACE IN ZAP AREA TO COPY ALL SELECTED ZAPS

Explanation: The space left in the ZAP area of the mounted diskette is not sufficient to contain the selected ZAPs.

Action: Use the ERASE function to make room in the ZAP area and restart COPY.

RECOVERY IN PROGRESS FOR ZAP XXXXXXXXXXX

Explanation: ZAP XXXXXXXXXXX has been partially applied (or restored) because of a MOSS check occurring during an APPLY (or RESTORE) operation. This situation is being recovered.

Action: Wait and see.

REFUSED: CCU SIZE MUST BE 512, 768, OR 1024

Explanation: CDF update with CCU storage size is not correct.

Action: Assign 512, 768, or 1024.

REFUSED: MAXIMUM NUMBER OF ZAPS REACHED

Explanation: No new ZAP can be created as the maximum number of ZAPs filed in the ZAP area is reached.

Action: Use the ERASE ZAP function to erase ZAP(s).

REFUSED: ZAP AREA IS FULL

Explanation: No new ZAP can be created as the ZAP area is full.

Action: Make room in the ZAP area by erasing ZAPs (use the 'ERASE ZAP' function).

SELECT A FILE

Explanation: Self-explanatory.

Action: As requested by message.

STORE EXCEEDED (MAX 75 SECTORS): USE TWO RUNS TO COPY FILES

Explanation: The total amount of data to be copied exceeds 75 sectors.

Action: Copy the files in two runs.

SWAP COMPLETED

Explanation: Self-explanatory.

Action: None.

SWAP IS NOT ALLOWED, MOSS IS NOT OFFLINE

Explanation: The SWAP functions cannot be performed because MOSS is in 'online' status.

Action: Use CCU function 5 to set MOSS offline.

SWAP IS STARTED

Explanation: This message is issued after having selected the file to be copied. It disappears when the SWAP functions request a diskette to be mounted.

Action: None.

THIS BER IS NO LONGER IN THE BER FILE

Explanation: BER has been overlapped.

Action: None.

TOO MANY ZAPS SELECTED (WOULD EXCEED ZAP AREA CAPACITY)

Explanation: The number of ZAPs in the ZAP area of the mounted diskette plus the number of ZAPs to be copied exceed the ZAP area capacity.

Action: Select the ERASE function to decrease the number of ZAPs in the ZAP area and restart COPY.

UNDEFINED PF KEY

Explanation: You pressed a PF key that is not displayed on tha screen.

Action: Do one of the following:

Press one of the PF keys displayed on the screen, if any, or

Enter requested input.

'VERIFY DATA' AND 'REPLACE DATA' HAVE DIFFERENT LENGTHS

Explanation: Self-explanatory.

Action: Enter as many bytes of REPLACE data as there are bytes of VERIFY data.

'VERIFY DATA' DOES NOT MATCH MODULE DATA

Explanation: The VERIFY data you entered is not found at the specified address in the specified module.

Action: Enter correct data.

ZAP ALREADY APPLIED

Explanation: You entered 'A' against the ZAP-ID of an already applied ZAP. The command is ignored.

Action: None.

ZAP ALREADY EXISTS

Explanation: You selected CREATE then you provided the ID of an existing ZAP.

Action: Provide another ZAP-ID, or use MODIFY instead of CREATE, or erase existing ZAP.

ZAP APPLIED

Explanation: The APPLY function is completed.

Action: None.

ZAP APPLIED BUT NOT RECORDED IN HISTORY TABLE (TABLE FULL)

Explanation: The ZAP has been applied in the microcode load module, but no record has been put in the MLT.

Action: None.

ZAP AREA IS NOW FULL

Explanation: ZAP data that you entered is accepted. The ZAP area is now full, and you cannot enter more data.

Action:

1. Press PF2 to file what you already entered.
2. If the ZAP is complete, no other action is required.

If the ZAP is not complete, clear some space in the ZAP area. To do so, use the ERASE function, and select MODIFY to complete the ZAP.

ZAP AREA OF NORMAL DISKETTE IS EMPTY

Explanation: You selected COPY but no ZAPs are to be copied.

Action: None.

ZAP FILED

Explanation: The ZAP you have just created or modified has been filed (that is, saved in the ZAP area on the diskette).

Action: None.

ZAP FUNCTION CANNOT BE PERFORMED WHEN MOSS IS ONLINE

Explanation: Self-explanatory.

Action: Select CCU FUNCTION 5 to set MOSS offline.

Utility Program Messages (Part 5 of 5)

ZAP FUNCTION TERMINATION NOT ALLOWED

Explanation: Termination of ZAP function is not accepted from the moment you selected 'UPDATE SPARE DISKETTE' until you return to the original diskette.

Action: Mount diskette if requested or press PF2 to return to original diskette.

ZAP IS NOT APPLIED

Explanation: You entered 'R' against the ZAP-ID of a non applied ZAP. The command is ignored.

Action: None.

ZAP NOT APPLICABLE: BAD CHECKSUM

Explanation: You entered 'A' against the ZAP-ID of a ZAP that has the BAD CHECKSUM status. Such a ZAP is not applicable.

Action: Modify the ZAP, correct any error in the ZAP records, or enter the good checksum in order to file this ZAP with the NON-APPLIED status. Then, apply the ZAP.

ZAP NOT APPLIED: DISKETTE ERROR WHILE CHECKING ZAP DATA

Explanation: The ZAP cannot be applied because of a diskette error.

Action: See whether a BER has been created or not.
If YES, the message is due to a physical diskette error.
If NO, this means that ZAP data has been damaged on the diskette. In this case:

1. Erase the ZAP
2. Recreate it (or recopy it on the spare diskette)
3. Apply it

ZAP NOT APPLIED: ZAP DATA DO NOT MATCH MODULE DATA

Explanation: Before applying a ZAP, the ZAP utility checks that the VERIFY data matches the module data. This checking has failed.

Action: Verify that the prerequisite ZAPs have been applied. Apply them if necessary.

This message may also mean that the ZAP data has been damaged on the diskette. In this case, check the ZAP by using the modify function and entering the 'A' (ALTER) command for each record.

ZAP NOT RESTORED: DISKETTE ERROR WHILE CHECKING ZAP DATA

Explanation: The ZAP cannot be restored because of a diskette error.

Action: See whether a BER has been created or not.
If YES, the message is due to a physical diskette error.
If NO, this means that ZAP data has been damaged on the diskette. The restore function cannot be performed and the diskette may be considered as out of order.

ZAP NOT RESTORED: ZAP DATA DO NOT MATCH MODULE DATA

Explanation: Before restoring a ZAP, the ZAP utility checks that the RESTORE data match the module data. This checking has failed.

Action: Verify that no other ZAP, for which this ZAP is prerequisite, has been restored first by mistake.

This message may also mean that the ZAP data has been damaged on the diskette. The restore function cannot be performed and the diskette may be considered as out of order.

ZAP RESTORED

Explanation: The RESTORE function is completed.

Action: None.

ZAPS OF NORMAL DISKETTE ARE ALL PRESENT ON SPARE DISKETTE

Explanation: Self-explanatory.

Action: If ZAPs have to be copied again, for example because they have been modified, erase them first from the spare diskette, then select the copy function (PF1).

ZAP XXXXXXXXXXXX ERASED

Explanation: Self-explanatory.

Action: None.

TSS Function Messages (Part 1 of 5)

A DELAYED DISPLAY OR ALTER HAS BEEN SPECIFIED

Explanation: The delayed operation that you entered has been validated and recorded. It can be used with address compare or snapshot trace functions.

Action: None.

A SCANNER IS ALREADY SELECTED: RELEASE IT TO SELECT ANOTHER

Explanation: You tried to select a scanner while one is already selected.

Action: Release the scanner currently selected, then retry the selection.

ADDRESS COMPARE ALREADY SET: CANCEL IT OR WAIT FOR HIT

Explanation: You tried to define an address compare operation while one was already set in the scanner.

Action: Cancel the current address compare, or wait for hit, which cancels the current address compare (except if action is 'STOP SCANNER AND LEAVE AC ACTIVE').

ADDRESS COMPARE ANOMALY: CANCEL ADDRESS COMPARE AND RETRY

Explanation: An abnormal situation has been detected in the address compare mechanism.

Action: Cancel the address compare and set it again. If the error persists, run diagnostics to isolate the error.

ADDRESS COMPARE CANCELED ON OPERATOR REQUEST

Explanation: You canceled the address compare operation.

Action: None.

AUTOMATIC DISPLAY BECAUSE OF ADDRESS COMPARE HIT

Explanation: You specified a delayed display which just appeared on the screen, due to an address compare hit.

Action: None.

CCU/MOSS ERROR: FUNCTION NOT PERFORMED

Explanation: The function that you selected cannot be performed because of a MOSS-to-CCU hardware error.
A BER is created: Type 01, ID 02.

Action: Terminate the function.

CHECKPOINT TRACE SET XXX FOR LINE ADDRESS YYY LLLLLLLL

Explanation: (XXX is either ON or OFF,YYY is the line address, LLLLLLLL is either TRANSMIT OR RECEIVE). You specified or removed (OFF) the checkpoint option to the scanner interface trace for the line interface address specified. This option becomes effective (only ON) when the corresponding scanner interface trace is started from the host.

Action: None.

COMMAND INCOMPATIBLE WITH SCANNER MODE: LOOK AT MSA

Explanation: You specified a command that cannot be executed when the scanner is in the mode 'displayed on MSA'.

Action: As requested by message.

DELAYED ALTER PERFORMED BECAUSE OF ADDRESS COMPARE HIT

Explanation: You specified a Delayed Display which just appeared on the screen, due to an address compare hit.

Action: None.

DISKETTE ERROR: DUMP MAY BE INCOMPLETE

Explanation: A diskette hardware error occurred during the scanner dump: the dump has been truncated.

Action: Use Dump Display functions to look at the dump and determine its real upper limit.

DISKETTE ERROR: FUNCTION NOT AVAILABLE

Explanation: The function that you selected is not available because of a hardware error on the diskette.

A BER is created: Type 01, ID 03.
Alarm A3 is displayed.

Action: Retry or terminate the function.

DISKETTE ERROR: IML CANCELED

Explanation: The scanner microcode is not accessible because of a hardware error on the diskette. The IML is canceled.

Action: Terminate the function.

TSS Function Messages (Part 2 of 5)

DISKETTE ERROR: SCANNER DUMP NOT AVAILABLE

Explanation: A diskette hardware error occurred at the beginning of scanner dump. The dump is not available.

Action: Terminate the function.

DUMP FILE BEING TRANSFERRED: TRY LATER

Explanation: You requested a scanner dump while the current dump file on the diskette was being transferred on host request.

Action: Try later.

| DUMP FILED IN CHGDMP: TO PRINT DUMP, TRANSFER IT TO HOST

Explanation: The scanner or TIC dump that you requested is complete and ready to be transferred on host request.

Action: Notify the host operator.

ERROR IN FRONT END SCANNER PROCESSOR

Explanation: A scanner hardware error is detected. The function cannot be performed.

A BER is created: Type 01, ID 05.

Action: Terminate the function.

ERROR IN SCANNER DURING COMMAND PROCESSING

Explanation: A scanner hardware error is detected. The function cannot be performed.

A BER is created: Type 01, ID 05.

Action: Terminate the function.

ERROR IN SCANNER: ICC/LIC FAILED OR IS NOT PRESENT

Explanation: A scanner hardware error is detected. The function cannot be performed.

A BER is created: Type 01, ID 05.

Action: Terminate the function:

Use the GCF utility to display and check for the presence of the LIC corresponding to the line interface address that you specified.

IML FOR SCANNER XX COMPLETED

Explanation: The scanner IML that you requested is complete. The scanner is initialized but cannot be set operational because MOSS is not in 'online' status. MSA field in displays: 'SCANNER XX INITIALIZED'.

Action: Set MOSS online if appropriate, then go to TSS functions.

IML FOR SCANNER XX COMPLETED: SCANNER CAN BE CONNECTED

Explanation: The scanner IML that you requested is complete. The scanner is initialized but not yet operational. MSA field m displays: 'SCANNER XX INITIALIZED'.

Action: Use function 3 (bypass phase 1 IPL) to connect logically the scanner to the CCU control program.

IML FOR SCANNER XX COMPLETED: SCANNER IS CONNECTED

Explanation: The scanner is operational and under control of the CCU control program. MSA field m displays: 'SCANNER XX CONNECTED'.

Action: None.

IML FOR SCANNER XX IN PROGRESS

Explanation: The IML of scanner XX is being processed normally.

Action: None.

INVALID ALTER REQUEST ON READ-ONLY STORAGE

Explanation: You tried an alter operation on a ROS address in the scanner.

Action: None.

INVALID LINE ADDRESS

Explanation: The line address that you entered is not within the range 0 through 255.

Action: Check the line address, and enter it again.

IOC ERROR DURING ERROR RECOVERY

Explanation: The scanner is not able to process the MOSS command. An IOC error was detected during the error recovery.

A BER is created: Type 01, ID 05.

Action: Re-IML the appropriate scanner.

IOC/SCANNER ERROR: FUNCTION NOT PERFORMED

Explanation: A hardware error is detected either in the scanner or in the IOC bus. The MOSS command cannot be performed.

A BER is created: Type 01, ID 05.

Action: Terminate the function.

LINE ADDRESS DOES NOT BELONG TO AN INSTALLED SCANNER

Explanation: There is no installed scanner corresponding to the line address that you entered.

Action: Check the line address and enter it again.

LINE ADDRESS XXX IS ZZ IN SELECTED SCANNER XX

Explanation: You selected the scanner XX by specifying the line address ZZ.

Action: None.

LOOK AT MSA FOR ADDRESS COMPARE STATUS

Explanation: The address compare operation you specified is now set. The MSA displays the status of the operation.

Action: None.

NO ANSWER TO ERROR STATUS REQUEST DURING ERROR RECOVERY

Explanation: The scanner is not able to process the MOSS command; it did not answer during error recovery.

A BER is created: Type 01, ID 05.

Action: Re-IPL the CCU/scanner.

NO SCANNER ANSWER: CHECK CCU STATE AND IF NEEDED RE-IML CS

Explanation: The scanner cannot answer MOSS commands because of the CCU or the scanner.

Action: Do one of the following:

- If CCU/Scanner not IPLed, IPL it and retry.
- Perform the CCU Reset All function, IML the scanner, and retry.

In both cases, the CCU state must be RUN or STOP-PGM. See MSA field g.

NO SCANNER SELECTED

Explanation: You tried to release a scanner, but no scanner is selected.

Action: None.

PRESS ATTN TO CANCEL ADDRESS COMPARE

Explanation: You specified an address compare operation with the Display or Alter action.

Action: Wait for hit, which cancels the current address compare
OR:
Press ATTN to force AC cancel.

REFRESH MODE: PRESS ATTN TO STOP

Explanation: You requested the refresh mode of the currently displayed data.

Action: Press ATTN to stop.

RELEASED SCANNER IS IN RESET OR INOPERATIVE MODE

Explanation: You released the selected scanner, which is in one of the following modes:

- RESET mode: Not operational for CCU control program.
- INOPERATIVE mode: Not operational for MOSS functions, may be operational for CCU control program. Action:
- RESET mode: Dump or IML the Scanner.
- INOPERATIVE mode: Select the scanner again. If it is selected with 'NO STATUS RECEIVED' or 'STATUS UNKNOWN', IML the scanner.

SCANNER AC HIT BUT REQUESTED ACTION NOT PERFORMED

Explanation: An address compare hit occurred for the operation that you specified, but the requested action did not take place because of a scanner error.

A BER is created: Type 01, ID 05.

Action: Terminate the function.

SCANNER CANNOT BE CONNECTED: MOSS IS NOT ONLINE

Explanation: Self-explanatory.

Action: Set MOSS online and re-IML the scanner:

SCANNER CHECKOUT FAILED: RC = XXXX

Explanation: A hardware error is detected in the scanner. The IML cannot be performed.

A BER is created: Type 01, ID 05.

Action:

1. Terminate the function.
2. Re-IPL CCU/scanner and retry.

TSS Function Messages (Part 4 of 5)

SCANNER CONNECTED TO CCU CONTROL PROGRAM

Explanation: The scanner is now operational; and the CCU control program can use it.

Action: None.

SCANNER CONNECTION REJECTED BY CCU CONTROL PROGRAM

Explanation: The scanner that you IMLed is not recognized by the CCU control program (the scanner is not operational).

A BER is created: Type 01, ID 05.

Action: Terminate the function using function terminate.

SCANNER CYCLE STEAL TO/FROM CCU FAILED

Explanation: The scanner is not able to exchange data with the CCU. The scanner recovery failed. The error is either a hardware error or a scanner microcode error (incorrect cycle steal parameters).

A BER is created: Type 01, ID 05.

Action:

1. Re-IML the appropriate scanner.
2. If the error persists, re-IPL the CCU/scanner.

SCANNER DUMP STARTED

Explanation: The scanner dump function found an empty dump file and started dump processing.

Action: None.

SCANNER IN DISCONNECTED/GO MODE

Explanation: The 'START' command is now processed. The scanner resumed the microcode execution; but stays unavailable to the CCU control programs.

Action: None.

SCANNER IN DISCONNECTED/STOP MODE

Cause The 'STOP' command is processed. The scanner microcode execution is suspended. The scanner becomes unavailable to the CCU control program, and "listens" to the following MOSS request.

Action: None.

SCANNER IN RESET MODE

Explanation: The 'RESET' command is performed. The scanner is ready to be IMLed or dumped.

Action: None.

SCANNER PROCESSING RESUMED BUT SCANNER MODE IS UNKNOWN

Explanation: The 'START' is complete, but MOSS is not able to determine the scanner mode.

Action: Release the scanner and reselect.

SCANNER PROCESSING RESUMED THEN STOPPED ON AC HIT

Explanation: The 'START' command has been executed. The scanner resumed the microcod execution, but this execution has been stopped by an address compare hit.

Action: None.

SCANNER RELEASED BUT CURRENT MODE KEPT

Explanation: You released the selected scanner, which is left in its current mode.

Action: None.

SCANNER SELECTED BUT NO STATUS RECEIVED

Explanation: The scanner that you want to select is already selected, but was not able to provide its current mode to MOSS. Three BERs are created:

Type 1, ID 01
Type 1, ID 03
Type 1, ID 02

Action: None.

SCANNER SELECTED BUT STATUS UNKNOWN

Explanation: The scanner that you want to select is already selected, but provided MOSS with an unknown status.

Action: Re-IML, or proceed according to the function you want to perform.

SCANNER XX AUTOMATIC DUMP IN PROGRESS

Explanation: An automatic dump has been started, due to a BER generated by the control program.

Action: Wait until completion message. Then transfer it to the host as indicated by the completion message.

SCANNER XX SELECTED: LOOK AT MSA FOR SCANNER MODE

Explanation: The scanner that you want to select is already selected. Its current mode is displayed in MSA.

Action: As requested by message.

SELECT A SCANNER

Explanation: You selected a TSS function without having selected a scanner.

Action: Select a scanner.

SPECIFY A DELAYED ALTER

Explanation: You requested an address compare function with action 'START DELAYED ALTER', but did not specify the delayed alter operation.

Action: Specify the delayed alter operation, and resume address compare.

SPECIFY A DELAYED DISPLAY

Explanation: You requested an address compare function with action 'START DELAYED ALTER', but did not specify the delayed alter operation.

Action: Specify the delayed display operation, and resume address compare.

TO ALTER DATA, SPECIFY AN IMMEDIATE DISPLAY

Explanation: You selected a display alter function. If you want to alter data, you must first display it.

Action: None.

TO DELAY ALTER, ENTER NEW DATA, CHANGE I TO D, PRESS SEND

Explanation: You selected the alter subfunction.

Action: As requested by message.

UNEXPECTED SCANNER INTERRUPT: PRESS SEND TO RETRY

Explanation: MOSS received a scanner interrupt on a command where no interrupt is expected.

A BER is created: Type 01, ID 05.

Action: Retry the command.

XX BYTES ALTERED

Explanation: You specified an immediate alter operation: XX bytes have been changed in scanner (control store, control blocks, local store, or external registers).

Action: None.

TRSS Function Messages (Part 1 of 4)

ALTER COMPLETE.

Explanation: Alter of register has been done.

ACTION: None.

CCU/MOSS ERROR: DUMP MAY BE INCOMPLETE.

Explanation: A complete TIC dump could not be taken because of an MIOC failure. A BER is created: 01 02. The DUMP SWAP cannot be performed.

ACTION: Retry or terminate function and use dump display function to look at dump and determine its real upper limit.

CCU/MOSS ERROR: TRA SELECTED WITH UNKNOWN MODE.

Explanation: Unsuccessful read of level 1 error status reg from the TIC due to MIOC failure. A BER is created: 01 02.

ACTION: Retry or continue.

CCU/MOSS ERROR: MODE NOW UNKNOWN.

Explanation: An MIOC error caused the TRA to be put in an intermediate or unknown state during the connect or disconnect. A BER is created: 01 02.

ACTION: Retry, terminate function, or continue with caution.

CCU/MOSS ERROR: NOT CONNECTED.

Explanation: An MIOC error during TRA start command caused termination of the connect operation. A BER is created: 01 02.

ACTION: Retry or terminate function.

CCU/MOSS ERROR: TIC MODE NOT REPORTED.

Explanation: An MIOC error occurred while trying to read the TIC mode from NTRI. A BER is created: 01 02.

ACTION: Continue or terminate function.

CCU/MOSS ERROR: TRA INTERRUPTS NOT ENABLED.

Explanation: An MIOC error prevented the TRA unmask command from being sent. A BER is created: 01 07.

ACTION: Terminate function or continue with caution.

DISKETTE ERROR: DUMP FUNCTION NOT AVAILABLE.

Explanation: The disk is inoperative or a physical disk I/O error occurred. A BER is created: 01 03. Alarm A3 is displayed.

ACTION: Retry or terminate function.

DISKETTE ERROR: DUMP MAY BE INCOMPLETE.

Explanation: A complete TIC dump could not be taken because of a diskette hardware error. A BER is created: 01 03. Alarm A3 is displayed.

ACTION: Use dump display functions to look at dump and determine its real upper limit.

DISKETTE ERROR: FUNCTION NOT PERFORMED.

Explanation: Overlay was not loaded properly. Bad return code from disk CAC. A BER is created: 01 03. Alarm A3 is displayed.

ACTION: Retry or terminate.

DISKETTE ERROR: CLOSE NOT PERFORMED.

Explanation: Close of the dump file could not be performed due to a diskette error. A BER is created: 01 03. Alarm A3 is displayed.

ACTION: Terminate function.

DISKETTE ADDRESS MODIFIED TO XXXX.

Explanation: An odd display TIC storage address was entered; only even addresses are valid. The odd address is rounded down to the nearest even address.

ACTION: Continue.

DUMP CANCELED AS REQUESTED

Explanation: The operator did not answer affirmatively to a DUMP TIC STORAGE screen prompt, canceling the dump request.

ACTION: None.

DUMP COMPLETE

Explanation: The TIC dump has completed without error.

ACTION: None.

DUMP FILE BEING TRANSFERRED: TRY LATER

Explanation: You requested a TIC dump file while the TRSS dump file on the diskette was being transferred to the host due to a host request.

ACTION: Try later.

DUMP FILED IN CHGTRSS: TO PRINT DUMP, TRANSFER IT TO HOST.

Explanation: The TIC autodump has completed and is ready to be transferred on host request.

ACTION: Notify host operator.

DUMP IN PROGRESS.

Explanation: The TIC dump has started and is being performed.

ACTION: None.

EXPECTED INTERRUPT NOT RECEIVED: FUNCTION CANCELED.

Explanation: An interrupt that was expected as the result of an MIOH was not received. A BER is created: 01 07.

ACTION: Terminate function.

INVALID ADDRESS - RANGE IS 0 TO FFF (HEX).

Explanation: The requested TIC storage address was outside of the indicated range.

ACTION: Enter correct address.

INVALID INPUT: RE-ENTER FIELDS IN ERROR.

Explanation: An input field is in error during an alter operation.

ACTION: As requested by message.

INVALID INTERRUPT RECEIVED FROM TRA: FUNCTION CANCELED.

Explanation: An interrupt was expected as the result of an MIOH but the interrupt expected bit was found to be on in the TCB (should have been reset by level 4). A BER is created: 01 07.

ACTION: Terminate function.

INVALID NUMBER OF HALFWORDS: RANGE IS 1-48.

Explanation: The requested amount of halfwords to display was out of range.

ACTION: Enter a valid value.

IOC/TRA ERROR: NOT CONNECTED.

Explanation: An IOC error during TRA start command caused termination of the connect operation. A BER is created: 01 07.

ACTION: Retry or terminate function.

IOC/TRA ERROR: DUMP MAY BE INCOMPLETE.

Explanation: A complete TIC dump could not be taken due to IOC or TRA hardware error. A BER is created 01 07.

ACTION: Use dump display functions to look at dump and determine its real upper limit.

IOC/TRA ERROR: FUNCTION NOT PERFORMED

Explanation: Function could not be performed because of a IOC or TRA hadrware error. A BER is created: 01 07.

ACTION: Retry or terminate function.

IOC/TRA ERROR: TRA SELECTED WITH UNKNOWN MODE.

Explanation: Unsuccessful read of level 1 error status reg from the TIC. A BER is created 01 07.

ACTION: Retry or continue.

IOC/TRA ERROR: MODE NOW UNKNOWN.

Explanation: An IOC error caused the TRA to be put in an intermediate or unknown state during the connect or disconnect process.

ACTION: Retry, terminate function, or continue with caution.

IOC/TRA ERROR: TIC INTERRUPTS NOT ENABLED.

Explanation: An IOC error occurred while trying to read the TIC mode from NTRI. A BER is created: 01 07.

ACTION: Continue.

IOC/TRA ERROR: TRA INTERRUPTS NOT ENABLED.

Explanation: An IOC error prevented the TRA UNMASK command from being sent. A BER is created: 01 07.

ACTION: Terminate function or continue with caution.

MOSS/TIC ERROR: FUNCTION CANCELED

Explanation: An interrupt that was not expected was received after an MIOH was done to a TIC. If a refresh is active, it is terminated.

ACTION: Retry or terminate function.

NO ACKNOWLEDGE FROM TRA: MODE NOW UNKNOWN.

Explanation: The TRM did not respond with an interrupt to MOSS during the disconnect process. A BER is created: 01 07.

ACTION: Terminate function or continue with caution.

NO ANSWER FROM CONTROL PROGRAM: MODE NOW UNKNOWN.

Explanation: Mailbox to NCP was never answered during the connect process. A BER is created: 01 02.

ACTION: Terminate function. Check if control program running.

NO ANSWER TO ERROR STATUS REQUEST DURING ERROR RECOVERY.

Explanation: The TRA is not able to process the MOSS command. It did not answer during error recovery. A BER is created: 01 07.

ACTION: Terminate function.

NO TRA'S INSTALLED: FUNCTION CANCELED.

Explanation: No TRAs were found to be installed in the CDF. The select function is not entered.

ACTION: Check the CDF.

NTRI/MOSS ERR.: FUNCTION CANCELED.

Explanation: A matching MPT was not found for the selected TIC. NTRI is set offline. Since NTRI is needed for the current function, it is canceled.

ACTION: Check the CDF and control program sysgen.

NTRI/MOSS ERR.: PRESS SEND TO CONTINUE.

Explanation: A matching MPT was not found for the selected TIC. NTRI is set offline. The function continues after SEND is pressed.

ACTION: Press SEND, continue. Check the CDF and control program sysgen.

TRSS Function Messages (Part 3 of 4)

NTRI OFFLINE: FUNCTION IGNORED.

Explanation: Selected function is not permitted if NTRI is offline.

ACTION: IPL the CCU with NTRI.

REFRESH MODE: PRESS ATTN TO STOP REFRESH.

Explanation: Refresh mode is active.

ACTION: Press ATTN to stop.

RESULTS UNPREDICTABLE - PF1 AGAIN TO CONFIRM, ELSE SEND.

Explanation: Warning before write to TIC or TRM register.

ACTION: Press PF1 to continue. Press PF3 or SEND to terminate.

SCROLL IGNORED.

Explanation: An attempt was made to scroll backwards (PF4) or forwards (PF5) beyond the limits of TIC storage (0000-1FFF).

ACTION: Enter a valid address or press valid PF key.

SELECT A TRA.

Explanation: A function was chosen before a TRA was selected.

ACTION: Select a TRA.

SELECTED TIC NOT AVAILABLE: REQUEST REJECTED.

Explanation: Selected TIC is not shown installed in the CDF.

ACTION: Select an installed TRA or check CDF.

TIC DUMP ALREADY EXISTS: AUTODUMP CANCELED.

Explanation: A TIC dump already exists for the TIC that is to be autodumped.

ACTION: Notify host operator to transfer dump to host.

TRA ALREADY CONNECTED: FUNCTION IGNORED.

Explanation: The selected TRA is already in CONNECT mode.

ACTION: None.

TRA ALREADY DISCONNECTED: FUNCTION IGNORED.

Explanation: The selected TRA is already in DISCONNECT mode.

ACTION: None.

TRA CAN NOT BE CONNECTED. MOSS IS NOT ONLINE

Explanation: Self explanatory.

ACTION: Set MOSS online

TRA CONNECTED.

Explanation: The connection has been done.

ACTION: Continue.

TRA CONNECTION REJECTED BY CONTROL PROGRAM.

Explanation: The connect mailbox was rejected by the control program.

ACTION: Terminate function.

TRA DISCONNECTED.

Explanation: The disconnect request was successful.

ACTION: Continue.

TRA DISCONNECTED BUT ERROR RESETTING TRM STATUS REGS.

Explanation: An MIOC error occured when trying to read the TRM level 2 error status registers. A BER is created: 01 07.

ACTION: Terminate function or continue with caution.

TRA DISCONNECTED BUT NO CCU ACKNOWLEDGE.

Explanation: The TRA is physically disconnected (bit in level 1 error status is on) but MOSS had to provide the "GET LEVEL 1 ERROR STATUS" request during the disconnect process. A BER is created: 01 07.

ACTION: Continue.

TRA DISCONNECTED BUT SOME TIC'S COULD NOT BE RESET.

Explanation: An MIOC/IOC error occurred during the setting of the TIC address register to '00AA'x or while writing to the TIC control register during the disconnect process.

ACTION: Terminate function or continue with caution.

TRA DISCONNECTED WITH UNEXPECTED STATUS.

Explanation: Level 4 detected an unexpected status condition in the get command completion of the disconnect interrupt. The MOSS bit was on and none of the MOSS Control bits were on in the TIC control reg. A BER is created: 01 07.

ACTION: Terminate function or continue with caution.

TRA NOT DISCONNECTED: FUNCTION IGNORED.

Explanation: The selected function requires that the TRA be disconnected.

ACTION: Disconnect the TRA or terminate function.

TRA SELECTED IS NOT INSTALLED: REQUEST REJECTED.

Explanation: The TRA is shown not installed in the CDF.

ACTION: Select an installed TRA or check the CDF.

TRA XX SELECTED: LOOK IN MSA FOR MODE.

Explanation: The selection was successful.

ACTION: Continue.

UNABLE TO SET TIC STORAGE BOUNDARY.

Explanation: The TIC did not correctly set the requested TIC 2KB storage boundary. A BER is created: 01 07.

ACTION: Terminate the function.

UNDEFINED PF KEY.

Explanation: An unassigned PF key was pressed.

ACTION: Press one of the PF keys displayed on the screen or enter requested input.

UNEXPECTED INTERRUPT RECEIVED: KEYBOARD INPUT IGNORED.

Explanation: An interrupt was received before or during the last Send/Receive (to 3727). The interrupt may not be related to the last keyboard input. A BER is created: 01 07.

ACTION: Retry last input or terminate function.

UPDATE HIGHLIGHTED FIELDS, PRESS SEND.

Explanation: Instructs operator to update fields to be altered and to then press the SEND key.

ACTION: As requested in message.

Chapter 2. Service Procedures

Section 2. Extended Troubleshooting Using BERs

BER Recovery Procedures

Before being logged and stored on the diskette, BERs are kept in MOSS and/or CCU storage. While in this transition stage, the BERs are volatile, and are lost if a power-off or power-on reset occurs. They can however be displayed using the following procedures:

MOSS

1. Catastrophic errors: The MOSS has stored a BER in the BER stack (in MOSS storage), but could not log it on the diskette. Display the BER using the procedure given on page 3-030 under "BER Display from MOSS Storage". This page also indicates the meaning of each byte.

2. All other errors:

   a. Call the utilities.

   b. Call MOSS store display

   c. Call items 10 (BER Stack) and 11 (BER TCB).

   The displayed bytes may be interpreted by referring to pages 2-340 and 2-341. The displayed format is identical to that stored on the diskette, except that there is no header present. The first byte displayed therefore corresponds to byte 10 on pages 2-340 and 2-341; the second byte displayed corresponds to byte 11, and so on.

CENTRAL CONTROL UNIT (CCU)

1. Call the utilities.

2. Call MOSS store display.

3. Display the control program information table (CPIT) (this table starts at address X'2200'). Starting at address X'2342' is a group of 20 bytes that contain the check record pool (CRP) for each interrupt level, as follows:

Address'2342'

Bytes 1-2	CRP entry count L1	CRP entry count L2
Bytes 3-4	CRP entry count L3	CRP entry count L4
Bytes 5-6	CRP entry length L1	1st CRP entry add. at L1 byte X
Bytes 7-8	First CRP entry address at L1 bytes 0 and 1	
Bytes 9-10	CRP entry length L2	1st CRP entry add. at L2 byte X
Bytes 11-12	First CRP entry address at L2 bytes 0 and 1	
Bytes 13-14	CRP entry length L3	1st CRP entry add. at L3 byte X
Bytes 15-16	First CRP entry address at L3 bytes 0 and 1	
Bytes 17-18	CRP entry length L4	1st CRP entry add. at L4 byte X
Bytes 19-20	First CRP entry address at L4 bytes 0 and 1	

Using the information obtained from the above table, call CCU Functions and display the BERs as stored in CCU main storage by the control program.

Refer also to ACF/NCP for the 3725, EP for the IBM 3725 Reference Summary and Data Areas, LY30-3070, for the control block structure of the BERs in the CRP.

BER Analysis Procedures (Part 1 of 5)

MULTIPLE BERS

The MIM Part 2 indicates that troubleshooting should start with the BER just below the ALARM. The following points should be noted:

1. Several BERs can be created and logged for a single failure, depending on:

   - The duration of the failure.

   - The situation at the subsystem boundaries.

   - The current functions being performed by the control program and/or microcode.

     Troubleshooting may therefore sometimes be improved by searching for possible 'bursts' of related BERs. The first BER reported (not necessarily under an ALARM) can also be a good starting point for error analysis.

2. Looking at several BERs together can detect overlapping FRUs in the FRU lists, and thus narrow down the possible range of failing components, or the order of FRU exchange (probability of failure). For example:

   ```
   ALARM     -
   BER 1     Suspected FRUs:   A, B, C
   BER 2     Suspected FRUs:   D, B, C
   ```

   In this case, although according to the MIM Part 2, FRU A should normally be changed first, the above correlation shows that the priority might be changed to 'FRU B first'.

3. An error may be propagated from one subsystem to another by:

   - A channel adapter and a scanner connected by the same redrive

   - Several adapters on the IOC bus

     In this case, the localization of the failing FRU may be improved by correlating different BERs on two or more adapters.

MOSS SUBSYSTEM STORAGE ERRORS

BERs type 01 ID 00, error codes 02 and 04 (MOSS parity check)

The storage address where the error was reported may be found by forming a data address as follows:

1. Take the entire contents of BER data byte 2; these 8 bits form the 8 high-order bits of the address.

2. Take the 4 low-order bits of data byte 0; these form the middle 4 bits of the address.

3. Take the entire contents of BER data byte 1; these 8 bits form the 8 low-order bits of the address.

The result is a 20-bit address, which can be used to locate the failing FRU, using the following table:

MOSS storage address	Corresponding FRU
00000 to 01FFF	MMM8 on MPC card
02000 to 0AFFF	MPC card
0B000 to 0FFFF	MMM24 on MPC card
10000 to 17FFF	MMM32-1 on MMC card
18000 to 1FFFF	MMM32-2 on MMC card

BER Analysis Procedures (Part 2 of 5)

CENTRAL CONTROL UNIT (CCU)

CCU Hardcheck

CCU failures are indicated in CCU registers X'7D', X'7E', and X'76'. For each type of failure, a list of FRUs is given in the following table by decreasing failure rate probability.

These FRU lists are used by manual intervention routine AB03, which is run in order to analyze the following BERs:

Type 01 - ID 06 - error code 08

Type 12 - ID 11 through 16

If several failures are present, an algorithm in the routine may take one of the following actions:

- Select the most probable failure and give the FRU list.
- Compute a new FRU list based on the different FRU lists corresponding to the failures.
- If the FRU list is flagged by two asterisks, the failure can be caused by the DFL5 card (if not already included), the redrive cards, or the adapters. Try and correlate with other BERs: IOC bus, TSS, or channel adapter, if any.

Register X'7D'

Byte	Bit	Meaning	Suspected FRUs (in order)										
0	0	POP Pty	ECC	SCTL	BSMI	CTL1	DFLN	CTL2	MIOC	DFL4	BTAC	MEMN	
	1	MDOR Pty	ECC	DFLN	MIOC	BSMI	SCTL	DFL4	BTAC	MEMN			
	2	MIOC Pty	MIOC	DFLN	SCTL	CTL2							
	3	Stg 2 Bit Err	Storage double-bit error										
	4	Stg Cntl Err	SCTL	BSMI	CTL2	CTL1	CCLK	ECC					
	5	(Reserved)											
	6	Stg Addr/Data	BSMI	SCTL	DFLN	CTL2	CTL1	MIOC	ECC				
	7	LS Pty	CTL2	DFLN	CTL1	MIOC	BSMI	SCTL	ECC				
1	0	0											
	1	A/B Bus Pty	DFL4	DFLN	MIOC	CTL1	BTAC	CTL2					
	2	IOC Data Pty	ECC	SCTL	DFL5	DFLN	BSMI	MIOC	DFL4	CTL1	MEMN	BTAC	CTL2
	3	ALU Comp Err	DFL4	CTL1	DFLN								
	4	SAR Pty	DFL4	CTL1	DFLN	DFL5	CTL2	BTAC	BSMI				
	5	ROS Pty	CTL1	CTL2	DFLN								
	6	Z Reg Pty	DFLN	ECC	DFL4	CTL2	MIOC	BTAC	SCTL	MEMN			
	7	0											

Note: DFLN = FRU group DFL1, DFL2, and DFL3.

Register X'7E'

Byte	Bit	Meaning	Suspected FRUs (in order)							
0	0	MOSS Inop	MIOC							
	1	CCU Hard Sum								
	2	0								
	3	L5 I/O Error	CTL1	DFL4	DFLN	CTL2	MIOC			
	4	Invalid Op	CTL1	DFL4	DFLN	CTL2	SCTL	ECC	BTAC	MIOC
	5	IOC1 Adp Req	DFL5	MIOC	CTL2	CTL1	BTAC	DFLN		
	6	0								
	7	IOC L1 Sum								
1	0	Addr Comp L1	BTAC	MIOC	CTL2	DFLN				
	1	Addr Exc I F	SCTL	CTL2	BSMI	CTL1	DFLN	MIOC	ECC	
	2	Stg Prot I F	SCTL	CTL2	BSMI	CTL1	DFLN	MIOC	ECC	
	3	Addr Exc Pgm	CTL1	CTL2	MIOC	BSMI	DFLN	DFL5		
	4	Stg Prot Pgm	CTL1	CTL2	MIOC	BSMI	SCTL	DFLN	ECC	
	5	0								
	6	IPL L1	BTAC	MIOC	CTL2	DFLN				
	7	(Reserved)								

Note: DFLN = FRU group DFL1, DFL2, and DFL3.

Register X'76'

Byte	Bit	Meaning	Suspected FRUs (in order)					
0	0	IOC Addr Exc	DFL5	DFLN	CTL1	CTL2		
	1	IOC Stg Prot	DFL5	DFLN	CTL1	CTL2		
	2	IOC Inv CCW	DFL5	DFLN				
	3	See Note 2						
	4	IOC Time Out	DFL5	DFLN	CCLK			
	5	IOC Bus In	DFL5	DFLN	CCLK			
	6	IOC Init Op	DFL5	DFLN				
	7	IOC MOSS Op	DFL5	MIOC	CTL2	CTL1	BTAC	DFLN
1	0	0						
	1	0						
	2	0						
	3	0						
	4	0						
	5	0						
	6	0						
	7	0						

Notes:

1. DFLN = FRU group DFL1, DFL2, and DFL3.
2. No FRU list is given. Refer to Chapter 10 for a description of Input X'7X'.

STORAGE DOUBLE-BIT ERRORS

Storage double-bit errors are handled in a different way.

RAC 7CF is indicated, which calls for the CCU BER analysis procedure. The most probable causes of storage double-bit errors are the ECC, SCTL, and BSMI cards. If the errors persist, change these cards and run routine B001.

MANUAL ROUTINE B001

The single-bit storage scan routine (B001) counts the single-bit errors for each storage card and indicates the storage cards for which the number of errors exceeds a given threshold. As the occurrence of double-bit storage errors (due to the storage) is related to the number of single-bit errors, storage cards should not be changed if this single-bit error threshold is not reached. However, if the double-bit storage error rate is high, replace the storage cards by groups of 2 to 4 cards.

To run the routine, proceed as follows:

1. Select routine B001. The message:

   'STORAGE SOLID 1-BIT ERROR DETECTION ==> PRESS SEND'

   is displayed.

2. At the end of the test, a second message is displayed:

   'XXXX XXXX XXXX XXXX XXXX XXXX ==> PRESS SEND'

   where XXXX is a storage card, or blank.

   In the above message, if six or more cards with one bit of error count more than a fixed threshold are detected, a maximum of six cards are called.

3. Press SEND to end the routine.

   Should a CCU hardware error prevent the execution of the CCU instructions, the following message is displayed:

   'CCU HARD ERROR, IML THEN RUN CCU DIAGS'

   When this message is displayed, the only valid action is to perform IML.

<u>CCU Clock</u>

CCLK errors are normally reported via an X'B24' code on the hexadecimal display (there is no associated BER on the diskette). However, an intermittent error in the CCU clocking can lead to different BERs depending on the way in which the error occurs. A correlation between several BERs (types 12, 13, 14, and CCU hardcheck) can point to a CCLK error.

<u>Note:</u> In general, the CCLK has not been specifically indicated in the suspected FRU lists (MIM Part 2).

BER Analysis Procedures (Part 4 of 5)

IOC BUS AND ADAPTERS

The following three BER types can occur for failures in this area.

BER Type 10

This BER occurs if an error was detected while the control program was in a transaction with a channel adapter and the control program has identified the channel adapter concerned.

BER Type 11

This BER occurs:

1. If an error was detected while the control program was in a transaction with a communication scanner and the control program has identified the scanner concerned.

2. If a specific communication scanner reported an error to the control program.

BER Type 14

This BER occurs if an error was detected while the control program was in a transaction with an adapter and no adapter could be identified as the source of the error.

BER Type 15

This BER occurs:

1. If an error was detected while the control program was in a transaction with a Token Ring Adapter and the control program has identified the TRA concerned.

2. If a specific Token Ring Adapter reported an error to the control program.

Note: A single intermittent error can be reported as BER types 10, 11, 14, or 15 depending on the time at which the error occurred and the control program or micro-code transaction that was taking place at that time. In this case, correlation may be useful to narrow down the range of possible failing components.

Example 1: CLAB1

```
Bus ========================================
                     |
                     v
         +-----------------------------+
         |             RDV             |
         +-----------------------------+
               |                 |
               v                 v
         +----------+      +----------+
         |    CA    |      |   TSS    |
         +----------+      +----------+
           BER 10            BER 11
```

An RDV error can lead to BER types 10 or 11; therefore, scan the error log for both BER types to aid fault isolation.

Example 2: Error Propagation for 3725 Model 2 C2LB

```
Bus ========================================
                     |
                     v
         +-----------------------------+
         |             RDV             |
         +-----------------------------+
               |          |          |
               v          v          v
         +---------+ +--------+ +---------+
         |  CA 1   | |  CA 2  | |   TSS   |
         +---------+ +--------+ +---------+
                BER 10            BER 11
```

An RDV error can lead to BER types 10 or 11; therefore, scan the error log for both BER types to aid fault isolation.

Example 3: Error Propagation Along the Entire IOC Bus (3725/3726)

```
Bus ========================================
               |                 |
               v                 v
         +----------+      +----------+
         |   RDV1   |      |   RDV2   |
         +----------+      +----------+
               |                 |
               v                 v
         +----------+      +----------+
         | TSS1/CA1 |      | TSS2/CA2 |
         +----------+      +----------+
```

An RDV error can propagate along the entire IOC bus, thus creating BERs of different types on other adapters; therefore, scan the error log for all BER types to aid fault isolation.

RDV ADDRESS AND ERROR REGISTERS

Regardless of the 3725/3726 configuration, all registers are given.

Each register is 2 bytes long. The high-order byte contains the RDV address; the low-order byte contains the RDV error register.

- If the redrive address is not as indicated in the table below, the RDV should be suspected.

Board	Redrive Address	Board	Redrive Address
C2LB	X'80'	FRDV	X'88'
CLAB1	X'80'	LAB4	X'8B'
C2LB2	X'81'	LAB5	X'8C'
CLAB2	X'81'	LAB6	X'8D'
LAB3	X'82'	LAB7	X'8E'
CABR	X'83'	LAB8	X'8F'

For the RDV error register, refer to Chapter 11 of this manual.

- Whenever an RDV error reports a value that is not X'00', suspect the RDV card and the connected adapter(s).

TSS BER PROCESSING

The following table indicates what actions are taken by NCP/EP and MOSS for the different kinds of TSS errors.

	NCP/EP ACTION						MOSS ACTION	
Detected error	BER IDs	Abend code	ADP down	CP put ADP down	RDV disa-bled	Pgm Reset done	ALERT and ALARM	Dump
Recoverable error in scanner	91,92,93,96,97 99,9A,9B,9C, A1,A4	000	no	no	no	no	none	no
Nonrecoverable error in TSS, line down	1C,A2,B1	000	no	no	no	no	A15	no
Nonrecoverable error in scanner, programmed reset	1E,1F	000	no	yes	no	yes	A14	yes
	91,92,93,98,99 9A	000	no	yes	no	yes	A12	yes
Nonrecoverable error in scanner, adapter is down	95	000	yes	no	no	no	A12	yes
Nonrecoverable error in scanner, disable redrive successful	1E,1F	000	no	no	yes	no	A13	no
	91,92,93,98,99 9A,9B	000	no	no	yes	no	A11	no
Nonrecoverable error in scanner, disable redrive unsuccessful	14,16,18,1B	93X	no	no	no	no	A8	no
	9B,9C,A1	93X	no	no	no	no	A7	no

TRSS BER PROCESSING

The following table indicates what actions are taken by NCP/NTRI and MOSS for the different kinds of TRSS errors.

	NCP ACTION					MOSS ACTION	
Detected error	BER IDs	Abend code	CP put TRA down	RDV disa-bled	CP freeze TIC	ALARM	TIC Dump
Recoverable error in TRSS, TIC	A4,A7	000	no	no	no	none	no
Nonrecoverable error in TRSS, TIC Frozen	A3,A4,A7,AC B2,B3,D4,B6 AF	000	no	no	yes	A29	yes
Recoverable error in TRA	91,92,93,96 97,A5,A8	000	no	no	no	none	no
Nonrecoverable error in TRA, programmed reset	91,92,93,98 A5,A8,B5	000	yes	no	yes	A28	no
Nonrecoverable error in TRA, not installed	18	000	no	no	no	A28	no
Nonrecoverable error in TRA, disable redrive successful	91,92,93,98	000	no	yes	no	A28	no
Nonrecoverable error in TRA, disable redrive unsuccessful	14	B01	no	no	no	A8	no
	16	B02	no	no	no	A8	no
	9C	9x3	no	no	no	A7	no

Scanner Errors Without BERS

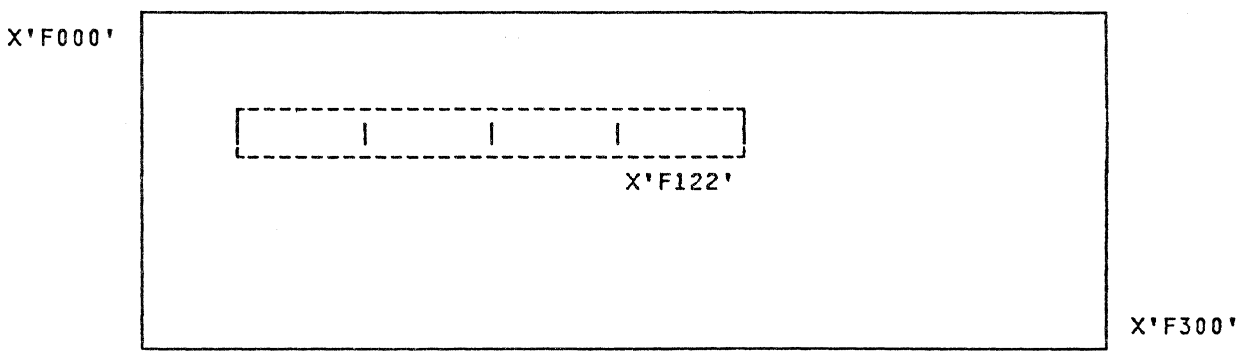
Some errors in a communication scanner may not lead to a BER, although information within the scanner is available to help in fault isolation. Use the following procedure:

1. Start a scan interface trace (SIT). Refer to the <u>3725 Problem Determination and Extended Services</u> Chapter 15.
2. When the problem occurs, stop the SIT.
3. Analyse the SIT. Use the TSS services to display the scanner storage:

Buffer Number	SIT Buffer Start/End Address	Next Available SIT Buffer
1	X'9520'	X'950D'
2	X'9548'	X'9535'
3	X'9570'	X'955D'
4	X'9598'	X'9585'

<u>Example:</u>

1. If location X'9520' contains X'F0F3', the SIT buffer is between X'F000' and X'F300' (refer to the following figure).
2. If location X'950D' contains X'F123', the last halfword of the last 'trace record unit' is at address X'F122' (refer to the following figure).



Each status entry begins with X'E2'. Refer to <u>ACF/NCP for the 3725, Emulation Program for the IBM 3725 Reference Summary and Data Areas,</u> LY30-3070 for details of the SIT control blocks and formats.

In each record, the line communication status (LCS) can help to locate an error. For the LCS format and details, refer to Chapter 13.

<u>Example:</u>

E2	00	05	00	04	22	00	CC

```
Status entry ---> E2
Length -------------> 05
SCF ----------------> 04
CMD ----------------> 22
SES ----------------> 00
LCS 'Line Interface Error' ---> CC
```

The information contained in the MIM Part 2 for BERs Type 11 and ID = A2 can now be used as an entry to the maintenance package.

1. Unresolved CA Level 1 Adapter error (BER 10 95)

   There are two possible types of unresolved CA level 1 interrupts.
   The first is when a CA level 1 occurs and no bits on in CA External Register X"E".
   The second type occurs when there is a CA level 1 and none of the following bits are on in CA External register X"D":

   - 0.0 IOC Bus Parity error
   - 0.1 Internal bus parity error
   - 0.2 CCIN card check
   - 0.4 CHIN card check
   - 0.5 Address Compare error
   - 1.0 Ouput exception check
   - 1.1 PIO Halt remember latch
   - 1.2 Cycle Steal Halt remember latch
   - 1.3 Bus In check Interface A
   - 1.4 Ground Fault error
   - 1.5 Bus In check Interface B
   - 1.6 CADR card check Interface A
   - 1.7 CADR card check Interface B

2. Level 3 Unresolved CA Initial selection

   The following bits in X"0" are checked.
   If none are on, the Control Program builds a BER 10 B1:

   - 0.0 (Normal) Initial selection interrupt
   - 0.1 Interface disconnect
   - 0.2 Selective reset
   - 0.3 Channel Bus Out check
   - 0.5 Stacked Initial status
   - 0.6 ESC Status byte cleared
   - 0.7 System reset

3. Level 3 Unresolved CA Data/Status

   The following bits in X"2" are checked.
   If none of these bits are set and the System Reset bit in X"0" is not set (bit 0.7), the Control Program builds a BER 10 B2:

   - 0.0 Outbound data transfer sequence
   - 0.1 Inbound data transfer sequence
   - 0.2 (Final) Status transfer sequence
   - 0.5 Channel stop/interface disconnect
   - 0.6 Suppress out monitor interrupt
   - 1.1 Data/Status Selective reset
   - 1.3 Stacked ending status

4. Unresolved level 3 CA interrupt

   If a CA Control Block in NCP/EP/PEP is not found that has Select bits matching those of the interrupting CA, then a BER 10 33 is built.

5. Scanner AIO unresolved errors (BER 11 92)

   For the TSS, interrupts are unresolved if:

   - in X"7E" bit 0.7 IOC Level 1 Summary is on
   - in x"76" bit 0.6 Adapter Initiated Operation is on
   - in X"75" bit 0.0 AIO CSCW is on
     Then following the IOH to read the Error Status, one of the following bits is on in X"76":
   - 0.4 IOC Time out
   - 0.5 IOC Bus In parity error

6. Scanner Adapter unresolved error (BER 11 9A)

   - in X"7E" bit 0.5 IOC Adapter level 1 request
   - the error status returned an IOH read error status command = 0.

7. Scanner level 2 unresolved (BER 11 A1)

   There are 3 types of unresolved/undefined interrupts:

   - a level 2 interrupt occurs on a non-Sysgenned line.
   - there is a level 2 interrupt from a a Sysgenned line, but the
   - SCF, SES, and LCS are all zero.
   - there is a level 2 interrupt from a Sysgenned line, but the received
   - status does not coincide with one of the expected ones.

| 8. Control Program unresolved errors (BER 12 21)

   Level 2 PCI: Level 2 should never be PCI'ed.

9. CCU Level 1 unresolved interrupts

   The following bits in X"7E" are checked. If none are set, the Control Program builds a BER 13 91:

   - 0.0 MOSS inoperative
   - 0.1 Any CCU Hard error
   - 0.3 Level 5 I/O error
   - 0.4 Invalid Operation
   - 0.5 IOC Adapter Level 1 request
   - 1.0 Address Compare Level 1
   - 1.1 Address Exception I fetch
   - 1.2 Storage Protect I fetch
   - 1.3 Address Exception Pgm execution
   - 1.4 Storage Protect Pgm execution
   - 1.6 IPL Level 1 request

10. CCU Level 3 unresolved interrupt

    This condition can occur in three different environments: NCP only, PEP, and Remote NCP. The checking are then different.

    a. NCP only
       The following bits are checked. If none of them are set, the Control Program builds a BER 13 B1:

       - X"77" bit 1.0 CA level 3 interrupt
       - X"7F" bit 0.6 User Interrupt request level 3
       - X"7F" bit 1.5 Internal timer interrupt level 3
       - X"7F" bit 1.6 PCI level 3

    b. PEP
       The following bits are checked. If none of them are set, the Control Program builds a BER 13 B1:

       - X"F" bit 0.2 CA Level 3 initial selection request
       - X"F" bit 0.3 CA Level 3 Data/status request
       - X"7F" bit 0.6 User interrupt request
       - X"7F" bit 1.5 Internal timer Level 3
       - X"7F" bit 1.6 PCI Level 3

    c. Remote NCP
       The following bits are checked. If none of them are set, the Control program builds a BER 13 B1:

       - X"77" bit 1.0 CA level 3 interrupt
       - X"7F" bit 0.6 User interrupt request
       - X"7F" bit 1.5 Internal timer Level 3
       - X"7F" bit 1.6 PCI Level 3
         In case X'77' bit 1.0 is set, and the other bits are reset, the Control program builds a BER "Unresolved interrupt", even though it is really a configuration check.

Unresolved Interrupts (Part 2 of 2)

11. CCU Unresolved Level 4 Router

    There are two conditions that may be detected by the Level 4 router. One is a general unresolved condition, the other is unresolved with respect to a PCI Level 4.

    a. General unresolved condition
       If none of the following bits are set in the X"7F" when a Level 4 interrupt occurs, the Control Program builds a BER 13 C1 :

       - X"7F" bit 0.3 MOSS Request service
       - X"7F" bit 0.4 MOSS Response service
       - X"7F" bit 0.7 PCI Level 4 interrupt
       - X"7F" bit 1.7 Service request

    b. Unresolved Level 4 PCI
       If X"7F" bit 0.7 is set, and no reason byte is set in the Level 4 Router Control Block, then the Control Program builds a BER 13 C2. Another error that falls under this category is when the Control Program cannot reset the Level 4 PCI latch (BER 13 C3).

12. Unresolved IOC Bus errors

    a. Unresolved Adapter level 1 (BER 14 91)
       In X"7E" bit 0.5, IOC Adapter level 1 request, is on.
       Following an IOH Broadcast Poll command to identify the board with the adapter problem, X"7E" bit 0.7, IOC Level 1 Summary, is on.

    b. Unresolved AIO Level 1 (BER 14 92)

       - X"7E" bit 0.7, IOC level 1 Summary, is on
       - X"76" bit 0.6, Adapter initiated operation, is on
       - X"75" is invalid. This is true when:

         either X"76" bit 0.2, IOC invalid CSCW, is on,
           or X"76" bit 0.4, IOC Timeout, is on and IOC Status (X"76" bits 0.0 to 0.3) = 2 (no response to TA tag or cycle steal grant)
           or X"76" bit 0.5, IOC Bus in parity error, is on and IOC Status (X'76' bits 0.0 to 0.3) = B (Loading the CSCW)

    c. Unresolved PIO level 1 (BER 14 93)

       - X"7E" bit 0.7, IOC Level 1 Summary, is on
       - X"76" bit 0.6, Adapter initiated operation, is off
       - X"76" bits 0.4, IOC Timeout, and 0.5, IOC Bus in parity error, are off

TROUBLESHOOTING IOC BUS PROBLEMS WITH BERS

Correlation between BERs is necessary in most cases for complex problems (BERs Type 10, 11, and 14).
See MIM Part 1, page 2-804

BER 11 1C MECHANISM

```
  NCP/EP                                 SCANNER
                  cmd nb 1
     --------------------------------->
                  cmd nb 2
     --------------------------------->
                                  Save cmd nb 2
          cmd reject level 1
     <---------------------------------
             Get Error Status
     --------------------------------->
                    Error Status : Cmd reject
                                   Interface Addr
                                   Line initialized
        Error Status type 3
     <---------------------------------
    Command on top
    of a command
     |   |
     |   |     Get cmd reject status
     |  Yes----------------------------------->
     |                            Commands 1 and 2
     |
     |    Error Stat type 3 bit 1.0 on
     |<--------------------------------------
     |
     No
  Set Line INOP            HALTI
          --------------------------------->
                          Disable
          --------------------------------->
   Build BER 11 1C, and put it in CRP for MOSS
   Set next T1C Timeout Exit level 1. Timer
   will end this command with "E4" status.
   MOSS sends Alert/Alarm A15.
```

BER 11 B1/A4 MECHANISM

```
   NCP/EP                                       SCANNER
                      Cmd Xmit/Rcv
      |------------------------------------>  .
  Start back up                                .
    timer                                      .
      |                                       Hang
      |
      |
   Time Out
  at Level 3
 Force Cmd Completion           'F5'
      |-------------------------------->  Save
      v                             information for problem
 .-----------------------.          determination in scanner
 |                       |          storage, (selected control
 |                       |          blocks),
 |                       |          perform clock checking
 |                       |
 |                       |   Level 2 with status
 |                       |<------------------------
 |                       |
 |                       |
 |                     Analyze
 |                     Status :
Time out.             -If Underrun or Time out,
Build BER 11 B1.       build BER 1A4, and retry.
Line Inop. Exit
level 3.                Cmd Xmit/Rcv
MOSS sends            -------------------->
Alert/Alarm A15       -If clock failure, build BER 11 A2
                       Line INOP, MOSS sends Alert/Alarm A15
```

Chapter 3. Maintenance Aids

Contents

Tools and Test Equipment (Part 1 of 4)

The following tools and test equipment must be available to the CE when maintaining the communication controller and its expansion. They are shipped with the machine or with an MES, or are general purpose tools and are part of the CE tool kit. They can also be branch office tools, depending on the country.

GENERAL PURPOSE TOOLS

Qty	Tool	Part No.	Page
1	Torque screwdriver	4134750	3-012
1	Module extractor/ aligner	1715889	3-013
1	Module extractor	453400	3-013
1	Flat cable extractor	2360340	3-013
	Digital multimeter (Worldwide)	8496278	-
	Digital multimeter (EMEA only)	8309874	-
1	Oscilloscope: 454 Tektronix*	459559	-
	or, 453 Tektronix*	453047	
	or, 475 Tektronix*	453215	
-	High voltage probe	453698	-

* Trademark of Tektronix, Inc.

SHIPPING GROUP TOOLS

Board

Qty	Tool	Part No.	Page
1	Indicator card (CELIA) *	1865015	3-011
4	Continuity plug (Base machine)	1736670	3-020
6	Continuity plug (3726)	1736670	3-020
1	Card extractor	1310707	3-013

| * Not in EMEA

Channel Adapters

Qty	Tool	Part No.	Page
1	CADR jumper block	4712553	5-042
2	Segment board (Base machine)	5997533	4-130
2	Segment board (3726)	5997533	4-130
21	Jumpers (Base machine)	2731801	4-260
35	Jumpers (3726)	2731801	4-260

Console

Qty	Tool	Part No.	Page
1	Console wrap block	2667737	3-013

Diskette

(See Chapter 7 for description and use).

Qty	Tool	Part No.	Page
1	Timing pin	5562019*	3-012
1	Force gauge	460870	3-012
1	Head/carriage adjustment spring	4240631*	3-012
1	Track 40 adjustment clip	4240632*	3-012
2	Jumpers	829117	-

* These diskette tools are stored in the diskette drive itself, as shown on page 3-012.

Lines

Qty	Tool	Part No.	Page
1	LIC type 1, 2, and 4 wrap block	1733977	3-012
1	LIC type 3 wrap cable	1733979*	3-012

* This wrap cable is sent one per frame when the corresponding LIC type is present on that frame.

General

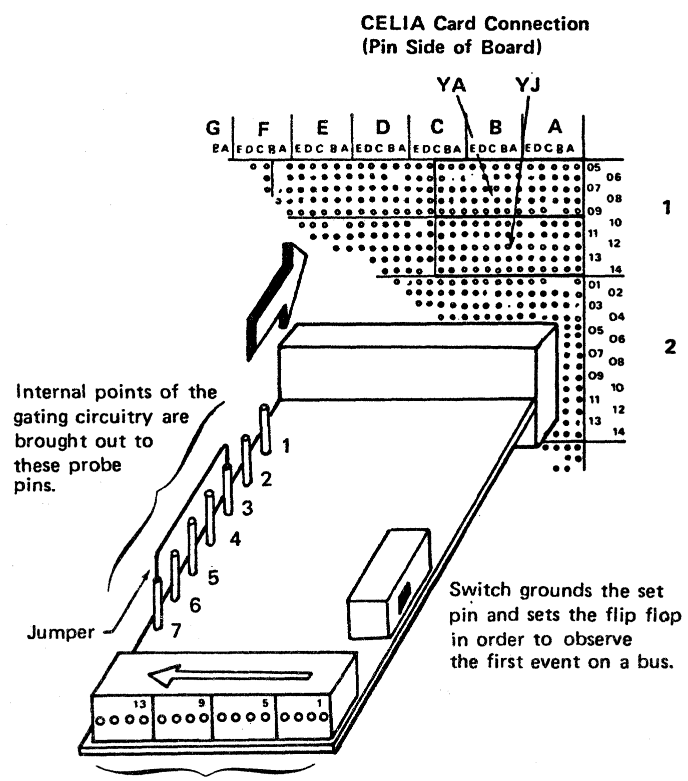
Qty	Tool	Part No.
2	Cover keys	6834390

CELIA CARD (PART 1865015)

Warning: The CELIA card must not be plugged on the MMB, CAB, or CCU boards. Use the card to isolate failing FRUs in the 3725 or the 3726 during initialization, or when running specific diagnostic routines. See MIM Part 2 for the use of this card for troubleshooting. The CELIA card may be plugged with the controller powered on. Plug the card on the pin side of any CLAB, LAB type A, LAB type B, or LAB type C, in the reserved locations:

- YA, for collecting troubleshooting information
- YJ, for checking that the card LEDs are working correctly (always on)

CELIA LED Testing



16 LEDs can be used as straight indicators, or to display the first or last event on a bus.

All LEDs should be ON with the card plugged in the YJ position of a CLAB, a LAB type A, a LAB type B or a LAB type C.

All LEDs should be OFF with the indicator card plugged in the YA position of one of these boards, and with a jumper installed from pin M05 of the board's RDV to ground.

Note: If CELIA is present on a board during a scanner IML, the LED set by hardware (LED 4 or LED 16) must flash for a short time (approximately 1 sec).

CELIA Card Functions

The indicator card provides many different functions as it is a general purpose tool used on many IBM machines.

Specifically, on the IBM 3725/3726, the CELIA card works as a straight indicator.

The indicators give the FRU isolation Code (FIC). The FIC is used in trouble shooting procedure (MIM 2) to isolate a FRU.

Straight Indicator

When used as a straight indicator, the card is plugged into the YA position of a CLAB, a LAB type A, or a LAB type B or a LAB type C. Connect pin 3 to pin 7, to allow the LEDs to show the signals assigned to their input (see data flow, right).

Out of the 16 LEDs of the card, only LEDs 1 through 4 and 13 through 16 carry significant troubleshooting information:

Used by odd scanners

LED	Set by	Via
1	Microcode	CSP ext reg 08, bit 5
2	Microcode	CSP ext reg 08, bit 6
3	Microcode	CSP ext reg 08, bit 7
4	Hardware	CSP ext reg 03, bit 2

Used by even scanners

LED	Set by	Via
13	Microcode	CSP ext reg 08, bit 5
14	Microcode	CSP ext reg 08, bit 6
15	Microcode	CSP ext reg 08, bit 7
16	Hardware	CSP ext reg 03, bit 2

Bits set by the microcode carry error codes for scanner troubleshooting using the MIM Part 2.

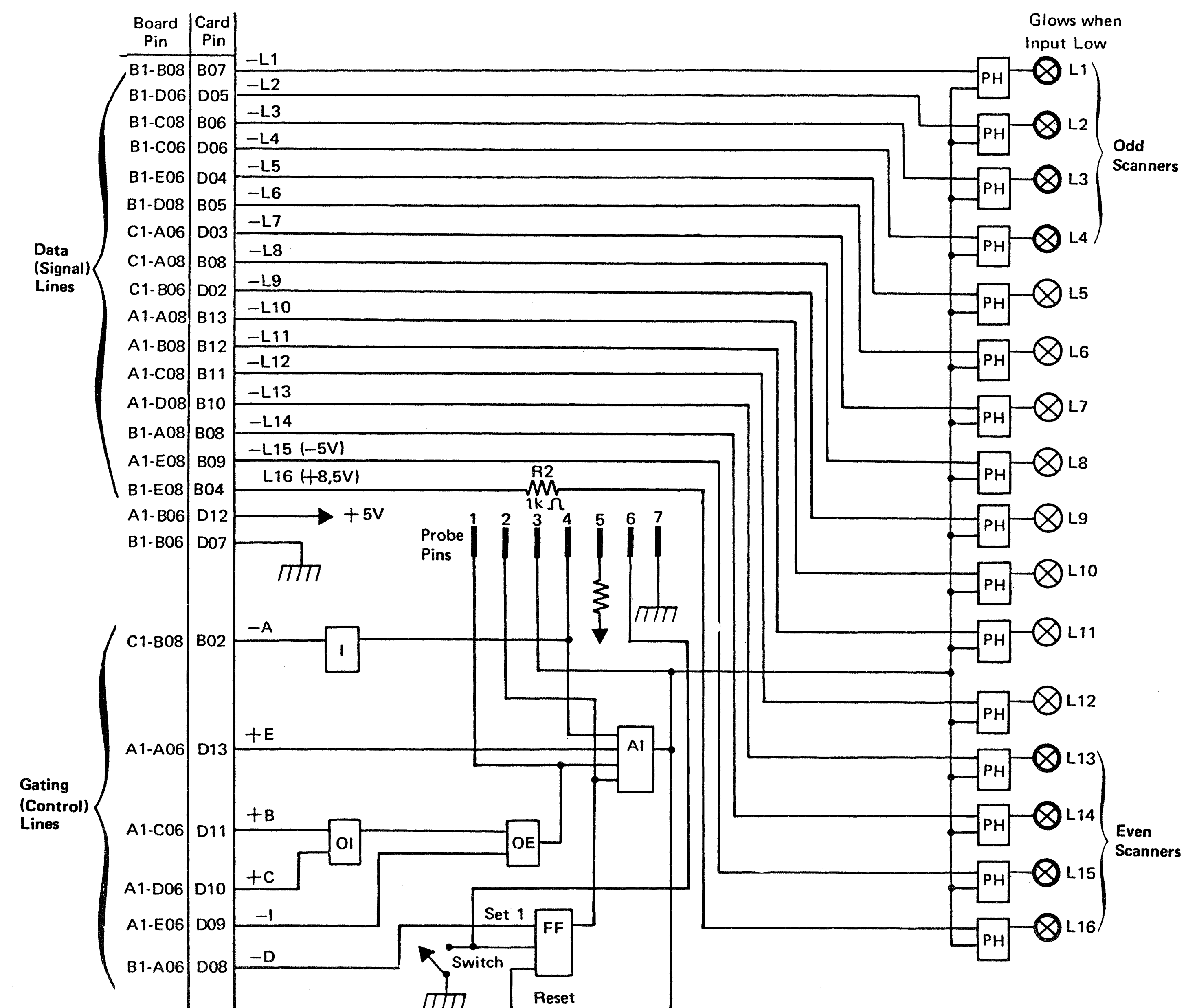
Bits 4 and 16 indicate a scanner processor hardware check.

On a LAB type B, LEDs 1 through 4 provide the status of the first scanner (odd). LEDs 13 through 16 provide the status of the second scanner (even).

The second scanner of a LAB type B is indicated between parentheses in the table (right).

Scanner	Board Name	Board Address
1	CLAB1 or C2LB	01A-A3
3	CLAB2 or C2LB2	01B-A2
5-(6)	LAB pos 3	A1
7-(8)	LAB pos 4	02A-A3
9-(10)	LAB pos 5	A2
11-(12)	LAB pos 6	A1
13-(14)	LAB pos 7	02B-A3
15-(16)	LAB pos 8	A2

CELIA CARD DATA FLOW



Tools and Test Equipment (Part 3 of 4)

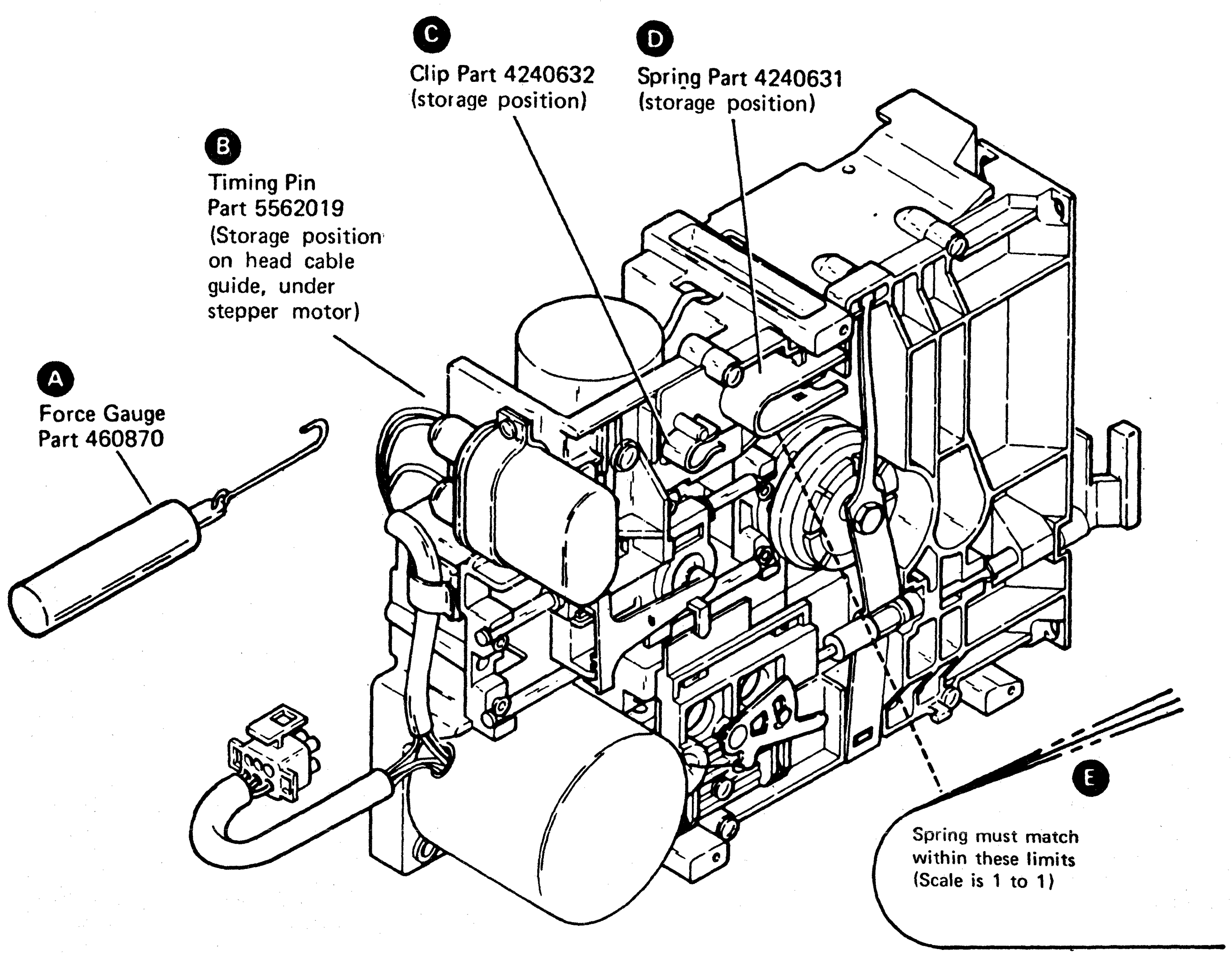
DISKETTE TOOLS

Use the diskette tools to:

- Adjust or check the drive band tension
- Adjust or service the read/write head carriage stepper motor pulley
- Keep the thickness gauge in contact with the adjustment surface of track 40
- Keep the head carriage in place against the thickness gauge when adjusting the head carriage.

For information on how and when to use the diskette tools, see Chapter 7.

Tools B, C, and D are stored in the diskette drive as shown.



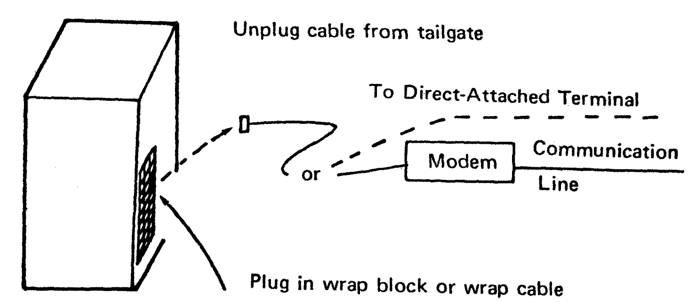
COMMUNICATIONS WRAP BLOCK AND WRAP CABLE

A wrap block and a wrap cable are used to test the LICs. Inserting the corresponding wrap block or wrap cable on the tailgate in place of the modem cable connector enables diagnostics and wrap programs to test the TSS circuits in the wrap mode on a particular line. The wrap block (Part 1733977) is used on LIC type 1, LIC type 2, and LIC type 4. The wrap cable (Part 1733979) is used on LIC type 3.

The MIM Part 2 shows how to use the wrap block and the wrap cable during troubleshooting procedures.

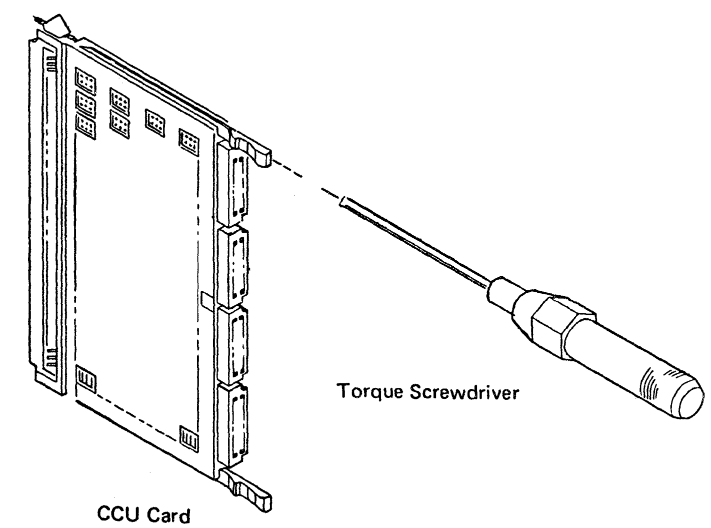
The wire function and wire wrap routing in the wrap block or the wrap cable is shown with the line interfaces in Chapter 4, starting on page 4-140.

Tailgate in Frame 01 or 02



TORQUE SCREWDRIVER (PART 4134750)

Use the torque screwdriver when plugging or unplugging a card or a connector on the CCU board (see page 5-010). A calibrated spring inside the tool enables the card holding screws to be tightened to the correct torque value.



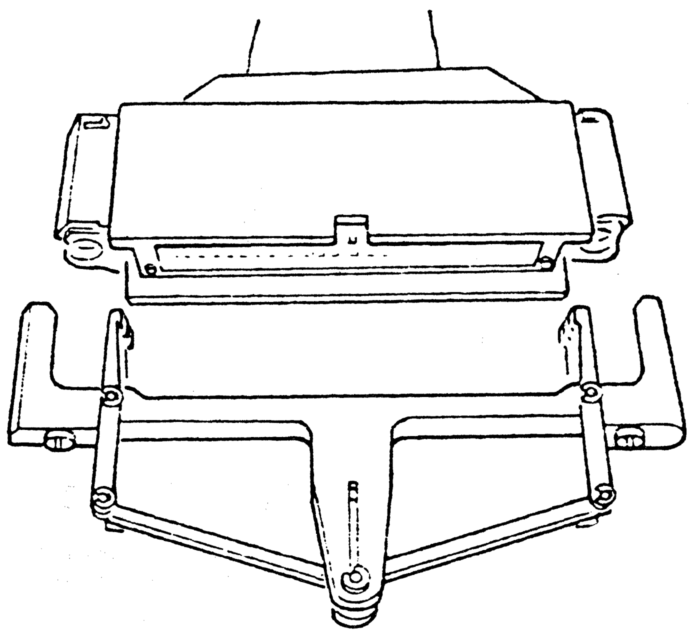
Tools and Test Equipment (Part 4 of 4)

FLAT CABLE EXTRACTOR (PART 2360340)

In the CCU board, there are three signal connectors:

- 01A-A2-A3 with three flat cables
- 01A-A2-B1 with five flat cables
- 01A-A2-V2 with two flat cables

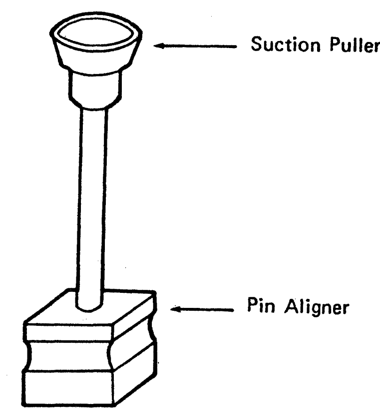
Use the flat cable extractor to remove any single flat cable from its connector.



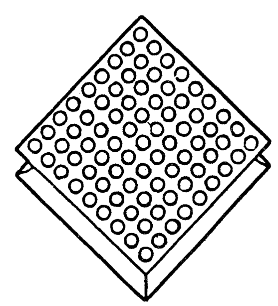
MODULE EXTRACTOR/ALIGNER (PART 1715889)

Warning: Pluggable modules of the MPC and MMC cards are ESD-sensitive parts. See instructions for working with ESD-sensitive parts in Chapter 5.

Use the module extractor/aligner to align bent pins on modules.

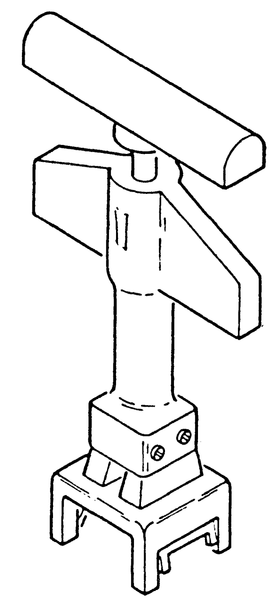


Bottom View of Pin Aligner

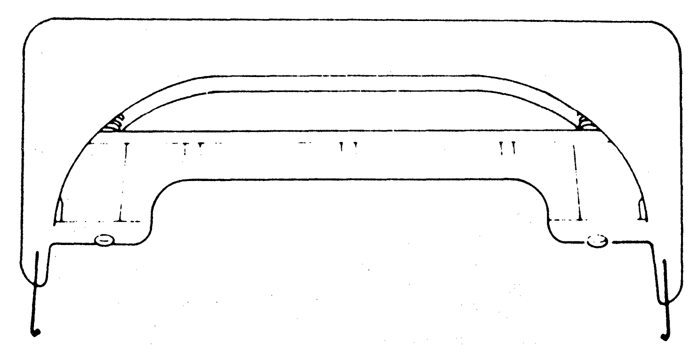


MODULE EXTRACTOR (PART 453400)

Use the module extractor to pull out the pluggable modules on the CSP1, MPC, and MMC cards.

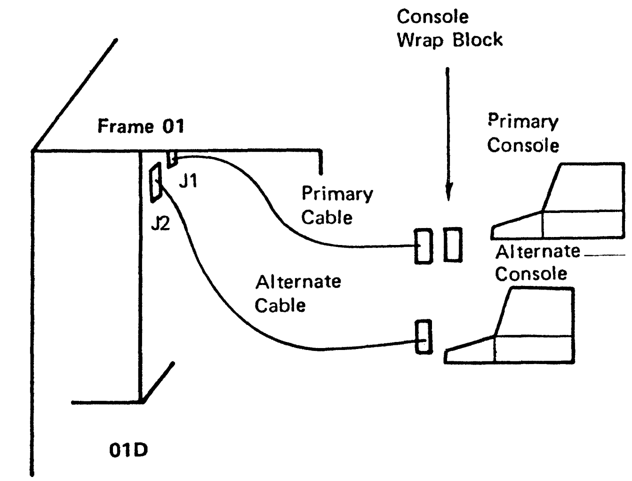


CARD EXTRACTOR (PART 1310707)



CONSOLE WRAP BLOCK (PART 2667737)

The console wrap block is connected as shown when the console adapter and interface (including the cable) are to be tested.



MIM Part 2, Chapter 6, explains when and how to use this block for maintenance testing.

ISO 2110
25 pins

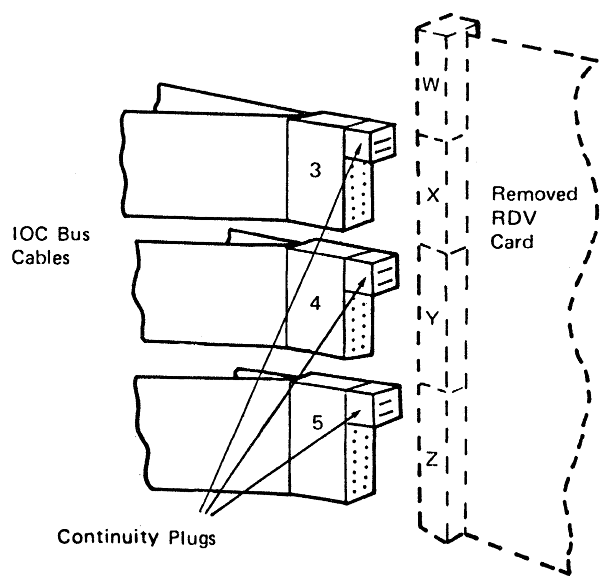
6	0-	---┐	Data channel received line Signal detector
9	0-	<--┤	Ready for sending (Clear to send)
10	0-	<--┘	Request to send
12	0-	---┐	Transmitted data
11	0-	<--┘	Received data
8	0-	---┐	Data terminal ready
19	0-	<--┘	Data set ready

Removing RDV or CADR Cards

REMOVING THE RDV FROM THE IOC BUS

For troubleshooting purposes, a board RDV card can be removed from the IOC bus cables as follows:

1. Switch power off.
2. Unplug the IOC bus cable connectors from the RDV top connectors.
3. Connect the continuity plugs (Part 1736670) in place of the RDV card as shown below.



<u>Note:</u> The continuity plugs can be replaced by four jumpers on the IOC bus cable connector as follows:

On connector 4: Pin B02 --> pin D02

On connector 4: Pin B03 --> pin D03

On connector 5: Pin B02 --> pin D02

On connector 5: Pin B03 --> pin D03

A continuity plug is also installed on connector 3, but is not used.

4. Switch power on.

   Refer to "Redrive State Definitions" in Chapter 11.

REMOVING THE CADR FROM THE HOST CHANNEL INTERFACE

Use the CADR jumper block (part 4712553). Refer to page 5-042 for removing and replacing a CADR card.

BER Display from MOSS Storage

The following errors cause a MOSS level 0 interrupt but do not force an automatic MOSS re-IML. They are:

- IML stop on error: codes Exx
- IML stop on diskette error: codes Dxx, except code D00
- Panel I/O error: codes Bxx
- MOSS re-IML threshold reached (10 MOSS IML attempts within a given period): codes Cxx
- Error recovery reentry: codes Axx; for hex display error description, see MIM Part 2, Chapter R4.

These errors flash on the hex display lamps as Axx, Bxx, Cxx, Dxx, or Exx. They indicate a failure found while running the MOSS microcode. A sixteen-byte BER is created for codes Axx and Cxx. Depending on the error, not all the BER fields may be updated. Fields not updated are filled with 'FF'. It is not written on the diskette, because of the failure type but kept in MOSS storage.

DISPLAY PROCEDURE

Ground pin 01A-A1U2G13 on the MMB board to display the 16-byte BER from storage.

As soon as the pin is grounded, the error that was flashing is replaced in hex lamps 2 and 3 by the first byte of the BER. Hex lamp 1 indicates the position of the displayed byte within the BER.

```
Hex lamps              1   2   3
                     ┌───┬───┬───┐
                     │ 0 │ x │ x │
                     └───┴───┴───┘
                       |   └───┘
                       |     |
                       |     |
Byte position <--------┘     └----> Byte value
```

Hex lamp 1 automatically displays the following BER byte positions up to F. The BER is displayed repeatedly until pin G13 is off the ground.

When the jumper is removed, the hex display lamps show the original error code again.

Warning:
Remove the jumper from pin 01A-A1U2G13 when troubleshooting is finished. If you do not remove the jumper, the MOSS IML ends with E61.

HEX DISPLAY/BER DECODE

This BER is a MOSS BER type 01, ID 00. It has no header as it has not yet been processed by MOSS. For details of BER contents, refer to page 2-240.

The column "Hex Display pos 2, 3" is left blank for the CE to write down the byte information read on the hex display.

Hex Display	Hex Display	Decode (BER Type 01, ID00)
Pos 1	Pos 2,3	Meaning
0		CHECK: MOSS check
1		LL : last level interrupt
2		MCPC : MCPC register
3		IOIR : IOIR register
4		PIRR : PIRR register
5		CM : common mask register
6		DATA : Data byte 0
7		Data byte 1
8		Data byte 2
9		MEF : Storage expansion feature
A		TTA : Current TTA entry byte
B/C		I : failing instruction
D/E		PSW : IAR of interrupted level (bytes 0 and 1 of PSW)
F		Not used

DISKETTE BERS

A MOSS BER related to a diskette error (type 01 ID 03) is kept in MOSS storage because it cannot be recorded in the diskette BER file. You can retrieve this BER by mounting the spare diskette and performing a MOSS IML from the control panel.

If the diskette drive itself is the cause of the error, you must first repair it before you can retrieve any BER from storage. To do so, follow the troubleshooting procedures given in the MIM Part 2.

BER STORAGE WHEN DISKETTE IS NOT OPERATIONAL

When the diskette is not operational, the MOSS keeps the BERs in the 365-byte buffer in MOSS RAM. When the buffer becomes full, new BERs are lost, but a count is kept in the last byte of the buffer of the BERs lost. This is called the lost record count. The 365-byte buffer in MOSS RAM is preserved during MOSS IML. To read this buffer, see the "Display Procedure" paragraph on this page.
When the diskette becomes operational again, MOSS stores the 365-byte buffer in the BER file on diskette, together with a BER giving the number of lost BERs in the error description line (Type 01, ID 06, error 02).

Extended Problem Analysis Tools

PT-2

The PT-2 is a general purpose programmable service system designed for on-site and remote maintenance of a wide range of products and systems.

The PT-2 consists of the following:

- A processor with 64K bytes of storage.
- A keyboard that contains 78 keys used for system control, program control, and data entry.
- A video unit for displaying data information and instructions. There are two display formats: 16 lines of 64 characters or 24 lines of 80 characters.
- A tape cartridge unit that has a storage capacity up to 2.1 million bytes and is used as an I/O device for programs and data.
- A teleprocessing link through an acoustical coupler or data access arrangement.
- A service interface that provides the link between the PT-2 programs and the product or system being maintained. Through the service interface the PT-2 programs can monitor, control or interrogate the product or system. Information or data received through the service interface can be stored in memory or on tape.
- An auxiliary interface is provided for connecting selected external I/O units.

OUTPUT 79 SYNC

The Sync points in output "79" can now be used as a Problem Determination aid for intermittent problems. MIM part 1, page 10-240 "OUTPUT 79" describes Byte 1, bits 6 and 7 as Scope syncs, pulse 1 and 2. The SST, Biomation, or scope can be used on these points for a trigger to the failure. Note that this is possible only with APAR IR61608, applicable to both EP and NCP. Byte 1, bit 6 (pulse 1) will be triggered by Level 1 interrupts. Byte 1, bit 7 (pulse 2) will be triggered by the Box Error Record processor. Using these triggers to isolate the failure will prevent long hours of record review time.

PT-2/TP LINE MONITOR (TPLM)

The PT-2/TPLM is a data capture/presentation tool used for problem determination in a TP network environment. The transmit and/or receive data of the communication network, along with control line changes, are monitored and recorded on tape under control of the PT-2 application programs. The PT-2/TPLM supports start-stop, BSC, and SDLC line protocols. The recorded data can be displayed and analyzed by the on-site CE or it can be transmitted to a remote site for analysis.

PT-2 SNA EDIT AND DISPLAY PROGRAM (SNAPED)

The SNAPED program formats and edits SDLC/SNA data recorded on tape by the SDLC or the high speed SDLC trace programs.

SDLC/SNA debugging is enhanced by displaying the data in two modes.

1. SDLC mode, the data on the trace tape is formatted to display:
   - Address
   - SDLC command (bytes are decoded to mnemonic form)
   - Poll/final bit
   - N/S transmitter sequence count
   - N/R receiver sequence count
   - Frame check sequence (FCS)
2. SNA Mode, the data on the trace tape is formatted to display:
   - Address
   - FID type
   - Request/response header
   - SNA commands
   - Request/response unit
   - Data

PT-2 HIGH-SPEED TRACE PROGRAMS

The high speed trace programs (HISDTR - high speed SDLC and HIBSTR - high speed BiSync) capture data from TP links or loops operating at speeds of 19.2 kbps to 56 kbps.

The trace data from the TP line monitor is stored in a 40K byte buffer area in the PT-2 main storage. All repetitive characters are compressed to achieve maximum high speed data capture and storage.

PT-2 TP EXERCISE PROGRAM (TPEXER)

The TP exercise programs, in conjunction with the PT-2 TPLM, exercise data terminal equipment (DTE) and/or data communication equipment (DCE) in start-stop, BSC or SDLC modes.

TP devices can be exercised remotely or locally.

There are two modes of TP exercise operation:

1. Manual Mode: Data to be transmitted (exercise data) is entered via the PT-2 keyboard. All TP activity is displayed and recorded on tape.
2. Tape Mode: Data to be transmitted (exercise data) is contained on a prerecorded tape from a previous line trace or manual exercise operation. In this mode of operation, the CE can compare the responses from DTE/DCE with what is on tape by selecting "compare mismatch stop". Expected responses can then be compared visually with actual responses from the DTE/DCE.

The PT-2/TPLM utilizes external clocks or the TPLM internal exercise clocks (600, 1200, 2400, 4800 or 9600).

PT-2 CHANNEL MONITOR (CHIM)

The PT-2/channel monitor can be attached to any System/370, 4331, or 4341 I/O Channel and to the DASD (file) CTL-I interface. The PT-2/CHIM, under program control, monitors all I/O channel bus and tag lines, stores up to 4096 electronic snapshots of the monitored lines, and time stamps and record multiple events on the PT-2 tape. The PT-2/CHIM can perform its functions in unattended mode. An offline edit program provides search capabilities and presents recorded bus and tag line data on the PT-2 display. The data is displayed in time-related sequences for reconstruction and analysis of channel events.

MODEM INTERFACE TEST SET

The modem interface test set is a hand-held battery-powered device that enables a TP CE to display, monitor, or control the 24 leads of an EIA data set cable. The polarities of commonly used lines are displayed in LEDs, and other lines can be jumpered to spare LEDs. All lines are brought out to jumper connections enabling the CE to make inter-line connections for diagnostic purposes or temporary repairs. This tool helps the CE readily identify problems on the EIA interface, such as not-ready conditions, no polling, no replies, and line interruptions.

MAINTENANCE DEVICE 2 (MD2)

The MD2 is a CE branch office tool that may be used with an acoustic coupler to perform various tasks directly with the 3725 diskette.

These tasks are detailed in Chapter 2, under "File Transfer".

Stand-Alone Link Tests (SALT)

The stand-alone link tests, also called "link tests", are used to test:

- The link between two communication controllers
- The link between a 3725 and an SDLC terminal

The link tests consist of two programs: (1) the link test requester (REQ), for use in the requester 3725, and (2) the link test responder (RESP), for use in the responder 3725. Both programs are recorded on the controller diskette. They destroy the control program when they are loaded and run in stand-alone mode instead of control program mode.

The link tests are particularly useful for link-attached controllers when the control program cannot be loaded over the normal IPL link.

The link tests are loaded from the operator console using the IPL/TSS functions. (The procedures are described in 3725 Problem Determination and Extended Services, GA33-0028, Vol. A06.)

TESTING AN INN LINK

The link tests can be used to check an intermediate network node (INN) link between two 3725s, or between a 3725 and a 3705. The INN link is an SDLC leased or manually switched line.

The link to be tested must be defined as an IPL port in the IPL port table of the requester controller, and also in the responder controller (if the link tests are to be used as responder). (See details in 3725 Problem Determination and Extended Services.)

SDLC TERMINALS EXERCISER WITHOUT CP LOADED

Test Purpose

The link tests can also be used to exercise SDLC terminals provided that they:

- Reply correctly to SDLC test frames (see 3725 Problem Determination and Extended Services for SDLC test frame description)
- Do not require the following options:
  - Transmit two flags before frame
  - Transmit flags between frames
  - Transmit with new SYNC
- Do not use the 3725 internal clock

The lines to be exercised must be defined as IPL ports in the IPL PORT table. They should be removed from the IPL PORT table at end of test. Also, if customer-defined IPL ports have been overridden, they must be redefined.

Procedure

1. Start as follows:

   a. Use the CDF functions to create (if not already done) and update the CDF, and check the clocking, as required (see page 2-401).

   b. Record the customer IPL ports manually, or via the printer, if installed, to be able to re-establish them after the test.

2. Define the lines to be tested as IPL ports in the link IPL PORT table according to the terminal and line characteristics (see 3725 Problem Determination and Extended Services).

   Notes:

   1) Up to eight lines can be defined in the IPL PORT table. If more than eight lines have to be tested, define the first eight in the IPL PORT table and test them as described below. Then, define new lines by updating the IPL PORT table and restart the procedure at step 3.

   2) If you override an existing customer IPL port, do not forget to re-establish it after the test.

3. Proceed as follows:

   a. Load the link test program requester in the CCU.

      Warning:
      The link tests destroy the control program that may be running in the CCU. In such case, before loading the link tests, ask the customer to vary off-line the lines and channels connected to the controller.

   b. Disable all the channel ports at the control panel.

   c. Press SELN AREA, then I followed by SEND to display the IPL CCU/TSS menu.

   d. Enter 3 to start loading the link test requester.

4. Invoke the link test function as follows:

   a. Enter T to terminate the LOAD function.

   b. Enter L to display the LINE FNCTN menu.

   c. Enter 3 followed by SEND to invoke the LINK TEST function.

5. Be sure that the terminal to be tested is powered on.

   Also, in case of a programmable terminal, be sure that the terminal is initialized (refer to appropriate terminal documentation) and that its host communication link is active.

6. Perform the test by providing the required information (see 3725 Problem Determination and Extended Services) considering the following notes:

   Notes:

   1) The responder address is the address of the terminal.

   2) The data pattern to be used for the test should not be longer then the size of the terminal buffer as the terminal will reflect back only the data it is able to receive. So, for terminals with a buffer size less than 128 bytes, the use of the personal pattern option is recommended.

   3) The personal pattern option allows defining an empty pattern (containing no data). This facility must be considered for terminals that are not able to reflect back the received data (or that send back their own data).

7. When the test is completed for a given line, return to step 4 to perform the test on another line, or to step 2 if new IPL ports must be defined.

   Warning:
   Never forget to reload the link test program each time the IPL PORT table is updated.

Error Reporting

When running in investigation mode, the test stops on the first error encountered and error information is displayed. (The error messages are explained in 3725 Problem Determination and Extended Services.)

Status codes (SCF, LCS, SES) may also be displayed along with some messages. (See MIM Part 2, Vol A01, Chapter R1 for an interpretation of these codes.)

RECMS (MDR): BSC/SS Device or Line Errors (Part 1 of 3)

The miscellaneous data recorder (MDR) record is a subset of the RECMS record. NCP may refer to a RECMS record by the term "MDR record".

All information herein is a duplicate from the Advanced Communications Function for Network Control Program for the IBM 3725; Emulation Program for the IBM 3725 Reference Summary and Data Areas, LY30-3070. Pages 3-050 to 3-058 give an understanding of what information is needed and what kind of logic is used by an NCP specialist for trouble-shooting. The complete and up-to-date manual to make reference to, for error analysis is the above-cited licensed handbook.

PERMANENT BSC/SS DEVICE OR LINE ERRORS

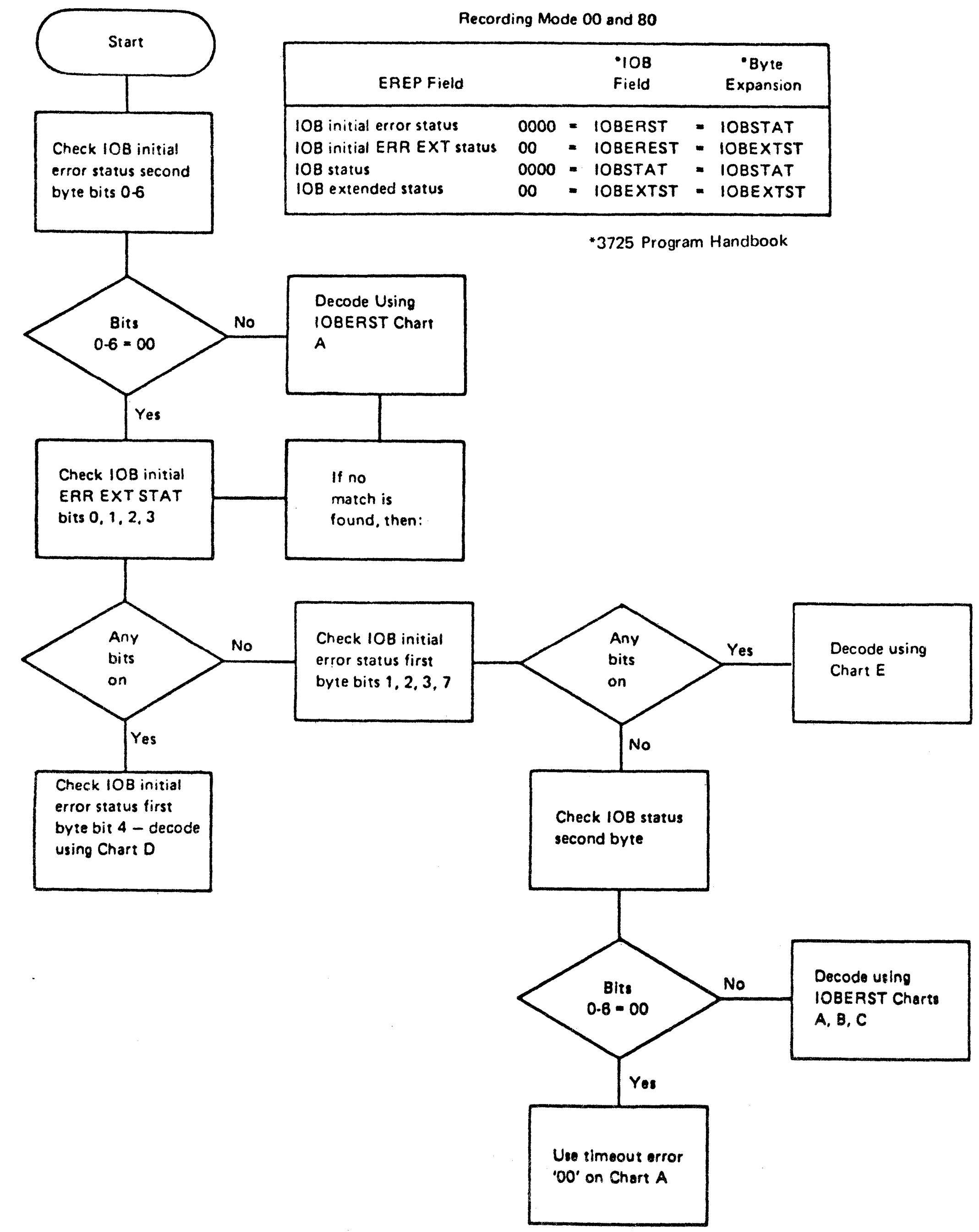
The line error recorder routine (CXDILER) and LPDA terminator (CXDKCET) build this RECMS RU.

RECMS PIU offset 55(37)

0(0)	Network services X'01'
1(1)	Physical maint.service X'03'
2(2)	Request code (RECMS) X'81'
3(3)	Network address of the BSC/SS device or line
5(5)	Line Interface Address (CCBBAR) (Note 1)
7(7)	Recording Mode=X'80'
8(8)	Record ID=X'25'
9(9)	Level of information changes X'01'
10(A)	Reserved
13(D)	BTU command (BCHCMD) (Note 1)
14(E)	BTU modifier (BCHMOD) (Note 1)
15(F)	BTU flags (BCHSFLAG) (Note 1)
17(11)	IOB command (IOBCMAND) (Note 1)
18(12)	IOB modifiers (IOBCMODS) (Note 1)
20(14)	IOB immediate control flags (IOBIMCTL) (Note 1)
21(15)	IOB status (IOBSTAT) (Note 1)
23(17)	IOB extended status (IOBEXTST) (Note 1)
24(18)	IOB initial error status byte 0 (IOBERST) (Note 1)
25(19)	IOB initial error status byte 1. (IOBERST) (Note 1)
26(1A)	IOB initial error extended status (IOBEREST) (NOTE 1)
27(1B)	Transmission counter (DVBSDRT) (Note 1)
29(1D)	Reserved
31(1F)	Temporary error counter (DVBSDRE) (Note 1)
33(21)	2740 graphic response byte (Note 2)
34(22)	Device features (DVBFEAT1) (Note 1) (DVBFEAT2) (Note 1)
36(24)	Device type (DVBTYPE) (Note 1)
37(25)	NPDA alarm parameter
38(26)	Link subsystem type (Note 3)
39(27)	LPDA control (1st byte)
40(28)	LPDA remote status (1st byte) (Note 4)
41(29)	LPDA remote status (1st byte) (Note 4)
42(2A)	LPDA local status (Note 4)
44(2C)	LPDA local and remote self-test results (Note 4)

Notes:
1. Indicates the control block field from which this RECMS-RU field is loaded
2. 2740 graphic response byte is zero if not applicable
3. Link subsystem type:
   X'00'-No link subsystem data
   X'01'-Link Problem Determination Aid (LPDA) test data
4. These fields are not present for a line without LPDA testing facilities or for which the LPDA test could not be initiated. The LPDA control byte is always present. If the remaining fields are not present, the control byte is marked "execution not attempted" for all tests.

PERMANENT BSC/SS LINE ERROR-RECMS DECODING



Recording Mode 00 and 80

EREP Field		*IOB Field		*Byte Expansion
IOB initial error status	0000 =	IOBERST	=	IOBSTAT
IOB initial ERR EXT status	00 =	IOBEREST	=	IOBEXTST
IOB status	0000 =	IOBSTAT	=	IOBSTAT
IOB extended status	00 =	IOBEXTST	=	IOBEXTST

*3725 Program Handbook

RECMS (MDR): BSC/SS Device or Line Errors (Part 2 of 3)

CHART A

IOBERST Second Byte Bits 0-6	Error	Error Description	Probable Cause
00,20 40,60	Timeout	Some character(s) have been received.	Communications/ secondary failure
04,24 44,64	Cutoff	Control length field was too long.	Communications/ secondary failure
06,26 46,66	Abort	Reply to transmitted data was an ENQ.	Communications/ secondary failure
08,28 48,68	Text in Control Mode	Text received in control mode. (No SOH, STX, or Circle D).	Communications/ secondary failure
0A,2A 4A,6A	DLE Control End	Undefined or DLE and character sequence was received.	Communications/ secondary failure
0C,2C 4C,6C	Wrong ACK	Wrong ACK received.	Secondary failure
0E,2E 4E,6E	Negative ACK	Negative ACK received.	Communications/ secondary failure
10,30 50,70	Received Sub-block	Received sub-block has ended before the end of the transmission block.	Secondary failure
1E,3E 5E,7E	WACK	WACK received.	Secondary failure
80	Timeout	Nothing received.	Communications/ secondary failure
82	Command Reject	Command could not be carried out because of specification error	Program failure
84	Buffer Depleted	Level 2 and 3 buffer pools depleted.	Program failure
88	DLE/EOT	Received disconnect signal.	Secondary failure

CHART B

IOBERST Second Byte Bits 0-6	Error	Error Description	Probable Cause
8A	Data not expected	Data was received when it was not expected.	Communications/ secondary failure
8C	Reset	Immediate X10 command has caused the current command to end prema-turely.	Program failure
90	Transmit sub-block end	Sub-block sent has ended before the end of the transmission block.	Program failure
92	EOT sent after Wack	The command ended when EOT was sent, after the Wack reply was received.	Secondary failure
94	Break in text	Break was received while receiving text.	Communications/ secondary failure
96	Poll stop	Poll Stop-Dev. was polled to the polling limit and responded negatively.	Secondary failure
9A	Break in Transmit	Break was received while in the process of transmitting (normal operation).	Secondary failure
9C	Discon-nected	Command issued to a line that is disabled.	Host program failure
E0	User error	Normally indicates an incorrect NCP generation (MTA).	Program failure
E4	Scanner check	Level 1 communication scanner check occured.	Hardware failure
E8	Adapter check	Communications line adapter check occurred when level 2 interrupt not received.	Hardware failure

RECMS (MDR): BSC/SS Device or Line Errors (Part 3 of 3)

CHART C

IOBERST Second Byte Bits 0-6	Error	Error Description	Probable Cause
EA	Adapter Feedback Check	Communication adpt. feedback check has occurred.	Hardware failure
EC	Equipment Check	Operation ended because of a 3725 hardware failure.	Hardware failure
F0	Modem Error	DSR or CTS dropped during command operation.	Modem interface failure
F2	Modem Clock Error	When in transmit mode and the first character cannot be transmitted.	Modem interface failure
F4	DSR - On Check	For leased lines, indicates DSR did not come up within 3 seconds after DTR.	Modem interface failure
F8	DSC - Off Check	Indicates DSR did not drop within 3 seconds of DTR dropping.	Modem interface failure
FC	ACU Check	No response from ACU.	Modem interface failure
FE	Program Failure	A negative data length was computed.	Program failure

CHART D

IOBERST Bit	Error	IOBERST First Byte	Error Description	Probable Cause
0=1	Underrun	4=1	Character transmitted more than once.	Program/hardware failure
	Overrun	4=0	Receive character overlayed.	Program/hardware failure
1=1	Line quiet timeout	N/A	Data still being received after block ended.	Communications failure
2=1	DLE format exception	N/A	Invalid DLE line control sequence	Secondary failure
3=1	Sub-block error flag	N/A	Error recovery failed to retry a recoverable error.	Communications/ secondary failure

CHART E

IOBERST First Byte	Error	Error Description	Probable Cause
3=1	Data check	Block check character error.	Communications failure
1=1	Format exception	Bad line control sequence.	Secondary failure
2=1	Sync check	Stop bit error (start-stop only).	Communications failure
7=1	Length check	Ending character detected before count exhausted (transmit).	Host program

RECMS (MDR): BSC/SS Station Statistics

The line error recorder routine (CXDILER) and LPDA terminator (CXDKCET) build this RECMS RU.

RECMS PIU offset 55(37)

0(0)	Network services X'01'
1(1)	Physical maint.service X'03'
2(2)	Request code (RECMS) X'81'
3(3)	Network address of the BSC/SS station
5(5)	Line interface address (CCBBAR) (Note 1)
7(7)	Recording Mode X'81'
8(8)	Record ID=X'25'
9(9)	Level of information changes X'01'
10(A)	Reserved
13(D)	Hex Zeros
27(1B)	Transmission Counter (DVBSDRT) (Note 1)
29(1D)	Reserved
31(1F)	Temporary error counter (DVBSDRE) (Note 1)
34(22)	Device features (DVBFEAT1) (Note 1) | (DVBFEAT2) (Note 1)
36(24)	Device type (DVBTYPE) (Note 1)
37(25)	NPDA alarm parameter
38(26)	Link subsystem type (Note 2)
39(27)	LPDA control (1st byte)
40(28)	LPDA remote status (1st byte) (Note 3)
41(29)	LPDA remote status (2nd byte) (Note 3)
42(2A)	LPDA local status (Note 3)
44(2C)	Reserved

Notes:

1. Indicates the control block field from which this RECMS-RU field is loaded
2. Link subsystem type:
   X'00'-No link subsystem data
   X'01'-Link Problem Determination Aid (LPDA) test data
3. These fields are not present for a line without LPDA testing facilities or for which the LPDA test could not be initiated. The LPDA control byte is always present. If the remaining fields are not present, the control byte is marked "execution not attempted" for all tests.

RECMS (MDR): SNA Link Permanent Errors

The line error recorder routine (CXDILER) and LPDA terminator (CXDKCET) build this RECMS RU.

RECMS PIU offset 55(37)

0(0)	Network services X'01'
1(1)	Physical maint.service X'03'
2(2)	Request code (RECMS) X'81'
3(3)	Network address of SNA link
5(5)	Line interface address (CCBBAR) (Note 1)
7(7)	Recording mode X'82'
8(8)	Record ID=X'25'
9(9)	Level of information changes X'02'
	Hex zeros
17(11)	I/O command (LXBCMAND) (Note 1)
18(12)	Command modifier field (LXBCMODS) (Note 1)
20(14)	Immed.ctrl command field (LXBIMCTL) (Note 1)
21(15)	Current error status (LXBSTAT) (Note 1)
23(17)	Extended error status (LXBEXTST) (Note 1)
24(18)	1st error status (byte 1) (LXBERST) (Note 1)
25(19)	Hold SDLC status (byte 2) (LXBHSTAT) (Note 1)
26(1A)	1st error extended status (LXBEREST) (Note 1)
	Hex zeros
30(1E)	Received BLU command field (LXBRBLUC) (Note 1)
	Hex zeros
	Hex zeros
34(22)(Note2)	Transmit BLU command (CCBCFLD) (Note 1)
39(27)	Control flags (CCBRSPON) (Note 1)
40(28)	Line type (CCBTYPE) (Note 1)
41(29)(Note3)	Command received from sec. station.
42(2A)(Note3)	N(R) and N(S) received from sec. station.
43(2B)(Note3)	Command reject reason
44(2C)(Note6)	Dial control flags (CCBTYPEC) (Note 1)
	Hex zeros
57(39) (Note 6)	X'21' call progress signals
59(3B)	NPDA alarm parameter
60(3C)	Link subsystem type (Note 4)
61(3D)	LPDA control (1st byte)
62(3E)	LPDA remote status (Note 5)
64(40)	LPDA local status (1st byte) (Note 5)
65(41)	LPDA local status (2nd byte) (Note 5)
66(42)	LPDA local and remote self-test results (Note 5)

Notes:

1. Indicates the control block field from which this RECMS-RU field is loaded
2. This field contains the transmit BLU command for a duplex link; contains X'00' for a half-duplex link
3. This field contains the indicated data only if a command reject caused the RECMS; otherwise, it contains X'00'
4. Link subsystem type:
   X'00'-No link subsystem data
   X'01'-Link Problem Determination Aid (LPDA) test data
5. These fields are not present for a line without LPDA testing facilities or for which the LPDA test could not be initiated. The LPDA control byte is always present. If the remaining fields are not present, the control byte is marked "execution not attempted" for all tests
6. These fields will be zero for non X.21 switched lines.

RECMS (MDR): SNA Station Permanent Errors

The line error recorder routine (CXDILER) and LPDA terminator (CXDKCET) build this RECMS RU.

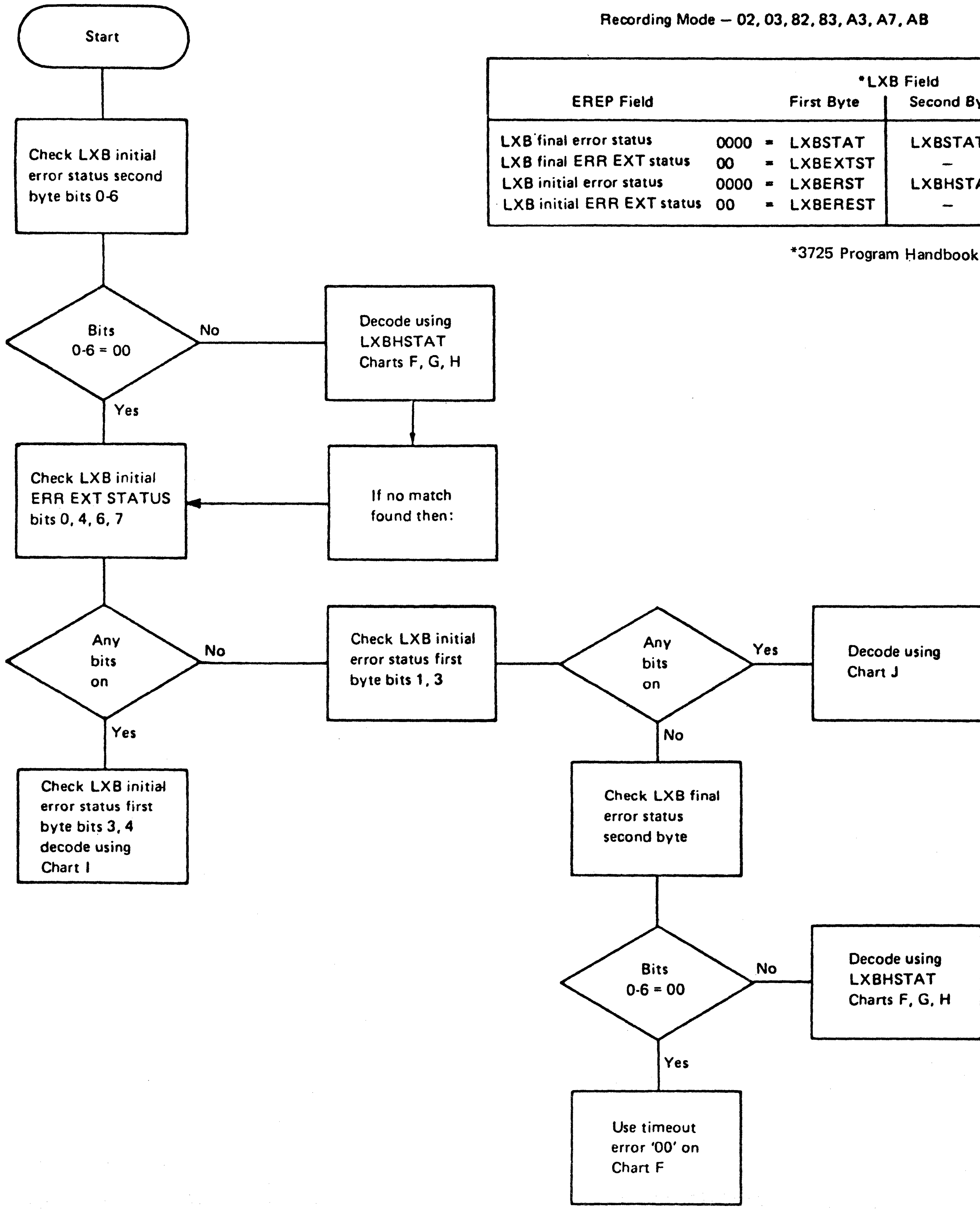
RECMS PIU offset 55(37)

							0(0) Network services X'01'
1(1) Physical maint.service X'03'	2(2) Request code (RECMS) X'81'	3(3) Network address of the SDLC station		5(5) Line interface address (CCBBAR) (Note 1)		7(7) Recording mode X'83'	8(8) Record ID=X'25'
9(9) Level of information changes X'02'	10(A) Reserved			13(D) Service-seeking control flags (SCBSSCF) (Note 1)		15(F) Output control flag (SCBOCF) (Note 1)	16(10) Reserved
17(11) I/O command (LXBCMAND) (Note 1)	18(12) Command modifier field (LXBCMODS) (Note 1)		20(14) Immed. ctrl command field (LXBIMCTL) (Note 1)	21(15) Current error status (LXBSTAT) (Note 1)		23(17) Extended error status (LXBEXTST) (Note 1)	24(18) 1st error status (byte 1) (LXBERST) (Note 1)
25(19) Hold SDLC status (byte 2) (LXBHSTAT) (Note 1)	26(1A) 1st error extended status (LXBEREST) (Note 1)	27(1B) Total I-format transmission counter (SCBTCNT) (Note 1)		29(1D) Reserved	30(1E) Received BLU Command field (LXBRBLUC) (Note 1)	31(1F) Total retry counter (SCBTRTCT) (Note 1)	
33(21) Station type (SCBTYPE) (Note 1)	34(22) Transmit BLU command (CCBCFLD) (Note 1)	35(23) Current outstanding count (SCBCOC) (Note 1)	36(24) Pass limit (SCBPCNT) (Note 1)	37(25) Receive count (bits 4,5,6) (SCBNR) (Note 1)	38(26) Send count (bits 4,5,6) (SCBNS) (Note 1)	39(27) Control flags (CCBRSPON) (Note 1)	40(28) Line type (CCBTYPE) (Note 1)
41(29) Command received from sec. station	42(2A) N(R) and N(S) received from sec. station	43(2B) Command reject reason	44(2C) Reserved	45(2D) Receive I-format error counter (SCBRECNT) (Note 1)		47(2F) Total transmission counter (SCBTPCNT) (Note 1)	
49(31) I-format received counter (error free) (SCBRCNT) (Note 1)		51(33) S-format received counter (error free) (SCBRPCNT) (Note 1)		53(35) Total ACK'd I-format counter (SCBTIACT) (Note 1)		55(37) Total I-format retransmissions counter (SCBTINCT) (Note 1)	
57(39) Reserved		59(3B) NPDA alarm parameter	60(3C) Link subsystem type (Note 3)	61(3D) LPDA control (1st byte)	62(3E) LPDA remote status (Note 4)		64(40) LPDA local status (1st byte) (Note 4)
65(41) LPDA local status (2nd byte) (Note 4)	66(42) LPDA local and remote self-test results (Note 4)						

Notes:

1. Indicates the control block field from which this RECMS-RU field is loaded
2. This field contains the transmit BLU command for a duplex link; contains X'00' for a half-duplex link.
3. Link subsystem type:
   X'00'-No link subsystem data
   X'01'-Link Problem Determination Aid (LPDA) test data.
4. These fields are not present for a line without LPDA testing facilities or for which the LPDA test could not be initiated. The LPDA control byte is always present. If the remaining fields are not present, the control byte is marked "execution not attempted" for all tests.

PERMANENT SDLC LINE ERROR



Recording Mode — 02, 03, 82, 83, A3, A7, AB

EREP Field			*LXB Field First Byte	*LXB Field Second Byte
LXB final error status	0000	=	LXBSTAT	LXBSTATC
LXB final ERR EXT status	00	=	LXBEXTST	–
LXB initial error status	0000	=	LXBERST	LXBHSTAT
LXB initial ERR EXT status	00	=	LXBEREST	–

*3725 Program Handbook

CHART F

LXBHSTAT Bits 0-6	Error	Error Description	Probable Cause
00	Timeout	Received RR, RNH or REJ.	Communication/ secondary failure
0C	Partial or negative acknow-ledgement	Partial acknowledge-ment (sequence number changed) or negative acknowledgement (se-quence number did not change).	Communication/ secondary failure
0E	SDLC REJ. received	Line is not duplex. Format exception.	Secondary failure
1C	SDLC RR received	Received RR in NS phase. Format exception.	Secondary failure
1E	SDLC XID received	Received XID in RR or RNR phase. Format exception.	Secondary failure
20	Timeout	Received address and control fields.	Communication/ secondary failure
24	Buffer cutoff	Exceeded buffer limit.	Program failure
2C	Partial or negative acknow-ledgement	Partial acknowledge-ment (sequence number changed) or negative acknowledgement (se-quence number did not change).	Communication/ secondary failure
60	Timeout	Flag received.	Communication/ secondary failure
62	SDLC command reject received	SDLC command reject displacement: X'YY'=08 Invalid N(R) 04 Frame too long 02 Data in S or NS format 01 Invalid com-mand	Communication/ failure

RECMS (MDR): SDLC Line Error (Part 2 of 3)

CHART G

LXBHSTAT Bits 0-6	Error	Error Description	Probable Cause
64	Buffer cutoff	Buffer limit exceeded.	Program failure
80	Timeout	Nothing received.	Communication/ secondary failure
84	Buffer pool depleted	No more buffers available.	Program failure
8C	Reset	End run command.	Program failure
8E	Invalid address	Invalid address received from secondary.	Secondary failure
96	Poll stop	Device was polled to the polling limit and responded negatively.	Secondary failure
9C	Disabled	Command issued to a line that is disabled.	Host program failure
A0	Timeout	Timeout flag received.	Communication/ secondary failure
A2 and LXBERST Byte 0.1 =1	Received invalid SDLC command	Format exception.	Secondary failure
A4	Invalid N(R) count	Invalid (incongruous N(R) in I or S format received.	Program/secondary failure
A6	Link activity timeout	No flags received (remote NCP only).	Primary communication failure
A8 and LXBERST Byte 0.1 =1	Received SDLC DISC	Format exception.	Secondary failure

CHART I

LXBEREST Bit	Error	LXBERST Bit	Error Description	Probable Cause
0=1	Underrun	4=1	Character transmitted more than once.	Program/hardware failure
0=1	Overrun	4=0 3=0	Received character overlayed.	Program/hardware failure
0=1	Frame check sequence error	4=0 3=1	Data check	Communication failure
4=1	Block overrun		Level 3 block processing in progress when another block available from level 2.	Program failure
6=1	Abort received		Eight consecutive 1-bits received.	Communication/ secondary failure
7=1	Monitor count overflow		64 temporary I-format receive errors have occurred.	Communication/ secondary failure

CHART H

LXBHSTAT Bits 0-6	Error	Error Description	Probable Cause
AC and LXBERST Byte 0.1 =1	Received SDLC SNRM	Format exception.	Secondary failure
B6 and LXBERST Byte 0.1 =1	Received SDLC ROL	Format exception. Can be caused by system reset at the secondary.	Secondary failure
BC and LXBERST Byte 0.1 =1	Received SDLC NSA	Received SDLC NSA in RR or RNR phase. Format exception.	Secondary failure
E2	Modem check	CTS dropped during command.	Modem failure
E8	Adapter check	Timer has detected no level 2 interrupt. Modem self-test failed to get a level 2 interrupt. Enable or dial failed to get a level 2 interrupt.	Hardware failure
EA	Adapter feedback check	Communication adapter feedback check has occured. Improper system generation for the adapter in use.	Hardware failure
EC	Equipment check	Equipment check.	Hardware failure
EE	Modem check	DSR dropped during command.	Modem failure

CHART H (CONTINUED)

LXBERST Bits 0-6	Error	Error Description	Probable Cause
F0	Modem error	. DSR dropped during Xmit or RCVE operation. . Can be set by the timer. . CTS drops while transmitting.	Modem interface failure
F2	Transmit clock or CTS failure	Transmit clock or CTS failure.	Modem interface failure
F4	DSR turn on check	For leased lines indicates DSR did not come up within 3 seconds after DTR.	Modem interface failure
F6			No cable installed
F8	DSR turn off check	DSR failed to drop during a disable operation.	Modem interface failure
FC	ACU check	Incorrect autocall interface sequence.	Modem interface failure
FE	Program failure	Negative data length was completed.	Program failure

CHART J

LXBERST	Error	Error Description	Probable Cause
3=1	Frame check sequence error	Frame check sequence error (data check).	Communication failure
1=1	Format exception	Invalid SDLC format.	Secondary failure

EREP Unit Check Records

The EREP unit check records should be correlated with console error messages and customer reports to pinpoint failure times and causes.

To analyze a unit check record:

1. Determine if the channel unit address A is the NSC (native subchannel) address.
2. Determine the device type B (3725 or emulated device).
3. Check the CCW for the command code C (see description of EP channel commands and NCP channel commands in Chapter 12).
4. Check the channel status D and/or unit status E for error indications.
5. Check the sense byte F .

   NSC: Use NCP status/sense information in Chapter 12.

   ESC: Determine terminal type G . For start-stop and BSC see EP sense information in Chapter 12.

Note: Statistical data H is accumulated in the access method (program counters).

```
---RECORD ENTRY TYPE - UNIT CHECK     SOURCE - OUTBOARD                MODEL- 145       SERIAL NO.    123456

   OS/VS REL X
                            DAY YEAR            HH MM SS.TH         JOB IDENTITY ABCDEFGH
                      DATE- 103  XX      TIME- 08 09 10 11                        C1C2C3C4 C5C6C7C8

 DEVICE TYPE                         2703   B
 PRIMARY   CHANNEL UNIT ADDRESS      000B8     A
 ALTERNATE CHANNEL UNIT ADDRESS      0000008
 COMMUNICATION ADAPTER TYPE          IBM TERM I
 TERMINAL TYPE                       1050   G

                  C   CC    CA    FL     C1                   K    CA    US CS  CT
    FAILING CCW       02 004000 40 00 0088              CSW F0 03EFF8 0E 00 0008


    UNIT STATUS    E          CHANNEL STATUS    D          STATISTICAL DATA    H                 STATISTICAL DATA

 ATTENTION         0        PRGM-CTLD TRPT    0        TEMPY READS      000          TEMPY WRITES      015
 STATUS MODIFIER   0        INCORRECT LENGTH  0        INTRVN REQD      000          BUS OUT CHK       015
 CONTROL UNIT END  0        PROGRAM CHECK     0        EQUIP CHK        000          OVERRUN           015
 BUSY              0        PROTECTION CHECK  0        LOST DATA        000          TIMEOUT           015
 CHANNEL END       1        CHAN DATA CHECK   0        NOT USED         000          NOT USED          006
 DEVICE END        1        CHAN CTL CHECK    0        NOT USED         000          NOT USED          006
 UNIT CHECK        1        I/F CTL CHECK     0        NOT USED         000          NOT USED          006
 UNIT EXCEPTION    0        CHAINING CHECK    0        NOT USED         000          CHAN DATA CHK     006

 SENSE BYTE DATA   F

BYTE 0     06

CMND REJ  0
INTV REQD 0
BUS C CHK 0
EQUIP CHK 0
DATA CHK  0
OVERRUN   1
RECEIVING 1
TIMEOUT   0


   HEX DUMP OF RECORD
   HEADER      30550800    00000000    0071103F    08091011          00123456    01300000

       0018    01020304    05060708    09004000    40000088          F003EFF8    DEB00008    00000103    01004013
       0038    00000003    0F0F0F0F    0F0F0F0F    06060606          06060606    06060606
```

Chapter 4. Locations and Jumpers

Contents

Contents

Component Locations (Part 1 of 4)

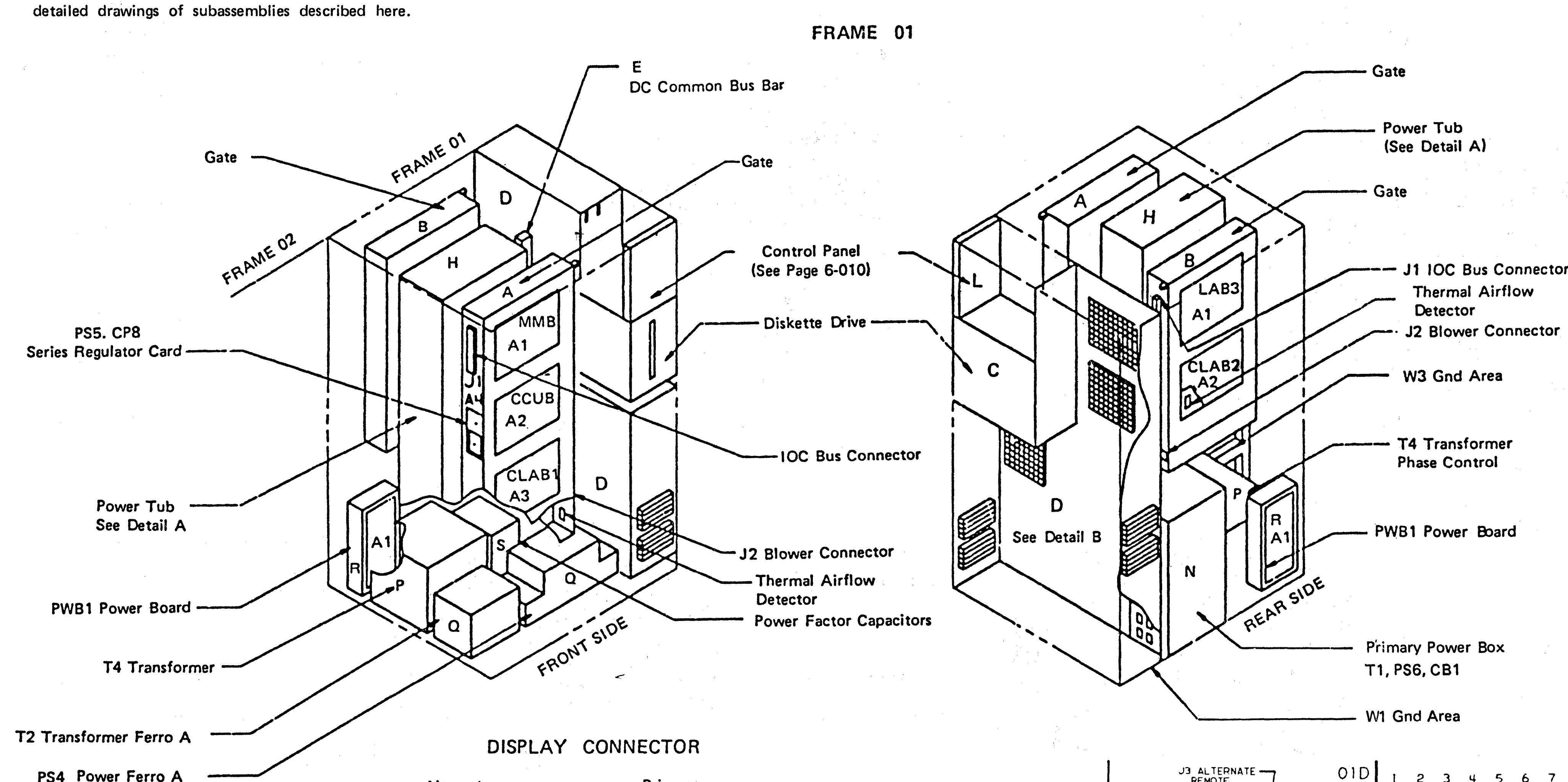
FRAME 01, 3725 MODEL 1

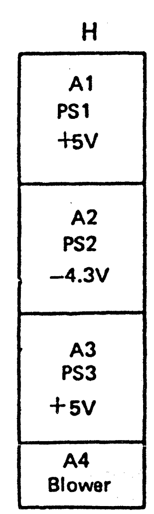
The main areas of frame 01 are indicated by bold letters on the 3725 drawings. Identify the area using the following table:

Area	Main Area Identification
A	Gate A
	A1: MMB
	A2: CCUB
	A3: CLAB1 (Ca or TPS position 1 and LAB type A position 1)
	A4: Series regulator
	J1: IOC bus connector
	J2: Blower connector
B	Gate B
	A1: LAB type A, B, or C position 3
	A2: CLAB2 (CA or TPS position 2 and LAB type A position 2)
	J1: IOC bus connector
	J2: Blower connector
C	Diskette drive
D	Connector area
	A1 ro A4: TPS position 2 (CLAB2)
	B1 to B4: CA position 2 (CLAB2)
	C1 to F8: LIC connectors (CLAB2)
	G1 to K8: LIC connectors (CLAB1)
	L1 to L4: CA position 1 (CLAB1)
	M1 to M4: CA position 1 (CLAB1)
	For LAB type A or B
	N1 to R8: LIC connectors
	For LAB type C
	N2, P2, Q2, R2 Ring connectors
	N5 to N8: LIC connectors
	P5 to P8: LIC connectors
	Q5 to Q8: LIC connectors
	R5 to R8: LIC connectors
	J1: Primary operator console
	J2: ALternate operator console
	J8 to J11: EPO connectors
E	DC common bus bar
H*	Power tub
	A1: PS1 (+5 V to CLAB2 and LAB position 3)
	A2: PS2 (-4.3 V to CCUB)
	A3: PS3 (+5 V to MMB and CLAB1)
	A4: Blower
L*	Control panel
N*	Primary power box (T1, PS6, CB1)
P*	Phase control transformer (T4)
Q*	T2, PS4 power ferro A
R*	Power board (PWB1)
S*	Power factor capacitors
W*	Frame ground

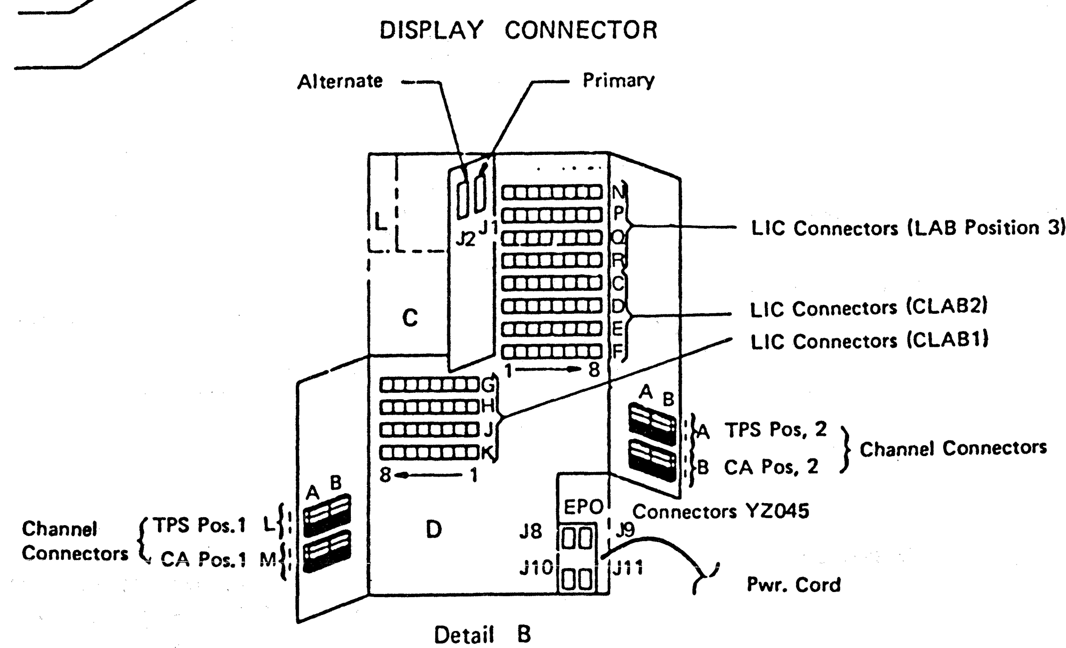
* Refer to the 3725/3726 MI Volume A02 for power details, and to the 3725/3726 MD Volume B01/B02 for wiring diagrams.

See 3725 MD Vol. B01 YZ pages for cross references to detailed drawings of subassemblies described here.

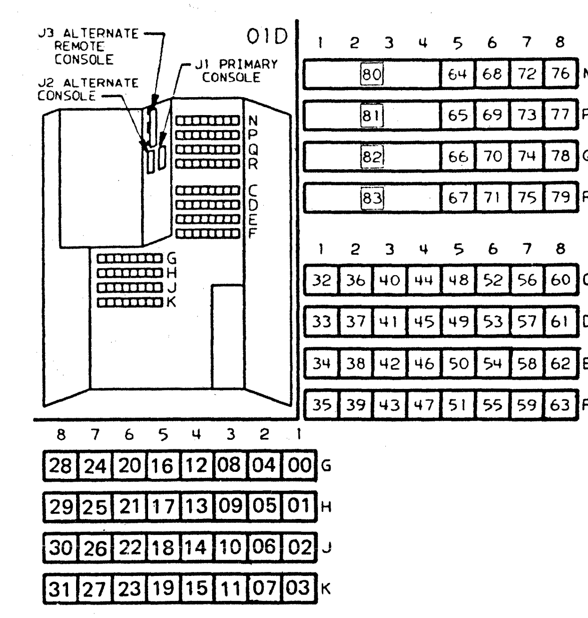




Power Tub Detail A



Detail B



Detail B with LAB C installed in LAB pos.3

FRAME 01, 3725 MODEL 2

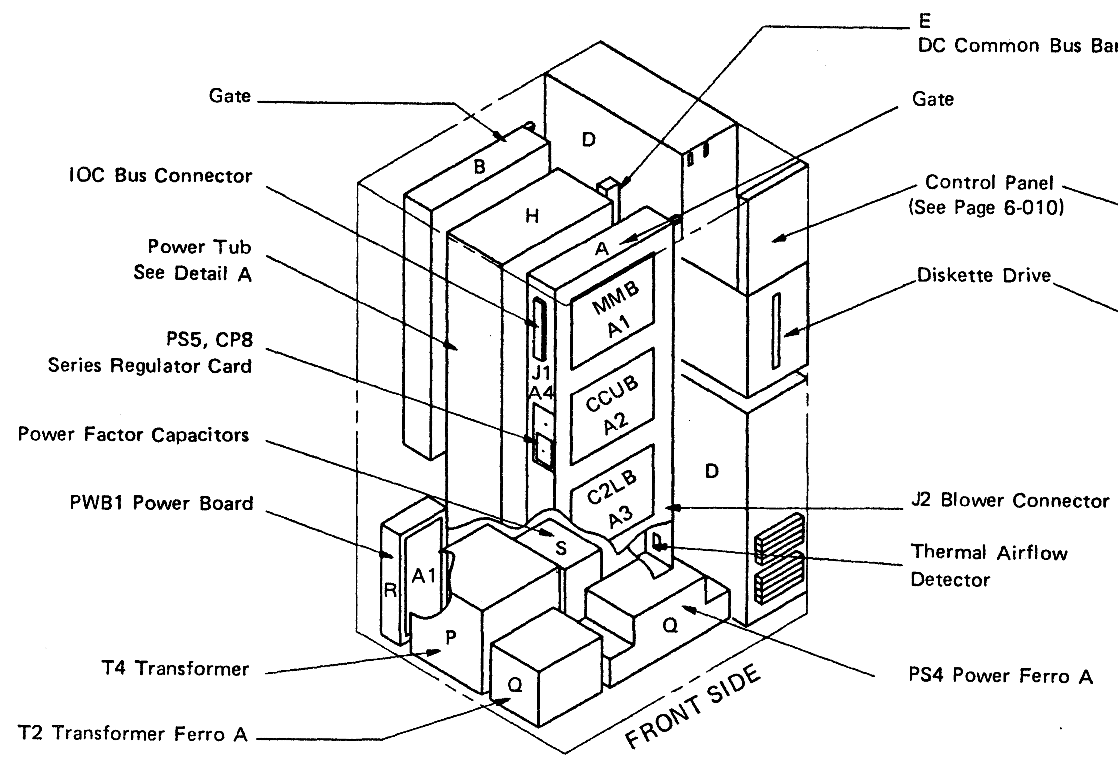
The main areas of frame 01 for the 3725 Model 2 are indicated by bold letters on the 3725 drawings. Identify the area using the following table:

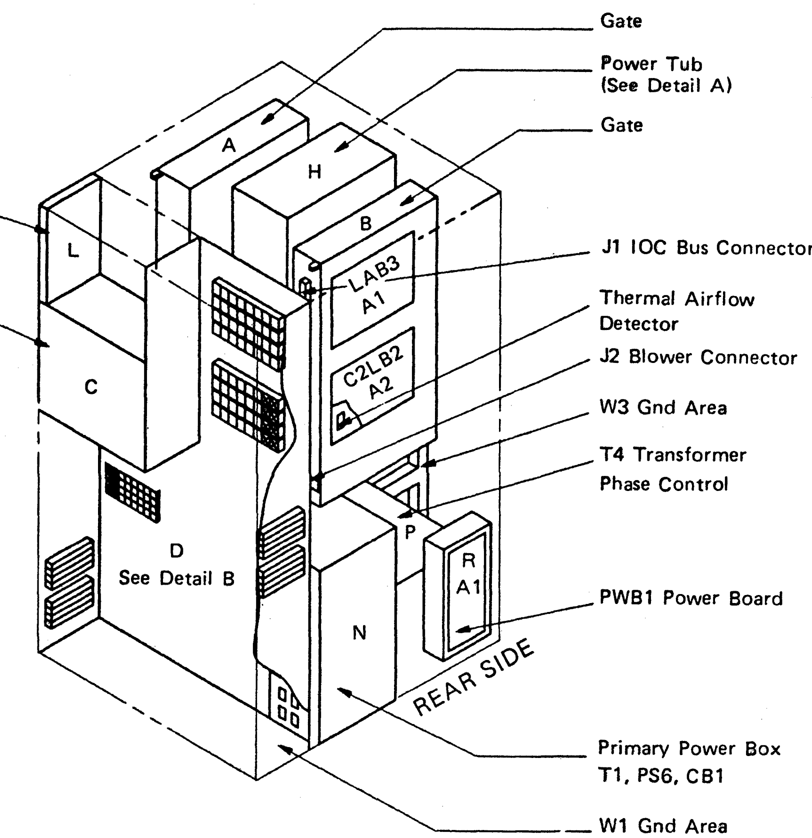
Area	Main Area Identification
A	Gate A A1: MMB A2: CCUB A3: C2LB (CA position 1 and 2, and TSS position 1) A4: Series regulator J1: IOC bus connector J2: Blower connector
B	Gate B A1: LAB type A, B, or C pos 3 A2: C2LB2 (CA position 3 and 4, and TSS position 2) J1: IOC bus connector J2: Blower connector
C	Diskette drive
D	Connector area G1 to K6: LIC connectors (C2LB) L1 to L4: CA position 2 (C2LB) M1 to M4: CA position 1 (C2LB) B1 to B4: CA position 3 (C2LB2) A1 to A4: CA position 4 (C2LB2) C1 to F6: LIC connectors (C2LB2) For LAB type A or B N1 to R8: LIC connectors For LAB type C N2, P2, Q2, R2 Ring Connectors N5 to N8: LIC Connectors P5 to P8: LIC Connectors Q5 to Q8: LIC Connectors R5 to R8: LIC Connectors J1: Primary operator console J2: Alternate operator console J8 to J11: EPO connectors
E	DC common bus bar
H*	Power tub A1: PS1 (+5 V to C2LB2 and LAB position 3) A2: PS2 (-4.3 V to CCUB) A3: PS3 (+5 V to MMB and C2LB) A4: Blower
L*	Control panel
N*	Primary power box (T1, PS6, CB1)
P*	Phase control transformer (T4)
Q*	T2, PS4 power ferro A
R*	Power board (PWB1)
S*	Power factor capacitors
W*	Frame ground

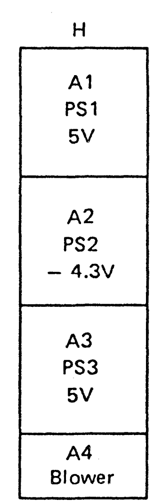
* Refer to the 3725 Model 2 MI Volume A02 for power details, and to the 3725/3726 MD Volume B01/B02 for wiring diagrams.

See 3725 MD Vol. B01 YZ pages for cross references to detailed drawings of subassemblies described here.

FRAME 01



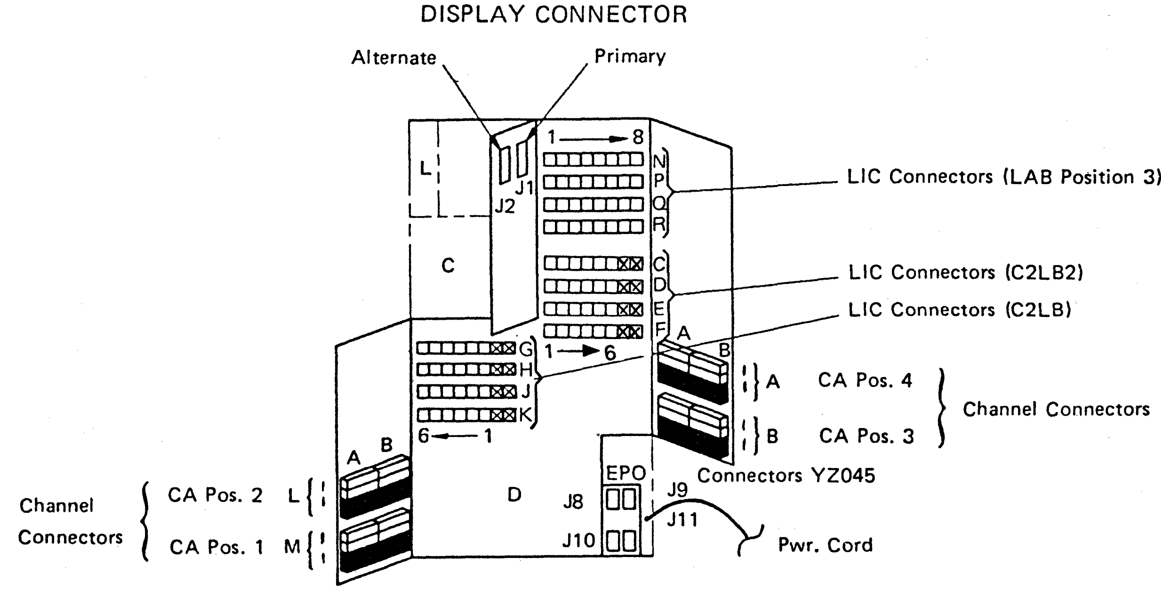




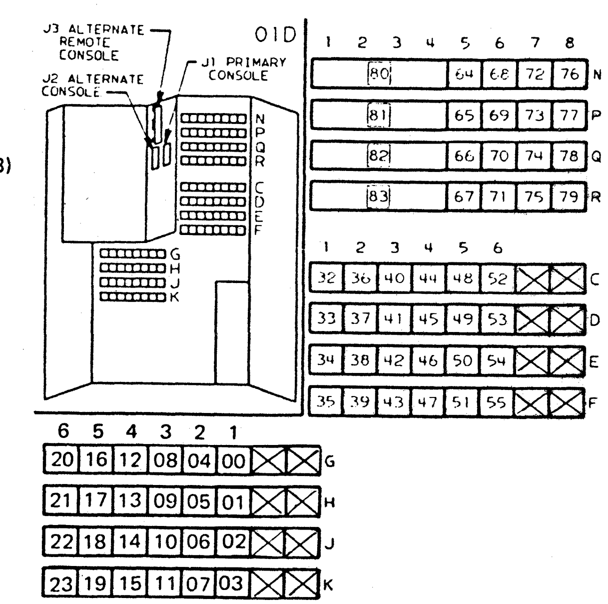
Power Tub

Detail A

DISPLAY CONNECTOR



Detail B



Detail B with LAB C installed in LAB pos.3

Component Locations (Part 3 of 4)

FRAME 02

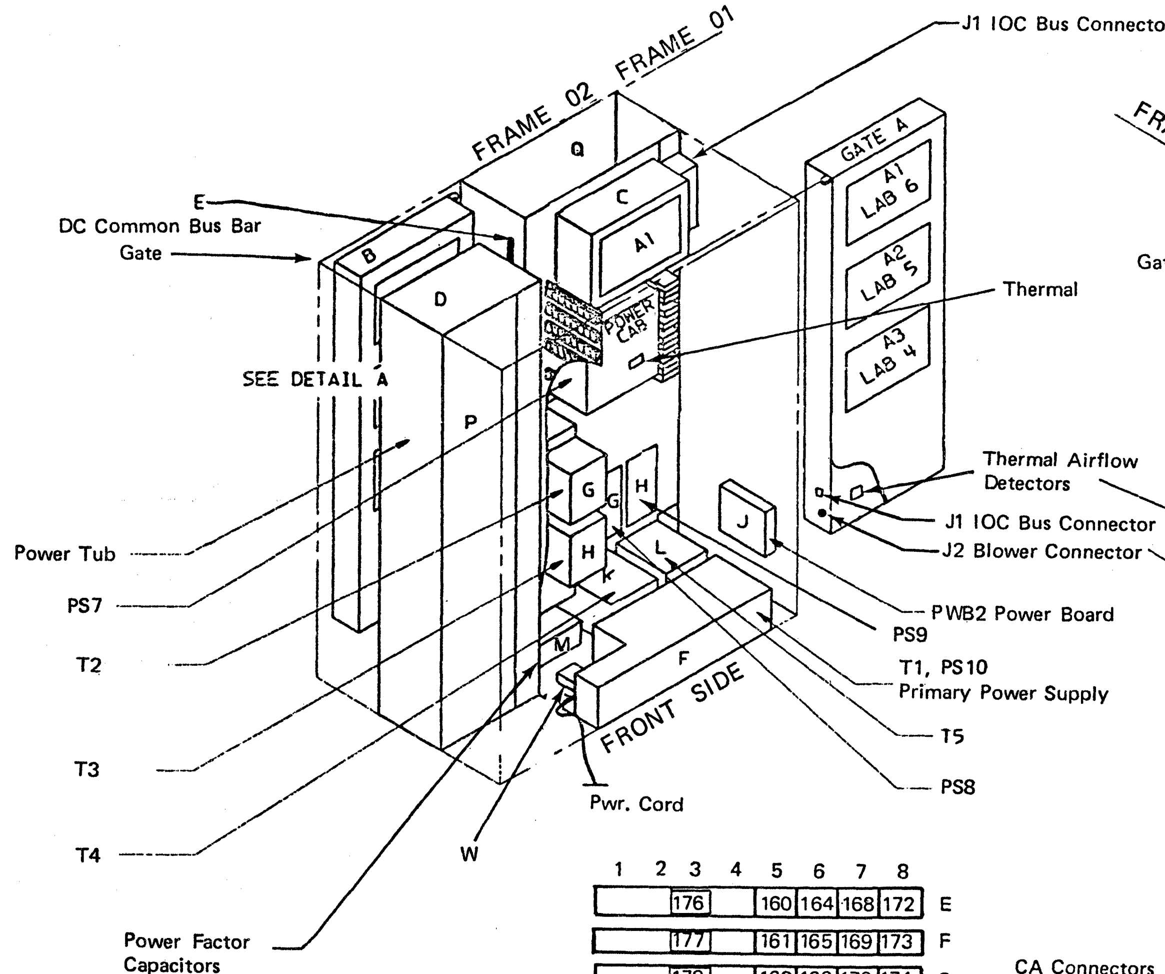
The main areas of frame 02 are indicated by bold letters on the 3726 drawings. Identify the area using the following table:

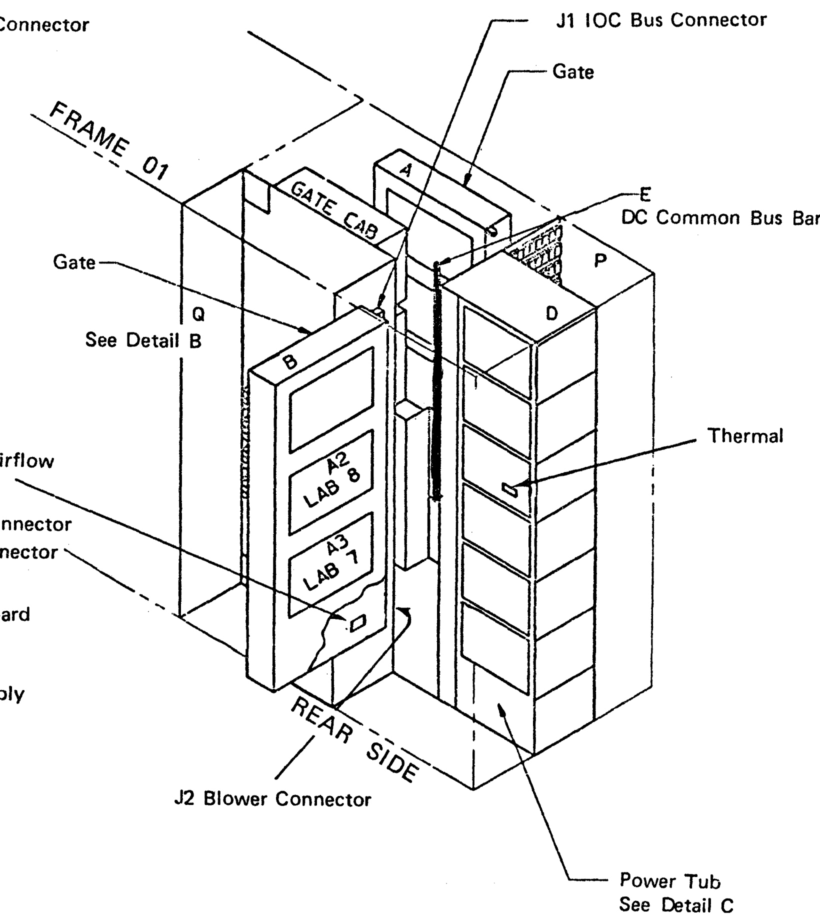
Area	Main Area Identification
A	Gate A A1: LAB type A, B, or C pos 6 A2: LAB type A, B, or C pos 5 A3: LAB type A, B, or C pos 4 J1: IOC bus connector J2: Blower connector
B	Gate B A2: LAB type A, B, or C pos 8 A3: LAB type A, B, or C pos 7 J1: IOC bus connector J2: Blower connector
C	Gate C A1: CAB (CA pos 3, CA pos 4, CA pos 5 or TPS pos 4, CA pos 6 or TPS pos 3) J1: IOC bus connector
D*	Power Tub A1: PS1 (+5 V to LAB position 6) A2: PS2 (+5 V to LAB position 5) A3: PS3 (+5 V to LAB position 4) A5: PS5 (+5 V to LAB position 8) A6: PS6 (+5 V to LAB position 7) A7: Blower
E	DC common bus bar
F*	Primary power supply (T1, PS10)
G*	Ferro power supply (T2, PS8)
H*	Ferro power supply (T3, PS9)
J*	Power board (PWB2)
K*	Transformer (T4)
L*	Transformer (T5)
M*	Power factor capacitors
P	Connector area E1-H8: Line or Ring connectors (LAB pos 6) J1-M8: Line or Ring connectors (LAB pos 5) N1-R8: Line or Ring connectors (LAB pos 4)
Q	Connector area A1-A4: CA pos 6 or TPS pos 3 (CAB) B1-B4: CA pos 5 or TPS pos 4 (CAB) C1-C4: CA pos 4 (CAB) D1-D4: CA pos 3 (CAB) J1-M8: Line or Ring connectors (LAB pos 8) N1-R8: Line or Ring connectors (LAB pos 7) J8-J11: EPO connectors
W*	Frame ground

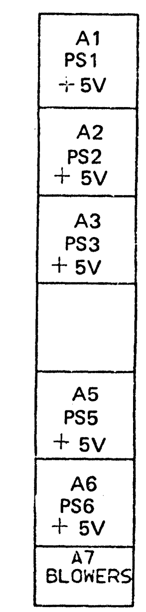
* Refer to the 3725/3726 MI Volume A02 for power details, and to the 3725/3726 MD Volume A01 for wiring diagrams.

See 3726 MD Vol. A01 YZ pages for cross references to detailed drawings of subassemblies described here.

FRAME 02

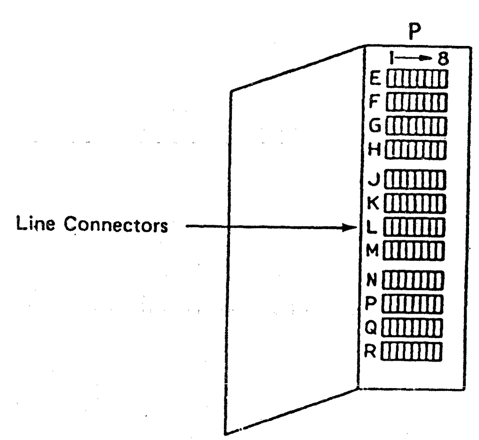




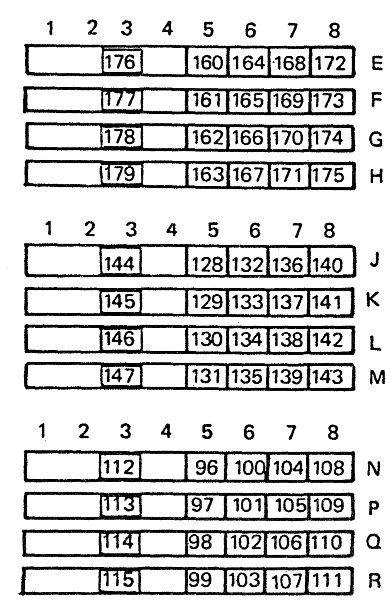


Detail C

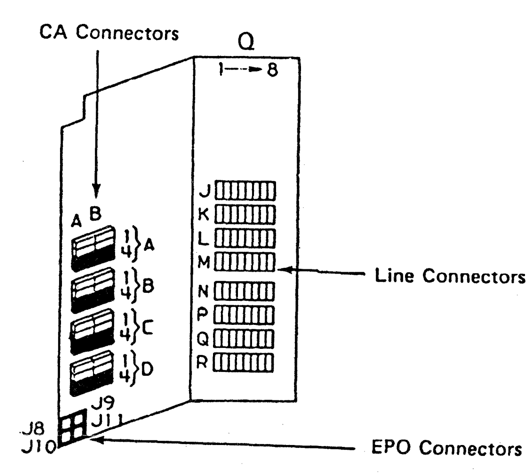
For details of cable routing and wire names, refer to pages 4-111 through 4-123



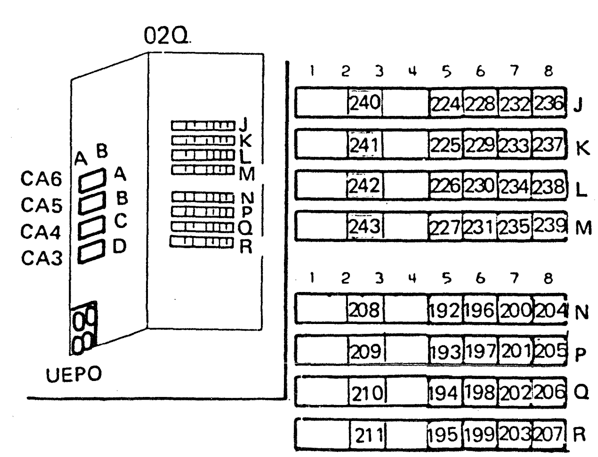
Detail A



Detail A with LAB C installed in LAB pos. 4,5,6.



Detail B

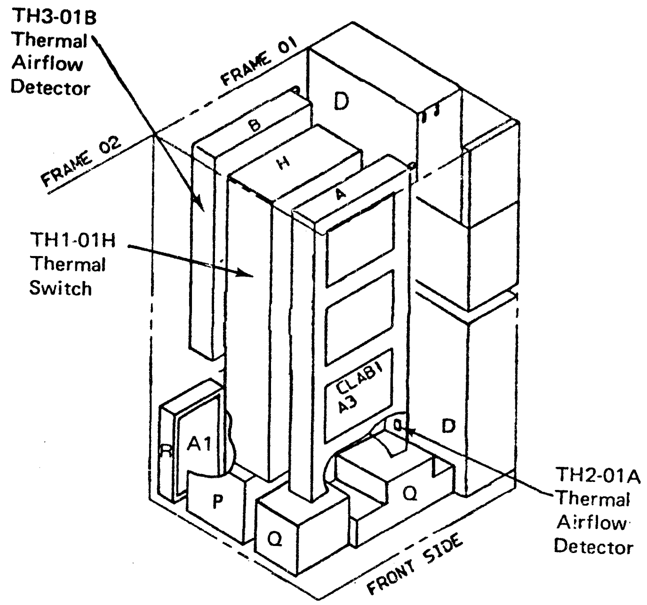


Detail B with LAB C installed in LAB pos. 7,8

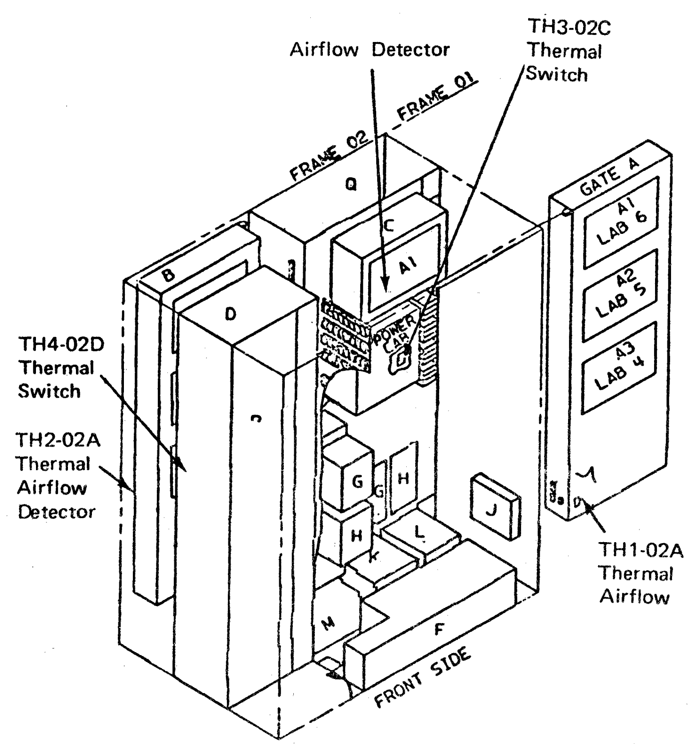
Component Locations (Part 4 of 4)

THERMAL SWITCH LOCATIONS

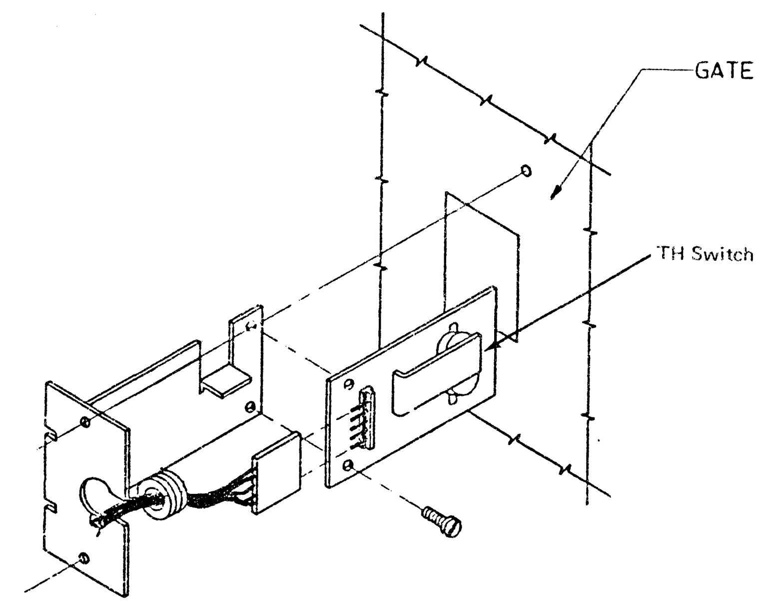
Locations 01ATH, 01BTH, 02ATH, 02BTH, 02CTH



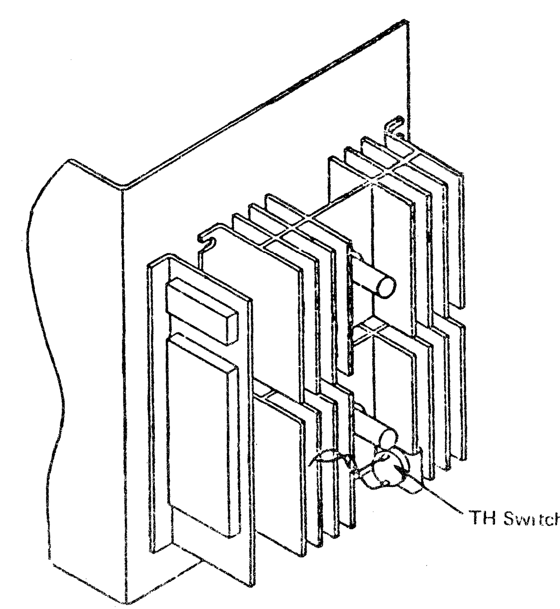
Locations 01HTH, 02DTH



THERMAL SWITCH TYPE AIRFLOW DETECTOR

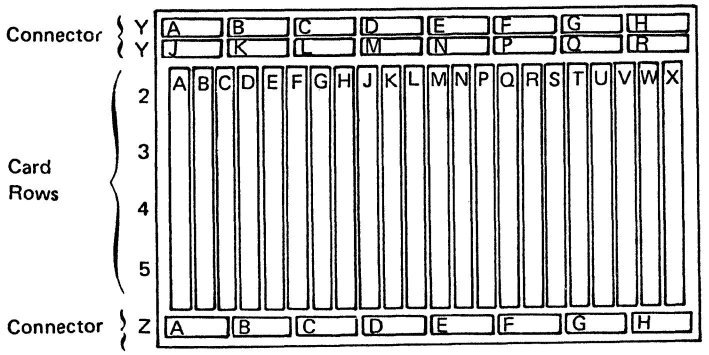


THERMAL SWITCH

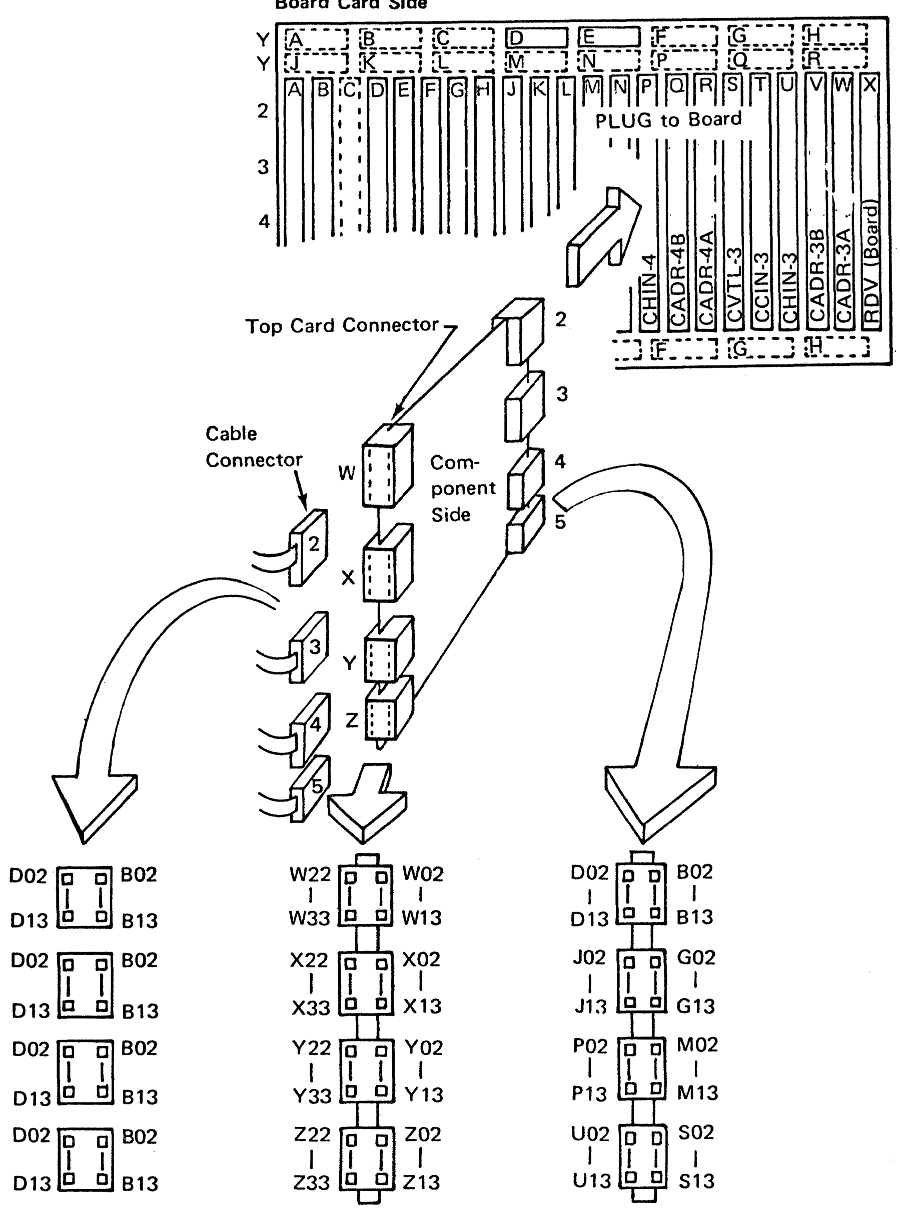


MMB, C2LB, C2LB2, CLAB, LAB, and CAB Board Layout

CARD AND CONNECTOR ASSIGNMENTS (CARD SIDE)

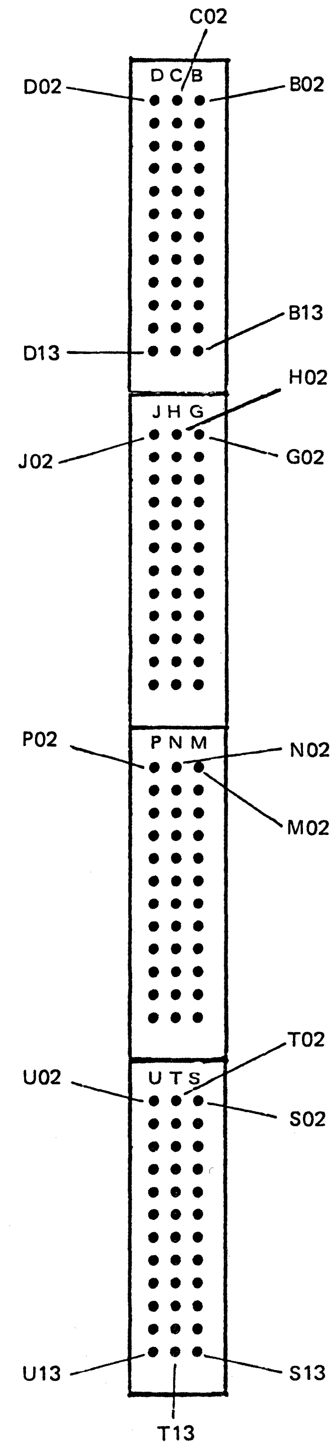


CARD PIN ASSIGNMENTS (BOARD AND TOP CONNECTOR)



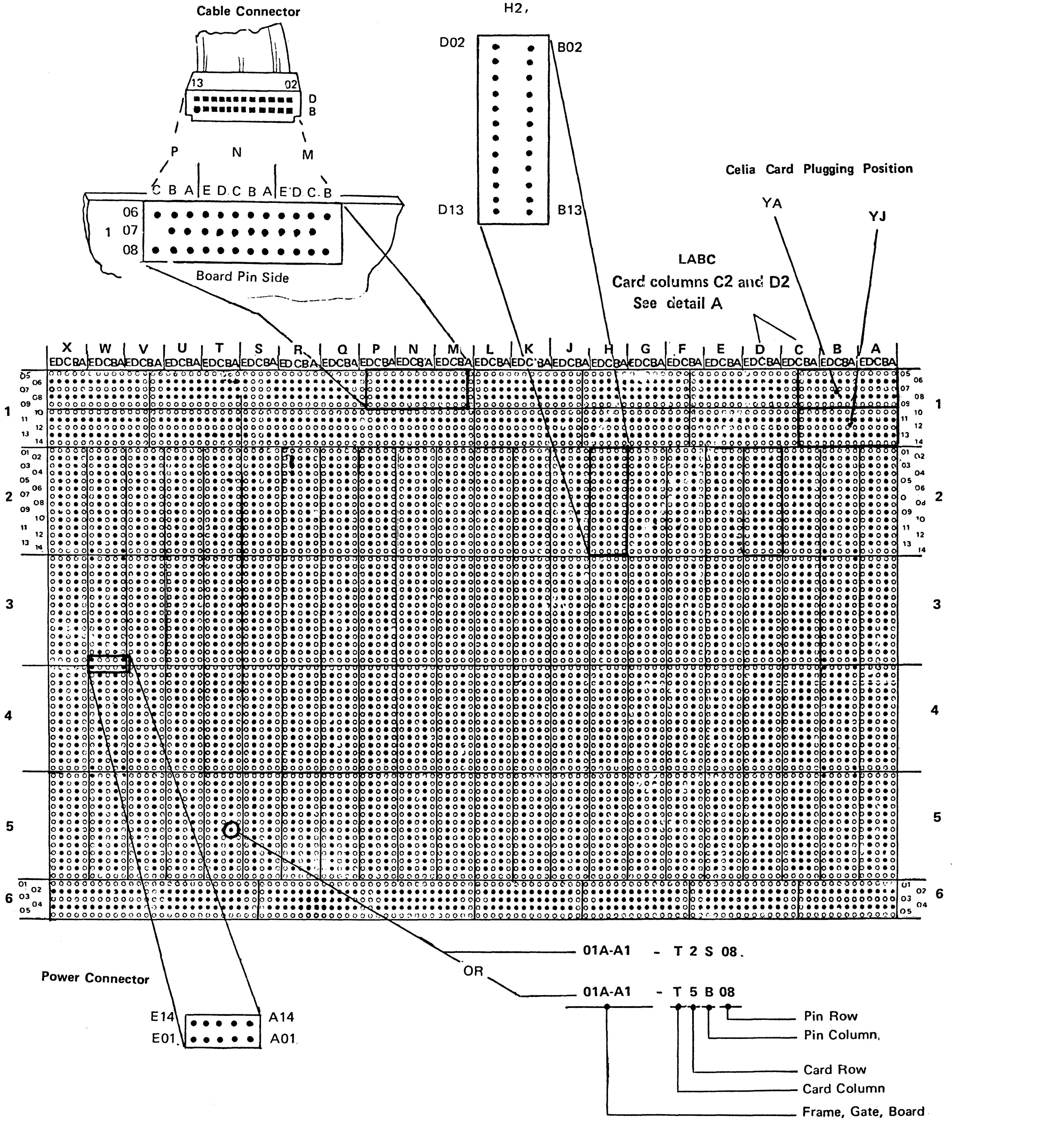
VOLTAGE PIN ASSIGNMENTS

For voltage pin assignments, refer to the board voltage plan starting on page 4-040.



Detail A

BOARD PIN ASSIGNMENTS (PIN SIDE)



Power Board Layout

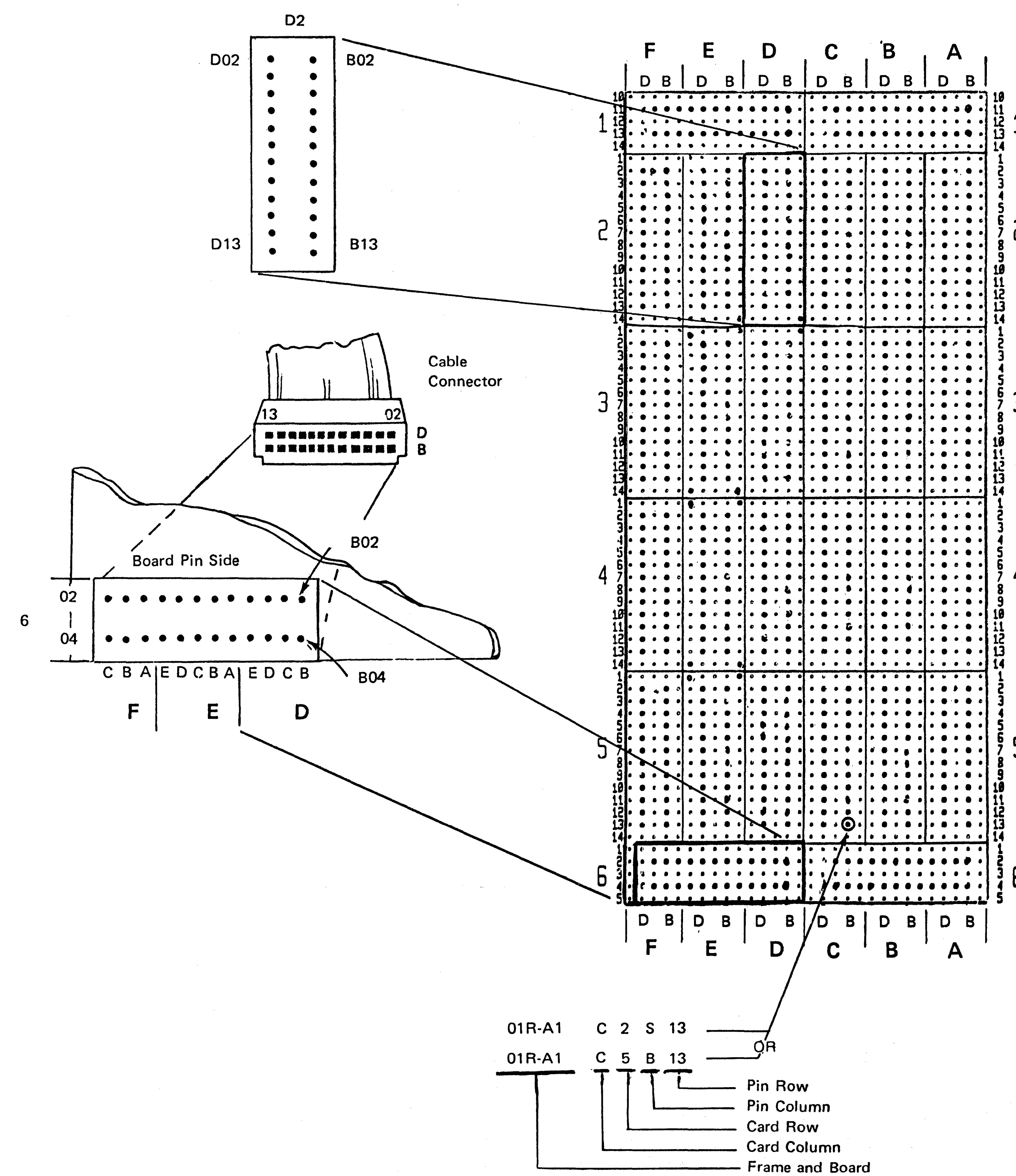
CARD AND CONNECTOR ASSIGNMENTS

For card and connector assignments, see page 4-060.

VOLTAGE PIN ASSIGNMENTS

For voltage pin assignments, refer to the board voltage plan starting on page 4-040.

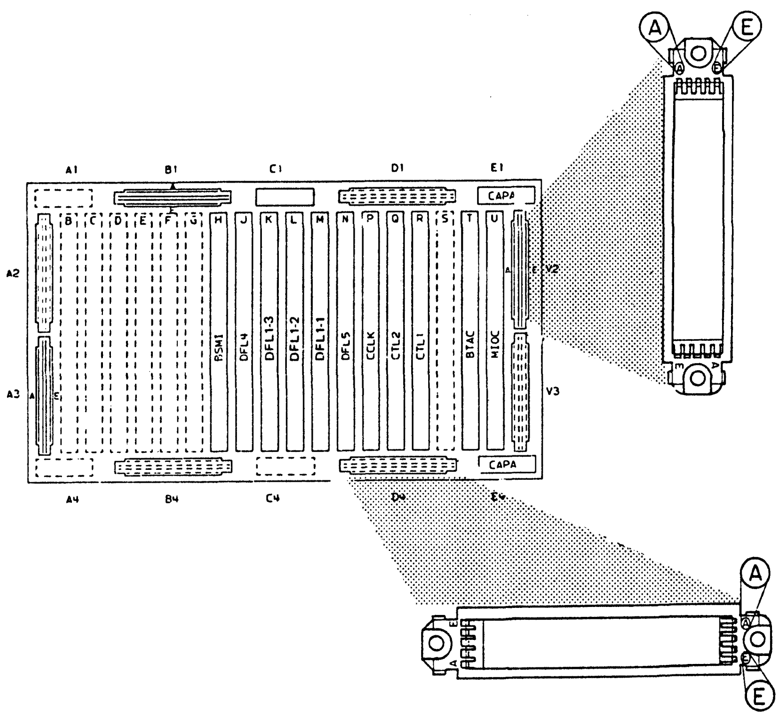
BOARD PIN ASSIGNMENTS (PIN SIDE)



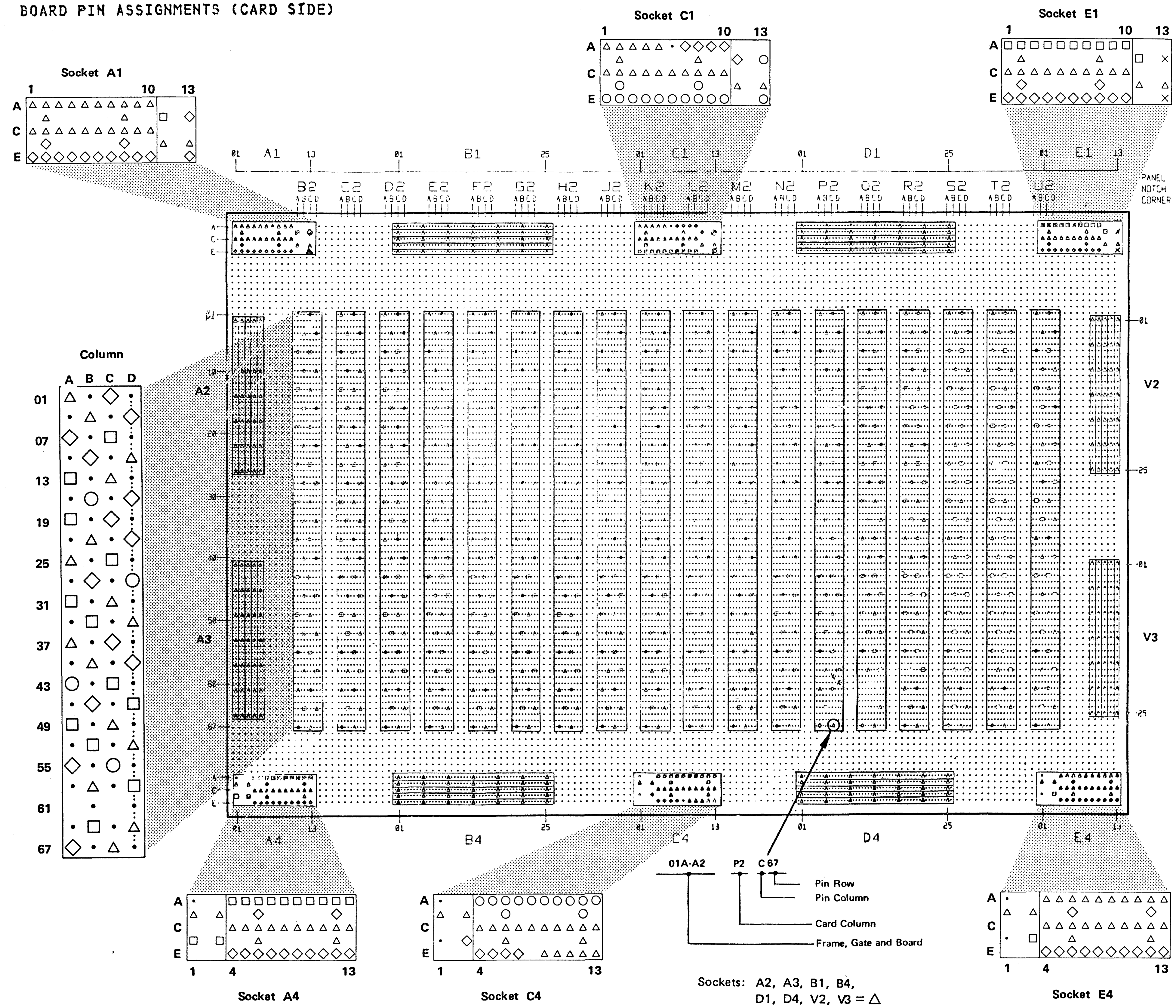
CCU Board Layout

CARD AND CONNECTOR ASSIGNMENTS (CARD SIDE)

__Warning:__ The torque screwdriver (part 4134750) must be used to tighten cards and connectors in place.



BOARD PIN ASSIGNMENTS (CARD SIDE)



VOLTAGE PLAN (BOARD SIDE)

No voltage checking is possible on the __pin side__ of the CCUB board.

Dots represent pins; bold dots represent power pins; all others are signal pins or are not used. The following table indicates the voltages on the different pins of the CCU board:

Symbol	Voltage
△	Ground
◇	-1.50V
□	-4.3V
○	+5.00V
×	-5.00V

Signal Routing Documentation (Part 1 of 2)

The YZ5xx pages provide pin lists and net lists.

PIN LISTS

These lists relate each board pin to its associated net name and signal name. The I/O column indicates when the signal is leaving the pin (O), or entering the pin (I). "V" indicates a voltage pin, and "#" indicates a connector pin leaving the board.

NET LISTS

These lists relate each signal name to net name, and indicate the pins wired together for that net on the board. Signal names are listed in alphabetic order.

PIN LIST (EXAMPLE)

```
PINS I/O NET NAME      SIGNAL NAME

H5D10 O $EK-BYT0005   MEMORY DATA BUS BYTE 0
H5D11 O $EK-BYT0003   MEMORY DATA BUS BYTE 0
H5D12 O $EK-BYT0000   MEMORY DATA BUS BYTE 0
H5D13 O $EC-FCO       MEMORY DATA BUS BIT PC

J2B02 O $EK-BYTY0 P   MEMORY DATA BUS BYTE Y
J2B03 O $EK-BYTY005   MEMORY DATA BUS BYTE Y
J2B04 O $EK-BYTY003   MEMORY DATA BUS BYTE Y
J2B05 O $EK-BYTY001   MEMORY DATA BUS BYTE Y
J2B07 O $EK-BYTX0 P   MEMORY DATA BUS BYTE X
J2B08 O $EK-BYTX006   MEMORY DATA BUS BYTE X
J2B09 O $EK-BYTX004   MEMORY DATA BUS BYTE X
J2B10 O $EK-BYTX001   MEMORY DATA BUS BYTE X
J2B12 O $EK-BYTX002   MEMORY DATA BUS BYTE X
J2D02 O $EK-BYTY007   MEMORY DATA BUS BYTE Y
J2D04 O $FK-BYTY006   MEMORY DATA BUS BYTE Y
J2D05 O $EK-BYTY004   MEMORY DATA BUS BYTE Y
J2D06 U $EK-BYTY002   MEMORY DATA BUS BYTE Y
J2D07 O $EK-BYTY000   MEMORY DATA BUS BYTE Y
J2D09 U $EK-BYTX007   MEMORY DATA BUS BYTE X
J2D10 U $EK-BYTX005   MEMORY DATA BUS BYTE X
J2D11 U $EK-BYTX003   MEMORY DATA BUS BYTE X
J2D12 U $EK-BYTX000   MEMORY DATA BUS BYTE X
J2D13 U $EC-PAO       MEMORY DATA BUS BIT PA

J3B03 U $EC-PBO       MEMORY DATA BUS BIT PB
J3B04 I $EK-MEMA005   MEMA ADDRESS BIT  FROM BSMI
J3B07 I $EK-REFA006  +REFRESH ADDRESS BITS 0 TO 6
J3B08 I LJ100AADO    +5 VOLTS
J3B09 I $EK-REFA004  +REFRESH ADDRESS BITS 0 TO 6
J3B10 I $EK-REFA002  +REFRESH ADDRESS BITS 0 TO 6
J3B12 I $EK-REFA000  +REFRESH ADDRESS BITS 0 TU 6
J3D02 I $EK-MEMA003   MEMA ADDRESS BIT  FROM BSMI
J3D03 V LJ100AADO    +5 VOLTS
J3D04 I $FA+DOGO     +DOG MEMORY
J3D06 I $EK-MEMA001   MEMA ADDRESS BIT  FROM BSMI
J3D07 O $FA-MEM0107   MEMORY CARD
J3D09 I $EK-SCTL004   SCTL ADDRESS BIT  FROM BSMI
J3D11 I $FA-REFO     -REFRESH TO MEMORY CARD
J3D12 I $EK-MEMA007   MEMA ADDRESS BIT  FROM BSMI

J4B02 I $EK-REFA003  +REFRESH ADDRESS BITS 0 TO 6
J4B03 I $EK-MEMA006   MEMA ADDRESS BIT  FROM BSMI
J4B04 I $EK-MEMA004   MEMA ADDRESS BIT  FROM BSMI
J4B05 I $EK-REFA005  +REFRESH ADDRESS BITS 0 TO 6
J4B07 I $LJ-GNDO      GROUND LJ
J4B10 I $LJ-GNDO      GROUND LJ
J4B13 I $FA-RWO      +READ - WRITE TO MEMORY CARD
J4D02 I $EK-REFA001  +REFRESH ADDRESS BITS 0 TO 6
J4D04 I $EK-MEMA002   MEMA ADDRESS BIT  FROM BSMI
J4D05 I $EK-MEMA000   MEMA ADDRESS BIT  FROM BSMI
J4D07 I $LJ-GNDO      GROUND LJ
J4D08 V $LJ-GNDO      GROUND LJ
J4D09 I $LJ-GNDO      GROUND LJ
J4D12 I $FA-SELO 07  -MEMORY CARDS CNTL STORE SEL

J5B02 O $EK-BYT10 P   MEMORY DATA BUS BYTE 1
J5B03 O $EK-BYT1005   MEMORY DATA BUS BYTE 1
J5B04 O $EK-BYT1003   MEMORY DATA BUS BYTE 1
J5B05 O $EK-BYT1001   MEMORY DATA BUS BYTE 1
J5B07 O $EK-BYT00 P   MEMORY DATA BUS BYTE 0
J5B08 O $EK-BYT0006   MEMORY DATA BUS BYTE 0
J5B09 U $EK-BYT0004   MEMORY DATA BUS BYTE 0
J5B10 O $EK-BYT0001   MEMORY DATA BUS BYTE 0
J5B12 O $EK-BYT0002   MEMORY DATA BUS BYTE 0
J5B13 O $EC-PDO       MEMORY DATA BUS BIT PD
J5D02 U $EK-BYT1007   MEMORY DATA BUS BYTE 1
J5D04 U $EK-BYT1006   MEMORY DATA BUS BYTE 1
J5D05 U $EK-BYT1004   MEMORY DATA BUS BYTE 1
J5D06 O $EK-BYT1002   MEMORY DATA BUS BYTE 1
J5D07 O $EK-BYT1000   MEMORY DATA BUS BYTE 1
J5D09 O $EK-BYT0007   MEMORY DATA BUS BYTE 0
J5D10 O $EK-BYT0005   MEMORY DATA BUS BYTE 0
J5D11 O $EK-BYT0003   MEMORY DATA BUS BYTE 0
J5D12 O $EK-BYT0000   MEMORY DATA BUS BYTE 0
J5D13 O $EC-PCO       MEMORY DATA BUS BIT PC

J6C02 # $ED-CAR05     M5
J6C04 # $ED-CAR06     M6
J6D02 # $ED-CAR04     M4
```

```
PINS I/O NET NAME      SIGNAL NAME

J6D04 V LA008AA35     GND
J6E02 V LA008AA34     GND
J6E04 # $ED-CAR03     M3

K2B02 O $EK-BYTY0 P   MEMORY DATA BUS BYTE Y
K2B03 O $EK-BYTY005   MEMORY DATA BUS BYTE Y
K2B04 O $EK-BYTY003   MEMORY DATA BUS BYTE Y
K2B05 O $EK-BYTY001   MEMORY DATA BUS BYTE Y
K2B07 O $EK-BYTX0 P   MEMORY DATA BUS BYTE X
K2B08 O $EK-BYTX006   MEMORY DATA BUS BYTE X
K2B09 O $EK-BYTX004   MEMORY DATA BUS BYTE X
K2B10 O $EK-BYTX001   MEMORY DATA BUS BYTE X
K2B12 O $EK-BYTX002   MEMORY DATA BUS BYTE X
K2D02 O $EK-BYTY007   MEMORY DATA BUS BYTE Y
K2D04 O $EK-BYTY006   MEMORY DATA BUS BYTE Y
K2D05 O $EK-BYTY004   MEMORY DATA BUS BYTE Y
K2D06 O $EK-BYTY002   MEMORY DATA BUS BYTE Y
K2D07 O $EK-BYTY000   MEMORY DATA BUS BYTE Y
K2D09 O $EK-BYTX007   MEMORY DATA BUS BYTE X
K2D10 U $EK-BYTX005   MEMORY DATA BUS BYTE X
K2D11 U $EK-BYTX003   MEMORY DATA BUS BYTE X
K2D12 D $EK-BYTX000   MEMORY DATA BUS BYTE X
K2D13 U $EC-PAO       MEMORY DATA BUS BIT PA

K3B03 O $EC-PBO       MEMORY DATA BUS BIT PB
K3B04 I $EK-MEMA005   MEMA ADDRESS BIT  FROM BSMI
K3B07 I $EK-REFA006  +REFRESH ADDRESS BITS 0 TO 6
K3B08 I LK100AADO    +5 VOLTS
K3B09 I $EK-REFA004  +REFRESH ADDRESS BITS 0 TO 6
K3B10 I $EK-REFA002  +REFRESH ADDRESS BITS 0 TO 6
K3B12 I $EK-REFA000  +REFRESH ADDRESS BITS 0 TO 6
K3D02 I $EK-MEMA003   MEMA ADDRESS BIT  FROM BSMI
K3D03 V LK100AADO    +5 VOLTS
K3D04 I $FA+DOGO     +DOG MEMORY
K3D06 I $EK-MEMA001   MEMA ADDRESS BIT  FROM BSMI
K3D07 O $FA-MEM0108   MEMORY CARD
K3D09 I $EK-SCTL004   SCTL ADDRESS BIT  FROM BSMI
K3D11 I $FA-REFO     -REFRESH TO MEMORY CARD
K3D12 I $EK-MEMA007   MEMA ADDRESS BIT  FROM BSMI

K4B02 I $EK-REFA003  +REFRESH ADDRESS BITS 0 TO 6
K4B03 I $EK-MEMA006   MEMA ADDRESS BIT  FROM BSMI
K4B04 I $EK-MEMA004   MEMA ADDRESS BIT  FROM BSMI
K4B05 I $EK-REFA005  +REFRESH ADDRESS BITS 0 TU 6
K4B07 I $LK-GNDO      GROUND LJ
K4B10 I $LK-GNDO      GROUND LJ
K4B13 I $FA-RWO      +READ - WRITE TO MEMORY CARD
K4D02 I $EK-REFA001  +REFRESH ADDRESS BITS 0 TO 6
K4D04 I $EK-MEMA002   MEMA ADDRESS BIT  FROM BSMI
K4D05 I $EK-MEMA000   MEMA ADDRESS BIT  FROM BSMI
K4D07 I $LK-GNDO      GROUND LJ
K4D08 V $LK-GNDO      GROUND LJ
K4D09 I $LK-GNDO      GROUND LJ
K4D12 I $FA-SELO 08  -MEMORY CARDS CNTL STORE SEL

K5B02 O $EK-BYT10 P   MEMORY DATA BUS BYTE 1
K5B03 U $EK-BYT1005   MEMORY DATA BUS BYTE 1
K5B04 O $EK-BYT1003   MEMORY DATA BUS BYTE 1
K5B05 U $EK-BYT1001   MEMORY DATA BUS BYTE 1
K5B07 O $EK-BYT00 P   MEMORY DATA BUS BYTE 0
K5B08 U $EK-BYT0006   MEMORY DATA BUS BYTE 0
K5B09 O $EK-BYT0004   MEMORY DATA BUS BYTE 0
K5B10 U $EK-BYT0001   MEMORY DATA BUS BYTE 0
K5B12 O $EK-BYT0002   MEMORY DATA BUS BYTE 0
K5B13 O $EC-PDO       MEMORY DATA BUS BIT PD
K5D02 O $EK-BYT1007   MEMORY DATA BUS BYTE 1
K5D04 O $EK-BYT1006   MEMORY DATA BUS BYTE 1
K5D05 U $EK-BYT1004   MEMORY DATA BUS BYTE 1
K5D06 O $EK-BYT1002   MEMORY DATA BUS BYTE 1
K5D07 O $EK-BYT1000   MEMORY DATA BUS BYTE 1
K5D09 O $EK-BYT0007   MEMORY DATA BUS BYTE 0
K5D10 O $EK-BYT0005   MEMORY DATA BUS BYTE 0
K5D11 U $EK-BYT0003   MEMORY DATA BUS BYTE 0
K5D12 U $EK-BYT0000   MEMORY DATA BUS BYTE 0
K5D13 U $EC-PCO       MEMORY DATA BUS BIT PC

K6H02 # $ED-CAR02     M2
K6H04 # $ED-CAR01     M1
K6B02 # $EK+SPWO     -RD/+WRT
K6B04 # $EK+STGOO    +STG GO
```

COMMENTS:

```
LEGEND :# BOARD CONNECTOR PIN
        I CARD INPUT SIGNAL PIN
        O CARD OUTPUT SIGNAL PIN
        V VOLTAGE PIN
```

Signal Routing Documentation (Part 2 of 2)

NET LIST (EXAMPLE)

000 YZ500

SIGNAL NAME	NET NAME	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X
.9MHZ OUTPUT	AC020AAB4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	I 4D02 0 4D04
+A	EC016ABA5	—	—	—	—	—	—	—	—	—	—	—	—	—	0 2Z02								
-A CLOCK CHECK	AM-CKCHK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	I 3D04	—	0 4G07
ACCESS 0	$F-AC0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_5D06	—	—	—	—	#_1D13	
ACCESS 1	$F-AC1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_5B07	—	—	—	—	#_1E13	
+AD.CLOCK CARD CHECK	LV110AA16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z12		
-AD.CLOCK CARD CHECK	LV110AA15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z13		
+ADAPTER CHECK	LV110AA10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z28		
-ADAPTER CHECK	LV110AA09	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z29		
ADDRESS MATCH	$EG-ADMA1	—	—	—	#_1A06 #_1A11																		
-ADDRESS 0	$W-SAR0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z24	I_2Z24	0_2Z24				
-ADDRESS 1	$W-SAR1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z25	I_2Z25	0_2Z25				
-ADDRESS 10	$W-SAR10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z22	I_2Z22	0_2Z22				
-ADDRESS 11	$W-SAR11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z02	I_2Z02	0_2Z02				
-ADDRESS 12	$W-SAR12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Y33	I_2Y33	0_2Y33				
-ADDRESS 13	$W-SAR13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Y13	I_2Y13	0_2Y13				
-ADDRESS 14	$W-SAR14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Y32	I_2Y32	0_2Y32				
-ADDRESS 15	$W-SAR15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Y12	I_2Y12	0_2Y12				
-ADDRESS 2	$W-SAR2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z30	I_2Z30	0_2Z30				
-ADDRESS 3	$W-SAR3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z31	I_2Z31	0_2Z31				
-ADDRESS 4	$W-SAR4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z32	I_2Z32	0_2Z32				
-ADDRESS 5	$W-SAR5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z12	I_2Z12	0_2Z12				
-ADDRESS 6	$W-SAR6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z33	I_2Z33	0_2Z33				
-ADDRESS 7	$W-SAR7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z13	I_2Z13	0_2Z13				
-ADDRESS 8	$W-SAR8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z23	I_2Z23	0_2Z23				
-ADDRESS 9	$W-SAR9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z03	I_2Z03	0_2Z03				
ADR 4	$W-ADR4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	I_2B12 0_2B13	
-AIO/HOLD TO PERF MNT	$EE-AIOP0	—	—	—	—	#_1C06 #_1C11																	
-ANY INSTRUCTION	$EG-ANYIO	—	—	—	—	—	#_1A08 #_1A13																
+B	EC016ABA6	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z03								
B CLOCK	$W-BLCK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	I_4B12	—	0_4B12				
BIT P1 (FROM ECC CARD	$EC+BITP1	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Y33	I_2Y33							
-BUS IN GOOD PTY	LV110AA19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2Z09		
-BUS OUT P RDV	LV110AA56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0_2X22		
BYTE SELECT FROM BSMI	$EK+SBS0 X $EK+SBS0 Y $EK+SBS0 00 $EK+SBS0 01	—	—	—	—	—	—	—	—	—	—	—	#_6D04 #_6E02 #_6C02 #_6B02	—	—	I_5B03 I_5B02 I_5B04 I_5B05							

COMMENTS:

LEGEND :# BOARD CONNECTOR PIN
I CARD INPUT SIGNAL PIN
0 CARD OUTPUT SIGNAL PIN
V VOLTAGE PIN

BOARD P/N : 8275736
BOARD LEVEL : REA 63-04594
OR EC 873521

PIN ADDRESSING

On the drawing of the board, the pin addressing has the following format: x-yztt

x = # indicates a board connector pin.
x = I indicates that the signal is entering the pin.
x = 0 indicates that the signal is leaving the pin.
x = V indicates a voltage pin.
y varies from 1 to 6 and indicates the board horizontal row.
z indicates the column address of the pin.

The pin can be a board pin (A, B, C, D, E, G, J, M, P, S, or U) or a card top connector pin (W, X, Y, or Z).

tt indicates the pin number in the z column address.

DRAWING INTERPRETATION

- Several "0s" (outputs) and "Is" (inputs) may appear on the same horizontal line. This indicates that different adapter cards are connected to the same net line.
- Several horizontal lines may belong to one signal name and one net name. This indicates connections between pins of the same card.
- Several horizontal lines may belong to one signal name, with different net names. This indicates connection to a bus. The net name shows the bit number on the bus.
- "0" alone on a net shows that the pin is not used, or is a card test point.

Board Voltage Plan (Part 1 of 4)

The following tables indicate the voltage assigned to each pin of the board.

For the CCU board voltage plan, see page 4-022. For card locations, see page 4-060 onward.

		B Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	.	.	.	-5	.	.	.	.	+12	.	.
	ECC	.	.	.	.	-5	.	.	.	.	.	.	.
	SCTL	.	.	.	.	-5	.	.	.	.	.	.	.
	MMC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	MPC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	DAC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	CPA	.	.	.	.	-5	.	.	.	.	.	.	.
	MCC	.	.	.	.	-5	.	.	.	.	.	.	.
	CCA	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	EIA	.	.	.	.	-5	.	.	.	.	+8.5	.	.
C2LB	CSM	.	.	.	.	-5	.	.	.	.	+12	.	.
CLAB1	CSM	.	.	.	.	-5	.	.	.	.	+12	.	.
C2LB2	CSP1	.	.	.	.	-5	.	.	.	.	.	.	.
CLAB2	CSP1	.	.	.	.	-5	.	.	.	.	.	.	.
LABs	CSP2	.	.	.	.	-5	.	.	.	.	.	.	.
	FES	.	.	.	.	-5	.	.	.	.	.	.	.
	LIC	.	.	.	.	-5	.	.	.	.	.	.	.
	ICC	.	.	.	.	-5	.	.	.	.	.	.	.
	RDV	.	.	.	.	-5	.	.	.	.	.	.	.
	TIC	.	.	.	.	-5	.	.	.	.	.	.	.
	TRM	.	.	.	.	-5	.	.	.	.	.	.	.
C2LB	CADR	.	.	.	.	-5	.	.	.	.	.	.	.
CLAB1	CADR	.	.	.	.	-5	.	.	.	.	.	.	.
C2LB2	CADRUK	.	.	.	.	-5	.	.	.	.	.	.	.
CLAB2	CADRUK	.	.	.	.	-5	.	.	.	.	.	.	.
CAB	CCIN	.	.	.	.	-5	.	.	.	.	.	.	.
	CHIN	.	.	.	.	-5	.	.	.	.	.	.	.
	RDV	.	.	.	.	-5	.	.	.	.	.	.	.
	CVTL	.	.	.	.	.	.	.	.	.	.	.	.
PWB1	PWCA1	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL1	.	.	.	.	.	.	.	.	.	.	.	.
	PH1	.	.	.	.	.	.	.	.	.	.	.	.
	ARC1	.	.	.	.	.	.	12ac	12ac	.	.	+24	.
	PWRC												
PWB2	PWCA2	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL2	.	.	.	.	.	.	.	.	.	.	.	.
	PH2	.	.	.	.	.	.	.	.	.	.	.	.
	PH4	.	.	.	.	.	.	.	.	.	.	.	.
	PWRC	.	.	.	.	.	.	.	.	.	.	.	.

		D Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	ECC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	SCTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MMC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MPC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	DAC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CPA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MCC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CCA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	EIA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CSP1	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB2	CSP1	.	+5	.	.	.	.	Gnd	.	.	.	.	.
LABs	CSP2	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	FES	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	LIC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	ICC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	RDV	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TIC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TRM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CAB	CCIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CHIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	RDV	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CVTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
PWB1	PWCA1	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL1	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH1	.	.	.	.	.	-12	Gnd	.	.	+12	.	.
	ARC1	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PWRC												
PWB2	PWCA2	.	+5	.	.	.	-12	Gnd	Gnd	.	+12	.	.
	PWCL2	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH2	.	.	.	.	.	-12	Gnd	.	.	+12	.	.
	PH4	.	.	.	.	.	-12	Gnd	.	.	+12	.	.
	PWRC	+24	.	+24	.	.	.	Gnd	.	.	.	.	.

* PWRC: + 24V on pins A1 B11 and A1 D11.
Ground on pin B1 C11.

Board Voltage Plan (Part 2 of 4)

The following tables indicate the voltage assigned to each pin of the board.

For the CCU board voltage plan, see page 4-022. For card locations, see page 4-060 onward.

		G Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	.	.	.	-5	.	.	.	.	+12	.	.
	ECC	.	.	.	.	-5	.	.	.	.	.	.	.
	SCTL	.	.	.	.	-5	.	.	.	.	.	.	.
	MMC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	MPC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	DAC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	CPA	.	.	.	.	-5	.	.	.	.	.	.	.
	MCC	.	.	.	.	-5	.	.	.	.	.	.	.
	CCA	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	EIA	.	.	+12	.	-5	.	.	.	.	+8.5	.	.
C2LB	CSM	.	.	.	.	.	.	.	.	.	+12	.	.
CLAB1	CSM	.	.	.	.	.	.	.	.	.	+12	.	.
C2LB2	CSP1	.	.	.	.	.	.	.	.	.	.	.	.
CLAB2	CSP1	.	.	.	.	.	.	.	.	.	.	.	.
LABs	CSP2	.	.	.	.	.	.	.	.	.	.	.	.
	FES	.	.	.	.	.	.	.	.	.	.	.	.
	LIC	.	.	.	.	-8.5	.	.	.	.	.	.	.
	ICC	.	.	.	.	.	.	.	.	.	.	.	.
	RDV	.	.	.	.	.	.	.	.	.	.	.	.
	TIC	.	.	.	.	.	.	.	.	.	.	.	.
	TRM	.	.	.	.	.	.	.	.	.	.	.	.
C2LB	CADR	.	.	.	.	.	.	.	.	.	.	.	.
CLAB1	CADR	.	.	.	.	.	.	.	.	.	.	.	.
C2LB2	CADRUK	.	.	.	.	.	.	.	.	.	.	.	.
CLAB2	CADRUK	.	.	.	.	.	.	.	.	.	.	.	.
CAB	CCIN	.	.	.	.	.	.	.	.	.	.	.	.
	CHIN	.	.	.	.	.	.	.	.	.	.	.	.
	RDV	.	.	.	.	.	.	.	.	.	.	.	.
	CVTL	.	.	.	.	.	.	.	.	.	.	.	.
PWB1	PWCA1	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL1	.	.	.	.	.	.	.	.	.	.	.	.
	PH1	.	.	.	.	.	.	.	.	.	.	.	.
PWB2	PWCA2	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL2	.	.	.	.	.	.	.	.	.	.	.	.
	PH2	.	.	.	.	.	.	.	.	.	.	.	.
	PH4	.	.	.	.	.	.	.	.	.	.	.	.
	ARC2	.	.	.	.	.	.	12ac	12ac	.	.	.	.

		J Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	ECC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	SCTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MMC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MPC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	DAC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CPA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MCC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CCA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	EIA	.	+5	.	.	.	.	Gnd	.	.	.	-12	.
C2LB	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CSP1	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
CLAB2	CSP1	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
LABs	CSP2	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	FES	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	LIC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	ICC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	RDV	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TIC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TRM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CAB	CCIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CHIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	RDV	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CVTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
PWB1	PWCA1	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL1	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH1	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
PWB2	PWCA2	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL2	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH2	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
	PH4	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
	ARC2	.	+5	.	.	.	.	Gnd	.	.	.	.	.

Board Voltage Plan (Part 3 of 4)

The following tables indicate the voltage assigned to each pin of the board.

For the CCU board voltage plan, see page 4-022. For card locations, see page 4-060 onward.

		M Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	.	.	.	-5	.	.	.	.	+12	.	.
	ECC	.	.	.	.	-5	.	.	.	.	.	.	.
	SCTL	.	.	.	.	-5	.	.	.	.	.	.	.
	MMC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	MPC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	DAC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	MCC	.	.	.	.	-5	.	.	.	.	.	.	.
	CCA	.	.	.	.	-5	.	.	.	.	+8.5	.	.
C2LB	CSM	.	.	.	.	-5	.	.	.	.	+12	.	.
CLAB1	CSM	.	.	.	.	-5	.	.	.	.	+12	.	.
C2LB2	CSP1	.	.	.	.	-5	.	.	.	.	.	.	.
CLAB2	CSP1	.	.	.	.	-5	.	.	.	.	.	.	.
LABs	CSP2	.	.	.	.	-5	.	.	.	.	.	.	.
	FES	.	.	.	.	-5	.	.	.	.	.	.	.
	LIC	.	.	.	.	-5	.	.	.	.	.	.	.
	ICC	.	.	.	.	-5	.	.	.	.	.	.	.
	RDV	.	.	.	.	-5	.	.	.	.	.	.	.
	TIC	.	.	.	.	.	.	.	.	.	.	.	.
	TRM	.	.	.	.	.	.	.	.	.	.	.	.
C2LB	CADR	.	.	.	.	.	.	.	.	.	.	.	.
CLAB1	CADR	.	.	.	.	.	.	.	.	.	.	.	.
C2LB2	CADRUK	.	.	.	.	.	.	.	.	.	.	.	.
CLAB2	CADRUK	.	.	.	.	.	.	.	.	.	.	.	.
CAB	CCIN	.	.	.	.	.	.	.	.	.	.	.	.
	CHIN	.	.	.	.	.	.	.	.	.	.	.	.
	RDV	.	.	.	.	.	.	.	.	.	.	.	.
	CVTL	.	.	.	.	.	.	.	.	.	.	.	.
PWB1	PWCA1	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL1	.	.	.	.	.	.	.	.	.	.	.	.
	PH1	.	.	.	.	.	.	.	.	.	.	.	.
PWB2	PWCA2	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL2	.	.	.	.	.	.	.	.	.	.	.	.
	PH2	.	.	.	.	.	.	.	.	.	.	.	.
	PH4	.	.	.	.	.	.	.	.	.	.	.	.
	ARC2	.	.	.	.	.	.	.	.	.	.	.	.

		P Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	ECC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	SCTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MMC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MPC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	DAC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MCC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CCA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CSP1	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
CLAB2	CSP1	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
LABs	CSP2	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	FES	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	LIC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	ICC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	RDV	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TIC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TRM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CAB	CCIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CHIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	RDV	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CVTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
PWB1	PWCA1	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL1	.	+5	.	.	.	.	Gnd	+24	.	.	.	.
	PH1	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
PWB2	PWCA2	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL2	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH2	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
	PH4	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
	ARC2	.	.	.	.	.	.	12ac	12ac	.	.	.	.

Board Voltage Plan (Part 4 of 4)

The following tables indicate the voltage assigned to each pin of the board.

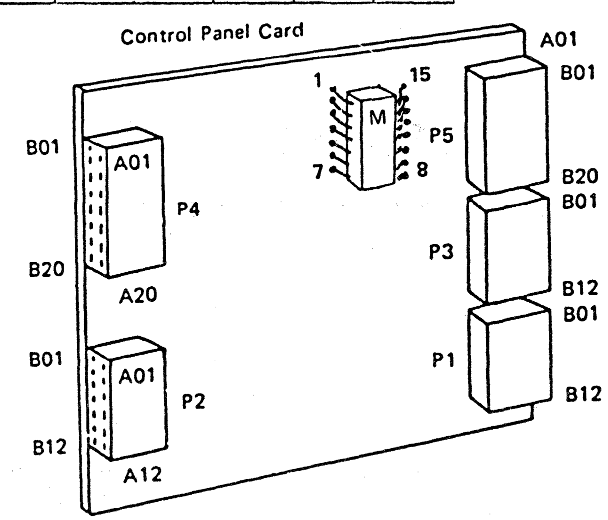
For the CCU board voltage plan, see page 4-022. For card locations, see page 4-060 onward.

		S Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	.	.	.	-5	.	.	.	.	+12	.	.
	ECC	.	.	.	.	-5	.	.	.	.	.	.	.
	SCTL	.	.	.	.	-5	.	.	.	.	.	.	.
	MMC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	MPC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	DAC	.	.	.	.	-5	.	.	.	.	+8.5	.	.
	MCC	.	.	.	.	-5	.	.	.	.	.	.	.
	CCA	.	.	.	.	-5	.	.	.	.	+8.5	.	.
C2LB	CSM	.	.	.	.	.	.	.	.	.	+12	.	.
CLAB1	CSM	.	.	.	.	.	.	.	.	.	+12	.	.
C2LB2	CSP1	.	.	.	.	+8.5	.	.	.	.	.	.	.
CLAB2	CSP1	.	.	.	.	+8.5	.	.	.	.	.	.	.
LABs	CSP2	.	.	.	.	.	.	.	.	.	.	.	.
	FES	.	.	.	.	.	.	.	.	.	.	.	.
	LIC	.	.	.	.	+8.5	.	.	.	.	.	.	.
	ICC	.	.	.	.	.	.	.	.	.	.	.	.
	RDV	.	.	.	.	.	.	.	.	.	.	.	.
	TIC	.	.	.	.	+8.5	.	.	.	.	.	.	.
	TRM	.	.	.	.	+8.5	.	.	.	.	.	.	.
C2LB	CADR	.	.	.	.	+8.5	.	.	.	.	.	.	.
CLAB1	CADR	.	.	.	.	+8.5	.	.	.	.	.	.	.
C2LB2	CADRUK	.	.	.	.	+8.5	.	.	.	.	.	.	.
CLAB2	CADRUK	.	.	.	.	+8.5	.	.	.	.	.	.	.
CAB	CCIN	.	.	.	.	.	.	.	.	.	.	.	.
	CHIN	.	.	.	.	.	.	.	.	.	.	.	.
	RDV	.	.	.	.	.	.	.	.	.	.	.	.
	CVTL	.	.	.	.	.	.	.	.	.	.	.	.
PWB1	PWCA1	.	.	.	.	Gnd	.	.	.	.	.	.	.
	PWCL1	.	+24	.	.	.	.	.	.	.	.	.	.
	PH1	.	.	.	.	.	.	.	.	.	.	.	.
PWB2	PWCA2	.	.	.	.	.	.	.	.	.	.	.	.
	PWCL2	.	.	.	.	.	.	.	.	.	.	.	.
	PH2	.	.	.	.	.	.	.	.	.	.	.	.
	PH4	.	.	.	.	.	.	.	.	.	.	.	.

CONTROL PANEL CARD (01L) VOLTAGE PINS

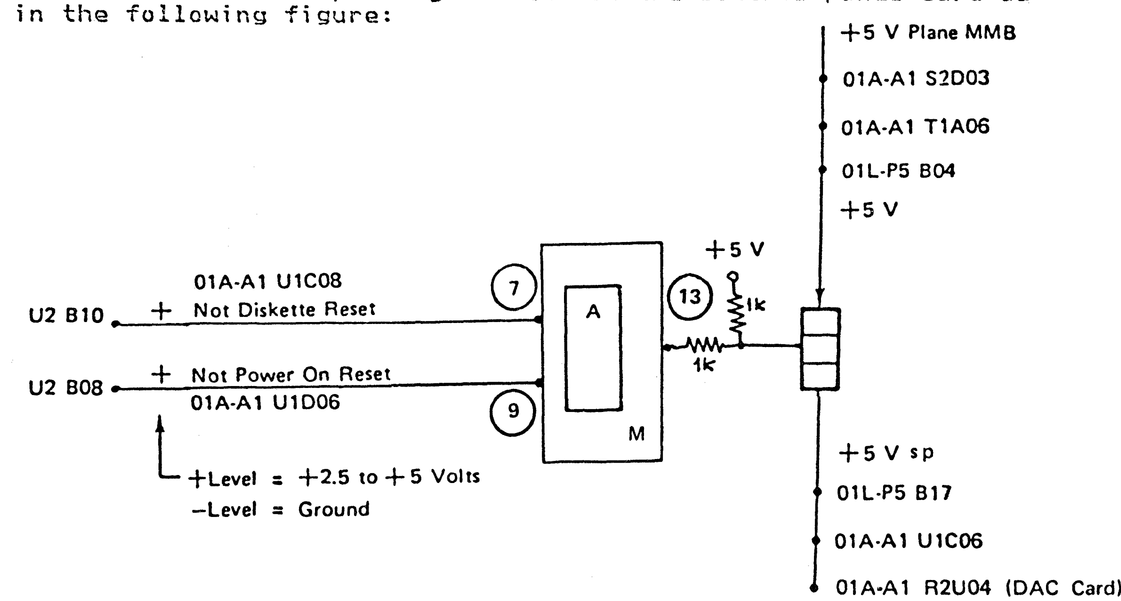
Voltage	Pin
+ 5V CNTL	P4 B10
+ 5V	P5 B04
+ 5V	P5 B17

For more information on control panel connector pins, see page YZ136. See also "Control Panel Connections" on page 6-020.

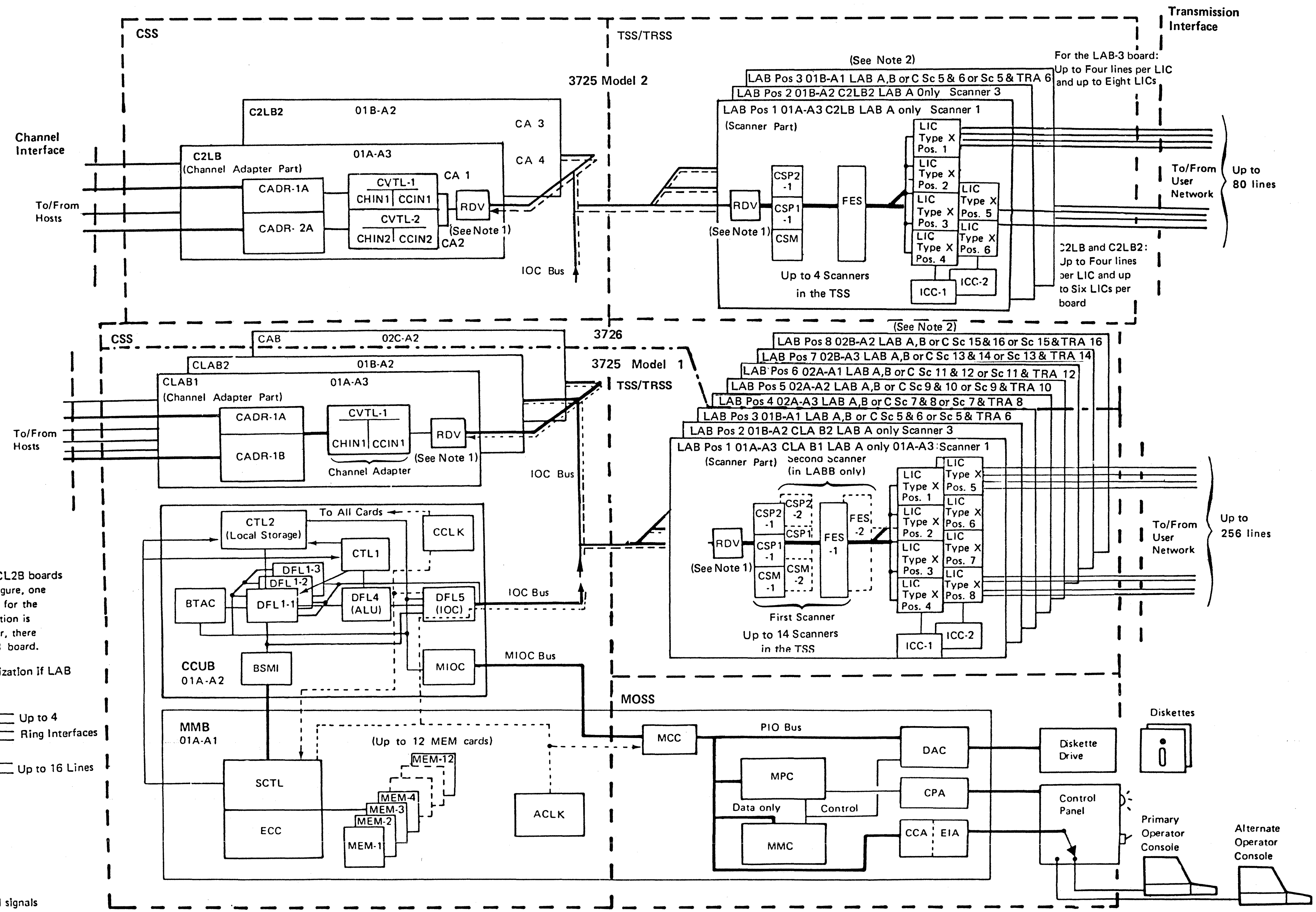


		U Pins											
Board	Card	02	03	04	05	06	07	08	09	10	11	12	13
MMB	MEM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	ECC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	SCTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	ACLK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MMC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	MPC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	DAC	.	+5	+5*	.	.	.	Gnd	.	.	.	.	.
	MCC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CCA	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CSM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CSP1	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
CLAB2	CSP1	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
LABs	CSP2	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	FES	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	LIC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	ICC	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	RDV	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	TIC	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	TRM	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB1	CADR	.	+5	.	.	.	.	Gnd	.	.	.	.	.
C2LB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CLAB2	CADRUK	.	+5	.	.	.	.	Gnd	.	.	.	.	.
CAB	CCIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	CHIN	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	RDV	Gnd	+5	.	.	.	.	Gnd	.	.	+5	.	.
	CVTL	.	+5	.	.	.	.	Gnd	.	.	.	.	.
PWB1	PWCA1	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL1	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH1	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
PWB2	PWCA2	.	+5	.	.	.	-12	Gnd	.	.	+12	.	.
	PWCL2	.	+5	.	.	.	.	Gnd	.	.	.	.	.
	PH2	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.
	PH4	.	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.	Gnd	.

* This special 5 volts (+5 sp) is generated on the control panel card as shown in the following figure:

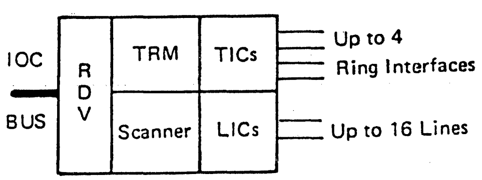


Card and Board Organization



Note 1: As the CLAB and the CL2B boards are split into two parts in this figure, one for the channel adapter and one for the scanner, the redrive (RDV) function is shown twice for clarity. However, there is one RDV per CLAB or C2LB board.

Note 2: LAB Pos. 3 to 8 organization if LAB type C installed



Legend:

- - - - - Clock signals

——— Data/control signals

Card Location (Part 1 of 5)

This page shows the card locations on the different types of board in the communication controller and its expansion. The same information for the power boards is in Volume A02.

When present on a board, cards are identified by a group of alphameric characters that indicate the name of the card. A card name may be followed by a hyphen (-) and a digit. The digit shows the sequence of implementation of:

- Cards on this board (MEM- cards or LICx- cards)
- Groups of cards (for example, the cards that make up a channel adapter, such as CCIN-6, CHIN-6, and CADR-6A)

Notes:

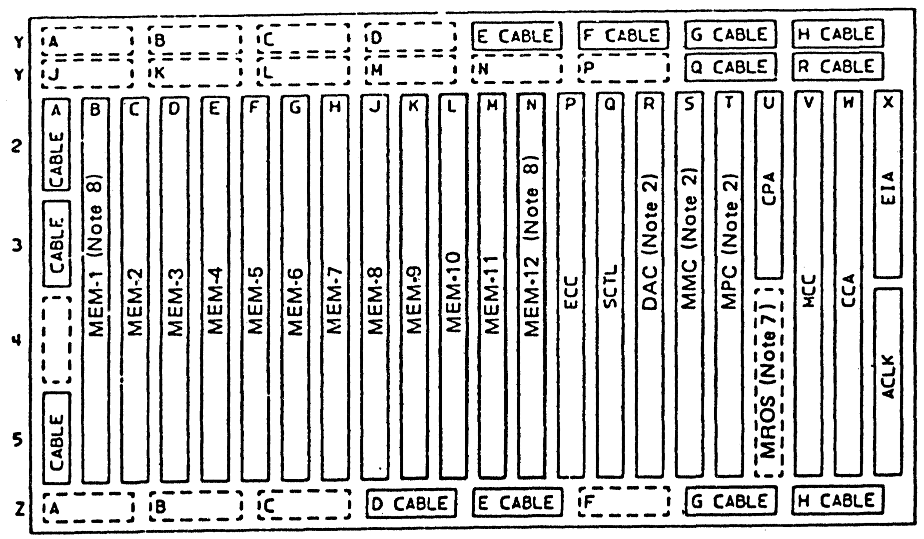
1. On a LAB type B, FES-1 controls LIC positions 1 through 4, and FES-2 controls LIC positions 5 through 8.
2. This card contains pluggable modules and/or jumpers. See Chapter 5 for module and jumper identification and for the plugging procedure. See the YZ pages for up-to-date jumper positions.
3. In the United Kingdom, card CADRUK replaces card CADR.
4. ICC-1 distributes its clock signals to LIC positions 1 through 4; ICC-2 distributes its clock signals to LIC positions 5 through 8.
5. PROM is used to patch the ROS on the CSP1 card. It is received when needed to make a temporary fix.
6. The figure on the crossover indicates its part number. There is no relationship of figures between boards. To identify crossover part numbers, see YZ pages and the 3725/3726 Parts Catalog.
7. MROS is used to patch the ROS on the MPC card of the MMB board. It is received when needed to make a temporary fix.
8. The MEM cards (up to 12) can be of different types depending on the EC level of the machine. (See page 10-050 for details.)

BOARD: MMB

Board Location: 01A-A1

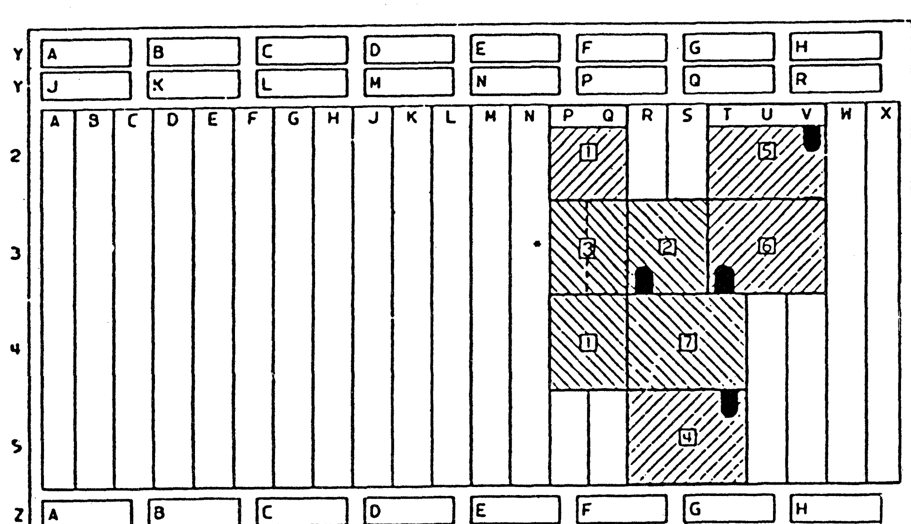
Card Part Numbers: See the ZZ pages

Card Locations



Crossover Part Numbers: See Note 6

Crossover Locations



* Crossover 3 can be of a different type (Q3 only) depending on the EC level of the machine.

Install the crossovers with the corner identification as shown in the figure above.

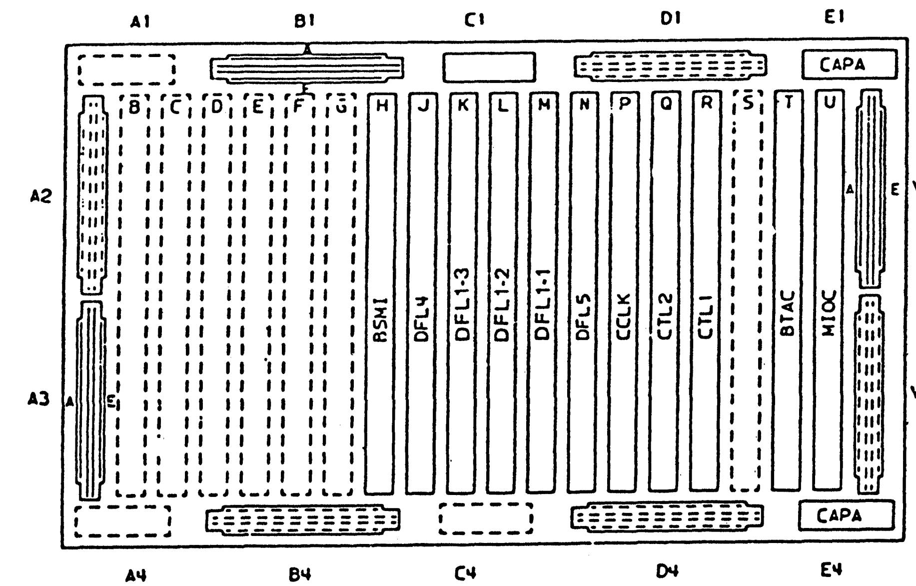
Warning: Check that the crossovers are properly seated after a card is replaced. Check also the crossovers adjacent to the card.

BOARD: CCUB

Board Location: 01A-A2

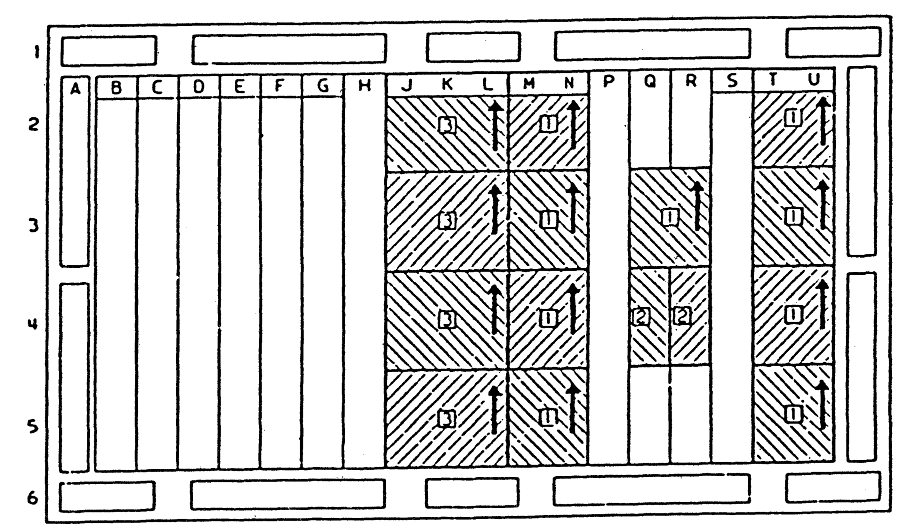
Card Part Numbers: See the ZZ pages

Card Locations



Crossover Part Numbers: See Note 6

Crossover Locations



Install the crossovers with corner identification as shown in the figure above.

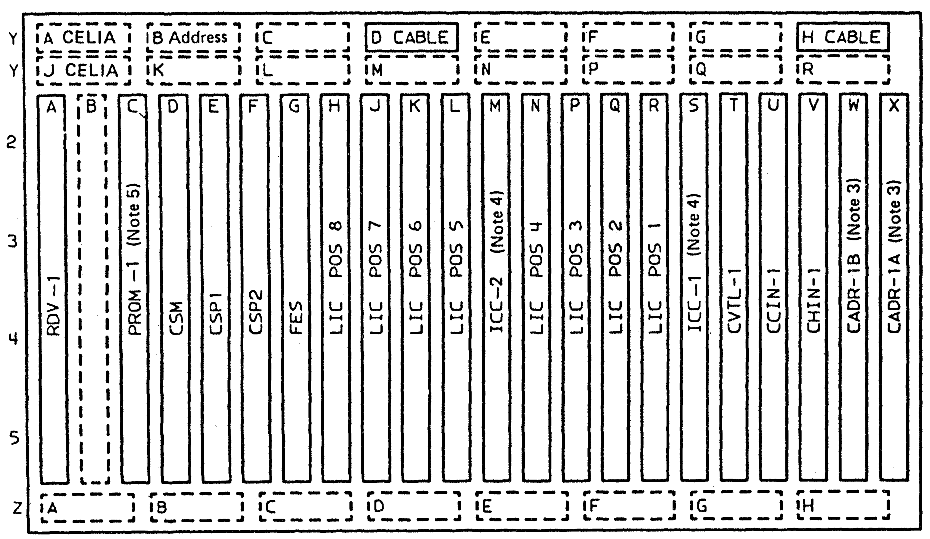
Card Location (Part 2 of 5)

BOARD CLAB1

Board Location: 01A-A3

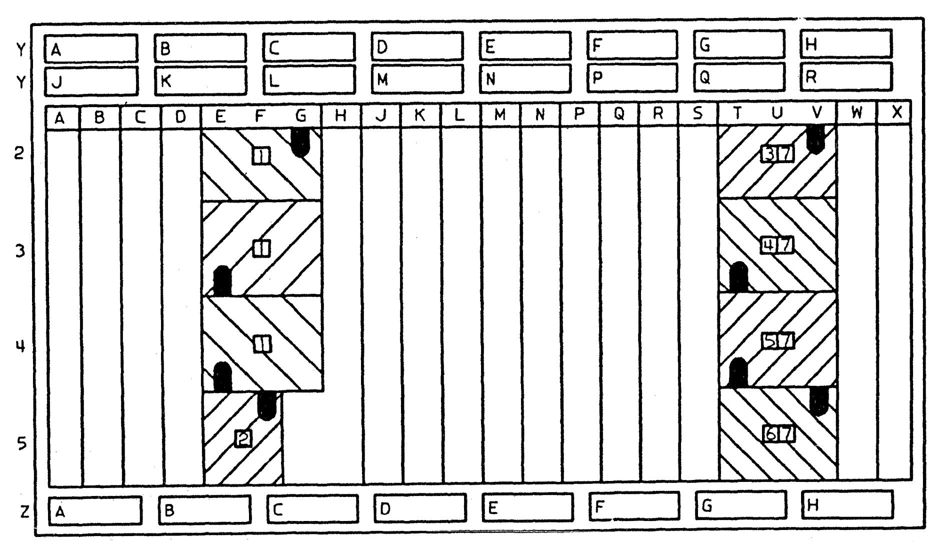
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



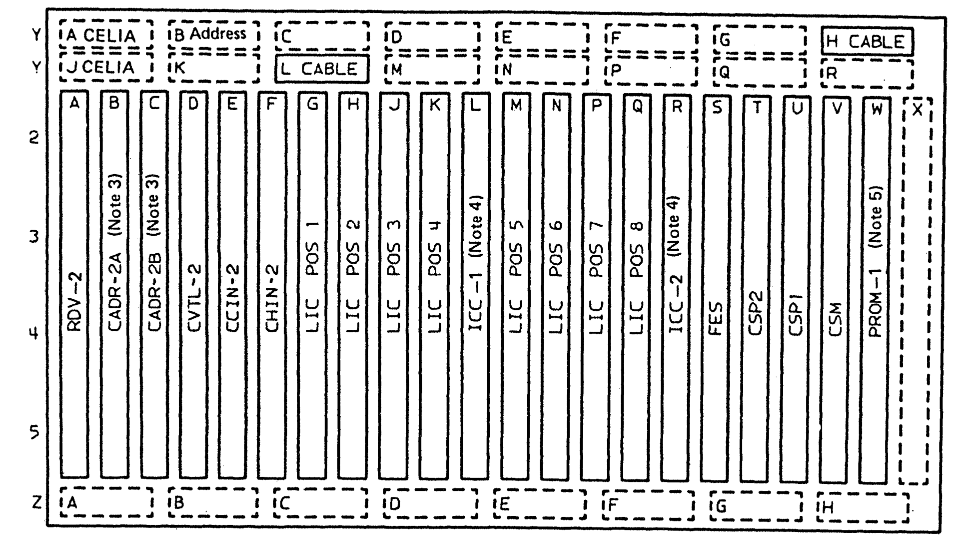
Install crossovers with corner identification on crossovers as shown. If the crossovers are polarized, see page YZ-026.

BOARD CLAB2

Board Location: 01B-A2

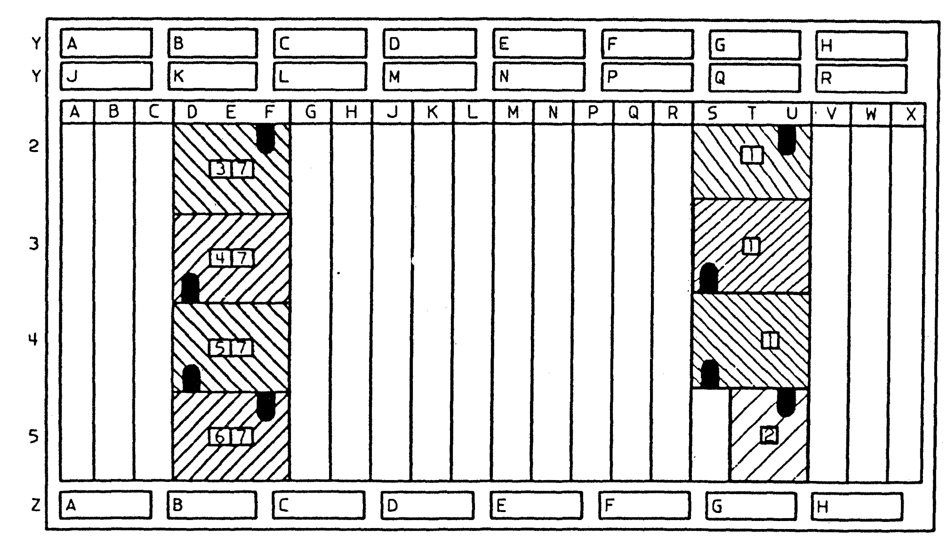
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



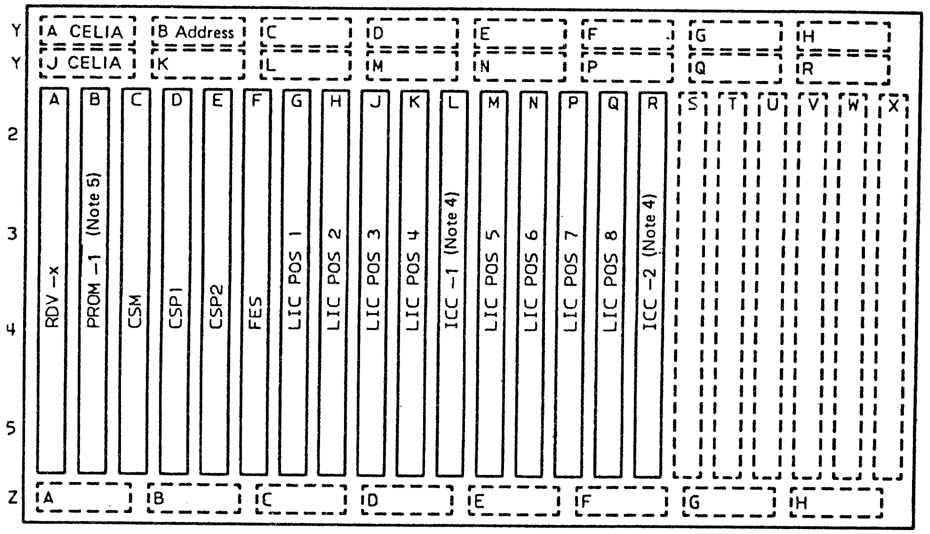
Install crossovers with corner identification on crossovers as shown. If the crossovers are polarized, see page YZ-031.

BOARD LABA

Board Location: See table on this page

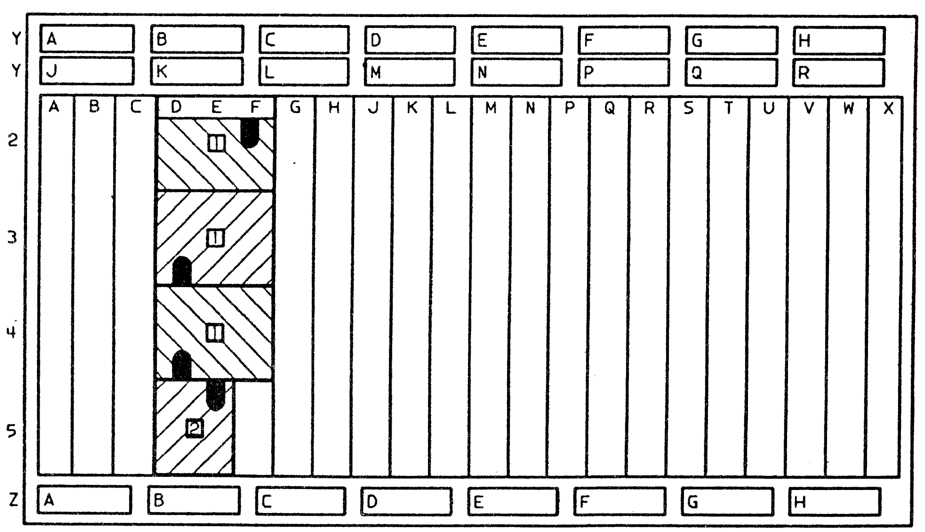
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



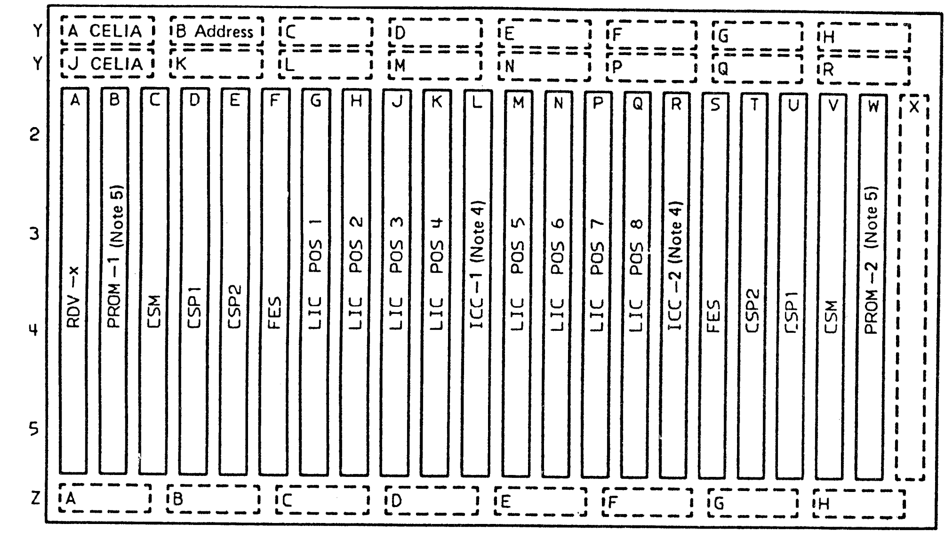
Install crossovers with corner identification on crossovers as shown.

BOARD LABB

Board Location: See table on this page

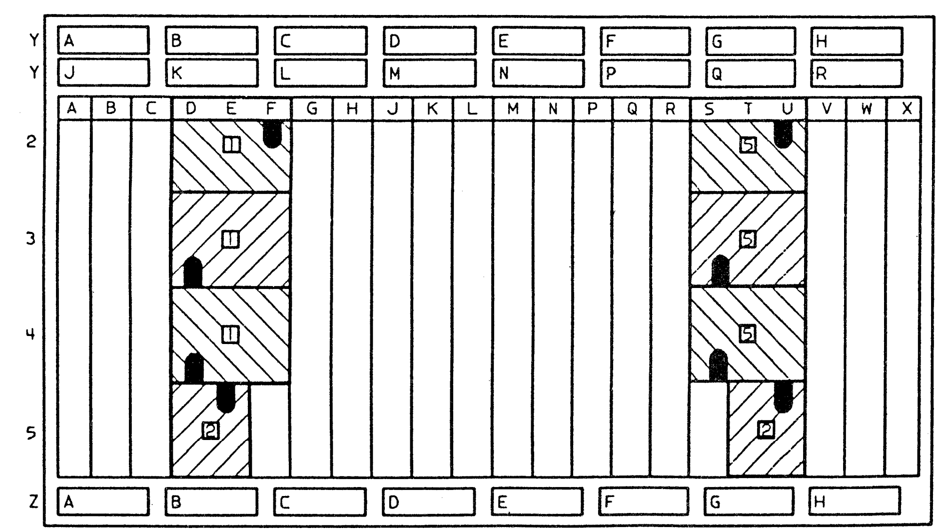
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



Install crossovers with corner identification on crossovers as shown.

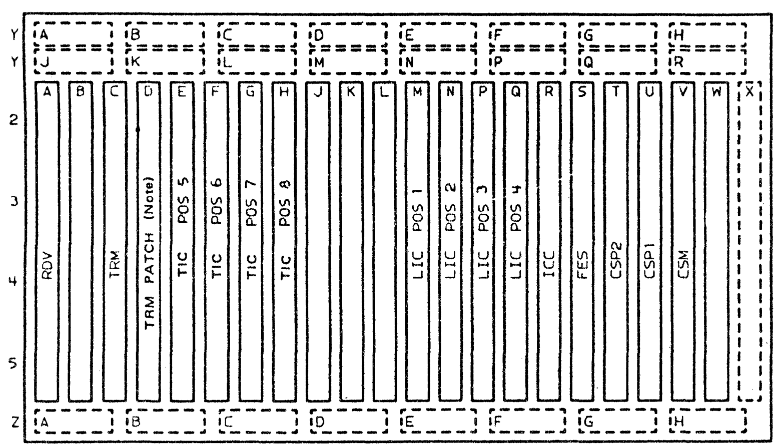
Card Location (Part 4 of 5)

LAB C BOARD

Board Location: Any Lab Pos 3 to 8.

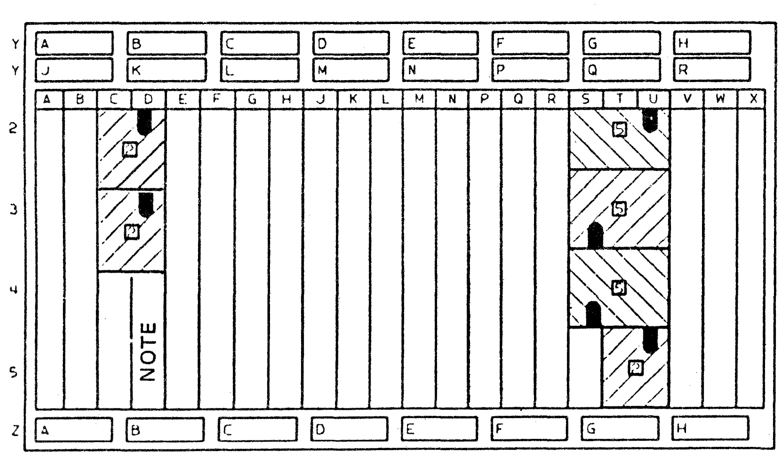
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



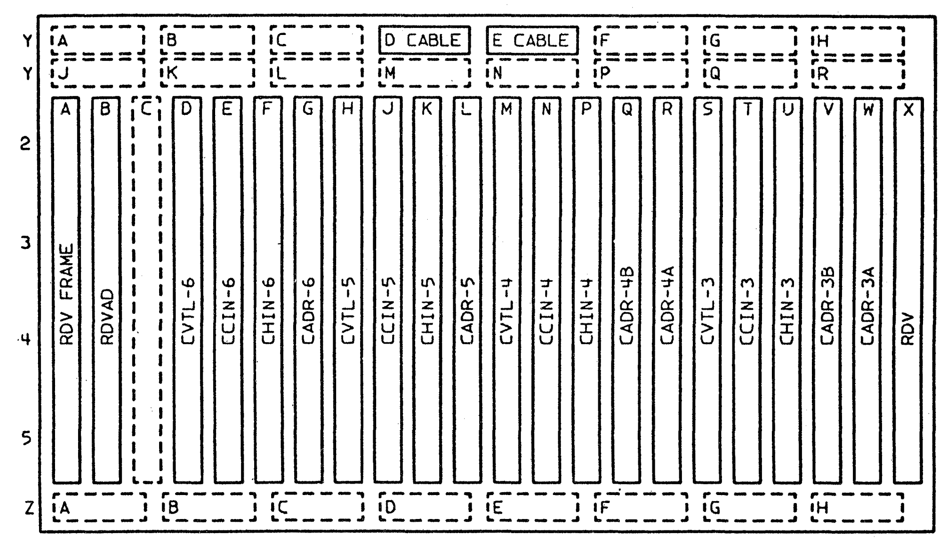
Note: TRM patch card may be present, and Cross overs will also be present.

BOARD CAB

Board Location: 02C-A1

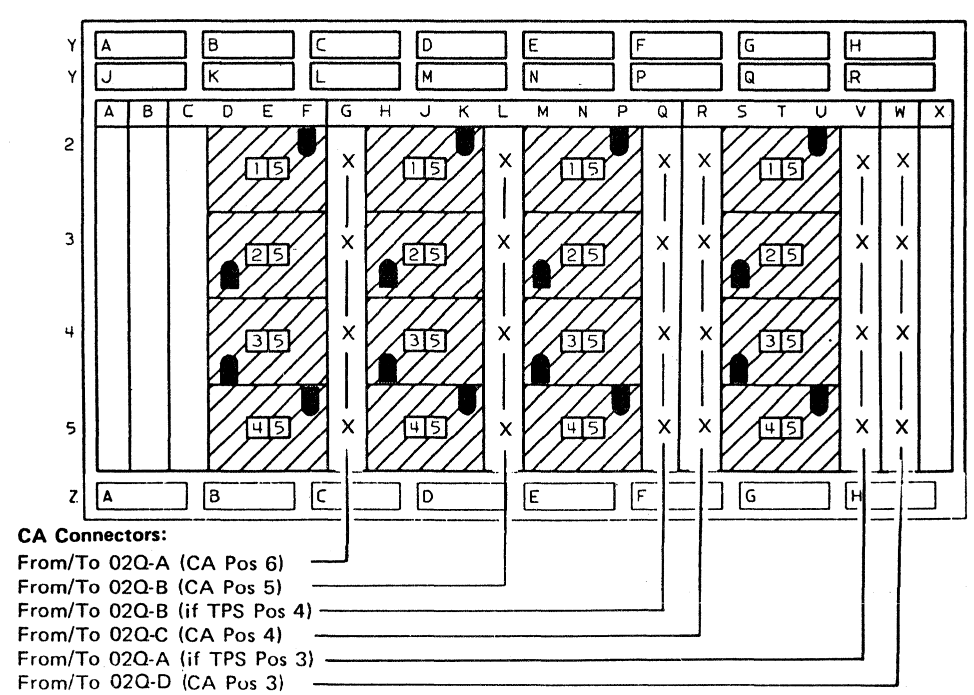
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See note 6, page 4-060

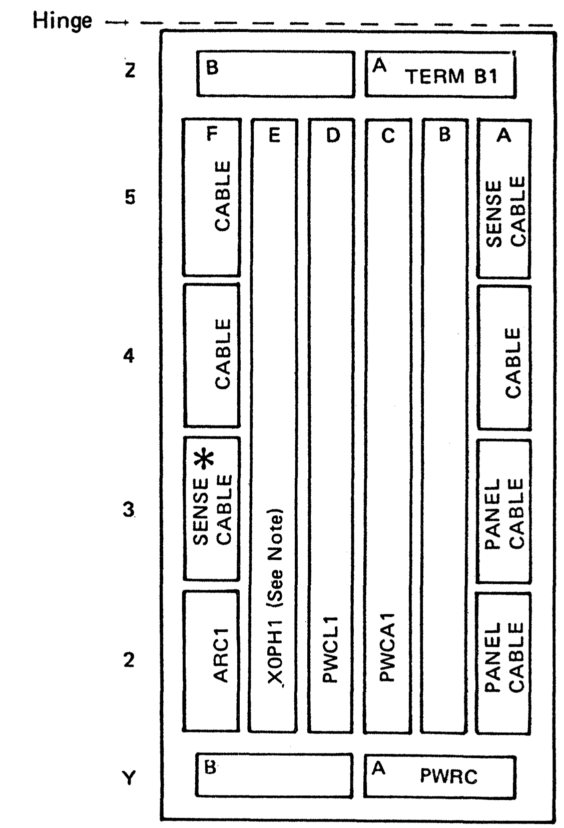
Crossover Location



Install crossovers with corner identification on crossovers as shown. If polarized crossovers, see page YZ-316.

BOARD PWB1

Board Location: 01R-A1
(Refer to page YZ156 for part numbers)
PWB1 is shown in the open position.

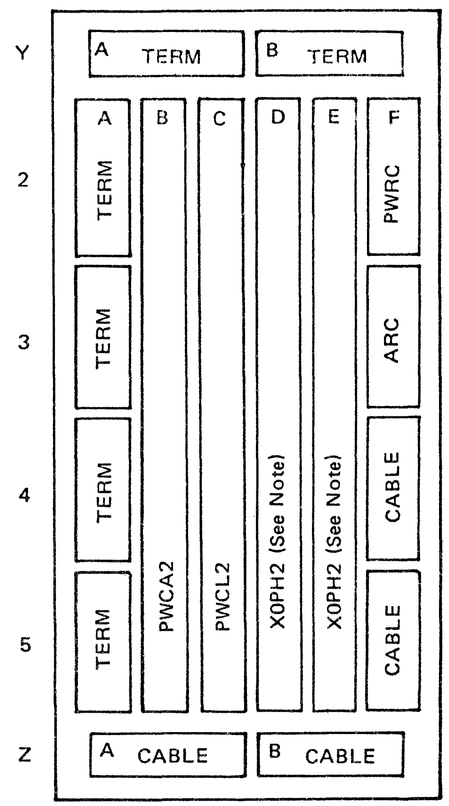


* For the 3725 Model 2, the sense cable is replaced by a terminator card.

Note: "XO" in the card name can be 50 or 60 Hz according to the ac input power frequency.

BOARD PWB2

Board Location: 02J-A1
(Refer to page YZ411 for part numbers)

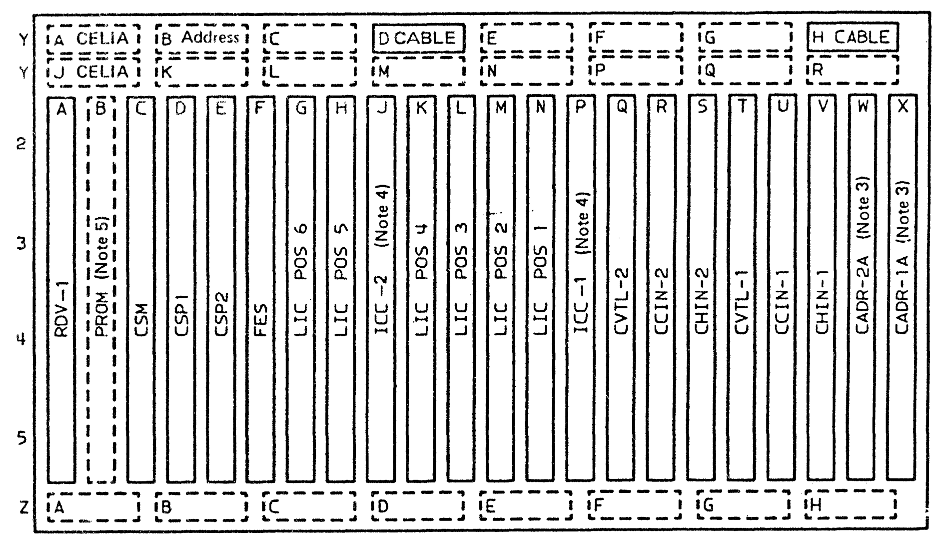


BOARD C2LB

Board Location: 01A-A3

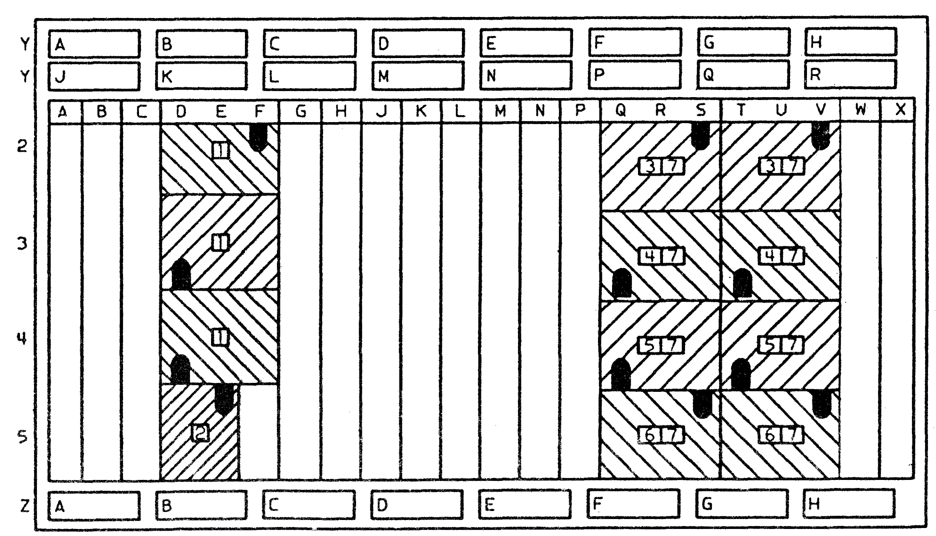
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



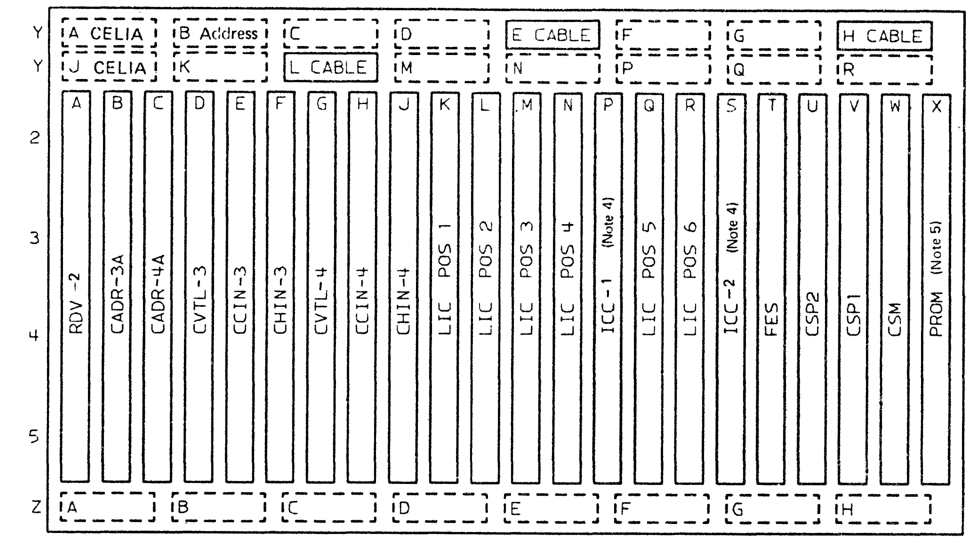
Install crossovers with corner identification on crossovers as shown. If the crossovers are polarized, see page YZ-026.

BOARD C2LB2

Board Location: 01B-A2

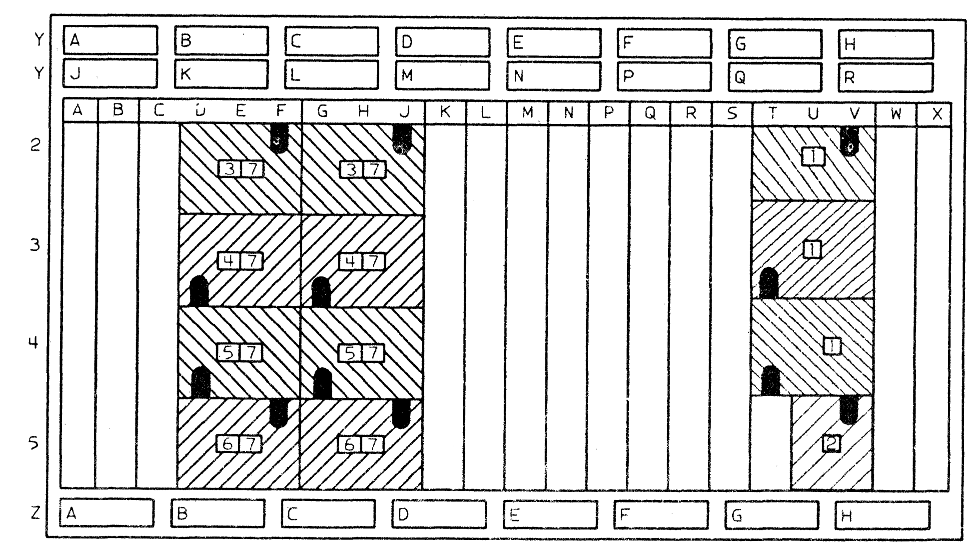
Card Part Numbers: See the ZZ pages

Card Location



Crossover Part Numbers: See Note 6, page 4-060

Crossover Location



Install crossovers with corner identification on crossovers as shown. If the crossovers are polarized, see page YZ-026.

Cabling Between Boards

GENERAL VIEW

This figure shows the cabling between the boards within the 3725 Model 1, the 3725 Model 2, and the 3726 expansion.

Power board cables are not represented; for details of these cables, see Volume A02.

The numbers in circles relate to the signal tables that list the signal names and signal voltages of all the leads in the cables.

The signal tables follow in this chapter starting at page 4-080.

Notes:

1. Bold lines represent the IOC bus cables that route signals from the CCU board (positions A3A, B, and C) to the different channel adapters and scanners. The maximum machine configuration is shown.

   From the CLAB, or the C2LB, the routing is via the card top connectors (TC) and the gate connectors (J1 sockets on a gate side). A gate connector may be plugged with:

   a. IOC bus cables routing signals to the other gates

   b. A terminator card (BUSTERM) containing mainly resistors to load the lines

   The gate to which a connector is plugged depends on the machine configuration.

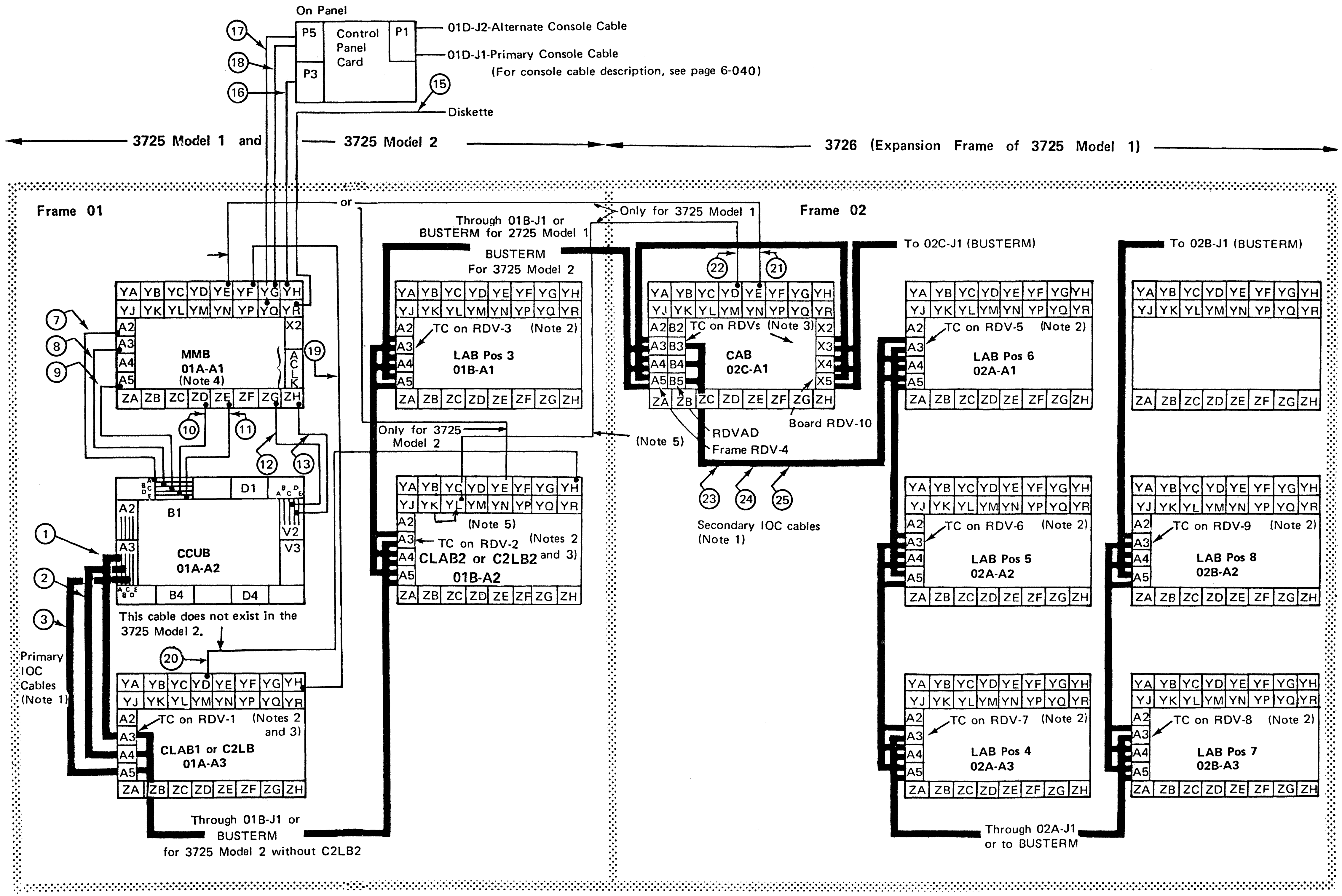
   When plugged, the terminator card receives power from the nearest board. The power cable is plugged in position J1A2 on the gate connector, and on pins B2-E14 and B3-E01 on the board pin side.

   To check wire continuity between the top connector pins, see page 4-090.

2. For the connections from the LIC top card connectors to the line sockets on the tailgates, see page 4-120.

3. For the connections from the channel adapter cards on the boards to the host channel sockets on the tailgates, see page 4-110.

4. For the adapter clock distribution from the ACLK card to the various board RDVs, see page 4-100.



5. This Cable is in two parts, each part having its own part number. The connection between them is done through 01B-J1. The continuity between YK and YL is assured by a jumper cable (part 4712959).

   When Frame 02 is not installed, the part of the cable pertaining to the board 01B-A2 is provided but not connected, and the jumper cable between YK and YL is not installed.

Primary IOC BUS : Signal Tables

For IOC wire distribution up to the CAB board, see page 4-090.

Cable 1

CCU 01A-A2A3A Pin Ref on Board	Cable	Cable A (IOC Bus) Signal Names with Polarities	RDV on CLAB1 01A-A3A3 Pin Ref on Cable	TC(1)
02	B1	-Data Bus 1.7	D13	X13
03	B2	-CS Req High RDV to CCU	B13	X33
04	B3	-Data Bus 1.6	D12	X12
06	B4	-CS Req Low RDV to CCU	B12	X32
07	B5	-CS Req Prty Line	B11	X31
08	B6	-Data Bus 1.5	D10	X10
10	B7	-L2 Priority Line	B10	X30
11	B8	-Data Bus 1.4	D09	X09
12	B9	-Data Bus 1.3	D08	X08
14	C1	-L2 Request to RDV	B08	X28
15	C2		B07	X27
16	C3	-Data Bus 1.2	D07	X07
18	C4		B06	X26
19	C5	-Data Bus 1.P	B05	X25
20	C6	-Data Bus 1.1	D05	X05
22	C7	-Data Bus 1.0	D04	X04
23	C8		D03	X03
24	C9		D02	X02
01	A1	-----+-- Signal Ground ---+---	B04	X24
05	A2	-----| |---	B09	X29
09	A3	-----| |---	D06	X06
13	A4	-----| |---	D11	X11
17	A5	-----|		
21	A6	-----|		
25	A7	-----|		

(1) TC: Pin on card top connector.

Cable 2

CCU 01A-A2A3B Pin Ref on Board	Cable	Cable B (IOC Bus) Signal Names with Polarities	RDV on CLAB1 01A-A3A4 Pin Ref on Cable	TC(1)
02	B1	-Data Bus 0.7	D13	Y13
03	B2	-Valid Halfword from Adapter	B13	Y33
04	B3	-Data Bus 0.6	D12	Y12
06	B4	-Parity Valid from Adapter	B12	Y32
07	B5	-Modifier from RDV	B11	Y31
08	B6	-Data Bus 0.5	D10	Y10
10	B7	-Scanner Interrupt to MOSS	B10	Y30
11	B8	-Data Bus 0.4	D09	Y09
12	B9	-Data Bus 0.3	D08	Y08
14	C1	-CA Req IPL Detect	B08	Y28
15	C2	-RDV Error Reg Out	B07	Y27
16	C3	-Data Bus 0.2	D07	Y07
18	C4	-RDV L1 Pending Out	B06	Y26
19	C5	-Data Bus 0.P	B05	Y25
20	C6	-Data Bus 0.1	D05	Y05
22	C7	-Data Bus 0.0	D04	Y04
		-CS Grant Low Out RDV to RDV	B03	Y23
23	C8	-CS Grant Low Out CCU to RDV	D03	Y03
		-CS Grant High Out RDV to RDV	B02	Y22
24	C9	-CS Grant High Out CCU to RDV	D02	Y02
01	A1	-----+-- Signal Ground ---+---	B04	Y24
05	A2	-----| |---	B09	Y29
09	A3	-----| |---	D06	Y06
13	A4	-----| |---	D11	Y11
17	A5	-----|		
21	A6	-----|		
25	A7	-----|		

(1) TC: Pin on card top connector.

Cable 3

CCU 01A-A2A3C Pin Ref on Board	Cable	Cable C (IOC Bus) Signal Names with Polarities	RDV on CLAB1 01A-A3A5 Pin Ref on Cable	TC(1)
02	B1	-15.258 us Pulse	D13	Z13
03	B2		B13	Z33
04	B3	-4.9152 MHz Clock	D12	Z12
06	B4	-Power On Reset to Adapter	B12	Z32
07	B5	-Reset Tag CCU to Adapter	B11	Z31
08	B6	-100 ms Pulse	D10	Z10
10	B7	+Read, -Write Tag CCU to Adapter	B10	Z30
11	B8	-End of Chain from Adapter	D09	Z09
12	B9	-Valid Byte from Adapter	D08	Z08
14	C1	-Halt Tag CCU to Adapter	B08	Z28
15	C2	-TD Tag CCU to Adapter	B07	Z27
16	C3	-Inter Req Removed from Adapter	D07	Z07
18	C4	-TA Tag CCU to Adapter	B06	Z26
19	C5	-I/O Tag CCU to Adapter	B05	Z25
20	C6	-Exception from Adapter	D05	Z05
22	C7	-480 Hz Clock	D04	Z04
		-Select Out RDV to RDV	B03	Z23
23	C8	-Select In	D03	Z03
		-Allow Poll Response Out	B02	Z22
24	C9	-Allow Poll Response In	D02	Z02
01	A1	-----+-- Signal Ground ---+---	B04	Z24
05	A2	-----| |---	B09	Z29
09	A3	-----| |---	D06	Z06
13	A4	-----| |---	D11	Z11
17	A5	-----|		
21	A6	-----|		
25	A7	-----|		

(1) TC: Pin on card top connector.

CCU-to-Storage BUS: Signal Tables

Cable 7

CCU * 01A-A2B1A Pin Ref on Board	Cable	Storage cable A (Data bus bytes X, Y) Signal Names with Polarities	MMB 01A-A1A2 Pin Ref on Cable	Board
02	B1	-Memory Data Bus Byte X (0)	D13	A2 D13
03	B2	-Memory Data Bus Byte X (1)	B12	A2 B12
04	B3	-Memory Data Bus Byte X (2)	B13	A2 B13
06	B4	-Memory Data Bus Byte X (3)	D11	A2 D11
07	B5	-Memory Data Bus Byte X (4)	B10	A2 B10
08	B6	-Memory Data Bus Byte X (5)	D10	A2 D10
10	B7	-Memory Data Bus Byte X (6)	B09	A2 B09
11	B8	-Memory Data Bus Byte X (7)	D09	A2 D09
12	B9	-Memory Data Bus Byte X (P)	B08	A2 B08
14	C1	-Memory Data Bus Byte Y (0)	D07	A2 D07
15	C2	-Memory Data Bus Byte Y (1)	B06	A2 B06
16	C3	-Memory Data Bus Byte Y (2)	D06	A2 D06
18	C4	-Memory Data Bus Byte Y (3)	B05	A2 B05
19	C5	-Memory Data Bus Byte Y (4)	D05	A2 D05
20	C6	-Memory Data Bus Byte Y (5)	B04	A2 B04
22	C7	-Memory Data Bus Byte Y (6)	D03	A2 D03
23	C8	-Memory Data Bus Byte Y (7)	D02	A2 D02
24	C9	-Memory Data Bus Byte Y (P)	B02	A2 B02
01	A1	-----+-- Signal Ground ---+---	D12	A2 D12
05	A2		B11	A2 B11
09	A3		D08	A2 D08
13	A4		B07	A2 B07
17	A5		D04	A2 D04
21	A6		B03	A2 B03
25	A7			

Cable 8

CCU * 01A-A2B1B Pin Ref on Board	Cable	Storage cable B (Addressing) Signal Names with Polarities	MMB 01A-A1A3 Pin Ref on Cable	Board
02	B1	-Read Mode	D13	A3 D13
03	B2	-SCTL Address Bit 4 from BSMI	B12	A3 B12
04	B3	+Refresh Address Bit 0 from BSMI	B13	A3 B13
06	B4	+Refresh Address Bit 1 from BSMI	D11	A3 D11
07	B5	+Refresh Address Bit 2 from BSMI	B10	A3 B10
08	B6	+Refresh Address Bit 3 from BSMI	D10	A3 D10
10	B7	+Refresh Address Bit 4 from BSMI	B09	A3 B09
11	B8	+Refresh Address Bit 5 from BSMI	D09	A3 D09
12	B9	+Refresh Address Bit 6 from BSMI	B08	A3 B08
14	C1	-Memory Address Bit 0 from BSMI	D07	A3 D07
15	C2	+Memory Address Bit 1 from BSMI	B06	A3 B06
16	C3	-Memory Address Bit 2 from BSMI	D06	A3 D06
18	C4	-Memory Address Bit 3 from BSMI	B05	A3 B05
19	C5	-Memory Address Bit 4 from BSMI	D05	A3 D05
20	C6	-Memory Address Bit 5 from BSMI	B04	A3 B04
22	C7	-Memory Address Bit 6 from BSMI	D03	A3 D03
23	C8	-Memory Address Bit 7 from BSMI	D02	A3 D02
24	C9	+CCU STG Grant	B02	A3 B02
01	A1	-----+-- Signal Ground ---+---	D12	A3 D12
05	A2		B11	A3 B11
09	A3		D08	A3 D08
13	A4		B07	A3 B07
17	A5		D04	A3 D04
21	A6		B03	A3 B03
25	A7			

Cable 9

CCU * 01A-A2B1C Pin Ref on Board	Cable	Storage cable C (Data bus bytes 0, 1) Signal Names with Polarities	MMB 01A-A1A5 Pin Ref on Cable	Board
02	B1	-Memory Data Bus Byte 0-Bit 0	D13	A5 D13
03	B2	-Memory Data Bus Byte 0-Bit 1	B12	A5 B12
04	B3	-Memory Data Bus Byte 0-Bit 2	B13	A5 B13
06	B4	-Memory Data Bus Byte 0-Bit 3	D11	A5 D11
07	B5	-Memory Data Bus Byte 0-Bit 4	B10	A5 B10
08	B6	-Memory Data Bus Byte 0-Bit 5	D10	A5 D10
10	B7	-Memory Data Bus Byte 0-Bit 6	B09	A5 B09
11	B8	-Memory Data Bus Byte 0-Bit 7	D09	A5 D09
12	B9	-Memory Data Bus Byte 0-Bit P	B08	A5 B08
14	C1	-Memory Data Bus Byte 1-Bit 0	D07	A5 D07
15	C2	-Memory Data Bus Byte 1-Bit 1	B06	A5 B06
16	C3	-Memory Data Bus Byte 1-Bit 2	D06	A5 D06
18	C4	-Memory Data Bus Byte 1-Bit 3	B05	A5 B05
19	C5	-Memory Data Bus Byte 1-Bit 4	D05	A5 D05
20	C6	-Memory Data Bus Byte 1-Bit 5	B04	A5 B04
22	C7	-Memory Data Bus Byte 1-Bit 6	D03	A5 D03
23	C8	-Memory Data Bus Byte 1-Bit 7	D02	A5 D02
24	C9	-Memory Data Bus Byte 1-Bit P	B02	A5 B02
01	A1	-----+-- Signal Ground ---+---	D12	A5 D12
05	A2		B11	A5 B11
09	A3		D08	A5 D08
13	A4		B07	A5 B07
17	A5		D04	A5 D04
21	A6		B03	A5 B03
25	A7			

Cable 10

CCU * 01A-A2B1D Pin Ref on Board	Cable	Storage cable D (Clocks and controls) Signal Names with Polarities	MMB 01A-A1ZD Pin Ref on Cable	Board
02	B1	-SCTL Address Bit 0 from BSMI	D13	L6 D02
03	B2	-SCTL Address Bit 1 from BSMI	B12	L6 C04
04	B3	-SCTL Address Bit 2 from BSMI	B13	L6 D04
06	B4	-SCTL Address Bit 3 from BSMI	D11	L6 B02
07	B5		B10	L6 A04
08	B6	-SCTL Address Bit 5 from BSMI	D10	L6 A02
10	B7	-SCTL Address Bit 6 from BSMI	B09	K6 E04
11	B8	-SCTL Address Bit 7 from BSMI	D09	K6 E02
12	B9	-SCTL Address Bit 8 from BSMI	B08	K6 D04
14	C1	-SCTL Address Bit 9 from BSMI	D07	K6 C02
15	C2	+STG Go	B06	K6 B04
16	C3	-STG Read, +STG Write	D06	K6 B02
18	C4	-M1 Clock Signal	B05	K6 A04
19	C5	-M2 Clock Signal	D05	K6 A02
20	C6	-M3 Clock Signal	B04	J6 E04
22	C7	-M4 Clock Signal	D03	J6 D02
23	C8	-M5 Clock Signal	D02	J6 C02
24	C9	-M6 Clock Signal	B02	J6 C04
01	A1	-----+-- Signal Ground ---+---	D12	L6 C02
05	A2		B11	L6 B04
09	A3		D08	K6 D02
13	A4		B07	K6 C04
17	A5		D04	K6 E02
21	A6		B03	J6 D04
25	A7			

Cable 11

CCU * 01A-A2B1E Pin Ref on Board	Cable	Storage cable E (Controls) Signal Names with Polarities	MMB 01A-A1ZE Pin Ref on Cable	Board
02	B1	-4.9152 MHz Clock	D13	P6 C02
03	B2	-4.9152 MHz Clock	B12	P6 B04
04	B3	-Dog Byte 0 BSMI	B13	P6 C04
06	B4	-Dog Byte 1	D11	P6 A02
07	B5	-Dog Byte X	B10	N6 E04
08	B6	-Dog Byte Y	D10	N6 E02
10	B7	-Dog BSMI Parity Bits	B09	N6 D04
11	B8	+STG Cntl Error to CCU	D09	N6 D02
12	B9	+STG Add/Data Pty Error to CCU	B08	N6 C04
14	C1	+SP Write Inhibit from BSMI	D07	N6 B02
15	C2	-Input 70	B06	N6 A04
16	C3	-STG Cntl Out Tag from BSMI	D06	N6 A02
18	C4	-2 Bits STG Error to CCU	B05	M6 E04
19	C5	+STG Byte Select Y	D05	M6 E02
20	C6	+STG Byte Select X	B04	M6 D04
22	C7	+STG Byte Select 0	D03	M6 C02
23	C8	+STG Byte Select 1	D02	M6 B02
24	C9	+Refresh In Progress to BSMI	B02	M6 B04
01	A1	-----+-- Signal Ground ---+---	D12	P6 B02
05	A2		B11	P6 A04
09	A3		D08	N6 C02
13	A4		B07	N6 B04
17	A5		D04	M6 D02
21	A6		B03	M6 C04
25	A7			

* Not accessible

MIOC BUS : Signal Tables

Cable 12

CCU * 01A-A2V2C Pin Ref on Board	Cable	CCU-to-MOSS cable (Clocks and controls) Signal Names with Polarities	MMB 01A-A1ZG Pin Ref on Cable	Board
02	B1	-Scan Inter to MOSS	D13	V6 A02
03	B2		B12	U6 E04
04	B3	-100 ms Pulse	B13	V6 A04
06	B4	-480 Hz Clock	D11	U6 D02
07	B5	-15.258 us Pulse	B10	U6 C04
08	B6	-15.258 us Pulse	D10	U6 C02
10	B7	-Power On Reset	B09	U6 B04
11	B8	-Remote Pwr Off	D09	U6 B02
12	B9	+CCU Clock Card Check	B08	U6 A04
14	C1	-Write Strobe	D07	T6 E02
15	C2	-Read Strobe	B06	T6 D04
16	C3	-Read Ack	D06	T6 D02
18	C4	-Write Ack	B05	T6 C04
19	C5	-MOSS Inoperative	D05	T6 C02
20	C6	-HLIR to MIOC	B04	T6 B04
22	C7	-LLIR to MIOC	D03	T6 A02
23	C8	-CCU/MOSS Parity Check	D02	S6 E02
24	C9		B02	S6 E04
01	A1	`-----+-- Signal Ground ---+---`	D12	U6 E02
05	A2	`-----` `---`	B11	U6 D04
09	A3	`-----` `---`	D08	U6 A02
13	A4	`-----` `---`	B07	T6 E04
17	A5	`-----` `---`	D04	T6 B02
21	A6	`-----` `---`	B03	T6 A04
25	A7	`-----`		

Cable 13

CCU * 01A-A2V2D Pin Ref on Board	Cable	CCU-to-MOSS cable (Data and address busses) Signal Names with Polarities	MMB 01A-A1ZH Pin Ref on Cable	Board
02	B1	-MIOC Data Bus (P)	D13	X6 E02
03	B2	-MIOC Address Bus (P)	B12	X6 D04
04	B3	-MIOC Data Bus (0)	B13	X6 E04
06	B4	-MIOC Address Bus (0)	D11	X6 C02
07	B5	-MIOC Data Bus (1)	B10	X6 B04
08	B6	-MIOC Address Bus (1)	D10	X6 B02
10	B7	-MIOC Data Bus (2)	B09	X6 A04
11	B8	-MIOC Address Bus (2)	D09	X6 A02
12	B9	-MIOC Data Bus (3)	B08	W6 E04
14	C1	-MIOC Address Bus (3)	D07	W6 D02
15	C2	-MIOC Data Bus (4)	B06	W6 C04
16	C3	-MIOC Address Bus (4)	D06	W6 C02
18	C4	-MIOC Data Bus (5)	B05	W6 B04
19	C5	-MIOC Address Bus (5)	D05	W6 B02
20	C6	-MIOC Data Bus (6)	B04	W6 A04
22	C7		D03	
23	C8	-MIOC Data Bus (7)	D02	V6 D02
24	C9	+PRGM Wait	B02	V6 D04
01	A1	`-----+-- Signal Ground ---+---`	D12	X6 D02
05	A2	`-----` `---`	B11	X6 C04
09	A3	`-----` `---`	D08	W6 E02
13	A4	`-----` `---`	B07	W6 D04
17	A5	`-----` `---`	D04	W6 A02
21	A6	`-----` `---`	B03	V6 E04
25	A7	`-----`		

* Not accessible

MOSS Buses: Signal Tables

MOSS-TO-DISKETTE CABLE

Cable 15

MMB 01A-A1YR Pin Ref on Board	Cable	MOSS-to-diskette Signal Names with Polarities	Diskette 01C-J1 Pins on Signal	Gnd
	B02			
	D02			
	B03			
V1 E11	D03	+5 Volts	B01	
W1 A13	B04	+Index	B04	A04
W1 A11	D04	+Diskette sense	B05	A05
W1 B13	B05	+Write/Erase Enable	B06	A06
W1 B11	D05	+File Data	B07	A07
W1 C13	B06	+Inner Tracks	B08	A08
W1 C11	D06	+Erase Gate	B09	A09
W1 D13	B07	+Access 0	B10	A10
W1 D11	D07	+Select Head 1	B11	A11
W1 E13	B08	+Access 1	B13	A13
W1 E11	D08	---------- Signal Ground -----		A02
X1 A13	B09	+Write Gate	B14	A14
X1 A11	D09	+Head Engage	B15	A15
X1 B13	B10	+Switch Filter	B16	A16
X1 B11	D10	+Write Data	B17	A17
	B11			
X1 C11	D11	-5 Volts	A01	
	B12			
	D12			
	B13			
	D13			

On the MOSS to diskette cable, interference between signals is prevented by using twisted pairs; the pin assignment is as follows:

```
                          +---+
          +index-----|---|--> B04
   Signal Ground-----+   +--> A04
```

A single wire carries the 24 Vdc from the primary power box 01N (see page 7-161).

MOSS-TO-CONTROL-PANEL CABLE

Cable 16

MMB 01A-A1YH Pin Ref on Board	Cable	MOSS to control panel (Primary/alternate console) Signal Names with Polarities	Panel Card 01L-P3 Pins
V1 D08	B02	+Transmit Data |	A01
V1 D06	D02	+RLSD |	B01
V1 E08	B03	+Data Terminal Ready |	A03
	D03	| Console	
W1 A08	B04	+Receive Data |Interface	A04
W1 A06	D04	+Ready For Sending |	B04
W1 B08	B05	+Request To Send |	A05
W1 B06	D05	+Data Set Ready |	B05
	B06		
W1 C06	D06	-Primary Console	B06
W1 D08	B07	-Start No	A07
W1 D06	D07	+Panel MOSS Inoperative	B07
W1 E08	B08	+Message	A08
W1 E06	D08	------- Signal Ground --------	B08
	B09		
X1 A06	D09	-Normal |	B09
X1 B08	B10	-MOSS IML |	A10
X1 B06	D10	-MOSS Dump |Rotary	B10
	B11	|Switch	
X1 C06	D11	-Maintenance |	B11
X1 D08	B12	-Console Link Test |	A12
	D12		
	B13		
	D13		

Cable 17

MMB 01A-A1YQ Pin Ref on Board	Cable	MOSS to control panel (Lamps and display) Signal Names with Polarities	Panel Card 01L-P5 Pins
S1 E13	B02	+Hex A 1	A01
S1 E11	D02	+Hex A 2	A03
T1 A13	B03	+Hex A 4	A04
	D03		
T1 B13	B04	+Hex A 8	A06
T1 B11	D04	+Hex B 1	A07
T1 C13	B05	+Hex B 2	A08
T1 C11	D05	+Hex B 4	A09
	B06		A10
T1 D11	D06	+Hex B 8	A11
T1 E13	B07	+Hex C 1	A12
T1 E11	D07	+Hex C 2	A13
U1 A13	B08	+Hex C 4	A14
U1 A11	D08	---------- Signal Ground --	A15
U1 B13	B09	+Hex C 8	A16
U1 B11	D09	+Hex Valid	A17
U1 C13	B10	+All CA Disabled	A18
U1 C11	D10	+PRGM Wait	A19
	B11		
	D11		
	B12		
	D12		
	B13		
	D13		

Cable 18

MMB 01A-A1YG Pin Ref on Board	Cable	MOSS to control panel (Switches and power control) Signal Names with Polarities	Panel Card 01L-P5 Pins
S1 E08	B02	-CA-1 A Enable	B01
S1 E06	D02	-CA-2 A Enable	B02
	B03		
T1 A06	D03	+5 volts	B04
T1 B08	B04	-CA-3 A Enable	B05
	D04		
T1 C08	B05	-CA-4 A Enable	B07
T1 C06	D05	-CA-5 A Enable	B08
	B06		
T1 D06	D06	-CA-6 A Enable	B09
T1 E08	B07	-CA-1 B Enable	B10
T1 E06	D07	-CA-2 B Enable	B11
U1 A08	B08	-CA-3 B Enable	B12
U1 A06	D08	--------- Signal Ground -----	B13
U1 B08	B09	-CA-4 B Enable	B14
U1 B06	D09	-Diskette Drive Power Off	B15
U1 C08	B10	-Diskette Drive Reset	B16
U1 C06	D10	+5 volts sp	B17
	B11		B18
U1 D06	D11	-Power On Reset	B19
U1 E08	B12	+Remote Power Off	B20
	D12		
	B13		
	D13		

Channel Adapter Cables: Signal Tables

CHANNEL ADAPTER CABLES

Cable 19 (3725/3726)

MMB 01A-A1YF Pin Ref on Board	MMB 01A-A1YF Pin Ref on Cable	Cable to CA position 1 (CA-1) Signal Names with Polarities	CLAB1 01A-A3YH Pin Ref on Board	CLAB1 01A-A3YH Pin Ref on Cable
Q1 A08	B02	-CA-1 A Enable	B02	V1 D08
	D02		D02	
Q1 B08	B03	-CA-1 B Enable	B03	V1 E08
	D03		D03	
	B04		B04	
Q1 C06	D04	+Interface CA-1 A Enabled	D04	W1 A06
	B05		B05	
Q1 D06	D05	+Interface CA-1 B Enabled	D05	W1 B06
	B06		B06	
	D06		D06	
R1 A08	B07	+All CA Disabled	B07	W1 D08
	D07		D07	
R1 B08	B08	-CA-2 A Enable	B08	W1 E08
R1 B06	D08	---------- Signal Ground ----	D08	W1 E06
	B09		B09	
R1 C06	D09	-CA-2 B Enable	D09	X1 A06
	B10		B10	
R1 D06	D10	-Interface CA-2 A Enabled	D10	X1 B06
	B11		B11	
	D11		D11	
S1 A08	B12	-Interface CA-2 B Enabled	B12	X1 D08
	D12		D12	
	B13		B13	
	D13		D13	

Cable 20 (3725/3726)

CLAB1 01A-A3YD Pin Ref on Board	CLAB1 01A-A3YD Pin Ref on Cable	Cable to CA position 2 (CA-2) Signal Names with Polarities	CLAB2 01B-A2YH Pin Ref on Board	CLAB2 01B-A2YH Pin Ref on Cable
J1 C08	B02	-CA-2 A Enable	B02	V1 D08
	D02		D02	
J1 D08	B03	-CA-2 B Enable	B03	V1 E08
	D03		D03	
	B04		B04	
J1 E06	D04	-Interface CA-2 A Enabled	D04	W1 A06
	B05		B05	
K1 A06	D05	+Interface CA-2 B Enabled	D05	W1 B06
	B06		B06	
	D06		D06	
K1 C08	B07	+All CA Disabled	B07	W1 D08
	D07		D07	
K1 D08	B08	-Priority Bus Bit 4 to Interface	B08	W1 E08
K1 D06	D08	--------- Signal Ground ------	D08	W1 E06
K1 E08	B09	-Priority Bus Bit 5 to Interface	B09	X1 A08
K1 E06	D09	-Priority Bus Bit 6 to Interface	D09	X1 A06
L1 A08	B10	-Priority Bus Bit 7 to Interface	B10	X1 B08
L1 A06	D10	-Hold to Interface	D10	X1 B06
	B11		B11	
L1 B06	D11	-CA Sample Trap to Interface	D11	X1 C06
L1 C08	B12	+Common Valid Feed Auto	B12	X1 D08
L1 C06	D12	-Sample Out to I/F Repowered	D12	X1 D06
L1 D08	B13	-Sample Out Wrap Dot Repowered	B13	X1 E08
L1 D06	D13	-CA Installed Received	D13	X1 E06

Cable 21 (3725/3726)

MMB 01A-A1YE Pin Ref on Board	MMB 01A-A1YE Pin Ref on Cable	Cable to CA positions 3, 4, 5, and 6 Signal Names with Polarities	CAB 02C-A1YE Pin Ref on Board	CAB 02C-A1YE Pin Ref on Cable
M1 B08	B02	-CA-3 A Enable	B02	M1 B08
M1 B06	D02	-CA-4 A Enable	D02	M1 B06
M1 C08	B03	-CA-5 A Enable	B03	M1 D08
	D03		D03	
M1 D08	B04	-CA-6 A Enable	B04	M1 D08
M1 D06	D04	-CA-3 B Enable	D04	M1 D06
M1 E08	B05	-CA-4 B Enable	B05	M1 E08
M1 E06	D05	-Interface CA-3 A Enabled	D05	M1 E06
	B06		B06	
N1 A06	D06	-Interface CA-4 A Enabled	D06	N1 A06
N1 B08	B07	-Interface CA-5 A Enabled	B07	N1 B08
N1 B06	D07	-Interface CA-6 A Enabled	D07	N1 B06
N1 C08	B08	-Interface CA-3 B Enabled	B08	N1 C08
N1 C06	D08	--------- Signal Ground -----	D08	N1 C06
N1 D08	B09	-Interface CA-4 B Enabled	B09	N1 D08
N1 D06	D09	+All CA Disabled	D09	N1 D06
	B10		B10	
	D10		B10	
	B11		B11	
	D11		D11	
	B12		B12	
	D12		D12	
	B13		B13	
	D13		D13	

Cable 19 (3725 Model 2)

MMB 01A-A1YF Pin Ref on Board	MMB 01A-A1YF Pin Ref on Cable	Cable to CA position 1 (CA-1) and CA position 2 (CA-2) Signal Names with Polarities	C2LB 01A-A3YH Pin Ref on Board	C2LB 01A-A3YH Pin Ref on Cable
Q1 A08	B02	-CA-1 A Enable	B02	V1 D08
	D02		D02	
Q1 B08	B03		B03	V1 E08
	D03		D03	
	B04		B04	
Q1 C06	D04	+Interface CA-1 A Enabled	D04	W1 A06
	B05		B05	
Q1 D06	D05		D05	W1 B06
	B06		B06	
	D06		D06	
R1 A08	B07	+All CA Disabled	B07	W1 D08
	D07		D07	
R1 B08	B08	-CA-2 A Enable	B08	W1 E08
R1 B06	D08	---------- Signal Ground ----	D08	W1 E06
	B09		B09	
R1 C06	D09		D09	X1 A06
	B10		B10	
R1 D06	D10	-Interface CA-2 A Enabled	D10	X1 B06
	B11		B11	
	D11		D11	
S1 A08	B12		B12	X1 D0
	D12		D12	
	B13		B13	
	D13		D13	

Cable 20 (3725 Model 2)

C2LB 01A-A3YD Pin Ref on Board	C2LB 01A-A3YD Pin Ref on Cable	Cable to CA position 3 (CA-3) and CA position 4 (CA-4) Signal Names with Polarities	C2LB2 01B-A2YH Pin Ref on Board	C2LB2 01B-A2YH Pin Ref on Cable
	B02		B02	V1 D08
	D02		D02	
	B03		B03	V1 E08
	D03		D03	
	B04		B04	
	D04		D04	W1 A06
	B05		B05	
	D05		D05	W1 B06
	B06		B06	
	D06		D06	
	B07		B07	W1 D08
	D07		D07	
K1 D08	B08	-Priority Bus Bit 4 to Interface	B08	W1 E08
K1 D06	D08	--------- Signal Ground ------	D08	W1 E06
K1 E08	B09	-Priority Bus Bit 5 to Interface	B09	X1 A08
K1 E06	D09	-Priority Bus Bit 6 to Interface	D09	X1 A06
L1 A08	B10	-Priority Bus Bit 7 to Interface	B10	X1 B08
L1 A06	D10	-Hold to Interface	D10	X1 B06
	B11		B11	
L1 B06	D11	-CA Sample Trap to Interface	D11	X1 C06
L1 C08	B12	+Common Valid Feed Auto	B12	X1 D08
L1 C06	D12	-Sample In (from CA-2)	D12	X1 D06
L1 D08	B13	-Sample Out Wrap Dot Repowered	B13	X1 E08
L1 D06	D13	-CA Installed Send	D13	X1 E06

Cable 21 (3725 Model 2)

MMB 01A-A1YE Pin Ref on Board	MMB 01A-A1YE Pin Ref on Cable	Cable to CA positions 3, and 4 Signal Names with Polarities	C2LB2 02C-A1YE Pin Ref on Board	C2LB2 02C-A1YE Pin Ref on Cable
M1 B08	B02	-CA-3 A Enable	B02	M1 B08
M1 B06	D02	-CA-4 A Enable	D02	M1 B06
M1 C08	B03	-CA-5 A Enable (not installed)	B03	M1 D08
	D03		D03	
M1 D08	B04	-CA-6 A Enable (not installed)	B04	M1 D08
M1 D06	D04		D04	M1 D06
M1 E08	B05		B05	M1 E08
M1 E06	D05	-Interface CA-3 A Enabled	D05	M1 E06
	B06		B06	
N1 A06	D06	-Interface CA-4 A Enabled	D06	N1 A06
N1 B08	B07	-Intrf. CA-5 A Enab.(not instal.)	B07	N1 B08
N1 B06	D07	-Intrf. CA-6 A Enab.(not instal.)	D07	N1 B06
N1 C08	B08		B08	N1 C08
N1 C06	D08	--------- Signal Ground -----	D08	N1 C06
N1 D08	B09		B09	N1 D08
N1 D06	D09	+All CA Disabled	D09	N1 D06
	B10		B10	
	D10		B10	
	B11		B11	
	D11		D11	
	B12		B12	
	D12		D12	
	B13		B13	
	D13		D13	

Secondary IOC Bus: Signal Tables

Cable 22

CLAB2 01B-A2 Board Pin	YK Cable Pin	YL Cable Pin	01B-J1A2 Cable Pin		CA position 2 to CA positions 3, 4, 5, and 6 — Signal Names with Polarities	CAB 02C-A1YD Pin Ref on Board	Cable
			D02	B02		B02	
			B02	D02		D02	
			D03	B03		B03	
			B03	D03		D03	
			D04	B04		B04	
			B04	D04		D04	
			D05	B05		B05	
			B05	D05		D05	
			D06	B06		B06	
			B06	D06		D06	
			D07	B07		B07	
			B07	D07		D07	
E1 A13	B08	B08	D08	B08	-Priority Bus Bit 4 to Interface	B08	K1 D08
E1 A11	D08	D08	B08	D08	--------- Signal Ground ------	D08	K1 D06
E1 B13	B09	B09	D09	B09	-Priority Bus Bit 5 to Interface	B09	K1 E08
E1 B11	D09	D09	B09	D09	-Priority Bus Bit 6 to Interface	D09	K1 E06
E1 C13	B10	B10	D10	B10	-Priority Bus Bit 7 to Interface	B10	L1 A08
E1 C11	D10	D10	B10	D10	-Hold to Interface	D10	L1 A06
			D11	B11		B11	
E1 D11	D11	D11	B11	D11	-CA Sample Trap to Interface	D11	K1 B06
E1 E13	B12	B12	D12	B12	+Common Valid Feed Auto	B12	K1 C08
E1 E11	D12	D12	B12	D12	-Sample Out to I/F Repowered	D12	K1 C06
F1 A13	B13	B13	D13	B13	-Sample Out Wrap Dot Repowered	B13	L1 D08
F1 A11	D13	D13	B13	D13	-CA Installed Received	D13	L1 D06

Cable 24

CAB 02C-A1B4 Pin Ref on TC(1)	Cable	Frame RDV to board RDV (IOC cable B) — Signal Names with Polarities	RDV on LAB position 6 02A-A1A4 Pin Ref on Cable	TC(1)
Y13	D13	-Data Bus 0.7	D13	Y13
Y33	B13	-Valid Halfword from Adapter	B13	Y33
Y12	D12	-Data Bus 0.6	D12	Y12
Y32	B12	-Parity Valid from Adapter	B12	Y32
Y31	B11	-Modifier from RDV	B11	Y31
Y10	D10	-Data Bus 0.5	D10	Y10
Y30	B10	-Scanner Inter to MOSS	B10	Y30
Y09	D09	-Data Bus 0.4	D09	Y09
Y08	D08	-Data Bus 0.3	D08	Y08
Y28	B08	-CA Request IPL	B08	Y28
Y27	B07	-RDV Error Register Out	B07	Y27
Y07	D07	-Data Bus 0.2	D07	Y07
Y26	B06	-RDV L1 Pending Out	B06	Y26
Y25	B05	-Data Bus 0.P	B05	Y25
Y05	D05	-Data Bus 0.1	D05	Y05
Y04	D04	-Data Bus 0.0	D04	Y04
Y23	B03	-CS Grant Low Out RDV to RDV	B03	Y23
Y03	D03	-CS Grant Low In CCU to RDV	D03	Y03
Y22	B02	-CS Grant High Out RDV to RDV	B02	Y22
Y02	D02	-CS Grant High In CCU to RDV	D02	Y02
Y24	B04	-----+-- Signal Ground ---+---	B04	Y24
Y29	B09	-----| |---	B09	Y29
Y06	D06	-----| |---	D06	Y06
Y11	D11	-----| |---	B11	Y11

(1) TC: Pin on top card connector.

For IOC wire distribution up to LAB board position 8, see page 4-091.

Cable 23

CAB 02C-A1B3 Pin Ref on TC(1)	Cable	Frame RDV to board RDV (IOC cable A) — Signal Names with Polarities	RDV on LAB position 6 02A-A1A3 Pin Ref on Cable	TC(1)
X13	D13	-Data Bus 1.7	D13	X13
X33	B13	-CS Req High RDV to CCU	B13	X33
X12	D12	-Data Bus 1.6	D12	X12
X32	B12	-CS Req Low RDV to CCU	B12	X32
X31	B11	-CS Req Prty Line	B11	X31
X10	D10	-Data Bus 1.5	D10	X10
X30	B10	-L2 Priority Line	B10	X30
X09	D09	-Data Bus 1.4	D09	X09
X08	D08	-Data Bus 1.3	D08	X08
X28	B08	-L2 Request to Redrive	B08	X28
X27	B07		B07	X27
X07	D07	-Data Bus 1.2	D07	X07
X26	B06		B06	X26
X25	B05	-Data Bus 1.P	B05	X25
X05	D05	-Data Bus 1.1	D05	X05
X04	D04	-Data Bus 1.0	D04	X04
X23	B03		B03	X23
X03	D03		D03	X03
X22	B02		B02	X22
X02	D02		D02	X02
X24	B04	-----+-- Signal Ground ---+---	B04	X24
X29	B09	-----| |---	B09	X29
X06	D06	-----| |---	D06	X06
X11	D11	-----| |---	B11	X11

Cable 25

CAB 02C-A1B5 Pin Ref on TC(1)	Cable	Frame RDV to board RDV (IOC cable C) — Signal Names with Polarities	RDV on LAB position 6 02A-A1A5 Pin Ref on Cable	TC(1)
Z13	D13	-15.258 us Pulse	D13	Z13
Z33	B13		B13	Z33
Z12	D12	-4.9152 MHz Clock	D12	Z12
Z32	B12	-Power On Reset to Adapter	B12	Z32
Z31	B11	-Reset Tag CCU to Adapter	B11	Z31
Z10	D10	-100 ms Pulse	D10	Z10
Z30	B10	+Read, -Write Tag CCU to Adapter	B10	Z30
Z09	D09	-End of Chain from Adapter	D09	Z09
Z08	D08	-Valid Byte from Adapter	D08	Z08
Z28	B08	-Halt Tag CCU to Adapter	B08	Z28
Z27	B07	-TD Tag CCU to Adapter	B07	Z27
Z07	D07	-Inter Request Removed from Adap	D07	Z07
Z26	B06	-TA Tag CCU to Adapter	B06	Z26
Z25	B05	-I/O Tag CCU to Adapter	B05	Z25
Z05	D05	-Exception from Adapter	D05	Z05
Z04	D04	-480 Hz Clock	D04	Z04
Z23	B03	-Select Out RDV to RDV	B03	Z23
Z03	D03	-Select In	D03	Z03
Z22	B02	-Allow Poll Response Out	B02	Z22
Z02	D02	-Allow Poll Response In	D02	Z02
Z24	B04	-----+-- Signal Ground ---+---	B04	Z24
Z29	B09	-----| |---	B09	Z29
Z06	D06	-----| |---	D06	Z06
Z11	D11	-----| |---	B11	Z11

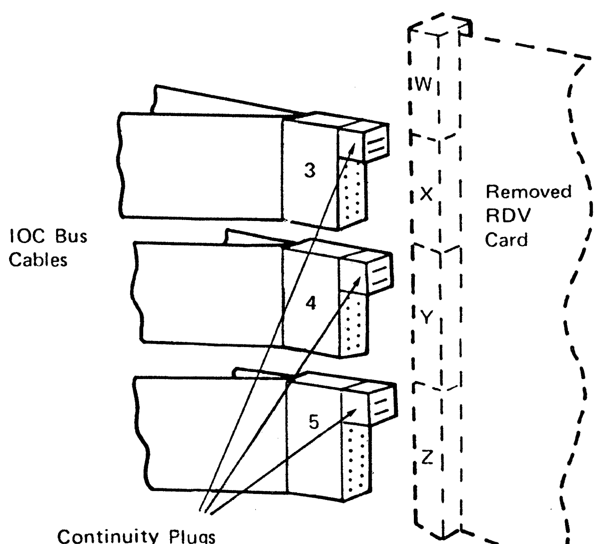
IOC Wire Continuity (Part 1 of 3)

CABLES FROM CCU BOARD TO CAB

These are the primary IOC cables.

This figure shows the IOC wire distribution between the CCU board and the CAB. The next page shows the IOC distribution between the CAB and LAB position 8. These figures can be used to check wire continuity.

Note that the paths of most wires can be checked for continuity all at once as the RDV cards receive the signals in parallel. Four wires on an RDV do not follow this rule and must be checked from RDV to RDV in sequence. When an RDV is not present on a board, these four wires are jumpered with continuity plugs placed on the IOC connector as shown.

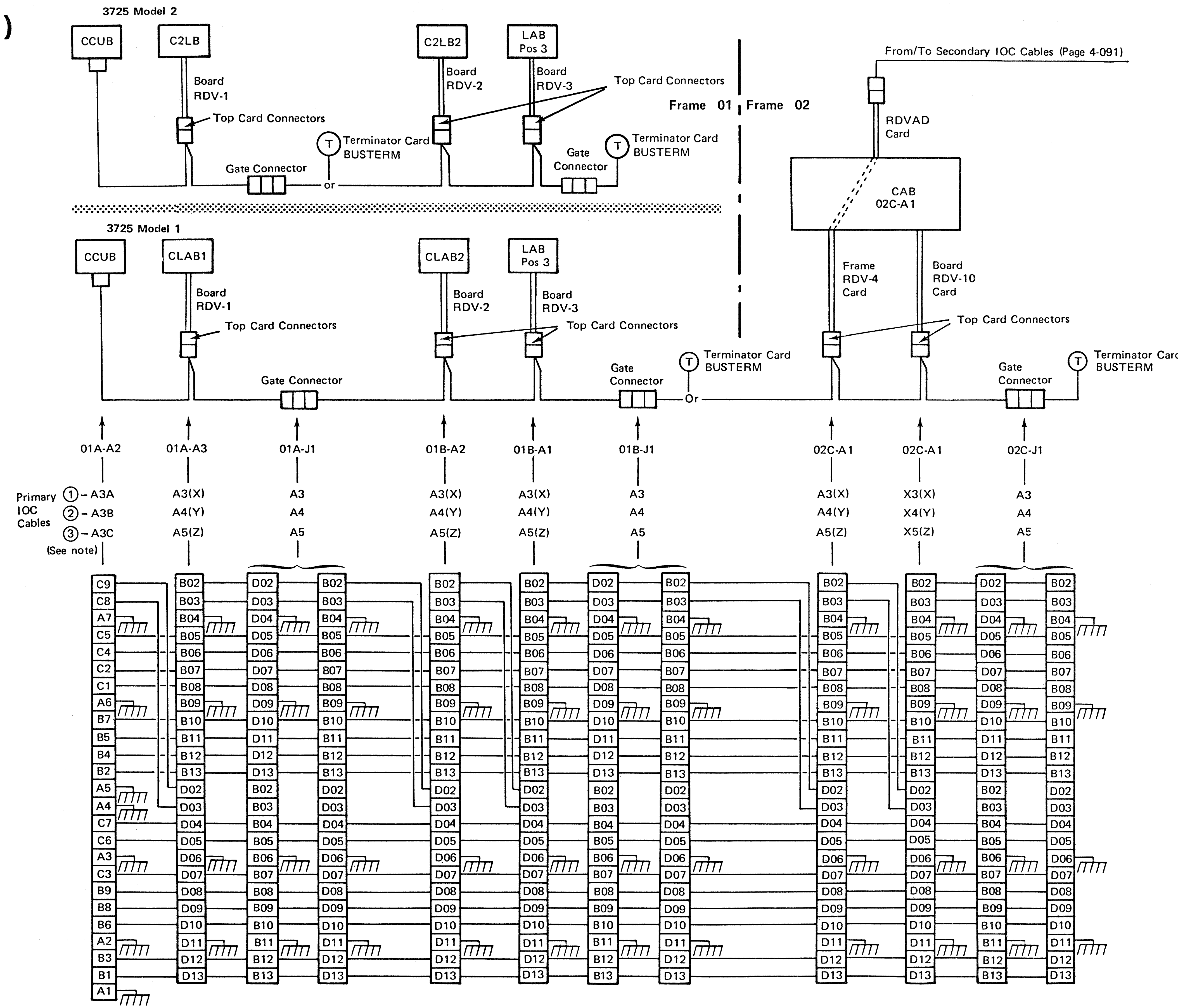


A continuity plug connects:

Cable position 3: (plug present but not used)

Cable position 4: Pin B02 to D02
Pin B03 to D03

Cable position 5: Pin B02 to D02
Pin B03 to D03

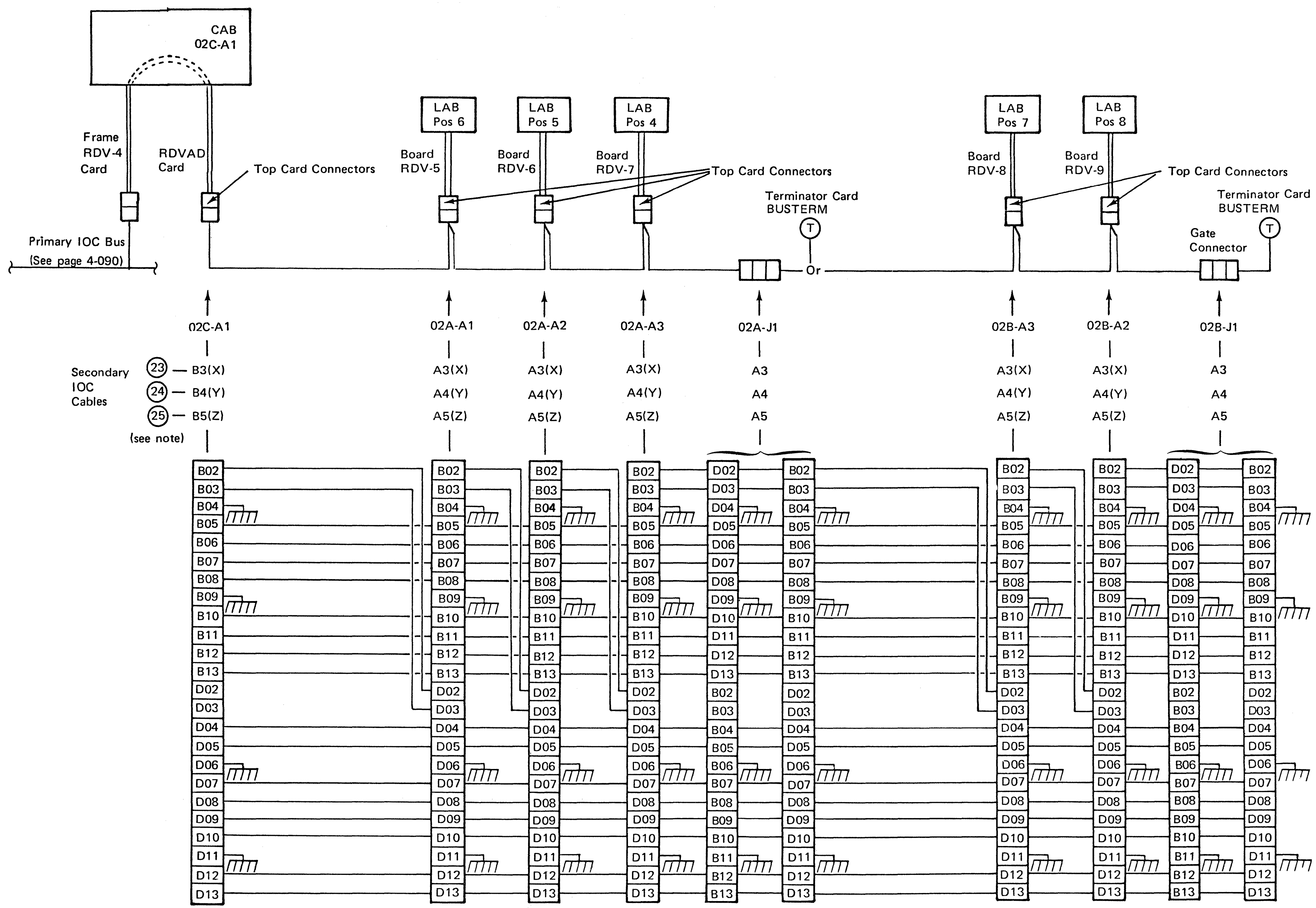


Note: For cable identification, see page 4-070. For signal identification, see page 4-080.

IOC Wire Continuity (Part 2 of 3)

CABLES FROM CAB TO LAB POSITION 8

These are the secondary IOC cables.



Note: For cable identification, see page 4-070. For signal identification, see page 4-085.

IOC Wire Continuity (Part 3 of 3)

You can probe the IOC bus signals on the bus terminator (BUSTERM) card. The following tables relate signal names and pins of the RDV card top connector, and of the BUSTERM card.

IOC Bus: Cable A

Signal Names (With Polarities)	RDV TC (1) Pin	BUSTERM Pin
-Data Bus 1.7	X13	J13
-CS Req High RDV to CCU	X33	G13
-Data Bus 1.6	X12	J12
-CS Req Low RDV to CCU	X32	G12
-CS Req Prty Line	X31	G11
-Data Bus 1.5	X10	J10
-L2 Priority Line	X30	G10
-Data Bus 1.4	X09	J09
-Data Bus 1.3	X08	J08
-L2 Request to RDV	X28	G08
	X27	G07
-Data Bus 1.2	X07	J07
	X26	G06
-Data Bus 1.P	X25	G05
-Data Bus 1.1	X05	J05
-Data Bus 1.0	X04	J04
	X03	J03
	X02	J02
Signal Ground	X24	G04
Signal Ground	X29	G09
Signal Ground	X06	J06
Signal Ground	X11	J11

(1) Pin on RDV card top connector (TC)

IOC Bus: Cable B

Signal Names (With Polarities)	RDV TC (1) Pin	BUSTERM Pin
-Data Bus 0.7	Y13	P13
-Valid Halfword from Adapter	Y33	M13
-Data Bus 0.6	Y12	P12
-Parity Valid from Adapter	Y32	M12
-Modifier from RDV	Y31	M11
-Data Bus 0.5	Y10	P10
-All CAs Disabled	Y30	M10
-Data Bus 0.4	Y09	P09
-Data Bus 0.3	Y08	P08
-CA Req IPL Detect	Y28	M08
-RDV Error Reg Out	Y27	M07
-Data Bus 0.2	Y07	P07
-RDV L1 Pending Out	Y26	M06
-Data Bus 0.P	Y25	M05
-Data Bus 0.1	Y05	P05
-Data Bus 0.0	Y04	P04
-CS Grant Low Out RDV to RDV	Y23	M03
-CS Grant Low Out CCU to RDV	Y03	P03
-CS Grant High Out RDV to RDV	Y22	M02
-CS Grant High Out CCU to RDV	Y02	P02
Signal Ground	Y24	M04
Signal Ground	Y29	M09
Signal Ground	Y06	P06
Signal Ground	Y11	P11

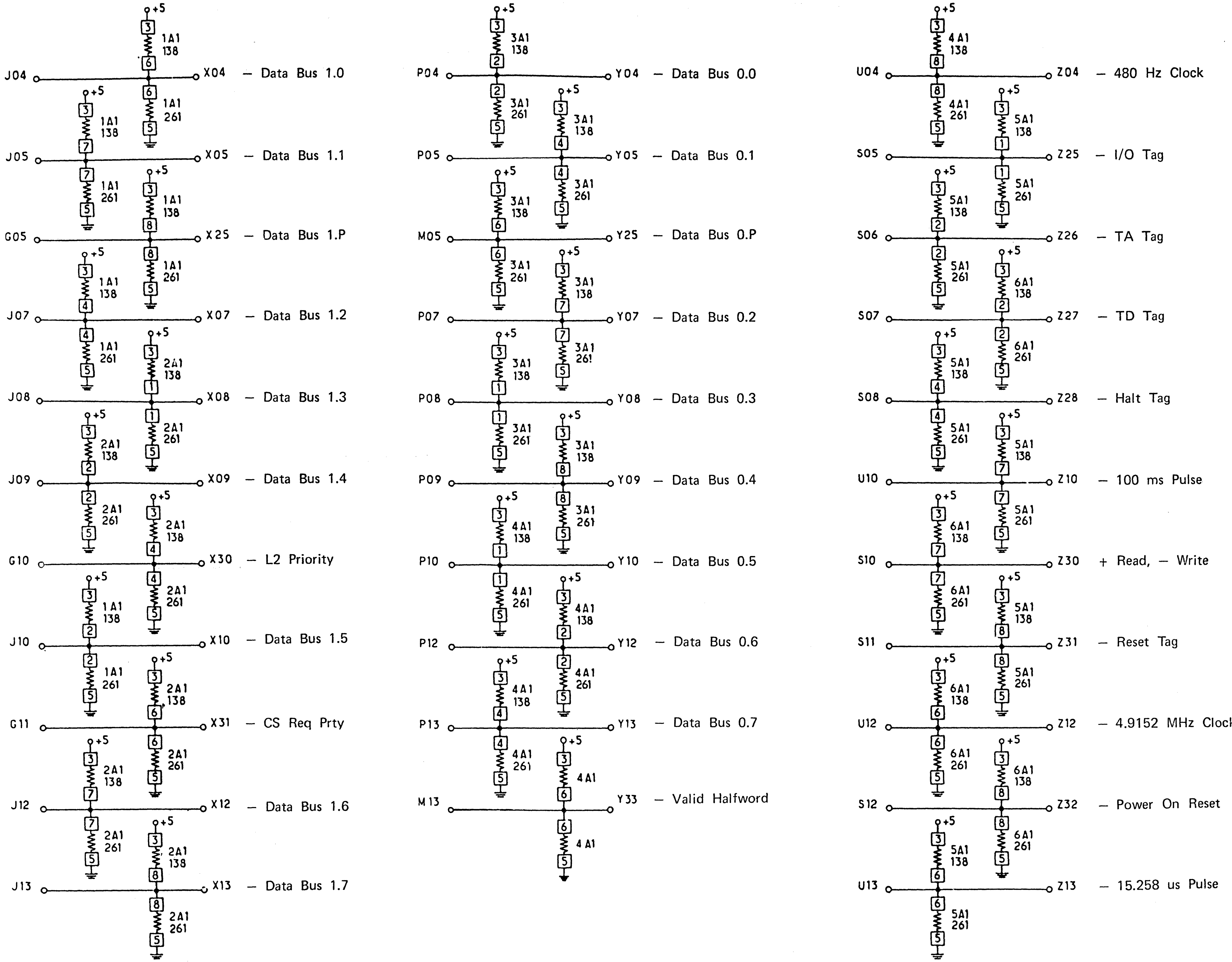
(1) Pin on RDV card top connector (TC)

IOC Bus: Cable C

Signal Names (With Polarities)	RDV TC (1) Pin	BUSTERM Pin
-15.258 us Pulse (A Clock)	Z13	U13
	Z33	S13
-4.9152 MHz Clock	Z12	U12
-Power On Reset to Adapter	Z32	S12
-Reset Tag CCU to Adapter	Z31	S11
-100 ms Pulse	Z10	U10
+Read, -Write Tag CCU to Adapter	Z30	S10
-End of Chain from Adapter	Z09	U09
-Valid Byte from Adapter	Z08	U08
-Halt Tag CCU to Adapter	Z28	S08
-TD Tag CCU to Adapter	Z27	S07
-Inter Req Removed from Adapter	Z07	U07
-TA Tag CCU to Adapter	Z26	S06
-I/O Tag CCU to Adapter	Z25	S05
-Exception from Adapter	Z05	U05
-480 Hz Clock	Z04	U04
-Select Out RDV to RDV	Z23	S03
-Select In	Z03	U03
-Allow Poll Response Out	Z22	S02
-Allow Poll Response In	Z02	U02
Signal Ground	Z24	S04
Signal Ground	Z29	S09
Signal Ground	Z06	U06
Signal Ground	Z11	U11

(1) Pin on RDV card top connector (TC)

Terminator Card (BUSTERM) Diagram



From	To	Signal Names
G08	X28	— L2 Request
G12	X32	— CS Request Low
G13	X33	— CS Request High
M06	Y26	— RDV L1 Pending
M07	Y27	— RDV Error Reg Out
M08	Y28	— CA Request IPL Detect
M10	Y30	— CSP Interrupt to MOSS
M12	Y32	— Parity Valid
U05	Z05	— Exception
U07	Z07	— Inter Request Removed
U08	Z08	— Valid Byte
U09	Z09	— End of Chain

Voltage	Pins
Signal	S04, U06, S09, U11, Z06, Z11, Z24, Z29, M04, P06, M09, P11, Y06, Y11, Y24, Y29, G04, J06, G09, J11, X06, X11, X24, X29, D08
+5	D03

High-Speed Clock Distribution (From ACLK Card)

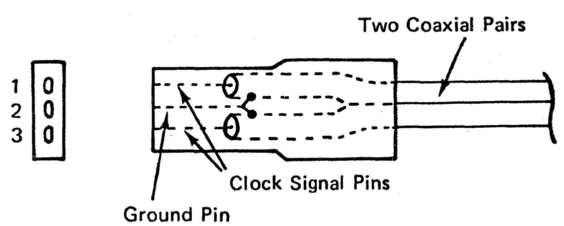
The high-speed clock signals (29.4912 MHz) are generated by the ACLK card on the MMB board.

They are distributed via five coaxial cables from the pin side of the ACLK card to the pin side of the RDV cards (those that are present in the machine). The first figure (right) shows the cable routing assuming a maximum machine configuration; the second figure lists the pin assignments for continuity checking the clock signal, or scoping. For high-speed clock scoping and signal waveforms, refer to page 5-051.

Low-speed clock signals are also generated by the ACLK card, and are distributed via the IOC cables.

See the signal tables on page 4-080 onward for clock wire identification, and the IOC wire continuity diagrams on page 4-090 for continuity checking.

Note: The 3-pin connector that carries the clock signals may be plugged either way up.



OTHER MACHINE CLOCKS

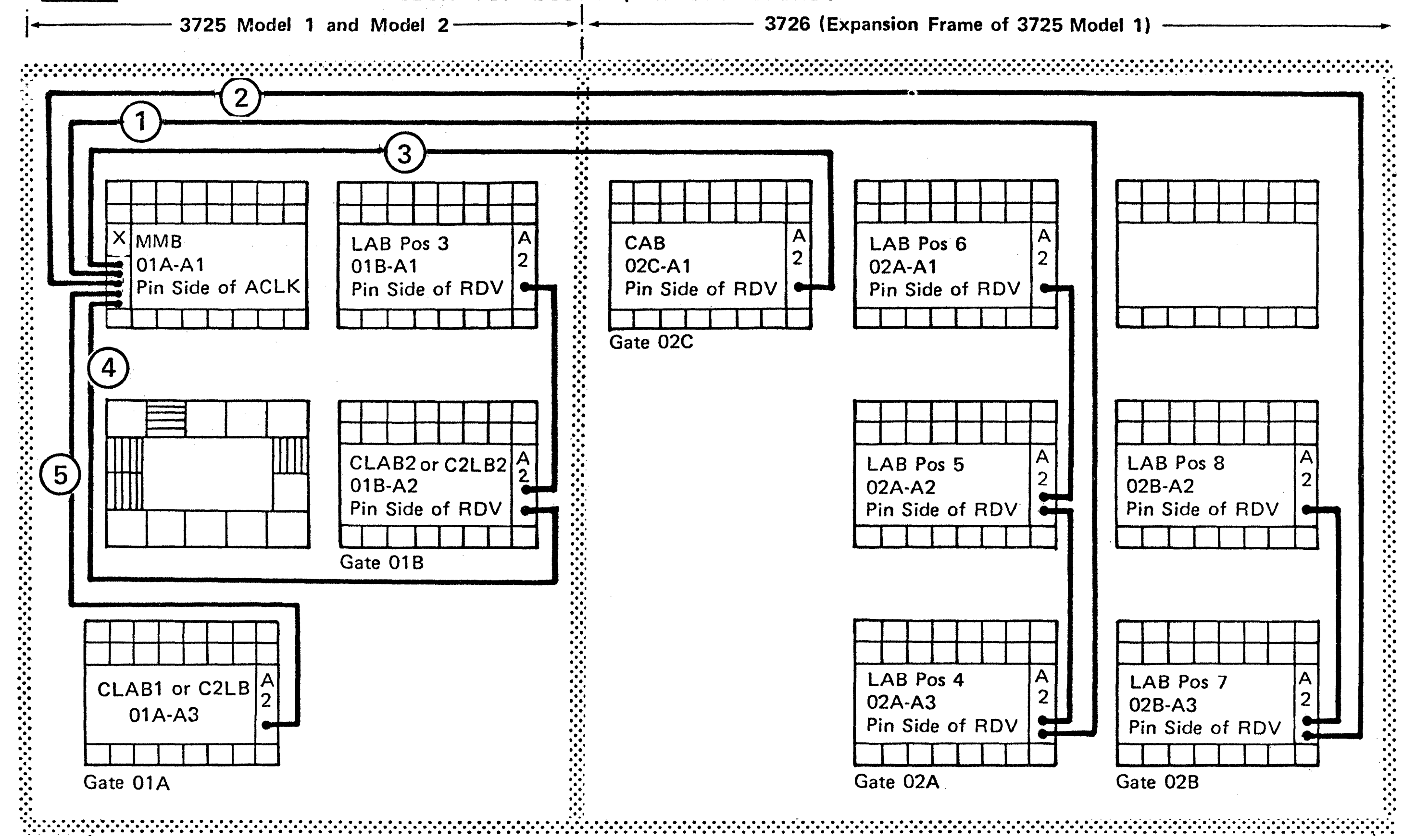
1. CCU clock is internal to the CCU board (see pin lists and net lists in MD volume B02).
2. For ICC clocks, see direct-attachment clock select jumper on page 4-270.

CLOCK SCOPING

For clock scoping and signal waveforms, refer to Chapter 5.

CLOCK CABLE ROUTING

Note: Refer to table below for board pin locations.

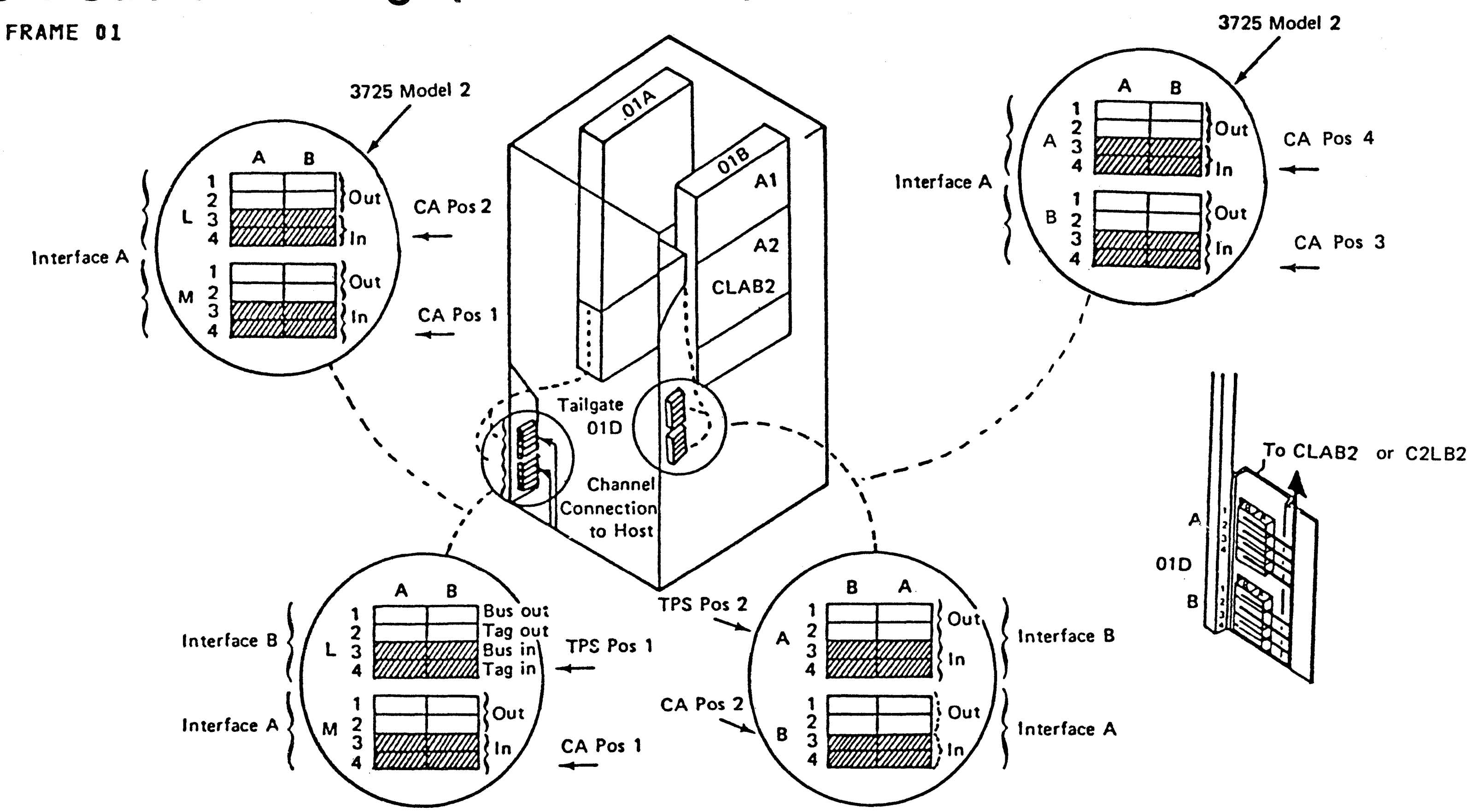


HIGH-SPEED CLOCK BOARD PINS

	From ACLK	To RDV	From RDV	To RDV	From RDV	To RDV
1	MMB 01A-A1X4D07 Ground: D08 D09	LAB Pos 4 02A-A3A2B02 Ground: B03 B04	LAB Pos 4 02A-A3A2D05 Ground: D06 D07	LAB Pos 5 02A-A2A2B02 Ground: B03 B04	LAB Pos 5 02A-A2A2D05 Ground: D06 D07	LAB Pos 6 02A-A1A2B02 Ground: B03 B04
2	MMB 01A-A1X4B02 Ground: B03 B04	LAB Pos 7 02B-A3A2B02 Ground: B03 B04	LAB Pos 7 02B-A3A2D05 Ground: D06 D07	LAB Pos 8 02B-A2A2B02 Ground: B03 B04		
3	MMB 01A-A1X4B07 Ground: B08 B09	CAB 02C-A1A2B02 Ground: B03 B04				
4	MMB 01A-A1X5B02 Ground: B03 B04	CLAB2 or C2LB2 01B-A2A2B02 Ground: B03 B04	CLAB2 or C2LB2 01B-A2A2D05 Ground: D06 D07	LAB Pos 3 01B-A1A2B02 Ground: B03 B04		
5	MMB 01A-A1X5D07 Ground: D08 D09	CLAB1 or C2LB 01A-A3A2B02 Ground: B03 B04				

CA Cable Routing (Part 1 of 5)

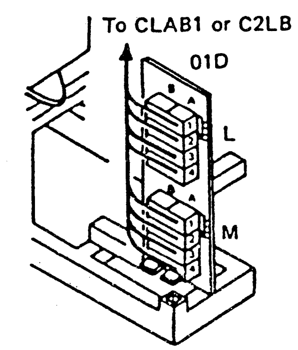
FRAME 01

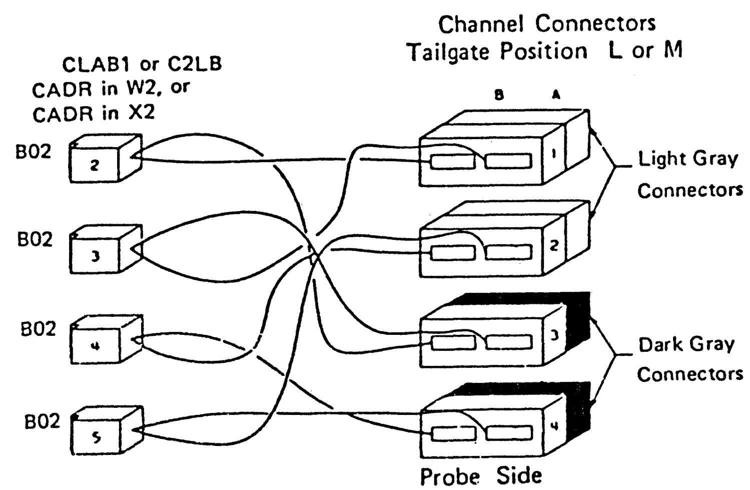


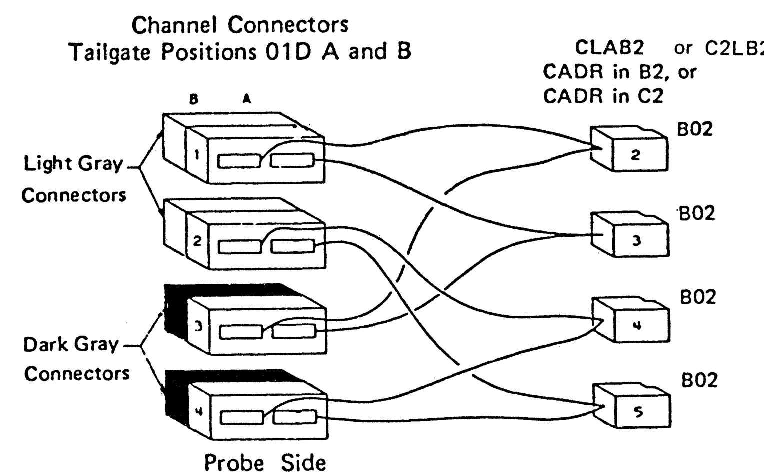
CA Cable Removal

Do not pull out a CA connector (from a tailgate socket or from a CADR card) unless you are sure that the host system is not using this channel interface.

You can display the status of the channel interfaces by using the CCU FNCTN key on the 3727 operator console, and selecting the subfunction 10. If the CA interface is enabled, switch the Enbl/Dsbl switch to Dsbl on the 3725 control panel. When the CA operation stops, the CA interface becomes disabled. You can check regularly the status of the CA with the CCU FNCTN key.







C2LB (Note)	Tailgate Connectors Channel	(Rear)	Interface
01A-A3X2 X3 X4 X5	01D-MB1 A1 B2 A2	01D-MB3 A3 B4 A4	CA Pos 1
01A-A3W2 W3 W4 W5	01D-LB1 A1 B2 A2	01D-LB3 A3 B4 A4	CA Pos 2

CLAB1 (Note)	Tailgate Connectors Channel	(Rear)	Interface
01A-A3X2 X3 X4 X5	01D-MB1 A1 B2 A2	01D-MB3 A3 B4 A4	1A CA Pos 1
01A-A3W2 W3 W4 W5	01D-LB1 A1 B2 A2	01D-LB3 A3 B4 A4	1B TPS Pos 1

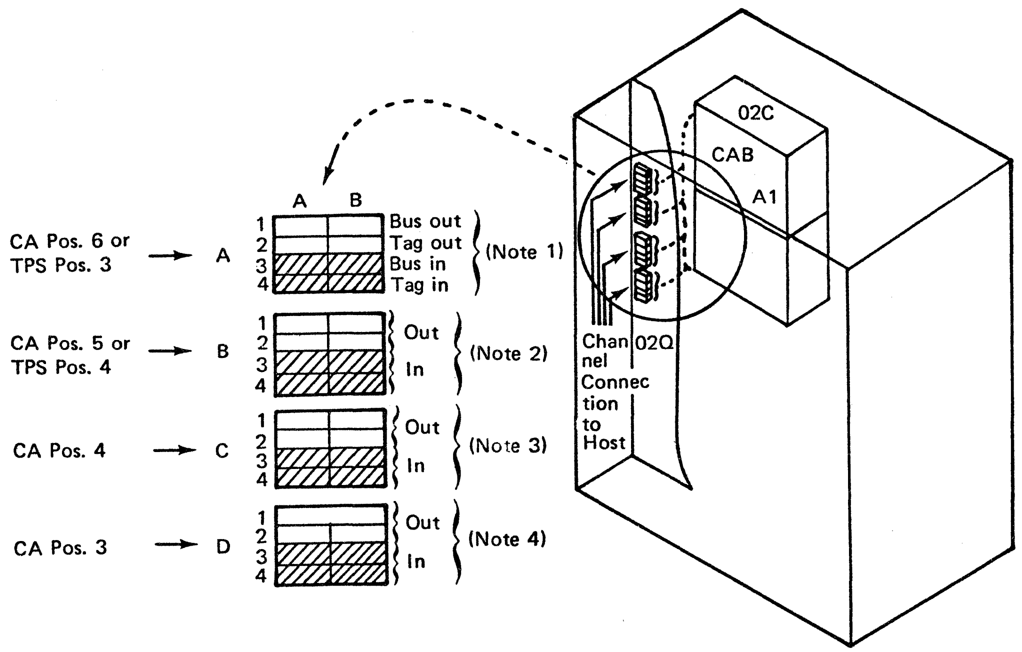
CLAB2 (Note)	Tailgate Connectors Channel	(Rear)	Interface
01B-A2B2 B3 B4 B5	01D-BB1 A1 B2 A2	01D-BB3 A3 B4 A4	2A CA Pos 2
01B-A2C2 C3 C4 C5	01D-AB1 A1 B2 A2	01D-AB3 A3 B4 A4	2B TPS Pos 2

C2LB2 (Note)	Tailgate Connectors Channel	(Rear)	Interface
01B-A2B2 B3 B4 B5	01D-BB1 A1 B2 A2	01D-BB3 A3 B4 A4	CA Pos 3
01B-A2C2 C3 C4 C5	01D-AB1 A1 B2 A2	01D-AB3 A3 B4 A4	CA Pos 4

Note: Top card connector on CADR card.

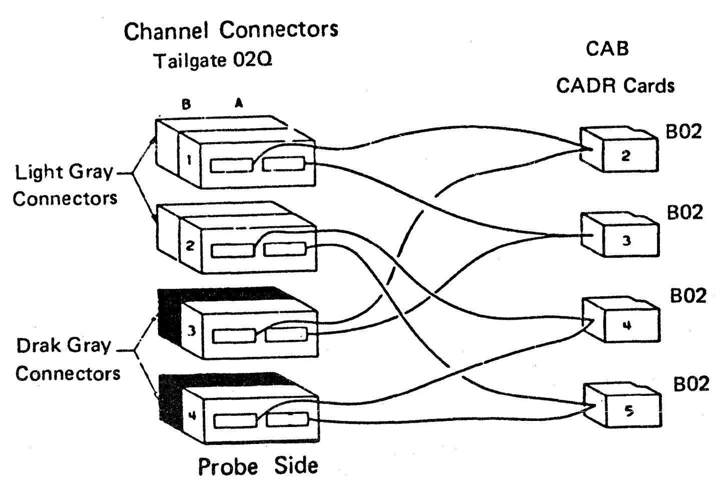
CA Cable Routing (Part 2 of 5)

FRAME 02



Notes:

1. Interface A of CA position 6 or (mutually exclusive) interface B of CA position 3 if TPS position 3
2. Interface A of CA position 5 or (mutually exclusive) interface B of CA position 4 if TPS position 4
3. Interface A of CA position 4
4. Interface A of CA position 3



CAB (Note 1)	Tailgate Connectors Channel	(Rear)	Interface
02C-A1W2 W3 W4 W5	02Q-DB1 A1 B2 A2	02Q-DB3 A3 B4 A4	3A CA Pos 3
02C-A1V2 V3 V4 V5	02Q-AB1 A1 B2 A2	02Q-AB3 A3 B4 A4	3B TPS Pos 3 (Note 2)
02C-A1R2 R3 R4 R5	02Q-CB1 A1 B2 A2	02Q-CB3 A3 B4 A4	4A CA Pos 4
02C-A1Q2 Q3 Q4 Q5	02Q-BB1 A1 B2 A2	02Q-BB3 A3 B4 A4	4B TPS Pos 4 (Note 3)
02C-A1L2 L3 L4 L5	02Q-BB1 A1 B2 A2	02Q-BB3 A3 B4 A4	5A CA Pos 5 (Note 3)
02C-A1G2 G3 G4 G5	02Q-AB1 A1 B2 A2	02Q-AB3 A3 B4 A4	6A TPS Pos 6 (Note 2)

Notes:

1. Top card connector on CADR card.
2. TPS position 3 and CA position 6 are mutually exclusive.
3. TPS position 4 and CA position 5 are mutually exclusive.

A	B	C		D	
(CADR) Top Card Connector Probe/Pin	(CADR) Top Card Cable #2 Probe/Pin	Bus out Tailgate NPL Probe/Pin	Bus in Tailgate NPL Probe/Pin	Channel Interface Cable Pin	Signal Name

A	B	C		D	
(CADR) Top Card Connector Probe/Pin	(CADR) Top Card Cable #3 Probe/Pin	Bus out Tailgate NPL Probe/Pin	Bus in Tailgate NPL Probe/Pin	Channel Interface Cable Pin	Signal Name

Bus Connections

```
W02 <--> D02 <------------------------------------> Ground
W03 <--> D03 <-------------- Y-B3B03 <-- #-B03 <--- Bus Out P bit
         D03 ---> Y-B1B03 --------------> #-B03 ---> Bus Out P bit
W04 <--> D04 <-------------- Y-B3B05 <-- #-B05 <--- Bus Out 1 bit
         D04 ---> Y-B1B05 --------------> #-B05 ---> Bus Out 1 bit
W05 <--- D05 <-------------- Y-B3B08 <-- #-B08 <--- Bus Out 3 bit
W06 ---> D06 ---> Y-B1B08 --------------> #-B08 ---> Bus Out 3 bit
W07 <--> D07 <-------------- Y-B3B10 <-- #-B10 <--- Bus Out 5 bit
         D07 ---> Y-B1B10 --------------> #-B10 ---> Bus Out 5 bit
W08 <--> D08 <-------------- Y-B3B12 <-- #-B12 <--- Bus Out 7 bit
         D08 ---> Y-B1B12 --------------> #-B12 ---> Bus Out 7 bit
W09 <--> D09 <------------------------------------> Ground
W10 <--> D10 <------------------------------------> Ground
W11 <--> D11 <------------------------------------> No Connection
W12 <--> D12 <------------------------------------> No Connection
W13 <--> D13 <------------------------------------> No Connection

W22 <--> B02 <------------------------------------> Ground
W23 <--> B03 <-------------- Y-B3D04 <-- #-D04 <--- Bus Out 0 bit
         B03 ---> Y-B1D04 --------------> #-D04 ---> Bus Out 0 bit
W24 <--> B04 <-------------- Y-B3D06 <-- #-D06 <--- Bus Out 2 bit
         B04 ---> Y-B1D06 --------------> #-D06 ---> Bus Out 2 bit
W25 ---> B05 ---------------> Y-B3D09 --> #-D09 ---> Bus Out 4 bit
W26 ---> B06 ---> Y-B1D09 --------------> #-D09 ---> Bus Out 4 bit
W27 <--> B07 <-------------- Y-B3D11 <-- #-D11 <--- Bus Out 6 bit
         B07 ---> Y-B1D11 --------------> # D11 <--- Bus Out 6 bit
W28 <--> B08 <-------------- Y-B3D13 <-- #-D13 <--- **Mark Out
         B08 ---> Y-B1D13 --------------> #-D13 <--- **Mark Out
W29 <--> B09 <------------------------------------> Ground
W30 <--> B10 <------------------------------------> Ground
W31 <--> B11 <------------------------------------> No Connection
W32 <--> B12 <------------------------------------> No Connection
W33 <--> B13 <------------------------------------> No Connection
```

```
X02 <--> D02 <------------------------------------> Ground
X03 <--> D03 <-------------- Y-A3B03 <-- #-G03 <--- Bus In P bit
         D03 ---> Y-A1B03 --------------> #-G03 ---> Bus In P bit
X04 <--> D04 <-------------- Y-A3B05 <-- #-G05 <--- Bus In 1 bit
         D04 ---> Y-A1B05 --------------> #-G05 ---> Bus In 1 bit
X05 ---> D05 ---------------> Y-A3B08 --> #-G08 ---> Bus In 3 bit
X06 ---> D06 ---> Y-A1B08 --------------> #-G08 ---> Bus In 3 bit
X07 <--> D07 <-------------- Y-A3B10 <-- #-G10 <--- Bus In 5 bit
         D0n ---> Y-A1B10 --------------> #-G10 ---> Bus In 5 bit
X08 <--> D08 <-------------- Y-A3B12 <-- #-G12 <--- Bus In 7 bit
         D08 ---> Y-A1B12 --------------> #-G12 ---> Bus In 7 bit
X09 <--> D09 <------------------------------------> Ground
X10 <--> D10 <------------------------------------> Ground
X11 <--> D11 <------------------------------------> No Connection
X12 <--> D12 <------------------------------------> No Connection
X13 <--> D13 <------------------------------------> No Connection

X22 <--> B02 <------------------------------------> Ground
X23 <--> B03 <-------------- Y-A3D04 <-- #-J04 <--- Bus In 0 bit
         B03 ---> Y-A1D04 --------------> #-J04 ---> Bus In 0 bit
X24 <--> B04 <-------------- Y-A3D06 <-- #-J06 <--- Bus In 2 bit
         B04 ---> Y-A1D06 --------------> #-J06 ---> Bus In 2 bit
X25 ---> B05 ---------------> Y-A3D09 --> #-J09 ---> Bus In 4 bit
X26 ---> B06 ---> Y-A1D09 --------------> #-J09 ---> Bus In 4 bit
X27 <--> B07 <-------------- Y-A3D11 <-- #-J11 <--- Bus In 6 bit
         B07 ---> Y-A1D11 --------------> #-J11 ---> Bus In 6 bit
X28 <--> B08 <-------------- Y-A3D13 <-- #-J13 <--- **Mark In
         B08 ---> Y-A1D13 --------------> #-J13 ---> **Mark In
X29 <--> B09 <------------------------------------> Ground
X30 <--> B10 <------------------------------------> Ground
X31 <--> B11 <------------------------------------> No Connection
X32 <--> B12 <------------------------------------> No Connection
X33 <--> B13 <------------------------------------> No Connection
```

Tag Connections

```
Y02 <--> D02 <------------------------------------> Ground
Y03 <--> D03 <-------------- Y-B4B03 <-- #-B03 <--- Operational In
         D03 ---> Y-B2B03 --------------> #-B03 ---> Operational In
Y04 <--> D04 <-------------- Y-B4B05 <-- #-B05 <--- Address In
         D04 ---> Y-B2B05 --------------> #-B05 ---> Address In
Y05 ---> D05 ---------------> Y-B4B08 --> #-B08 ---> Select In
Y06 ---> D06 ---> y-B2B08 --------------> #-B08 ---> Select In
Y07 <--> D07 <-------------- Y-B4B10 <-- #-B10 <--- Address Out
         D07 ---> Y-B2B10 --------------> #-B10 ---> Address Out
Y08 <--> D08 <-------------- Y-B4B12 <-- #-B12 <--- Suppress Out
         D08 ---> Y-B2B12 --------------> #-B12 ---> Suppress Out
Y09 <--> D09 <------------------------------------> Ground
Y10 <--> D10 <------------------------------------> Ground
Y11 <--> D11 <------------------------------------> No Connection
Y12 <--> D12 <------------------------------------> No Connection
Y13 <--> D13 <------------------------------------> No Connection

Y22 <--> B02 <------------------------------------> Ground
Y23 <--> B03 <-------------- Y-B4D04 <-- #-D04 <--- Status In
         B03 ---> Y-B2D04 --------------> #-D04 ---> Status In
Y24 <--> B04 <-------------- Y-B4D06 <-- #-D06 <--- Service In
         B04 ---> Y-B2D06 --------------> #-D06 ---> Service In
Y25 ---> B05 ---------------> Y-B4D09 --> #-D09 ---> Select Out
Y26 ---> B06 ---> Y-B2D09 --------------> #-D09 ---> Select Out
Y27 <--> B07 <-------------- Y-B4D11 <-- #-D11 <--- Command Out
         B07 ---> Y-B2D11 --------------> #-D11 ---> Command Out
Y28 <--> B08 <-------------- Y-B4D13 <-- #-D13 <--- Service Out
         B08 ---> Y-B2D13 --------------> #-D13 ---> Service Out
Y29 <--> B09 <------------------------------------> Ground
Y30 <--> B10 <------------------------------------> Ground
Y31 <--> B11 <------------------------------------> No Connection
Y32 <--> B12 <------------------------------------> No Connection
Y33 <--> B13 <------------------------------------> No Connection
```

```
Z02 <--> D02 <------------------------------------> Ground
Z03 <--> D03 <-------------- Y-A4B03 <-- #-G03 <--- **Clock Out
         D03 ---> Y-A2B03 --------------> #-G03 ---> **Clock Out
Z04 <--> D04 <-------------- Y-A4B05 <-- #-G05 <--- **Metering In
         D04 ---> Y-A2B05 --------------> #-G05 ---> **Metering In
Z05 ---> D05 ---------------> Y-A4B08 --> #-G08 ---> Data In
Z06 ---> D06 ---> Y-A2B08 --------------> #-G08 ---> Data In
Z07 <--> D07 <-------------- Y-A4B10 <-- #-G10 <--- Data Out
         D07 ---> Y-A2B10 --------------> #-G10 ---> Data Out
Z08 <--> D08 <-------------- Y-A4B12 <-- #-G12 <--- Hold Out
         D08 ---> Y-A2B12 --------------> #-G12 ---> Hold Out
Z09 <--> D09 <------------------------------------> Ground
Z10 <--> D10 <------------------------------------> Ground
Z11 <--> D11 <------------------------------------> No Connection
Z12 <--> D12 <------------------------------------> No Connection
Z13 <--> D13 <------------------------------------> No Connection

Z22 <--> B02 <------------------------------------> Ground
Z23 <--> B03 <-------------- Y-A4D04 <-- #-J04 <--- **Metering Out
         B03 ---> Y-A2D04 --------------> #-J04 ---> **Metering Out
Z24 <--> B04 <-------------- Y-A4D06 <-- #-J06 <--- Request In
         B04 ---> Y-A2D06 --------------> #-J06 ---> Request In
Z25 <--> B05 <--------------> Y-A4D09 <-> #-J09 <--> (Reserved Spare)
Z26 <--> B06 <--> Y-A2D09 <-------------> #-J09 <--> (Reserved Spare)
Z27 <--> B07 <-------------- Y-A4D11 <-> #-J11 <-** Disconnect In
         B07 ---> Y-A2D11 --------------> #-J11 ->** Disconnect In
Z28 <--> B08 <-------------- Y-A4D13 <-- #-J13 <--- Operational Out
         B08 ---> Y-A2D13 --------------> #-J13 ---> Operational /ut
Z29 <--> B09 <------------------------------------> Ground
Z30 <--> B10 <------------------------------------> Ground
Z31 <--> B11 <------------------------------------> No Connection
Z32 <--> B12 <------------------------------------> No Connection
Z33 <--> B13 <------------------------------------> No Connection
```

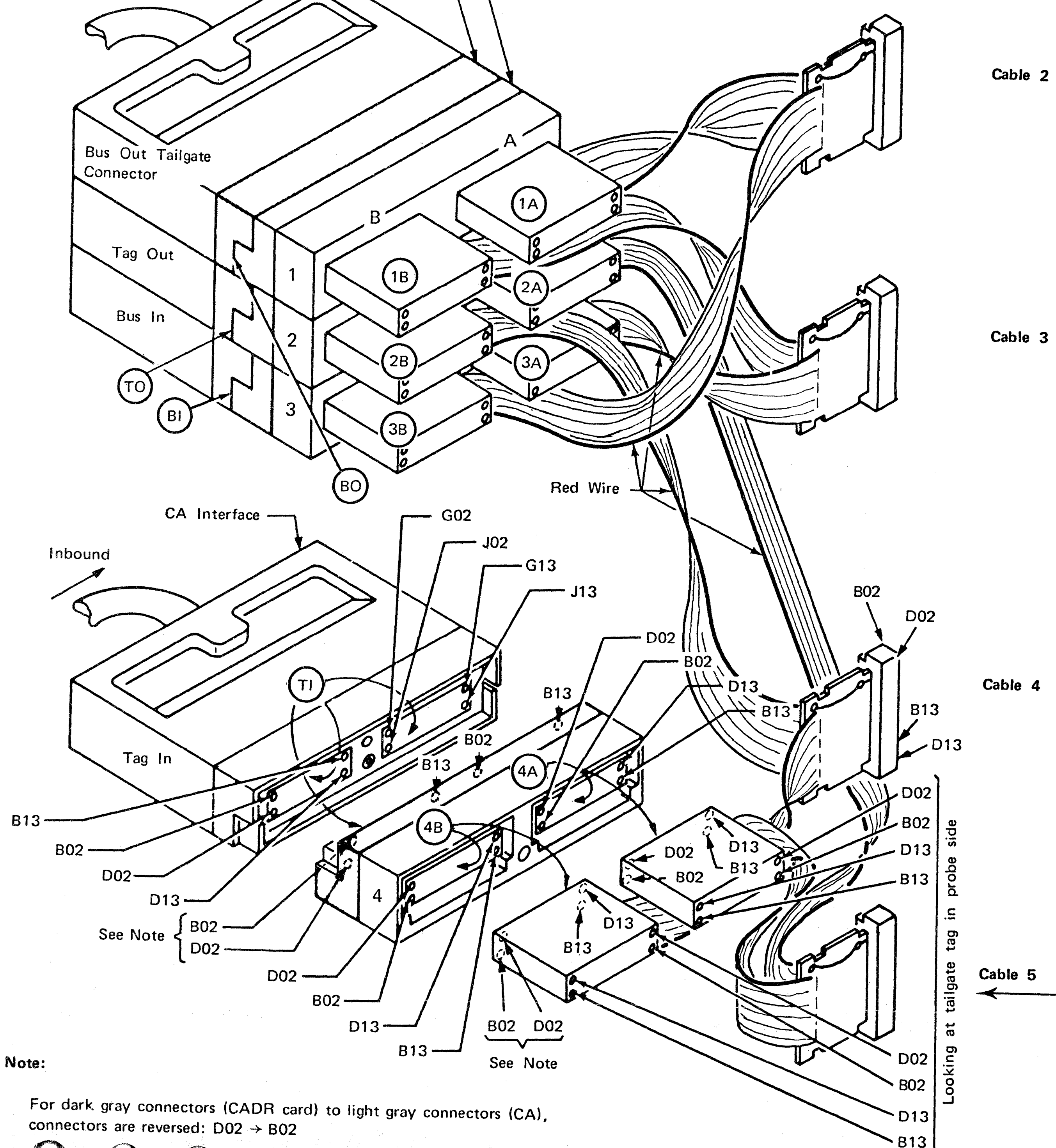
Legend:

** This signal is not used in this machine.

CA Cable Routing (Part 4 of 5)

CA CONNECTION DETAILS (FROM A TOP CONNECTOR TO THE TAILGATE)

- Frame 01, CLAB2 or C2LB2
- Frame 02, CAB



CADR jumper blocks on socket X4 (see page 5-042)

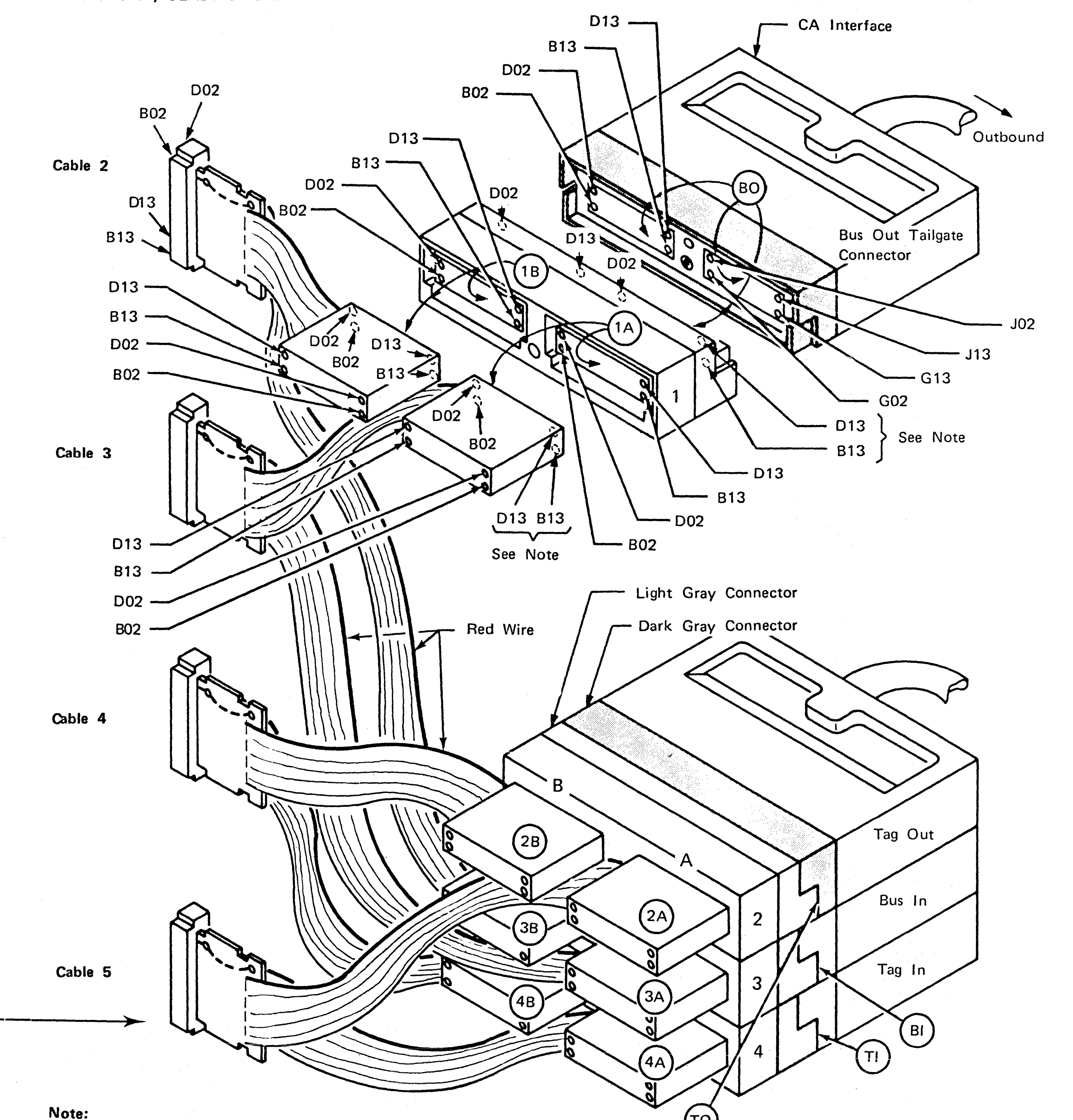
Top of CADR card

Note:

For dark gray connectors (CADR card) to light gray connectors (CA), connectors are reversed: D02 → B02

CA CONNECTION (FROM A TOP CONNECTOR TO THE TAILGATE)

- Frame 01, CLAB1 or C2LB



Note:

For light gray connectors (CADR Card) to dark gray connectors (CA), connectors are not reversed: D02 → D02

CABLE CONTINUITY

Cables and connectors identified in the figures on page 4-113 and on this page are as follows:

Cable n: Looking at cable end to CADR top card.

(1A)(2A)(3A)(4A): Cable connectors and corresponding face of tailgate connector (A side)

(1B)(2B)(3B)(4B): Cable connectors and corresponding face of tailgate connector (B side)

Note that the probe side of the cable connector and its tailgate connector side are reversed:

- Probe side: D13 – D02
  B13 – B02
- Tailgate side: D02 – D13
  B02 – B13

(BO): Bus out tailgate connector (A or B)

(TO): Tag out tailgate connector (A or B)

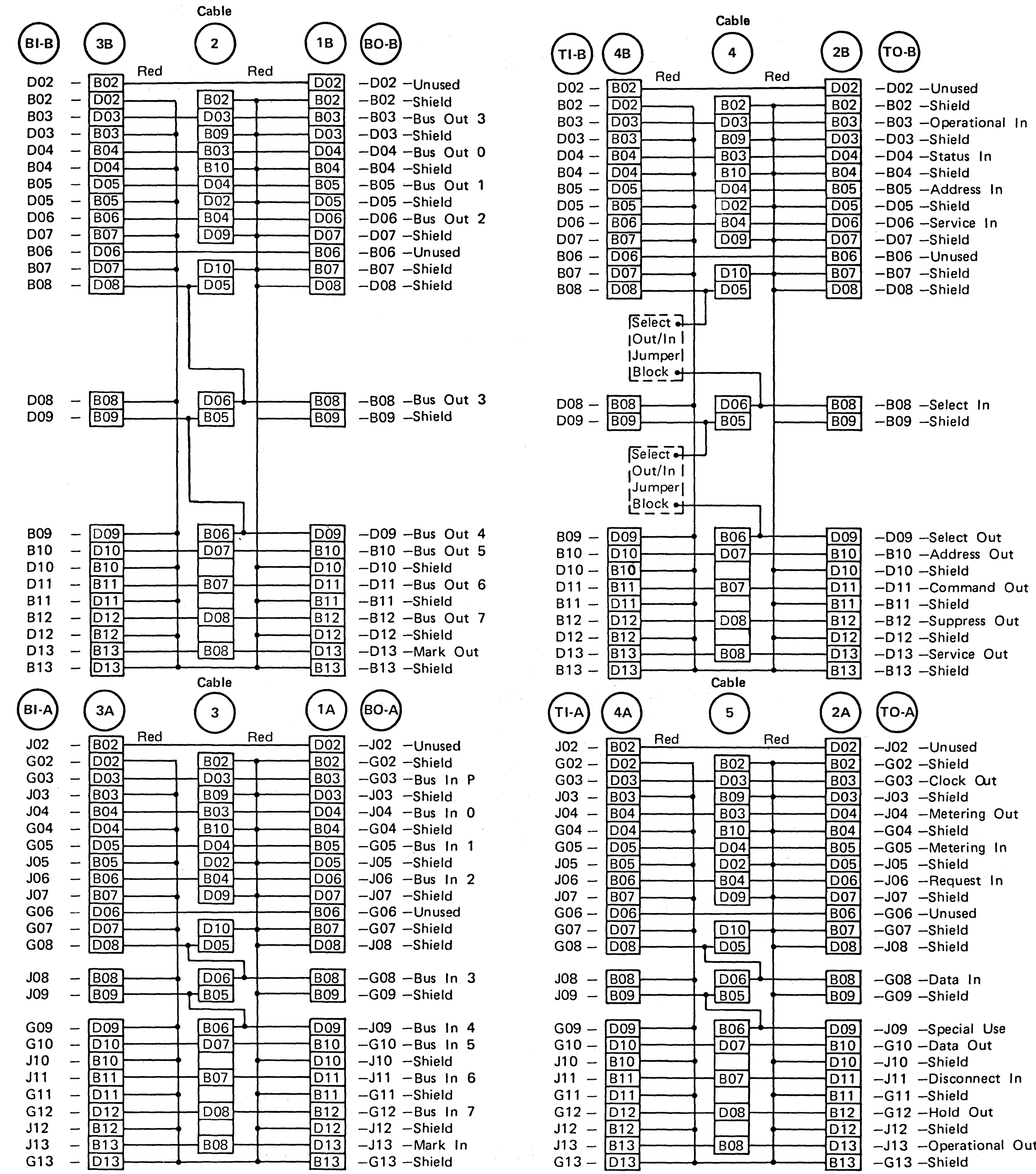
(BI): Bus in tailgate connector (A or B)

(TI): Tag in tailgate connector (A or B)

Note that the front side of a bus or tag in connector and its rear side are reversed:

- Front side (card side): D02 – D13
  B02 – B13
- Rear side (CA side): B02 – B13
  D02 – D13

	Channel Adapter (CADR) Location	Two Processor Switch (CADR) Location
3725 – CA/TPS 1	01A-A3X2	01A-A3W2
3725 – CA/TPS 2	01B-A2B2	01B-A2C2
3726 – CA/TPS 3	02C-A1W2	02C-A1V2
3726 – CA/TPS 4	02C-A1R2	02C-A1Q2
3726 – CA – 5	02C-A1I2	N/A
3726 – CA – 6	02C-A1G2	N/A



C2LB, Scanner Board Information

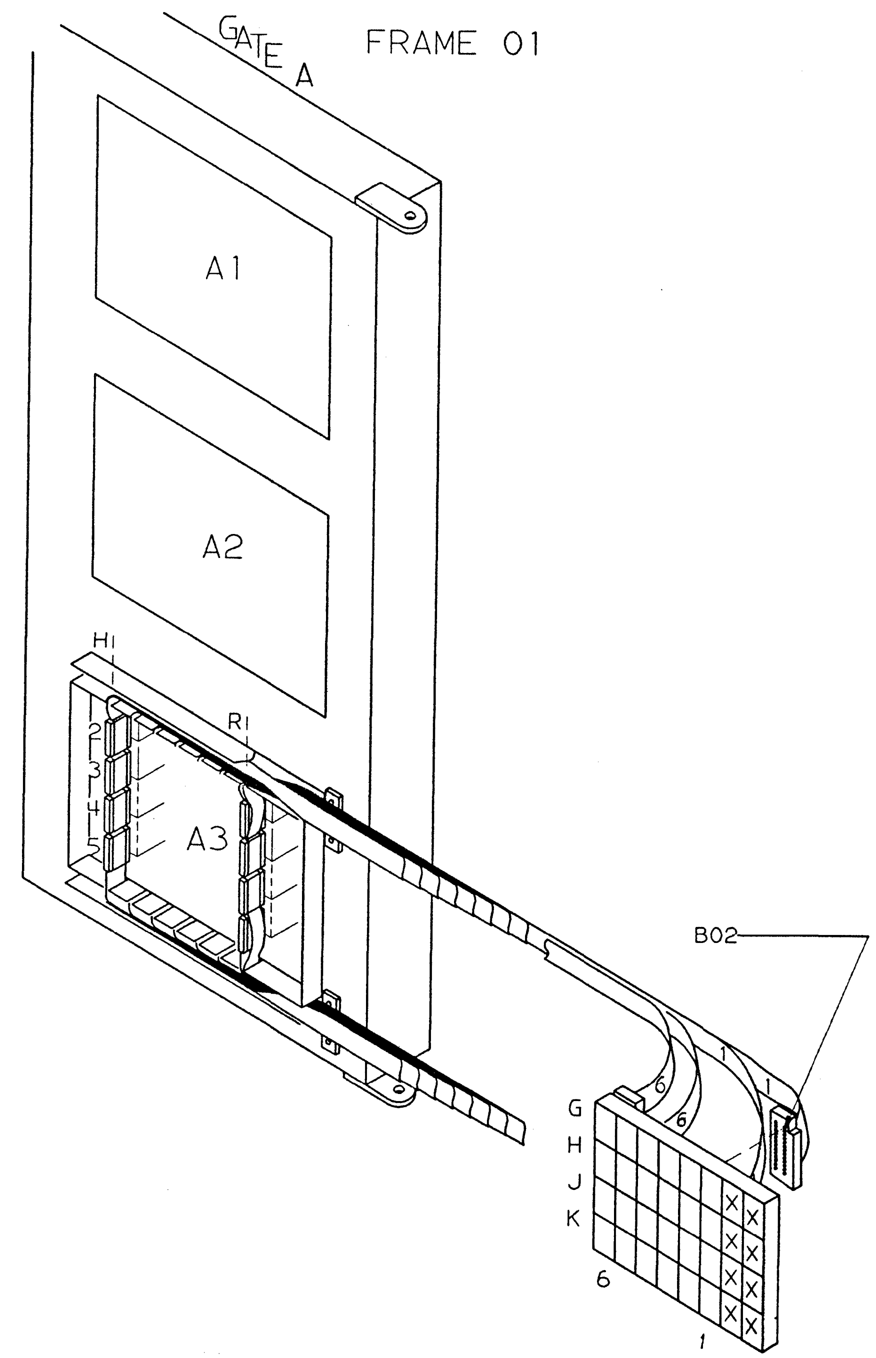
C2LB BOARD 01A-A3 - SCANNER 1

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
1	000-015 016-023	P2 J2	F2	C2	D2	E2	A2	10X0/1 20X0/1	40X0/1 40X0/1

Note: Fill in the next table with the line information for your customer's installation:

Even line interface addresses are transmit interfaces.

Odd line interface addresses are receive interfaces.



C2LB Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	C2LB Scanner Number	Tailgate Position 01D	LIC CABLE Position 01A-A3	LIC Pos	LIC Card 01A-A3
00(00) 01(01) 02(02) 03(03)	000/001 002/003 004/005 006/007				1	01D-G1 01D-H1 01D-J1 01D-K1	N2 N3 N4 N5	1	N2
04(04) 05(05) 06(06) 07(07)	008/009 010/011 012/013 014/015				1	01D-G2 01D-H2 01D-J2 01D-K2	M2 M3 M4 M5	2	M2
08(08) 09(09) 10(10) 11(11)	016/017 018/019 020/021 022/023				1	01D-G3 01D-H3 01D-J3 01D-K3	L2 L3 L4 L5	3	L2
12(12) 13(13) 14(14) 15(15)	024/025 026/027 028/029 030/031				1	01D-G4 01D-H4 01D-J4 01D-K4	K2 K3 K4 K5	4	K2
16(16) 17(17) 18(18) 19(19)	032/033 034/035 036/037 038/039				1	01D-G5 01D-H5 01D-J5 01D-K5	H2 H3 H4 H5	5	H2
20(20) 21(21) 22(22) 23(23)	040/041 042/043 044/045 046/047				1	01D-G6 01D-H6 01D-J6 01D-K6	G2 G3 G4 G5	6	G2

* The number in parentheses is the line relative address within the board.

C2LB2, Scanner Board Information

C2LB2 BOARD 01B-A2 — SCANNER 3

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
3	032-046 047-055	P2 S2	T2	W2	V2	U2	A2	11X0/1 21X0/1	40X2/3 40X2/3

Note: Fill in the next table with the line information for your customer's installation:

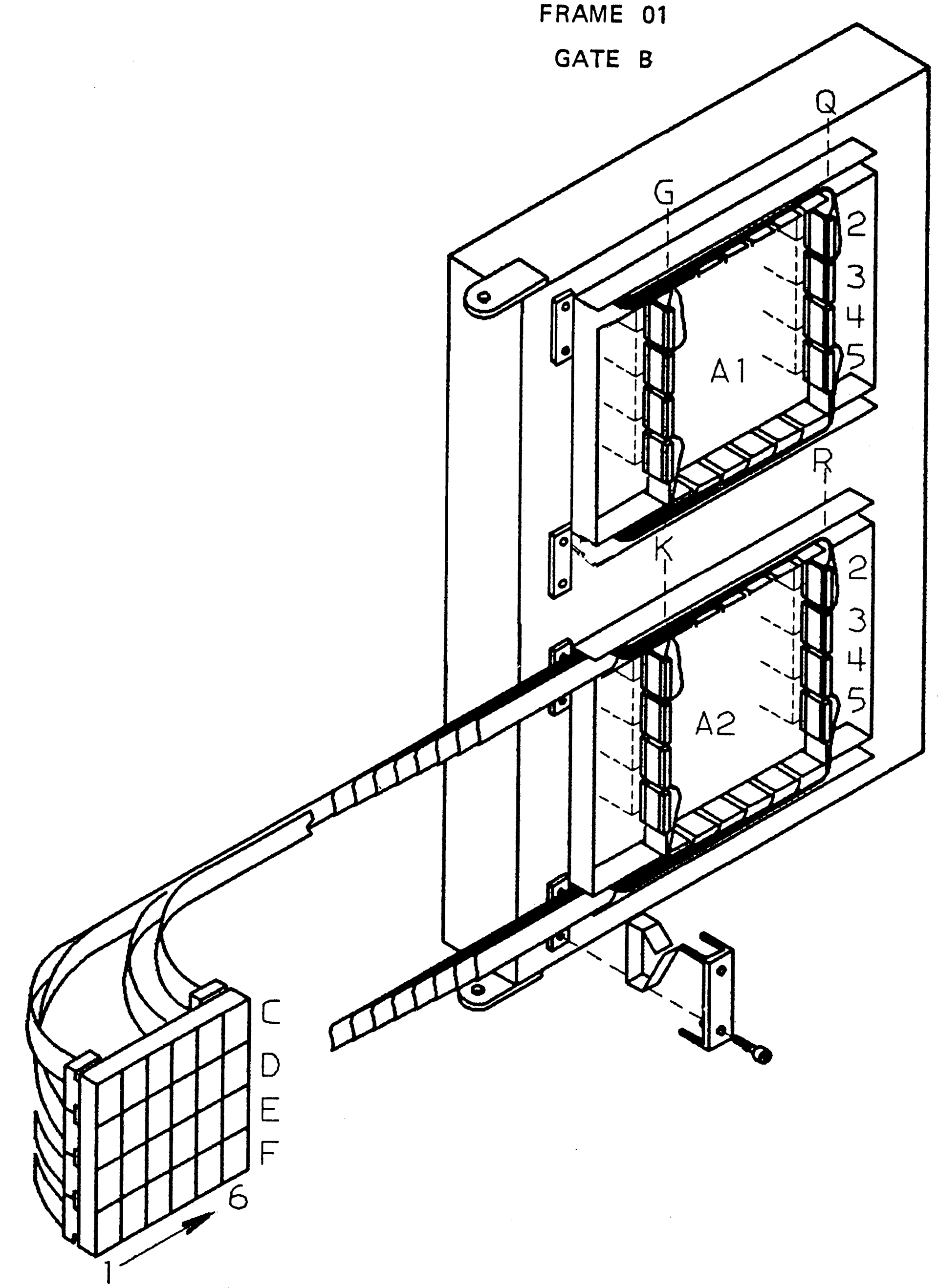
Even line interface addresses are transmit interfaces.

Odd line interface addresses are receive interfaces.

C2LB2 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	C2LB2 Scanner Number	Tailgate Position 01D	LIC CABLE Position 01B-A2	LIC Pos	LIC Card 01B-A2
32(00) 33(01) 34(02) 35(03)	064/065 066/067 068/069 070/071				3	01D-C1 01D-D1 01D-E1 01D-F1	K2 K3 K4 K5	1	K2
36(04) 37(05) 38(06) 39(07)	072/073 074/075 076/077 078/079				3	01D-C2 01D-D2 01D-E2 01D-F2	L2 L3 L4 L5	2	L2
40(08) 41(09) 42(10) 43(11)	080/081 082/083 084/085 086/087				3	01D-C3 01D-D3 01D-E3 01D-F3	M2 M3 M4 M5	3	M2
44(12) 45(13) 46(14) 47(15)	088/089 090/091 092/093 094/095				3	01D-C4 01D-D4 01D-E4 01D-F4	N2 N3 N4 N5	4	N2
48(16) 49(17) 50(18) 51(19)	096/097 098/099 100/101 102/103				3	01D-C5 01D-D5 01D-E5 01D-F5	Q2 Q3 Q4 Q5	5	Q2
52(20) 53(21) 54(22) 55(23)	104/105 106/107 108/109 110/111				3	01D-C6 01D-D6 01D-E6 01D-F6	R2 R3 R4 R5	6	R2

* The number in parentheses is the line relative address within the board.



CLAB1, Scanner Board Information

CLAB1 BOARD (TYPE A) — 01A-A3 — SCANNER 1

Note: There is no scanner 2 on this board.

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
1	000-015 016-031	S2 M2	G2 G2	D2 D2	E2 E2	F2 F2	A2 A2	10X0/1 20X0/1	40X0/1 40X0/1

Note: Fill in the next table with the line information for your customer's installation:

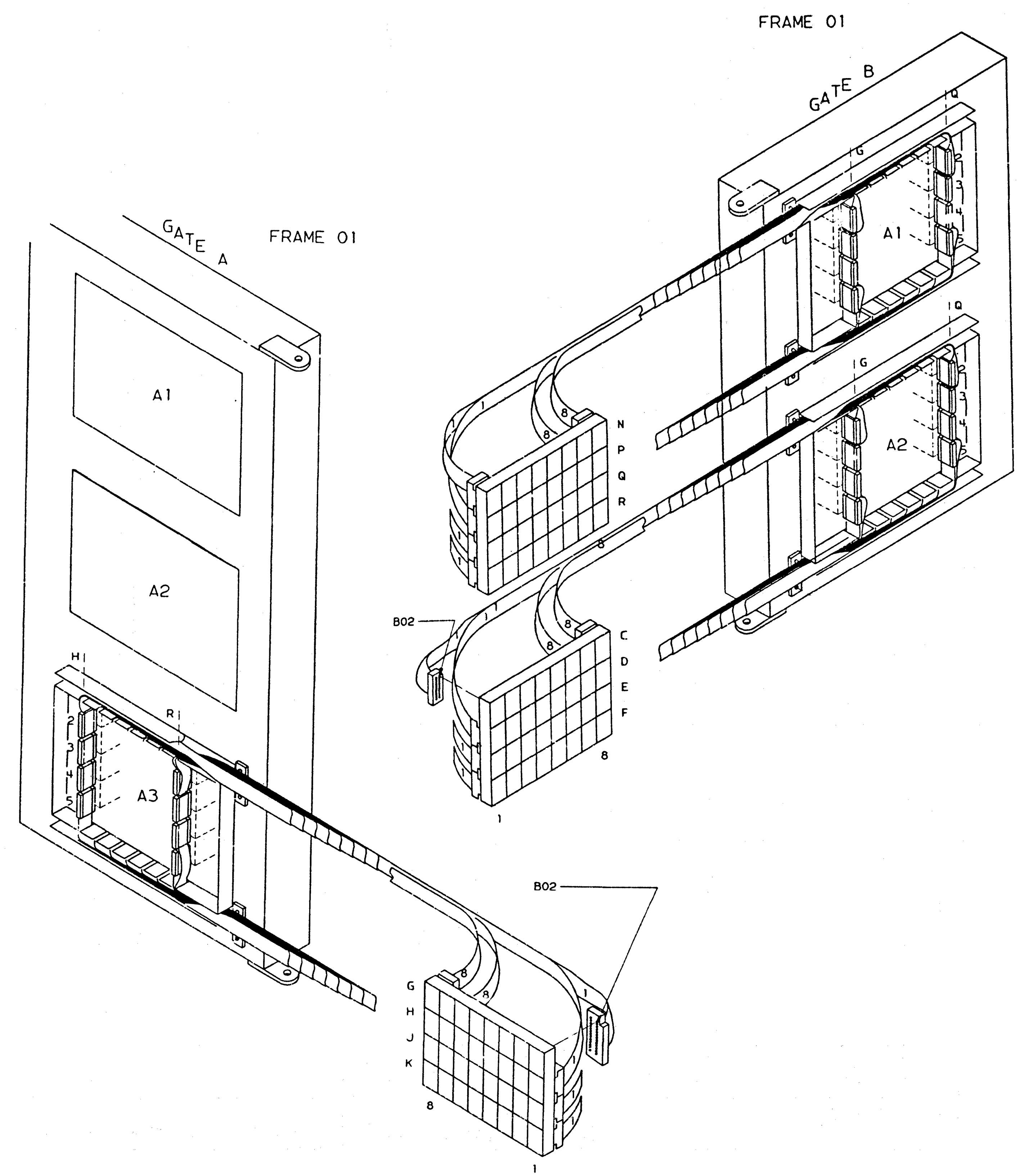
Even line interface addresses are transmit interfaces.

Odd line interface addresses are receive interfaces.

CLAB1 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	CLAB1 Scanner Number	Tailgate Position 01D	LIC CABLE Position 01A-A3	LIC Pos	LIC Card 01A-A3
00(00) 01(01) 02(02) 03(03)	000/001 002/003 004/005 006/007				1	01D-G1 01D-H1 01D-J1 01D-K1	R2 R3 R4 R5	1	R2
04(04) 05(05) 06(06) 07(07)	008/009 010/011 012/013 014/015				1	01D-G2 01D-H2 01D-J2 01D-K2	Q2 Q3 Q4 Q5	2	Q2
08(08) 09(09) 10(10) 11(11)	016/017 018/019 020/021 022/023				1	01D-G3 01D-H3 01D-J3 01D-K3	P2 P3 P4 P5	3	P2
12(12) 13(13) 14(14) 15(15)	024/025 026/027 028/029 030/031				1	01D-G4 01D-H4 01D-J4 01D-K4	N2 N3 N4 N5	4	N2
16(16) 17(17) 18(18) 19(19)	032/033 034/035 036/037 038/039				1	01D-G5 01D-H5 01D-J5 01D-K5	L2 L3 L4 L5	5	L2
20(20) 21(21) 22(22) 23(23)	040/041 042/043 044/045 046/047				1	01D-G6 01D-H6 01D-J6 01D-K6	K2 K3 K4 K5	6	K2
24(24) 25(25) 26(26) 27(27)	048/049 050/051 052/053 054/055				1	01D-G7 01D-H7 01D-J7 01D-K7	J2 J3 J4 J5	7	J2
28(28) 29(29) 30(30) 31(31)	056/057 058/059 060/061 062/063				1	01D-G8 01D-H8 01D-J8 01D-K8	H2 H3 H4 H5	8	H2

* The number in parentheses is the line relative address within the board.



CLAB2 and LAB3, Scanner Board Information

CLAB2 BOARD (TYPE A) – 01B-A2 – SCANNER 3

Note: There is no scanner 4 on this board.

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
3	032-047 048-063	L2 R2	S2 S2	V2 V2	U2 U2	T2 T2	A2 A2	11X0/1 21X0/1	40X2/3 40X2/3

Note: Fill in the next table with the line information for your customer's installation:

CLAB2 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	CLAB2 Scanner Number	Tailgate Position 01D	LIC Cable Position 01B-A2	LIC Pos	LIC Card 01B-A2
32(00) 33(01) 34(02) 35(03)	064/065 066/067 068/069 070/071				3	01D-C1 01D-D1 01D-E1 01D-F1	G2 G3 G4 G5	1	G2
36(04) 37(05) 38(06) 39(07)	072/073 074/075 076/077 078/079				3	01D-C2 01D-D2 01D-E2 01D-F2	H2 H3 H4 H5	2	H2
40(08) 41(09) 42(10) 43(11)	080/081 082/083 084/085 086/087				3	01D-C3 01D-D3 01D-E3 01D-F3	J2 J3 J4 J5	3	J2
44(12) 45(13) 46(14) 47(15)	088/089 090/091 092/093 094/095				3	01D-C4 01D-D4 01D-E4 01D-F4	K2 K3 K4 K5	4	K2
48(16) 49(17) 50(18) 51(19)	096/097 098/099 100/101 102/103				3	01D-C5 01D-D5 01D-E5 01D-F5	M2 M3 M4 M5	5	M2
52(20) 53(21) 54(22) 55(23)	104/105 106/107 108/109 110/111				3	01D-C6 01D-D6 01D-E6 01D-F6	N2 N3 N4 N5	6	N2
56(24) 57(25) 58(26) 59(27)	112/113 114/115 116/117 118/119				3	01D-C7 01D-D7 01D-E7 01D-F7	P2 P3 P4 P5	7	P2
60(28) 61(29) 62(30) 63(31)	120/121 122/123 124/125 126/127				3	01D-C8 01D-D8 01D-E8 01D-F8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

LAB BOARD POSITION 3 (TYPE A) – 01B-A1 – SCANNER 5

Scanner 5 (LAB Type A)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
5	064-079 080-095	L2 R2	F2 F2	C2 C2	D2 D2	E2 E2	A2 A2	12X0/1 22X0/1	40X4/5 40X4/5

LAB BOARD POSITION 3 'TYPE B) – 01B-A1 – SCANNERS 5 AND 6

Scanner 5 and 6 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
5 6	064-079 080-095	L2 R2	F2 S2	C2 V2	D2 U2	E2 T2	A2 A2	12X0/1 12X0/1	40X6/7 40X6/7

Note: Fill in the next table with the line information for your customer's installation:

LAB Position 3 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB A Scanner Number	LAB B Scanner Number	Tailgate Position 01D	LIC Cable Position 01B-A1	LIC Pos	LIC Card 01B-A1
64(00) 65(01) 66(02) 67(03)	128/129 130/131 132/133 134/135				5	5	01D-N1 01D-P1 01D-Q1 01D-R1	G2 G3 G4 G5	1	G2
68(04) 69(05) 70(06) 71(07)	136/137 138/139 140/141 142/143				5	5	01D-N2 01D-P2 01D-Q2 01D-R2	H2 H3 H4 H5	2	H2
72(08) 73(09) 74(10) 75(11)	144/145 146/147 148/149 150/151				5	5	01D-N3 01D-P3 01D-Q3 01D-R3	J2 J3 J4 J5	3	J2
76(12) 77(13) 78(14) 79(15)	152/153 154/155 156/157 158/159				5	5	01D-N4 01D-P4 01D-Q4 01D-R4	K2 K3 K4 K5	4	K2
80(16) 81(17) 82(18) 83(19)	160/161 162/163 164/165 166/167				5	6	01D-N5 01D-P5 01D-Q5 01D-R5	M2 M3 M4 M5	5	M2
84(20) 85(21) 86(22) 87(23)	168/169 170/171 172/173 174/175				5	6	01D-N6 01D-P6 01D-Q6 01D-R6	N2 N3 N4 N5	6	N2
88(24) 89(25) 90(26) 91(27)	176/177 178/179 180/181 182/183				5	6	01D-N7 01D-P7 01D-Q7 01D-R7	P2 P3 P4 P5	7	P2
92(28) 93(29) 94(30) 95(31)	184/185 186/187 188/189 190/191				5	6	01D-N8 01D-P8 01D-Q8 01D-R8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

LAB 3, Scanner and Token-Ring Adapter Board Information

LAB BOARD POSITION 3 (LAB TYPE C) – 01B-A1 – SCANNERS 5 AND TRA 6

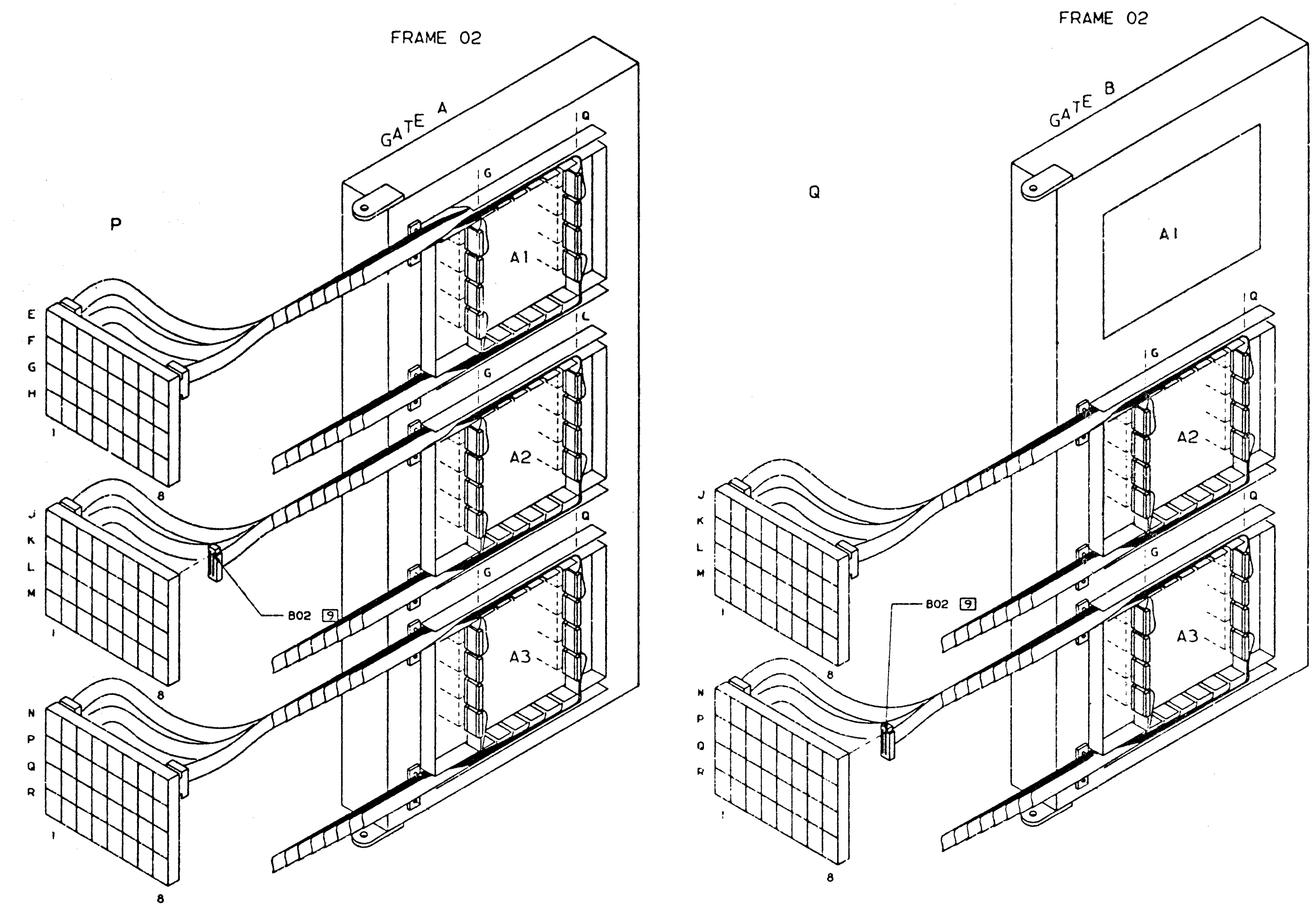
Scanner or TRA	Line Addr	ICC	FES	CSM	CSP1	CSP2	TRM	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
5	064-079	R2	S2	V2	U2	T2		A2	12X0/1	40X6/7
6	080,081 082,083						C2	A2	12X0/1	40X6/7

Note: Fill in the next table with the line information for your customer's installation.

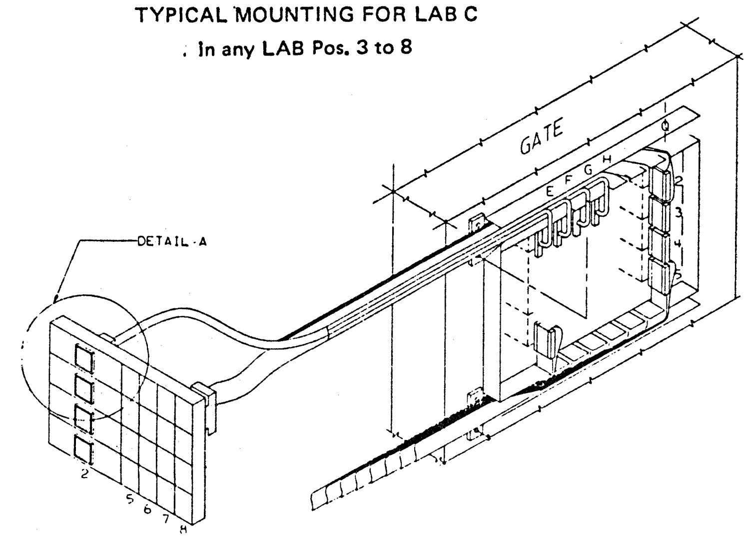
LAB Position 3 Line Information

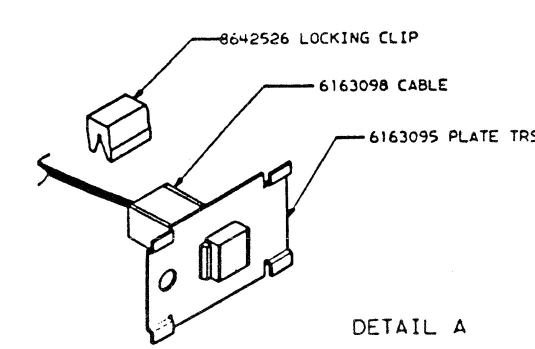
Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB C Scanner or TRA Number	Tailgate Position 01D	LIC/TIC Cable Position 01B-A1	TIC LIC Pos	LIC TIC 01B-A1
080	50				6	01D-N2	E2	5	E2
081	51				6	01D-P2	F2	6	F2
082	52				6	01D-Q2	G2	7	G2
083	53				6	01D-R2	H2	8	H2
64(16) 65(17) 66(18) 67(19)	128/129 130/131 132/133 134/135				5	01D-N5 01D-P5 01D-Q5 01D-R5	M2 M3 M4 M5	1	M2
68(20) 69(21) 70(22) 71(23)	136/137 138/139 140/141 142/143				5	01D-N6 01D-P6 01D-Q6 01D-R6	N2 N3 N4 N5	2	N2
72(24) 73(25(74(26) 75(27)	144/145 146/147 148/149 150/151				5	01D-N7 01D-P7 01D-Q7 01D-R7	P2 P3 P4 P5	3	P2
76(28) 77(29) 78(30) 79(31)	152/153 154/155 156/157 158/159				5	01D-N8 01D-P8 01D-Q8 01D-R8	Q2 Q3 Q4 Q5	4	Q2

* The number in parentheses is the line relative address within the board.



TYPICAL MOUNTING FOR LAB C
. In any LAB Pos. 3 to 8





DETAIL A

LAB 4, Scanner and Token-Ring Adapter Board Information

LAB BOARD POSITION 4 — 02A-A3

Scanner 7 (LAB Type A)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
7	096-111 112-127	L2 R2	F2 F2	C2 C2	D2 D2	E2 E2	A2 A2	13X0/1 23X0/1	41X6/7 41X6/7

Scanners 7 and 8 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
7 8	096-111 112-127	L2 R2	F2 S2	C2 V2	D2 U2	E2 T2	A2 A2	13X0/1 21X0/1	41X6/7 41X6/7

Note: Fill in the next table with the line information for your customer's installation:

LAB Position 4 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB A Scanner Number	LAB B Scanner Number	Tailgate Position 01D	LIC Cable Position 02A-A3	LIC Pos	LIC Card 02A-A3
96(00) 97(01) 98(02) 99(03)	192/193 194/195 196/197 198/199				7	7	02P-N1 02P-P1 02P-Q1 02P-R1	G2 G3 G4 G5	1	G2
100(04) 101(05) 102(06) 103(07)	200/201 202/203 204/205 206/207				7	7	02P-N2 02P-P2 02P-Q2 02P-R2	H2 H3 H4 H5	2	H2
104(08) 105(09) 106(10) 107(11)	208/209 210/211 212/213 214/215				7	7	02P-N3 02P-P3 02P-Q3 02P-R3	J2 J3 J4 J5	3	J2
108(12) 109(13) 110(14) 111(15)	216/217 218/219 220/221 222/223				7	7	02P-N4 02P-P4 02P-Q4 02P-R4	K2 K3 K4 K5	4	K2
112(16) 113(17) 114(18) 115(19)	224/225 226/227 228/229 230/231				7	8	02P-N5 02P-P5 02P-Q5 02P-R5	M2 M3 M4 M5	5	M2
116(20) 117(21) 118(22) 119(23)	232/233 234/235 236/237 238/239				7	8	02P-N6 02P-P6 02P-Q6 02P-R6	N2 N3 N4 N5	6	N2
120(24) 121(25) 122(26) 123(27)	240/241 242/243 244/245 246/247				7	8	02P-N7 02P-P7 02P-Q7 02P-R7	P2 P3 P4 P5	7	P2
124(28) 125(29) 126(30) 127(31)	248/249 250/251 252/253 254/255				7	8	02P-N8 02P-P8 02P-Q8 02P-R8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

Scanner 7 and TRA 8 (LAB type C with TRA)

Scanner or TRA	Line Addr	ICC	FES	CSM	CSP1	CSP2	TRM	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
7 8	096-111 112,113 114,115	R2	S2	V2	U2	T2	C2	A2 A2	13X0/1 21X0/1	41X6/7 41X6/7

Note: Fill in the next table with the line information for your customer's installation.

LAB Position 4 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB C Scanner or TRA Number	Tailgate Position 01D	LIC/TIC Cable Position 02A-A3	TIC LIC Pos	LIC TIC 02A-A3
112	70				8	02P-N2	E2	5	E2
113	71				8	02P-P2	F2	6	F2
114	72				8	02P-Q2	G2	7	G2
115	73				8	02P-R2	H2	8	H2
96(00) 97(01) 98(02) 99(03)	192/193 194/195 196/197 198/199				7	02P-N5 02P-P5 02P-Q5 02P-R5	M2 M3 M4 M5	1	M2
100(04) 101(05) 102(06) 103(07)	200/201 202/203 204/205 206/207				7	02P-N6 02P-P6 02P-Q6 02P-R6	N2 N3 N4 N5	2	N2
104(08) 105(09) 106(10) 107(11)	208/209 210/211 212/213 214/215				7	02P-N7 02P-P7 02P-Q7 02P-R7	P2 P3 P4 P5	3	P2
108(12) 109(13) 110(14) 111(15)	216/217 218/219 220/221 222/223				7	02P-N8 02P-P8 02P-Q8 02P-R8	Q2 Q3 Q4 Q5	4	Q2

* The number in parentheses is the line relative address within the board.

LAB 5, Scanner and Token-Ring Adapter Board Information

LAB BOARD POSITION 5 — 02A-A2

Scanner 9 (LAB Type A)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
9	128-143 144-159	L2 R2	F2 F2	C2 C2	D2 D2	E2 E2	A2 A2	14X9/1 24X9/1	41X8/9 41X8/9

Scanners 7 and 8 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
9 10	128-143 144-159	L2 R2	F2 S2	C2 V2	D2 U2	E2 T2	A2 A2	14X0/1 24X0/1	41X8/9 41X8/9

<u>Note:</u> Fill in the next table with the line information for your customer's installation:

<u>LAB Position 5 Line Information</u>

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB A Scanner Number	LAB B Scanner Number	Tailgate Position 01D	LIC Cable Position 02A-A2	LIC Pos	LIC Card 02A-A2
128(00) 129(01) 130(02) 131(03)	256/257 258/259 260/261 262/263				9	9	02P-J1 02P-K1 02P-L1 02P-M1	G2 G3 G4 G5	1	G2
132(04) 133(05) 134(06) 135(07)	264/265 266/267 268/269 270/271				9	9	02P-J2 02P-K2 02P-L2 02P-M2	H2 H3 H4 H5	2	H2
136(08) 137(09) 138(10) 139(11)	272/273 274/275 276/277 278/279				9	9	02P-J3 02P-K3 02P-L3 02P-M3	J2 J3 J4 J5	3	J2
140(12) 141(13) 142(14) 143(15)	280/281 282/283 284/285 286/287				9	9	02P-J4 02P-K4 02P-L4 02P-M4	K2 K3 K4 K5	4	K2
144(16) 145(17) 146(18) 147(19)	288/289 290/291 292/293 294/295				9	10	02P-J5 02P-K5 02P-L5 02P-M5	M2 M3 M4 M5	5	M2
148(20) 149(21) 150(22) 151(23)	296/297 298/299 300/301 302/303				9	10	02P-J6 02P-K6 02P-L6 02P-M6	N2 N3 N4 N5	6	N2
152(24) 153(25) 154(26) 155(27)	304/305 306/307 308/309 310/311				9	10	02P-J7 02P-K7 02P-L7 02P-M7	P2 P3 P4 P5	7	P2
156(28) 157(29) 158(30) 159(31)	312/313 314/315 316/317 318/319				9	10	02P-J8 02P-K8 02P-L8 02P-M8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

Scanner 9 and TRA 10 (LAB type C with TRA)

Scanner or TRA	Line Addr	ICC	FES	CSM	CSP1	CSP2	TRM	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
9 10	128-143 144,145, 146,147,	R2	S2	V2	U2	T2	C2	A2 A2	14X0/1 24X0/1	41X8/9 41X8/9

<u>Note:</u> Fill in the next table with the line information for your customer's installation.

<u>LAB Position 5 Line Information</u>

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB C Scanner or TRA Number	Tailgate Position 01D	LIC/TIC Cable Position 02A-A3	TIC LIC Pos	LIC TIC 02A-A3
144	90				10	02P-J2	E2	5	E2
145	91				10	02P-K2	F2	6	F2
146	92				10	02P-L2	G2	7	G2
147	93				10	02P-M2	H2	8	H2
128(00) 129(01) 130(02) 131(03)	256/257 258/259 260/261 262/263				9	02P-J5 02P-H5 02P-L5 02P-M5	M2 M3 M4 M5	1	M2
132(04) 133(05) 134(06) 135(07)	264/265 266/267 268/269 270/271				9	02P-J6 02P-H6 02P-L6 02P-M6	N2 N3 N4 N5	2	N2
136(08) 137(09) 138(10) 139(11)	272/273 274/275 276/277 278/279				9	02P-J7 02P-H7 02P-L7 02P-M7	P2 P3 P4 P5	3	P2
140(12) 141(13) 142(14) 143(15)	280/281 282/283 284/285 286/287				9	02P-J8 02P-H8 02P-L8 02P-M8	Q2 Q3 Q4 Q5	4	Q2

* The number in parentheses is the line relative address within the board.

LAB 6, Scanner and Token-Ring Adapter Board Information

LAB BOARD POSITION 6 — 02A-A1

Scanner 11 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
11	160-175 176-191	L2 R2	F2 F2	C2 C2	D2 D2	E2 E2	A2 A2	15X0/1 25X0/1	41XA/B 41XA/B

Scanners 11 and 12 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
11 12	160-175 176-191	L2 R2	F2 S2	C2 V2	D2 U2	E2 T2	A2 A2	15X0/1 25X0/1	41XA/B 41XA/B

Note: Fill in the next table with the line information for your customer's installation:

LAB Position 6 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB A Scanner Number	LAB B Scanner Number	Tailgate Position 01D	LIC Cable Position 02A-A2	LIC Pos	LIC Card 02A-A2
160(00) 161(01) 162(02) 163(03)	320/321 322/323 324/325 326/327				11	11	02P-E1 02P-F1 02P-G1 02P-H1	G2 G3 G4 G5	1	G2
164(04) 165(05) 166(06) 167(07)	328/329 330/331 332/333 334/335				11	11	02P-E2 02P-F2 02P-G2 02P-H2	H2 H3 H4 H5	2	H2
168(08) 169(09) 170(10) 171(11)	336/337 338/339 340/341 342/343				11	11	02P-E3 02P-F3 02P-G3 02P-H3	J2 J3 J4 J5	3	J2
172(12) 173(13) 174(14) 175(15)	344/345 346/347 348/349 350/351				11	11	02P-E4 02P-F4 02P-G4 02P-H4	K2 K3 K4 K5	4	K2
176(16) 177(17) 178(18) 179(19)	342/353 354/355 356/357 358/359				11	12	02P-E5 02P-F5 02P-G5 02P-H5	M2 M3 M4 M5	5	M2
180(20) 181(21) 182(22) 183(23)	360/361 362/363 364/365 366/367				11	12	02P-E6 02P-F6 02P-G6 02P-H6	N2 N3 N4 N5	6	N2
184(24) 185(25) 186(26) 187(27)	368/369 370/371 372/373 374/375				11	12	02P-E7 02P-F7 02P-G7 02P-H7	P2 P3 P4 P5	7	P2
188(28) 189(29) 190(30) 191(31)	376/377 378/379 380/381 382/383				11	12	02P-E8 02P-F8 02P-G8 02P-H8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

Scanner 11 and TRA 12 (LAB type C with TRA)

Scanner or TRA	Line Addr	ICC	FES	CSM	CSP1	CSP2	TRM	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
11 12	160-175 176,177, 178,179	R2	S2	V2	U2	T2	 C2	A2 A2	15X0/1 25X0/1	41XA/B 41XA/B

Note: Fill in the next table with the line information for your customer's installation.

LAB Position 6 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB C Scanner or TRA Number	Tailgate Position 01D	LIC/TIC Cable Position 02A-A3	TIC LIC Pos	LIC TIC 02A-A3
176	B0				12	02P-E2	E2	5	E2
177	B1				12	02P-F2	F2	6	F2
178	B2				12	02P-G2	G2	7	G2
179	B3				12	02P-H2	H2	8	H2
160(00) 161(01) 162(02) 163(03)	320/321 322/323 324/325 326/327				11	02P-E5 02P-F5 02P-G5 02P-H5	M2 M3 M4 M5	1	M2
164(04) 165(05) 166(06) 167(07)	328/329 330/331 332/333 334/335				11	02P-E6 02P-F6 02P-G6 02P-H6	N2 N3 N4 N5	2	N2
168(08) 169(09) 170(10) 171(11)	336/337 338/339 340/341 342/343				11	02P-E7 02P-F7 02P-G7 02P-H7	P2 P3 P4 P5	3	P2
172(12) 173(13) 174(14) 175(15)	344/345 346/347 348/349 350/351				11	02P-E8 02P-F8 02P-G8 02P-H8	Q2 Q3 Q4 Q5	4	Q2

* The number in parentheses is the line relative address within the board.

LAB7, Scanner and Token-Ring Adapter Board Information

LAB BOARD POSITION 7 - 02B-A3

Scanner 13 (LAB Type A)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
13	192-207 208-223	L2 R2	F2 F2	C2 C2	D2 D2	E2 E2	A2 A2	16X0/1 26X0/1	41XC/D 41XC/D

Scanners 13 and 14 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
13 14	192-207 208-223	L2 R2	F2 S2	C2 V2	D2 U2	E2 T2	A2 A2	16X0/1 26X0/1	41XC/D 41XC/D

Note: Fill in the next table with the line information for your customer's installation:

LAB Position 7 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB A Scanner Number	LAB B Scanner Number	Tailgate Position 01D	LIC Cable Position 02A-A2	LIC Pos	LIC Card 02A-A2
192(00) 193(01) 194(02) 195(03)	384/385 386/387 388/389 390/391				13	13	02Q-N1 02Q-P1 02Q-Q1 02Q-R1	G2 G3 G4 G5	1	G2
196(04) 197(05) 198(06) 199(07)	392/393 394/395 396/397 398/399				13	13	02Q-N2 02Q-P2 02Q-Q2 02Q-R2	H2 H3 H4 H5	2	H2
200(08) 201(09) 202(10) 203(11)	400/401 402/403 404/405 406/407				13	13	02Q-N3 02Q-P3 02Q-Q3 02Q-R3	J2 J3 J4 J5	3	J2
204(12) 205(13) 206(14) 207(15)	408/409 410/411 412/413 414/415				13	13	02Q-N4 02Q-P4 02Q-Q4 02Q-R4	K2 K3 K4 K5	4	K2
208(16) 209(17) 210(18) 211(19)	416/417 418/419 420/421 422/423				13	14	02Q-N5 02Q-P5 02Q-Q5 02Q-R5	M2 M3 M4 M5	5	M2
212(20) 213(21) 214(22) 215(23)	424/425 426/427 428/429 430/431				13	14	02Q-N6 02Q-P6 02Q-Q6 02Q-R6	N2 N3 N4 N5	6	N2
216(24) 217(25) 218(26) 219(27)	432/433 434/435 436/437 438/439				13	14	02Q-N7 02Q-P7 02Q-Q7 02Q-R7	P2 P3 P4 P5	7	P2
220(28) 221(29) 222(30) 223(31)	440/441 442/443 444/445 446/447				13	14	02Q-N8 02Q-P8 02Q-Q8 02Q-R8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

Scanner 13 and TRA 14 (LAB type C with TRA)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	TRM	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
13 14	192-207 208,209, 210,211	R2	S2	V2	U2	T2	C2	A2 A2	16X0/1 26X0/1	41XC/D 41XC/D

Note: Fill in the next table with the line information for your customer's installation.

LAB Position 7 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB C Scanner or TRA Number	Tailgate Position 01D	LIC/TIC Cable Position 02A-A3	TIC LIC Pos	LIC TIC 02A-A3
208	D0				14	02Q-N2	E2	5	E2
209	D1				14	02Q-P2	F2	6	F2
210	D2				14	02Q-Q2	G2	7	G2
211	D3				14	02Q-R2	H2	8	H2
192(00) 193(01) 194(02) 195(03)	384/385 386/387 388/389 390/391				13	02Q-N5 02Q-P5 02Q-Q5 02Q-R5	M2 M3 M4 M5	1	M2
196(04) 197(05) 198(06) 199(07)	392/393 394/395 396/397 398/399				13	02Q-N6 02Q-P6 02Q-Q6 02Q-R6	N2 N3 N4 N5	2	N2
200(08) 201(09) 202(10) 203(11)	400/401 402/403 404/405 406/407				13	02Q-N7 02Q-P7 02Q-Q7 02Q-R7	P2 P3 P4 P5	3	P2
204(12) 205(13) 206(14) 207(15)	408/409 410/411 412/413 414/415				13	02Q-N8 02Q-P8 02Q-Q8 02Q-R8	Q2 Q3 Q4 Q5	4	Q2

* The number in parentheses is the line relative address within the board.

LAB 8, Scanner and Token-Ring Adapter Board Information

LAB BOARD POSITION 8 – 02B-A2

Scanner 15 (LAB Type A)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
15	224-239 240-255	L2 R2	F2 F2	C2 C2	D2 D2	E2 E2	A2 A2	17X0/1 27X0/1	41XE/F 41XE/F

Scanners 15 and 16 (LAB Type B)

Scanner	Line Addr	ICC	FES	CSM	CSP1	CSP2	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
15 16	224-239 240-255	L2 R2	F2 S2	C2 V2	D2 U2	E2 T2	A2 A2	17X0/1 27X0/1	41XE/F 41XE/F

Note: Fill in the next table with the line information for your customer's installation:

LAB Position 8 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB A Scanner Number	LAB B Scanner Number	Tailgate Position 01D	LIC Cable Position 02A-A2	LIC Pos	LIC Card 02A-A2
224(00) 225(01) 226(02) 227(03)	448/449 450/451 452/453 454/455				15	15	02Q-J1 02Q-K1 02Q-L1 02Q-M1	G2 G3 G4 G5	1	G2
228(04) 229(05) 230(06) 231(07)	456/457 458/459 460/461 462/463				15	15	02Q-J2 02Q-K2 02Q-L2 02Q-M2	H2 H3 H4 H5	2	H2
232(08) 233(09) 234(10) 235(11)	464/465 466/467 468/469 470/471				15	15	02Q-J3 02Q-K3 02Q-L3 02Q-M3	J2 J3 J4 J5	3	J2
236(12) 237(13) 238(14) 239(15)	472/473 474/475 476/477 478/479				15	15	02Q-J4 02Q-K4 02Q-L4 02Q-M4	K2 K3 K4 K5	4	K2
240(16) 241(17) 242(18) 243(19)	480/481 482/483 484/485 486/487				15	16	02Q-J5 02Q-K5 02Q-L5 02Q-M5	M2 M3 M4 M5	5	M2
244(20) 245(21) 246(22) 247(23)	488/489 490/491 492/493 494/495				15	16	02Q-J6 02Q-K6 02Q-L6 02Q-M6	N2 N3 N4 N5	6	N2
248(24) 249(25) 250(26) 251(27)	496/497 498/499 500/501 502/503				15	16	02Q-J7 02Q-K7 02Q-L7 02Q-M7	P2 P3 P4 P5	7	P2
252(28) 253(29) 254(30) 255(31)	504/505 506/507 508/509 510/511				15	16	02Q-J8 02Q-K8 02Q-L8 02Q-M8	Q2 Q3 Q4 Q5	8	Q2

* The number in parentheses is the line relative address within the board.

Scanner 15 and TRA 16 (LAB type C with TRA)

Scanner or TRA	Line Addr	ICC	FES	CSM	CSP1	CSP2	TRM	RDV	Scanner IOC Bus Addr	RDV IOC Bus Addr
15 16	224-239 240,241, 242,243	R2	S2	V2	U2	T2	 C2	A2 A2	17X0/1 27X0/1	41XE/F 41XE/F

Note: Fill in the next table with the line information for your customer's installation.

LAB Position 8 Line Information

Line Address *	Line I/F Addr	NCP Line Addr	EP Line Addr	LIC Type	LAB C Scanner or TRA Number	Tailgate Position 01D	LIC/TIC Cable Position 02A-A3	TIC LIC Pos	LIC TIC 02A-A3
240	F0				16	02Q-J2	E2	5	E2
241	F1				16	02Q-K2	F2	6	F2
242	F2				16	02Q-L2	G2	7	G2
243	F3				16	02Q-M2	H2	8	H2
224(00) 225(01) 226(02) 227(03)	448/449 450/451 452/453 454/455				15	02Q-J5 02Q-K5 02Q-L5 02Q-M5	M2 M3 M4 M5	1	M2
228(04) 229(05) 230(06) 231(07)	456/457 458/459 460/461 462/463				15	02Q-J6 02Q-K6 02Q-L6 02Q-M6	N2 N3 N4 N5	2	N2
232(08) 233(09) 234(10) 235(11)	464/465 466/467 468/469 470/471				15	02Q-J7 02Q-K7 02Q-L7 02Q-M7	P2 P3 P4 P5	3	P2
236(12) 237(13) 238(14) 239(15)	472/473 474/475 476/477 478/479				15	02Q-J8 02Q-K8 02Q-L8 02Q-M8	Q2 Q3 Q4 Q5	4	Q2

* The number in parentheses is the line relative address within the board.

Communication Interfaces: LICs

Access to the external telecommunications environment is via the following interfaces:

1. Analog transmission to remote DTEs:

   CCITT V.24 LIC type 1 (to stand-alone DCEs)

   CCITT V.25 LIC type 1 (to autocall units)

   CCITT V.35 LIC type 3 (to stand-alone DCEs)

   Bell 303 LIC type 2 (to Bell Data Station Type 303)

   CCITT X.21 LIC type 4A and LIC type 4B (to stand-alone DCEs)

2. Digital transmission to local DTEs:

   V.24 low-speed direct-attachment LIC type 1 (to local low-speed IBM terminals)

   V.24 medium-speed direct-attachment LIC type 1 (to local medium-speed terminals)

   V.35 high-speed direct-attachment LIC type 3 (to local high-speed terminals)

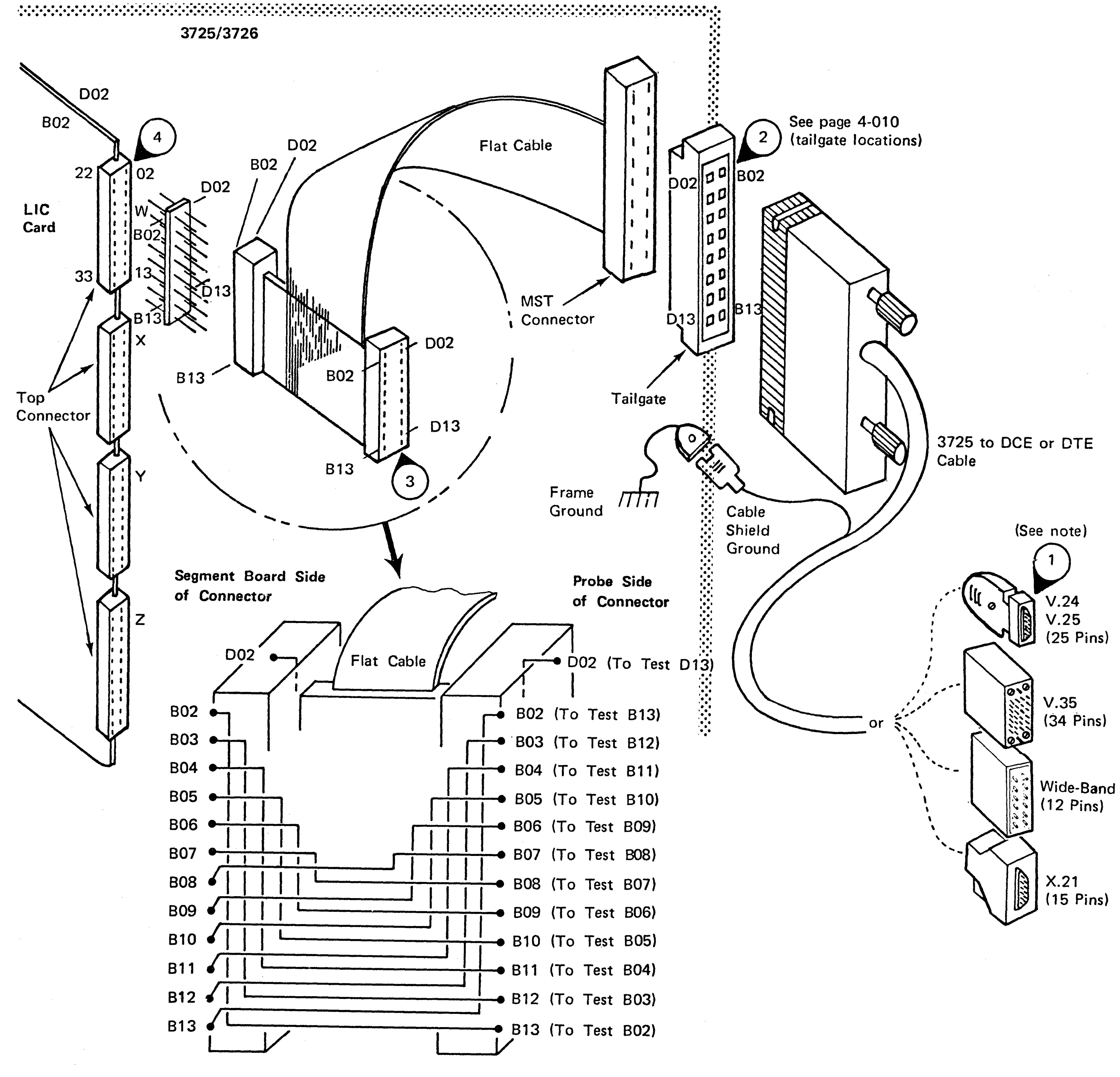
   X.21 direct-attachment LIC type 4A and LIC type 4B (to X.21 local terminals)

SIGNAL NAME ABBREVIATIONS

AC	Abandon call
AGC	Automatic gain control
C	Control
CI	Calling indicator
CR	Call request
CTS	Clear to send
DCRLSD	Data channel receive line signal detector
DLO	Data line occupied
DP	Digit present
DSC	Distant station connected
DSR	Data set ready
DSRS	Data signaling rate selector
DS0	Digit signal 2 to power 0
DS1	Digit signal 2 to power 1
DS2	Digit signal 2 to power 2
DS3	Digit signal 2 to power 3
DTR	Data terminal ready
I	Indication
LLB	Local loop back
LT	Local test
NS	New sync
PI	Power indication
PND	Present next digit
R	Receive
RD	Received data
RI	Ring indicator
RFS	Ready for sending
RSET	Receive signal element timing
RTS	Request to send
SCR	Serial clock receive
SCT	Serial clock transmit
SD	Send data
SET	Signal element timing
SG	Signal ground
T	Transmit
TD	Transmitted data
TI	Test indicator
TSET	Transmitter signal element timing
WB	Wrap back

Note: The following correspondences exist:

Data channel receive line signal detector	= Carrier detector
Ready for sending	= Clear to send
Receiver signal element timing	= Receive clock
Transmitter signal element timing	= Transmit clock
Ring indicator	= Calling indicator
Abandon call	= Abandon call and retry

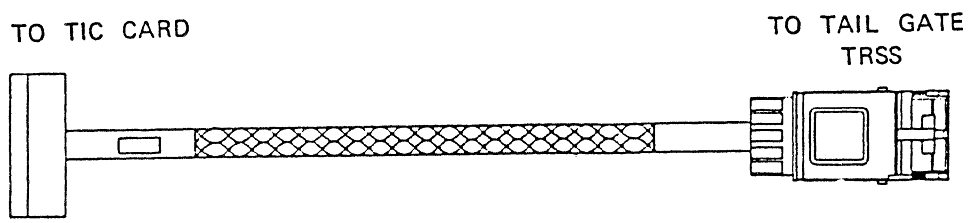


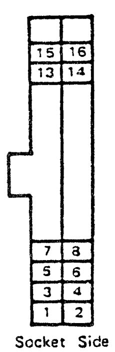
Note: Use the circled numbers as connector identifications in the following pages.

Communication Interfaces : TICs

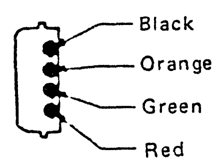
The access to the Ring Interface is via the attachment cable.

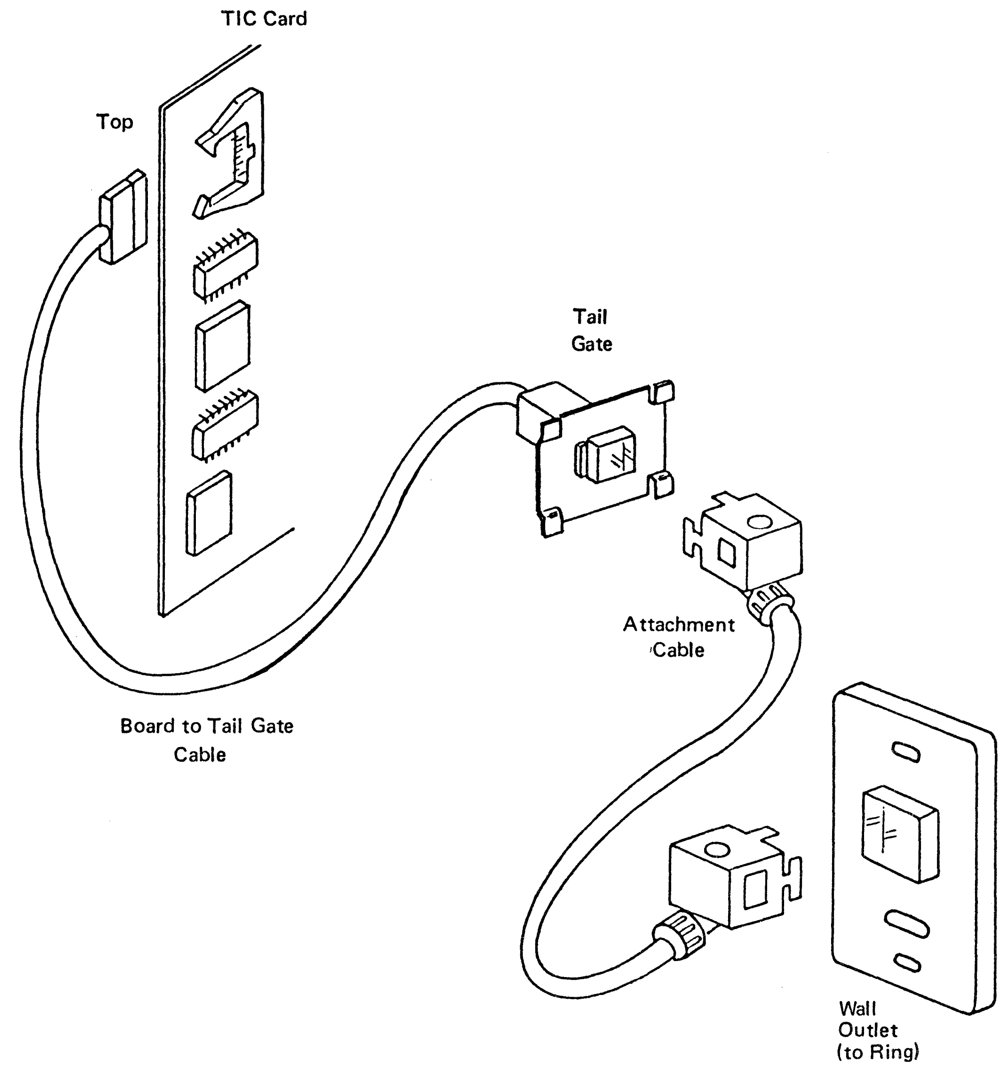
Signal name	Color	Pin Connector (socket Side)
+ Ring out A	Black	Pos 16
+ Ring out B	Orange	Pos 15
+ Ring in A	Green	Pos 1
+ Ring in B	Red	Pos 2





PIN POSITION





Note: Cable checking procedure: By removing the TIC card connector the wire continuity may be checked between connector pin position 16 and 1, and pin position 15 and 2.

RING INTERFACE ELECTRICAL CHARACTERISTICS

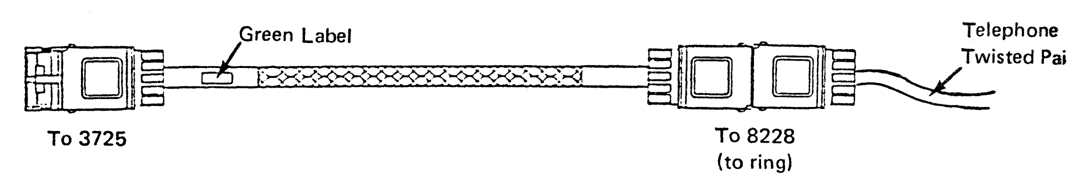
Ring Receiver

Minimum input signal: 50 millivolts peak-to-peak.

Ring Transmitter

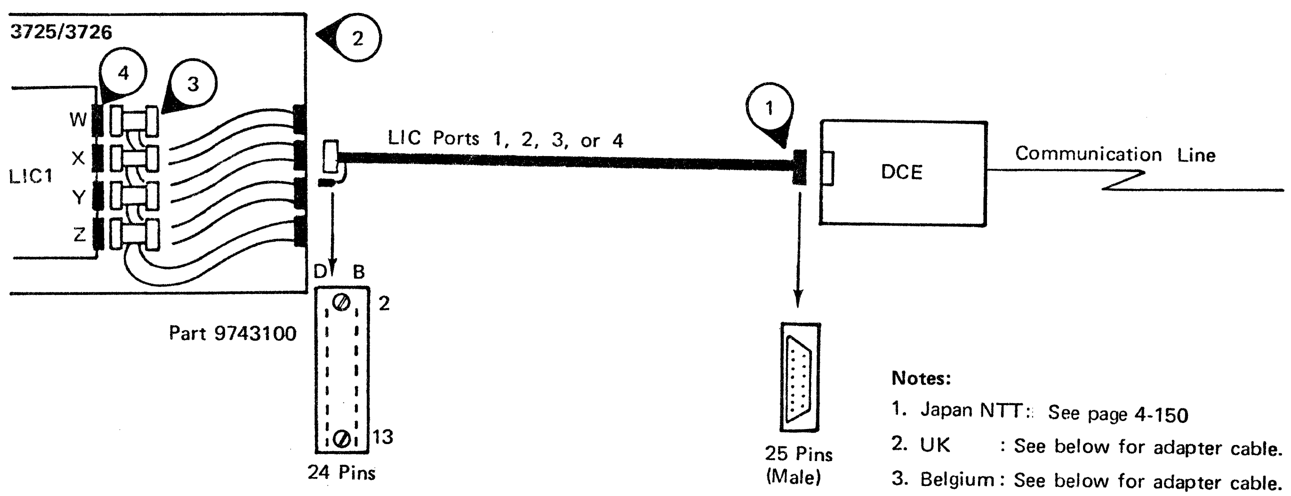
Output signal: between 3.0 and 4.5 Volts peak-to-peak.
Output load: 150 Ohms ± 10%

In the case where the ring is made of a telephone twisted pair a "Data Grade Media to Type 3 Media Filter" must be inserted between the end of the telephone twisted pair and the 3725/3726.



Data Grade Media to Type 3 Media Filter

LIC Type 1 DCE Interface (Except Japan NTT) (Part 1 of 2)



Notes:
1. Japan NTT: See page 4-150
2. UK : See below for adapter cable.
3. Belgium: See below for adapter cable.

CABLE TO DCE

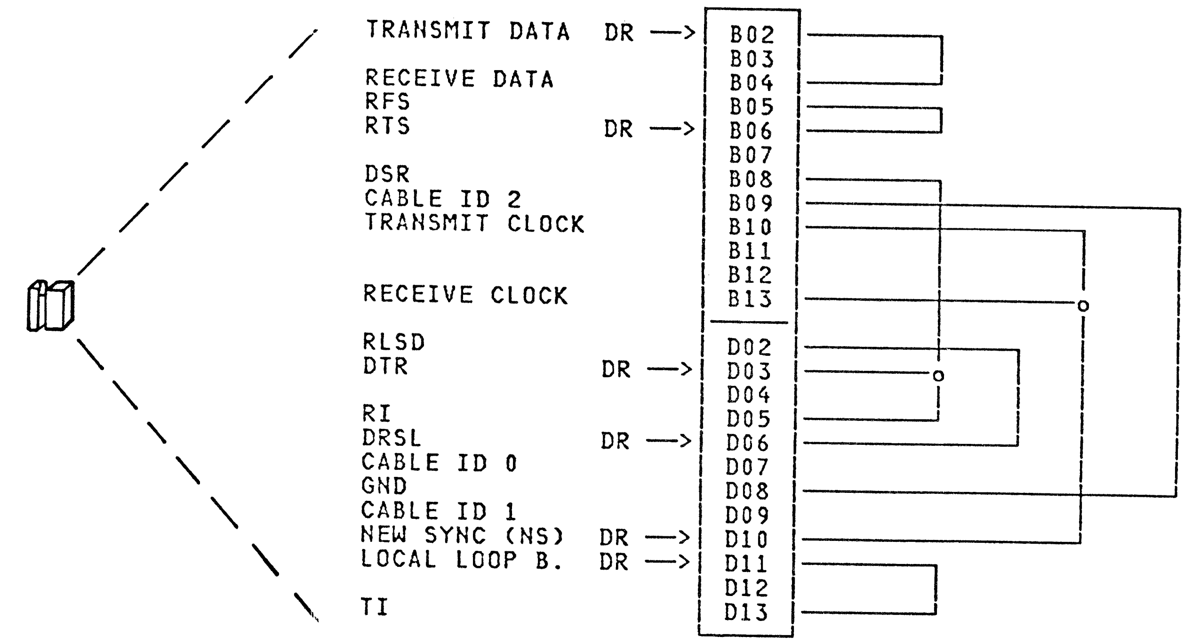
Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard or Regular	Maximum
4911 (LIC1)	Up to 4	V.24 DCE (except Japan NTT, UK, and Belgium)	1404	1404	6081088	13.5 (45)	
					6089075	13.5 (45)	
			0691	0691	1736733	10.6 (35)	35 (115) see Note
					6089075	10.6 (35)	10.6 (35)
4911 (LIC1)	Up to 4	V.24 DCE United Kingdom only	0092	0092A 0092B*	6081088 1743584	13.5 (45)	
					1736733 1743584	13.5 (45)	35 (115) see Note
					6089075 1743584	13.5 (45)	13.5 (45)
4911 (LIC1)	Up to 4	V.24 DCE Belgium only	0096	0096A 0096B*	6081088 1489985	13.5 (45)	
					6089075 1489985	13.5 (45)	13.5 (45)
					1736733 1489985	13.5 (45)	35 (115) see Note

* = Adapter cable

Note: When the DCE is an IBM 3863, 3864, or 3865 Modem, the maximum length is 100 m (328 ft). If the suffix level of the modem (two alphabetic characters on the date tag) is FG or later for the US and America/Far East, or KF or later for Europe/Middle East/Africa. For earlier suffix level modems, if data multiplexer feature 3260 is not installed, the modem must have EC 344120 installed. If data multiplexer feature 3260 is installed, the modem must have EC 323406 installed.

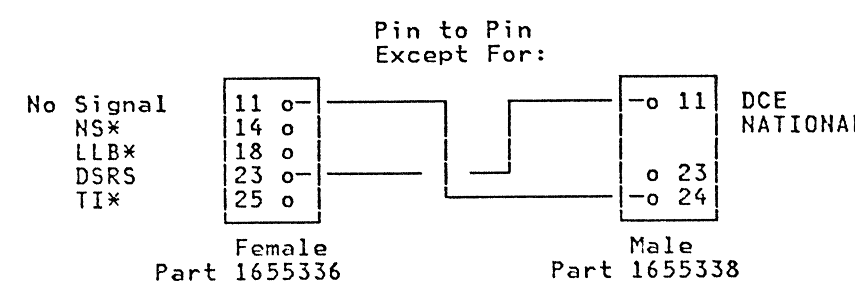
WRAP BLOCK (PART 1733977)

Install in (2) (ports 1, 2, 3, and 4).



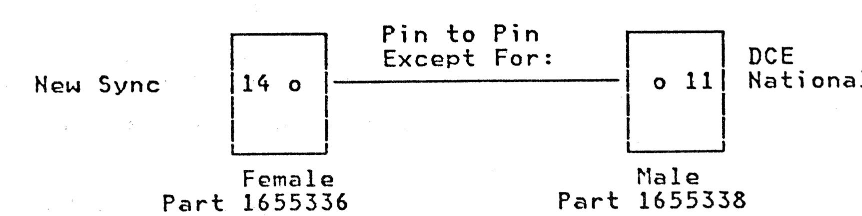
ADAPTER CABLES

UK



* These wires are not present in the adapter cable because the UK DCEs do not use these signals.

Belgium



Pins not used on 3725/26: 1

LIC Type 1 DCE Interface (Except Japan NTT) (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

Signal	(4)	(3)	(3)	(2)		(1)	CCITT
TRANSMIT DATA (TD)	22	B02	B13	B02	->-	2	103
GND	23	B03	B12	B03			
RECEIVE DATA (RD)	24	B04	B11	B04	-<-	3	104
CLEAR TO SEND (RFS)	25	B05	B10	B05	-<-	5	106
REQUEST TO SEND (RTS)	26	B06	B09	B06	->-	4	105
GND	27	B07	B08	B07			
DATA SET READY (DSR)	28	B08	B07	B08	-<-	6	107
CABLE ID 2	29	B09	B06	B09			
TRANSMIT CLOCK (TSET)	30	B10	B05	B10	-<-	15	114
GND (SG)	31	B11	B04	B11		7	102
	32	B12	B03	B12			
RECEIVE CLOCK (RSET)	33	B13	B02	B13	-<-	17	115
CARRIER DETECT(DCRLSD)	02	D02	D13	D02	-<-	8	109
DATA TERM. RDY (DTR)	03	D03	D12	D03	->-	20	108
GND	04	D04	D11	D04			
CALL INDICAT. (RI)	05	D05	D10	D05	-<-	22	125
DATA RATE SEL. (DSRS)	06	D06	D09	D06	->-	23	111
CABLE ID 0	07	D07	D08	D07			
GND	08	D08	D07	D08			
CABLE ID 1	09	D09	D06	D09			
NEW SYNC (NS)	10	D10	D05	D10	->-	14	
LOCAL LOOP BCK (LLB)	11	D11	D04	D11	->-	18	141
GND	12	D12	D03	D12			
TEST INDIC. (TI)	13	D13	D02	D13	-<-	25	142
						1	

Male

Legend:

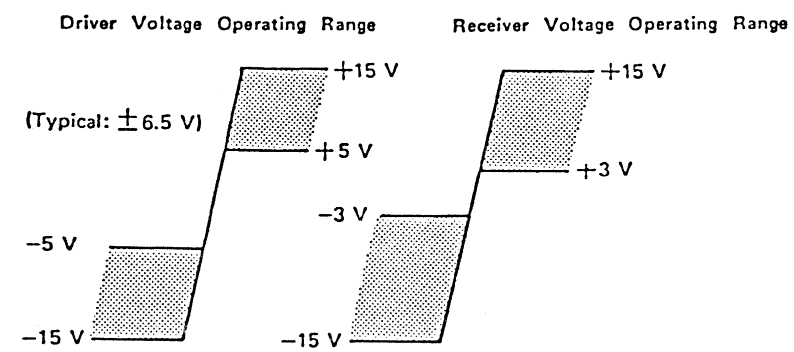
->- Driver
-<- Receiver

CABLE ID SIGNALS

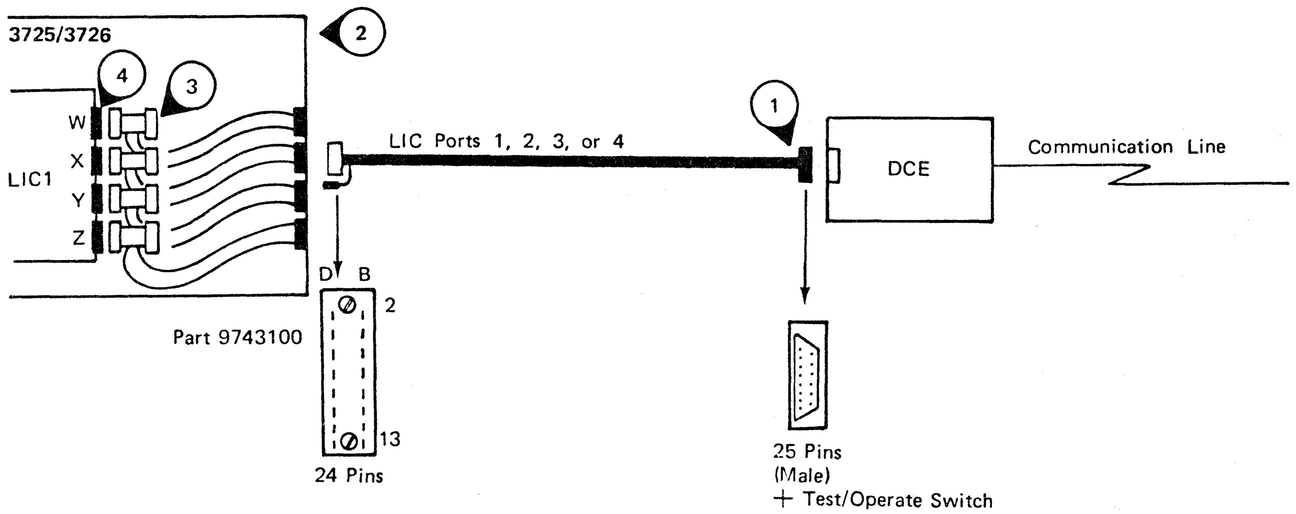
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between signals and ground (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.



LIC Type 1 DCE Interface (Japan NTT Only) (Part 1 of 2)



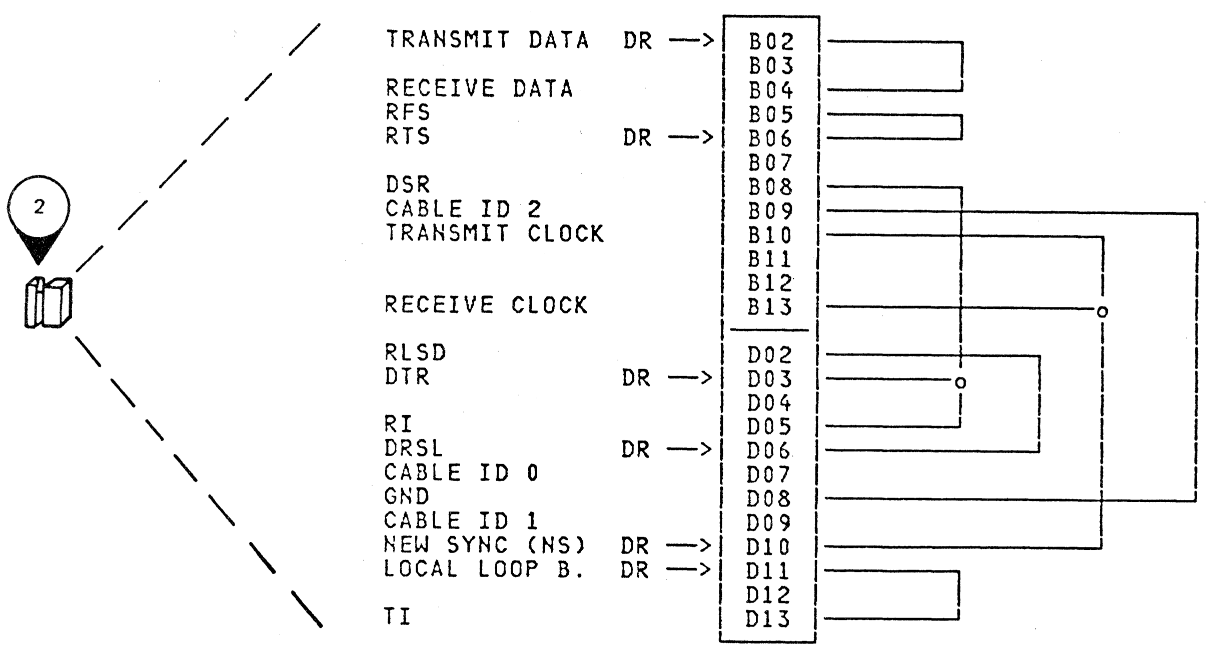
CABLE TO DCE

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard or Regular	Maximum
4911 (LIC1)	Up to 4	V.24 DCE (Japan NTT only)	0081	0081	2667349	13.5 (45)	35 (115) see Note
					6089076	13.5 (45)	13.5 (45)

Note: When the DCE is an IBM 3863, 3864, or 3865 Modem, the maximum length is 100 m (328 ft). If the suffix level of the modem (two alphabetic characters on the date tag) is FG or later for the US and America/Far East, or KF or later for Europe/Middle East/Africa. For earlier suffix level modems, if data multiplexer feature 3260 is not installed, the modem must have EC 344120 installed. If data multiplexer feature 3260 is installed, the modem must have EC 323406 installed.

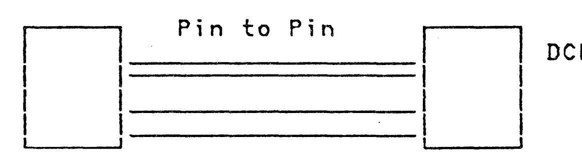
WRAP BLOCK (PART 1733977)

Install in (2) (ports 1, 2, 3, or 4).



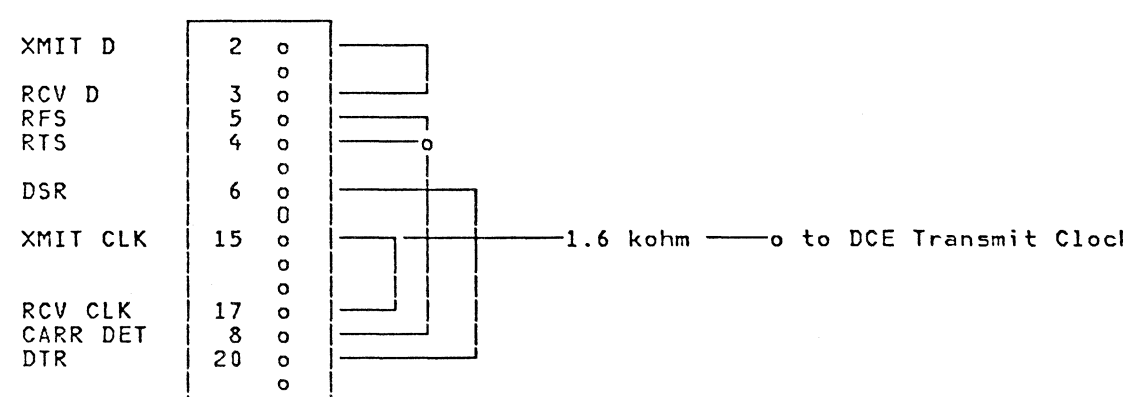
ADAPTER CABLE (PART 1743583)

(Used at (1) if connector hood is too large to fit DCE socket.)



TEST SWITCH LOGICAL FUNCTION

(Used at (1)).



INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

Signal	(4)	(3)		(2)	Direction	(1)	CCITT
TRANSMIT DATA (TD)	22	B02	B13	B02	->-	2	103
GND	23	B03	B12	B03			
RECEIVE DATA (RD)	24	B04	B11	B04	-<-	3	104
CLEAR TO SEND (RFS)	25	B05	B10	B05	-<-	5	106
REQUEST TO SEND (RTS)	26	B06	B09	B06	->-	4	105
GND	27	B07	B08	B07			
DATA SET READY (DSR)	28	B08	B07	B08	-<-	6	107
CABLE ID 2	29	B09	B06	B09			
TRANSMIT CLOCK (TSET)	30	B10	B05	B10	-<-	15	114
GND (SG)	31	B11	B04	B11		7	102
	32	B12	B03	B12			
RECEIVE CLOCK (RSET)	33	B13	B02	B13	-<-	17	115
CARRIER DETECT(DCRLSD)	02	D02	D13	D02	-<-	8	109
DATA TERM. RDY (DTR)	03	D03	D12	D03	->-	20	108
GND	04	D04	D11	D04			
CALL INDICAT. (RI)	05	D05	D10	D05	-<-	22	125
DATA RATE SEL. (DSRS)	06	D06	D09	D06	->-	23	111
CABLE ID 0	07	D07	D08	D07			
GND	08	D08	D07	D08			
CABLE ID 1	09	D09	D06	D09			
NEW SYNC (NS)	10	D10	D05	D10	->-	11	
LOCAL LOOP BCK (LLB)	11	D11	D04	D11	->-	18	142
GND	12	D12	D03	D12			
TEST INDIC. (TI)	13	D13	D02	D13			

(1): Male (See note)

Legend:

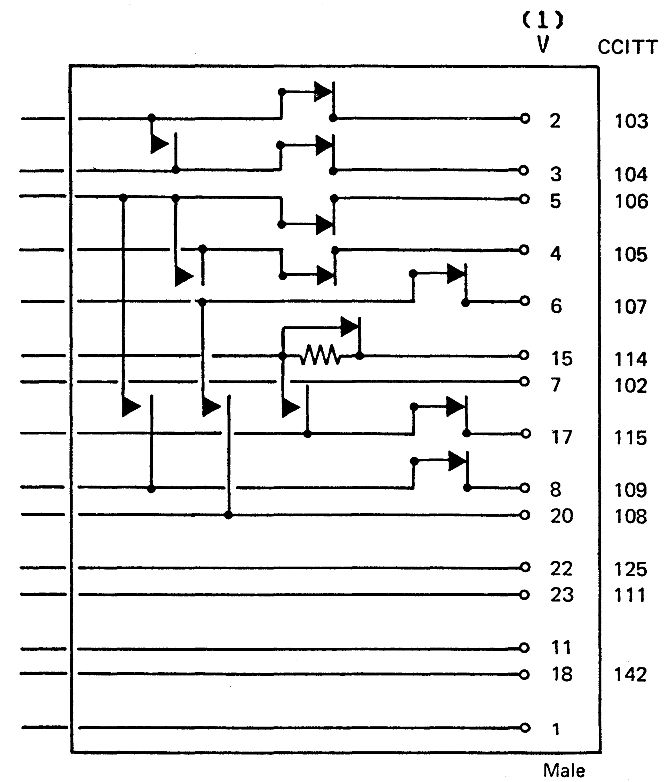
->- Driver
-<- Receiver

Note: This connector is equipped with a test/operate switch. The figure on the right gives the details of this switch (shown in "Operate" position).

CABLE ID SIGNALS

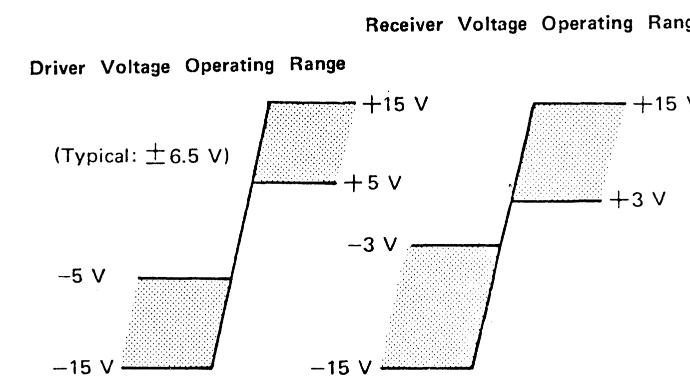
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

TEST/OPERATE SWITCH

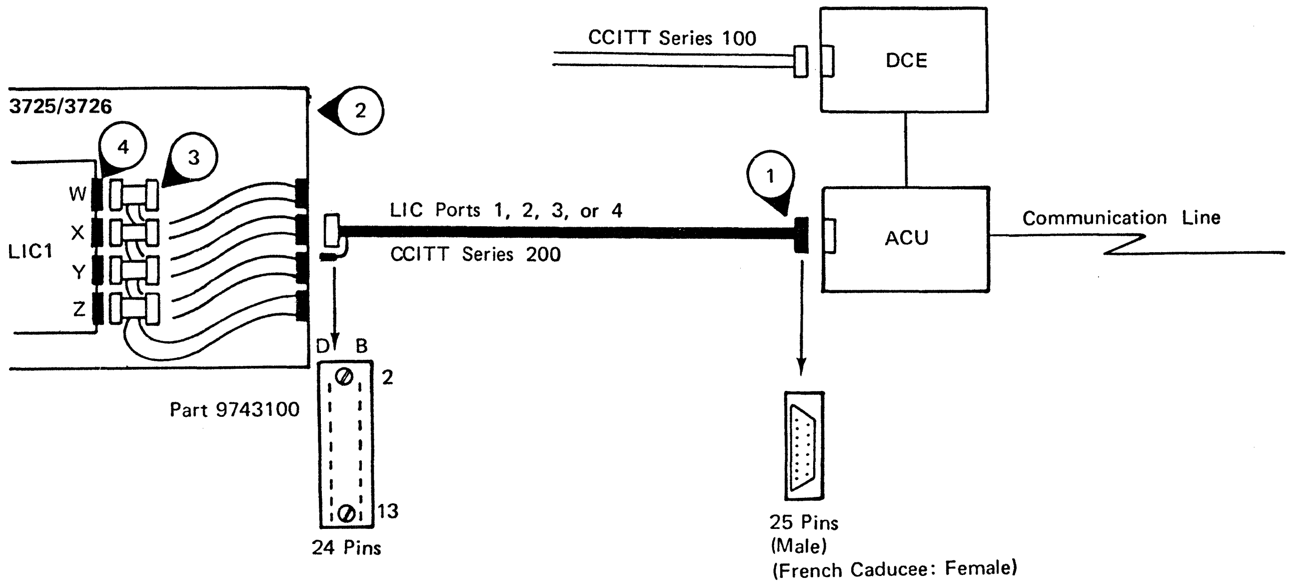


VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between signals and ground (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.



LIC Type 1 Auto Call Unit Interface (Part 1 of 2)



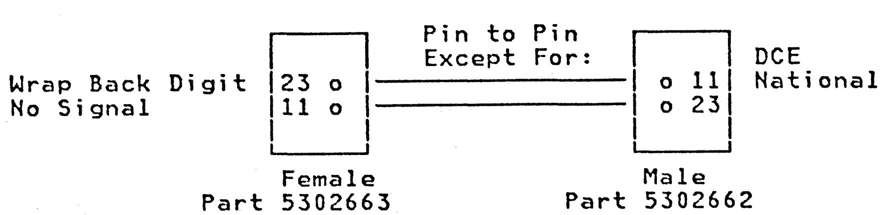
Note: For UK adapter cable, see below.

CABLE TO ACU

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard or Regular	Maximum
4911 (LIC1)	Up to 4	V.25 autocall unit (except Japan, UK, and French Caducee)	0082 and/ or 0682	0082 and/ or 0682	1733747	13.5 (45)	35 (115)
					6089077	13.5 (45)	13.5 (45)
					6089077		13.5 (45)
4911 (LIC1)	Up to 4	V.25 autocall unit (Japan)	0093	0093	2667696	13.5 (45)	35 (115)
					6089078	13.5 (45)	13.5 (45)
4911 (LIC1)	Up to 4	V.25 autocall unit (United Kingdom)	0094	0094A 0094B*	1733747 674570	13.5 (45)	35 (115)
					6089077 674570	13.5 (45)	13.5 (45)
4911 (LIC1)	Up to 4	V.25 autocall unit (French Caducee)	0083	0083	1733914	13.5 (45)	35 (115)
					6406254	13.5 (45)	13.5 (45)

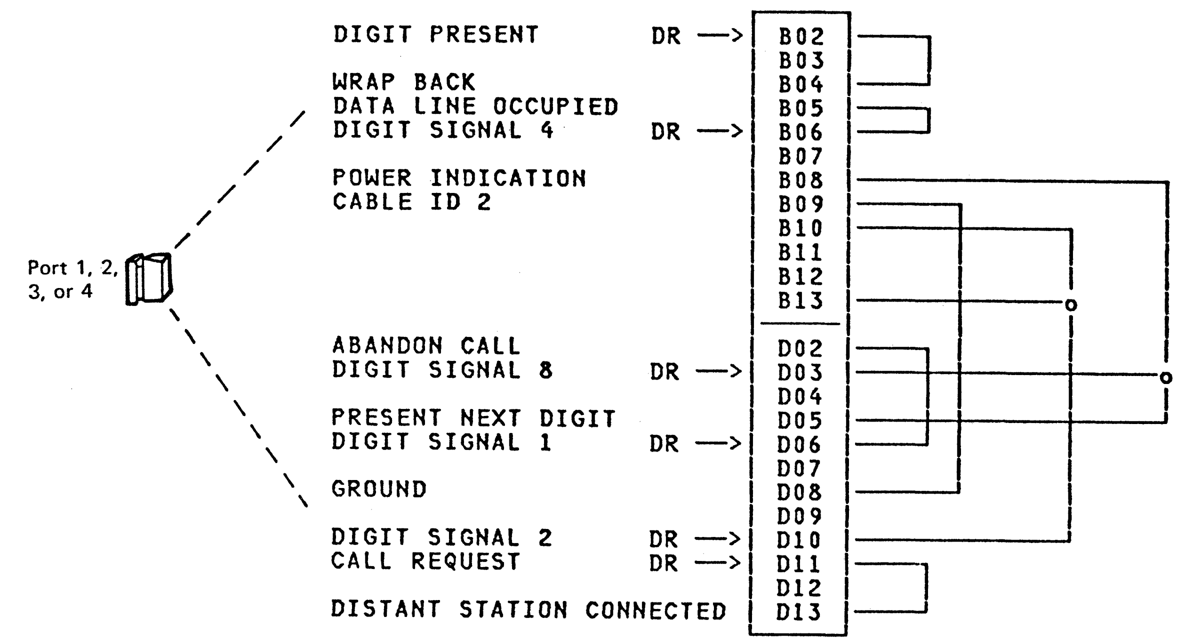
* = Adapter cable

ADAPTER CABLE (UK)



WRAP BLOCK (PART 1733977)

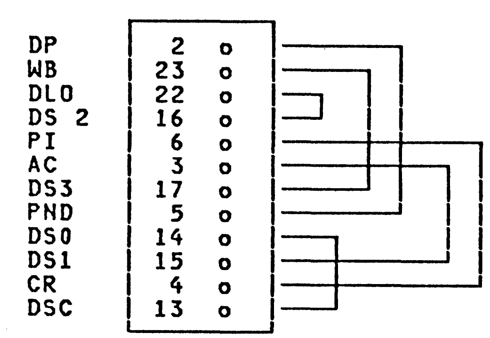
Install in (2) (ports 1, 2, 3, or 4).



THREAD WRAP BLOCK (PART 147440, JAPAN ONLY)

Install in (1).

ISO 2110
25 pins



Cable ID 1 = gnd for autocall
DS 0 : 2 power 0 = 1
DS 1 : 2 power 1 = 2
DS 2 : 2 power 2 = 4
DS 3 : 2 power 3 = 8

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

```
                            (4)        (3)        (2)                   (1)
                             V          V          V                     V     CCITT

DIGIT PRESENT    (b5) 22 |—|B02 B13|—| B02 |——————>——————|—o 2    | 211
       GND            23 |—|B03 B12|—| B03 |┐              |        |
WRAP BACK DIGIT 8 (b5)24 |—|B04 B11|—| B04 |┼<—————————————|—o 23   | WB*
DATA LINE OCCUP. (b1) 25 |—|B05 B10|—| B05 |┼<—————————————|—o 22   | 203
DIGIT SIGNAL 4   (b1) 26 |—|B06 B09|—| B06 |┼——————>——————|—o 16   | 208
       GND            27 |—|B07 B08|—| B07 |-o—————————————|—o 7    | 201
POWER INDIC      (b0) 28 |—|B08 B07|—| B08 |┼<—————————————|—o 6    | 213
CABLE ID 2            29 |—|B09 B06|—| B09 ||              |        |
                      30 |—|B10 B05|—| B10 ||              |        |
       GND            31 |—|B11 B04|—| B11 ||              |        |
                      32 |—|B12 B03|—| B12 ||              |        |
                      33 |—|B13 B02|—| B13 ||              |        |
ABAND CALL + RETRY(b0)02 |—|D02 D13|—| D02 |┼<—————————————|—o 3    | 205
DIGIT SIGNAL 8   (b0) 03 |—|D03 D12|—| D03 |┼——————>——————|—o 17   | 209
       GND            04 |—|D04 D11|—| D04 |-o             |        |
PRESENT NEXT DIGIT(b2)05 |—|D05 D10|—| D05 |┼<—————————————|—o 5    | 210
DIGIT SIGNAL 1   (b3) 06 |—|D06 D09|—| D06 |┼——————>——————|—o 14   | 206
CABLE ID 0            07 |—|D07 D08|—| D07 |┼┐             |        |
       GND            08 |—|D08 D07|—| D08 |┼o             |        |
CABLE ID 1            09 |—|D09 D06|—| D09 |┼┘             |        |
DIGIT SIGNAL 2   (b2) 10 |—|D10 D05|—| D10 |┼——————>——————|—o 15   | 207
CALL REQT        (b4) 11 |—|D11 D04|—| D11 |┼——————>——————|—o 4    | 202
       GND            12 |—|D12 D03|—| D12 |┘              |        |
DIST.STAT.CONNECT.(b4)13 |—|D13 D02|—| D13 |-<—————————————|—o 13   | 204

  (b0,1,2,3,4,5) = bit 0,1,2,3,4,5
  b: FE BI-BUS bit number (0 to 5)                                   Male
```

* Japan only (for maintenance purposes)

Legend:

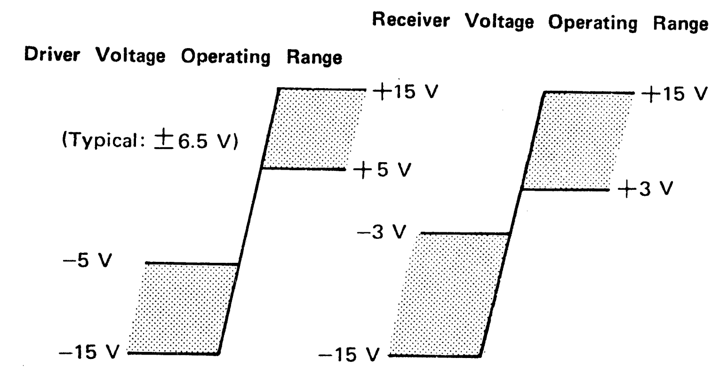
->- Driver
-<- Receiver

CABLE ID SIGNALS

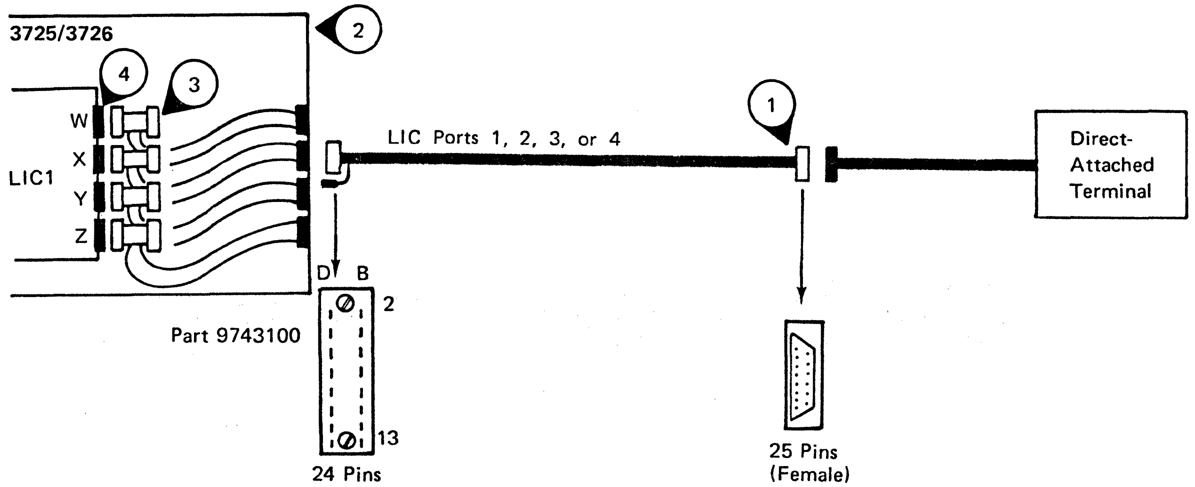
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between signals and ground (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

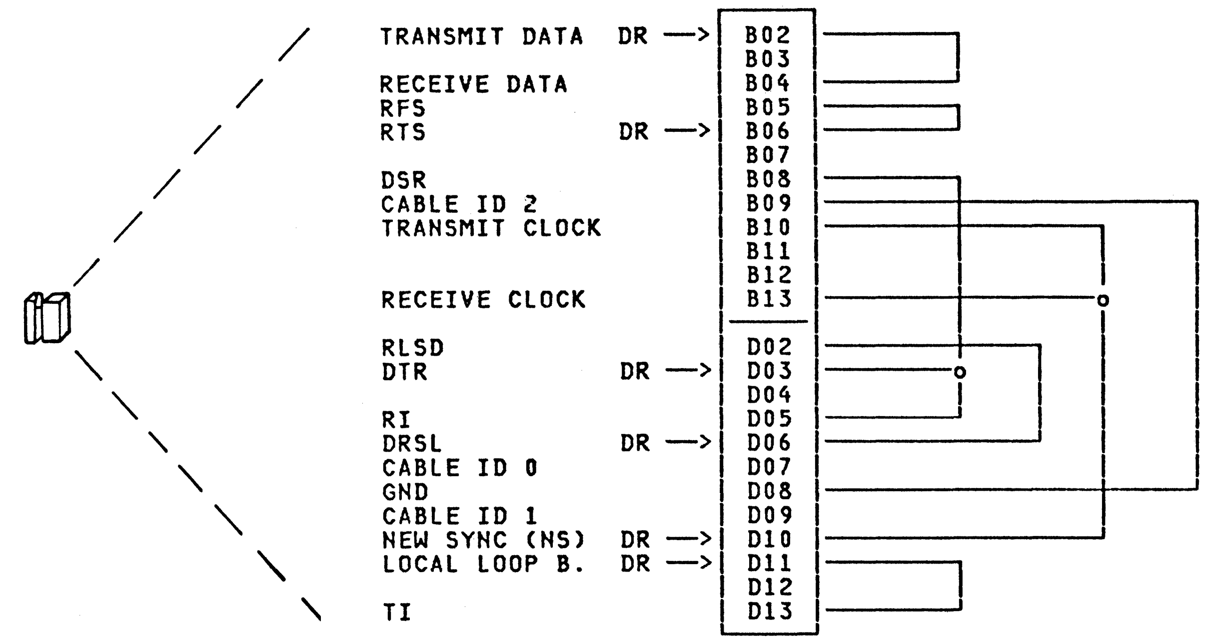


LIC Type 1 Direct Attachment to Terminal (Part 1 of 2)



WRAP BLOCK (PART 1733977)

Install in (2) (ports 1, 2, 3, or 4).



CABLE TO TERMINAL

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4911 (LIC1)	Up to 4	V.24 direct attachment (except 3101 and Teletype)	1400 or 0690	1400 or 0690	1733746 1733746	13.5 (45) 13.5 (45)	See note See note
4911 (LIC1)	Up to 4	V.24 direct attachment (3101 and Teletype)	0085 or 0683	0085 or 0683	2667351 2667351	13.5 (45) 13.5 (45)	See note See note

Note: A maximum length of 35 m (115 ft) meets the CCITT specifications, however, if the terminal is a 3725, it operates correctly at distances up to 150 m (492 ft).

LIC Type 1 Direct Attachment to Terminal (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

	(4)	(3)		(2)	(1)	CCITT
TRANSMIT DATA	22	B02	B13	B02	->- o 3	104
GND	23	B03	B12	B03		
RECEIVE DATA	24	B04	B11	B04	-<- o 2	103
READY FOR SENDING	25	B05	B10	B05	>o 5	106
REQUEST TO SEND	26	B06	B09	B06	o 4	105
GND	27	B07	B08	B07	o 7	102
DATA SET READY	28	B08	B07	B08	>o 6	107
CABLE ID 2	29	B09	B06	B09		
TRANSMIT CLOCK	30	B10	B05	B10		
GND	31	B11	B04	B11		
	32	B12	B03	B12		
RECEIVE CLOCK	33	B13	B02	B13		
CARRIER DETECTOR	02	D02	D13	D02		
DATA TERMINAL RDY	03	D03	D12	D03	o 20	108
GND	04	D04	D11	D04		
RING INDICATOR	05	D05	D10	D05		
DATA RATE SELECT	06	D06	D09	D06	->- o 8	109
CABLE ID 0	07	D07	D08	D07		
GND	08	D08	D07	D08		
CABLE ID 1	09	D09	D06	D09		
TR&RCV LOCAL CLOCK*	10	D10	D05	D10	->- o 17*	115
LOCAL LOOP BACK	11	D11	D04	D11	->- o 15*	114
GND	12	D12	D03	D12		
TEST INDICATOR	13	D13	D02	D13		

Female

* 3725 provides TR (transmit) and RCV (receive) clocks to the terminal.

Legend:

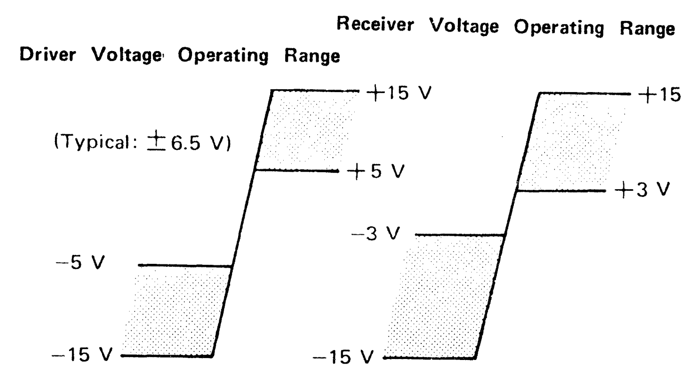
->- Driver
-<- Receiver

CABLE ID SIGNALS

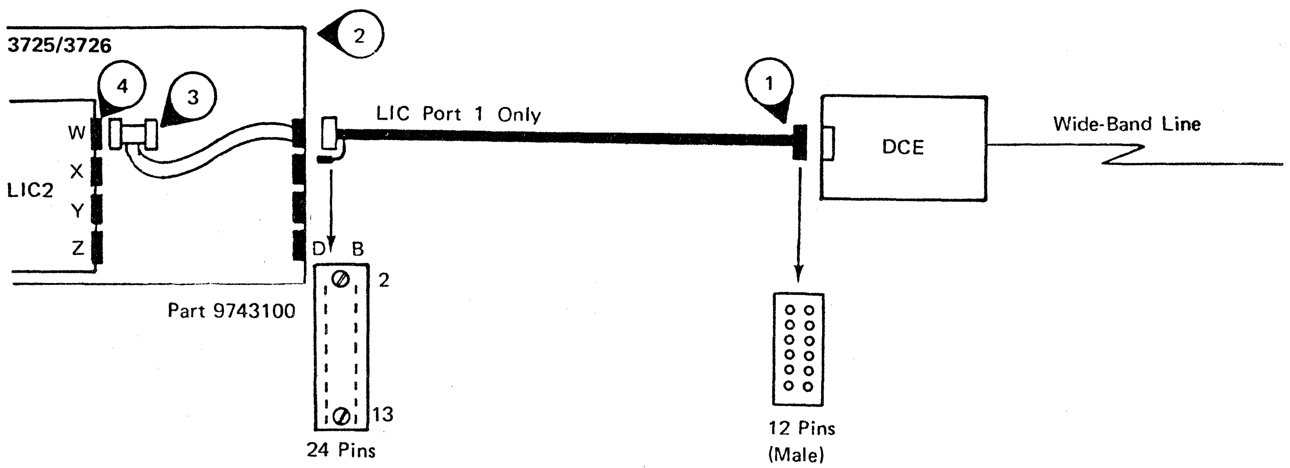
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between signals and ground (they must be within shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

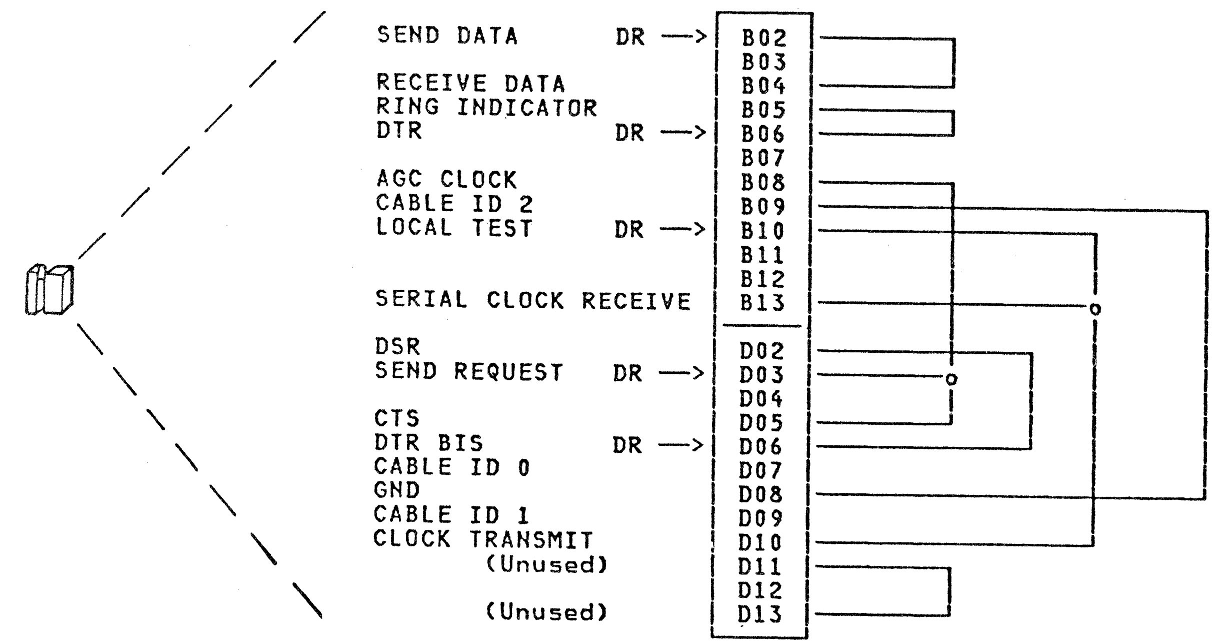


LIC Type 2 DCE Interface (Part 1 of 2)



WRAP BLOCK (PART 1733977)

Install in (2) (port 1 only).



CABLE TO DCE

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4921 (LIC2)	1	Wide-band DCE	0086 0684	0086 0684	2667779 1733817	13.5 (45) 10.6 (35)	13.5 (45

LIC Type 2 DCE Interface (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

Signal	(4)	(3)		(2)	Direction	(1)	EIA
SEND DATA	22	B02	B13	B02	->-	E	SD
GND	23	B03	B12	B03			
RECEIVE DATA	24	B04	B11	B04	-<-	K	RD
RING INDICATOR	25	B05	B10	B05	-<-		RI
DATA TERM. RDY	26	B06	B09	B06	->-		DTR
GND	27	B07	B08	B07			
AGC CLOCK	28	B08	B07	B08	-<-	M	AGC
CABLE ID 2	29	B09	B06	B09			
LOCAL TEST	30	B10	B05	B10	->-	G	LT
GND	31	B11	B04	B11			
	32	B12	B03	B12			
SERIAL CLOCK RECEIVE	33	B13	B02	B13	-<-	L	SCR
DATA SET RDY	02	D02	D13	D02	-<-	F	DSR
SEND REQUEST	03	D03	D12	D03	->-	D	SR
GND	04	D04	D11	D04			
CLEAR TO SEND	05	D05	D10	D05	-<-	C	CTS
DTR BIS (FOR WRAP)	06	D06	D09	D06			
CABLE ID 0	07	D07	D08	D07			
GND	08	D08	D07	D08			
CABLE ID 1	09	D09	D06	D09			
SERIAL CLOCK TRANSMIT	10	D10	D05	D10	-<-	J	SCT
	11	D11	D04	D11			
GND	12	D12	D03	D12			
	13	D13	D02	D13			

Male

Legend:

->- Driver
-<- Receiver

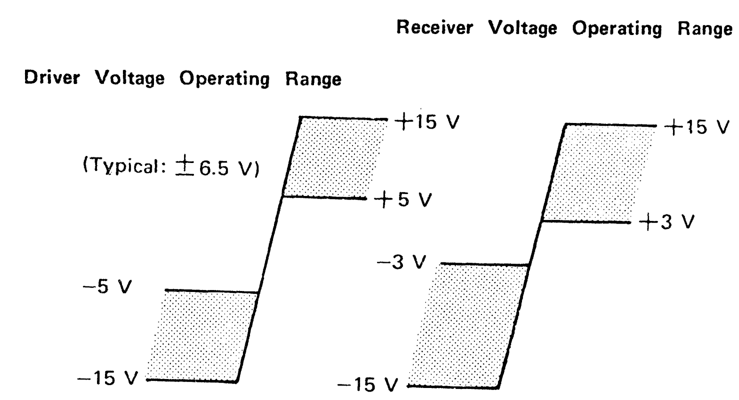
CABLE ID SIGNALS

The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

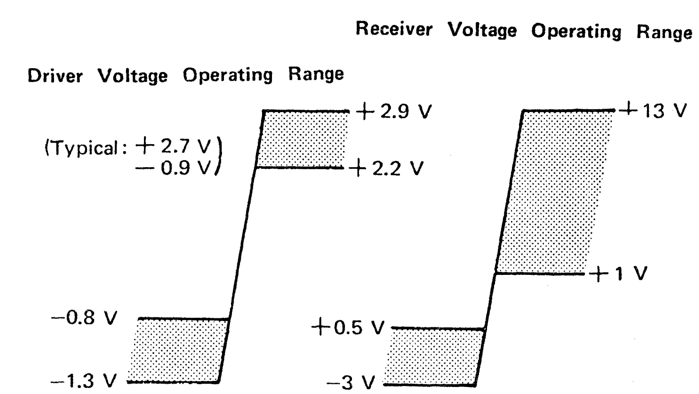
VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between signals and ground (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

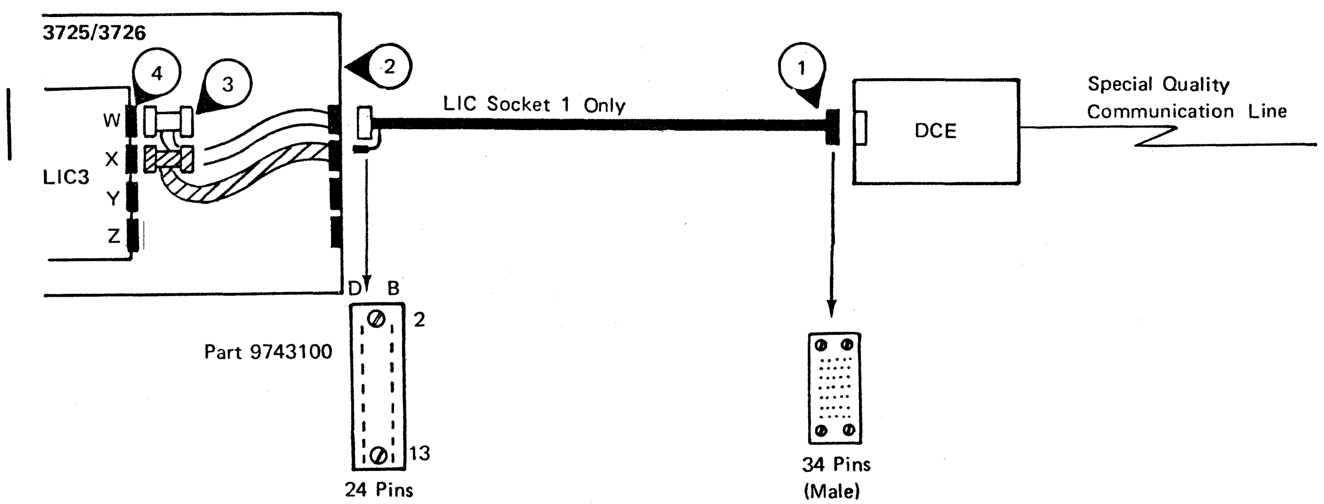
Data Terminal Ready and Ring Indicator Leads



Other Circuits



LIC Type 3 DCE Interface (Part 1 of 2)



Note: For French adapter cable, see below.

CABLE TO DCE

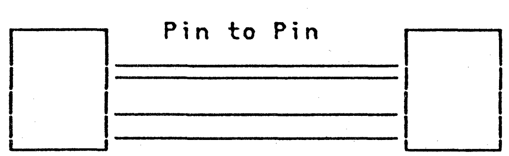
Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4931 (LIC3)	1	V.35 DCE (except French PTT modems)	0087 0685	0087 0685	6081094 1733820	13.5 (45) 10.6 (35)	 35 (115) See note
4931 (LIC3)	1	V.35 DCE (French PTT modems)	0095	0095A 0095B*	6081094 1749352	13.5 (45)	
				0095A 0095B*	1733820 1749352	10.6 (35)	35 (115) See note

* = Adapter cable

Note: For speeds greater or equal to 64 000 bps, the maximum cable length is 13.5 m (45 ft).

ADAPTER CABLE (FRANCE)

At (1).

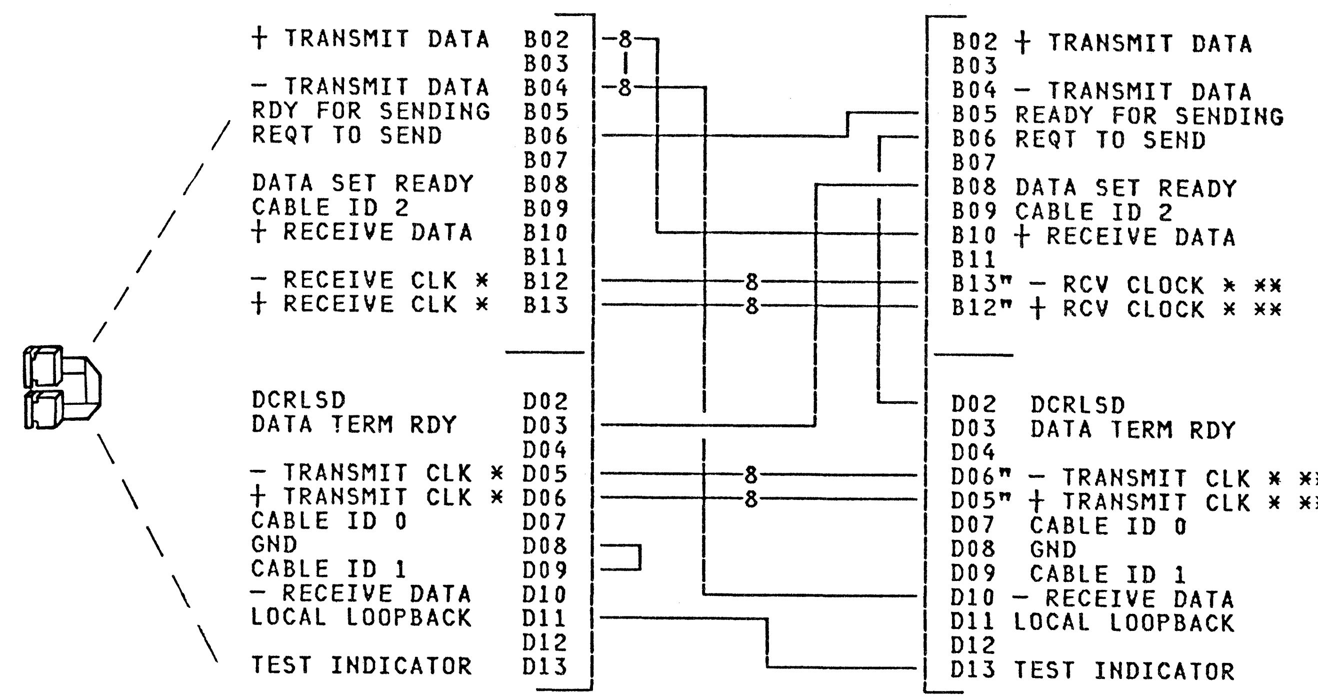


Female
Part 1749310

Male
Part 1749353

WRAP CABLE (PART 1733979)

Install in (2) (sockets 1 and 2, reversible).



8 = Twisted pair

This CE wrap cable is plugged between socket 1 and socket 2. Socket plugging is reversible. In order to fully test the LIC3 card, it is necessary to reverse the LIC3 wrap cable after a first test pass, then run the test again.

* Clocks are generated by socket 2 and received by socket 1. Other signals are identical in socket 1 and socket 2.

** Note that B12" and B13", D05" and D06" are respectively inverted in the wrap cable.

Pins B05, B06, and D02 are connected together after wrap cable installation.

Note: To run QA or QB diagnostics on LIC 3 with the wrap cable installed, manually enter CDF configuration as shown:

	C	I
Port 1	2	2
Port 2	0	2

At the end of diagnostics, when the test is finished, restore the CDF to normal configuration as shown:

	C	I
Port 1	2	2
Port 2	0	0

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

```
                           (4)         (3)        (2)                         (1)
                            V           V          V                           V        CCITT

+ TRANSMIT DATA (A)      22  |-|B02 B13|-| B02 |---8-------->----|--o P   |  103+
GND                      23  |-|B03 B12|-| B03 |-┐ .              |        |
- TRANSMIT DATA (B)      24  |-|B04 B11|-| B04 |-|-8-------->----|--o S   |  103-
READY FOR SENDING        25  |-|B05 B10|-| B05 |-|--<=======-----|--o D   |  106
REQUEST TO SEND          26  |-|B06 B09|-| B06 |-|--======>=-----|--o C   |  105
GND                      27  |-|B07 B08|-| B07 |-o                |        |
DATA SET READY           28  |-|B08 B07|-| B08 |-|--<=======-----|--o E   |  107
CABLE ID 2               29  |-|B09 B06|-| B09 | |                |        |
+ RECEIVE DATA  (A)      30  |-|B10 B05|-| B10 |-|--<--8---------|--o R   |  104+
GND                      31  |-|B11 B04|-| B11 |-o------.--------|--o B   |  102
- RECEIVE CLOCK (B)      32  |-|B12 B03|-| B12 |-----<--+---8----|--o X   |  115-
+ RECEIVE CLOCK (A)      33  |-|B13 B02|-| B13 |-----<--+---8----|--o V   |  115+
RCV. SIGNAL DETECTOR     02  |-|D02 D13|-| D02 |-----<==+====----|--o F   |  109
DATA TERM. READY         03  |-|D03 D12|-| D03 |-----===+==>=----|--o H   |  DTR
GND                      04  |-|D04 D11|-| D04 |         .        |        |
- TRANSMIT CLOCK (B)     05  |-|D05 D10|-| D05 |-------<-+8------|--o AA* |  114-
+ TRANSMIT CLOCK (A)     06  |-|D06 D09|-| D06 |-------<-+8------|--o Y   |  114+
CABLE ID 0               07  |-|D07 D08|-| D07 |-----┐  .        |        |
GND                      08  |-|D08 D07|-| D08 |-----┘  .        |        |
CABLE ID 1               09  |-|D09 D06|-| D09 |         .        |        |
- RECEIVE DATA (B)       10  |-|D10 D05|-| D10 |-------<-8-------|--o T   |  104-
LOCAL LOOPBACK           11  |-|D11 D04|-| D11 |                  |        |
GND                      12  |-|D12 D03|-| D12 |                  |        |
TEST INDICATOR           13  |-|D13 D02|-| D13 |                  |        |
                                                                   Male
```

Legend:

```
-8-   Twisted pairs
==-   Shielded wire
->-   Driver
-<-   Receiver
```

CABLE ID SIGNALS

The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).

2. Measure voltages at (3) (they should be in shaded areas)

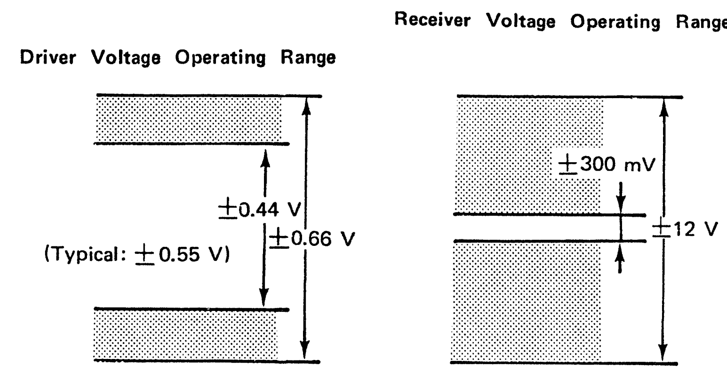
   a. Balanced circuits: Between wire A and wire B of the given signal for:

      ± Transmitted data

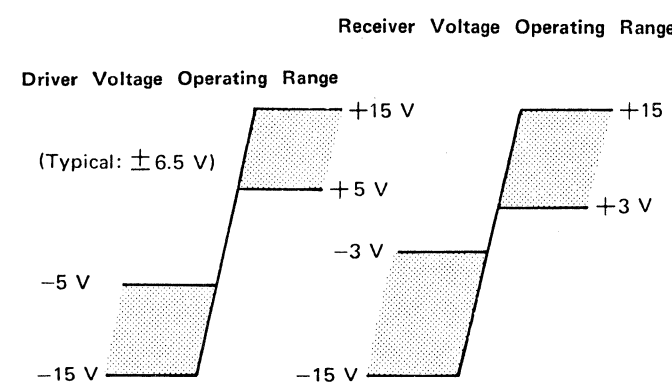
      ± Received data

      ± Receiver signal element timing

      ± Transmitter signal element timing

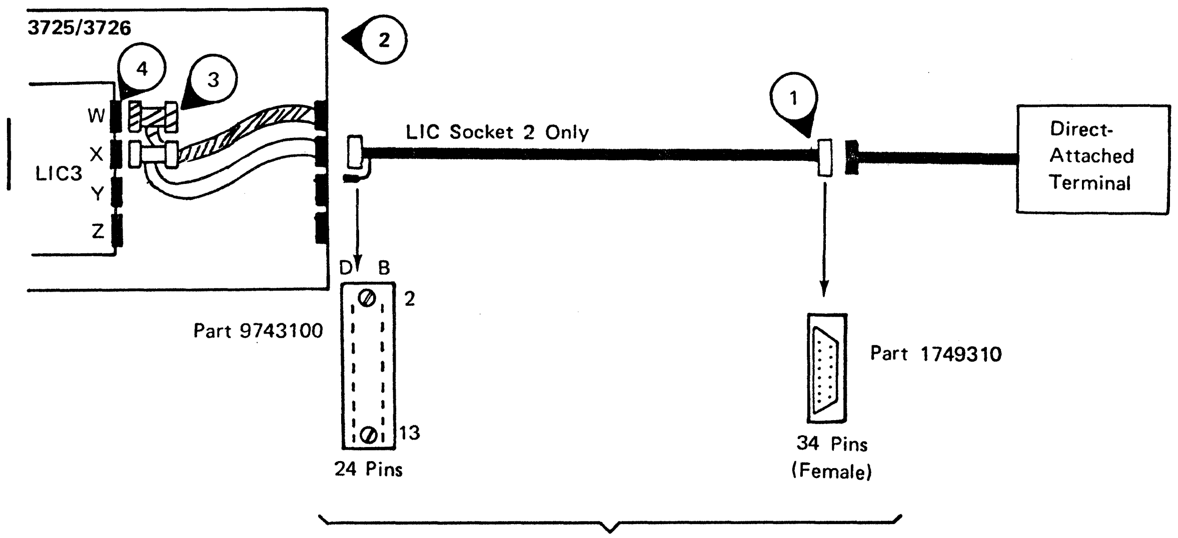


   b. Unbalanced circuits: Between signals and ground for other circuits



3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

LIC Type 3 Direct Attachment to Terminal (Part 1 of 2)



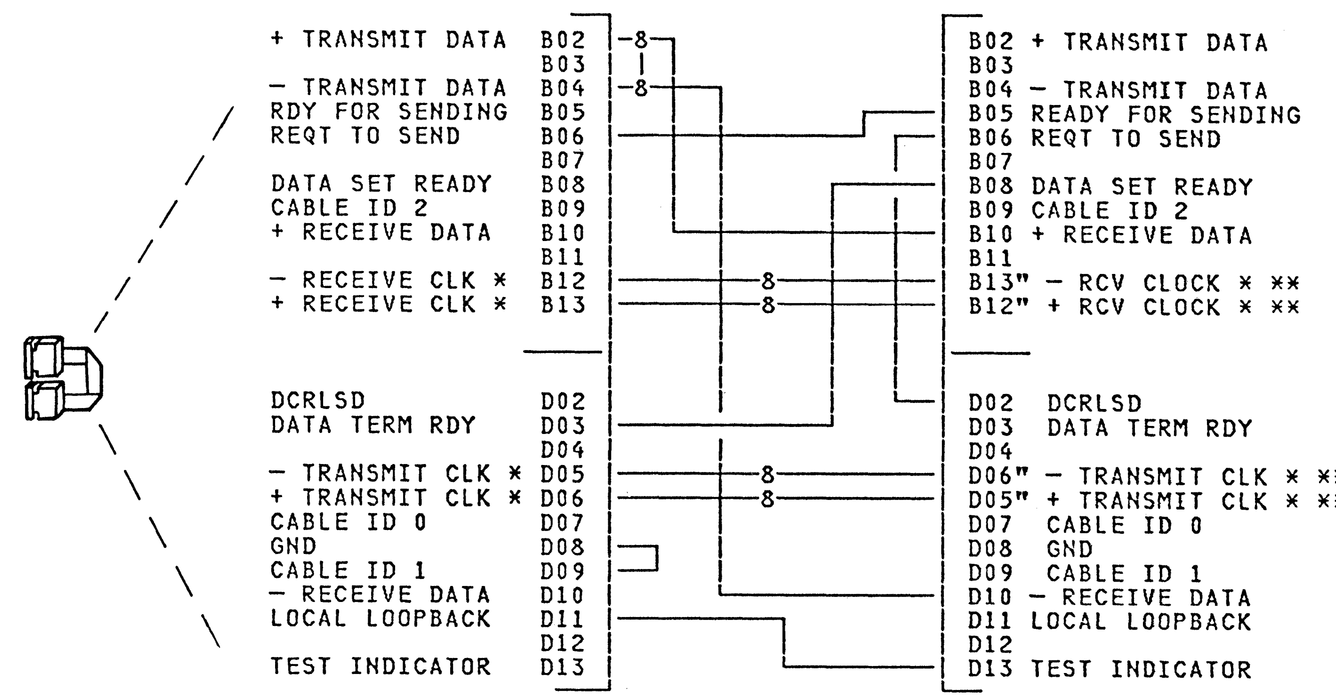
CABLE TO TERMINAL

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4931 (LIC3)	1	V.35 direct attachment	0088 0686	0088 0686	1733822 1733822	30 (100) 13.5 (45)	150(492) See note

Note:
For speeds greater or equal to 64 000 bps, the maximum cable length is 13.5 m (45 ft).

WRAP CABLE (PART 1733979)

| Install in (2) (sockets 1 and 2).



-8- = Twisted pair

This CE wrap cable is plugged between socket 1 and socket 2. Socket plugging is reversible. In order to fully test the LIC3 card, it is necessary to reverse the LIC3 wrap cable after a first test pass, then run the test again.

* Clocks are generated by socket 2 and received by socket 1. Other signals are identical in socket 1 and socket 2.

** Note that B12" and B13", D05" and D06" are respectively inverted in the wrap cable.

Pins B05, B06, and D02 are connected together after wrap cable installation.

| Note: To run QA or QB diagnostics on LIC 3 with wrap cable installed, manually enter CDF configuration as shown:

	C	I
Port 1	2	2
Port 2	0	2

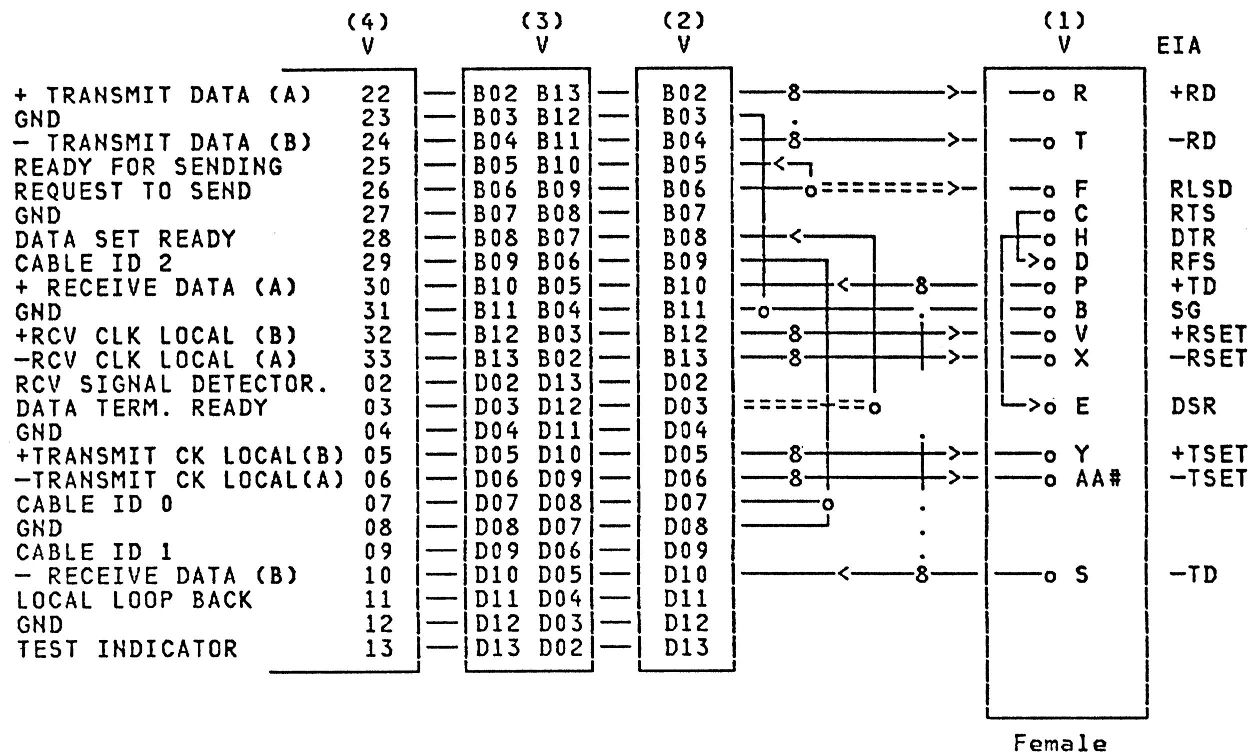
At the end of diagnostics, when the test is finished, restore the CDF to normal configuration as shown:

	C	I
Port 1	2	2
Port 2	0	0

LIC Type 3 Direct Attachment to Terminal (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.



Legend:

-8- Twisted pair
==- Shielded wire
->- Driver
-<- Receiver

CABLE ID SIGNALS

The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2)

2. Measure voltages at (3) (they should be in shaded areas)

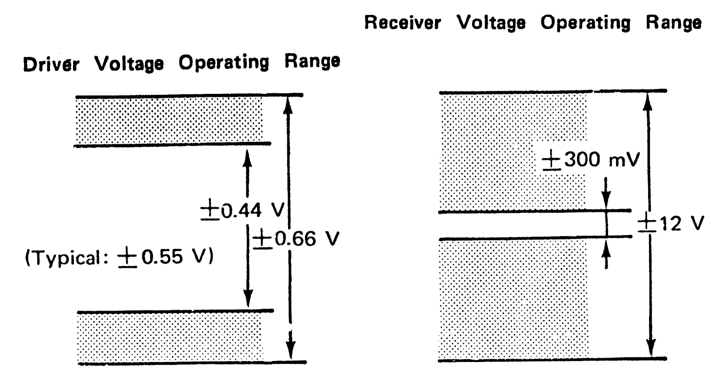
   a. Balanced circuits: Between wire A and wire B of the given signal for:

      ± Transmitted data

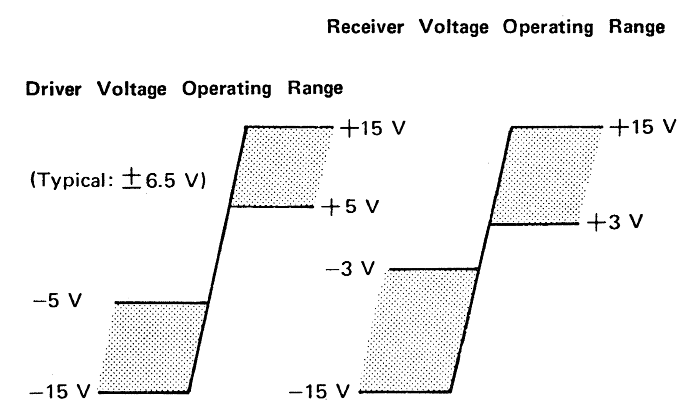
      ± Received data

      ± Receiver signal element timing

      ± Transmitter signal element timing

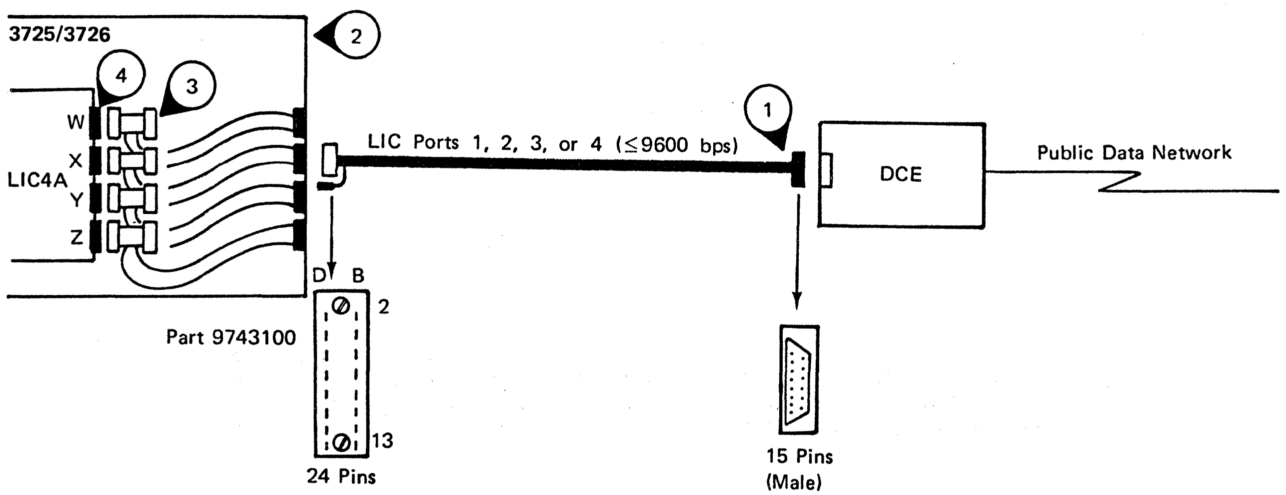


   b. Unbalanced circuits: Between signals and ground for other circuits



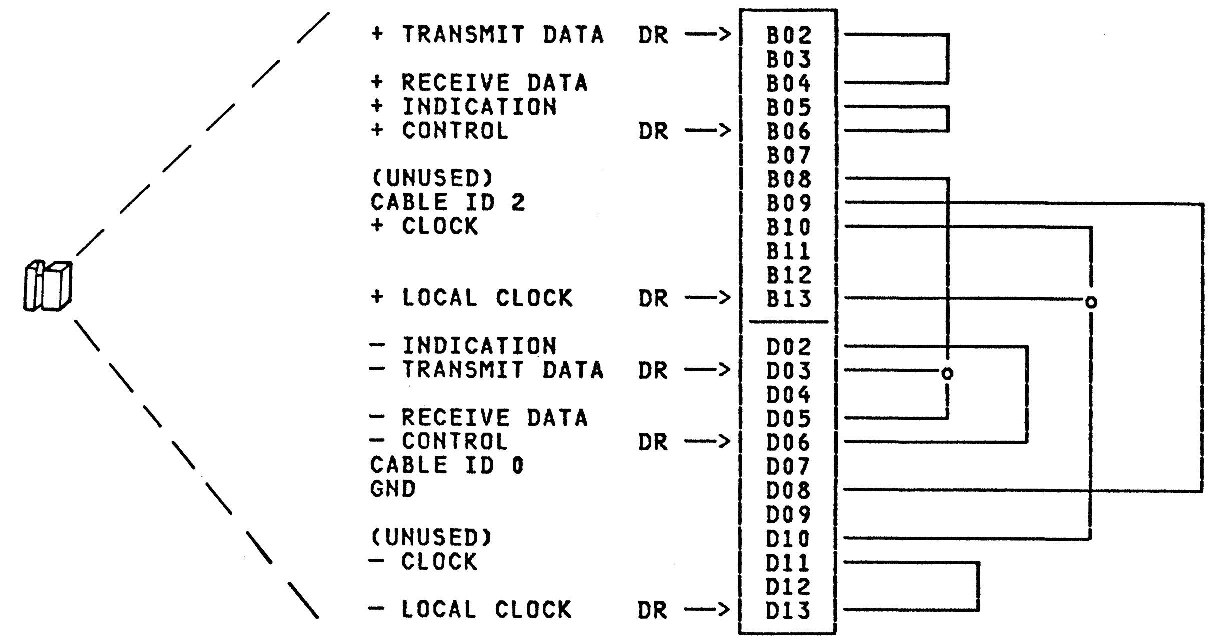
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

LIC Type 4A DCE Interface (Part 1 of 2)



WRAP BLOCK (PART 1733977)

Install in (2) (ports 1, 2, 3, or 4).



CABLE TO DCE

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4941 (LIC4A)	Up to 4	X.21 DCE	0089 0687	0089 0687	6081096 1733825	13.5 (45) 13.5 (45)	 150(492)

LIC Type 4A DCE Interface (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

```
                             (4)         (3)        (2)                           (1)
                              V           V          V                             V   CCITT
                         ---------   -----------  -------                      ---------
+ TRANSMIT DATA (A)       22   |--|B02  B13|--| B02  |--------8--------->|--o 2     |  +T
GND                       23   |--|B03  B12|--| B03  |-+        .            |         |
+ RECEIVE DATA (A)        24   |--|B04  B11|--| B04  |-+-----8--+<-----------|--o 4     |  +R
+ INDICATION (A)          25   |--|B05  B10|--| B05  |-+--8--+--+<-----------|--o 5     |  +I
+ CONTROL (A)             26   |--|B06  B09|--| B06  |-+--+--+--+--8-------->|--o 3     |  +C
GND                       27   |--|B07  B08|--| B07  |-o--+--+--+--+---------|--o 8     |   G
                          28   |--|B08  B07|--| B08  |    .  .  .  .         |         |
CABLE ID 2                29   |--|B09  B06|--| B09  |    .  .  .  .         |         |
+ CLOCK (A)               30   |--|B10  B05|--| B10  |----+--+--+<-+----8----|--o 6     |  +S
GND                       31   |--|B11  B04|--| B11  |    .  .  .  .    .    |         |
                          32   |--|B12  B03|--| B12  |    .  .  .  .    .    |         |
+ LOCAL CLOCK (A)         33   |--|B13  B02|--| B13  |    .  .  .  .    .    |         |
- INDICATION (B)          02   |--|D02  D13|--| D02  |----8--+--+<-+----+----|--o 12    |  -I
- TRANSMIT DATA (B)       03   |--|D03  D12|--| D03  |-------+--8--+----+--->|--o 9     |  -T
GND                       04   |--|D04  D11|--| D04  |       .     .    .    |         |
- RECEIVE DATA (B)        05   |--|D05  D10|--| D05  |-------8--<--+----+----|--o 11    |  -R
- CONTROL (B)             06   |--|D06  D09|--| D06  |-------------8----+--->|--o 10    |  -C
CABLE ID 0                07   |--|D07  D08|--| D07  |------+           .    |         |
GND                       08   |--|D08  D07|--| D08  |------+           .    |         |
CABLE ID 1                09   |--|D09  D06|--| D09  |                  .    |         |
                          10   |--|D10  D05|--| D10  |                  .    |         |
- CLOCK (B)               11   |--|D11  D04|--| D11  |-------------<----8----|--o 13    |  -S
GND                       12   |--|D12  D03|--| D12  |                       |         |
- LOCAL CLOCK (B)         13   |--|D13  D02|--| D13  |                       |         |
                         ---------   -----------  -------                      |         |
                                                                               ---------
                                                                                 Male
```

Legend:

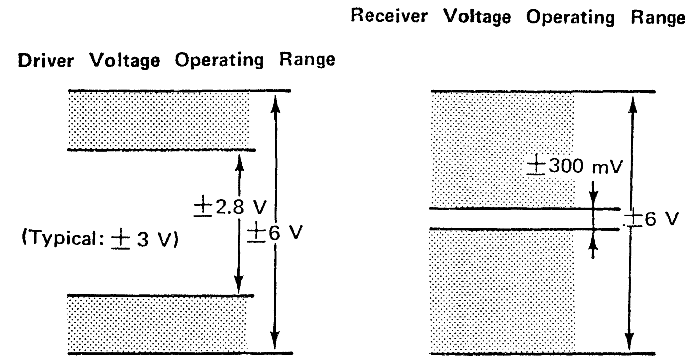
```
-8-    Twisted pair
->-    Driver
-<-    Receiver
```

CABLE ID SIGNALS

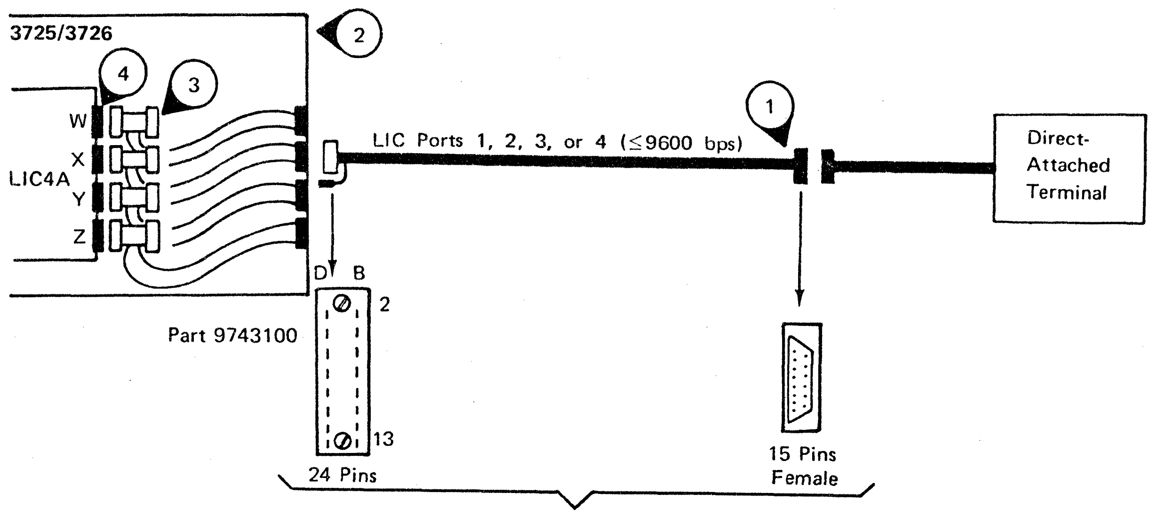
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between plus and minus wires of a given signal (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

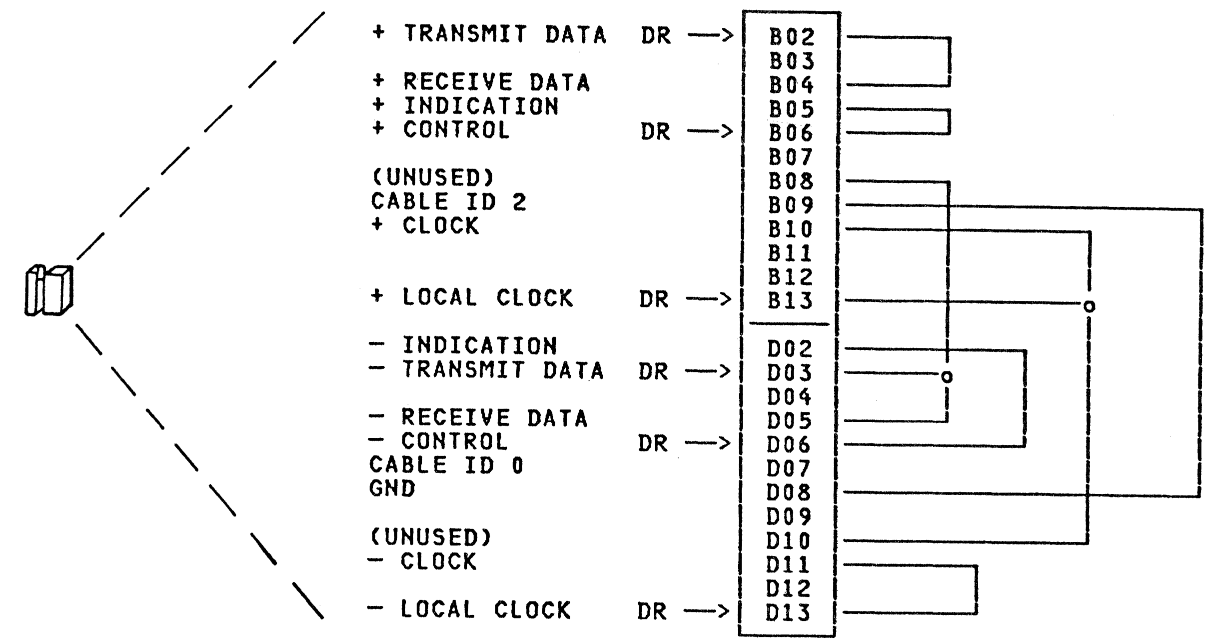


LIC Type 4A Direct Attachment to Terminal (Part 1 of 2)



WRAP BLOCK (PART 1733977)

Install in (2) (ports 1, 2, 3, or 4).



CABLE TO TERMINAL

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4941 (LIC4A)	Up to 4	X.21 direct attachment	0091 0688	0091 0688	6081097 2667352	30 (100) 30 (100)	See note

Note:
The maximum distance to meet the CCITT specifications is:

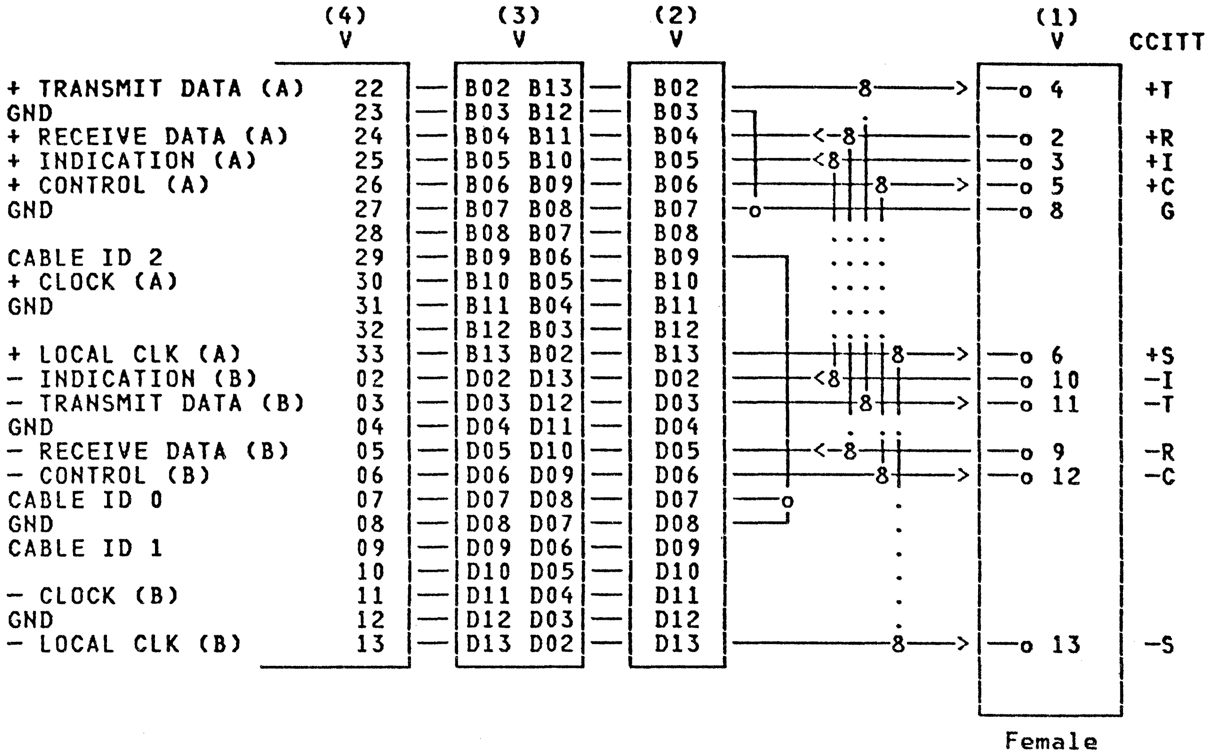
Up to 56 000 bps 150 m (492 ft)
Above 56 000 bps 60 m (197 ft)

However, if the terminal is a 3725, it operates correctly:

Up to 19 200 bps 600 m (1969 ft)
Above 19 200 bps 300 m (984 ft)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.



Legend:

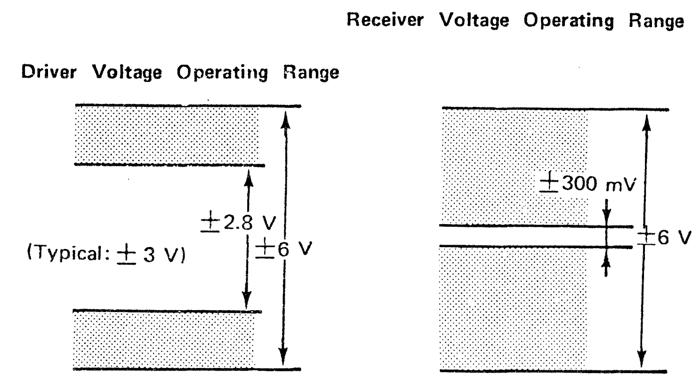
-8- Twisted pair
->- Driver
-<- Receiver

CABLE ID SIGNALS

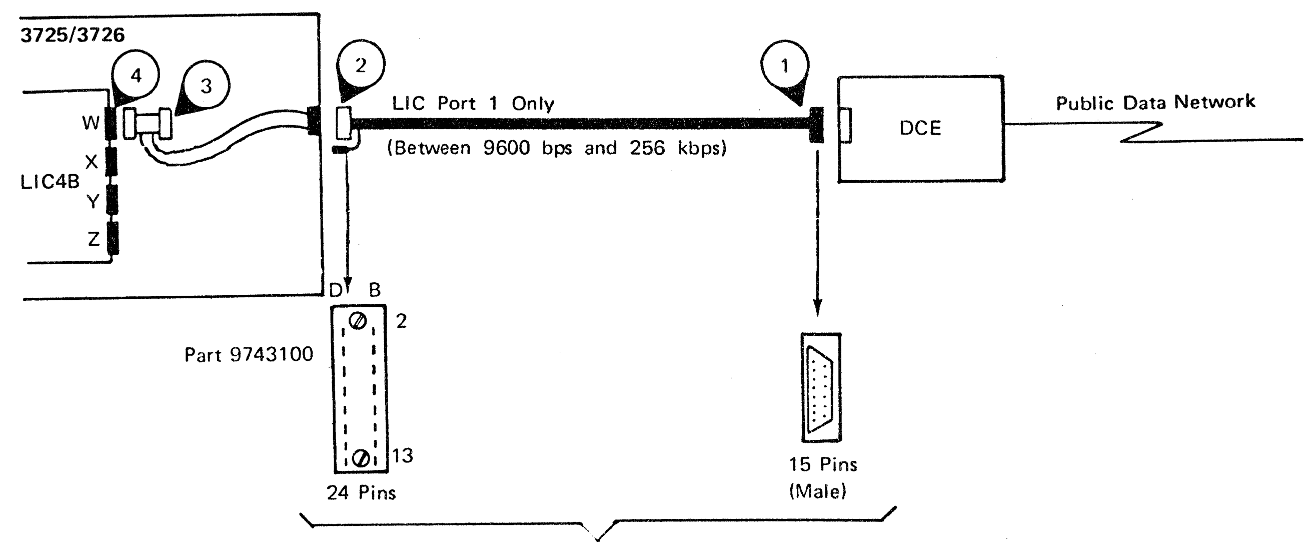
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between plus and minus wires of a given signal (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.



LIC Type 4B DCE interface (Except France) (Part 1 of 2)



CABLE TO DCE

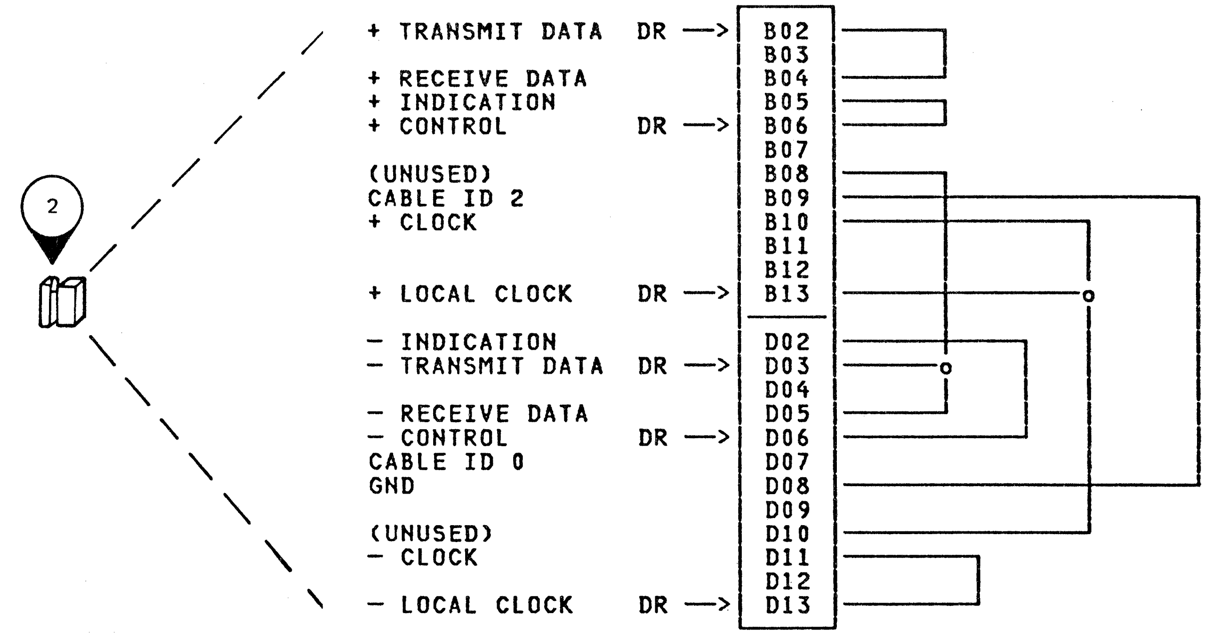
Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4942 (LIC4B)	1	X.21 DCE	0089 0687	0089 0687	6081096 1733825	13.5 (45) 13.5 (45)	See note

Note: The maximum length is:

150 m (492 ft) up to 56 kbps
60 m (197 ft) up to 128 kbps
30 m (98 ft) up to 256 kbps

WRAP BLOCK (PART 1733977)

Install in (2) (port 1 only).



LIC Type 4B DCE Interface (Except France) (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

```
                         (4)        (3)       (2)                        (1)
                          V          V         V                          V     CCITT
                      ________   _________   _____                      _______
+ TRANSMIT DATA (A)   22 |—|B02 B13|—| B02 |————————8————————>|—o 2  |  +T
GND                   23 |—|B03 B12|—| B03 |—┐                |      |
+ RECEIVE DATA (A)    24 |—|B04 B11|—| B04 |—┼——8——┼<—————————|—o 4  |  +R
+ INDICATION (A)      25 |—|B05 B10|—| B05 |—┼8——┼——<—————————|—o 5  |  +I
+ CONTROL (A)         26 |—|B06 B09|—| B06 |—┼—┼—┼——┼——8——————>|—o 3  |  +C
GND                   27 |—|B07 B08|—| B07 |-o—┼—┼——┼——┼——————|—o 8  |   G
                      28 |—|B08 B07|—| B08 |   . . . .        |      |
CABLE ID 2            29 |—|B09 B06|—| B09 |   : : : :        |      |
+ CLOCK (A)           30 |—|B10 B05|—| B10 |———┼—┼—┼——┼——8>   |—o 6  |  +S
GND                   31 |—|B11 B04|—| B11 |   . . . .   .    |      |
                      32 |—|B12 B03|—| B12 |   . . . .   .    |      |
+ LOCAL CLOCK (A)     33 |—|B13 B02|—| B13 |   : : : :   :    |      |
- INDICATION (B)      02 |—|D02 D13|—| D02 |——8—┼—┼<┼————┼————|—o 12 |  -I
- TRANSMIT DATA (B)   03 |—|D03 D12|—| D03 |————┼——8——┼———┼>  |—o 9  |  -T
GND                   04 |—|D04 D11|—| D04 |     .   .   .    |      |
- RECEIVE DATA (B)    05 |—|D05 D10|—| D05 |————8——<┼————┼————|—o 11 |  -R
- CONTROL (B)         06 |—|D06 D09|—| D06 |——————————8——┼>   |—o 10 |  -C
CABLE ID 0            07 |—|D07 D08|—| D07 |————┐        .    |      |
GND                   08 |—|D08 D07|—| D08 |————┘        .    |      |
CABLE ID 1            09 |—|D09 D06|—| D09 |             .    |      |
                      10 |—|D10 D05|—| D10 |             .    |      |
- CLOCK (B)           11 |—|D11 D04|—| D11 |————————<————8————|—o 13 |  -S
GND                   12 |—|D12 D03|—| D12 |                  |      |
- LOCAL CLOCK (B)     13 |—|D13 D02|—| D13 |                  |      |
                      ________   _________   _____            |      |
                                                              |______|
                                                                Male
```

Legend:

-8- Twisted pair
->- Driver
-<- Receiver

CABLE ID SIGNALS

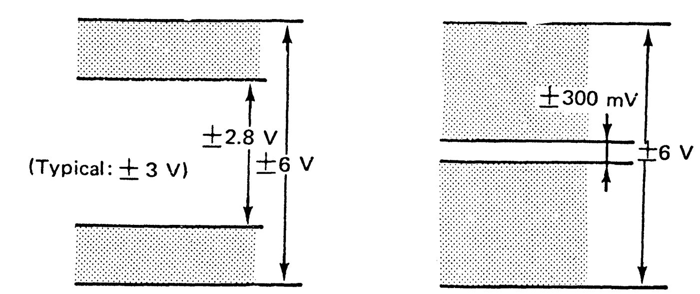
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

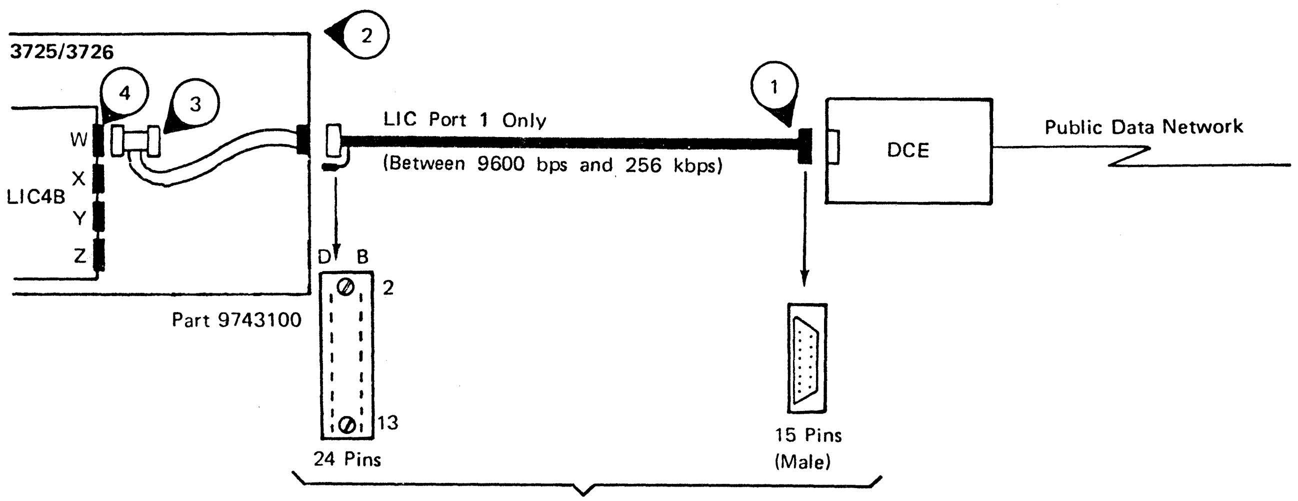
1. Install the wrap block in (2).
2. Measure voltages at (3) between plus and minus wires of a given signal (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

Driver Voltage Operating Range

Receiver Voltage Operating Range

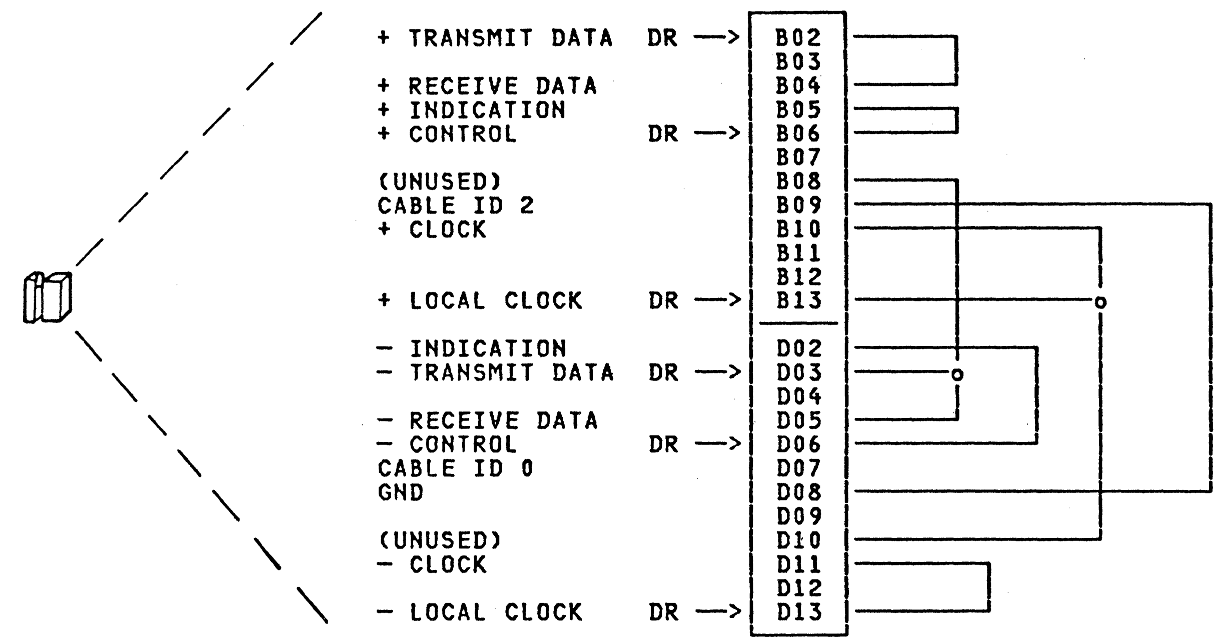


LIC Type 4B DCE Interface (France Only-Transmix) (Part 1 of 2)



WRAP BLOCK (PART 1733977)

Install in (2) (port 1 only).



CABLE TO DCE

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4942 (LIC4B)	1 1	X.21 DCE	0155 0155	0155 0155	4712548 2667777	13.5 (45) 30 (100)	 See note

<u>Note:</u> The maximum length is:

150 m (492 ft) up to 56 kbps
60 m (197 ft) up to 128 kbps
30 m (98 ft) up to 256 kbps

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.

	(4)	(3)	(2)	(1)	CCITT
+ TRANSMIT DATA (A)	22	B02 B13	B02	2	+T
GND	23	B03 B12	B03		
+ RECEIVE DATA (A)	24	B04 B11	B04	4	+R
+ INDICATION (A)	25	B05 B10	B05		
+ CONTROL (A)	26	B06 B09	B06		
GND	27	B07 B08	B07	8	G
	28	B08 B07	B08		
CABLE ID 2	29	B09 B06	B09		
+ CLOCK (A)	30	B10 B05	B10	6	+S
GND	31	B11 B04	B11		
	32	B12 B03	B12		
+ LOCAL CLK (A)	33	B13 B02	B13		
- INDICATION (B)	02	D02 D13	D02		
- TRANSMIT DATA (B)	03	D03 D12	D03	9	-T
GND	04	D04 D11	D04		
- RECEIVE DATA (B)	05	D05 D10	D05	11	-R
- CONTROL (B)	06	D06 D09	D06		
CABLE ID 0	07	D07 D08	D07		
GND	08	D08 D07	D08		
CABLE ID 1	09	D09 D06	D09		
	10	D10 D05	D10		
- CLOCK (B)	11	D11 D04	D11	13	-S
GND	12	D12 D03	D12		
- LOCAL CLK (B)	13	D13 D02	D13		

Male

Legend:

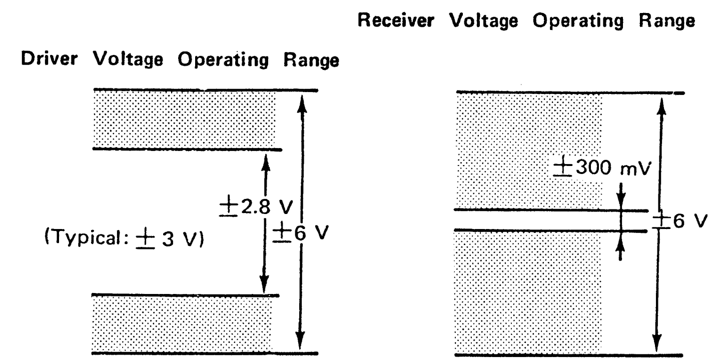
-8- Twisted pair
->- Driver
-<- Receiver

CABLE ID SIGNALS

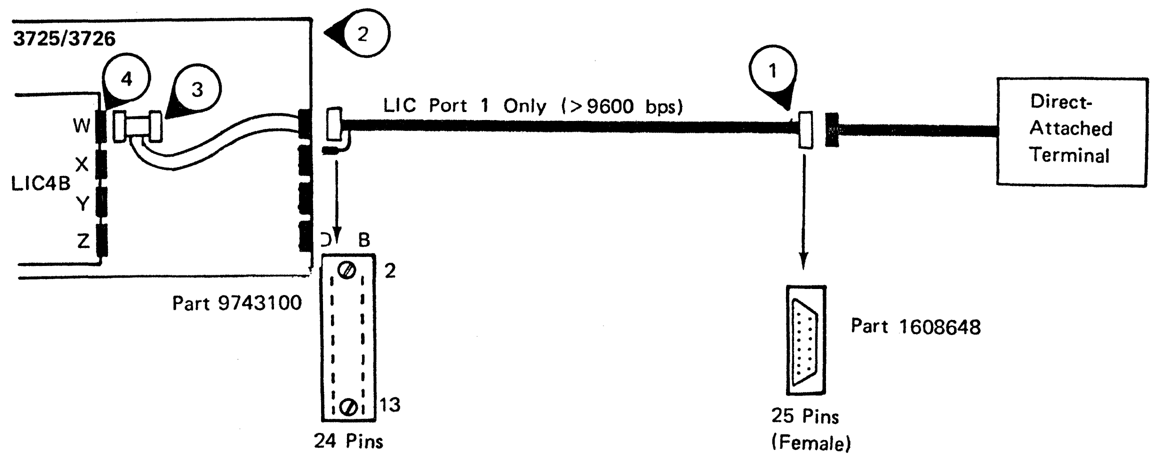
The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between plus and minus wires of a given signal (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.

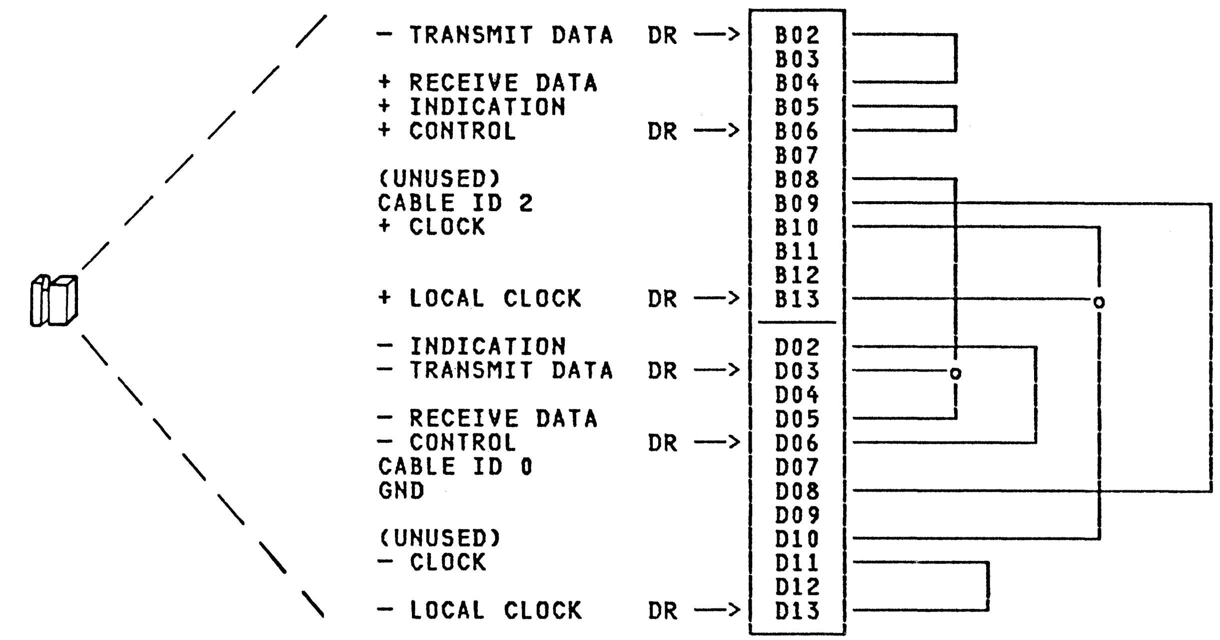


LIC Type 4B Direct Attachment to Terminal (Part 1 of 2)



WRAP BLOCK (PART 1733977)

Install in (2) (port 1 only).



CABLE TO TERMINAL

Feature Code	No of Lines	Coming From:	Cable Group	Key No.	Cable P/N	Length, m (ft) Standard	Maximum
4942 (LIC4B)	1	X.21 direct attachment	0091 0688	0091 0688	6081097 2667352	30 (100) 30 (100)	See note

Note:
The maximum distance to meet the CCITT specifications is:

Up to 56 000 bps	150 m (492 ft)
Above 56 000 bps	60 m (197 ft)

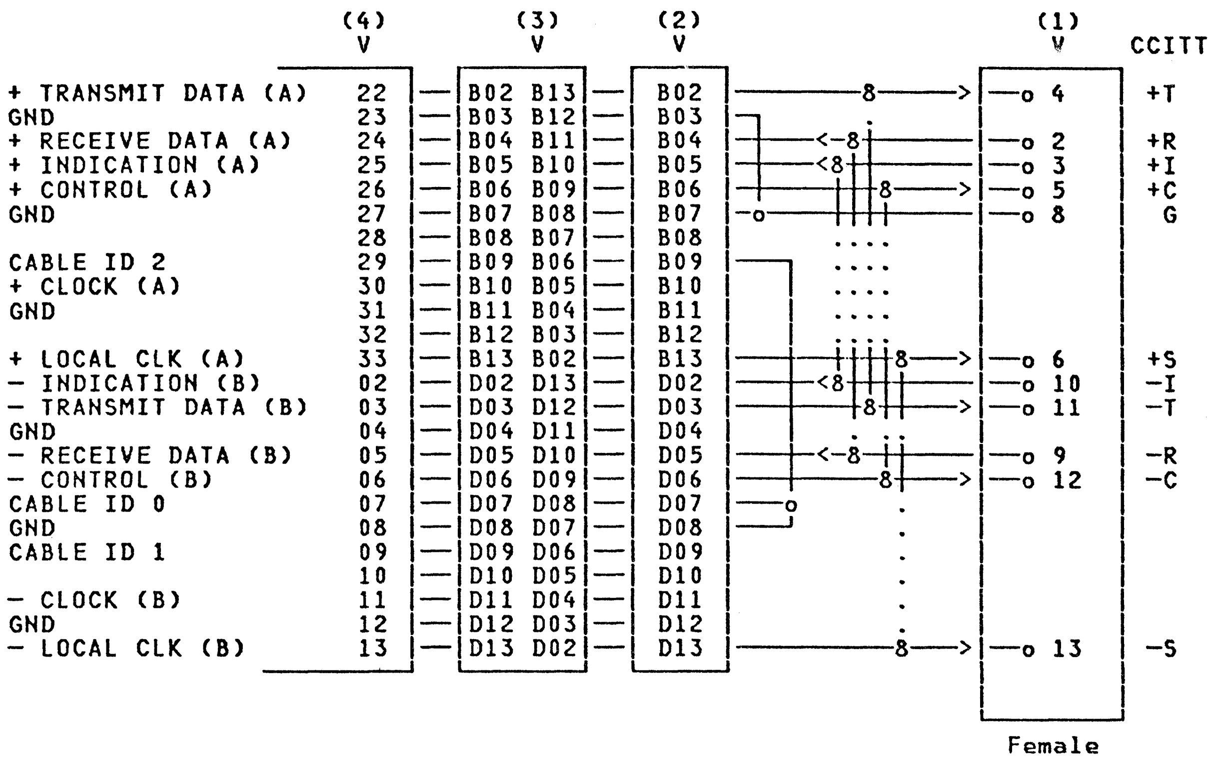
However, if the terminal is a 3725, it operates correctly:

Up to 19 200 bps	600 m (1969 ft)
Above 19 200 bps	300 m (984 ft)

LIC Type 4B Direct Attachment to Terminal (Part 2 of 2)

INTERCHANGE CIRCUITS

For physical layout, see page 4-130.



<u>Legend:</u>

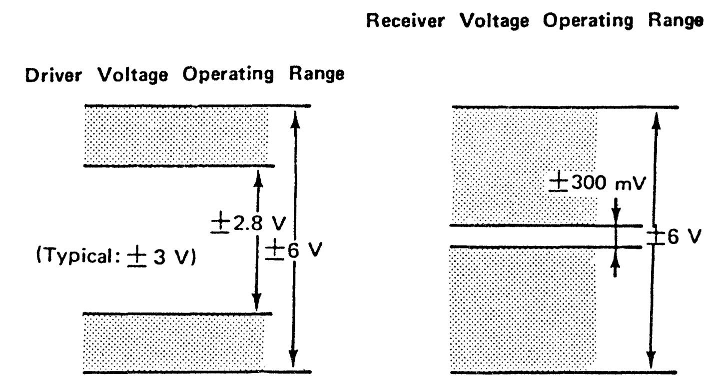
-8- Twisted pair
->- Driver
-<- Receiver

CABLE ID SIGNALS

The cable ID signals 0-2 indicate the cable attachment type to the scanner. They correspond to bits 3-5 of register 10 in the LIC. For a DCE attachment, 'cable ID0' is connected to ground; 'cable ID1' and 'cable ID2' are not connected.

VOLTAGE LEVELS

1. Install the wrap block in (2).
2. Measure voltages at (3) between plus and minus wires of a given circuit (they should be in shaded areas).
3. These voltage measurements apply only to the configuration with the wrap block installed. They are used to verify the correct operation of the 3725 circuitry. Measurements with other configurations may be different.



Jumpers

All machine configurations require jumpers for proper machine operation. In the text that follows, the word 'jumper' can define a card, a switch, a connecting block, or the usual jumper wire. The table (right) lists all jumpers in the communication controller and expansion. They are installed on:

- The pin side of boards
- The component side of cards
- The IOC bus cable end
- The power supplies
- The CADR cable end

For up-to-date jumper plugging information and part numbers, refer to the YZ pages of the 3725 Volume B01, and 3726 Volume A01.

Jumper	MD Vol. B01 Fr.01	Fr.02	Function	Quantity	When to Install	Part Number
LAB and CLAB						
YB socket	YZ161	YZ426	LAB and CLAB address	Up to 4 jumpers per board	MES or board replacement	816645
LIC socket	YZ201	YZ451	Direct attach clock (ICC feature present)	1 jumper per LIC	(Note 1)	1774335
CADR	YZ186	YZ436	Select out priority	3 jumpers per CA	Card replacement (Note 1)	2731801
			NSC address	Up to 9 jumpers per CA	Card replacement (Note 1)	2731801
CADRUK	YZ191	YZ441	Select out priority	3 jumpers per CA	Card replacement (Note 1)	2731801
			NSC address	Up to 9 jumpers per CA	Card replacement (Note 1)	2731801
CCIN	YZ206	YZ456	Lock/unlock NCP buffer	1 jumper	Card replacement (Note 1)	2731801
			Burst length control	2 jumpers per CA	Card replacement (Note 1)	2731801
CHIN	YZ196	YZ446	ESC address range	Up to 10 jumpers per CA	Card replacement (Note 1)	2731801
			Data in/out	1 jumper per CA	Card replacement (Note 1)	2731801
LIC type 4	YZ166	YZ431	Select type A or type B	4 jumpers per LIC	Card replacement (Note 1)	2731801
IOC bus end			Bus terminator (frame 01)	1 terminator card	MES or cable replacement	6081177
			Bus terminator (frame 02)	Up to 2 terminator cards	MES or cable replacement	6081177
Along IOC bus			Bus continuity plug	2 continuity plugs per LAB not installed	MES or cable replacement (Note 2)	1736670
Frame 01						
Power board 01R-A1ZA	YZ156		Frame 02 not installed	1 terminator card	MES (Notes 2 and 3)	2667338
5 volt block	YZ126		LAB pos 3 not installed	1 jumper	MES (Note 3)	2667338
Frame 02						
Power board 02J-A1F5	YZ411		CAB not installed	1 terminator card	MES (Note 3)	2667228
Power board 02J-A1A2			LAB pos 4 not installed	1 terminator card	MES (Note 3)	2667228
Power board 02J-A1A3			LAB pos 5 not installed	1 terminator card	MES (Note 3)	2667228
Power board 02J-A1A4			LAB pos 6 not installed	1 terminator card	MES (Note 3)	2667228
Power board 02J-A1A5			LAB pos 7 not installed	1 terminator card	MES (Note 3)	2667228
Power board 02J-A1YA			always present	1 terminator card	Power board replacement (Note 3)	2667228
Power board 02J-A1YB			LAB pos 8 not installed	1 terminator card	MES (Note 3)	2667228
CADR cable end			Bus continuity	1 jumper	CADR card replacement	4712553

MOSS board DAC, MMC, MPC (YZ171-181) For jumpers and modules replacement, see Chapter 5

Notes:

1. These jumpers are set at 3725/3726 installation time, for an MES installation, or on customer request.
2. Or for troubleshooting.
3. Or power board replacement.

LAB, CLAB, C2LB, C2LB2, AND CAB ADDRESS JUMPERS

The CLAB and LAB address jumpers are grouped on the board pin side of the YB socket.

```
     F|    E    |    D    |C
      |         |         |
---- A|E D C B A|E D C B A|E ------
     ___________________________
    | . . . . . . . . . . . . . | 06
 YB | . . . . . . . . . . . . . | 07  Row 1
    | . . . . . . . . . . . . . | 08
    |___________________________|
-----------------------------------
```

The CLAB1, C2LB, C2LB2, CLAB2, and CAB board addresses are set in the printed circuit of the board at the plant. No jumpers are changed in the field.

The LAB location in the machine determines its address. Address jumpers must be installed if a LAB board is added, relocated, and/or replaced.

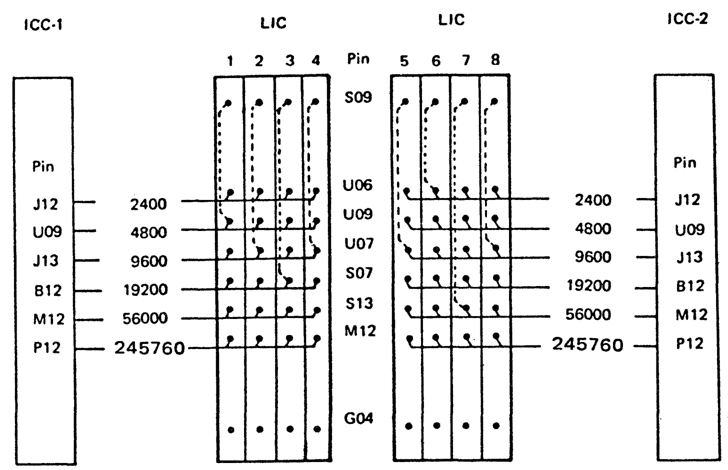
Use the following table to determine where to plug the LAB address jumpers (part 816645).

Board	E08 to E07	D08 to D07	C08 to C07	B08 to B07
LAB pos 3 01B-A1D1		X		
LAB pos 4 02A-A3D1	X	X		X
LAB pos 5 02A-A2D1			X	X
LAB pos 6 02A-A1D1	X		X	X
LAB pos 7 02B-A3D1		X	X	X
LAB pos 8 02B-A2D1	X	X	X	X

CLOCK SELECT JUMPER

3725/3726

This jumpering provides clock signals to terminals attached to the communication controller without modems (direct-attached terminals) or modems without clocks (up to 1200 bps). On the board, ICC position 1 distributes the clock signals to LIC positions 1 through 4, and ICC position 2 distributes clock signals to LIC positions 5 through 8. All the clock speeds are expressed in hertz.



3725 Model 2

On the C2LB and C2LB2 boards, ICC position 1 distributes the clock signals to LIC positions 1 through 4, and ICC position 2 distributes clock signals to LIC positions 5 and 6. All the clock speeds are expressed in hertz. LAB-3 board, has the same clock signal distribution than that of the 3725/3726.

BOARD C2LB

Board Location: 01A-A3

Card Part Numbers: See the ZZ pages

Card Location

Speed Selection

To locate a LIC card on a board, refer to page 4-061.

As supplied from the plant, LIC jumpers connect U07 to S09 and select the 9600-Hz clock for all LIC cards attached to the ICC cards. Change the jumpering only if a different speed in the range of the following table is required. If any of the four LIC cards attached to the ICC does not require a direct-attached line speed, the jumpers are overriden by the 3725 software. Nevertheless, these jumpers must remain installed for 9600 Hz to prevent diagnostic errors.

When the ICC card is not present, the diagnostic and wrap tests use the 480-Hz clock signal coming through the RDV card. This signal is connected to the LIC cards pin G04 with a printed circuit net (no jumpers required). This 480-Hz signal can be scoped on pin U04 of each LIC card (see page 5-053).

ICC Local Clock	ICC Clock Bus on LIC Card	LIC Input Clock Pin	Line Speed
2400 Hz	U06	S09	2400 bps
4800 Hz	U09	S09	4800 bps
9600 Hz*	U07*	S09*	9600 bps*
19200 Hz	S07	S09	19200 bps
56000 Hz	S13	S09	56000 bps
245760 Hz	M12	S09	245760 bps

* This is the factory setting.

Notes: At generation time the selected lines must be defined as "local attached. This jumper should not exceed a length of 42 mm (1 5/8 in.) to avoid electromagnetic radiation.

To select a clock for the lines attached to a LIC, plug a jumper from the ICC clock bus pin on the LIC card to the corresponding LIC input clock pin.

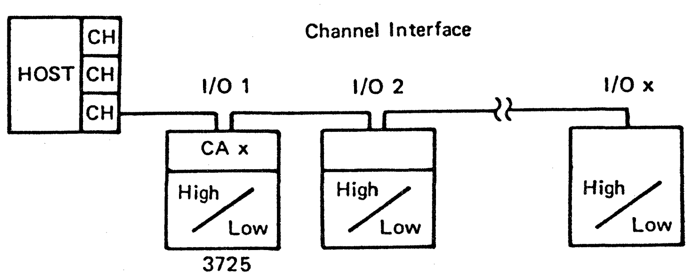
Jumpers Installed on Cards (Part 1 of 4)

For jumpers and modules required on DAC, MMC, TIC, and MPC cards, refer to Chapter 5.

SELECT OUT PRIORITY JUMPERS (ON CADR)

Control units attached to a host channel have high or low selection priority according to their sequential positions on the channel interface, and their jumpering. On the communication controller the select out priority jumpers are located on the CADR cards (see table below for CADR card locations).

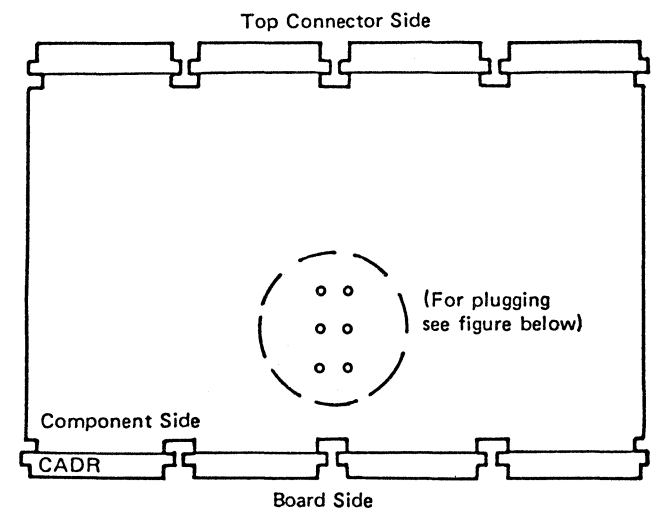
Warning: Do not pull out a CADR card, even if the communication controller is powered off, unless you are sure that the host system is not using the channel interface attached to the CADR. If the host system is using the channel interface, refer to the CADR replacement procedure in Chapter 5 before pulling out the CADR card.

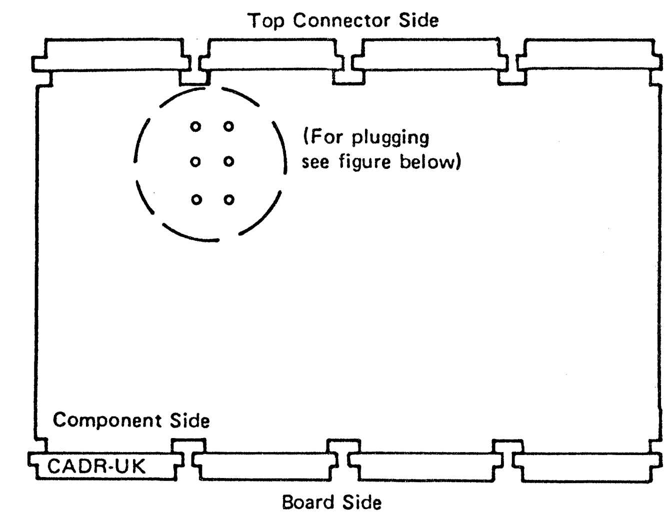


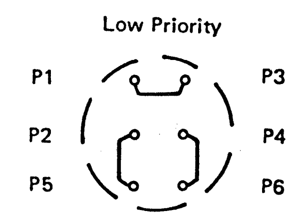
CA Card Location

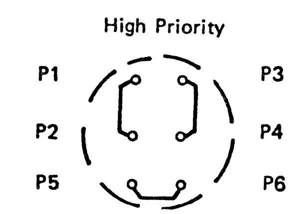
CA and TPS	CA I/F	Board Address	CADR	CHIN	CCIN	CVTL	Board Name
CA pos 1	1A	01A-A3	X2	V2	U2	T2	C2LB
CA pos 2	2A		W2	S2	R2	Q2	
CA pos 3	3A	01B-A2	B2	F2	E2	D2	C2LB2
CA pos 4	4A		C2	J2	H2	G2	
CA pos 1	1A	01A-A3	X2	V2	U2	T2	CLAB1
TPS pos 1	1B		W2				
CA pos 2	2A	01B-A2	B2	F2	E2	D2	CLAB2
TPS pos 2	2B		C2				
CA pos 3	3A	02C-A1	W2	U2	T2	S2	CAB
TPS pos 3	3B		V2				
CA pos 4	4A	02C-A1	R2	P2	N2	M2	CAB
TPS pos 4	4B		Q2				
CA pos 5	5A	02C-A1	L2	K2	J2	H2	CAB
CA pos 6	6A	02C-A1	G2	F2	E2	D2	CAB

Determine with the customer the selection priority for every channel adapter in the communication controller, and plug the jumpers (part 2731801) as indicated below:









NSC ADDRESS JUMPERS (ON CADR)

Channel adapter addresses are required on two separate occasions:

- At initial selection, the channel adapter must be able to recognize the address presented to it.
- At control unit initiated selection sequence (request in), the channel adapter must present a valid address to the channel before it can transfer data or status information.

Obtain from the user the NSC addresses for the channel adapters present on the machine.

The NSC address may be set to any value in the range 0 through 255. If the two-processor switch is installed on a channel, the two interfaces (A and B) are assigned separately, and may be either the same or different NSC addresses.

The ESC addresses are located on the CHIN card. Refer to page 4-280 for CHIN card locations and page 4-282 for plugging.

The NSC address jumpers are located on the CADR cards.

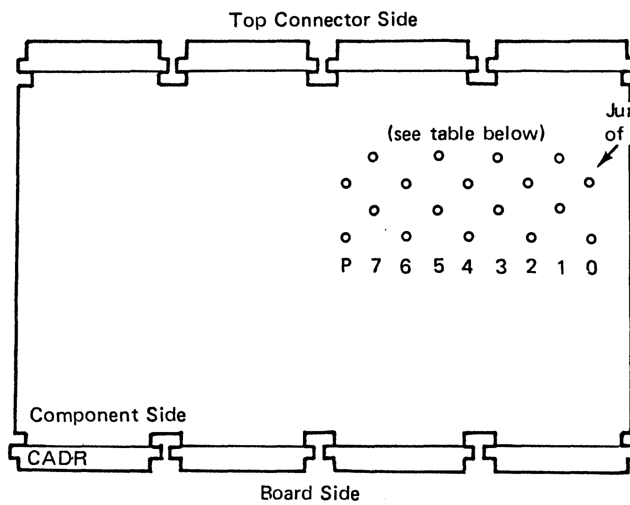
Refer to page 4-280 for CADR card locations.

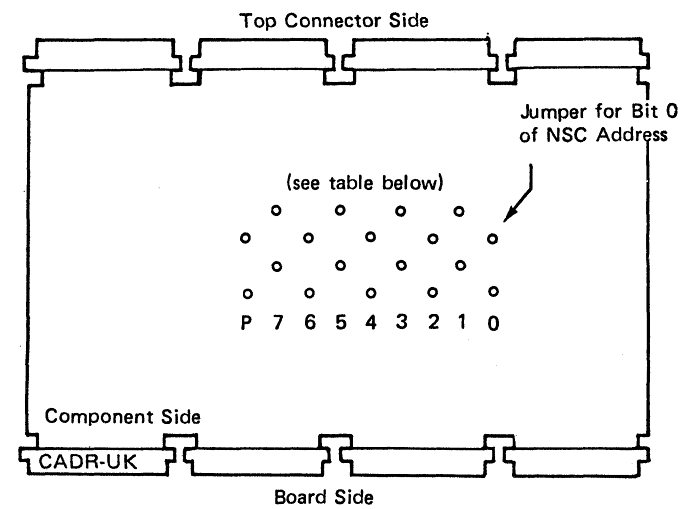
Notes:

1. If emulation is not required, ESC address jumpers must be plugged to low = X'C0' and high = X'53'.
2. The address assigned for the NSC may be one of the addresses in the range of addresses assigned to the ESC. In this case, however, the NSC address cannot be used for the ESC.

Warning: Do not pull out a CADR card, even if the communication controller is powered off, unless you are sure that the host system is not using this channel interface. If the host system is using the channel interface, refer to the CADR replacement procedure in Chapter 5 before pulling out the CADR card.

Set the NSC address jumpers (part 2731801) as follows. A jumper in place forces the corresponding NSC address bit value to 1. After the address bit jumpers have been set, place a jumper on the P position to have an odd total number of jumpers.





Examples

Address Bit	0	1	2	3	4	5	6	7	P
A3	1	0	1	0	0	0	1	1	1
0E	0	0	0	0	1	1	1	0	0

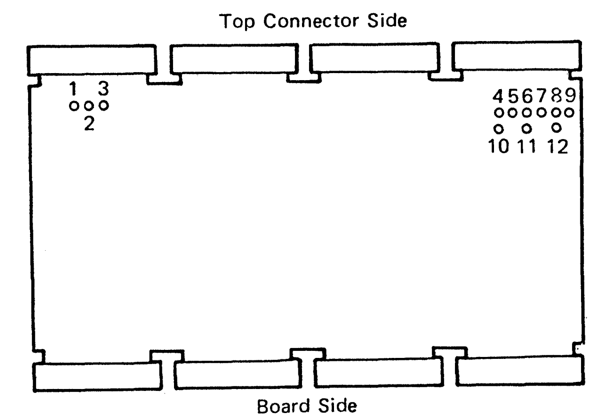
Note: Insert jumper for 1, remove it for 0.

LIC TYPE 4A, 4B JUMPERS

To change from LIC 4A to LIC 4B or conversely, move jumpers as shown below (jumper part 2731801).

Notes:

1. LIC type 4A is for speeds up to 9600 bps.
   The card is not wide-band and provides four ports.
2. LIC type 4B is for speeds above 9600 bps.
   The card is wide-band and provides one port only.



FOR CARD P/N 8610093 (OLD)

LIC Type	Jumper Positions							
	1-2	2-3	4-5	4-10	6-7	6-11	8-9	8-12
4A	X		X		X		X	
4B		X		X		X		X

FOR CARD P/N 8610994 (NEW)

LIC Type	Jumper Positions							
	1-2	2-3	4-5	4-10	6-7	6-11	8-9	8-12
4A	X		NA		NA		NA	
4B		X		NA		NA		NA

Jumpers Installed on Cards (Part 3 of 4)

ESC ADDRESS RANGE JUMPERS (ON CHIN)

The ESC device addresses must form a group of consecutive addresses. The lowest address in the group may be set to 0, or to any multiple of 16 from 16 to 240. The highest address in the group may be set to one of the values 4n-1, where n is any number from 1 through 64, that is, from 3 to 255 by steps of 4.

For example:

```
   High address limit <----- 255 (X'FF')
                             |
                         --- 251 (X'FB')
                             |
                         --- 247 (X'F7')
               .             |
               .   ----------- 243 (X'F3')
               .       A     |
               .       |     |
               .    Example  |
               A      of     V
               |    valid    .
               |    range    .
               |      |      .
               |      V      .
48 (X'30') -----------       .
               |
32 (X'20') ---
               |
16 (X'10') ---
               |
00 (X'00') -----> Low address limit
```

The plugging of the corresponding low and high addresses for the above example (address range X'30' through X'F3') is as follows:

```
| 0 0 1 1 0 0 0 0 | 1 1 1 1 0 0 1 1 |
  0             7   0             7
|<-low address->| <high address->|
     48 = X'30'       243 = X'F3'
```

If the two-processor switch is installed, only NSC addresses are used, either in native or in partitioned mode.

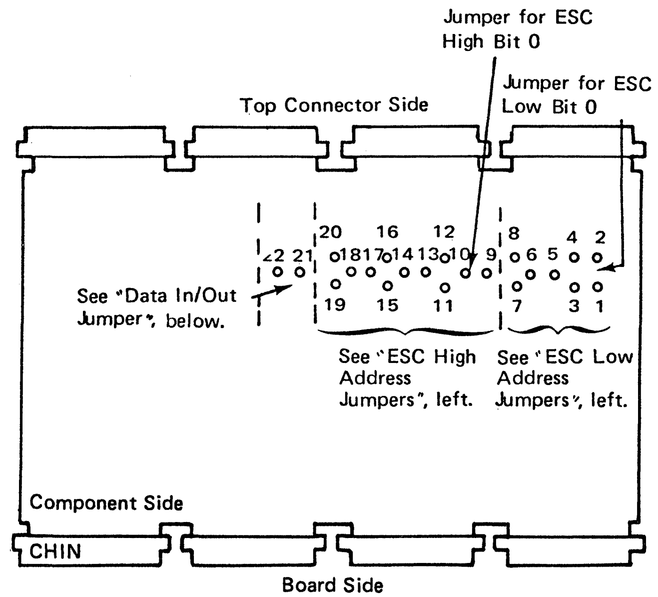
Obtain from the user the ESC address range for the channel adapters present on the machine.

The ESC address range jumpers are located on the CHIN cards. A jumper in place forces the ESC address bit value 1.

Refer to page 4-280 for CHIN card locations.

Set the ESC address range jumpers (part 2731801) as follows:

Note: In NCP mode only, ESC address jumpers must be plugged to low = X'C0' and high = X'53'.



ESC Low Address Jumpers

Low Channel Address		Pin on CHIN Card			
Hex	Dec	1-2	3-4	5-6	7-8
00	00	—	—	—	—
10	16	—	—	—	Jumper
20	32	—	—	Jumper	—
30	48	—	—	Jumper	Jumper
40	64	—	Jumper	—	—
50	80	—	Jumper	—	Jumper
60	96	—	Jumper	Jumper	—
70	112	—	Jumper	Jumper	Jumper
80	128	Jumper	—	—	—
90	144	Jumper	—	—	Jumper
A0	160	Jumper	—	Jumper	—
B0	176	Jumper	—	Jumper	Jumper
C0	192	Jumper	Jumper	—	—
D0	208	Jumper	Jumper	—	Jumper
E0	224	Jumper	Jumper	Jumper	—
F0	240	Jumper	Jumper	Jumper	Jumper

Legend:

— : No jumper
Jumper : Part 2731801

ESC High Address Jumpers

High Channel Address		Pin on CHIN Card					
Hex	Dec	9-10	11-12	13-14	15-16	17-18	19-20
03	3	—	—	—	—	—	—
07	7	—	—	—	—	—	Jumper
0B	11	—	—	—	—	Jumper	—
0F	15	—	—	—	—	Jumper	Jumper
13	19	—	—	—	Jumper	—	—
17	23	—	—	—	Jumper	—	Jumper
1B	27	—	—	—	Jumper	Jumper	—
1F	31	—	—	—	Jumper	Jumper	Jumper
23	35	—	—	Jumper	—	—	—
27	39	—	—	Jumper	—	—	Jumper
2B	43	—	—	Jumper	—	Jumper	—
2F	47	—	—	Jumper	—	Jumper	Jumper
33	51	—	—	Jumper	Jumper	—	—
37	55	—	—	Jumper	Jumper	—	Jumper
3B	59	—	—	Jumper	Jumper	Jumper	—
3F	63	—	—	Jumper	Jumper	Jumper	Jumper
43	67	—	Jumper	—	—	—	—
47	71	—	Jumper	—	—	—	Jumper
4B	75	—	Jumper	—	—	Jumper	—
4F	79	—	Jumper	—	—	Jumper	Jumper
53	83	—	Jumper	—	Jumper	—	—
57	87	—	Jumper	—	Jumper	—	Jumper
5B	91	—	Jumper	—	Jumper	Jumper	—
5F	95	—	Jumper	—	Jumper	Jumper	Jumper
63	99	—	Jumper	Jumper	—	—	—
67	103	—	Jumper	Jumper	—	—	Jumper
6B	107	—	Jumper	Jumper	—	Jumper	—
6F	111	—	Jumper	Jumper	—	Jumper	Jumper
73	115	—	Jumper	Jumper	Jumper	—	—
77	119	—	Jumper	Jumper	Jumper	—	Jumper
7B	123	—	Jumper	Jumper	Jumper	Jumper	—
7F	127	—	Jumper	Jumper	Jumper	Jumper	Jumper
83	131	Jumper	—	—	—	—	—
87	135	Jumper	—	—	—	—	Jumper
8B	139	Jumper	—	—	—	Jumper	—
8F	143	Jumper	—	—	—	Jumper	Jumper
93	147	Jumper	—	—	Jumper	—	—
97	151	Jumper	—	—	Jumper	—	Jumper
9B	155	Jumper	—	—	Jumper	Jumper	—
9F	159	Jumper	—	—	Jumper	Jumper	Jumper
A3	163	Jumper	—	Jumper	—	—	—
A7	167	Jumper	—	Jumper	—	—	Jumper
AB	171	Jumper	—	Jumper	—	Jumper	—
AF	175	Jumper	—	Jumper	—	Jumper	Jumper
B3	179	Jumper	—	Jumper	Jumper	—	—
B7	183	Jumper	—	Jumper	Jumper	—	Jumper
BB	187	Jumper	—	Jumper	Jumper	Jumper	—
BF	191	Jumper	—	Jumper	Jumper	Jumper	Jumper
C3	195	Jumper	Jumper	—	—	—	—
C7	299	Jumper	Jumper	—	—	—	Jumper
CB	203	Jumper	Jumper	—	—	Jumper	—
CF	207	Jumper	Jumper	—	—	Jumper	Jumper
D3	211	Jumper	Jumper	—	Jumper	—	—
D7	215	Jumper	Jumper	—	Jumper	—	Jumper
DB	219	Jumper	Jumper	—	Jumper	Jumper	—
DF	223	Jumper	Jumper	—	Jumper	Jumper	Jumper
E3	227	Jumper	Jumper	Jumper	—	—	—
E7	231	Jumper	Jumper	Jumper	—	—	Jumper
EB	235	Jumper	Jumper	Jumper	—	Jumper	—
EF	239	Jumper	Jumper	Jumper	—	Jumper	Jumper
F3	243	Jumper	Jumper	Jumper	Jumper	—	—
F7	247	Jumper	Jumper	Jumper	Jumper	—	Jumper
FB	251	Jumper	Jumper	Jumper	Jumper	Jumper	—
FF	255	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper

Legend:

— : No jumper
Jumper : Part 2731801

Data In/Data Out Jumper (on CHIN)

Remove jumper 21 to 22 if 'Data In/Data Out' feature is available on all host channel interfaces attached to this channel adapter.

Leave this jumper installed in all other cases.

'Data In/Data Out' fully available	Pins 21-22 on CHIN card
Yes	------
No	Jumper

Legend:

------: No jumper
Jumper: Part 2731801

CPU Type (S/370)	Data In/Data Out Support (X)	
	Byte Channel	Block or Selector Channel
148		X
158		X
303X		X
308X	X	X
4321	X	X
4331	X	X
4341	X	X
4361	X	X
4381	X	X

1. All interconnecting interface cables must be capable of handling 'Data In/Data Out.'
2. All control units on the channel must also pass 'Data In/Data Out.'
3. Channel interface cable terminators type 370 must be used.
4. All possible alternate channel paths to the 3725 must meet the preceding conditions.

Jumpers Installed on Cards (Part 4 of 4)

BURST LENGTH (ON CCIN)

Number of Bytes in Buffer	Jumper 4-5	6-7
8	1	1
16	0	1
32	1	0
64	0	0

The CCIN card controls the burst mode data transfer operation for a channel adapter attached to a host byte multiplexor channel. This transfer operation is automatically overridden if the channel adapter is attached to a block multiplex or selector channel.

The CCIN card controls the length of the data burst to the host. The number of bytes that can be transferred on the byte multiplex channel without dropping the 'operational in' tag is equal to 8, 16, 32, or 64 bytes, depending upon the host system.

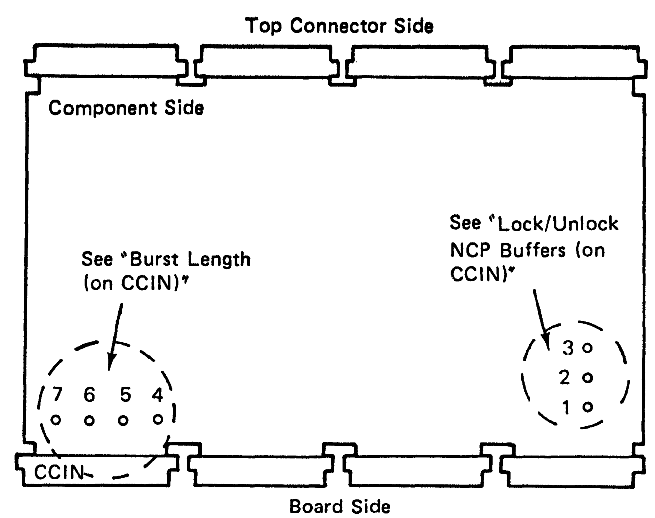
Notes:

1. If no devices other than 3725s or devices that cannot be overrun (for example, all buffered devices, 3705 or 3725 with NCP) are attached to the byte multiplex channel, set the byte length to 64 for EP and PEP; for NCP there is no limitation.

2. If devices that can be overrun are attached to the byte multiplex channel, set the burst length jumpers for maximum throughput, depending on the type of host, as follows:

System Type	Burst Length
S/370: 3115, 3125, 3155, 3158, 4331, 4361.	8 bytes
S/370: 4341, 4381.	16 bytes
S/370: 2870B, 3031, 3032, 3033, 308X, 3135, 3138, 3145, 3148.	32 bytes

Note: If the system type is not in the above table, set the burst length to 8.



LOCK/UNLOCK NCP BUFFERS (ON CCIN)

Jumper	1-2	2-3
NCP burst control		X
Burst length control	X	

Notes:

1. Jumper on 2-3 overrides the burst length jumper setting of positions 4 through 7, and forces the burst length to 255.

2. Jumper on 1-2 enables the burst length jumper setting of positions 4 through 7, setting the burst length to 8, 16, 32, or 64 bytes.

Jumpers on IOC Bus

IOC BUS TERMINATOR JUMPERS

The plugging position of the terminator cards (BUSTERM) depends on the boards that are installed. Check the plugging using the following tables and refer to pages 4-070, 4-090, and 4-091). IOC bus routing and location.

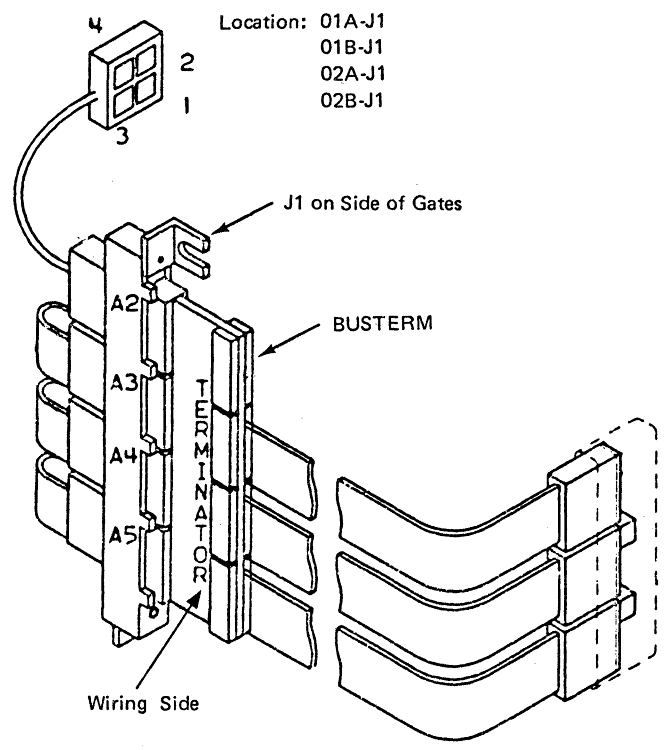
Plug the primary IOC bus terminator card in:	When:
01A-J1	Single-frame machine (Model 2 only)
01B-J1	Single-frame machine (Model 1 and Model 2)
02C-J1	Two-frame machine

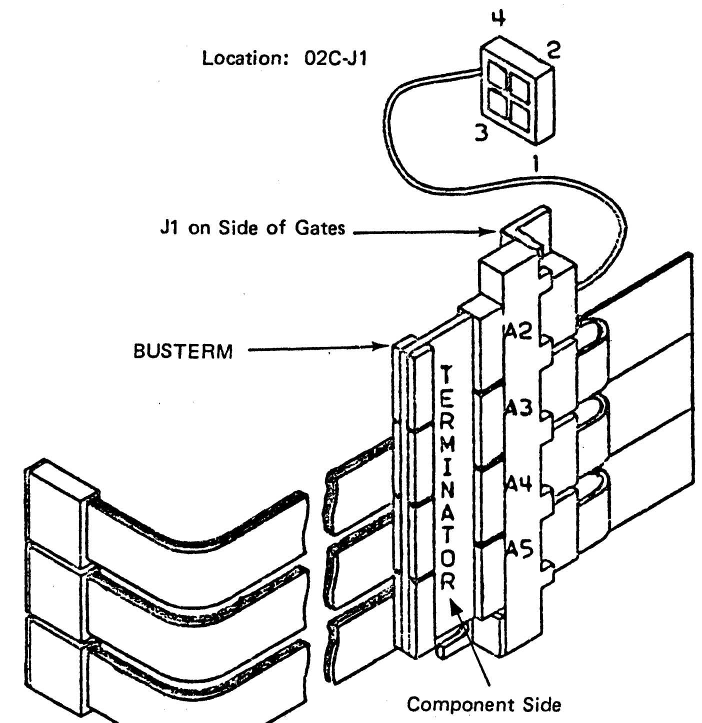
Plug the secondary bus terminator card in:	When:
02A-J1	Gate 02A installed and gate 02B not installed
02B-J1	Gate 02B installed

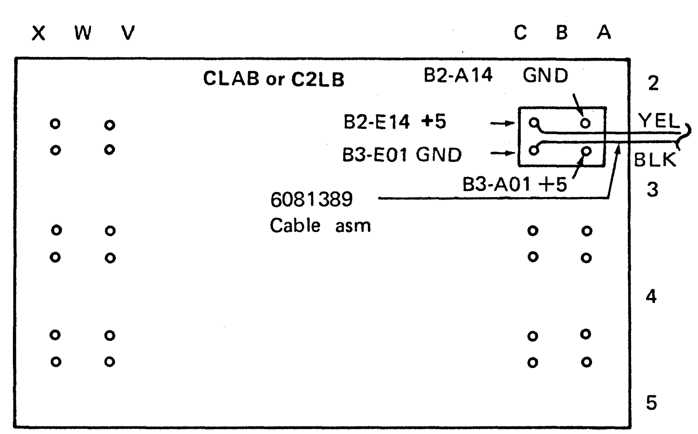
The terminator card needs dc voltages. When moving BUSTERM, ensure that the new socket position on the board has its power cable plugged into J1A2. If not, move the power cable to the new BUSTERM location too. Connect the other end of the power cable to the board pin side, according to the following table:

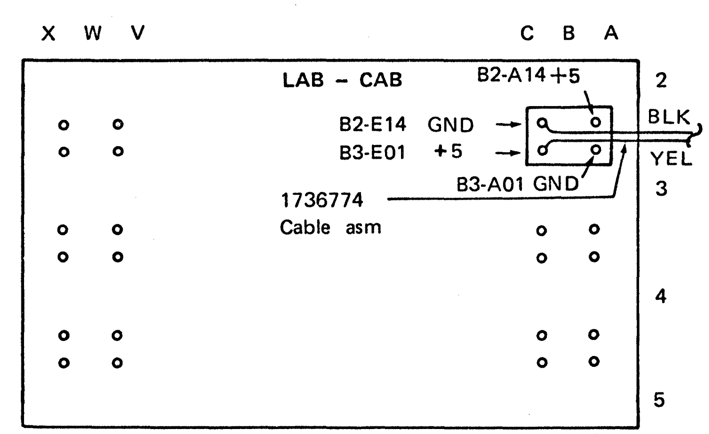
Part 6081389 CLAB1 or C2LB CLAB2 or C2LB2	Part 1736774 CAB LAB	Voltage	Wire Color
B2-E14 B3-E01	B3-E01 B2-E14	+5 0	Yellow Black

Warning: Interchanging of the cable types, or incorrect plugging of the voltage connector will burn the voltage land pattern on the BUSTERM card.









IOC BUS CONTINUITY PLUGS

When a board is not installed on the IOC bus, three jumper plugs (part 1736670) are required for signal continuity.

Connect these plugs in the place of the missing RDV card as shown. A continuity plug connects:

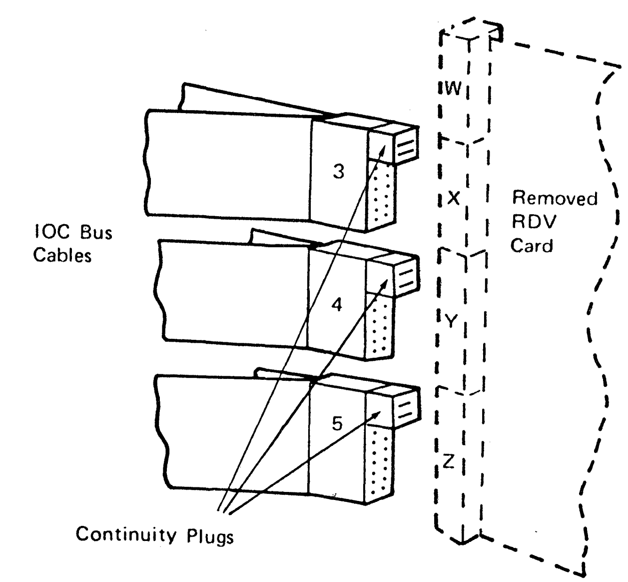
Cable position 3 : (plug present but not used)

Cable position 4 : Pin B02 to D02
Pin B03 to D03

Cable position 5 : Pin B02 to D02
Pin B03 to D03

The following signals are propagated:

- Cycle steal grant high
- Cycle steal grant low
- Allow poll response
- Select out



Power Jumpers

POWER TERMINATOR CARDS

Frame 01

Terminator cards in the power boards tie down the sense signals for features that are not present on the 3725/3726. You should not attempt to sense these features. When a power supply is added the corresponding power cable replaces the terminator card. The terminator card connects together the pins of the power board socket as indicated in the various tables. No manual jumpering is necessary on the card.

Terminator Card 01R-A1ZA (Part 2667338)

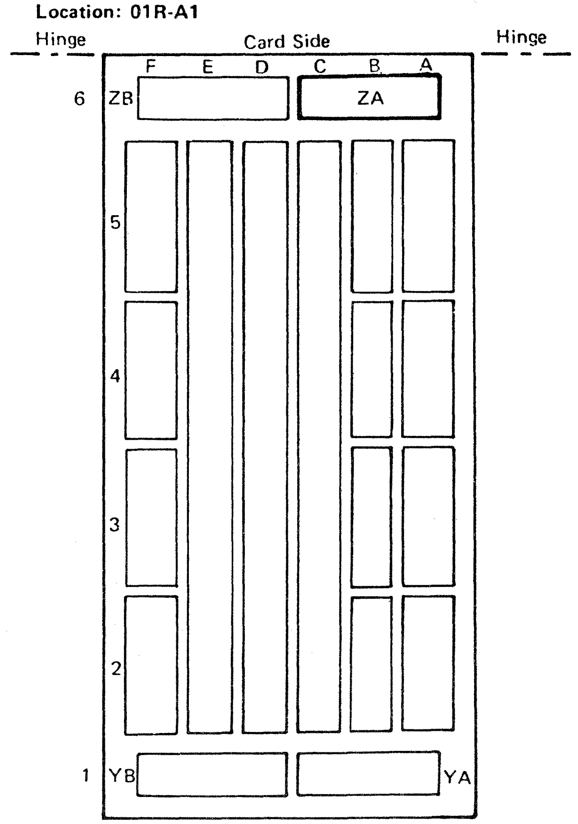
Pin	Signal	Wiring
D05	Expansion 1-Fault	------+
B05	Expansion 2 Fault	------|
D08	Ground	------+

For the 3725 Model 2, a terminator card is installed in position 01R-F3.

Plug the terminator card in position 01R-A1-ZA when there is no expansion frame 02.

3725: PWB1

Location: 01R-A1



Note:

PWB1 board is shown in the open position.

Frame 02

The terminator cards on the power board in frame 02 all have the same part number. The wire that is active depends on the terminal block position on the board. See the tables below:

Terminator Card 02J-A1A3, A4, YA, YB (Part 2667228)

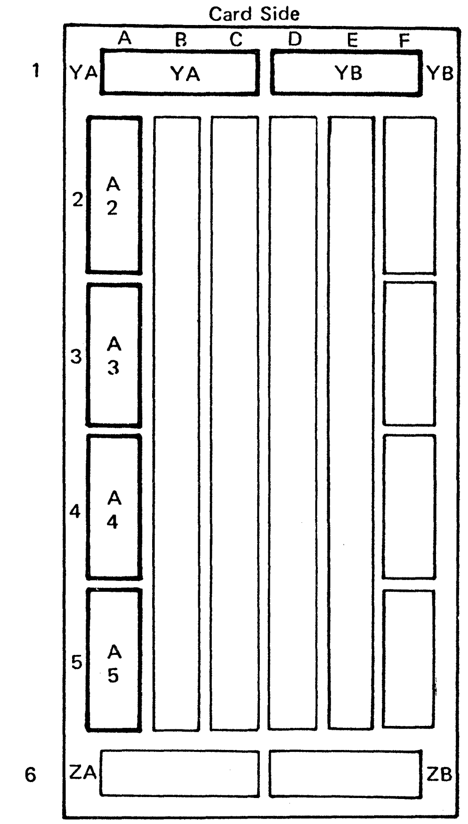
Pin	Signal	Wiring
D05	+5 volts sense	------+
D06	+5 volts LAB Sense	------|
D07	+5 volts undervoltage	------|
D08	Ground	------+

Terminator Card 02J-A1A2, A5 (Part 2667228)

Pin	Signal	Wiring
B02	+5 volts sense	------+
B03	+5 volts LAB sense	------|
B04	+5 volts undervoltage	------|
D02	+12 PS overcurrent	------|
D03	+ 8.5 PS overcurrent	------|
D04	- 8.5 PS overcurrent	------|
D05	- 5 PS overcurrent	------|
D06	+ 12 PS undervoltage	------|
D07	+ 8.5 PS undervoltage	------|
D09	- 8.5 PS undervoltage	------|
D10	- 5 undervoltage	------|
D08	Ground	------+
D11	Thermal switch 2	------+
D12	Thermal switch 2 return	------+
D13		
B13		

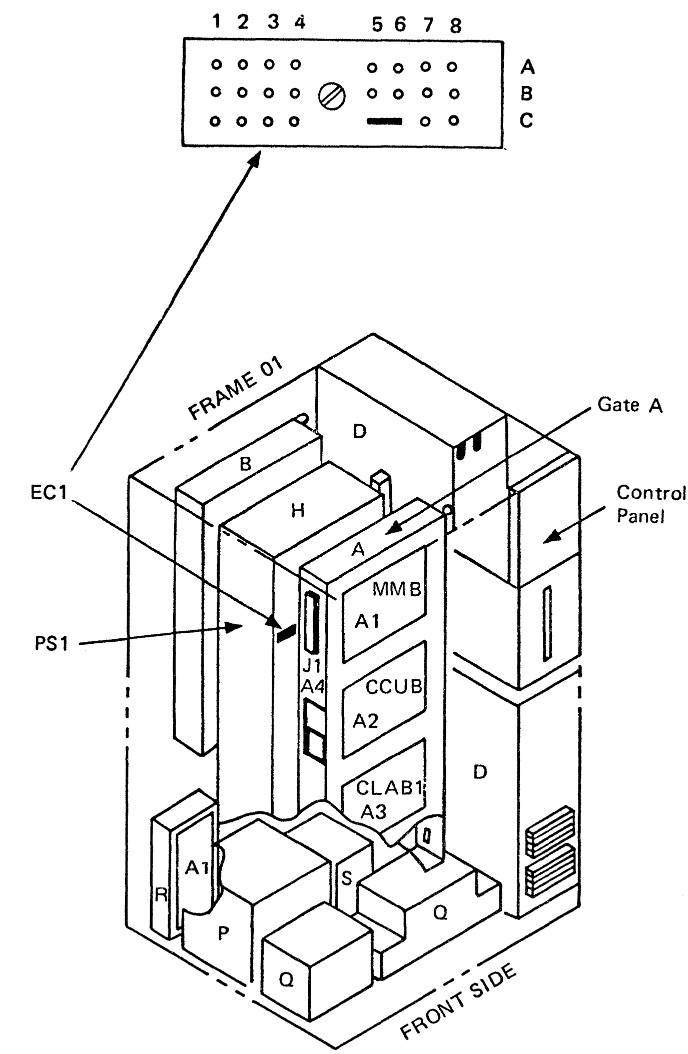
3726: PWB2

Location: 02J-A1



Five-Volt Power Supply Jumpers

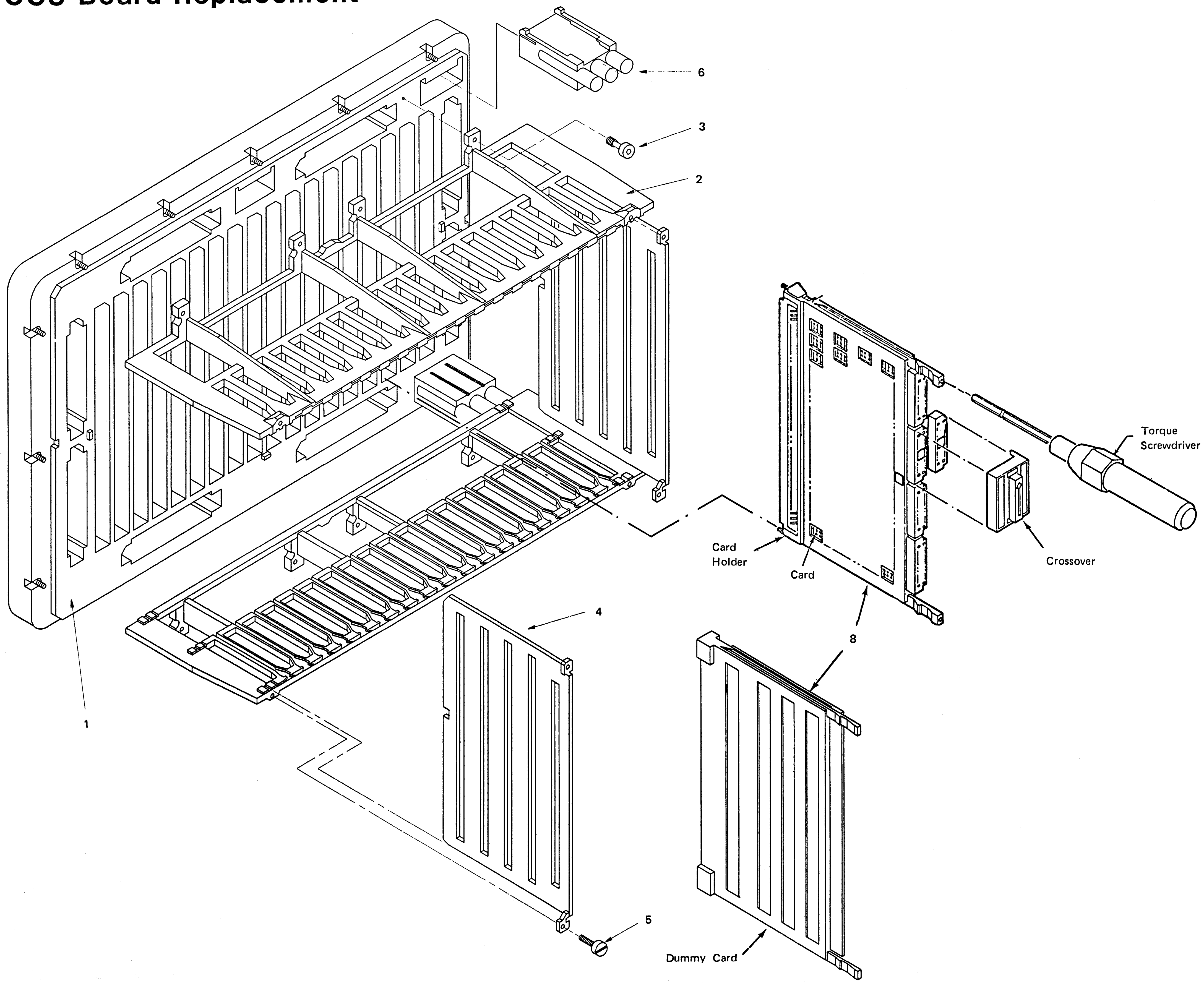
In frame 01, on the connector PS1 EC1, remove Jumper C5-C6 when LAB position 3 is installed.



Chapter 5. Replacements, Machine Clocking, and Adjustments

Contents

CCU Board Replacement



Removing the CCU Board

Using the torque screwdriver (part 4134750):

1. Unscrew slightly the eight screws that secure the plastic mask over the pins, and disconnect power cables on pin side of board.
2. Disconnect cables on card side of CCU board.
3. Unscrew the screws that retain the CCU board assembly to the controller.
4. Carefully remove the board assembly and place it on a flat surface.
5. Remove cards and dummy cards (item 8).
6. Remove capacitor assemblies (item 6).
7. Remove screws (item 5) and sideplates (item 4).
8. Remove screws (item 3) and card guides (item 2).

Replacing the CCU Board

Replace the CCU board in the reverse order.

ESD Instructions

Warning: The 3725 Communication Controller uses parts that are sensitive to electrostatic discharge (ESD). These parts are located on the following boards.

- MOSS board for MPC and MMC cards
- CCU board for DFL1-1, -2, and -3, DFL4, DFL5, CCLK, CTL1, CTL2, BTAC, and MIOC
- Channel and scanner/TRA boards for RDV, CADR, CSP1, CSP2, FES, ICC, LICs, TRM, and TICs.

Note: As only a few cards are not ESD-sensitive on the 3725 controller, it is recommended to handle all of them as if ESD-sensitive.

ESD SENSITIVE PARTS HANDLING.

ESD Precautions

The new procedures and tools for handling all ESD (Electro Static Discharge) sensitive parts are detailed in the 19-minute video tape, "When ESD Strikes", Order No. ZZ25-7319.
All persons involved in the handling and distribution of parts are required to view this video training film. Time spent on the ESD training should be recorded as service code 51, course code 40365.

A folder, consisting of questions and answers, is intended to supplement the training film (Order No. ZZ25-8157).
As new information becomes available, it will appear in RETAIN TIP "ESD HANDLING", (TIP TOOL 014-TD42579).

Generally, all logic is to be considered ESD SENSITIVE and must be handled using the ESD Field ESD Kit, Part 6428316. This kit contains:

IBM Part	Description
6428166	ESD Cord
6428274	ESD Mat, safe work surface
6428275	Conductive black plastic box
6428317	Label, containing instructions (Inside lid of box)
6428318	Label, outside identification

In addition to the kit, a wrist strap is needed for personnel grounding.

Two sizes are available and must be ordered separately:

IBM Part	Description
6428167	Wrist band , small (Beige)
6428169	Wrist band , large (blue)

The small wrist band is for persons having a wrist circumference less than 16.5 cm (6 1/2 inches). The large one is for wrist circumferences over 16.5 cm (6 1/2 inches).

The instructions included with the kit must be read before using these tools.They give SAFETY considerations, which MUST BE FOLLOWED, and general practices.

ALL OTHER WRIST STRAPS ARE OBSOLETE with the new ESD Field Kit and should be discarded.

Two new ESD protective card caddies have been released:

IBM Part	Description
6428141	Conductive, soft-sided caddy (Capacity = 36 4W X 3H cards)
6317023	Conductive, soft-sided caddy (1/2 size = 18 4W X 3H cards)

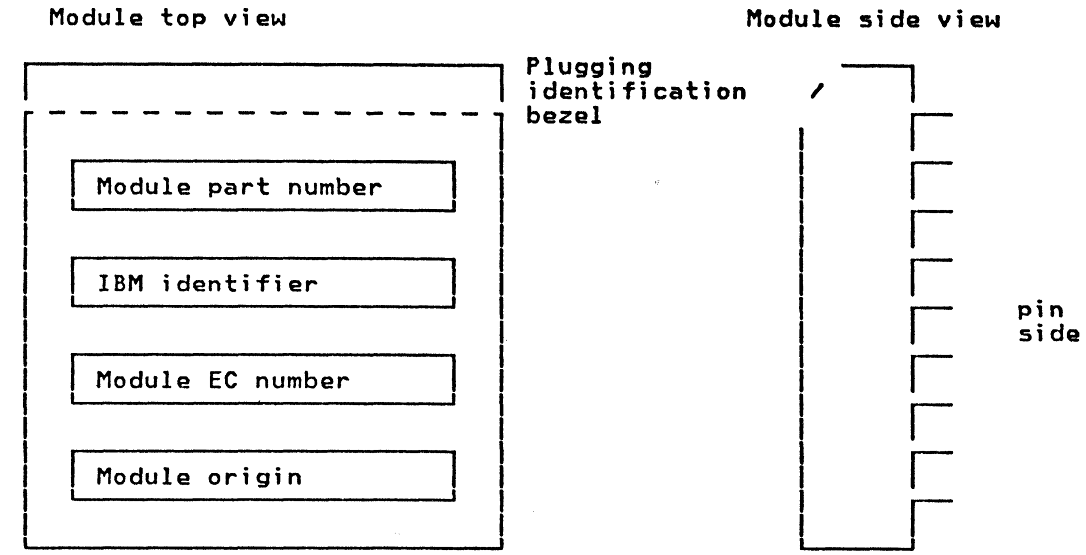
Both caddies have a snap for attaching the ESD cord part 6428166 (part of the ESD field kit). This feature enables the caddy to serve as a large ESD-safe work surface.

Another feature is the strap carrying handle. It was made long enough to permit over-the-shoulder carrying. For most people, this frees up one hand to carry the tool bag on the same side. This is less tiring than carrying with the hand over longer distances.

The new soft-sided caddies are intended for logic, but in some instances may include small mechanical parts (if the caddy is stocked) to support a particular product. Large, heavy parts should not be carried in the new soft sided caddies. Present caddies will remain useful for carrying mechanical parts and other items.

CARD MODULE INFORMATION

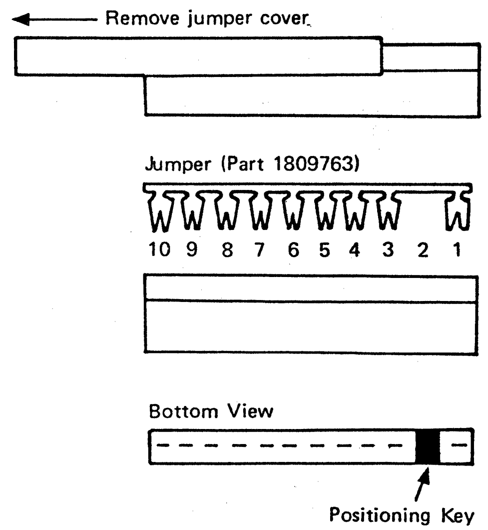
There are four lines of text on the top side of a card module. The information provided by these lines is given in the following figure. Always read these lines starting from the plugging identifier bezel of the module.



Jumper on Card

HOW TO REMOVE A JUMPER PIN

1. Remove the jumper cover from the assembly.

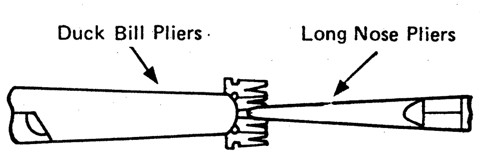


2. Remove the old jumper from the housing.

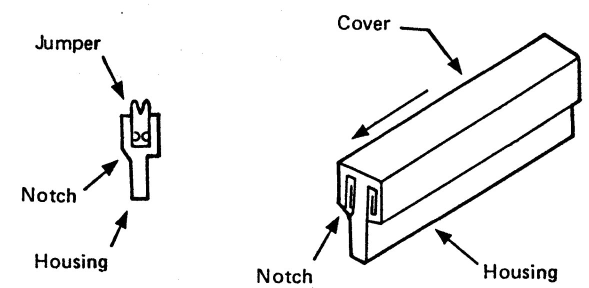
3. If a new jumper is needed, use jumper part 1809763.

4. Carefully cut off the jumper pins that are not needed.

   Warning: Failure to support the jumper assembly with duck bill pliers as shown may damage the carrier strip and cause unreliable jumper operation.



5. When installing the jumper in its housing, ensure that it is correctly seated.



Card Replacement (Part 1 of 3)

<u>Warning:</u> Power off the 3725 or 3726 before card replacement.

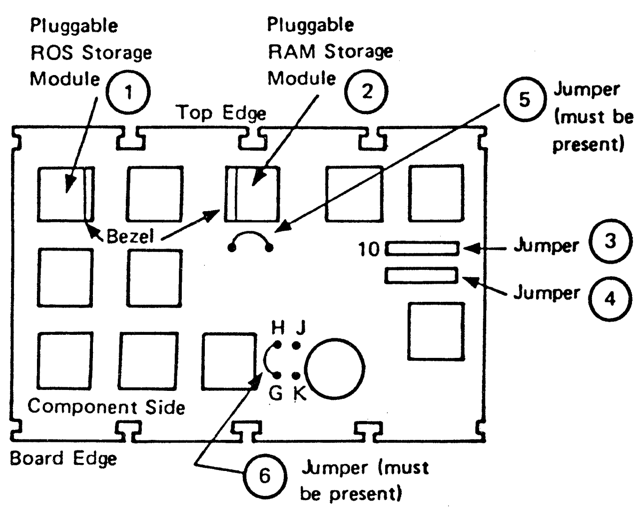
MPC CARD REPLACEMENT (01A-A1T2)

When the MPC card is replaced, the new card is received:

- <u>Without</u> the pluggable modules (1) and (2)
- <u>Without</u> the jumpers (3) and (4)
- <u>With</u> jumpers plugged between H and J, and G to K

The pluggable modules and jumper (3) must be removed from the old card and installed on the new. Jumper (4) is not required. Jumpers (5) and (6) must be installed as shown on the following drawing.

To remove modules use the puller part 1715889 and part 453400. Use extreme care when handling the MPC card and its modules, which are ESD-sensitive. For information on handling ESD-sensitive parts, refer to page 5-020.



Use the following table to select the proper pluggable storage module and to make the correct jumper assembly.

Module 1	Module 2	Jumper 3 Part 1809763	Jumper 4 Part 1809763	Jumper 5	Jumper 6
8K ROS MMM8	24K RAM MMM24 (See note)		Not required	Must be present	H to G

<u>Note:</u> For module ordering, refer to page ZZ012.

MROS CARD REPLACEMENT (01A-A1U4)

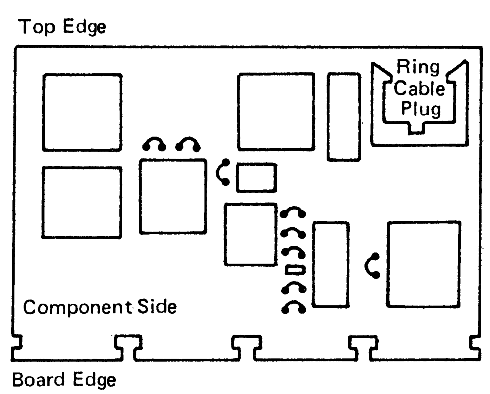
The MROS is used to fix temporarily a microcode error in the ROS of the MPC card.

1. Remove the MPC card from the board (01A-A1T2).
2. Unplug the MPC ROS module (1).
3. Plug the connector in place of the ROS module just removed. Ensure that the cable is leaving the card as shown.
4. Plug the MPC card on the MMB board.
5. Plug the MROS card in location 01A-A1U4.
6. Connect the 32-pin cable connector to the MROS.

TIC CARD REPLACEMENT

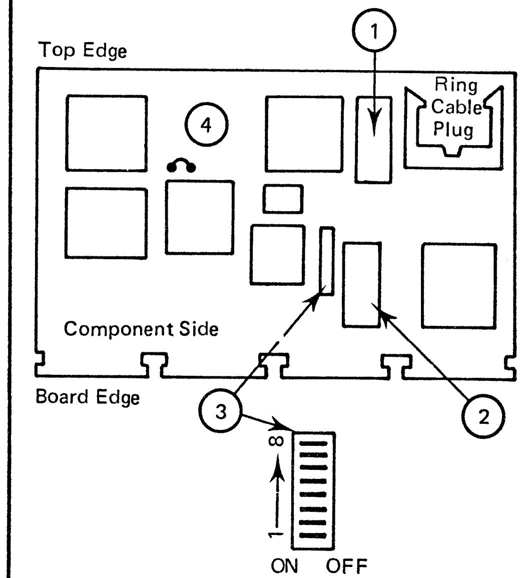
OLD STYLE

When a TIC card old style is replaced, make sure that jumpers(9) are present.



NEW STYLE

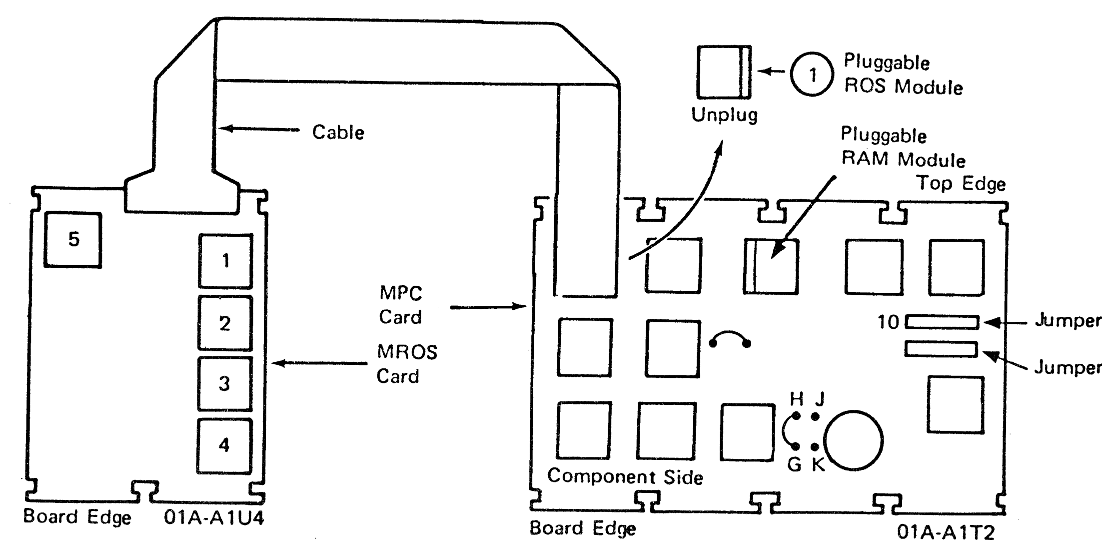
When a TIC card new style is replaced, make sure that the jumper (4) is present and the rocker switches (3) are all in ON position.



The pluggable modules (1, 2) and jumper (4) must be removed from the old card and installed on the new.

Use extreme care when handling the TIC card and its modules, which are ESD-sensitive. For information on handling ESD-sensitive parts, refer to page 5-020.

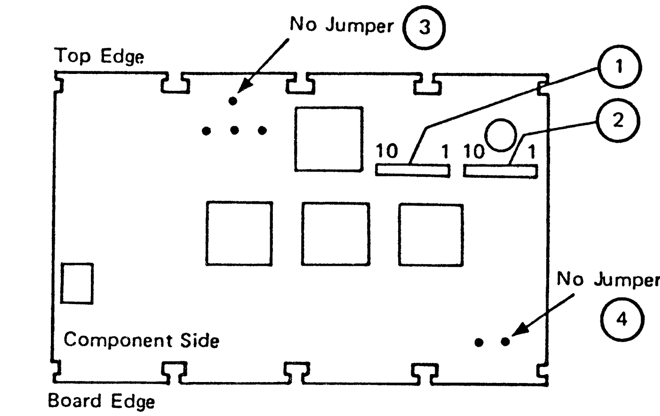
<u>Note:</u> For module ordering, refer to page ZZ012.



DAC CARD REPLACEMENT (01A-A1R2)

When the DAC card is replaced with a new card, the new card is received <u>without</u> the pluggable jumpers (1) and (2).

These jumpers must be removed from the old card and installed on the new card. There must be no jumpers in positions (3) and (4).



If a new jumper must be installed, use jumper part 1809763.

Jumpers 1 and 2	Jumpers 3 and 4
10 9 8 7 6 5 4 3 2 1	Not required

Card Replacement (Part 2 of 3)

Warning: Power off the 3725 or 3726 before card replacement.

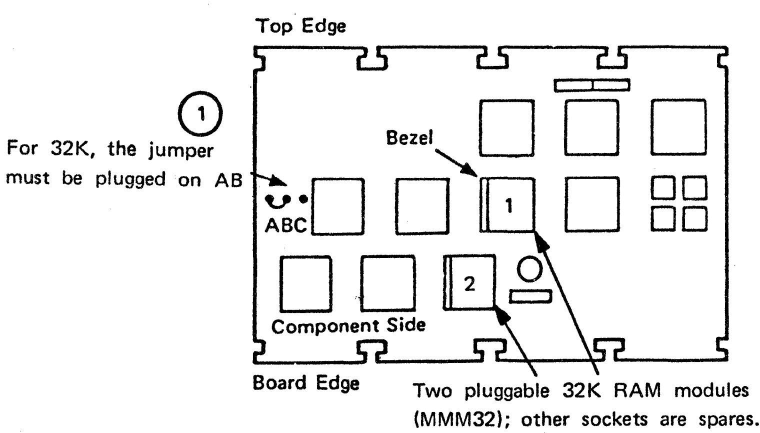
MMC CARD REPLACEMENT (01A-A1S2)

When the MMC card is replaced with a new card, the new card is received:

- Without the pluggable modules
- Without the jumper (1)

These pluggable modules and the jumper (1), which defines a 16K or 32K module, (part 1794401) must be removed from the old card and installed on the new card.

To remove the modules, use puller part 453400. Use extreme care when handling the MMC card and its modules, which are ESD sensitive parts. For information on handling ESC-sensitive parts, refer to page 5-020.



Module 1	Jumper 1
32K RAM MMM 32	Must be present and plugged in AB (32K)

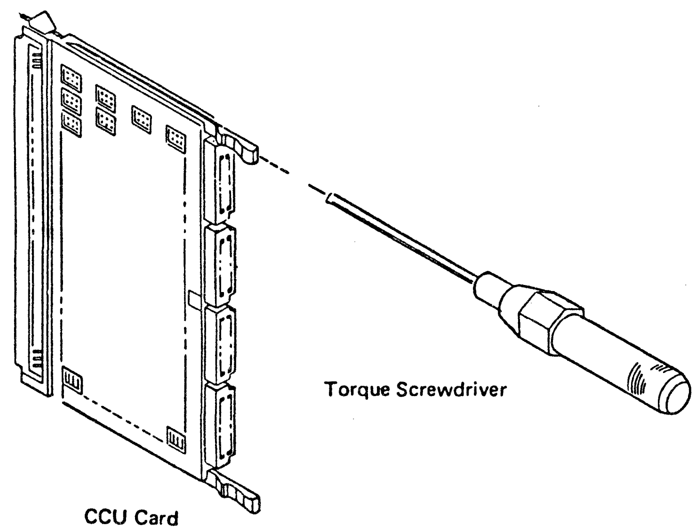
MEM CARD REPLACEMENT (01A-A1B2 THROUGH N2)

When a MEM card is replaced, or when two MEM cards are swapped, make sure that they are of the same type: depending on the EC level of the machine, 128K cards, 256K cards, or both, can be found on the MMB board.

CCU CARD REPLACEMENT (01A-A2)

Also, use extreme care not to break or bend pins when replacing the CCU or MEM cards. The resulting shorts would damage several cards attached to the storage data bus.

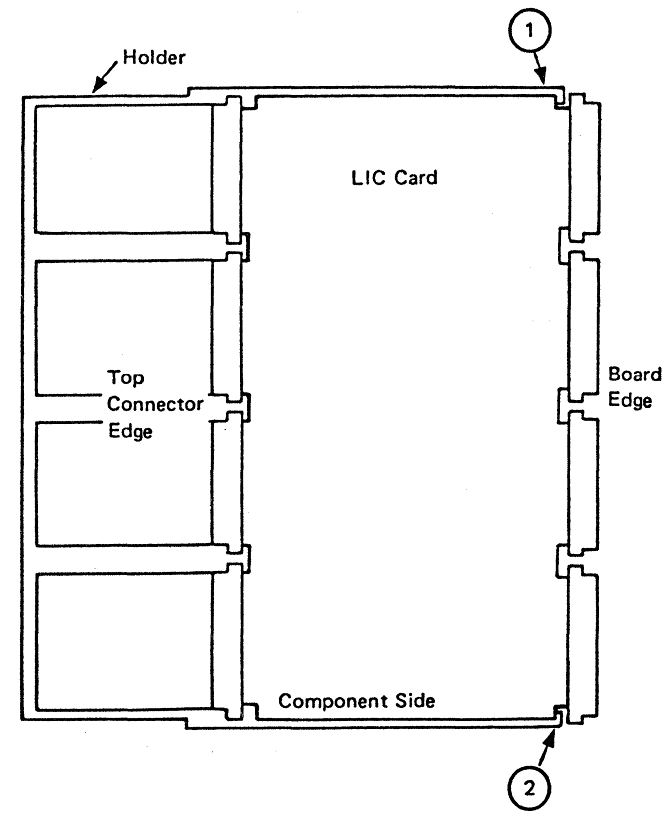
Use the torque screwdriver (part 4134750) when plugging or unplugging a card or a connector on the CCU board. A calibrated spring inside the tool allows you to tighten the card-holding screws to the correct torque value.



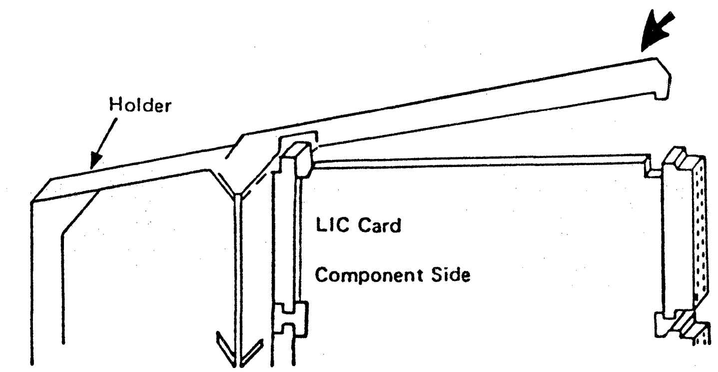
LIC CARD REPLACEMENT

To unplug a LIC card:

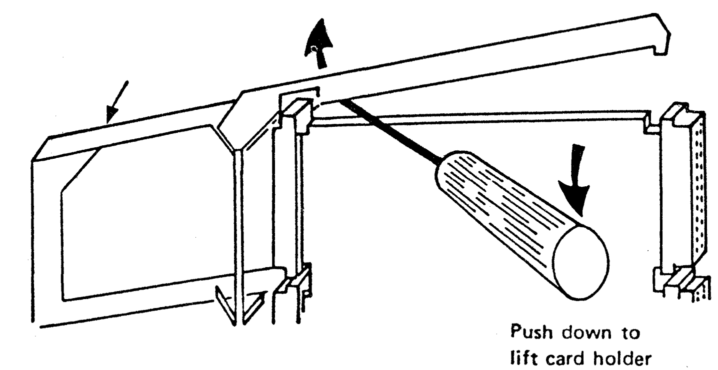
1. Slide out the flat cables attached to the LIC top connectors.
2. Unplug the LIC card by pulling out the LIC holder.
3. Unlatch the LIC holder from the LIC card (1) and (2).



4. Rotate the LIC card.



5. Unlatch the top connector end of the LIC card by pulling the holder away from the card.



6. Separate the holder from the LIC card.

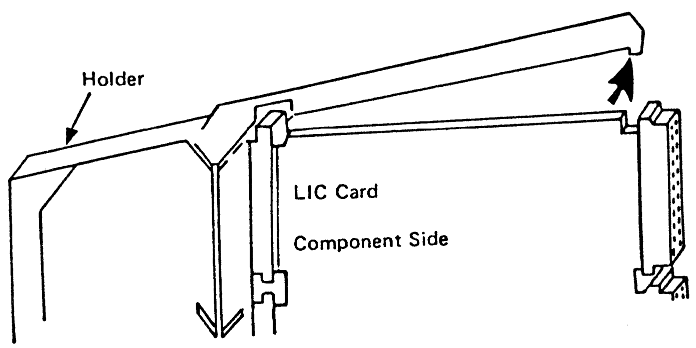
Card Replacement (Part 3 of 3)

__Warning:__ Power off the 3725 or 3726 before card replacement

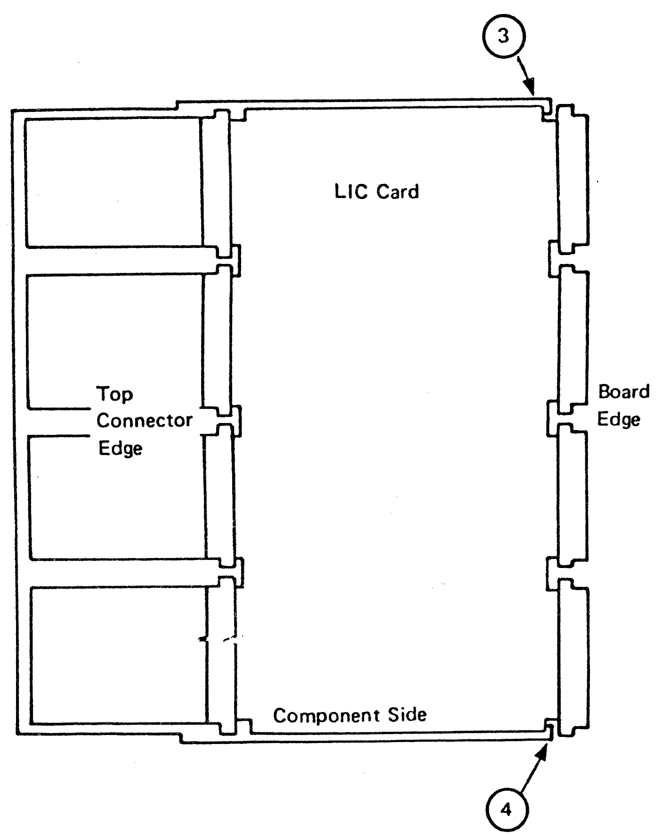
LIC CARD REPLACEMENT (CONTINUED)

To plug a LIC card:

1. Latch the LIC top connector end by placing the LIC card as shown, and then rotating the LIC card towards the LIC holder.



2. Latch the LIC holder to the LIC card.



3. Plug the LIC card to the board by pushing on the top connector edge.
4. Slide in the flat cables attached to the LIC top connectors.

RDV CARD REPLACEMENT

Use extreme care when handling this card, which has ESD-sensitive parts. For information on handling ESD-sensitive parts, see page 5-020.

__Note:__ Interference from a board to the IOC bus cables can be prevented by jumpering pin D11 of the RDV card to ground. This troubleshooting facility is used by the IOC diagnostics (see page 2-080). See also "Redrive State Definition" in Chapter 11.

__CA Card Location__

CA and TPS	CA I/F	Board Address	CADR	CHIN	CCIN	CVTL	Board Name
CA pos 1	1A	01A-A3	X2	V2	U2	T2	C2LB
CA pos 2	2A		W2	S2	R2	Q2	
CA pos 3	3A	01B-A2	B2	F2	E2	D2	C2LB2
CA pos 4	4A		C2	J2	H2	G2	
CA pos 1	1A	01A-A3	X2	V2	U2	T2	CLAB1
TPS pos 1	1B		W2				
CA pos 2	2A	01B-A2	B2	F2	E2	D2	CLAB2
TPS pos 2	2B		C2				
CA pos 3	3A	02C-A1	W2	U2	T2	S2	CAB
TPS pos 3	3B		V2				
CA pos 4	4A	02C-A1	R2	P2	N2	M2	CAB
TPS pos 4	4B		Q2				
CA pos 5	5A	02C-A1	L2	K2	J2	H2	CAB
CA pos 6	6A	02C-A1	G2	F2	E2	D2	CAB

CADR CARD REPLACEMENT

Use extreme care when handling this card, which has ESD sensitive parts. For information on handling ESD-sensitive parts, see page 5-020.

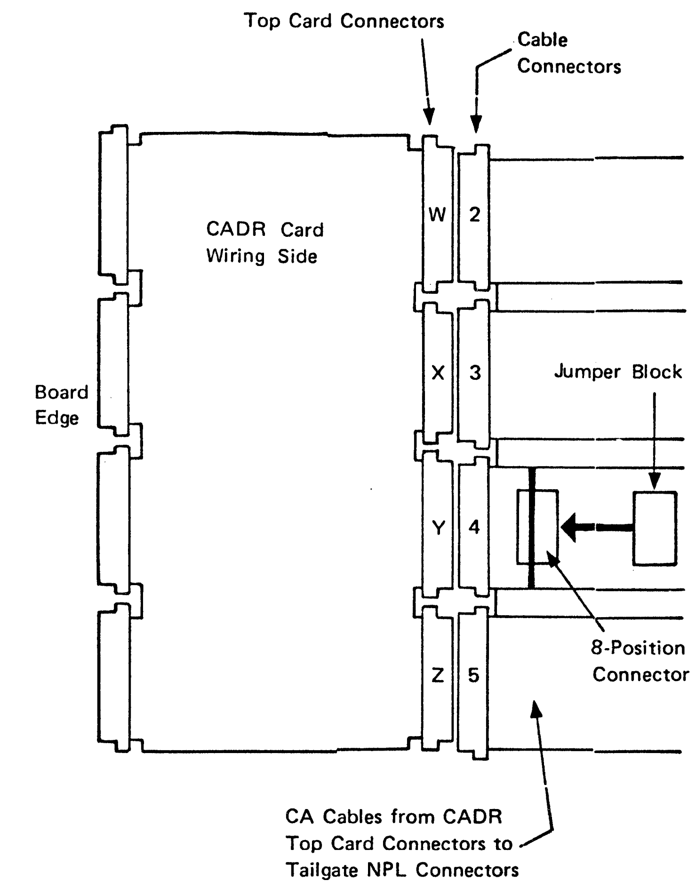
__Warning:__ Do not pull out a CADR card, even if the communication controller is powered off, unless you are sure that the host system is not using this channel interface.

You can display the status of the channel interfaces by using the CCU FNCTN key and then selecting the subfunction number 10.

If the host system is using the channel interface, you must follow the CADR card removal procedure described on this page to ensure that the propagation of 'select in' and 'select out' signals is not broken. Use jumper block (part 4712553).

CADR CARD REMOVAL

1. Set the CA interface switch to DSBL on the control panel.
2. Plug a jumper block (part 4712553) to the eight-position connector located on the side of cable socket 4 of the selected CADR card.



3. Unplug the cable connectors from the CADR card.
4. Unplug the CADR card.

CADR CARD PLUGGING

1. Plug the CADR in place.
2. Plug back the cable connectors to the CADR card.
3. Unplug the jumper block from cable connector 4.

Clock Scoping (Part 1 of 5)

LIMITS

You may scope the following controller areas using the oscilloscopes listed in Chapter 3:

- Adapter clock distribution from the ACLK card to the RDV cards
- CCU clock to SCTL card on the MMB (scope on MMB board only)
- Lines of the channel to CA interface
- Line interfaces (scope on LIC top connectors)
- 3727 console interface (scope on the pin side of the MMB board)

In the field, scoping the CCU board is not used in the 3725 maintenance.

SCOPE POINT REFERENCES

- CA interface : Pages 4-110 and 4-112
- Line interface : Pages 4-130 to 4-241
- 3727 interface : Page 6-040

CLOCK SCOPING

CCU Clock

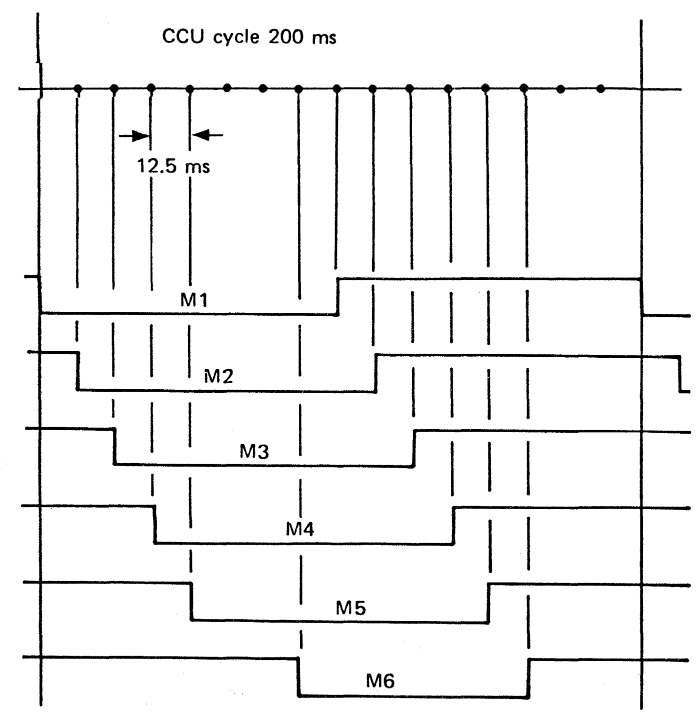
The CCU clock is internal to the CCU and cannot be checked on the CCU board with the scope.

The clock signals driving the storage are generated on the CCLK card. They can be probed on the MMB board.

Board Name: MMB Location: 01A-A1

Clock	Socket	SCTL Card
M1	YDB05	Q2U02
M2	YDD05	Q2U04
M3	YDB04	Q2U05
M4	YDD03	Q2U06
M5	YDD02	Q2U07
M6	YDB02	Q2U09

Clock Signal Relationship



Waveform # 001

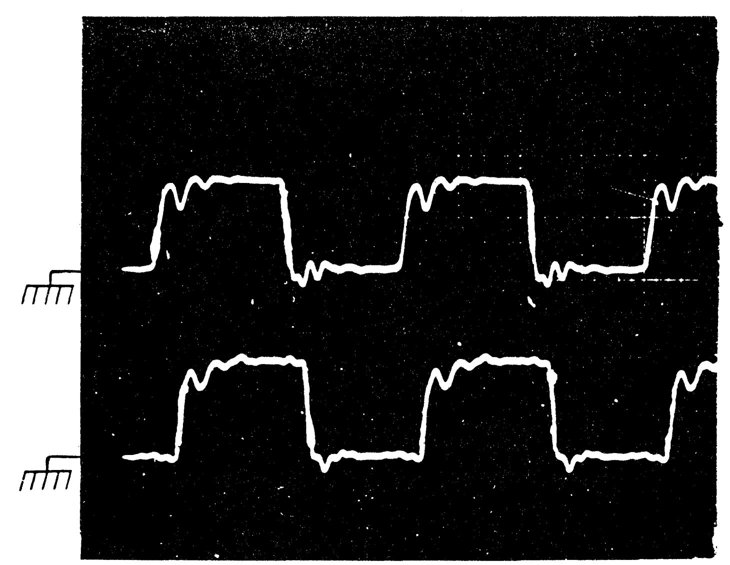
Scope Setting

Channel 1
Probe x 10 on pin: 01A-A1Q2 U02
Signal name: M1
Voltage: .2V/Div.
Speed: 50 ns

Channel 2
Probe x 10 on pin: 01A-A1Q2 U05
Signal name: M3
Voltage: .2V/Div.

Sync: Internal/Channel 1 only

Mode:



Waveform # 001a

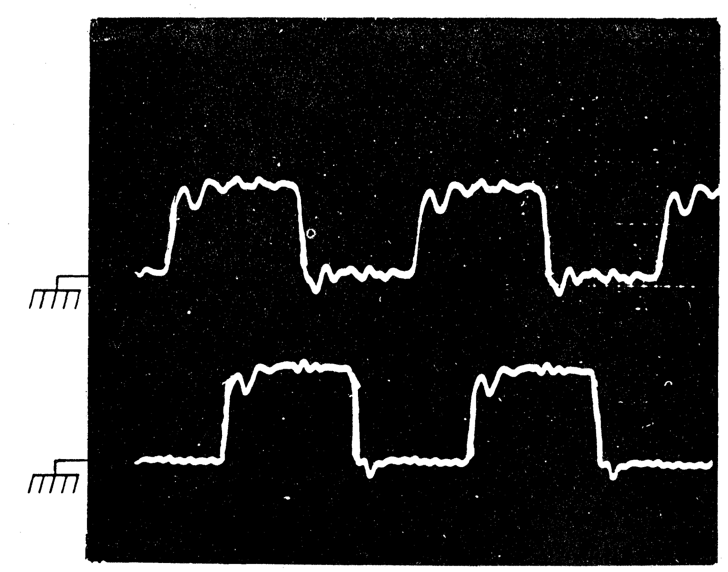
Scope Setting

Channel 1
Probe x 10 on pin: 01A-A1Q2 U02
Signal name: M1
Voltage: .2V/Div.
Speed: 50 ns

Channel 2
Probe x 10 on pin: 01A-A1Q2 U07
Signal name: M5
Voltage: .2V/Div.

Sync: Internal/Channel 1 only

Mode:



Clock Scoping (Part 2 of 5)

HIGH-SPEED CLOCK

The high-speed clock signals (29.4912 MHz) are generated by the ACLK card on the MMB board (see cable routing below). They are distributed via coaxial cables from the pin side of the ACLK card to the pin side of the RDV cards as shown on page 4-100.

The high-speed clock is free running.

LOW-SPEED CLOCK

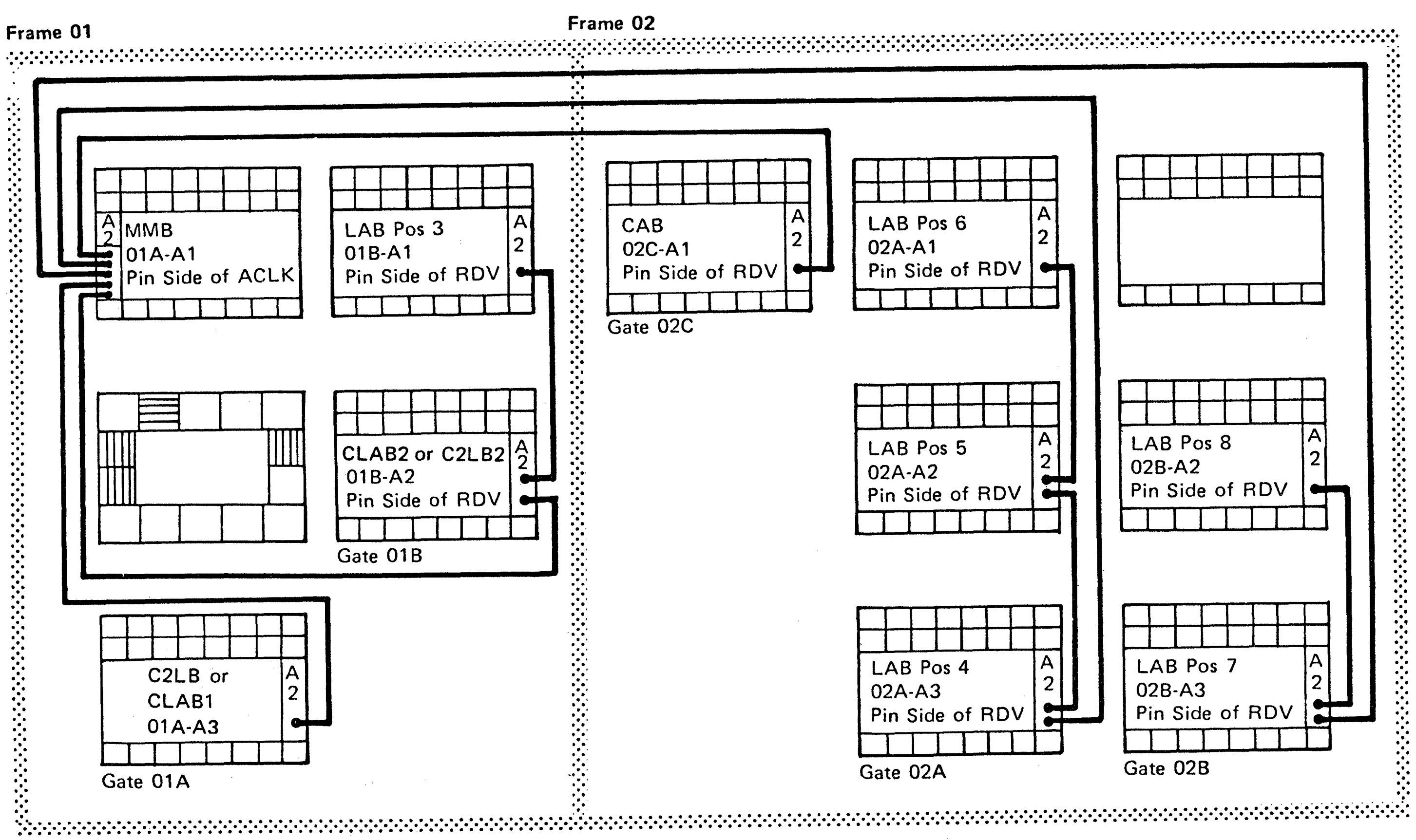
The low-speed clock signals are generated by the ACLK card on the MMB board. They are distributed via the IOC cables. To identify the clock signals, refer to the signal tables on:

- Page 4-080 for the primary IOC cables
- Page 4-085 for the secondary IOC cables

For IOC continuity checking, see pages 4-090 to 4-093.

The low-speed clocks are free running.

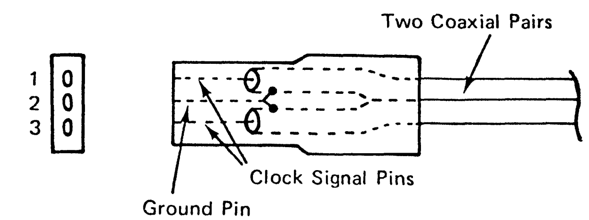
CLOCK CABLE ROUTING



Scoping Procedure

Slightly pull out the clock cable connector and place a hook probe on the selected board pin. The following scope screens are shown when checking for the presence of the clock signal on the CLAB1 board.

Note: The 3-pin connector that carries the clock signals may be plugged either way up.



Waveform # 002

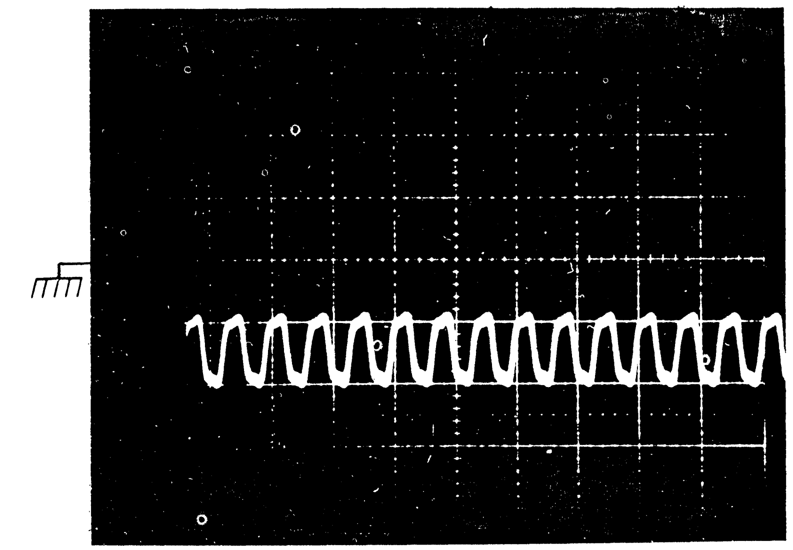
Scope Setting

Channel 1
  Probe x 10 on pin: see table
  Signal name: High-speed clock
  Voltage: .1V/div
  Speed: 5 ns

Channel 2
  Probe x 10 on pin:
  Signal name:
  Voltage:

Sync: Internal/channel 1 only

Mode: Channel 1



Scope Points

From ACLK	To RDV
MMB 01A-A1X4D07 Ground: D08 D09	LAB pos 4 02A-A3A2B02 Ground: B03 B04
MMB 01A-A1X4B02 Ground: B03 B04	LAB pos 7 02B-A3A2B02 Ground: B03 B04
MMB 01A-A1X4B07 Ground: B08 B09	CAB 02C-A2X2B02 Ground: B03 B04
MMB 01A-A1X5B02 Ground: B03 B04	CLAB2 or C2LB2 01B-A2A2B02 Ground: B03 B04
MMB 01A-A1X5D07 Ground: D08 D09	CLAB1 or C2LB 01A-A3A2B02 Ground: B03 B04

From RDV	To RDV
LAB pos 4 02A-A3A2D05 Ground: D06 D07	LAB pos 5 02A-A2A2B02 Ground: B03 B04
LAB pos 7 02B-A3A2D05 Ground: D06 D07	LAB pos 8 02B-A2A2B02 Ground: B03 B04
CLAB2 or C2LB2 01B-A2A2D05 Ground: D06 D07	LAB pos 3 01B-A1A2B02 Ground: B03 B04

From RDV	To RDV
LAB pos 5 02A-A2A2D05 Ground: D06 D07	LAB pos 6 02A-A1A2B02 Ground: B03 B04

Clock Scoping (Part 3 of 5)

SCOPE POINTS

Board name: MMB Location: 01A-A1

Clock Signal	Card Name and Location MCC V2	CPA U2	ACLK X4
15 us	M09		G05
100 ms	U07	D12	J12

LAB A, B AND C LOCATIONS

3725/3726

Scanner	Board Name	Board Address
1	CLAB1	01A-A3
3	CLAB2	01B-A2
5-(6)	LAB pos 3	A1
7-(8)	LAB pos 4	02A-A3
9-(10)	LAB pos 5	A2
11-(12)	LAB pos 6	A1
13-(14)	LAB pos 7	02B-A3
15-(16)	LAB pos 8	A2

The second scanner or TRA of a LAB type B or C is indicated in brackets.

3725 Model 2

Scanner	Board Name	Board Address
1	C2LB	01A-A3
3	C2LB2	01B-A2
5-(6)	LAB pos 3	01B-A1

The second scanner of a LAB type B or C is indicated in brackets.

Board name and Location	Card Name and Location: Top conn. on RDV RDVAD	RDV RDVAD	CSP1	CSP2	FES	LIC TIC	ICC	CVTL	TRM
C2LB Mod 2 01A-A3		A2	D2	E2	F2	N2,M2,L2, K2,H2,G2,	P2,J2	Q2,T2	
CLAB1 01A-A3		A2	E2	F2	G2	H2,J2,K2, L2,N2,P2, Q2,R2	M2,S2	T2	
C2LB2 (Mod 2) 01B-A2		A2	V2	U2	T2	K2,L2,M2, N2,Q2,R2,	P2,S2	D2,G2	
CLAB2 01B-A2		A2	U2	T2	S2	G2,H2,J2, K2,M2,N2, P2,Q2	L2,R2	D2	
LAB-A See Location on this page		A2	D2	E2	F2	G2,H2,J2, K2,M2,N2, P2,Q2	L2,R2		
LAB-B See Location on this page		A2	D2 U2	E2 T2	F2 S2	G2,H2,J2, K2,M2,N2, P2,Q2	L2,R2		
LAB-C See Location on this page		A2	U2	T2	S2	M2,N2, P2,Q2	R2		C2
CAB		A2 B2 X2						D2,H2 M2,S2	
Clock Signal and Scoping Points: 5 Mhz	Z12	U12						M06	
100 ms	Z10	U10		P04	J06			P07	
480 Hz	Z04	U04			G07	G04			
15 us	Z13	U13	D13						
CLK1*		D04			J05		J10		B03
CLK2*		D09			U07				
CLK3*		D13			G05		S03		B05
CLK4*		G02					P13		B04

* CLK1 through CLK4 are generated on the RDV card from the high-speed clock signals distributed via coaxial cables.

Clock Scoping (Part 4 of 5)

Waveform # 003

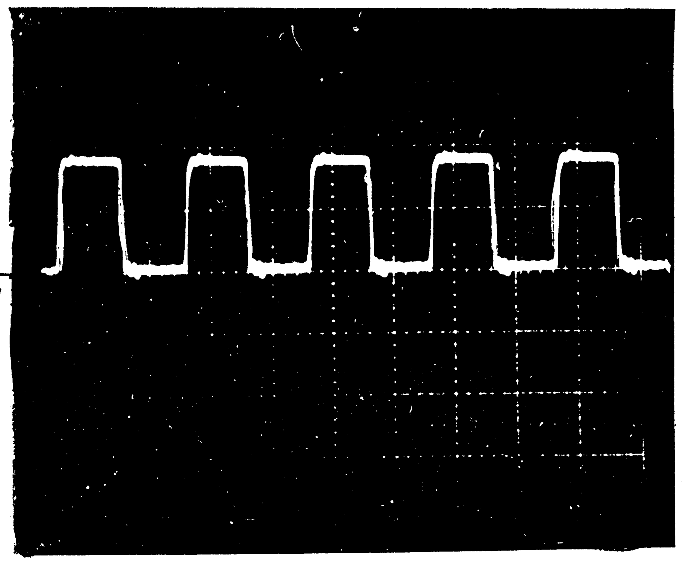
Scope Setting

Channel 1
Probe x 10 on pin: 01A-A3 A2 U12
Signal Name: 5 MHz
Voltage: .2V/Div.
Speed: 100 ns

Channel 2
Probe x 10 on pin:
Signal Name:
Voltage:

Sync: Internal/Channel 1 only

Mode: Channel 1



Waveform # 004

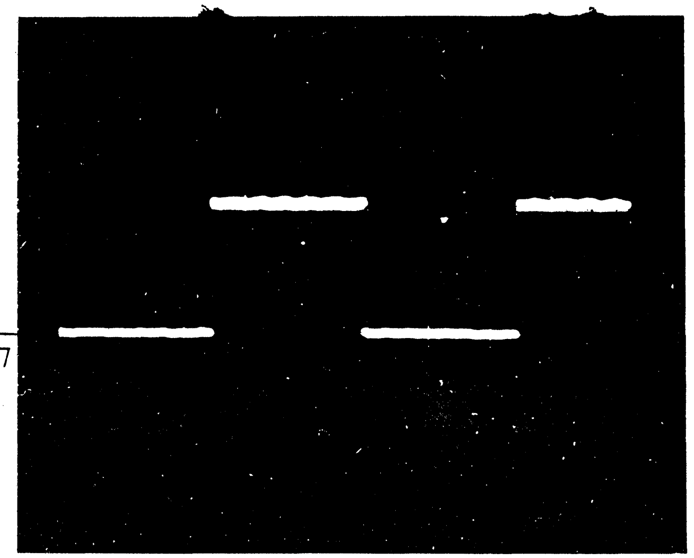
Scope Setting

Channel 1
Probe x 10 on pin: 01A-A1 X4 J12
Signal Name: 100 ms
Voltage: .2V/Div.
Speed: 20 ms

Channel 2
Probe x 10 on pin:
Signal Name:
Voltage:

Sync: Internal/Channel 1 only

Mode: Channel 1



Waveform # 005

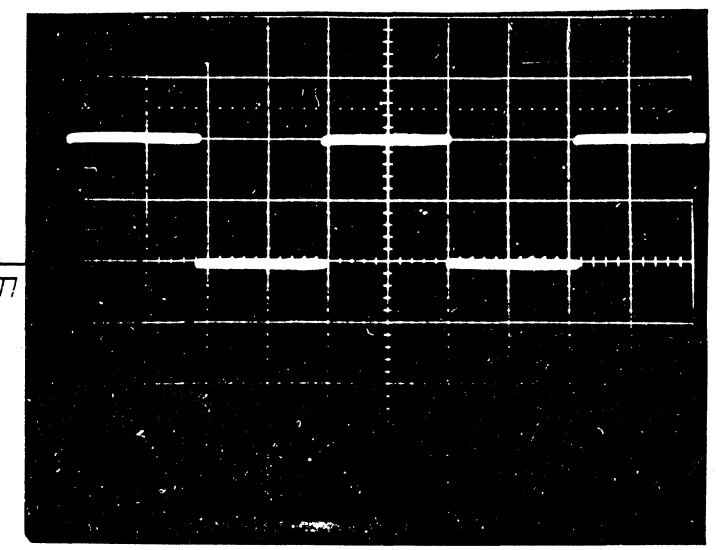
Scope Setting

Channel 1
Probe x 10 on pin: 01A-A3 A2 U04
Signal Name: 480 Hz
Voltage: .2V/Div.
Speed: .5 ms

Channel 2
Probe x 10 on pin:
Signal Name:
Voltage:

Sync: Internal/Channel 1 only

Mode: Channel 1



Waveform # 006

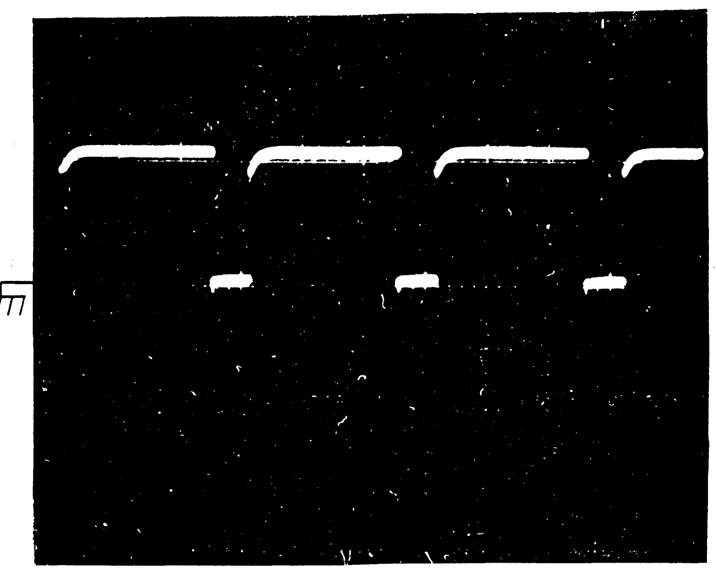
Scope Setting

Channel 1
Probe x 10 on pin: 01A-A1 X4 G05
Signal Name: 15 us
Voltage: .2V/Div.
Speed: 5 us

Channel 2
Probe x 10 on pin:
Signal Name:
Voltage:

Sync: Internal/Channel 1 only

Mode: Channel 1



Clock Scoping (Part 5 of 5)

Waveform # 007

Scope Setting

Channel 1
Probe x 10 on pin: 01A-A3 A2 D09
Signal Name: CLK2
Voltage: .2V/Div.
Speed: 50 ns

Channel 2
Probe x 10 on pin: 01A-A3 A2 D04
Signal Name: CLK1
Voltage: .2V/Div.

Sync: Internal/Channel 2

Mode: Chopped

Waveform # 008

Scope Setting

Channel 1
Probe x 10 on pin: 01A-A3 A2 D13
Signal Name: CLK3
Voltage: .2V/Div.
Speed: 50 ns

Channel 2
Probe x 10 on pin: 01A-A3 A2 D04
Signal Name: CLK1
Voltage: .2V/Div.

Sync: Internal/Channel 2

Mode: Chopped

Waveform # 009

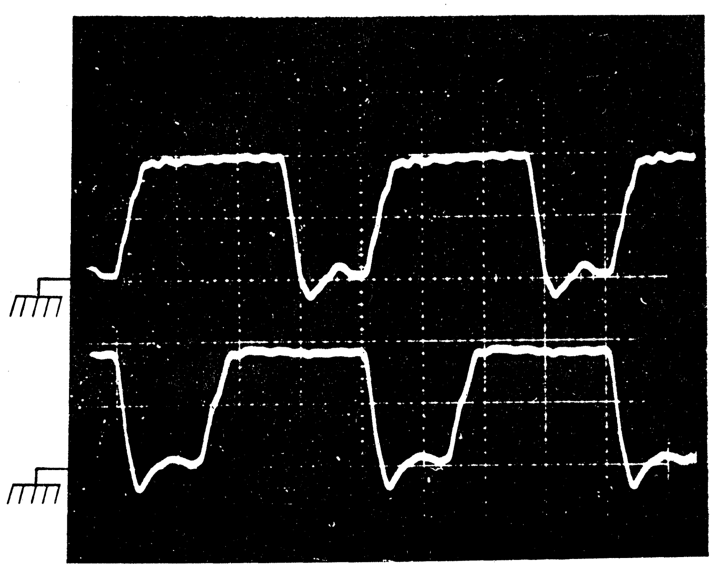
Scope Setting

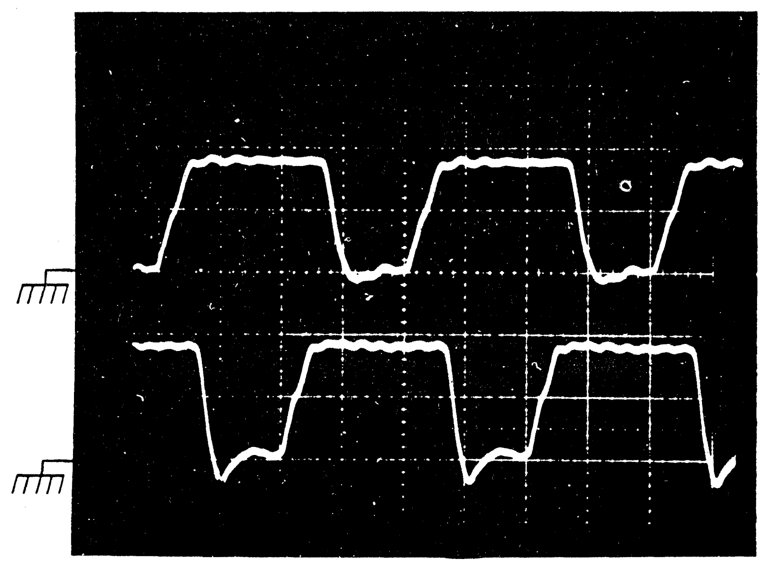
Channel 1
Probe x 10 on pin: 01A-A3 A2 G02
Signal Name: CLK4
Voltage: .2V/Div.
Speed: 50 ns

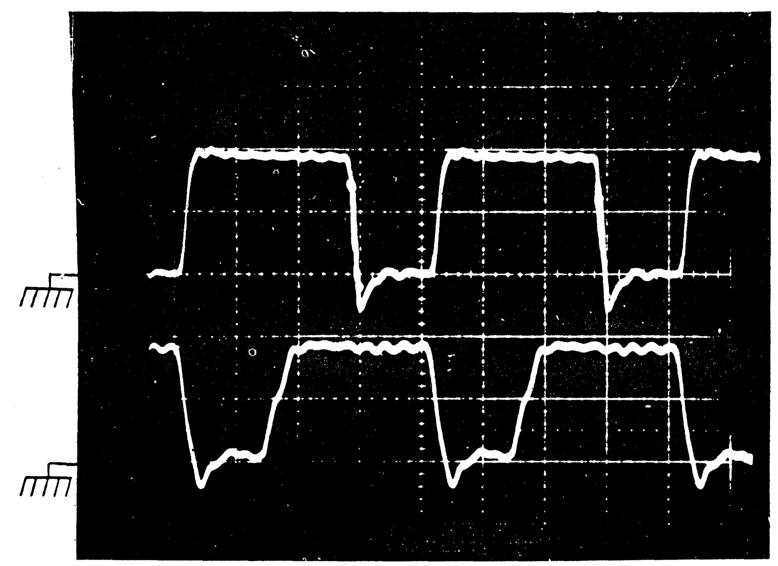
Channel 2
Probe x 10 on pin: 01A-A3 A2 D04
Signal Name: CLK1
Voltage: .2V/Div.

Sync: Internal/Channel 2

Mode: Chopped







Power Supply Adjustments

DC VOLTAGE ADJUSTMENT

There is no dc voltage adjustment in the field. Dc voltages must be within the specified limits (see 3725/3726 Power Supplies, Theory of Operation, SY33-2020, in Volume A03.

AC VOLTAGE ADJUSTMENT

For ac voltage verification and adjustment, see 3725/3726 Power Supplies, Theory of Operation, in Volume A03.

Chapter 6. 3725 Initialization (IML,IPL)

Contents

CHAPTER 6. 3725 INITIALIZATION (IML, IPL)

Control Panel (Part 1 of 2)

CHANNEL ADAPTER AND MOSS CONTROL

The 3725 control panel carries the switches and indicators necessary for the operator to:

- Control the power system
- Interface with the maintenance and operator subsystem (MOSS)
- Enable the channel adapters

Additional switches are provided for the CE to trace a power system fault. These switches are normally behind the machine cover in the power service area, and are not accessible to the customer operator (see page 6-011).

Program Wait Lamp (Green)

When on, indicates that the 3725 control program is in wait status.

MOSS Inoperative Lamp (Red)

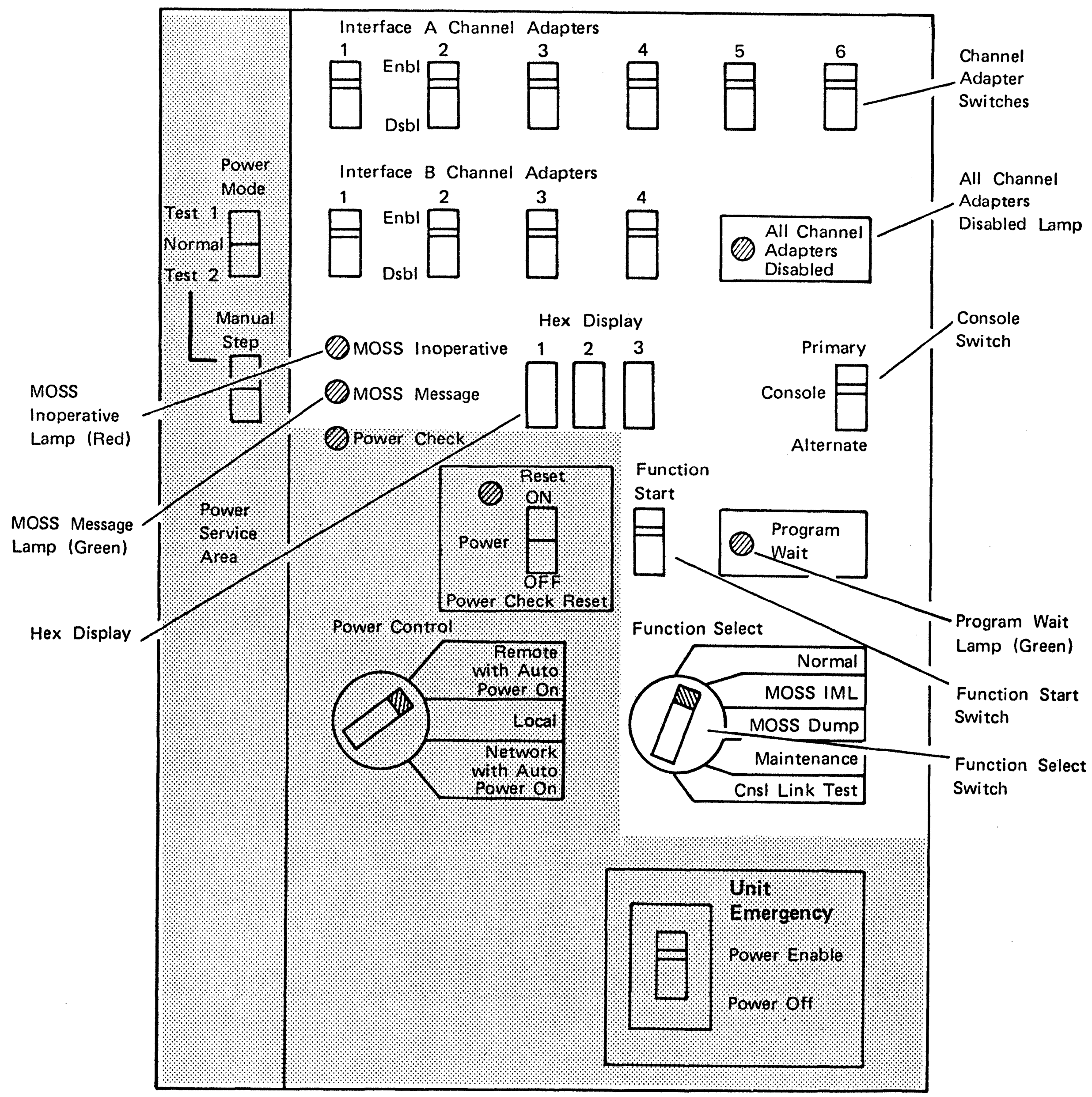
When on, indicates that the MOSS is not available to the CCU.

MOSS Message Lamp (Green)

When on, indicates that the MOSS has a message waiting for the operator.

Hex Display

Displays IPL phases and IML steps, MOSS error codes, or power error codes.



Channel Adapter Enable Switches

Enable the associated channel interface.

All Channel Adapters Disabled Lamp (Green)

When on, indicates that all channel adapters are disabled.

Console Switch

Switch MOSS interface to primary or alternate console.

Warning: Before operating this switch you must properly terminate any operation with the presently selected console.

Function Start Switch

Starts the MOSS runnning according to the Function Select switch

Function Select Switch

Sensed by the MOSS to determine what type of function is to be performed at power on, or at power on reset, or when the Function Start switch is operated.

The positions are:

- Normal: This causes initial microcode load (IML) of MOSS, CCU, and scanners, followed by a CCU IPL.
- MOSS IML: This causes IML of MOSS only.
- MOSS Dump: This resets MOSS and dumps MOSS microcode onto the diskette. The MOSS dump is rejected (error code E65) after a power-on IML because the storage is empty.
- Maintenance: This loads MOSS microcode from the service diskette, and sets the controller to service mode.
- Cnsl Link Test: This runs a wrap test up to the end of the console cable (see cable interface on page 6-040).

Control Panel (Part 2 of 2)

POWER CONTROL

Power Mode Switch

- Test 1: Activates the hex display to check that the power error scanning is running and that the display has no failure.

  This position also enables the CE to power on the controller during an undervoltage condition to facilitate faultfinding.

  When the 3725/3726 is power on, activating Test 1 does not power off the 3725/3726.

- Normal: This is the position required for normal controller operation.

- Test 2: Forces a power off to enable the CE to check the power off status of the various fault detectors (OV, UV, OC). In this position, the power fault scanner can be advanced, step by step, by the Manual switch.

Manual Step Switch: Pressing this switch causes the power fault scanner to advance one step (when the Power Mode switch is set to Test 2).

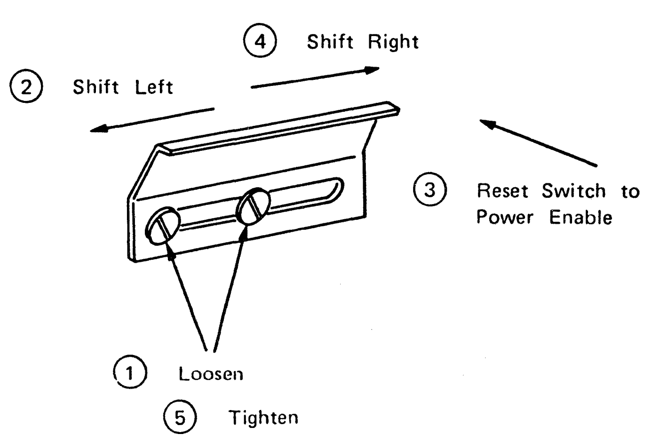
Unit Emergency Switch

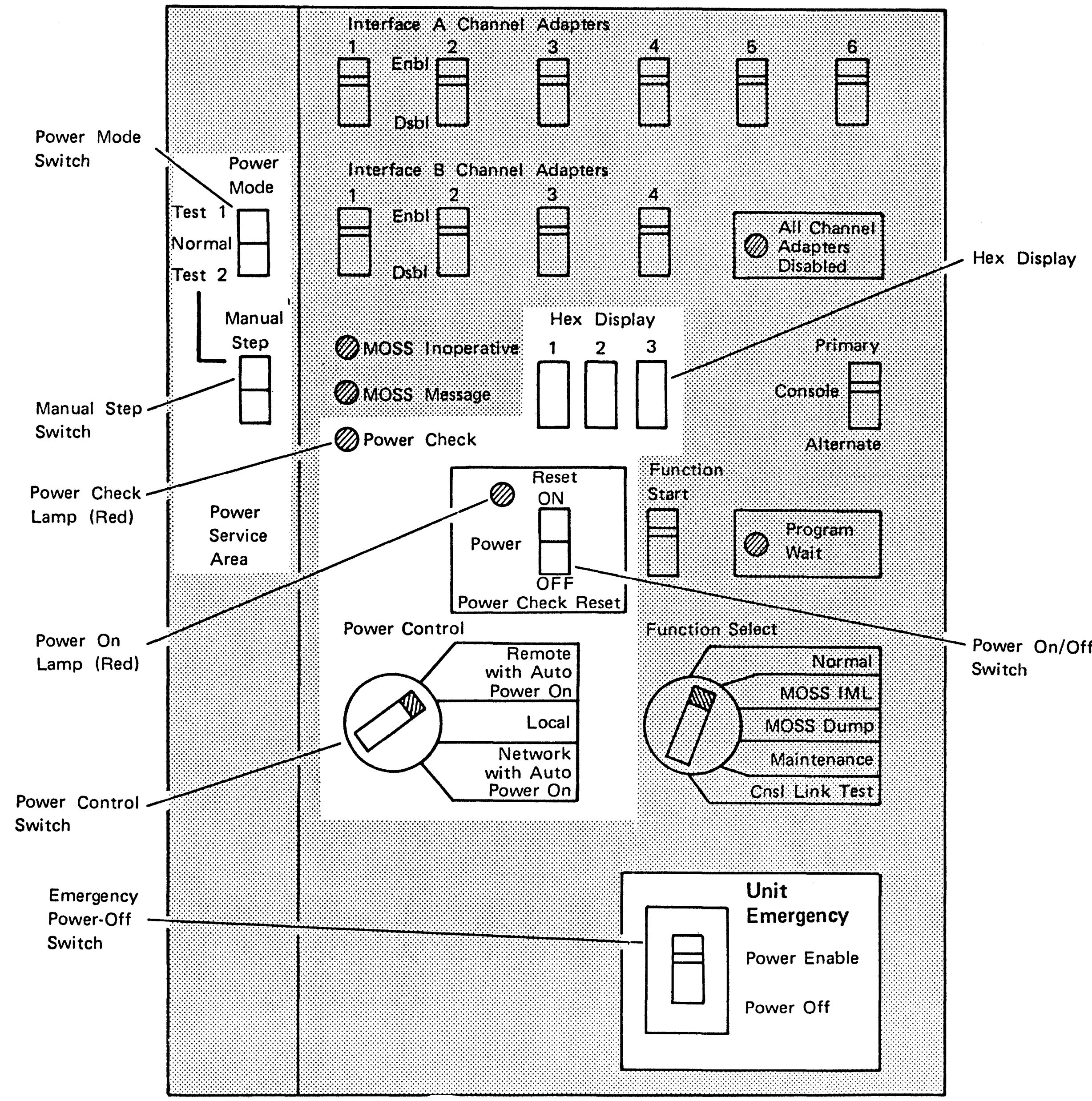
- Power Enable: This is the normal position.

- Power Off: Drops prime power to all contactors, removing all voltages from the machine (except in the primary power box).

  This switch should be used only to power off during an emergency, as it latches mechanically in the off position, requiring a CE call to reset it for power enable.

Unlatching the Unit Emergency Switch





Power Control Switch

Warning: The machine may auto restart with power control switch set to Remote or Network. It automatically powers itself on after ac power is restored.

For more information on auto restart, see 3725/3726 Power Supplies TO.

- Remote: Allows power on and off to be controlled by the host machine.

- Local: Allows power on and off to be controlled by the operator panel Power On/Off switch.

- Network: Allows power on to be controlled by the operator panel Power On/Off switch and, power off to be controlled by the telecommunications network receiving a 'remote power off' signal.

Power Check Lamp (Red)

Lights when any of the following power faults is detected:

- Overvoltage (OV)
- Undervoltage (UV)
- Overcurrent (OC)
- Thermal
- Open circuit protector chain
- Clock fault

Note: Any of the above faults also causes the machine to power down.

Hex Display

When the machine is in the 'power check' condition, the hex display shows a three-digit code that indicates the power fault symptom (as indicated in 3725/3726 Power Supplies TO.

Power On Lamp (Red)

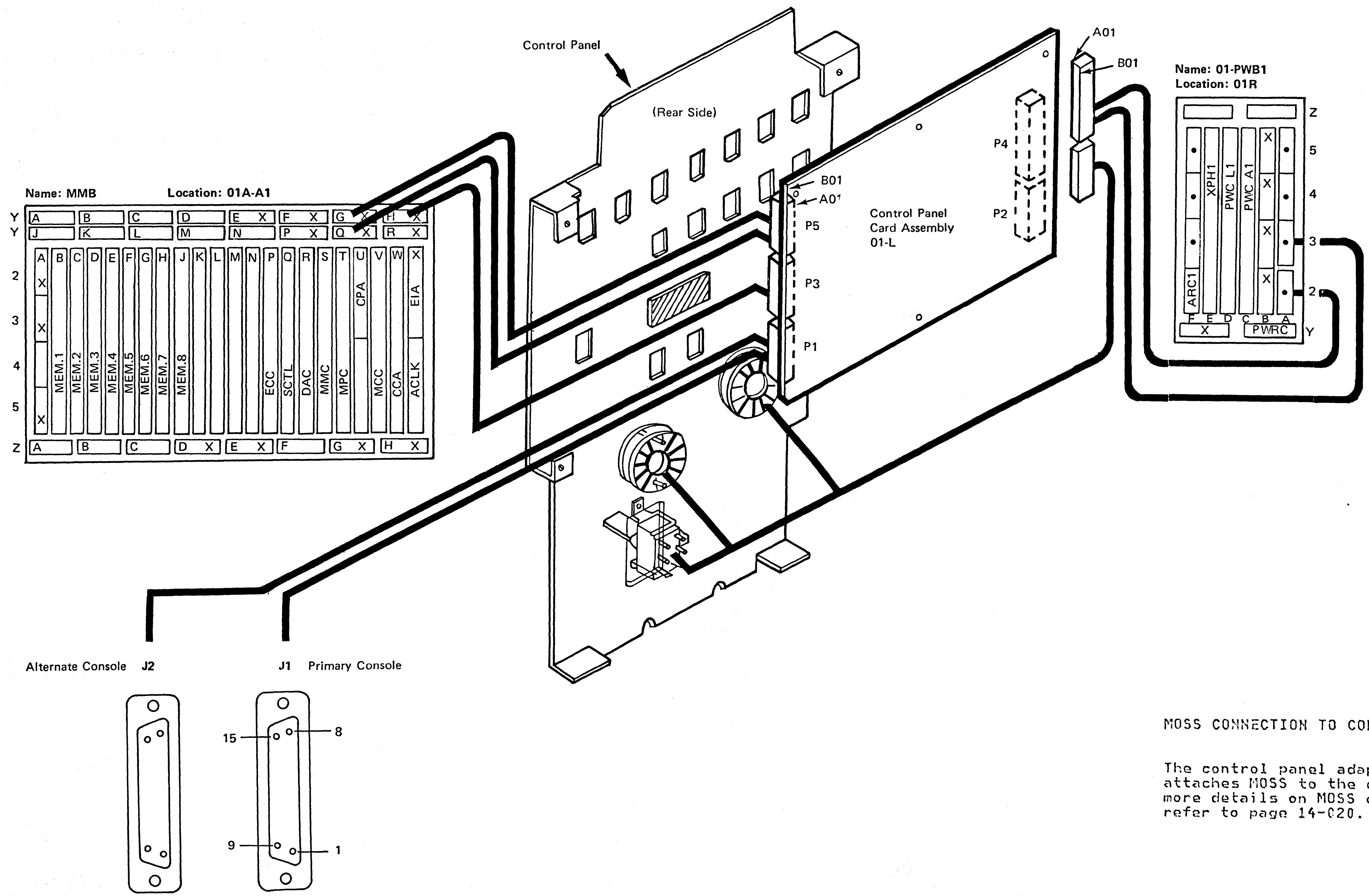
Lights as soon as the power on sequence starts, and goes off as soon as the controller powers down.

Power On/Off Switch

Current Machine Status	Action when switch is set to: ON	OFF
Power OFF	Power on sequence or IML/IPL	Not applicable
Power ON	Reset *, or IML/IPL	Power off sequence
Power OFF + Power check	---	Power check reset

* In local mode only. Before using this reset function, all channels must be disabled (see "Controller Resets", page 6-050).

Control Panel Connections



MOSS CONNECTION TO CONTROL PANEL

The control panel adapter (CPA) card attaches MOSS to the control panel. For more details on MOSS card interconnection, refer to page 14-020.

3727 Operator Console (Part 1 of 5)

Detailed information on operating the operator console is given in the 3725 Operator's Guide.

Problem analysis procedures are given in the 3727 Reference and Problem Analysis Guide, located in a compartment under the keyboard element.

The 3727 Maintenance Information Manual is available in countries where 3727 FRUs may be replaced on site by service personnel.

CAUTION

Be careful when moving the 3727 Operator Console, as the video element is simply placed on the logic element.

CONTROLS AND LOCATIONS

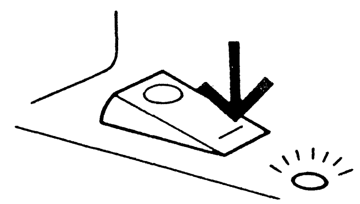
Power On/Off Switch

Press "I" . . . . Power ON
Press "O" . . . . Power OFF

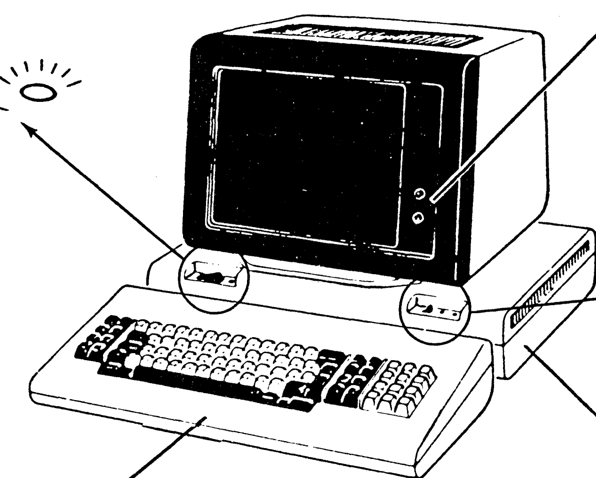
Power On Light

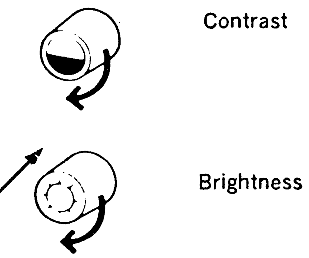
Lights when the Power On/Off switch is ON.

Note: Turning the Power switch off, then on quickly, may cause a reversed screen (green background with no characters displayed). If this happens, turn the Power switch off, wait several seconds, then turn it back on.



Video Element

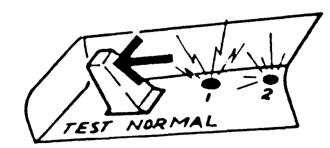




Note. On latest console models, the keyboard is different but the keys are the same.

Test/Normal Switch

In normal communication operation, this switch is set to NORMAL. When this switch is set to TEST, the self-testing program checks the terminal functions.



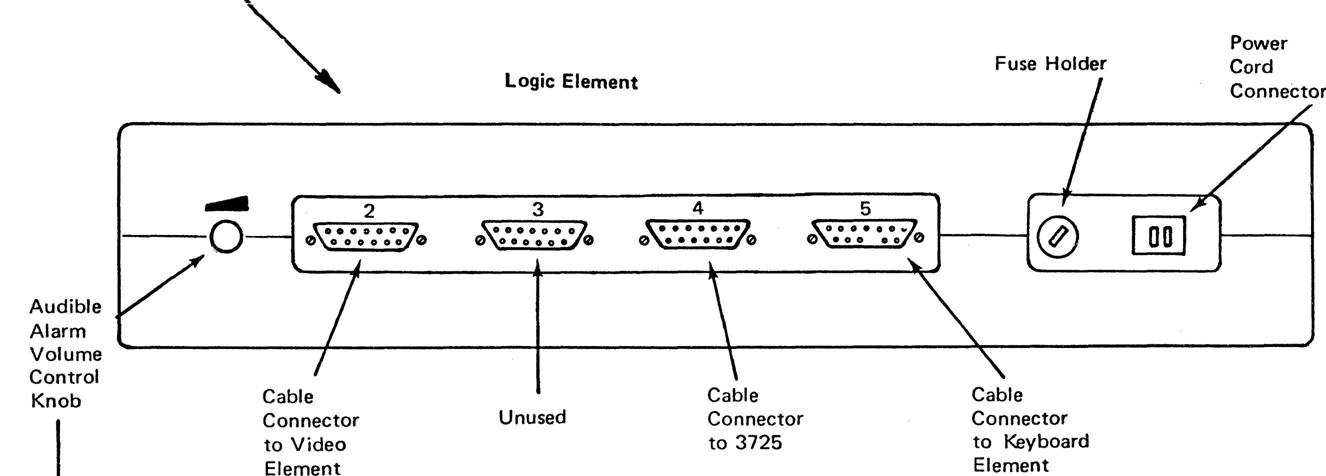
Light 1

Blinks when the TEST/NORMAL switch is set to TEST and stays off when the switch is set to NORMAL.

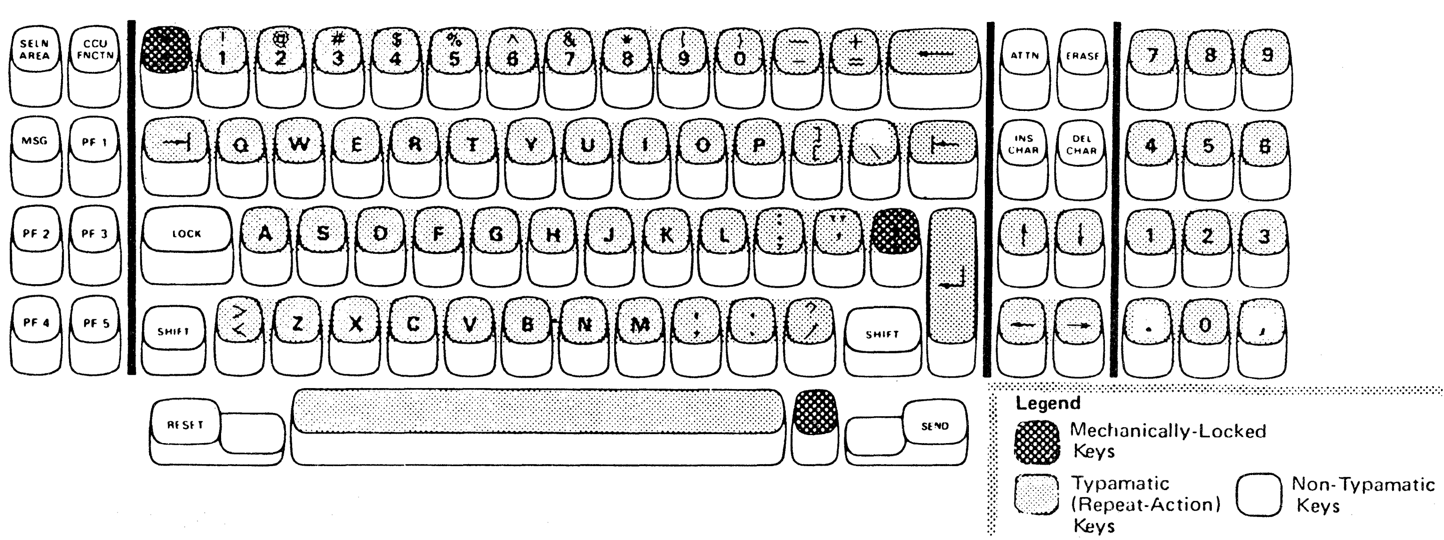
Light 2

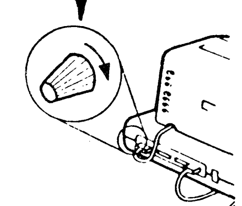
Lights when the 3727 is ready to communicate with the 3725 or when the Test/Normal switch is set to TEST.

Logic Element



Keyboard Element





Turning this knob clockwise increases the volume.

The audible alarm sounds to alert the operator under the following conditions:

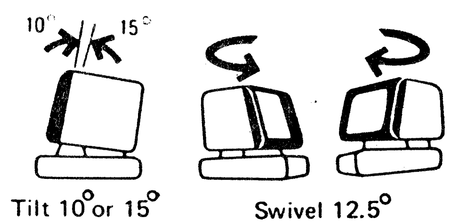
- When a character is entered in the 8th position before the end of the last line of the screen.
- When the Test/Normal switch is set to TEST.
- When the uppercase of reverse slash key is pressed.
- When an error is detected during a diagnostic request run ALL.

3727 Operator Console (Part 2 of 5)

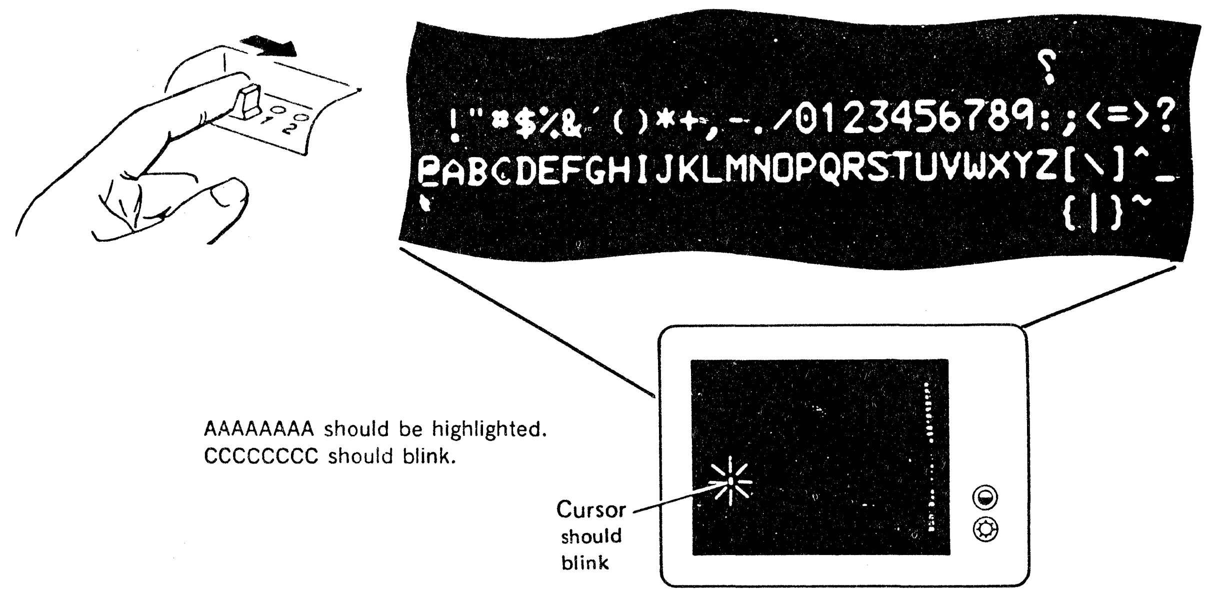
ADJUSTMENT AND TESTS

Adjusting the Video Element

You can tilt the video element to either 10 or 15 degrees and swivel it up to 12.5 degrees in either direction from the normal position. To tilt, lift the front of the element and move it forward or backward until its feet fit into the appropriate groove of the logic element.



Operator Console Test



When the 3727 is in test mode, if the above conditions are not met, refer to:

- 3727 Reference and Problem Analysis Guide, to determine the faulty element.
- 3727 Maintenance Information Manual, to determine the faulty FRU (depending on the maintenance strategy in your country).

Console Link Test

See the 3725/3726 Maintenance Information Manual, Part 2 (Volume A01) to run the console link test from the 3725 controller.

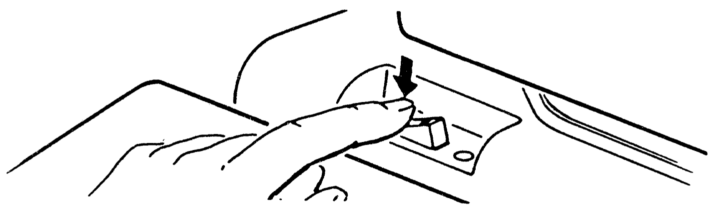
ELEMENT REMOVAL AND REPLACEMENT PROCEDURES

These procedures are given for machines that are under "Element Exchange" contract only.

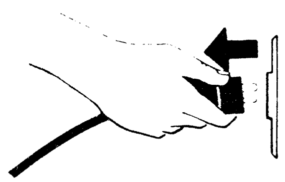
Note: If you return a video element equipped with an anti-glare filter to the IBM Repair Center, remove the anti-glare filter before shipment. No repair service is provided for the filter.

Video Element Replacement

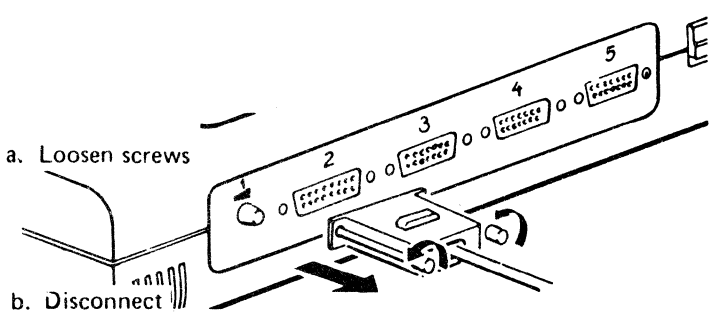
1. Turn Power switch OFF (0).



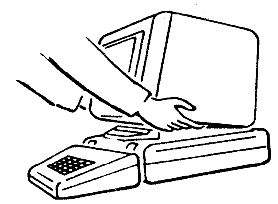
2. Unplug the power cord.



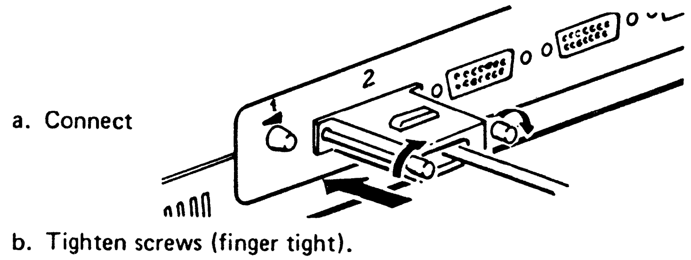
3. Unscrew the connector of the video element cable and disconnect it from the receptacle labeled 2. (Do not remove thumb screws from the connector.) Omit this step if the connector has already been removed.



4. Replace the failing video element with a good one.

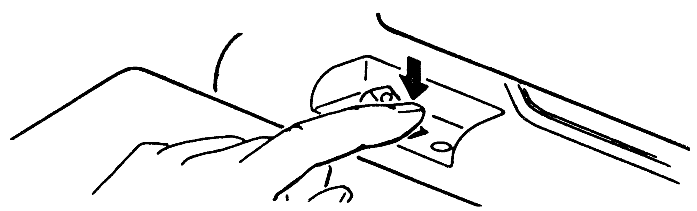


5. Connect the cable of the new video element.



6. Plug the power cable into the power outlet.

7. Turn Power switch ON (I) and verify that the terminal operates normally.



8. Run the operator console test to check that the exchanged element is working correctly.

   Set the Test/Normal switch to NORMAL.

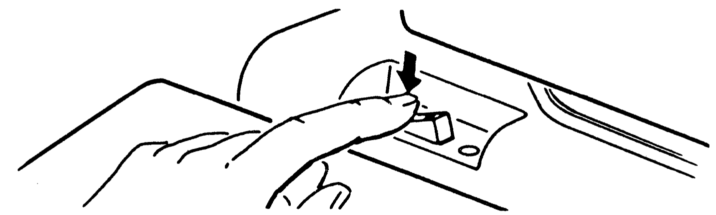
   If the customer operations function correctly, the repair procedure is finished.

   If the customer operations do not function correctly, refer to the 3725 Problem Determination and Extended Services.

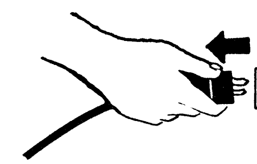
Keyboard Element Replacement

Note: If you return a keyboard element equipped with a palm rest to the IBM Repair Center, remove the palm rest before shipment. No repair service is provided for the palm rest.

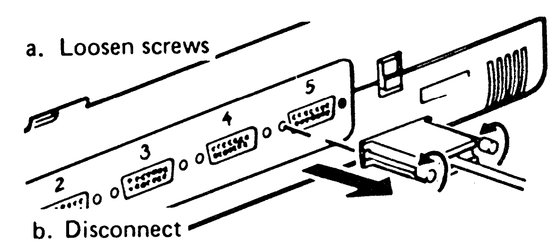
1. Turn Power switch OFF (0).



2. Unplug the power cord.

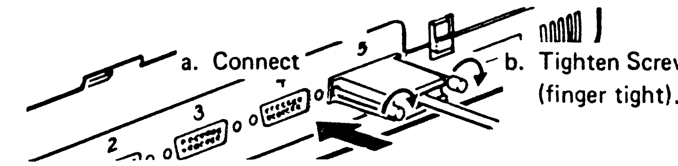


3. Unscrew the connector of the keyboard element cable and disconnect it from the receptacle labeled 5. (Do not remove thumb screws from the connector.) Omit this step if the connector has already been removed.



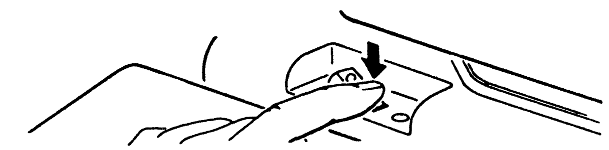
4. Replace the failing keyboard element with a good one.

5. Connect the keyboard element cable of the new element to the logic element.



6. Plug the power cable into the power outlet.

7. Turn Power switch ON (I) and verify that the terminal operates normally.



8. Run the operator console test to check that the exchanged element is working correctly.

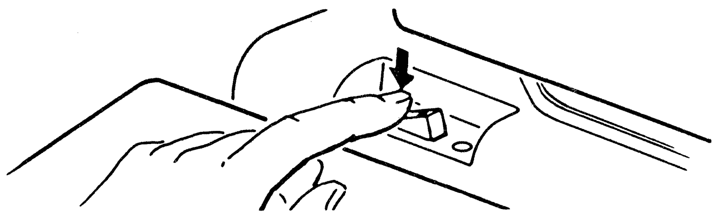
   Set the Test/Normal switch to NORMAL.

   If the customer operations function correctly, the repair procedure is finished.

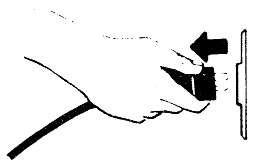
3727 Operator Console (Part 4 of 5)

Logic Element Replacement

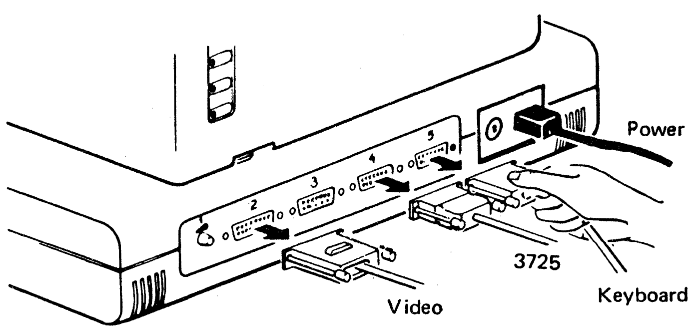
1. Turn Power switch OFF (O).



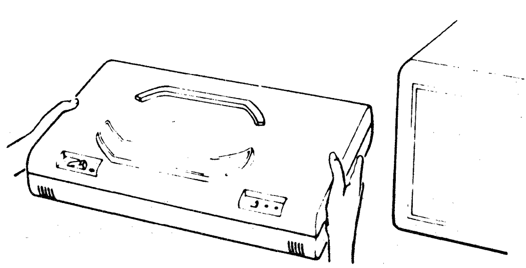
2. Unplug the power cord.



3. Loosen the screws on all the cables from the rear side of the logic element and disconnect them. Do not disconnect the power cord.



4. Replace the failing logic element.

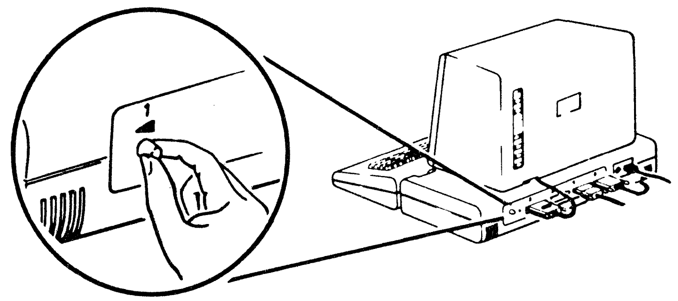


5. Connect all the cables disconnected in Step 3 to the logic element.

6. Plug the power cable into the power outlet.

7. Turn Power switch ON (I) and verify that the terminal operates normally.

8. Set alarm to the desired volume (in TEST mode).



9. Run the operator console test to check that the exchanged element is working correctly.

   Set the Test/Normal switch to NORMAL.

   If the customer operations function correctly, the repair procedure is finished.

   If the customer operations do not function correctly, refer to the <u>3725 Problem Determination and Extended Services.</u>

3727 Operator Console (Part 5 of 5)

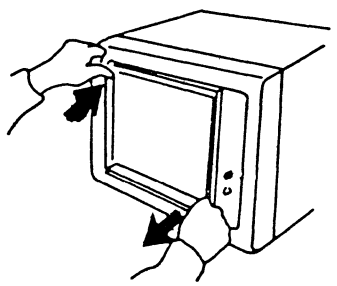
ANTI-GLARE FILTER FEATURE

This filter has a specially-coated glass that reduces reflectance of ambient light.

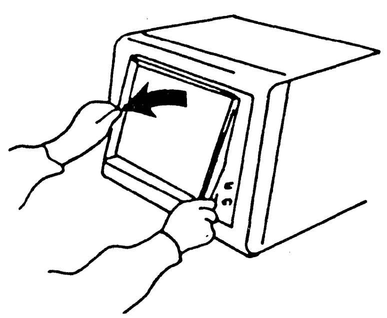
<u>Note:</u> If you return a video element to the IBM Repair Center, remove the anti-glare filter before shipment. No repair service is provided for the filter.

Removal Procedure

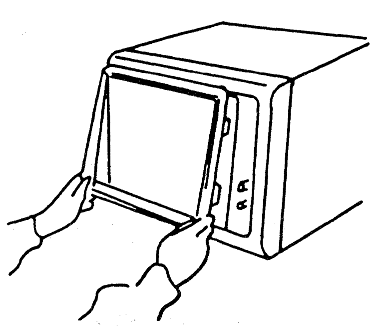
1. Push the upper left corner and pull the bottom right corner until the bottom edge comes out.



2. Grasp the left and right edges and rotate the top edge of the filter forward gently.



3. Pull the filter to remove.



Cleaning Procedure

Turn display terminal power off.

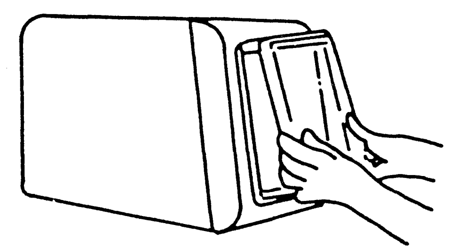
Wash the filter with a clean, soft cloth and either plain water or water and detergent. Dry the filter with a clean, soft cloth.

Do not use paper for cleaning; it may be abrasive.

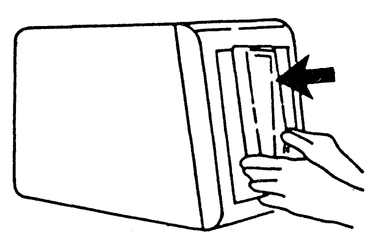
<u>Warning:</u> Do NOT use acid solutions or abrasive products, such as cleansers or scouring pads, because these products will damage the filter.

Replacement Procedure

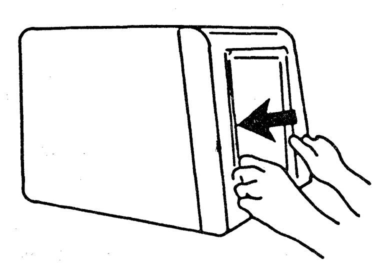
1. Hold both sides of the anti-glare filter.



2. Put the right edge of the filter into the filter groove.



3. Push the left edge of the filter into the other groove.



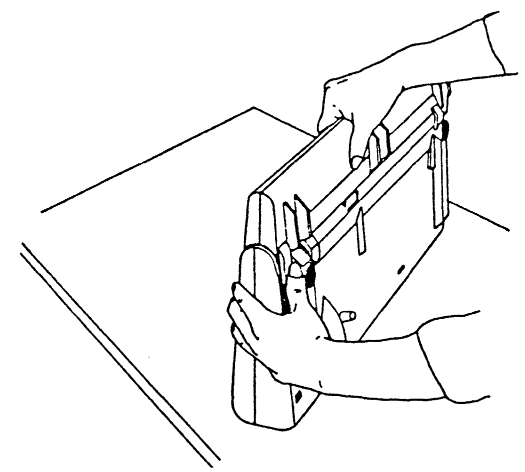
KEYBOARD PALM REST FEATURE

This palm rest extends the depth of the keyboard element toward the operator by approximately 60 mm for comfortable operation.

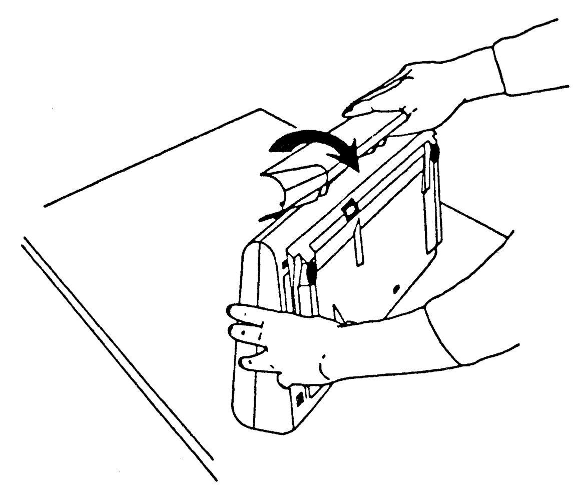
<u>Note:</u> If you return a 3727 keyboard element to the IBM Repair Center, remove the keyboard palm rest before shipment. No repair service is provided for the palm rest.

Removal

1. Tilt the keyboard to the position shown below.

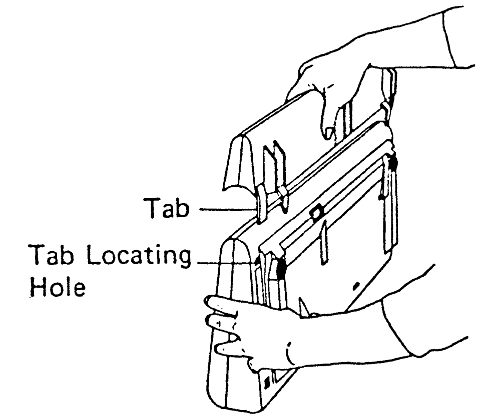


2. Remove the palm rest from the keyboard by rotating it as shown below.

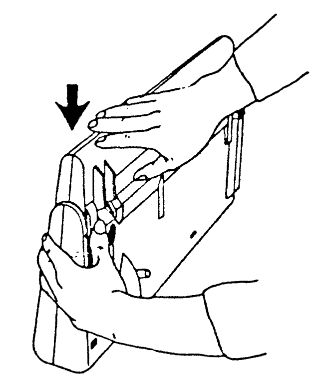


Replacement

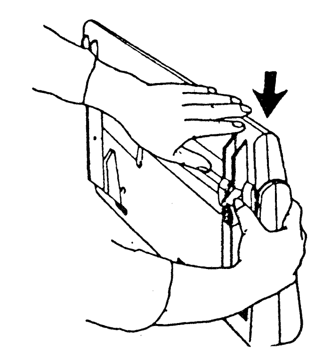
1. Tilt the keyboard and position the palm rest as shown below.



2. Hold the keyboard and the palm rest in position by placing your thumb on the tab as shown. Tap the palm rest with the other hand until it snaps into position.



3. Hold the other side of the keyboard and palm rest in position by placing your thumb on the tab as shown. Tap the palm rest with the other hand until it snaps into position.

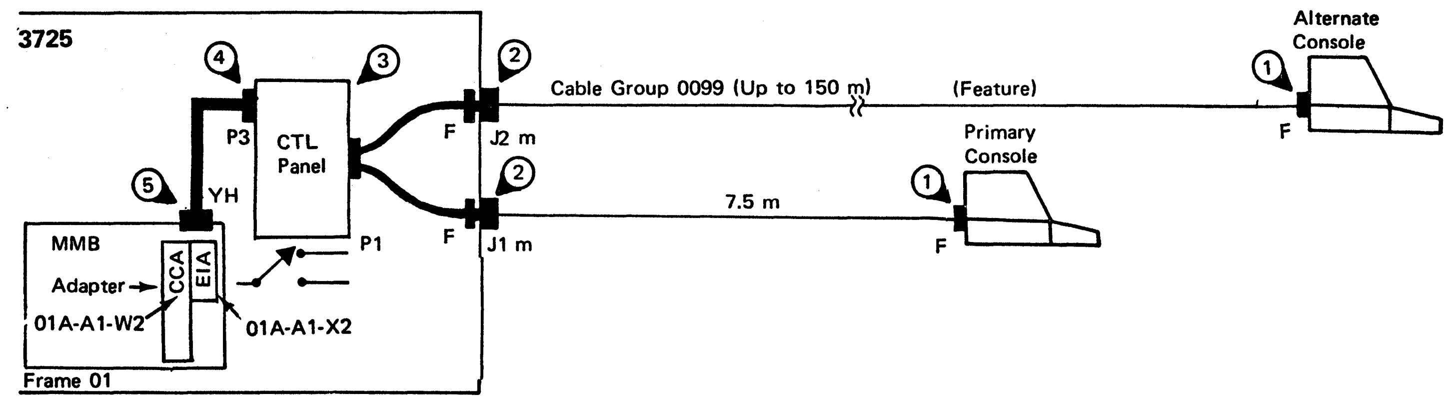


3727 Operator Console Connection

Primary and alternate operator consoles connect directly to the 3725 via a CCITT interface in start-stop mode at 2400 bps, using ASCII code with one stop bit only.

Depending on the position of the Primary/Alternate Console switch on the control panel, only one console is connected at a time.

The IBM 7427 Console Switch (RPQ) allows one primary or one alternate console to be shared among several 3725 controllers.

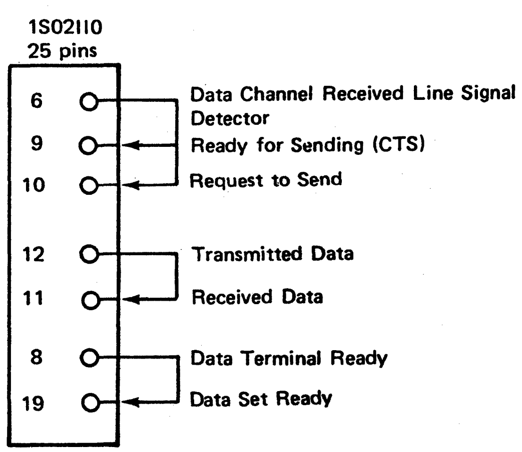


Signal	MMB Pin 01A–A1	5	4	3	2	Primary 1	Signal Names
MOSS Msg LED Driver				A11	14	24	LED on 7427 Console Switching Unit (RPQ)
MOSS Msg LED Ground				A12	15	25	
Transmitted Data	V1 D08	B02	A01	A06	12	12	Transmitted Data
Received Data	W1 A08	B04	A04	A07	11	11	Received Data
Carrier Detect	V1 D06	D02	B01	A08	6	6	Data Channel Received Line Signal Detector
Request to Send	W1 B08	B05	A05	A01	10	10	Request to Send
Ready for Sending	W1 A06	D04	B04	A03	9	9	Ready for Sending (Clear to Send)
Data Set Ready	W1 B06	D05	B05	A05	8	8	Data Set Ready
Data Terminal Ready	V1 E08	B03	A03	A04	4	19	Data Terminal Ready
Signal Ground	W1 E06	D08	B08	A09	7	7	Signal Ground
					1	13*	

3	2	Alternate 1	Signal Names
B11	14	24	LED on 7427 Console Switching Unit (RPQ)
B12	15	25	
B06	12	12	Transmitted Data
B07	11	11	Received Data
B08	6	6	Data Channel Received Line Signal Detector
B01	10	10	Request to Send
B03	9	9	Ready for Sending (Clear to Send),
B05	8	8	Data Set Ready
B04	4	19	Data Terminal Ready
B09	7	7	Signal Ground
	1	13*	

* Pin 1 is connected to the cable shield on the controller end of the cable. The console is not connected to this shield. However, when a 7427 Console Switching Unit (RPQ) is installed between the controller and console, the later is connected to the shield of the additional cable, through connector pin 13.

Wrap Block Part 2667737 to install in 1



Controller Resets

Resetting the 3725 causes a hardware reset followed by a MOSS load/dump or other operations called by the switches.

Warning: Before initiating a reset, you must disable all channels to avoid propagation of channel errors to the host system.

The reset depends on the four switches on the control panel:

1. Power On/Off
2. Power Control
3. Function Select
4. Function Start

- Resetting is generally done by using the Power On/Off switch.
- The Function Select switch determines the operation that follows a MOSS reset:
  - Normal
  - MOSS IML (for the controller diskette)
  - MOSS Dump
  - Maintenance
  - Console link test
- The MOSS is reset and the selected operation starts when the Function Start switch is pressed.

There are three modes of operation, depending on Power Control switch setting:

1. In local mode, the 3725 is reset (except for power faults) using the 'on' position of the Power On/Off switch.

   To reset power faults, the switch should first be set to off, then to on.

   a. Off clears the fault indicators

   b. On causes a power-on reset (POR)

2. In remote mode, the 3725 is powered on and off by a pulse sent by the first channel-attached host that is powered on.

   The 'on' and 'off' positions of the Power On/Off switch are inoperative.

3. In network mode, the 'off' position of the Power On/Off switch is inoperative because power off can come only from the CCU that received a remote power off signal via a telecommunication line.

   In network mode, the 'on' position is active only at initial 3725 power on. After the 3725 has been powered on, the 'on' position is inactive and will not cause a 3725 reset if pressed.

   Note: The 3725 is also reset when the input voltage is restored after an ac power loss (automatic power on, auto restart function).

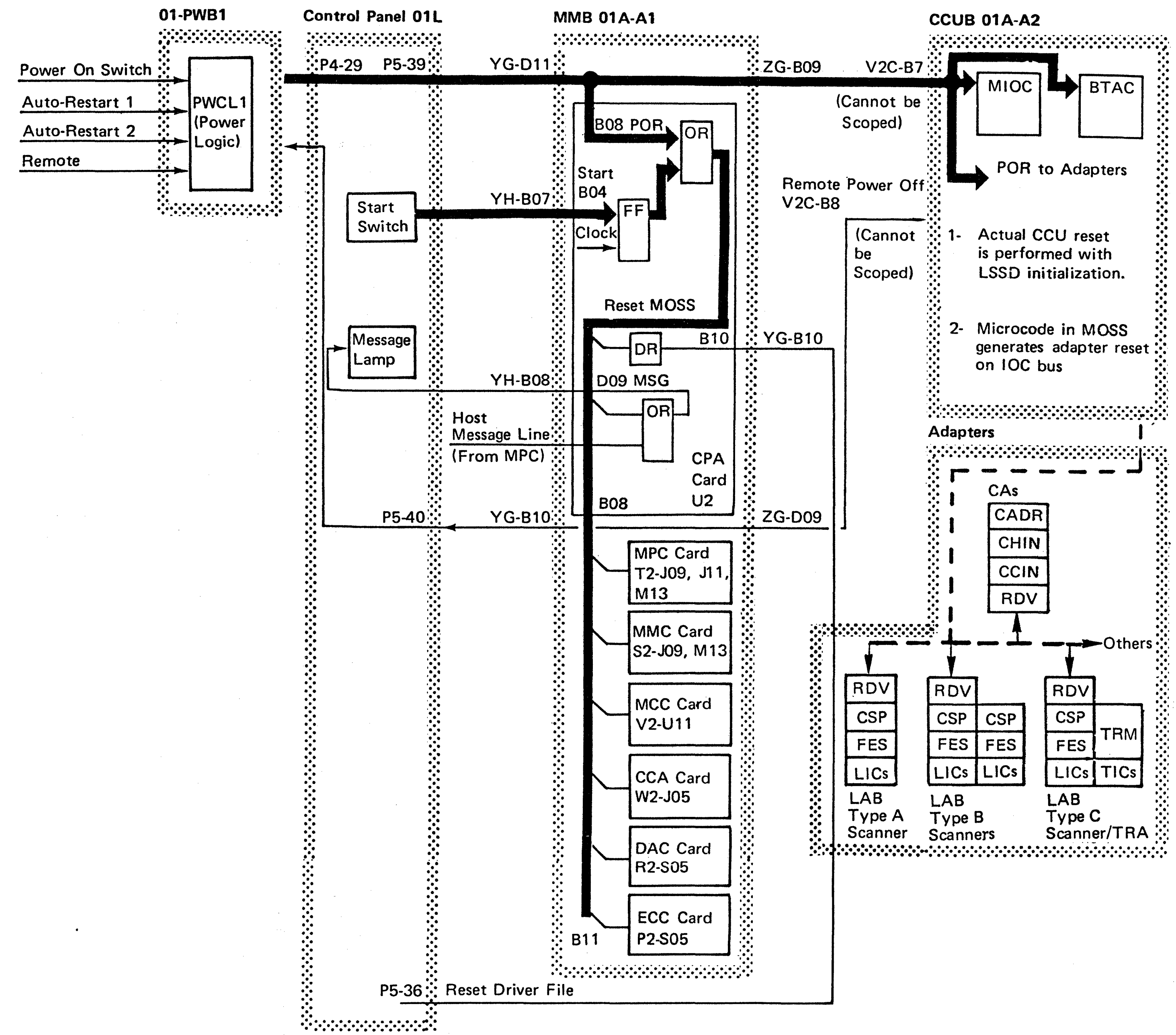
   In both cases, the POR signal itself is generated by the power logic card PWCL1 in the power board PWB1.

REMOTE POWER OFF (RPO)

This is an SNA command (010209) issued when the access method operator requests that the remote controller be powered off. An SDLC command precedes the remote power off so that if a control program is loaded, a re-IPL occurs and CLDP is called in to respond to the remote power off command. If CLDP is already loaded, a re-IPL does not occur. A remote power off may be a parameter of any of the following commands:

- Deactivate
- Dump
- Z (closedown)

CLDP informs MOSS that a remote power off command has been received by issuing an output X'71' (With byte X, bit 3 on). MOSS then displays the following message in field w of the MSA area of the 3727 screen "RPO detected on L XXX", where XXX is the decimal communication line address. CLDP then issues an output X'79' (With byte 0, bit 4 on) which activates the power off circuitry of the power supply. The power control switch must be in the "Network with Auto Power On" position for the power off to occur. If the switch was not in the proper position, setting it to the correct position has no effect after the output has been issued.



RESET FUNCTIONS

From the control panel, the reset line signal is sent to the CCU board (MIOC and BTAC cards). It is also sent to the CPA card.

The reset line starts the microcode in the MOSS by forcing a branch to storage address 0000 (MOSS ROS).

The hardware POR line, which is also sent from the CCU to the scanners, is not used. Instead, the adapter reset line in the IOC bus is sent to the adapters. This reset line is generated by the MOSS microcode at the beginning of each 3725 initialization phase 1 (see Table 2 on page 6-071).

Controller Initialization

The initialization of the 3725:

1. Tests the MOSS IML circuits using microcode from MOSS ROS and the TSS IML circuits using microcode from the TSS ROS.

2. Loads and initializes the MOSS microcode in MOSS storage (MOSS IML).

3. Initializes the hardware in the CCU (CCU IML).

4. Loads and initializes the 3725 load/dump program (CLDP) in the CCU storage, along with the IPL port(s) defined for this 3725 (channel and link).

5. Loads and initializes the microcode in the scanner(s) (scanner IML).

6. _Either_ loads and initializes the control program in the CCU storage (CCU IPL). This program is received from the host through a channel-attached or link-attached IPL port.
   _Or_ dumps the contents of CCU storage to the host through a channel or link IPL port.

The initialization step in progress (IML, then IPL) is displayed on the hex display of the control panel, and on line 3 of the machine status area (MSA) of the operator console.

When the initialization is complete, the message 'IPL COMPLETE' is displayed on the operator console, and message 000 stays on the hex display.

When initialization fails, an error code is displayed on the hex display and on the MSA.

The initialization is under control of the controller load/dump program (CLDP).

INITIALIZATION OF A CHANNEL-ATTACHED 3725

1. CLDP is loaded

2. Write IPL command is received, followed by a Write Break if loading or by a Write if dumping.

3. Scanners are IMLed (see note).

4. Multiple Write and No Op commands load the control program, or multiple Write and Read commands dump CCU storage.

5. Write Break followed by Write command ends a load.

6. If loading, the control program is now loaded and is given control. If dumping, the dump is complete and CLDP prepares for a load.

Note: The scanners may be IMLed before the Write IPL is received. However, the Write IPL may be detected and acted upon as soon as CLDP is loaded. In this case, the control program load and the scanner IMLs take place at the same time.

INITIALIZATION OF A LINK-ATTACHED 3725

1. The control program is loaded in the channel-attached 3725.

2. CLDP is loaded in the link-attached 3725 (see note).

3. Scanners are IMLed.

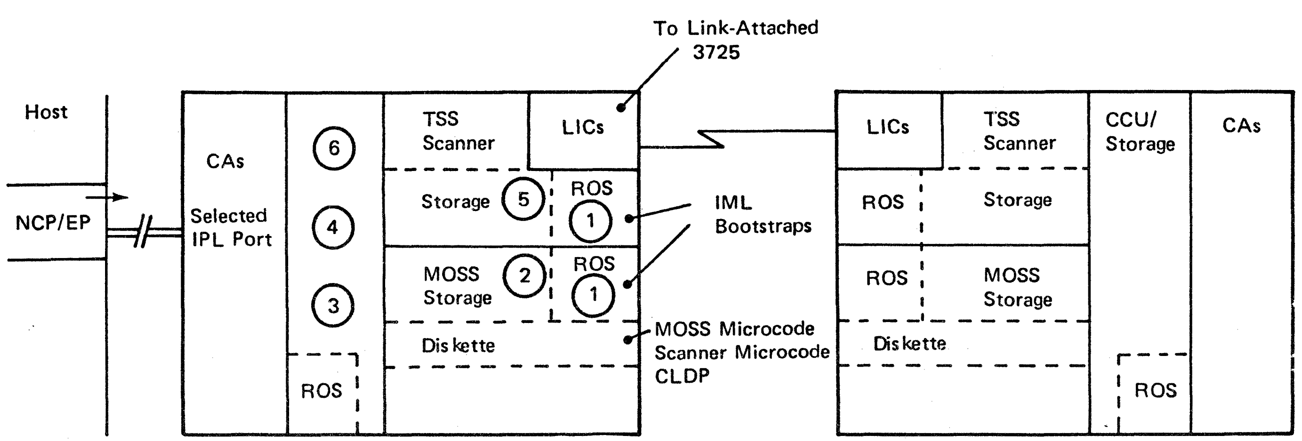
4. IPL Init or Dump Init is received on a defined link IPL port.

5. Multiple IPL texts load the control program, or Dump texts unload CCU storage.

6. IPL Final or Dump Final is received.

7. If loading, the control program is now loaded and is given control. If dumping, the dump is complete and CLDP prepares for a load. See descriptions of IPL exchanges and dump exchanges in this chapter for details.

Note: No Write IPL is received on any channel adapter of the link-attached 3725 before completion of the link IPL.



INITIALIZATION REQUESTS

The controller initialization can be started by the operator from the host console, from the 3725 control panel, or from the 3727 operator console.

The controller initialization can also be started automatically to recover from a faulty condition in the 3725. This is the case when NCP abends, when MOSS abends, when the ac input voltage is restored after a break, or on a CCU hardcheck.

The headings in the following table identify the extent of 3725 initialization caused by the conditions listed under each heading. The conditions not listed as automatic are manual requests.

Requesting a MOSS IML

The MOSS may be IMLed automatically or manually.

MOSS is automatically IMLed when Power On occurs or when the Power On Reset Switch is operated and the Function Select switch is in the Normal, MOSS IML, or Maintenance position. MOSS may also be IMLed automatically by microcode.

1. If the control program (NCP) is running, set MOSS offline (CCU function 5, selection 12).

2. Set the Function Select switch to the MOSS IML or Maintenance position.

3. Operate the Function Start switch.

4. the progress of the MOSS IML will be displayed on the hex display.

5. If the control program (NCP) is running, set MOSS online (CCU function 5, selection 11).

MOSS, CCU, and Scanner IML (Function Select switch in normal position)
==> At host site: . Power on from host (applies to CA-attached controller with Power Control switch in remote position and an EPO cable installed) ==> At 3725 site: . Power on . Function start from control panel ==> Automatic: . Repowering after ac power loss (with auto power on)
MOSS IML
==> At 3725 site: . Power on with Function Select switch in MOSS IML or Maintenance position. . Function Start switch with Function Select switch in MOSS IML or Maintenance position ==> Automatic: . Re-IML on MOSS Abend
CCU and Scanner IML
==> At host site: . Control program load ==> At 3725 site: . Reload request from console ==> Automatic: . Access method request . NCP request on NCP abends . Reload attempt on CCU hard checks
Selective Scanner IML
==> At 3725 site: . TSS services . CCU and scanner IML menu

Controller Initialization Sequence (Part 1 of 2)

The following tables list the phases and steps of a controller initialization. IPL phase 0 shows the initialization sequence starting from a MOSS that is not running. IPL phases 1 to 4 show the initialization sequence continuing from a MOSS that is running.

Phases 1A and 1B are mutually exclusive in a controller initialization. Phase 1B runs when an initialization results from:

1. A CCU hardcheck
2. The function start switch gets activated with the function select switch at normal and the 3725 is loaded with the control program.

The MOSS IML sequence itself varies with the request. In the following figure the request (power on, software, or start) points to the selected sequence of MOSS actions during phase 0 (A, B, C, or D in Table 1).

The hex display shows the initialization step in progress. The step can be part of MOSS IML, scanner IML, or CCU IML, or can be part of the control program loading (IPL). Any other value indicates an initialization error (refer to the 3725/3726 MIM Part 2).

```
               • POWER ON --------------------------->|
                 (associated with Function Select     |
                  switch)                             |
                                                      |
       |<----- • MOSS auto IML                        |
       |<----- • FUNCTION START Switch                |
       |         (associated with Function Select     |
       |          switch)                             |
       V                                              V
```

Software Requests		Power-On Requests	
Maintenance	MOSS Auto IML MOSS Dump MOSS IML	Maintenance	MOSS IML Normal
A	B	C	D

Note: For explanation of A, B, C, and D, see "MOSS Actions" in Table 1.

Notes:

1. This step is skipped if a MOSS dump is requested.
2. MOSS stops on this step and waits for operator action when the Function Select switch is set to Console Link Test.

Table 1: MOSS Not Running

IPL Phase	Hex Step	MOSS Action	MOSS Storage	MOSS Actions A	B	C	D
0		CONTROLLER RESET AND MOSS IML					
		MOSS processor checkout					
		. Basic MPC Test	ROS	x	x	x	x
		. ROS CRC Calculation	*	x	x	x	x
		. MPC Instruction Test	*	x	x	x	x
		. Register Space Part 2	*	x	x	x	x
		. Internal PIO Bus to CPA	*	x	x	x	x
		. Internal PIO Bus to Console	*	x	x	x	x
		. Hex Display Register (Wrap Mode)	*	x	x	x	x
		. ROS Test Controller Initialization	*	x	x	x	x
	F00						
		. IML/IPL Decode and CPA test	*	x	x	x	x
	F01						
		. Register Space (Part 1)	*			x	x
		. Partial Storage Test (Note 1)	*	x	x		
		. Complete Storage Test (MOSS storage reset to zero value)	*			x	x
	F03						
		. MPC Communication Adapter	*	x	x	x	x
		. External I/O Bus	*	x	x	x	x
	F04						
		. IOIRR Test	*	x	x	x	x
		. Interrupt Test	*	x	x	x	x
		. DAC Test	*	x	x	x	x
		. Diagnostic Exit Service	*	x	x	x	x
	F05						
		. RAM Test Controller Initialization	RAM	x	x	x	x
	F06	CCA TEST					
		. Valid Command Recognition	*	x	x	x	x
		. Test Rejection of Invalid Commands	*	x	x	x	x
		. Test Control Reg - Set/Reset/Read	*	x	x	x	x
		. Test Modem Control Reg - Write/Read	*	x	x	x	x
		. Test Modem Status Register	*	x	x	x	x
		. Timer Test (Part 1)	*	x	x	x	x
		. Timer Test (Part 2)	*	x	x	x	x
		. Enable/Disable Bit	*	x	x	x	x
		. Output Request/Receive Clock Run	*	x	x	x	x
		. Input Request	*	x	x	x	x
		. Input Request with RCV Mode Off	*	x	x	x	x
		. Overrun Bit/Set/Reset	*	x	x	x	x
		. Invalid Character Bit/Set/Reset	*	x	x	x	x
		. Break Byte Detected-Set/Reset	*	x	x	x	x
	F07						
		. CCA Wrap Test	*	x	x	x	x
		. Console Link Test (Note 2) (Function Select Switch on Console Link Test)	*				
		. Console Attached Test	*	x	x	x	x
		. Hex Display Test	*	x		x	
	F08						
		. MCC Test	*	x	x	x	x
		. MMC Test (Part 1)	*	x	x	x	x
	F09						
		. MMC Test (Part 2)	*	x	x	x	x
	F0A	MOSS Microcode Loading		x	x	x	x
	F0B	MOSS Initialization (Part 1)	*	x	x	x	x
	FE0	MOSS Initialization (Part 2)	*	x	x	x	x
	FEF	MOSS IML Complete	*		x		x

Controller Initialization Sequence (Part 2 of 2)

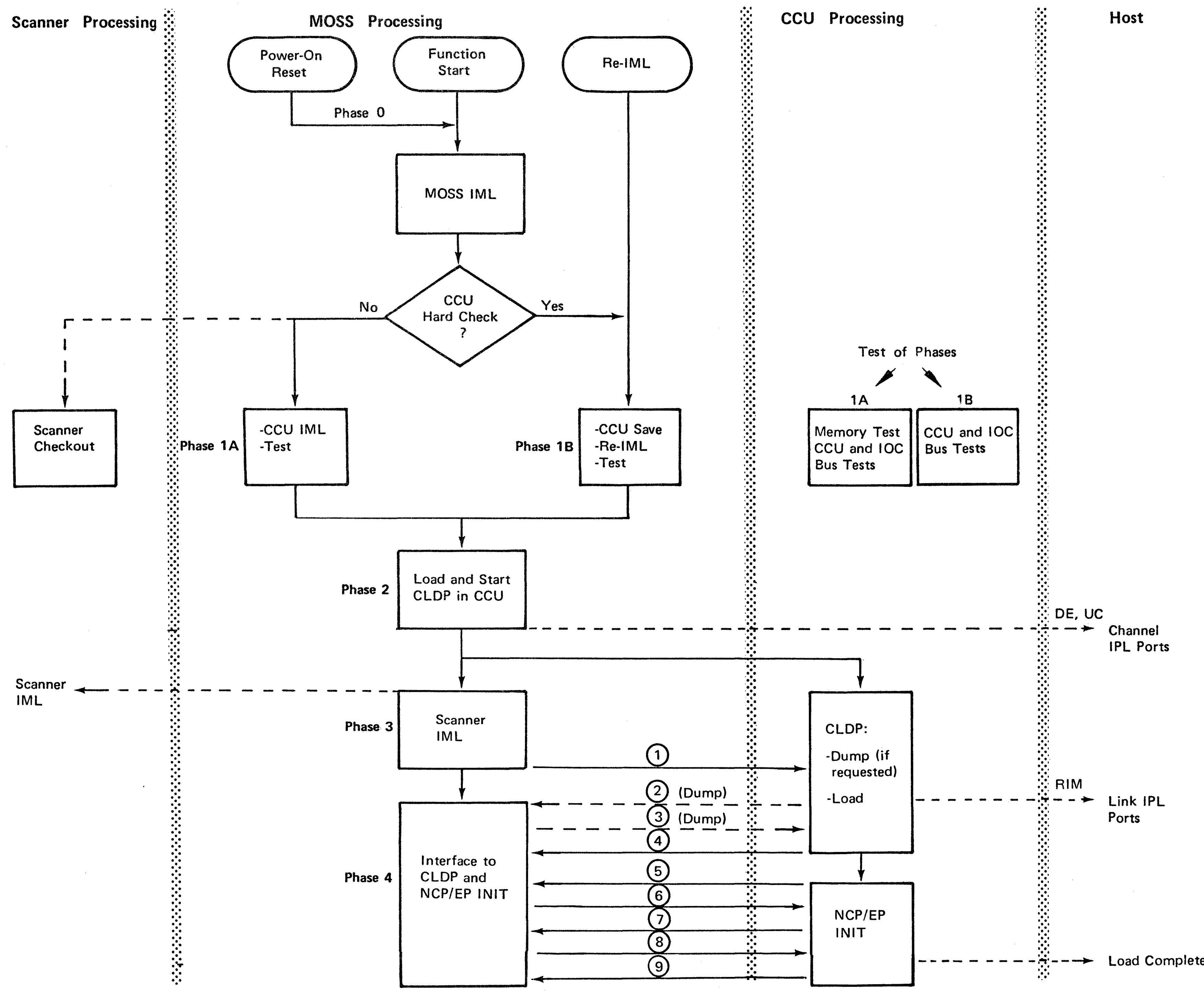
Table 2: MOSS Running

IPL Phase	Hex Step	MOSS/CCU Action	Scanner Action
1A	FF0 FF1	CONTROLLER INITIALIZATION CONTROLLER IPL ------------------->
 . LSSD Initialization . CCU LSRs Initialization to zero value . Main Storage Initialization to zero value with parity . Disable Storage Protect/Address Exception Mechanism . Initialize CA register with parity . Run CCU Initial Tests . Run IOC Bus Initial Tests	The reset sent to IOC adapters starts the scanner test from CSP ROS: . Start Initialization . CSP Branch . CSP LRI . CSP RI Type . CSP RR Type . CSP XI Type . CSP Copy Type . LS Byte Address . LS Space - (Odd) 0, 1 pattern . LS Space - (Even) 0, 1 pattern . Interrupt Mechanism . Masking Mechanism . Control Store 0/1 Instructions . Control Store Addressing . Control Store Patterns . AC XR1C (Part 1) . AC XR1D (Part 2) . AC Enable Data Store (Part 3) . AC Enable Data Fetch (Part 4) . FES to CSP Bus Test . Error Reg XR03 . Parity Check . IOC-Bus Connection XR00 . IOC-Bus Connection XR01 . IOC-Bus Connection XR02 . IOC-Bus Connection Ping Buffer . IOC-Bus Connection Pong Buffer . IOC-Bus Connection Ping Busy (Write) . IOC-Bus Connection Ping Busy (Read) . IOC-Bus Connection Ping Pong Busy . IOC-Bus Connection Pong Busy (Write) . IOC-Bus Connection Pong Busy (Read) . L1 Interrupt to CCU . Autoselect L2 Interrupt to CCU . Priority and Channel Request Test . IOC-Bus Test - Phase 1 . IOC-Bus Test - Phase 2 (ROS) . IOC-Bus Test - Phase 2 (RAM) . Timer (100 ms) . Interrupt to MOSS Test (TSS only) . Hard Stop Test

Table 2 (continued): MOSS Running

IPL Phase	Hex Step	MOSS/CCU Action	Scanner Action
1B	FF1	CONTROLLER RE-IPL . Stop Channel Monitoring Task . Stop CCU . Read Out LSSD and Store Contents on Diskette . Initialize LSSD . Reset IOC adapters . Enable redrive . Restart Channel Monitoring Task . Read Out LSRs and Store Contents on Diskette . Roll Out Last 16K bytes of Main Storage and Save Contents on Diskette . Get BERs in Storage (if any) and Store Contents on Diskette . Stop Channel Monitoring Task . Run CCU Initial Tests (except for host IPL request) . Run IOC Bus Initial Tests . Enable redrive . Restart Channel Monitoring	As for phase 1A
2	FF2	LOAD AND START CLDP . Load CLDP and IPL Port Definition in Rollout Area . Previously saved LSSD and LSR contents sent to CLDP (re-IPL only) . Give control to CLDP to monitor IPL ports and signal the hosts that control program loading may be started on a channel IPL port.	No action
3	FF3	SCANNER IML (Selective scanner IML is a MOSS function and is not part of the controller initialization.) . First use of mailbox to send to CLDP the list of scanners that have completed IML. . CLDP starts monitoring the defined link IPL ports for an IPL Init.	CSP storage set to zero Microcode on diskette broadcast to scanners by MOSS. The scanner code is sent on a block basis using the CCU/Scanner buffer. MOSS transmits blocks to the CCU buffer and each scanner gets each block through cycle steal. After a timeout, MOSS gets the "completion block" from each working scanner and resumes RAM loading with the next block.
4	FF4 FF5 FF6 FF7 000	CCU LOADING, DUMPING, AND INIT . The control program can start from the host if loading on link-IPL port . Start Branch Trace Write IPL command detected (from host) Loading on channel IPL port. . Loading on link IPL port. . CCU control program loaded . CCU initialization with CDF parameters . MOSS initialization with control program information table (CPIT) . CONTROLLER INITIALIZATION COMPLETE WITHOUT ERROR . Stop "Branch Trace" activity	The scanner handles the load traffic.

Controller Initialization Flow



Legend:

1. Scanner IMLs complete
2. Roll in 16K
3. Roll in complete
4. Control program loaded
5. Control program parameters
6. Control program parameters saved
7. CDF information requested
8. CDF information available
9. Control program initialized

Controller Initialization Phase Descriptions

PHASE 0: CONTROLLER RESET AND MOSS IML

This phase takes place only at power on. It consists of:

1. A controller reset (MOSS, MIOC, BTAC)
2. MOSS testing and MOSS IML

PHASE 1A: CONTROLLER IPL

Phase 1A activates the following steps in turn:

1. CCU LSSD initialization.
2. IOC bus adapter reset, which starts the scanner ROS diagnostics.
3. CCU local store register initialization with good parity and zero value.
4. CCU storage initial tests. All address exception bits for installed or not-installed storage blocks are initialized, the entire memory is reset to zero, and the correct parity and ECC bits are initialized.

   At the end of the test, the storage protect and address exception mechanism remains disabled.
5. CCU initial tests.
6. IOC bus initial tests, in conjunction with the scanner checkout test.

Any error during phase 1A stops the controller initialization.

PHASE 1B: CONTROLLER RE-IPL

Phase 1B activates the following steps in turn:

1. CCU stop.
2. Read out CCU LSSDs, which are saved on the diskette.
3. CCU LSSD initialization.
4. IOC bus adapter reset, which starts the scanner ROS diagnostic.
5. Read out CCU local store registers, which are saved on the diskette.
6. Roll out last 16K bytes of CCU storage, which are saved on the diskette.
7. Get the last BERs not transmitted to the MOSS (if any) from the check record pool and log them on the diskette.
8. CCU initial tests, except when the first IPL request is initiated from the host.
9. IOC bus initial tests.

Any error during the last two tests stops the controller initialization.

PHASE 2: LOAD AND START CLDP IN CCU

During this phase the controller loader/dump program is loaded from the diskette into the CCU rollout area along with the IPL port definition. The previously-saved CCU LSSD and local store registers are also passed to the CLDP, if they are available (controller re-IPL only).

The CLDP then monitors the CA IPL ports, if any CA(s) are installed and enabled, and signals to the host(s) that the controller is ready to receive the control program or a dump request.

CCU Rollout Area

		1.00K
Loading Address =======> of IPL Data in Reg 1.	CCU LS registers	0.50K
	CCU LSSD strings	0.25K
	IPL ports table	0.25K
	C L D P	8.00K
		4.00K
	MOSS/scanners communication	1.75K
	MOSS/CCU mailboxes	0.25K
=======> End of CCU Storage	////////////////////	

Communication with the CLDP:

- CCU work register 1 points to the CCU local store registers saved before the controller re-IPL.
- CCU work Register 2 contains a code indicating which information was retrieved:

  R2 = 0 ==> Both LSSD and local store registers available
  R2 = 1 ==> LSSD not available
  R2 = 2 ==> Local store registers not available
  R2 = 3 ==> Neither LSSD nor local store registers available

  External registers X'51' and X'52' contain the sense ID information to be returned to the host upon receipt of a sense ID command.

  These registers are invalid when selected during CCU normal operation; they are however used for communication with CLDP during initialization.

X'51'	X'52'
FF37	2500

  This value is fixed and identifies the 3725 controller.

PHASE 3: SCANNER IML

In this phase, the scanner IML support in the MOSS loads each scanner.

At the end of phase 3, the MOSS sends a 'scanner IML complete' mailbox command to the CLDP along with a list of the scanners that have performed IML. The CLDP then monitors any defined link-IPL ports for an IPL Init or Dump Init if an IPL or dump request has not yet been received over a channel adapter.

PHASE 4: CCU LOADING SUPPORT

The CCU control program is received from a host processor directly via a channel adapter (local controller), or indirectly via a TP link. If the IPL or dump request is received via a channel adapter, the actual loading of the control program or dump could have begun at the end of phase 2. The following steps take place during phase 4:

1. Process the Rollin 16K mailbox command.

   If the IPL is preceded by a dump, the dump routine is given control in the CCU by the CLDP, and the dump takes place. When the CCU rolled out area is needed, the CLDP sends this mailbox command to the MOSS which rolls back in the 16K storage block and returns to the CLDP the Rollin Complete mailbox command.
2. Process the Control Program Loaded mailbox command.

   When the CLDP finishes loading the NCP/EP, a message is passed to the MOSS, which displays it on the screen. It indicates that CCU control has been passed to the NCP/EP initialization by CLDP.
3. Process the Control Program Parameters mailbox command.

   Starts the "Branch Trace" activity on : all CCU levels, and all the CCU storage. When the branch trace buffer is full wrap mode is applied, CCU does not stop and there is no MOSS low level interrupt request.

   Once loaded, the CCU control program starts its initialization. One step of the initialization procedure passes to the MOSS the control program addresses, kept in the control program information table. This table points to specific areas in storage that the MOSS needs for executing CCU operations.
4. Send the Control Program Parameters Saved mailbox command.

   Once the parameters have been saved, this command is sent to the NCP/EP initialization to resume processing.
5. Process the CDF Request mailbox command.

   On this request, the MOSS passes to NCP/EP the CDF information used mainly by the CCU level 1 handler, and signals their ready state with the mailbox command CDF Information Available.
6. Process the Control Program Initialized mailbox command.

   At this time, the initialization of the control program is complete. The MOSS now displays the message 'IPL complete', and enters the 'MOSS online' state.

   The MOSS stops the "Branch Trace" activity.

Abnormal Conditions During Controller Initialization

1. An unconditional controller IPL request coming from a host during the processing of a previous IPL request is detected and serviced immediately. The controller initialization restarts from phase 1A unless the controller loader dump program remains in the CCU. In this case, the CLDP handles the initialization request, which can be control program dump or IPL. MOSS is transparent to this new request.

2. If a CLDP abend occurs (output X'70'), the MOSS stops the IPL application. A manual intervention is required to restart the initialization, which resumes from phase 1B.

3. If an NCP/EP initialization abend occurs (output X'79' + X'70'), the MOSS automatically resumes the initialization from phase 1B.

4. Program abends from the CLDP or NCP/EP initialization cause a CLDP rollout.

5. Any hardware check on the elements of the initialization path (MOSS, CCU, IPL port) causes an IPL abend.

6. A BER is logged if an IPL abend occurs, or when initialization is complete with non-blocking errors (for example, a scanner that cannot be IMLed).

USING CCU FUNCTIONS DURING INITIALIZATION

You may use the CCU functions (for example, display, alter) as soon as the CCU initialization is complete (phase 1A or 1B). During this phase, the LSSD strings, LSRs, and storage are initialized. Using the CCU function key (CCU FNCTN), you may switch from the initialization process to the CCU services, and conversely. This key can be used at any time during any initialization phase.

During step-by-step IPL, the CCU FNCTN must be used only when the IPL stop message, indicating a step end, is displayed on the console.

MOSS IML Step Description

INTRODUCTION

MOSS IML is done in steps starting from the MOSS physical reset and ending with the initialization of the MOSS microcode.

The IML microcode used is stored:

- On the MOSS ROS for IML steps 1 through 5
- On the diskette for the remaining steps

A description of these steps follows. MOSS IML stops when an error is encountered. An error code is displayed on the hex display of the control panel.

MOSS IML STEPS

Step 0: MOSS Reset

During this step the MOSS hardware components are physically reset when the initialization request comes from either the Power On/Off Switch (reset position) or the Function Start switch.

After this, or for other MOSS IML requests, the MOSS ROS test controller is given control. Hardware or software indicators are available to the ROS to identify any IML request.

Step 1: MOSS Processor Checkout

The IML code in the ROS is entered immediately at the end of the reset pulse or directly by a branch instruction from the MOSS level 0, which detects the MOSS re-IML request.

This step is dedicated to the testing of the MOSS processor. The main tested functions are:

- Instruction set
- Control store and register space
- ROS CRC calculation
- Console hardware in MPC

Functions performed in step 1 stop the IML if they are not successful.

During this step the ROS test controller tests the IML type.

Step 2: MOSS IOC Bus Testing/RAM Testing

During step 2, the MOSS internal bus and the RAM are tested. Functions performed in step 2 stop the IML if they are not successful.

Step 3: I/O Selection and Interrupt Mechanism

During step 3, the I/O selection and interrupt mechanisms are tested.

Functions performed in this step stop the IML if they are not successful.

Step 4: Diskette Testing

Step 4 is a disk adapter test. Functions performed in this step stop the IML if they are not successful.

Step 5: Execute Disk Bootstrap

During step 5, the diskette read and write functions are exercised.

The ROS IML section ends with the execution of the disk bootstrap, which loads the 'RAM test controller/MOSS loader' from a fixed address on the diskette into a fixed address in the RAM, to manage the rest of the IML sequence within the RAM.

Functions performed in step 5 stop the IML if they are not successful.

Diskette tests are made during the loading phase.

Step 6: CCA Card Test

During step 6, the CCA card is tested.

Step 7: EIA Card and Console Attached Test

When the function selected is 'maintenance', the hex display function is tested before executing the following steps.

Steps 8 and 9: MCC and MMC Card Test

During steps 8 and 9, the MCC card is tested.

Step 9: TTA Test, Loader Move, Loading of the MOSS

Step 10: Microcode Load in MOSS

Step 11: MOSS Initialization

Before being operational, the MOSS microcode must be initialized. After a first basic initialization (PSW, translate table array, switching from ROS to RAM support for MOSS levels 1 and 5, console initialization if power on), a second initialization takes place. This second initialization is done according to the request and to the MOSS environment.

- For 'Normal' or 'MOSS IML', the initialization ends as follows:
  - 'MOSS only running'
  - 'MOSS disconnected' from the rest of the system (if MOSS has been re-IMLed by the operator).

    The MOSS operator command 'MOSS online' sent via 'CCU services', is necessary to reconnect logically the MOSS to the CCU and to reach the 'system running' state, or one of the following states:
  - 'Controller IPL in progress' (in case of 'normal')
  - 'System running' (in case of MOSS auto re-IML and auto-reconnection)

  Finally the MOSS general menu is displayed on the console.

- For 'Maintenance' IML, the initialization phase first checks whether the service diskette is on the drive, and initializes the MOSS accordingly:
  - The BER logging task is deactivated, as its space in storage is required for the DCM.
  - The CCU background task is deactivated, as its space in storage is also required for the DCM.
  - The service diskette general menu is displayed.

  If the service diskette is not on the drive, this diagnostic IML is rejected, and an abend code (FEB) is displayed on the hex display.

Scanner IML Step Description

INTRODUCTION

Loading the microcode into the scanners is either a general function common to all scanners, or a selective function related to one scanner only.

From a scanner point of view, general or selective IML functions are supported by the same scanner ROS code.

From a MOSS point of view, the general IML of the scanners is a phase of the controller initialization, whereas the selective IML of a scanner is a TSS function.

IML requests are presented to the MOSS, which controls the scanner IML.

IML PRINCIPLE

An IML responder is located in the scanner ROS (CSP card).

The IML is done on a block transfer basis, between the MOSS diskette and the CSP RAM, via the MOSS RAM and the CCU main storage scanner communication area (see page 14-140).

This block transfer is completely transparent to the control program running in the CCU.

Blocks of code along with control information transit through the MOSS/scanner dedicated area, which is the last 2K bytes of the CCU RAM (minus the area for the CCU/MOSS mailboxes).

CCU commands are simulated via the MIOC interface.

IML STEPS

The IML of a scanner takes four steps.

Step 1: TSS Reset/IML

1. A general 'reset' signal is sent to every scanner (general IML) by the MOSS microcode during phase 1 of the controller initialization.

2. On the scanner side, checkout starts when the 'reset' signal is received. The checkout stops when it has exchanged the commands requested by the IOC bus test, which runs in the CCU during phase 1A or 1B of the controller initialization.

At this time, the scanner ROS is ready to handle the scanner IML commands.

Step 2: Get CSP Checkout Result

After a timeout, the MOSS fetches and tests the checkout result of any scanner. It uses IOH instructions sent to each scanner and specifying a 'read checkout status' command.

The MOSS flags the scanner as 'not IMLed' if the checkout result is bad, or if the scanner does not answer the IOH. The error is logged, and the IML sequence goes on if at least one scanner is working.

Step 3: Transfer of Block of Code

1. The MOSS sends the first IML commands with two MIOHs indicating the address of the communication area in the CCU RAM. Each scanner can then determine its address in the mailbox and the address of the buffer part of the communication area (see page 14-140).

2. The MOSS starts transferring the microcode under a block format. The block length is 1500 bytes (max).

3. The MOSS loads each block from the diskette to the 'buffer part' of the MOSS/scanner dedicated area in the CCU. In addition, the MOSS loads the 'control part' of each scanner within the dedicated area with command parameters such as:

   a. Block length

   b. Block address in RAM

4. The MOSS sends an MIOH instruction to each scanner specifying:

   a. Scanner address

   b. IML command

5. The MOSS initiates a timeout counter and waits for the end of transfer for the current block.

6. On the other side, receiving the MIOH command causes the scanner to cycle steal both the control information and the current block, and to store it in its RAM.

A transfer completion code is sent back into the dedicated area. If an error occurs, the scanner sends back an error status into the dedicated area.

Step 4: Get Block Transfer Completion

1. When the transfer of blocks of code is finished (MOSS timeout), the MOSS reads the transfer completion code returned by each scanner in its dedicated area.

2. If the command failed, the scanner is flagged as 'not IMLed' in the scanner configuration block residing in the MOSS RAM, and the error is logged.

3. The MOSS then loops, transferring the remaining blocks to the working scanners.

4. When scanner loading is complete, MOSS sends the 'init' signal to leave the scanners in the initialized state.

HANDLING WRITE IPL REQUESTS ON THE MOSS SIDE

When a Write IPL command is detected by the MOSS ('IPL detect' signal) all channels must be monitored by the MOSS to avoid timeout problems on the host, until the CLDP is ready to take over.

port channel. All other installed channel adapters are then considered non-IPL port channels.

1. The MOSS does not require more than 5 ms to stop the CCU because the handling of 'IPL detect' is performed in the MOSS level 1 code.

   In the case of a MOSS automatic re-IML, the NCP rejects the IPL request coming from the host. The MOSS forces an IML as if it were requested by the MOSS operator, provided the 'IPL detect' signal has been kept by the MIOC.

2. The 'write IPL detect' signal is propagated directly to the MOSS without any intervening CCU logic. It is latched in the MIOC.

   This latch is reset either by the MOSS level 1 microcode when initiating the IPL procedure, or by the hardware system reset of the controller.

   The information is kept until one of the two above events occurs. The MOSS does not have to respond to this signal itself on the IPL port channel, but only to start the IPL procedure.

3. The 'write IPL detect' signal causes a level 1 interrupt on the MOSS. During this interrupt, the CCU is stopped and a cancel request is posted to the MOSS supervisor (level 6). The cancel handler not only cancels active tasks but also initiates a resident task, the channel adapter monitor, which runs on level 7.

The channel adapter monitor surveys all installed channel adapters. Its main functions are:

a. To terminate all active or new channel adapter commands with (CE), DE, UC except for Sense, Sense I/O, or Write IPL.
b. If a Sense is received it is answered 'not initialized' and a CE/DE status if a Write IPL has not been already received and 'command reject, not initialized', with CE, DE, UE if a Write IPL has been received.
c. If a Sense I/O is received the channel identification is returned.

d. If a Write IPL is received it has already been answered with CE by the channel adapter. The channel adapter monitor does nothing on a channel adapter with Write IPL.

For non-IPL port channels the handling is as follows depending on the condition detected on the channel:

For stacked status:

- Monitor for dropping of 'suppress out'.

- Present the status stored in the channel adapter.

For bus out check:

- If initial selection, reset the bus out check only.

- If not initial selection, reset the bus out check and present CE, DE, UC status.

For selective system reset:

- Reset system reset/NSC address active.

For level 1 interrupts:

- The error is logged and the IPL is aborted.

- DE is sent to the IPL port channel.

- The controller is reset, thus disabling all channel adapters.

For halt I/O (Interface Disconnect):

- The MOSS does not know the status of ESC operations so it does not present any status to interface disconnect.

- If the interface disconnect is for the NSC, and if 'NSC address active' is set, an ending status (CE), DE, UC is presented.

Note: The channel adapter monitor task is called whenever a CCU control program is running when a re-IPL is requested, except for a re-IPL due to a CCU hard check.

The channel adapter monitor calls itself back every 500 ms and monitors all channel adapter interrupts on both levels 3 and 4 of the CCU. It is deactivated by IPL phase 2 when control is given to the CLDP, and when the CCU and IOC bus test runs in phase 1.

The IPL application is then loaded. For a reinitialization of the controller, phase 1B is loaded. It causes a run of the CCU and IOC bus test diagnostics. Phase 2 then loads the CLDP and gives control to it. Initialization then continues with phases 3 and 4.

If the MOSS is down, the Write IPL detect is ignored by the MOSS. In this case, the NCP must reject the IPL request by presenting DE, UC then Command Reject to the following Sense.

The channel adapter hardware always answers with an immediate CE to a Write IPL command. The MOSS accepts the first and rejects any other conditional IPL by answering Sense with 'not initialized' and CE, DE if first or 'not initialized' and CE, DE, UE status if not first. Write IPL is handled as follows:

- If no re-IPL is in progress, the MOSS level 1 starts the initialization

- If a re-IPL is in progress (up to the end of CLDP: 'NCP loaded' in mailbox or CLDP abend) the Write IPL is ignored on the MOSS side. It is handled by CLDP, which rejects any subsequent Write IPL with DE, UC and answers the following sense command with 'command reject, not initialized'.

  CLDP also rejects any conditional IPL (Sense) when an IPL port has been accepted. This rejection is made with 'not initialized', CE, DE, UE.

Note: All commands received on an ESC subchannel, with the exception of Sense, are ignored; however, interrupts are reset. Sense is answered with timeout no matter what the preceding command was.

IPL Exchanges over Channel IPL Port

This figure indicates the sequence of loading a control program into the 3725 over a channel IPL port when an IPL has been started, except when the IPL is initiated from the host.

When the IPL is initiated from the host, the DE, UC, and sense are not sent by the 3725, but the remaining sequences are the same.

During and IPL, the responder is CLDP in the 3725. The host system can start sending the control program to the 3725 as soon as the CLDP has been loaded (end of IPL phase 2). The host continues sending the remainder of the control program to the 3725 through IPL phase 5.

For events that cause an IPL, see "Initialization Requests" on page 6-060.

IPL EXCHANGE MECHANISM (CHANNEL IPL PORT)

```
|Access method   |        CA        |              CCU               |     MOSS      | 3727 Screen    | Hex Display |
|                                                                                                                    |
|  Channel type:                                                     |               |   (Note 1)     |             |
|. Byte channel to exchange 8, 16, 32, 64 or burst ≤ 255 bytes       |               |                |             |
|. Block channel to exchange burst ≤ 255 bytes                       |               |                |             |
|                |                  |                                |     ---------> IPL PHASE 2     |     FF2     |
|                |                  |         <------------------- Load CLDP       |                |             |
|                |                  |                                |(+ IPL port    |                |             |
|                |                  |                                | defined)      |                |             |
|                |                  |. CLDP enables CAs              |               |                |             |
|                |                  |. Interface Switches on panel   |               |                |             |
|                |           DE, UC |  to "Enbl"                     |               |                |             |
|Sense (04) <--------------------------- Send status (IPL required)  |    ----------> IPL PHASE 3     |     FF3     |
|    |                              |                                | IML Scanners| ENABLED PORTS  |             |
|    └------------------------------->                              |      |       | CA YNNNNN      |             |
|                  Sense (not initialized)                           |      |       | L NNNNNNNN     |             |
|           <-----------------------------                           |      V --------> IPL PHASE 4   |     FF4     |
|Not initialized |                  |                                |               |                |  (Note 2)   |
|detected,       |                  |                                |               |                |             |
|IPL required    |                  |                                |               |                |             |
|                |                  |              Interrupt to MOSS               |   WRITE IPL    |     FF5     |
|Write IPL (05)----> - - - - - ┌------------------------------------------>  ----> DETECTED ON CA1|             |
|Access method   | CE          | |                                   |               |                |             |
|waits up to 3 <-----          └----> Interrupt level 3              |               |                |             |
|minutes for DE  |           DE |                                    |               |                |             |
|status to write <------------------ Send status after all           |               |                |             |
|IPL before      |                  |  other IPL ports are           |               |                |             |
|timing out      |                  |  disabled                      |               |                |             |
|Write Break (09)-->                | Main storage loaded  ----------->     ------>  LOAD IN          |             |
|                                   | progressively. Level 3         |               |PROGRESS ON CA1 |             |
|                                   | interrupt occurs after         |               |                |  (Note 3)   |
|             <---CE, DE status     | each write and after the       |               |                |             |
|Write (01)-------->                | last write break               |               |   (Note 4)     |             |
|             <---CE, DE status     |                                |               |                |     FF7     |
|Write continues-->                 |                                |               |                |             |
|             <---CE, DE status     |                                |               |                |             |
|Write Break (09)--->               |                                |               |                |             |
|             <---CE, DE status     |                                |               |                |             |
|Write (01)-------->                | CLDP presents CE to last       |      ------> IPL COMPLETE      |     000     |
|             <---CE status         | write and passes control to|Load Complete|                |             |
|Access method   |                  | NCP/EP.  NCP/EP present DE     |               |                |             |
|waits up to 3 <---DE status        | status after initialization|               |                |             |
|minutes for DE  |                  |                                |      ------> (Line 3 of        |             |
|status to last  |                  |                                |               | MSA cleared    |             |
|write before    |                  |                                |               |                |             |
|timing out      |                  |                                |               |                |             |
|                |                  |                                |               |                |             |
|Load complete   |                  |                                |               |                |             |
|message to host |                  |                                |               |                |             |
|operator        |                  |                                |               |                |             |
```

Notes:

1. Refer to Chapter 7 of the _3725 Problem Determination and Extended Services_ for a description of the IPL progress messages that appear on line 3 of the machine status area.
2. FF4 is displayed only if a Write IPL command has not been received from the host before the scanners are IMLed.
3. FF6 is displayed only during an IPL or dump over a link IPL port.
4. On line 2 of the machine status area, X72: XXXXXX indicates the progression of the IPL by displaying the CCU storage addresses. The X'72' contents increment until the IPL is complete.

Dump Exchanges over Channel IPL Port

This figure indicates the sequence of dumping the storage contents of a 3725 after a control program abend via a channel adapter. After the abend MOSS loads CLDP and CLDP is the responder during the dump sequence. If a dump is initiated from the host with a control program still active (no abend), the DE, UC, and sense are not sent by the 3725 but the remaining sequences are the same.

The dump can proceed as soon as CLDP has been loaded (end of IPL phase). The dump continues until the last read command is received by CLDP. The C is then ready to receive another dump or program load sequence. The hex display remains FF5 after the dump is completed.

<u>Caution:</u> After a control program abend, a control program dump may be taken. MOSS console or operator panel switches should not be used before or during the dump.

DUMP EXCHANGE MECHANISM (CHANNEL IPL PORT)

```
+--------------------------------------------------------------------------------------------------------------+
|Access Method    |      CA        |             CCU              |     MOSS      | 3727 Screen    | Hex Display |
|--------------------------------------------------------------------------------------------------------------|
|                 |                | Control program abends and   |               |   (Note 1)     |     000     |
|                 |                | informs MOSS ------------------->MOSS starts|                |             |
|                 |                |                              |IPL sequence----> IPL REQ       |     FF0     |
|                 |                |                              |               |  IPL           |             |
|                 |                |                              |               |  IPL PHASE 1   |     FF1     |
|                 |                |                              |     -----------> IPL PHASE 2   |     FF2     |
|                 |                |                    <------- Load CLDP        |                |             |
|                 |                |                              |(+ IPL port    |                |             |
|                 |     DE, UC     |                              | defined)      |                |             |
|Sense (04)  <--------------------- CLDP sends status             |      --------> IPL PHASE 3     |     FF3     |
|   |             |                | (IPL required)               |IML SCANNERS   | ENABLED PORTS  |             |
|   └------------------------------->                             |      |        | CA YNNNNN      |             |
|                 |                |                              |      |        | L NNNNNNNN     |             |
|           <-------- Sense (Not initialized)                      |      V -------> IPL PHASE 4    |     FF4     |
|Not Initialized  |                |                              |               |                |  (Note 2)   |
|detected,        |                |                              |               |                |             |
|IPL required.    |                |                              |               |                |             |
|Host operator    |                |                              |               |                |             |
|requests dump.   |                |           Interrupt to MOSS  |               |                |     FF5     |
|                 |                |                              |               |    CA IPL      |             |
|Write IPL (05)----> - - - - - ┌------------------------------------->      ---->DETECTED ON CA1  |             |
|            <----- CE       | |                                |               |                |             |
|                 |          └----> Interrupt level 3           |               |                |             |
|                 |           DE |                              |               |                |             |
|            <-------------------- Send status                   |               |                |             |
|Write (01) ------>              |                              |     --------> DUMP IN          |             |
|            <--- CE, DE status |                              |               |PROGRESS ON CA1 |             |
|Read (02)  ------>              |                              |               |                |             |
|            <--- CE, DE status |                              |               |                |             |
|Writes (01) and |                 |                              |               |                |             |
|reads (02) continue --->          |                              |               |                |             |
|            <--- CE, DE status |                              |               |   (Note 3)     |             |
|Read (01)-Last   |                |                              |               |                |             |
|command in dump ---->             |                              |               |                |             |
|Sequence is a    |                |                              |               |                |             |
|Read             |                |                              |               |                |             |
|            <--- CE, DE status |                              |               |                |             |
|Dump Complete    |                |                              |               |                |             |
|message to host  |                |                              |               |                |             |
|operator         |                |                              |               |                |             |
+--------------------------------------------------------------------------------------------------------------+
```

<u>Notes:</u>

5. Refer to Chapter 7 of the <u>3725 Problem Determination and Extended Services</u> for a description of the IPL progress messages that appear on line 3 of the machine status area.
6. FF4 is displayed only if a Write IPL command has not been received from the host before the scanners are IMLed.
7. On line 2 of the machine status area, X72: XXXXXX indicates the progression of the dump by displaying the CCU storage addresses. The X'72' contents increment until the dump is complete, that is, the Dump Complete message appears on the host console.

IPL Exchanges over Link IPL Port

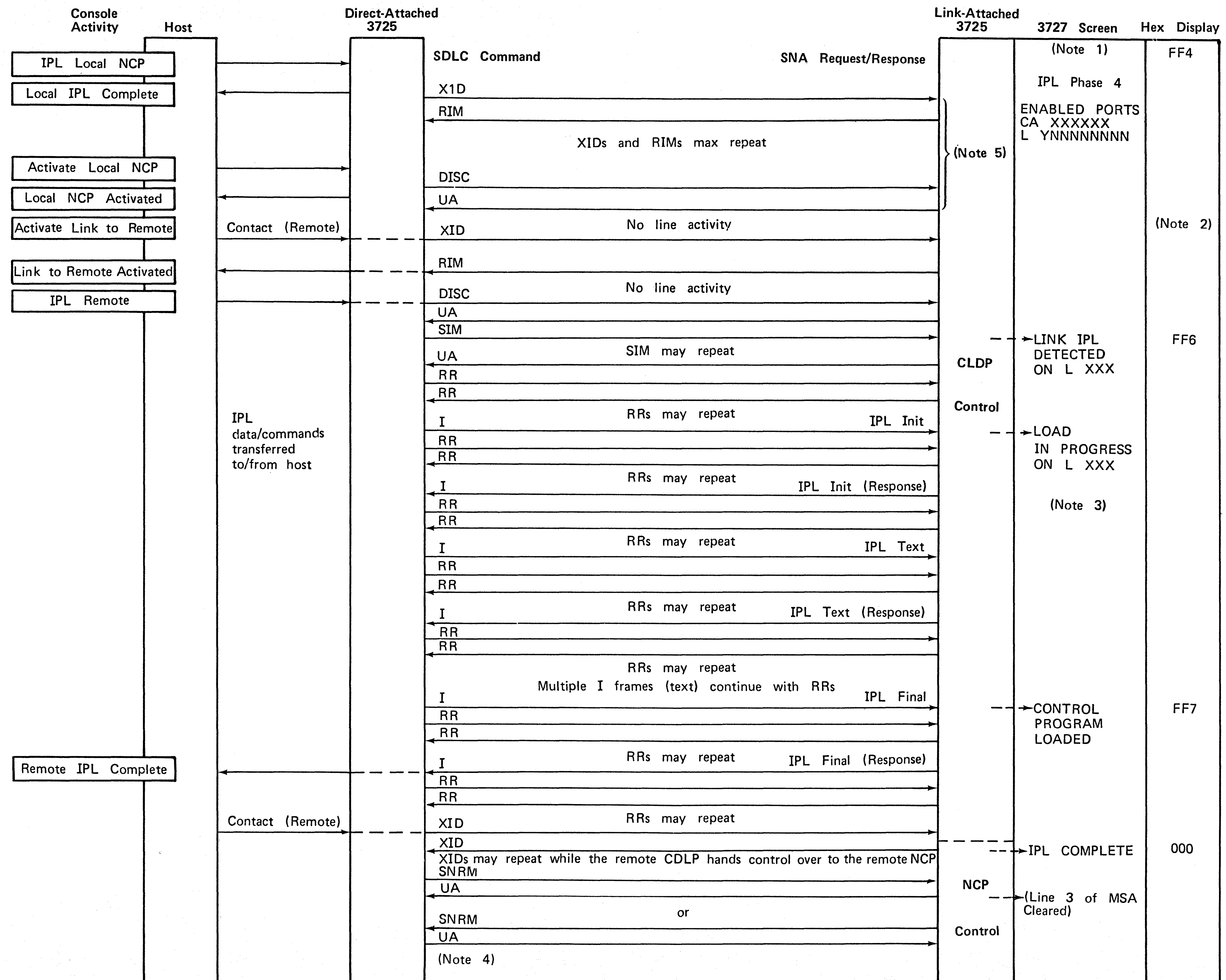
The figure on the following page indicates the sequence of loading a control program into a link-attached 3725 over a link IPL port. The CLDP is the responder in the link-attached 3725. The control program has to be already loaded in the channel-attached 3725.

IPL phases 0 through 3 are not shown, since IPL phase 4 has to be entered before an IPL over a link can take place (scanners must be IMLed). Refer to pages 6-070 and 6-090 for descriptions of IPL phases 0 through 3 and expected hex displays. Refer to page 6-170 for a trace of a remote load.

The following notes correspond to the note references on the next page.

Notes:

1. Refer Chapter 7 of the 3725 Problem Determination and Extended Services for a description of the IPL progress messages that appear on line 3 of the machine status area.
2. FF5 is displayed only during IPL or over a channel adapter IPL port.
3. On line 2 of the machine status area, X '72': XXXXXX indicates the progression of the IPL by displaying the CCU storage addresses. The X'72' contents increment until the IPL is complete.
4. The NCP with the highest-numbered subarea becomes the primary and generates the SNRM. An SNRM with an XID may occur before the SNRM/UA.
5. These first four lines of exchange may or may not occur depending upon individual generation parameters.



Remote End Line Trace of Remote Load (Part 1 of 2)

```
          (Note 1)     (Note 2)
IPL local NCP          XID     7E FF BF 24 2C FF F0 00 00 00 00 40 08 00 06 77 01 00 00 00 06 00 00 D9 ...... 00 80 E2 7E
                       ---
                       RIM     7E 50 17 8E B8 7E
                         XID and RIM sequences repeat
Activate local NCP     DISC    7E FF 53 99 90 7E
                       ----
                       UA      7E 50 73 AC 9D 7E
                         Line activity stops
Activate link to remote XID    7E FF BF 24 2C FF F0 00 00 00 00 40 08 00 06 77 01 00 00 00 06 00 00 D9 ...... 00 80 E2 7E
                       ---
                       RIM     7E 50 17 8E B8 7E
                         Line activity stops
IPL remote NCP         DISC    7E FF 53 99 90 7E
                       ----
                       UA      7E 50 73 AC 9D 7E
```

```
           (Note 3)    (Note 2)
                       SIM     7E FF 17 B9 94 7E
                       ---
                         SIMs may repeat

                       UA      7E 50 73 AC 9D 7E
                       RR      7E 50 11 B8 DD 7E
                       --
                       RR      7E 50 11 B8 DD 7E
                         RRs repeat
(IPL INIT)             I       7E 50 00 1C 00 60 00 30 00 00 15 00 08 0B 80 00 01 02 03 60 31 CC F9 7E
                       -
                       RR      7E 50 11 B8 DD 7E
                       --
(IPL INIT RESPONSE)    I       7E 50 30 1C 00 30 00 60 00 00 15 00 06 8B 80 00 01 02 03 0C FD 7E
                       RR      7E 50 31 BA FC 7E
                       --
                       RR      7E 50 31 BA FC 7E
                         RRs repeat
(IPL TEXT)             I       7E 50 22 1C 00 60 00 30 00 00 16 02 08 0B 80 00 01 02 04 60 31 71 4C 01 ...... E4 EA FA 7E
                       -
                       RR      7E 50 31 BA FC 7E
                       --
(IPL TEXT RESPONSE)    I       7E 50 52 1C 00 30 00 60 00 00 16 00 06 8B 80 00 01 02 04 EC 4D 7E
                       RR      7E 50 51 BC 9F 7E
                       --
                       RR      7E 50 51 BC 9F 7E
                         RRs repeat
                       I   ┐
                       -   |
                       RR  |
                       --  |
                       I   > The IPL text sequence is repeated as above for the remainder of the program load.
                       RR  |
                       --  |
                       RR ─┘
```

Remote End Line Trace of Remote Load (Part 2 of 2)

```
(IPL Final)                I       7E 50 00 1C 00 60 00 30 00 02 45 00 0C 0B 80 00 01 02 05 60 31 00 04 50 48 DD 5D 7E
                           RR      7E 50 11 B8 DD 7E
(IPL Final Response)       I       7E 50 30 1C 00 30 00 60 00 02 45 00 06 8B 80 00 01 02 05 83 D9 7E
                           RR      7E 50 31 BA FC 7E
                           RR      7E 50 31 BA FC 7E
                           XID     7E FF BF 24 2C FF 00 00 00 00 04 00 08 00 06 77 01 00 00 00 06 00 00 D9 ...... 00 80 E2 7E

                  (Note 4)    XIDs repeat from local NCP while remote CLDP passes control to remote NCP

                           XID     7E FF BF 24 2C FF 00 00 00 00 04 00 08 00 00 00 01 00 00 00 09 00 00 D9 ...... 00 81 4A 7E
                           XID     7E FF BF 24 2C FF 00 00 00 00 04 00 08 00 06 77 01 00 00 00 06 00 07 D9 D4 D7 E3 F0 F2
                                   D3 40 00 00 01 21 00 00 00 30 00 00 07 00 00 00 00 00 31 A57E
                           SNRM    7E FF 93 95 56 7E
                           UA      7E 06 73 8B 1A 7E
```

Notes:

1. These first four lines of exchange may or may not occur depending upon individual GEN parameters.
2. Receive data is shown underscored, for example, XID.
3. Comments between parentheses, for example (IPL Init), are SNA requests or responses.
4. The local and remote NCPs exchange XIDs. The XIDs contain descriptive data about the NCPs including their subarea address. The NCP with the highest subarea address is resolved to become the primary station and transmits a SNRM . The NCP with the lower subarea address becomes the secondary and responds by transmitting a UA. For further details of these records, see Systems Network Architecture Reference Summary, GA27-3136.

Dump Exchanges over Link IPL Port

The figure indicates the sequence of dumping a control program over a link IPL port. In this example, the remote NCP has abended and CLDP must be loaded to act as a responder in the remote. For an example of the trace of a remote dump, see page 6-190.

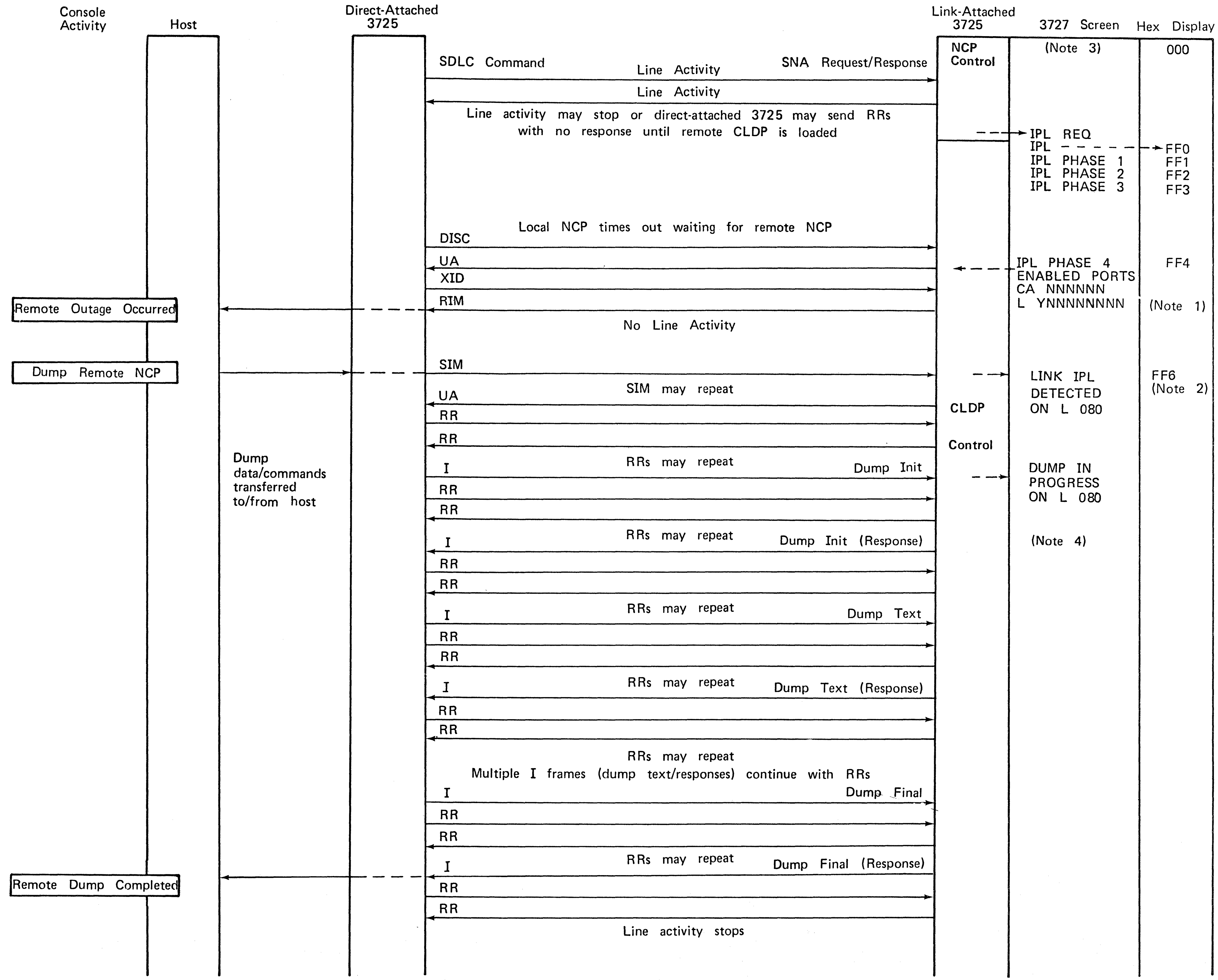
<u>Notes:</u>

1. FF5 is displayed only during IPL over a channel adapter.

2. FF6 is displayed during the dump and dump completion. The CLDP is then ready to receive another dump or load sequence.

3. Refer to Appendix A of the <u>3725 Operating Guide</u> for a description of the IPL progress messages in the machine status area.

4. On the 3727 screen, X'72' indicates the progression of the dump by displaying addresses that increment until the dump is complete.



Remote End Line Trace of Remote NCP Abend and Dump Transfer (Part 1 of 2)

Any normal line activity may be taking place when the remote NCP abends
All line activity stops while CLDP is being loaded in the remote 3725 and the local NCP is timing out

(Note 2)

Local NCP Error Recovery	DISC	7E FF 53 99 90 7E
	UA	7E F9 73 4B E5 7E
	XID	7E FF BF 24 2C FF F0 00 00 00 00 40 08 00 06 77 01 00 00 00 06 00 00 D9 ...... 17 69 C0 7E
Remote CLDP Req. Initialization	RIM	7E F9 17 69 C0 7E

Local NCP notifies host of lost line

Host displays console message that remote outage has occurred

Host operator enters dump request for remote NCP

(Note 1)	SIM	7E FF 17 B9 94 7E
	SIM	7E FF 17 B9 94 7E
	UA	7E F9 73 4B E5 7E
	RR	7E F9 11 5F A5 7E
	RR	7E F9 11 55 A5 7E
(Dump Init)	I	7E F9 00 1C 00 60 00 30 00 02 4A 00 08 0B 80 00 01 02 06 60 31 81 89 7E
	RR	7E F9 11 5F A5 7E
(Dump Init Response)	I	7E F9 30 1C 00 30 00 60 00 02 4A 01 92 8B 80 00 01 02 06 00 10 08 01 00 00 1B BA 00 00 00 00 00 01 CC C0 00 00 44 00 00 00 1E 4C 00 00 00 1D 00 01 CB FC 00 00 ...... 00 6A EB 7E
	RR	7E F9 31 5D 84 7E
	RR	7E F9 31 5D 84 7E

RRs may repeat

(Dump Text)	I	7E F9 22 1C 00 60 00 30 00 02 4B 00 0E 0B 80 00 01 02 07 60 31 00 00 00 00 02 00 04 0E 7E
	RR	7E F9 31 BA FC 7E
(Dump Text Response)	I	7E F9 52 1C 00 30 00 60 00 02 4B 02 06 8B 80 00 01 02 07 71 4C 01 AA 71 ...... 00 2A BA 7E
	RR	7E F9 51 4A 92 7E

Dump text sequences repeat for the remainder of remote storage

(Dump Final)	I	7E F9 AA 1C 00 60 00 30 00 0A 4B 00 08 0B 80 00 01 02 08 60 31 46 B9 7E
	RR	7E F9 B1 B2 78 7E
(Dump Final Response)	I	7E F9 DA 1C 00 30 00 60 00 0A 4B 00 06 8B 80 00 01 02 08 B2 65 7E
	RR	7E F9 D1 B4 1B 7E
	RR	7E F9 D1 B4 1B 7E

All line activity stops and host console displays message that dump is complete

Remote End Line Trace of Remote NCP Abend and Dump Transfer (Part 2 of 2)

(Dump Final	<u>I</u>	7E F9 AA 1C 00 60 00 30 00 0A 4B 00 08 0B 80 00 01 02 08 60 31 46 B9 7E
	<u>RR</u>	7E F9 B1 B2 78 7E
(Dump Final Response)	I	7E F9 DA 1C 00 30 00 60 00 0A 4B 00 06 8B 80 00 01 02 08 B2 65 7E
	<u>RR</u>	7E F9 D1 B4 1B 7E
	RR	7E F9 D1 B4 1B 7E
	All line activity stops	

<u>Notes:</u>

1. Comments between parentheses, for example (IPL Init), are SNA requests or responses.
2. Receive data is shown underscored, for example, <u>XID.</u>

Chapter 7. Diskette Drive

Contents

General Description (Part 1 of 2)

IBM diskette drives are direct access read/write storage devices. They use a flexible magnetic disk as the storage medium.

The diskette drive can read from and write to both sides of a 2D diskette. It can read and write in either frequency modulation (FM) or modified frequency modulation (MFM).

DISKETTE DESCRIPTION

The IBM diskette is a thin flexible disk, permanently contained in its protective jacket. Information is stored magnetically on the diskette surface, which is covered with the magnetic recording material. The diskette is free to turn inside the jacket; as the diskette turns, the inner surface of the jacket cleans the diskette.

The diskette jacket has three holes:

- The first (central) hole is used by the drive to turn the diskette.
- The second hole allows the read/write head to make contact with the diskette.
- The third hole allows the photosensor to sense the index hole in the diskette.

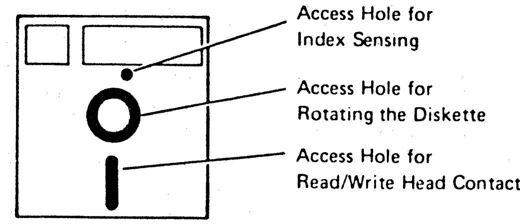
For storage, the diskette (in its jacket) can be placed in a protective envelope.

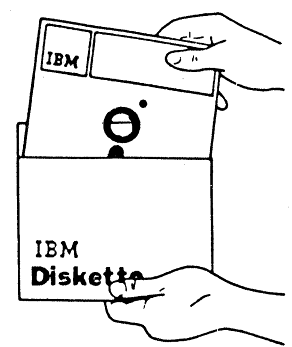
Information is stored on the diskette on a circular path called a 'track'. As the diskette turns, the track passes under the read/write head.

Each side of the diskette contains 77 tracks (tracks 00 through 76). The outside track (track 00) is reserved as a label track, and cannot be used for data. Tracks 75 and 76, the two tracks closest to the center, are reserved as alternate tracks, and can be used only for data if another track becomes damaged. A total of 74 tracks is thus available for data on each side of a diskette 2D.

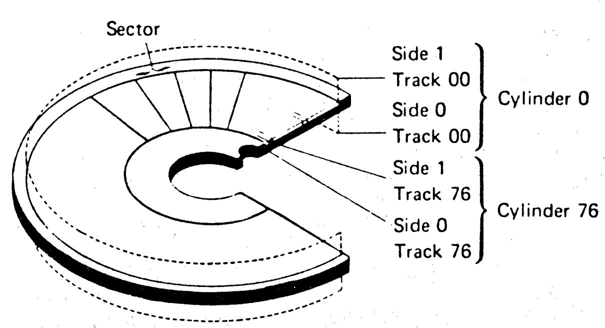
As the diskette is double sided, the two tracks (one on either side) that are accessible for one position of the read/write heads are collectively referred to as a 'cylinder'.

Each track is divided into 26 'sectors'; each sector can store 256 bytes (except for track 00, side 0, which can store only 128 bytes per sector).





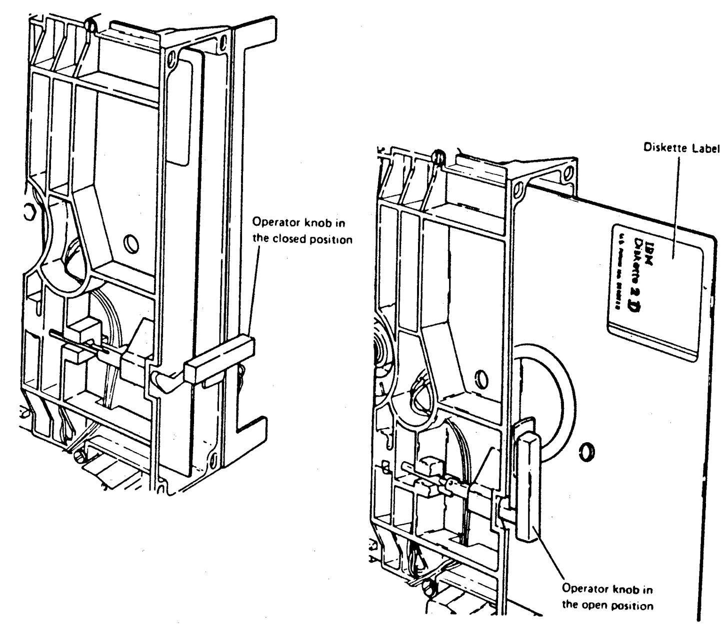
Diskette 2D



DISKETTE USE

Inserting the Diskette

1. Turn the operator knob to the 'open' position.
2. Remove the diskette from its protective envelope.
3. Insert the diskette squarely into the diskette drive with the label facing the knob. The slot for the read/write heads must be horizontal and must enter the drive first, as shown in the figure below:



4. Turn the operator knob to the closed position.

Removing the Diskette

1. Turn the operator knob to the 'open' position.
2. Remove the diskette from the drive.
3. Replace the diskette in its protective envelope.

MAINTENANCE

The diskette drive requires no planned maintenance. Failures in the diskette drive and its interface to the MOSS (DAC card) may be diagnosed with the help of the MAPs in Part 2 of this manual. When an adjustment, service check, or FRU replacement is required, the MAPs refer to maintenance procedures in this section.

Note: The drive may be powered off independently to perform these procedures.

Diskette repair actions can be verified online during MOSS IPL without disturbing controller operations.

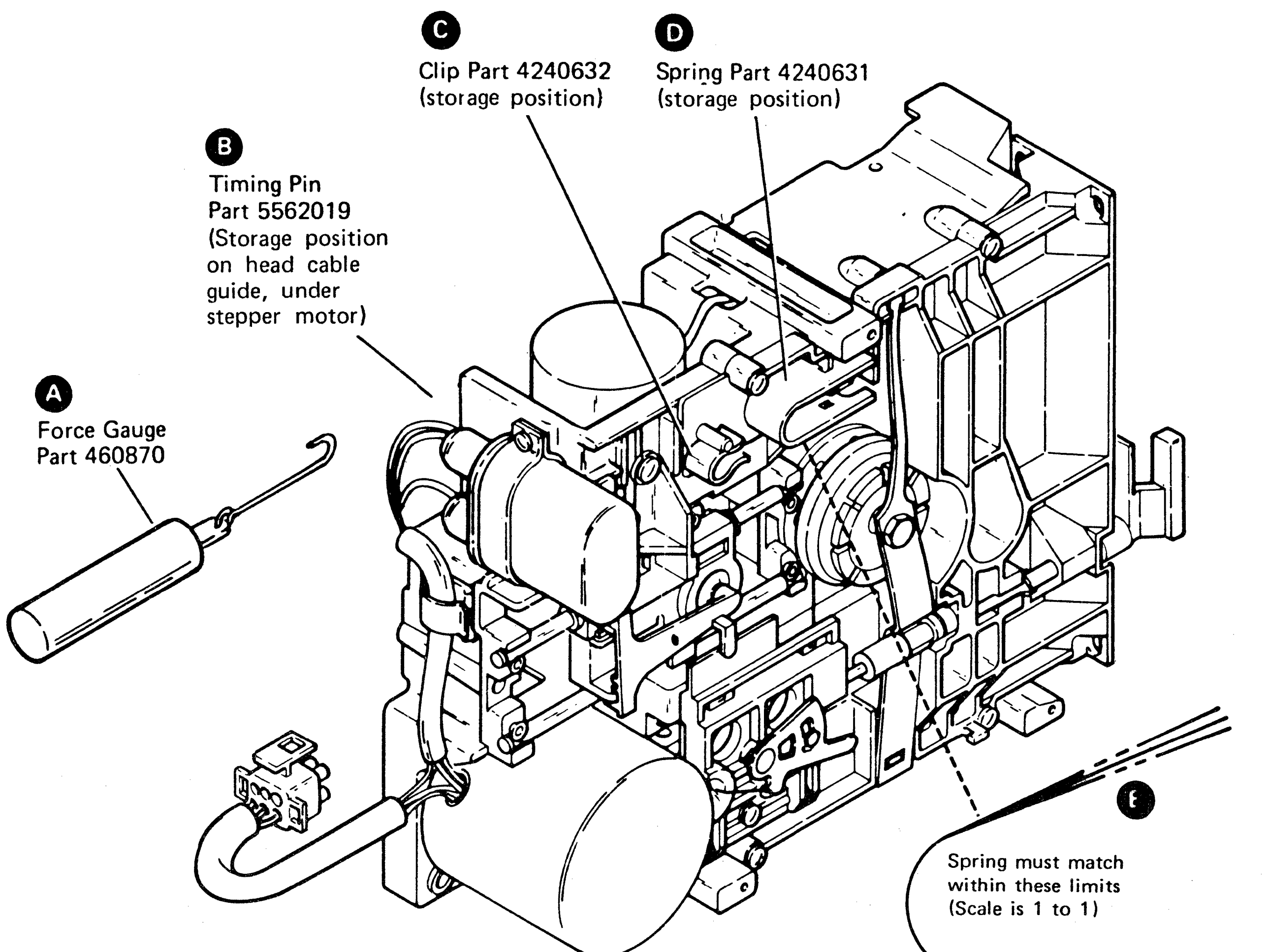
The head/carriage assembly, the drive hub, and the pulley are adjusted and tested at the factory. The head/carriage assembly may be changed in the field; the drive hub and the pulley cannot. If the track 40 adjustment surface, or the drive hub and pulley assembly is damaged, the entire diskette drive must be changed.

General Description (Part 2 of 2)

DISKETTE DRIVE SPECIAL TOOLS

- Force gauge Ⓐ (part 460870) to perform the service check or to adjust the drive band tension.
- Timing pin Ⓑ (part 5562019) to perform the service check or to service the read/write head carriage stepper motor pulley. This part is supplied with each drive, and stored on the head cable guide (see page 7-040).
- Clip Ⓒ (part 4240632) to keep the thickness gauge in contact with the track 40 adjustment surface.
- Spring Ⓓ (part 4240631) to keep the head/carriage in place against the thickness gauge when performing the head/carriage adjustments. This part is supplied with each drive.

  Note: The spring must match view (E).



DISKETTE DRIVE CHARACTERISTICS

- Diskette type: 51TD on the 3725 controller
- Weight: 5 kg (11 lb)
- Diskette speed: 360 rpm
- Drive motor voltage: 220 Vac, 50/60 Hz. Note however that the drive has enough tolerance to run on any ac input between 180 and 254 Vac. To keep the diskette speed constant at 360 rpm, a different pulley is used for 50 Hz and 60 Hz mains supplies.

DISKETTE FUNCTIONAL CHARACTERISTICS

The format of data on a diskette is changed when the number of bytes per sector is changed. The format used in the 3725 is as follows:

- 256 bytes per sector for all tracks except track 00 on side 0.
- 128 bytes per sector for track 00, side 0. .'EZB 77 tracks per side:
  - Track 00 is the label track.
  - Tracks 1 through 74 are data tracks.
  - Tracks 75 and 76 are alternate tracks.
- Total formatted data storage capacity is 985088 bytes.

The other characteristics of the diskette drive are as follows:

- Data rate: 250 kilobits (31.25 kilobytes) per second, with MF encoding for track 00.
- 500 kilobits (62.50 kilobytes) per second, with MFM encoding.
- Track-to-track seek time: 5 ms, plus 35 ms for the head/carriage assembly to stop. The total seek time is therefore the number of tracks to be moved, multiplied by 5, plus 35 ms.

Safety

PERSONAL SAFETY

- The 3725 provides ac and dc power. When the motor is turning, ac voltages are present on the motor terminals and on the motor capacitor.
- The motor and solenoid cases become hot after continuous use; let the parts cool before servicing them.

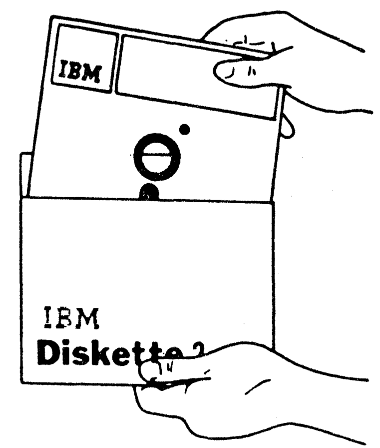
DISKETTE DRIVE SAFETY

- The diskette drive may be damaged if it is not operated or serviced correctly. Warning notices in this manual are machine safety precautions.
- Do not use IBM or any other cleaning fluid near plastic parts.
- Do not allow your fingers to come into contact with the recording surface through the read/write head slot; fingerprints may cause read/write errors.
- Never use damaged diskettes in a diskette drive. Diskettes that are physically damaged (creased or bent) or contaminated (by pencil marks, finger marks, or cleaning fluid can cause data errors, equipment errors, or head damage.

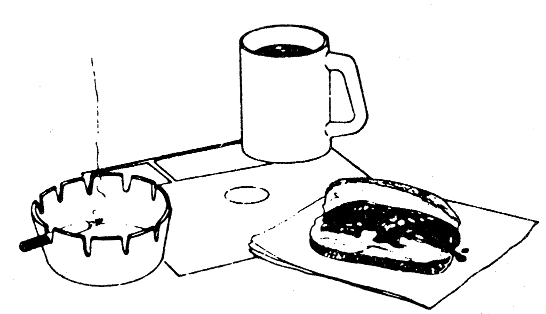
DISKETTE SAFETY

Refer to the figure on the right:

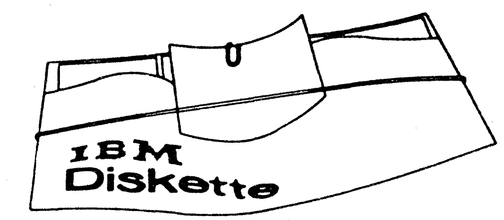
Return a diskette to its envelope whenever it is removed from the diskette drive.



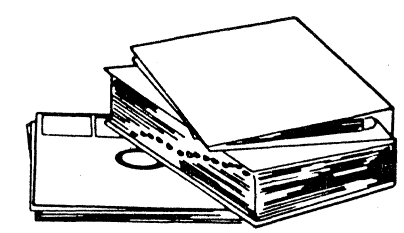
Do not lay diskettes near food, drink, or ashtrays.



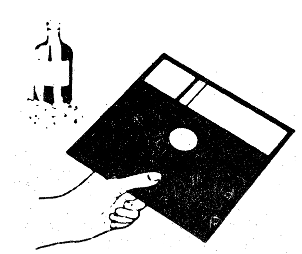
Do not use clips or rubber bands on a diskette.



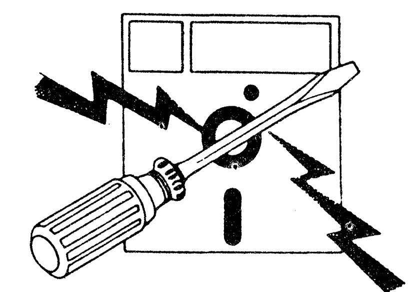
Do not place heavy objects on diskettes.



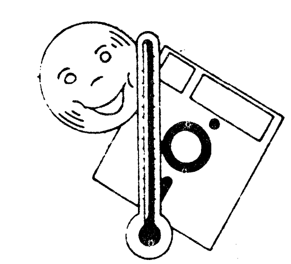
Do not touch or clean diskette surfaces. Contaminated diskettes must be discarded.



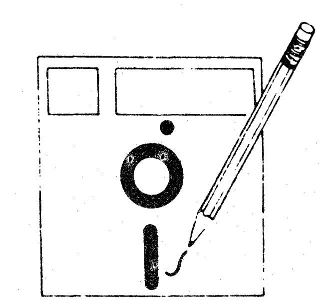
Do not place diskettes near materials that might be magnetized. Data can be lost from a diskette exposed to a magnetic field.



Do not expose diskettes to heat greater than 51.5° C (125° F) or direct sunlight.

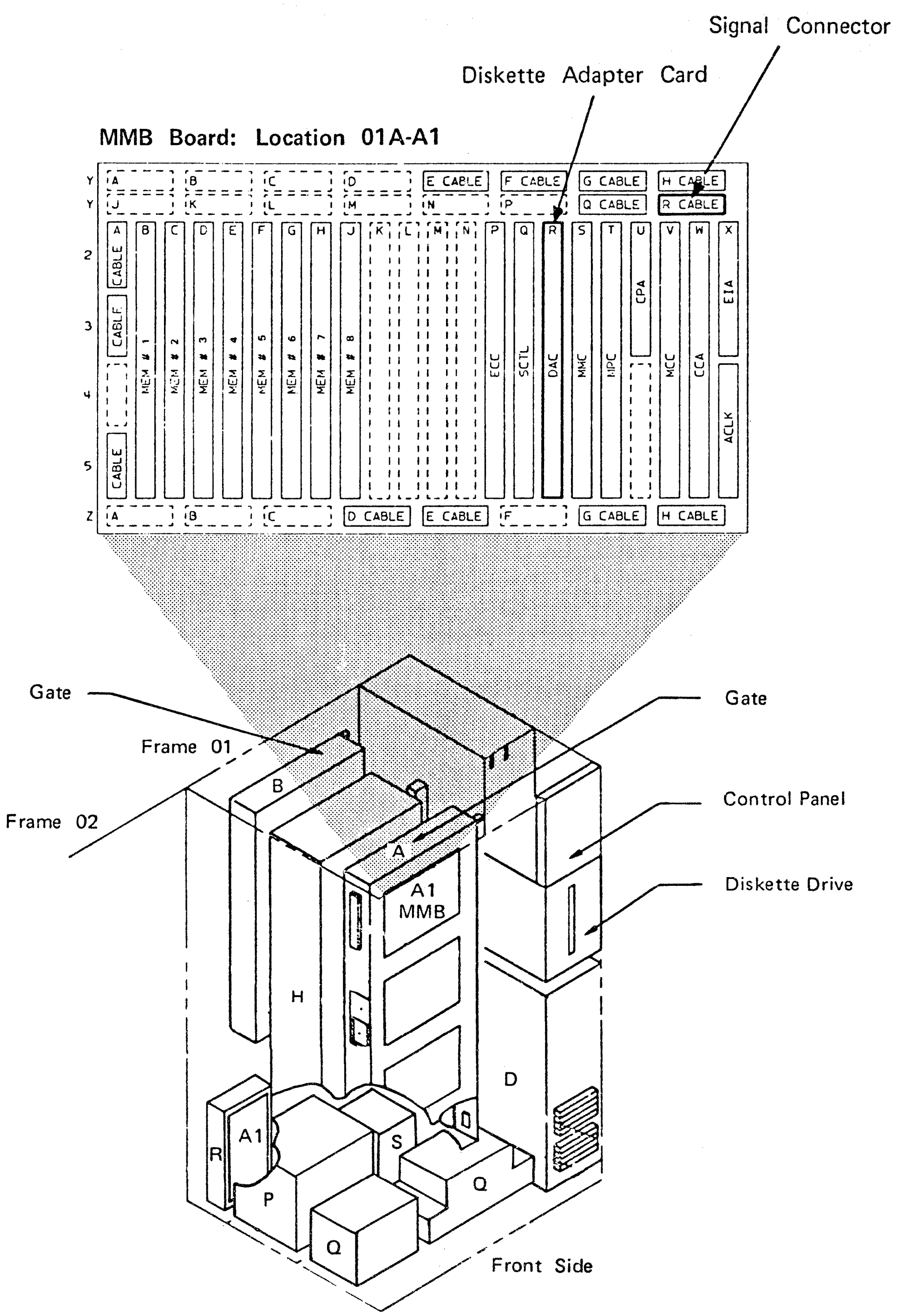


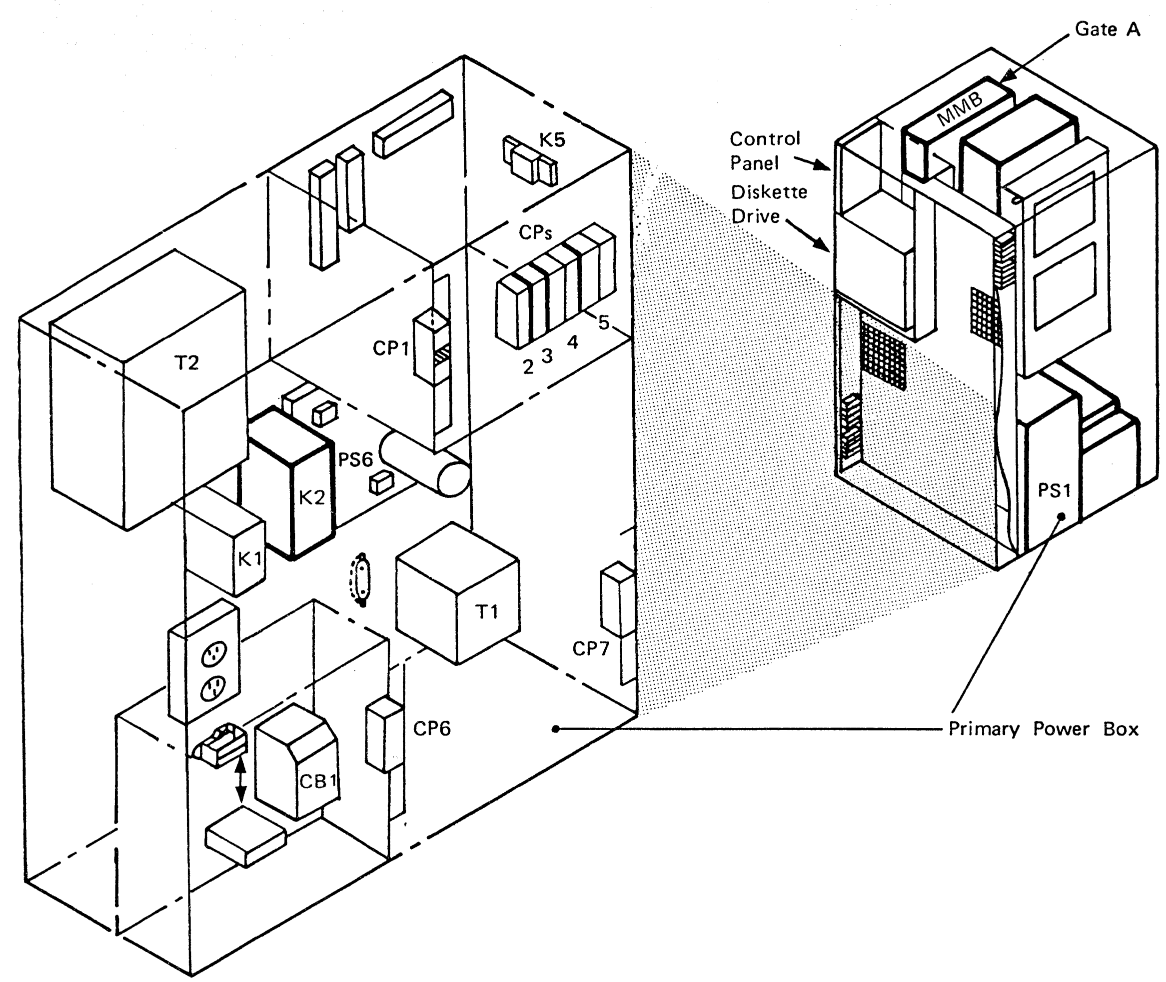
Do not use hard-tipped writing instruments, and do not write outside the label area on diskettes.



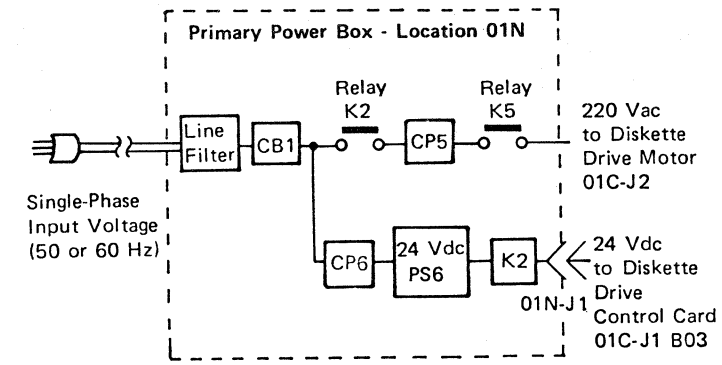
Diskette Drive Support Logic Locations

3725 CONTROLLER - FRAME 01

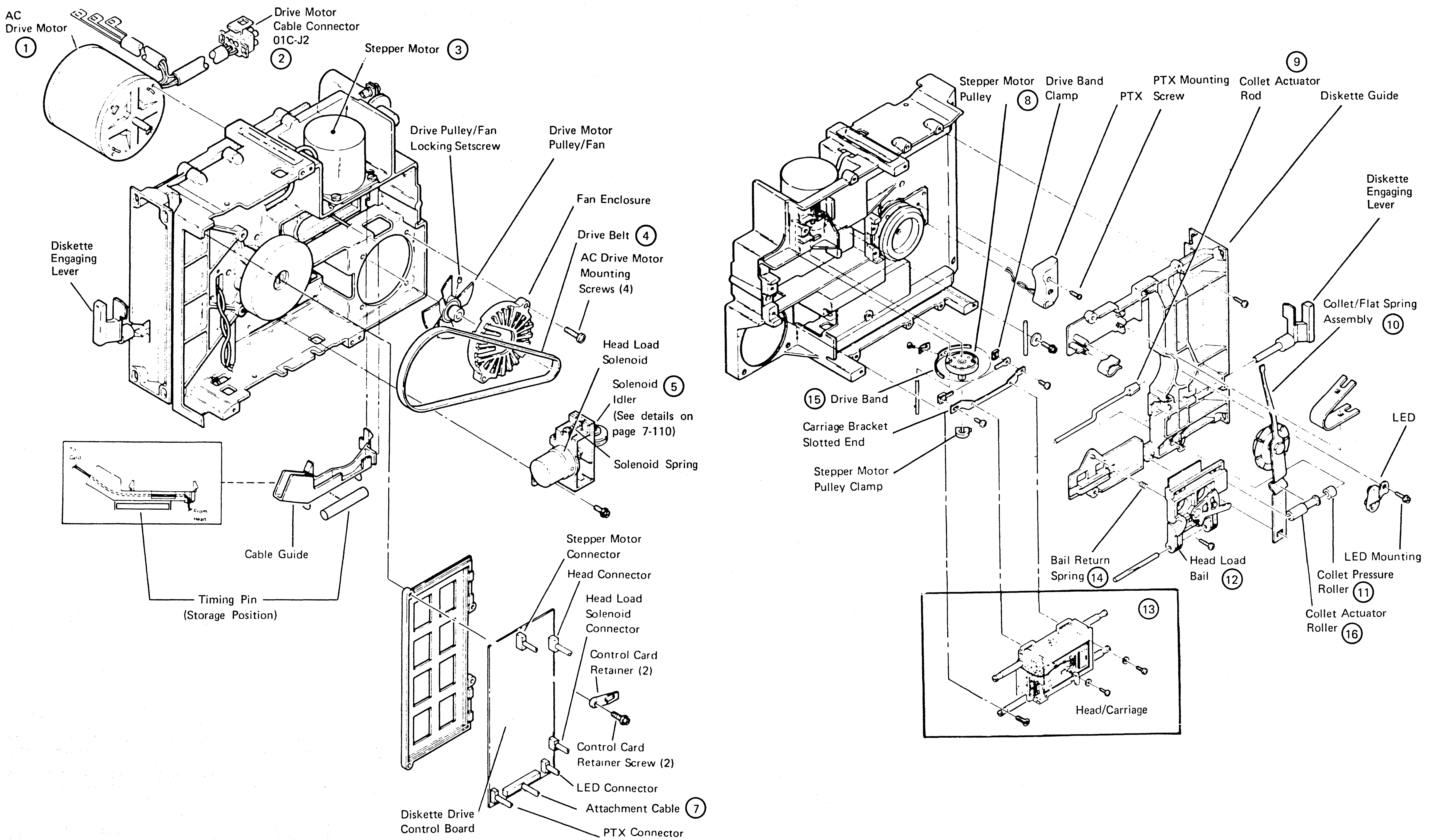




AC and DC Voltage Distribution to Diskette



Diskette Drive Detail Locations



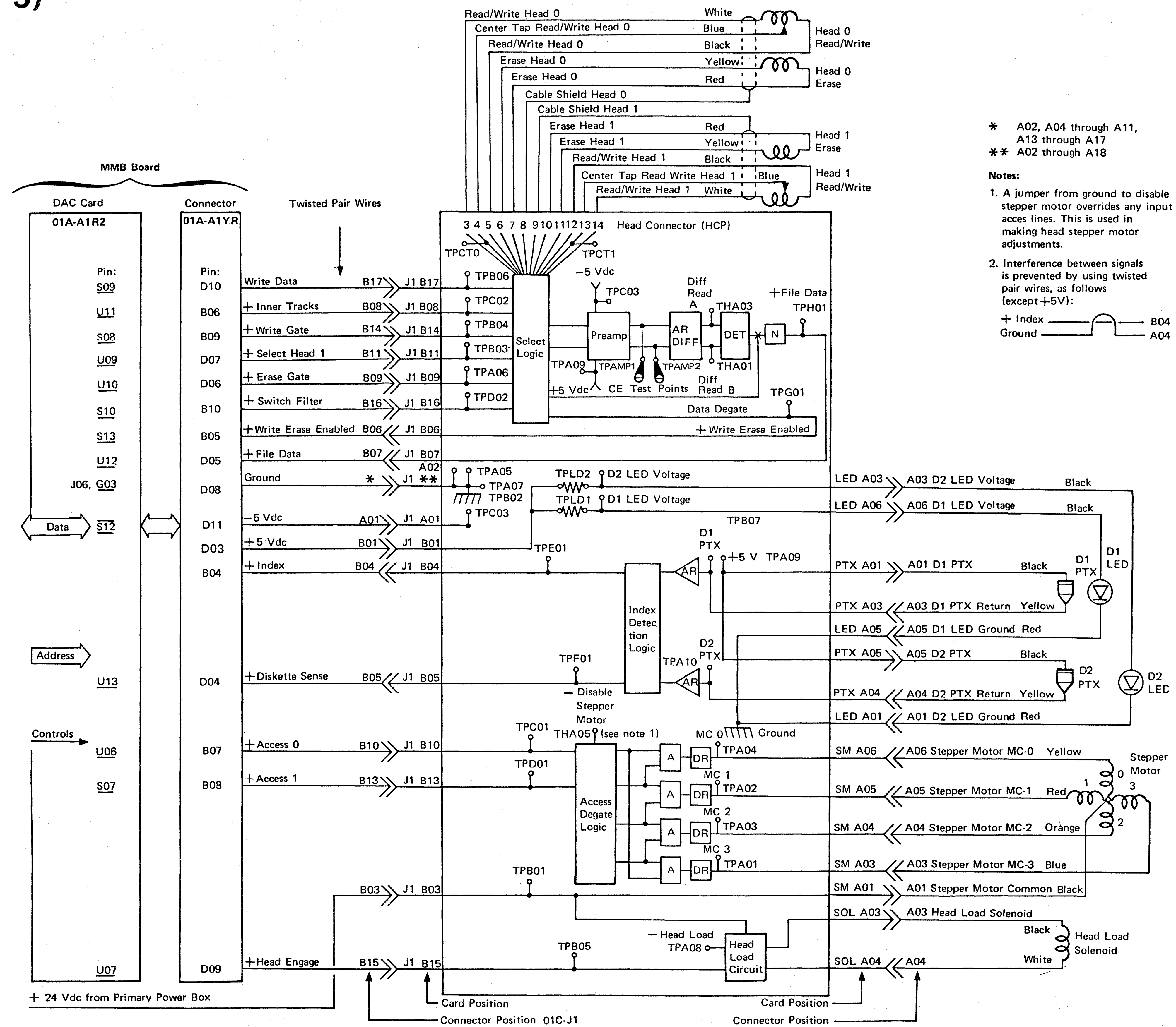
Theory of Operation (Part 1 of 5)

The diskette drive depends on the MOSS for power, commands, and control.

This section contains theory information about the device connections, the data flow, and the operation of the diskette drive.

DISKETTE DRIVE CONTROL CARD AND MMB BOARD CONNECTIONS

The figure below shows the connection lines at connector 01A-A1YR.



* A02, A04 through A11, A13 through A17
** A02 through A18

Notes:

1. A jumper from ground to disable stepper motor overrides any input acces lines. This is used in making head stepper motor adjustments.
2. Interference between signals is prevented by using twisted pair wires, as follows (except +5V):

+ Index — B04
Ground — A04

Theory of Operation (Part 2 of 5)

INTERCONNECTION LINES DESCRIPTION

Write Data

For each change of the 'write data' signal, the current reverses in the read/write heads, writing the data on the diskette.

+Inner Tracks

The 'inner tracks' line is active from track 44 through track 76. When this line is active, less write current is sent to the read/write head. This is necessary because the inner tracks have a higher bit density, and thus require a lower write current. The same line is also used to increase the read amplifier gain for tracks 44 through 76.

+Write Gate

During a write operation, the 'write gate' line activates the write circuits and deactivates the read circuits. The signal is delayed on the control panel card assembly to prevent bit changes on the diskette surface when the drive is powered on or off.

+Select Head 1

When active, this line selects head 1.

+Erase Gate

The 'erase gate' line activates the tunnel erase circuits during a write operation to erase the edges of the track just recorded. This erasing prevents crosstalk between tracks during later read operations. The signal is delayed on the control panel card assembly to prevent bit changes on the diskette surface when the drive is powered on or off.

+Switch Filter

This line is used in conjunction with the 'inner tracks' signal to correct when bits shift beyond cylinder 60 (for MFM encoding). It is used only during read operations.

+Write/Erase Enabled

When this line is active, either write or erase current has been enabled on the card.

File Data

The 'file data' line is a series of clock and data pulses that together represent the data read from the diskette surface. The VFO circuits supplied by the adapter separate the clock pulses from the data.

+Index

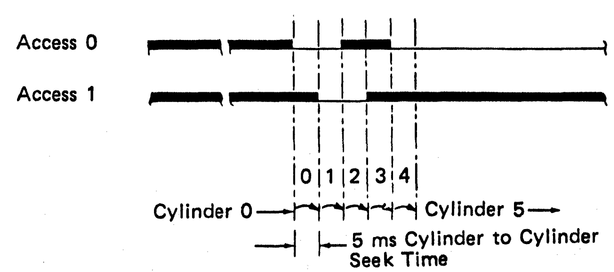
The 'index' line indicates the start of a track. It consists of a 1.5 ms to 3.0 ms pulse occurring every 166.7 ms.

Diskette Sense

When the 'diskette sense' line is activated, it indicates that a diskette type 2 or 2D is in use. The line is not activated by a diskette type 1.

Access Lines 0 and 1

Sequentially activating the access signal lines causes the read/write head to move from one cylinder to the next. The two access line signals (0 and 1) are activated sequentially to move the head inwards (towards the hub) or outwards (away from the hub). The sequence is repeated every 4 cylinders.



+Head Engage

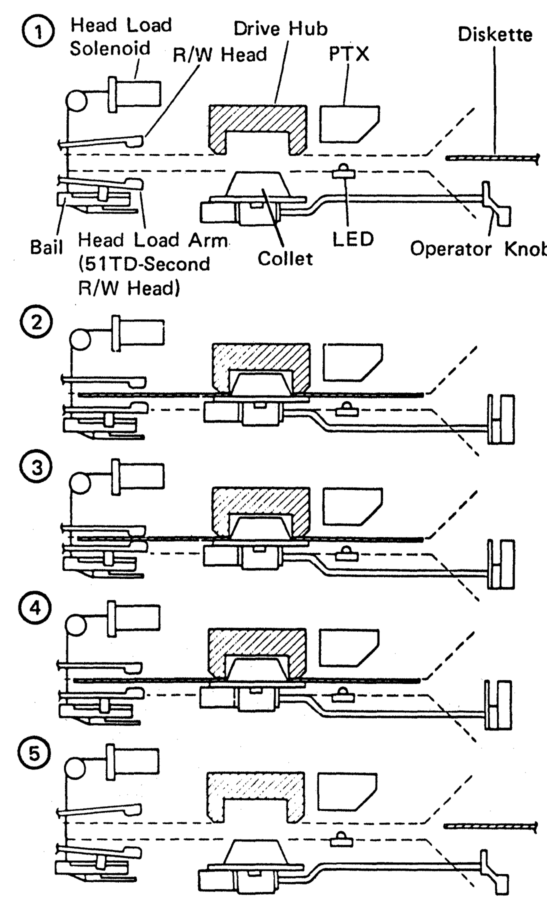
When active, this line causes the read/write heads to load.

MECHANICAL OPERATION

The following figure shows the loading of the two read/write heads of the diskette drive.

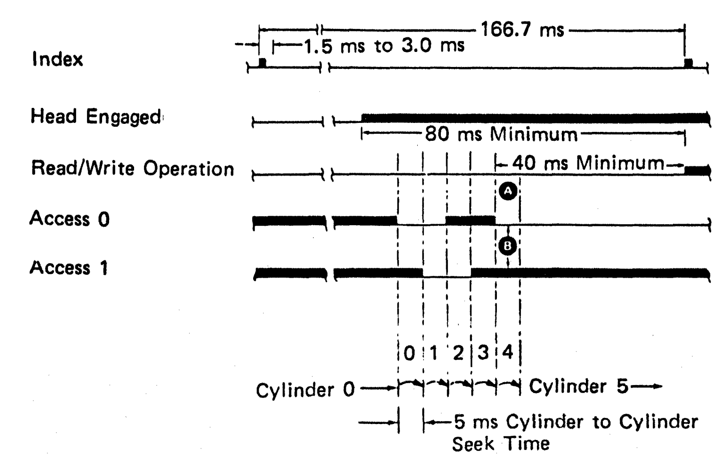
1. The diskette is about to be inserted.
2. The diskette is inserted into the diskette guide, closing the knob which clamps the collet (the read/write heads are now much closer to the diskette).
3. The heads are loaded (touching the diskette). The solenoid is activated, the cable pulls the bail, and the bail lowers the head onto the diskette.

   The read/write operation takes place. The heads are moved to the desired cylinder of the diskette when the system activates the two stepper motor lines (access lines 0 and 1) in a specific sequence.
4. The heads are released (solenoid deactivated).
5. The operator turns the knob to the open position; the diskette is released and may be removed from the drive.



TYPICAL DEVICE OPERATION

1. The MOSS starts the diskette drive motor.
2. The operator inserts a diskette and turns the operator knob to the closed position. The diskette starts turning as soon as the operator knob is in the closed position. The heads move into position on the diskette surface.
3. Index pulses are sensed once per revolution (166.7 ms). An up level indicates that a diskette is inserted into the drive.
4. The MOSS activates sequentially the two access lines (0 and 1) to move the head/carriage assembly inwards (towards the hub), or outwards (away from the hub) to select the desired cylinder. The two access line states last used to move the carriage remain the same when head movement has stopped.
5. Data from the selected cylinder is valid after 40 ms (minimum time for the head/carriage assembly to come to rest).
6. A head load command can be given before or during a seek to activate the head load solenoid. Data is valid 80 ms after the heads are loaded. The address bytes of the first identifiable ID (identifier) field are then read, thus localizing the heads on the cylinder.
7. Reading or writing may take place 40 ms after seeking to the last cylinder (A) or 80 ms after the heads are loaded.
8. The read/write heads are unloaded after the read or write operation.

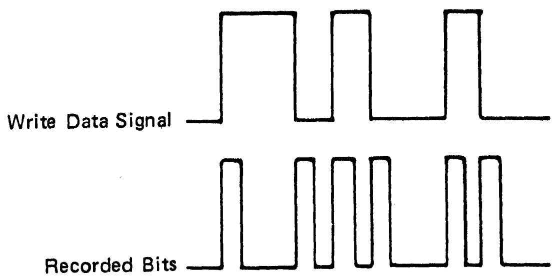


Note: Seeking and head loading are not to the index.

READ/WRITE OPERATION PRINCIPLES

Write Data

For each change of the 'write data' signal, the current is switched in the write head, recording the data on the surface of the diskette.

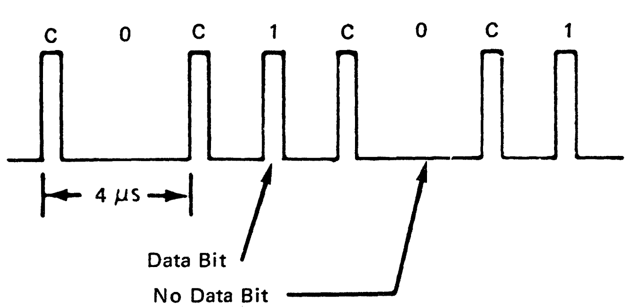


FM Encoding

Frequency modulation (FM) encoding writes data bits 4 us apart. This mode of operation is used on track 00 only, as follows:

Data bit to be recorded	Recorded as: clock bit	data bit
1	1	1
0	1	0

The sequence of bits 0 1 0 1 appears as follows:



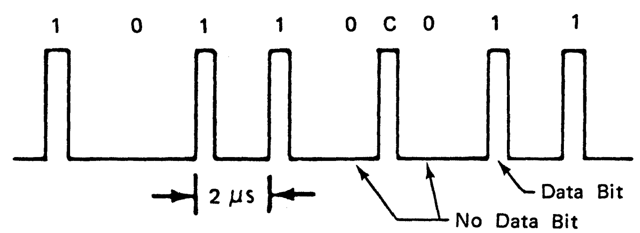
MFM Encoding

Modified frequency modulation (MFM) encoding writes data bits 2 us apart. It does not use a constant clock pulse; a clock bit is recorded only when a 0 (no data bit) is immediately followed by another 0. This mode of operation is used on all tracks except track 00, as follows:

Data bit to be recorded	Recorded as: clock bit	data bit
1	0	1
0	(x)	0

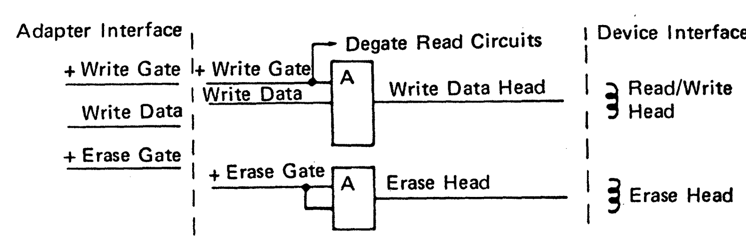
Note: (x) is a 0-bit if the preceding bit was a 0-bit, or a 1-bit if the preceding bit was a 1-bit.

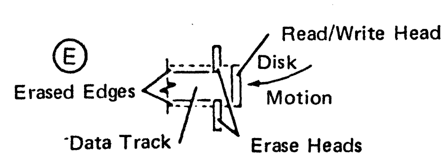
The sequence of bits 1 0 1 1 0 0 1 1 appears as follows:



Write Operation

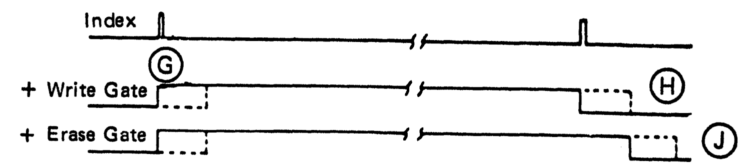
For a write operation, the 'write gate' signal activates the write circuits and deactivates the read circuits. The 'erase gate' signal activates the tunnel erase circuits during a write operation to erase the edges of the data track (E) just recorded. This erasing process prevents crosstalk between tracks during later read operations.





Format Write Operation

The format write operation writes a full track, changing all the ID (identifier) fields, data fields, and gaps. The index to the first ID field gap is 79 eight-bit bytes.

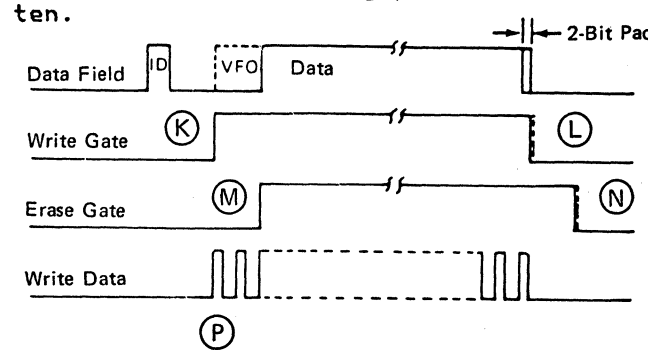


The 'write gate' signal is activated any time between the leading edge of the index pulse (G) and 100 bytes after the leading edge of the index pulse. The 'write gate' signal is deactivated approximately 102 bytes after the leading edge of the next index pulse (H).

The 'erase gate' signal is activated at the same time as the 'write gate' signal. However, the 'erase gate' signal is deactivated 537 us after the 'write gate' signal is deactivated (J).

Record (Update) Write Operation

The record write operation is done only on the data field and its VFO sync field. The ID fields and the gaps are not written.



The 'write gate' signal is activated 316 us after the last ID character is read (K). The 'write gate' signal is deactivated 5 us after the last clock of the 2-bit pad is written (L).

The 'erase gate' signal is activated (M) 221 us after the 'write gate' signal, and is deactivated (N) 537 us after the 'write gate' signal is deactivated.

The writing of the new VFO sync field starts when the 'write gate' line is activated (P).

Read Data

The 'read data' signal is the FM or MFM encoded read head signal; it can be observed at TPAMP 1 and TPAMP 2.

Typical measurements for FM encoding are:

- 125 kHz: 120 to 300 mV (all 0's)
- 250 kHz: 100 to 250 mV (all 1's)

The voltage is higher at the outer tracks because of the higher track speed and the lower bit density.

An all 0's pattern has a higher amplitude and half the frequency of an all 1's pattern.

Typical MFM encoding measurements for the drive are:

- 125 kHz: 120 to 300 mV (alternating 0's and 1's, typical measurements)
- 250 kHz: 100 to 250 mV (all 0's or all 1's, typical measurements)

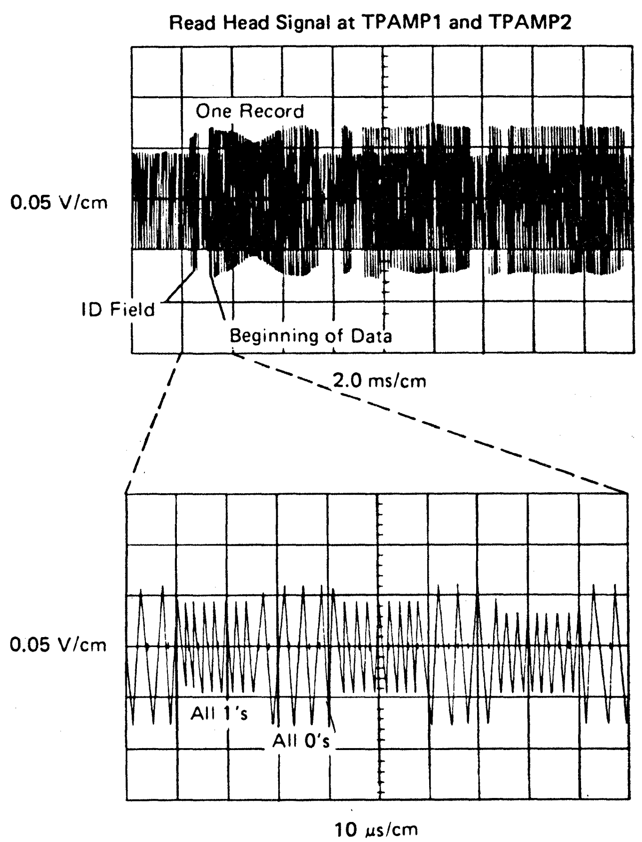
For MFM, an alternating 0's and 1's pattern has a higher amplitude and has half the frequency of an all 0's or an all 1's pattern.

FILE DATA

The 'file data' signal is a series of clock and data pulses that represent the read data. They are from 150 to 500 ns long, and can be observed at TPH01. The VFO circuits, supplied by the DAC card, separate the clock pulses from the data pulses.

Theory of Operation (Part 4 of 5)

READ DATA: FM ENCODED

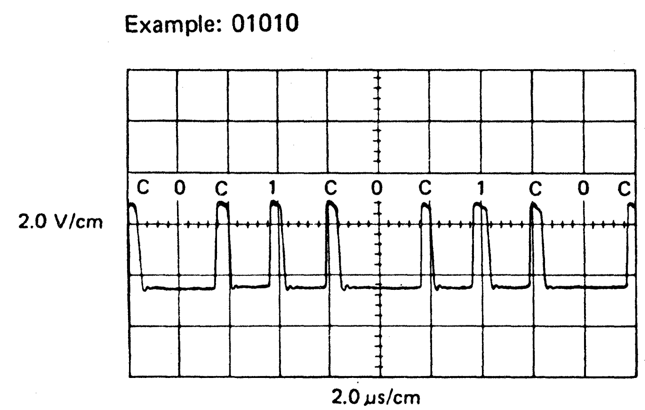


Scope Setup

Note: Use Tektronix 453, 454, or similar oscilloscope with x10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	External
Trigger	Normal
Mode	Add
Channel 1 volts/division	5 mV/cm
Channel 2 volts/division	5 mV/cm
Channel 1 input	AC
Channel 2 input	AC
Invert	Pull out
Times per division	2 ms/cm
Connect channel 1 to	TPAMP1
Connect channel 2 to	TPAMP2
Connect trigger to	+Index test pin
Note: The amplitude of the read signal should be from 100 to 250 mV.	

FILE DATA SIGNAL

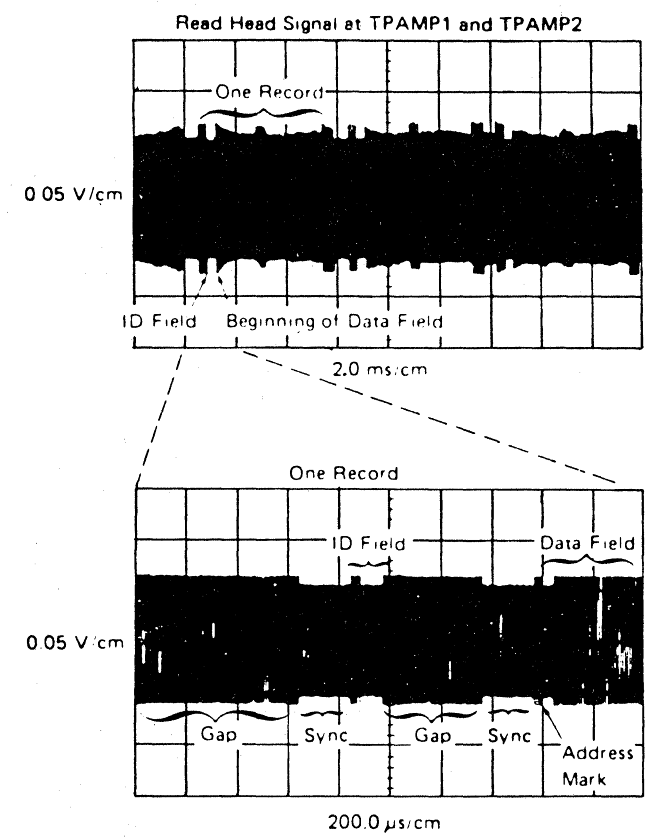


Scope Setup

Note: Use Textronix 453, 454, or similar oscilloscope with x10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	External
Trigger	Normal
Mode	Channel 1
Channel 1 volts/division	0.2 V/cm
Channel 1 input	DC
Times per division	2 us/cm
Connect channel 1 to	+File data
Connect trigger to	+Index test pin
Note: Clock pulses every 4 us. Pulse duration should be between 100 and 500 ns. Pulse amplitude should be between 2.4 and 4.2 volts.	

READ DATA: MFM ENCODED

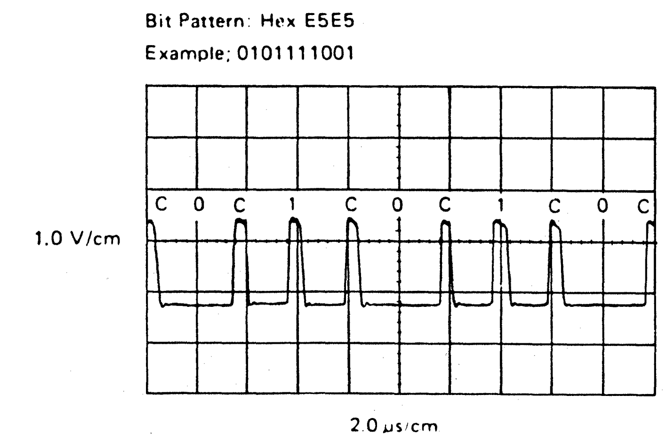


Scope Setup

Note: Use Tektronix 453, 454, or similar oscilloscope with x10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	External
Trigger	Normal
Mode	Add
Channel 1 volts/division	5 mV/cm
Channel 2 volts/division	5 mV/cm
Channel 1 input	AC
Channel 2 input	AC
Invert	Pull out
Times per division	2 ms/cm
Connect channel 1 to	TPAMP1
Connect channel 2 to	TPAMP2
Connect trigger to	+Index test pin
Note: The amplitude of the read signal should be from 100 to 250 mV.	

MFM FILE DATA

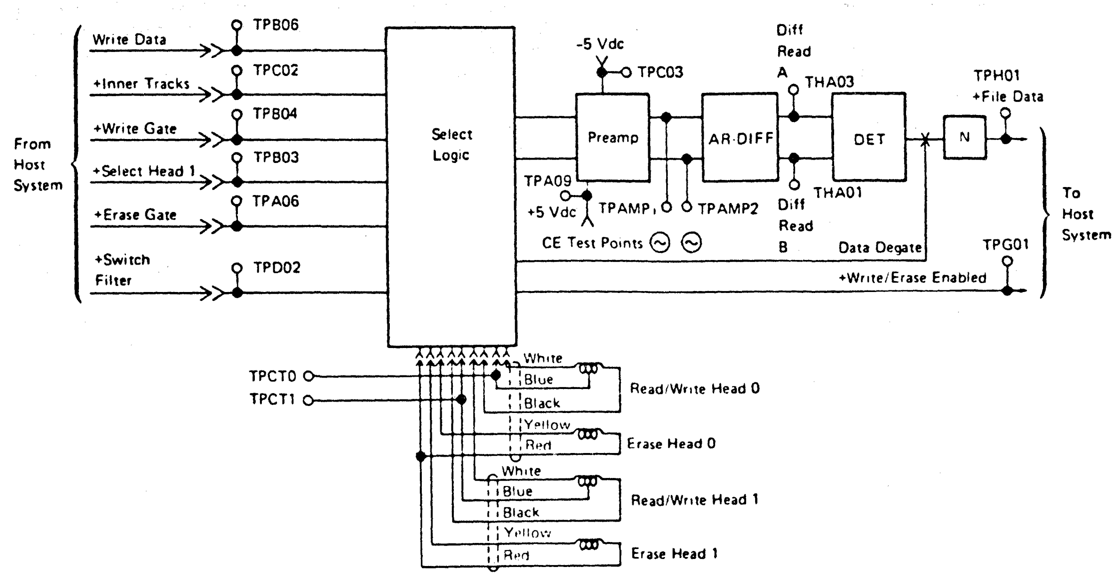


Scope Setup

Note: Use Tektronix 453, 454, or similar oscilloscope with x10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	External
Trigger	Normal
Mode	Channel 1
Channel 1 volts/division	0.1 V/cm
Channel 1 input	DC
Times per division	2 us/cm
Connect Channel 1 to	+File data
Connect trigger to	+Index test pin
Note: Clock or data pulses every 2 to 4 us. Pulse duration should be between 100 and 500 ns. Pulse amplitude should be between 2.4 and 4.2 volts.	

DISKETTE DRIVE TEST PINS



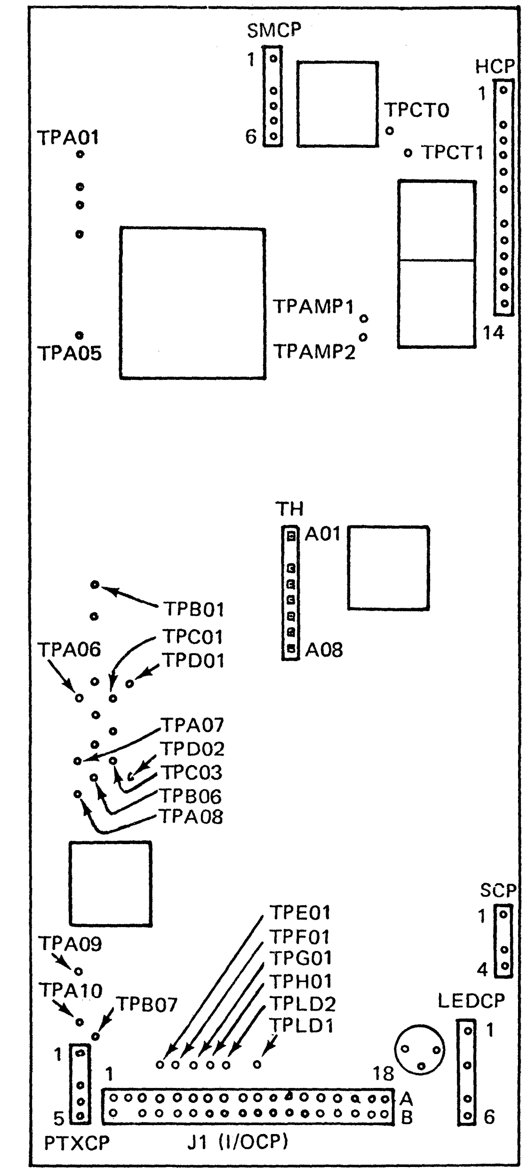
DISKETTE DRIVE CONTROL CARD CABLE

Test Points	Line Names
THA01	Diff Read B
THA02	No Pin
THA03	Diff Read A
THA04	-High Gain
THA05	-Disable Stepper Motor
THA06	+14V
THA07	Access Clamp Voltage
THA08	Oscillator

Test Points	Line Names
TPB07	D1 PTX
TPC01	+Access 0
TPC02	+Inner Tracks
TPC03	-5 Vdc
TPD01	+Access 1
TPD02	+Switch Filter
TPE01	+Index
TPF01	+Diskette Sense
TPG01	+Write/Erase Enabled
TPH01	+File Data
TPLD2	D2 LED Voltage
TPLD1	D1 LED Voltage
TPAMP2	Preamp TP2
TPAMP1	Preamp TP1
TPCT0	Center Tap Head 0
TPCT1	Center Tap Head 1

Test Points	Line Names
TPA01	MC-3
TPA02	MC-1
TPA03	MC-2
TPA04	MC-0
TPA05	Ground
TPA06	+Erase Gate
TPA07	Ground
TPA08	-Head Load
TPA09	+5 Vdc
TPA10	D2 PTX
TPB01	+24 Vdc
TPB02	Ground
TPB03	+Select Head 1
TPB04	+Write Gate
TPB05	+Head Engage
TPB06	Write Data

DISKETTE DRIVE CONTROL CARD



PTXCP	PTX Connector Pins
I/O CP	I/O Connector Pins 01C-J1
LEDCP	LED Connector Pins
SCP	Solenoid Connector Pins
HCP	Head Connector Pins
SMCP	Stepper Motor Connector Pins

On/Off and Replacement Procedures

DISKETTE DRIVE AC POWER ON/OFF

1. Remove the controller or service diskette from the diskette drive.
2. Turn off CP5 (1). When CP5 is off, relay K5 turns the 220 V ac to the diskette drive motor off. The dc voltages are not cut.

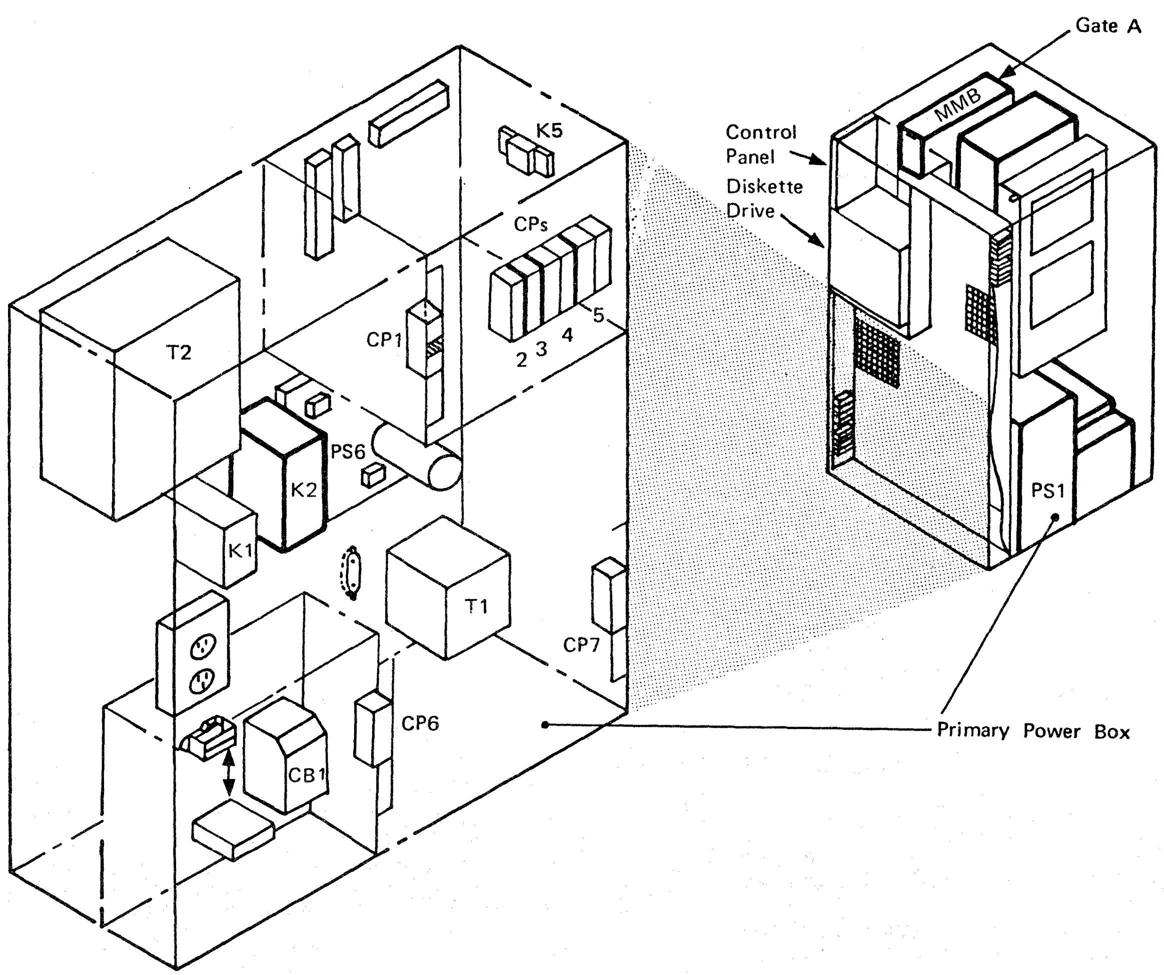
To turn on diskette drive ac power, turn on CP5.

DISKETTE DRIVE AC/DC POWER OFF

1. Remove the controller or service diskette from the diskette drive.
2. Turn off CP5 (1).
3. Unplug the drive motor cable (4).
4. Remove the attachment cable (2) from the diskette drive control card.

DISKETTE DRIVE AC/DC POWER ON

1. Plug the attachment cable (2) to the diskette drive control card.
2. Plug the drive motor cable (5).
3. Turn on CP5 (1).



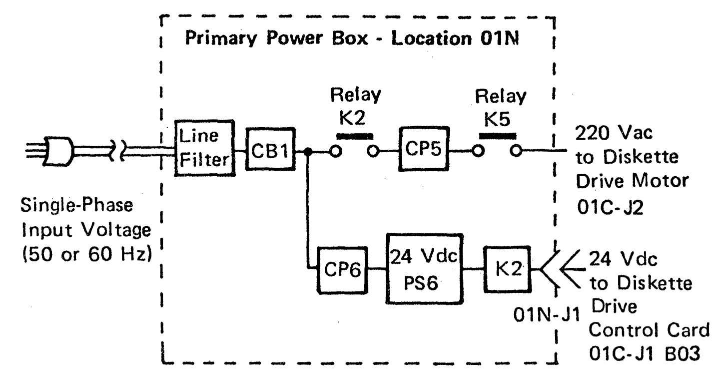
DISKETTE DRIVE REMOVAL/REPLACEMENT

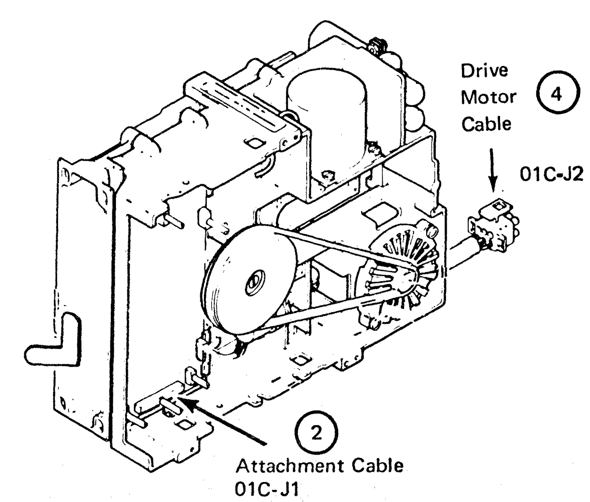
1. Remove the controller or service diskette from the diskette drive.
2. Turn off CP5 (1).
3. Unplug the diskette drive motor cable (4).
4. Remove the attachment cable (2) from the diskette drive control card.

   At this point of this procedure, ac and dc power voltages to the diskette drive are off.

5. Remove the screws holding the diskette drive, and lift out the drive.
6. Put the new diskette drive in place and fasten the screws to hold it in place.
7. Plug the attachment cable (2) into its socket on the diskette drive control card.
8. Plug the drive motor cable (4).
9. Turn on CP5 (1).

AC and DC Voltage Distribution to Diskette





Diskette Drive Service Check

LED, PTX, AND DRIVE CONTROL CARD VERIFICATION OF CORRECT OPERATION

1. With power on, insert a diskette backwards, but do not close the diskette engaging lever.
2. Connect the negative lead of the multimeter to test point TPA07.
3. Connect the positive lead of the multimeter to test point (4) and then to test point (5). Each of these points should be less than 1 Vdc.
4. Very slowly, pull out the diskette to approximately 25mm (1 in.). The meter reading should change to 2.5 Vdc or more. Repeat the test, if necessary.
5. If the result of this test is correct, the LED, PTX, and drive control card are operating correctly. If the result is not good, check the LED and the control card as follows.

LED SERVICE CHECK

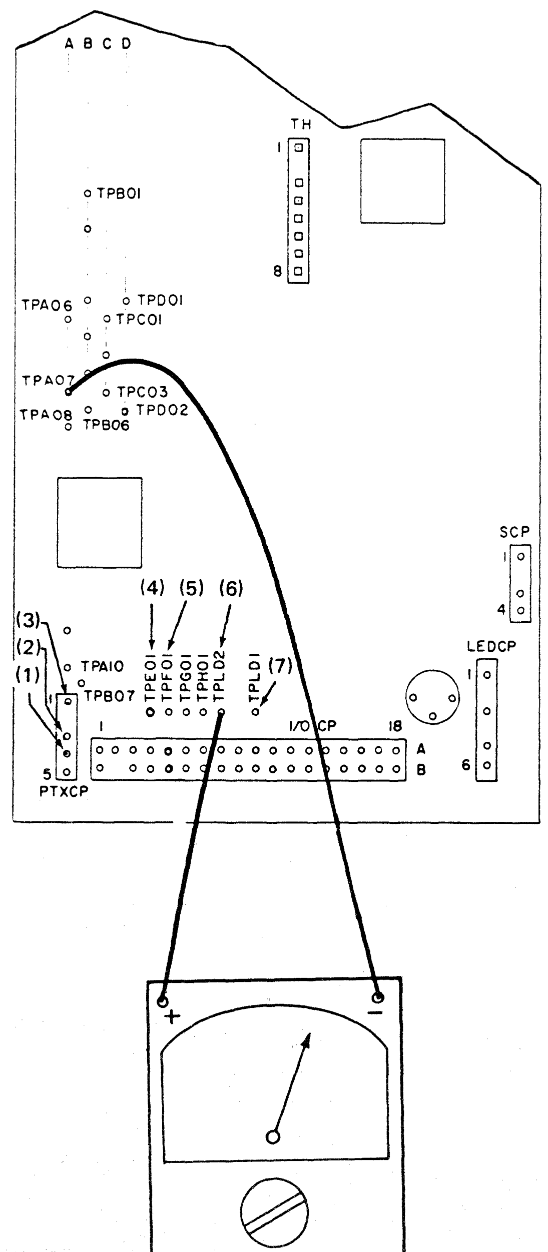
1. Connect the positive lead of the multimeter to test point (6), and then to test point (7). Each of these test points should be between 1 Vdc and 2 Vdc. Any other reading indicates a failing LED.
2. If the LED is failing, replace it (see page 7-140).

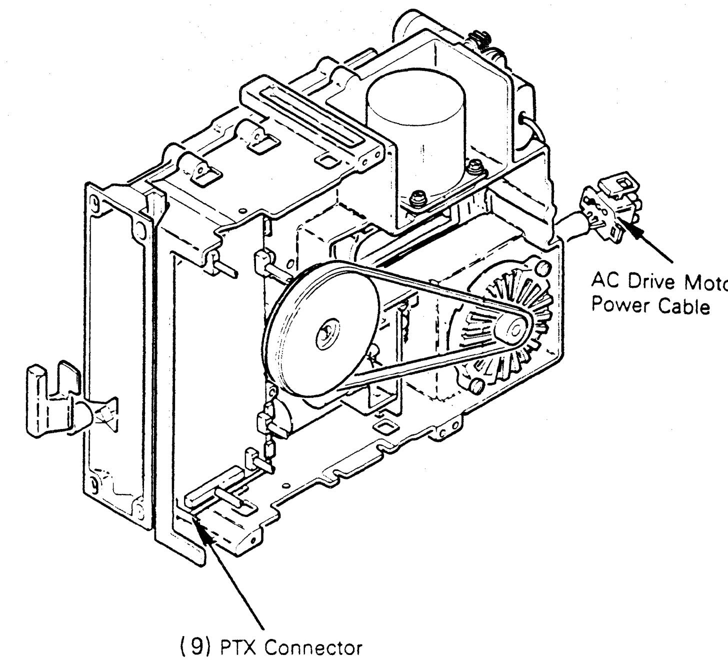
DISKETTE DRIVE CONTROL CARD SERVICE CHECK

1. Switch off the ac/dc power from the diskette drive (page 7-060), and disconnect the PTX connector (9).
2. Connect the multimeter, as shown, to measure the positive voltage at test point (4). It should be less than 1 Vdc.
3. Connect one end of a jumper to test point (3). Touch the other end of the jumper, alternately, to test points (2) and (1), several times. The meter reading should now be 2.5 Vdc or more at test point (4) when test point (2) and test point (1) are touched.
4. If the voltage is less than +2.5 Vdc on these test points, the control card should be replaced. To replace the control card, see this page.
5. If the voltage is correct, connect the PTX connector (9).
6. Switch on ac/dc power to the diskette drive.

PTX SERVICE CHECK

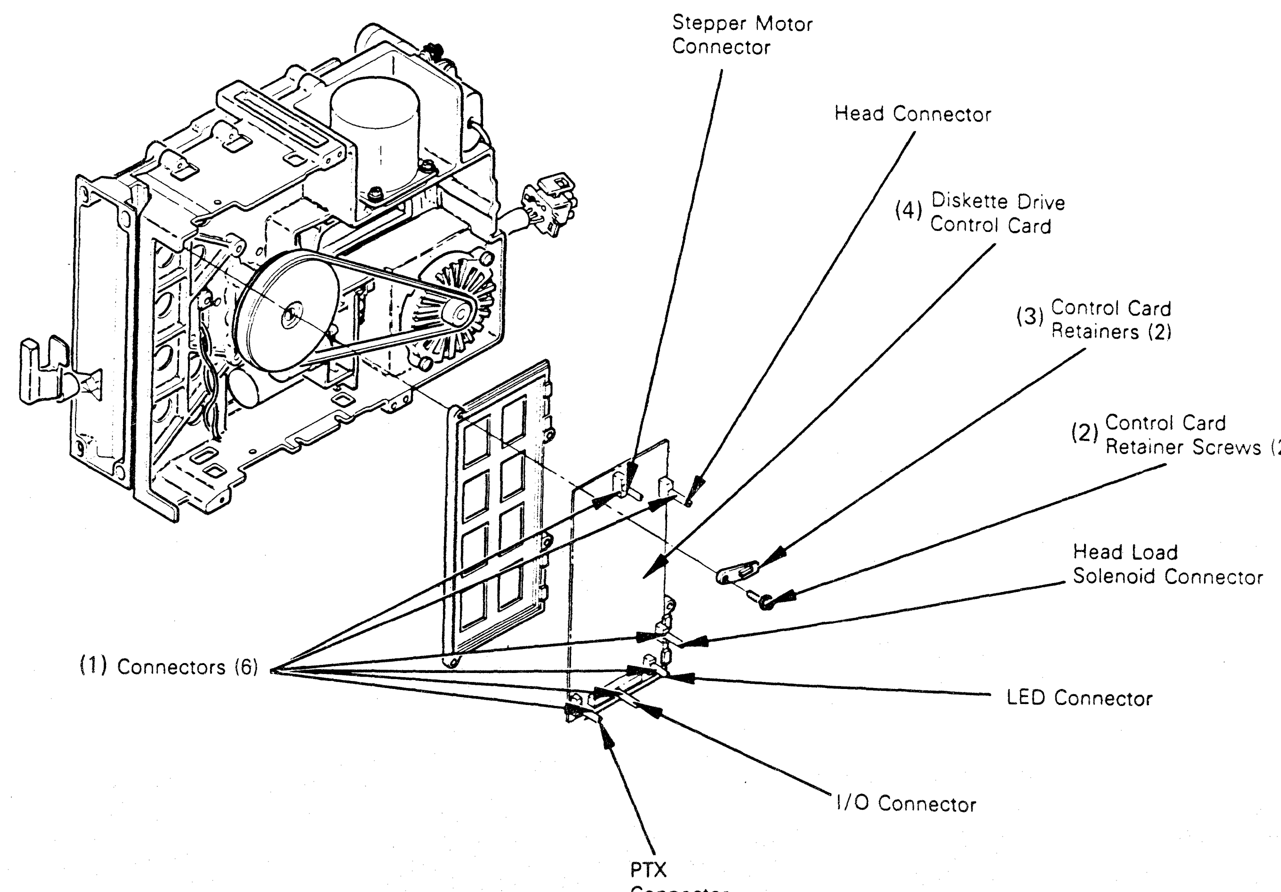
If the LED and the Diskette Drive Control Card Service Checks have correct results, but the verification of correct operation for the LED, PTX, and Drive Control Card has bad results, replace the PTX (see page 7-140).





REMOVAL AND REPLACEMENT OF THE DISKETTE DRIVE CONTROL CARD

1. Switch off the ac/dc power from the diskette drive (page 7-060).
2. Remove the six connectors (1) from the control card.
3. Loosen the two retainer screws (2) and turn the two retainers (3) outward until they are no longer in the path of the control card.
4. Remove the control card (4).
5. Install a control card in place of the removed one.
6. Turn the two retainers inward slightly until they prevent the card from moving.
7. Tighten the two retainer screws.
8. Reinstall the six connectors on the control card.
9. Power on the system.



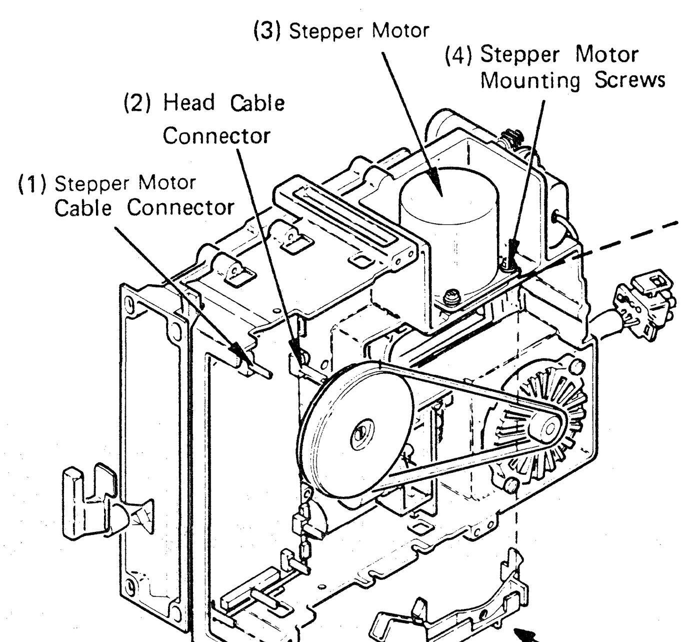
Stepper Motor Removal/Replacement

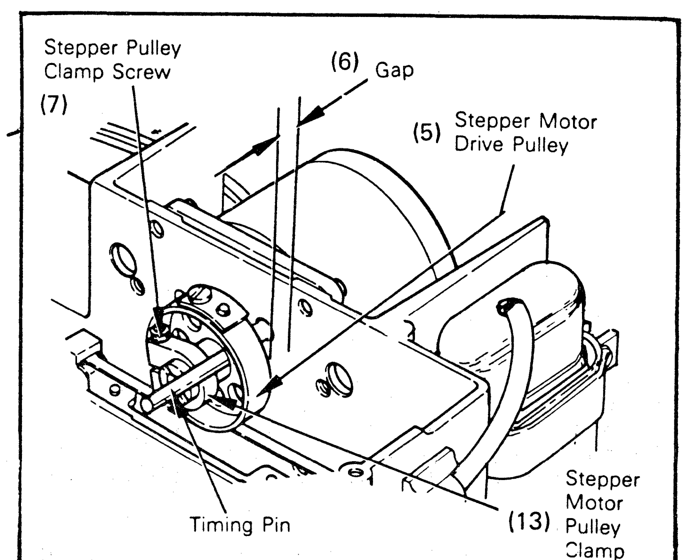
STEPPER MOTOR REMOVAL

1. Switch off the ac power from the diskette drive, and open diskette drive gate (see page 7-030).
2. Remove the head signal cable connector (2) and the head cable guide (8).
3. Remove the stepper motor connector (1).

   Warning: The drive band can be easily damaged.
4. Remove the drive band (14) by removing:
   - Screws (15), (11), and (12)
   - Clamps (16) and (9)
5. Measure (using feeler gauge) the gap (6) between the stepper motor pulley and the casting. Record this figure here:

   GAP (6) is ________
6. Now remove:
   - Clamp screw (7)
   - Stepper motor pulley clamp (13)
   - Stepper motor pulley (5)
7. Remove the stepper motor mounting screws (4), then remove the stepper motor (3).





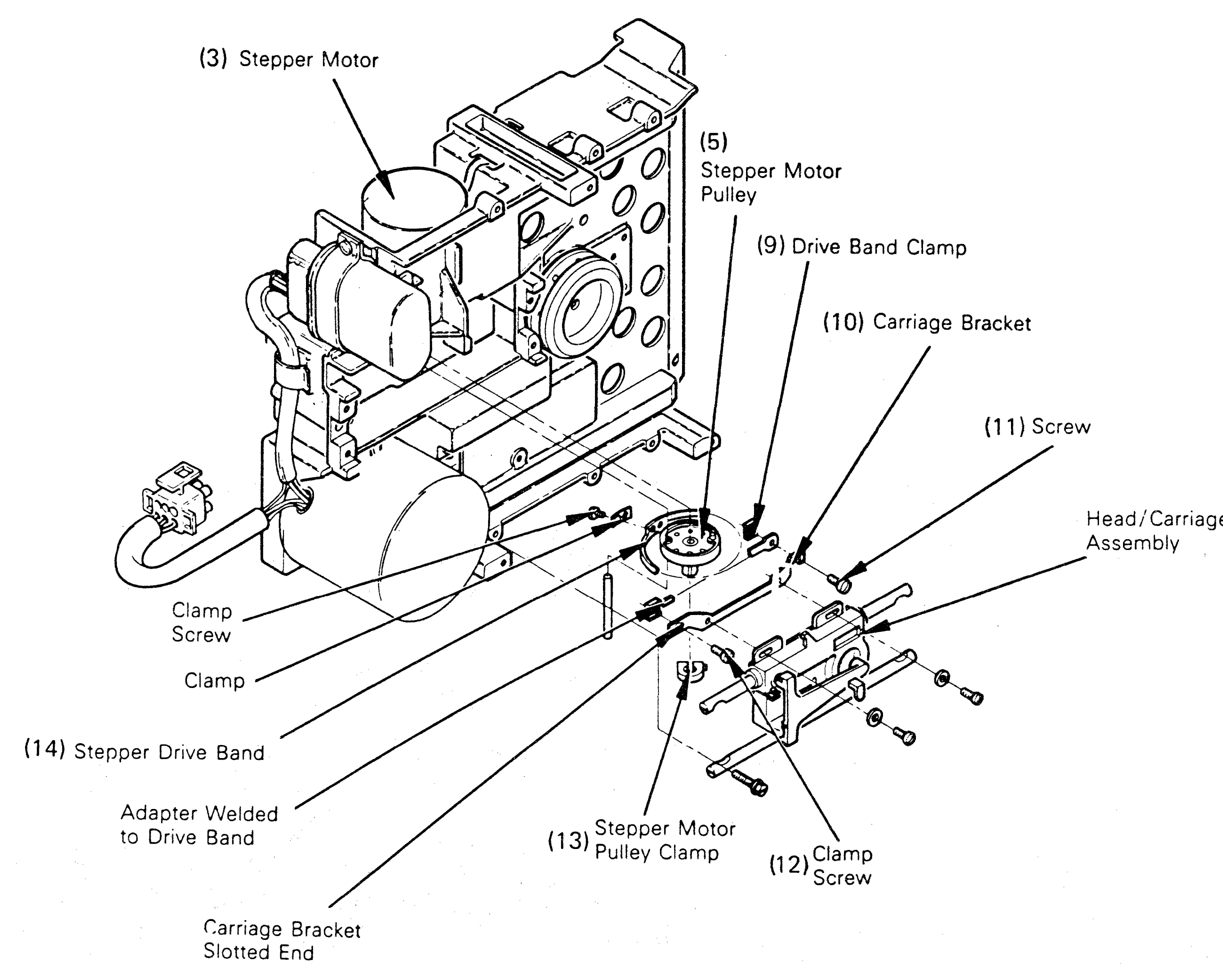
STEPPER MOTOR REPLACEMENT

1. When you place the motor on the casting, locate the motor cable toward the control card.
2. Use the clamp (13) to reinstall the stepper motor pulley (5), with a gap (6) between the pulley and the casting. This gap was recorded in a preceding step.
3. Carefully install the drive band (14) so that you do not damage it. Install the drive band parallel to the carriage bracket (10) (do not tighten screws (11), (12), and (15) yet).

ADJUSTMENTS AFTER STEPPER MOTOR INSTALLATION

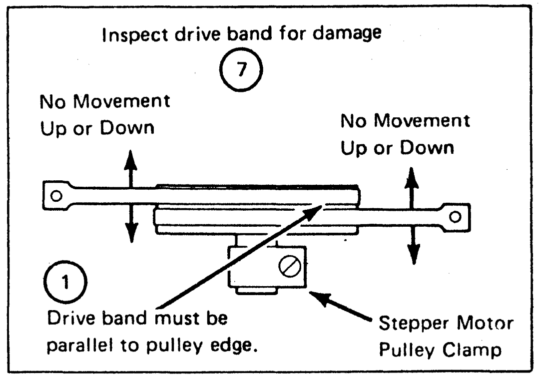
To complete the stepper motor installation:

1. Adjust the stepper drive band (see page 7-070).
2. Adjust the head/carriage (see page 7-090).



DRIVE BAND SERVICE CHECK

Power off ac power from the diskette drive (page 7-060). Move manually the head/carriage within its total range of travel. Check the band movement to ensure that it remains parallel to the edge of the pulley (1).



DRIVE BAND REPLACEMENT

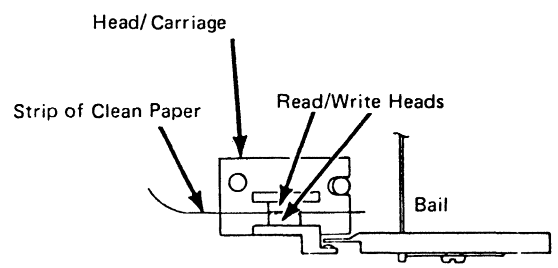
1. Power off the ac/dc power from the diskette drive (page 7-060), and open the diskette drive gate.
2. Remove the head cable connector and the head cable guide, and note the cable routing for replacement later.
3. Remove the drive band (9) by removing:
   - Screws (10), (4), and (6)
   - Clamps (11) and (2)

   WARNING

   The drive band can be easily damaged. Be very careful to avoid damaging the band when you are removing and installing it.
4. Be sure that the band is reinstalled parallel to the pulley (1) and the carriage bracket (3). Do not tighten screw (6) yet.

DRIVE BAND AND HEAD/CARRIAGE ADJUSTMENT

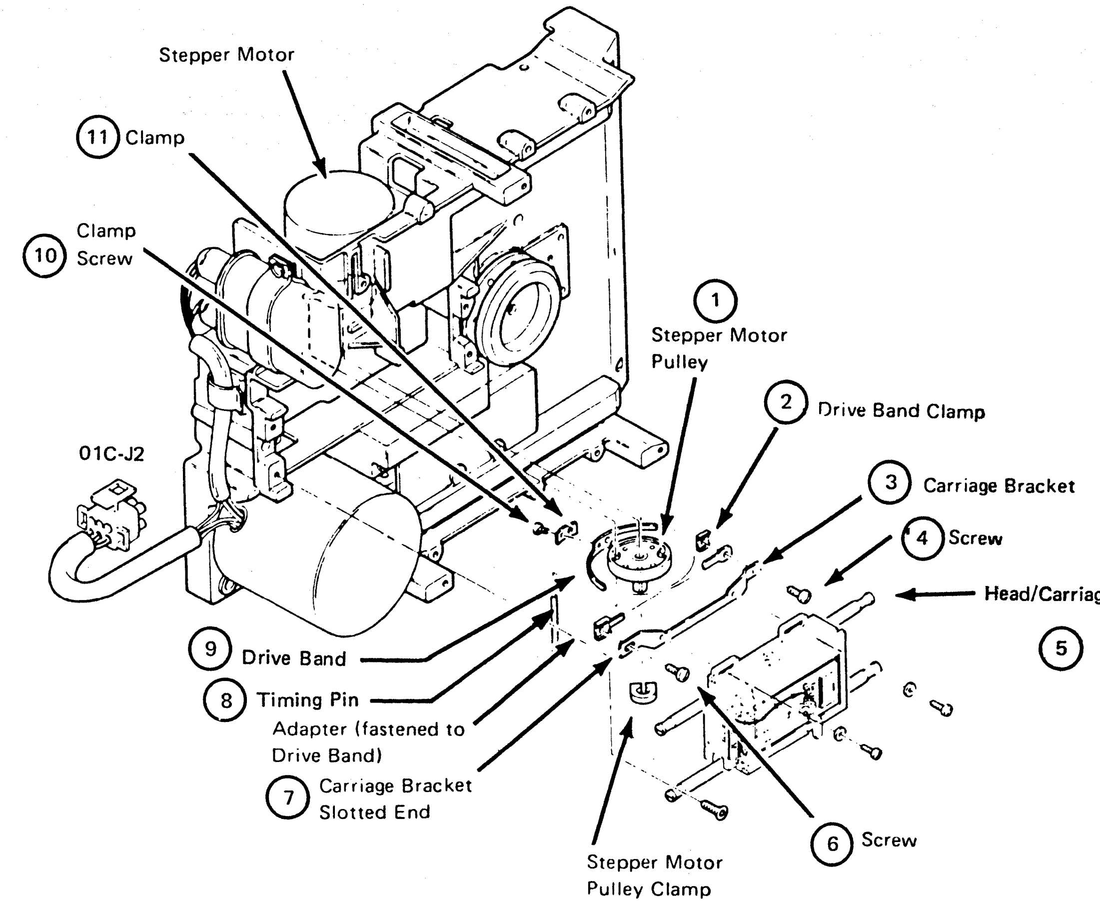
1. Power off the ac/dc power from the diskette drive (page 7-060) remove the head cable connector and cable guide, and note the cable routing for replacement later.
2. Insert a strip of clean paper between the read/write heads to prevent damage to the heads.

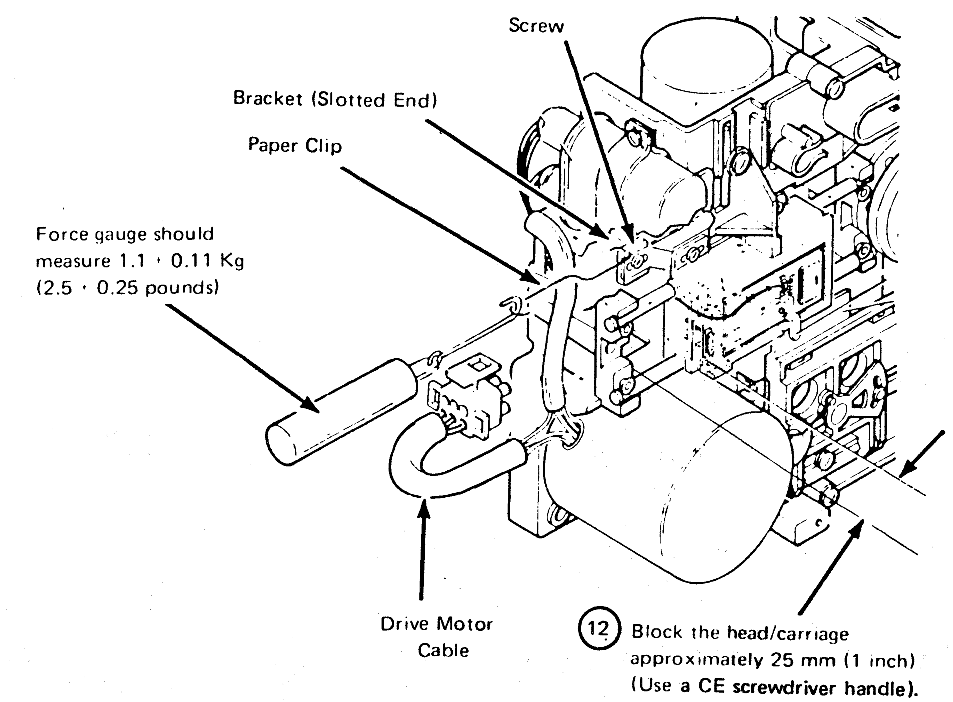


<u>Note:</u> If the band does not remain parallel while you are following the procedures for tightening screws (4),(6), and (10), loosen the screws (4), (6), and (10) and begin again.

3. Loosen screws (4), (6), and (10).
4. Block the head/carriage approximately 25 mm (1 inch) from the casting as shown (12) (you can use a screwdriver handle for this).
5. Pull on the loose end of the band at (7) with a force of 1.1 ± 0.11 kg (2.5 ± 0.25 pounds) and tighten screw (10) (use a force gauge, part 460870). Check to be sure that the band remains parallel to the edge of the pulley (1).
6. Move manually the head/carriage to mid-range (insert the timing pin (8) into the timing hole in the casting to align the head/carriage (5) at track 40). Tighten screw (6). Check that the band remains parallel to the edge of the pulley (1).
7. Move manually the head/carriage to track 0 and tighten the screw (4). Check that the drive band remains parallel to the pulley (1).

Perform the head/carriage adjustment (page 7-090).



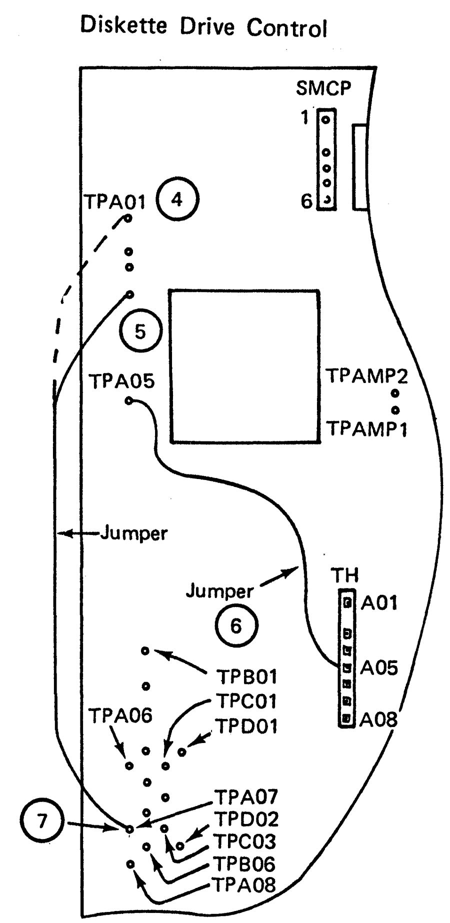


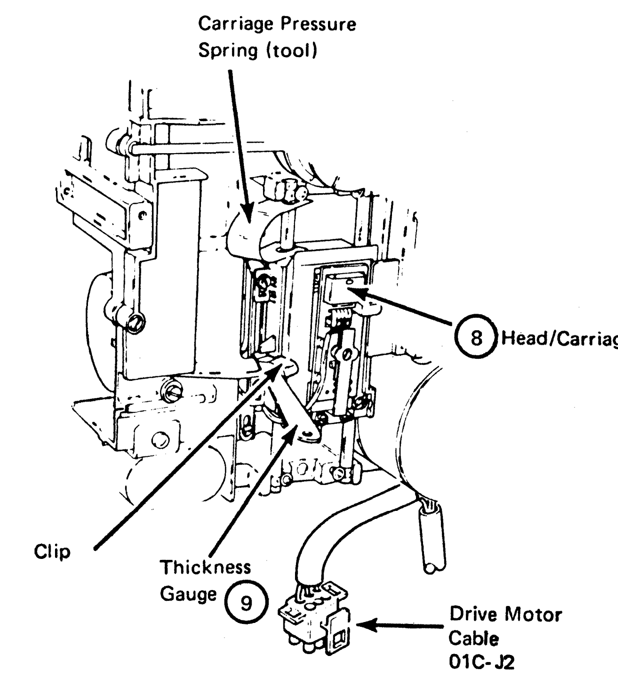
Head/Carriage Service Check

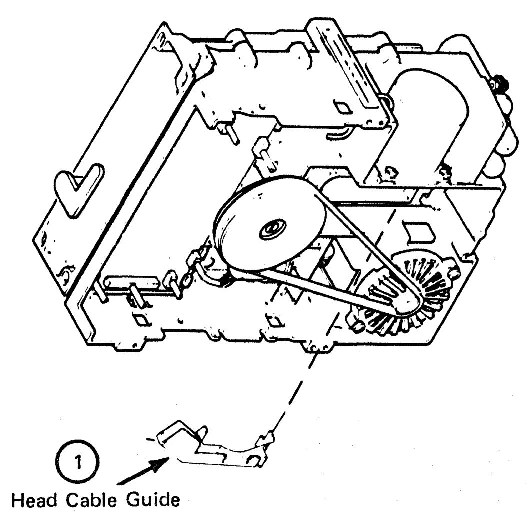
1. Power off the ac power from the diskette drive, and open the diskette drive gate (see page 7-060).
2. Remove the head cable guide (1) (note the head cable routing, for reference later).
3. Remove the timing pin from its storage location B (see page 7-040). Install a jumper (6) between TPA05 and THA05 to disable the stepper motor
4. Manually move the head/carriage (8) to approximately align the timing pointer (12) with the timing block.
5. Insert the timing pin (2) through the pulley (3) and into the timing hole in the casting and then remove the timing pin.
6. Install a jumper between (7) and (5) to cause the stepper motor to move the carriage to cylinder 40.
7. Remove and insert the timing pin (2) to ensure that it passes freely into the timing hole in the casting. If it does not, adjust the head/carriage (see page 7-090).
8. Remove the timing pin (2). Move the end of the jumper at (5) to (4). This moves the head to cylinder 39. Verify the cylinder 39 position by checking for 'no gap' (10) between the timing pointer (12) and the timing block.
9. Move the jumper from (4) to (5). DO NOT use a timing pin. Use a dental mirror to ensure the alignment of the timing holes in the pulley and the casting. When these holes are aligned the motor and pulley are at cylinder 40

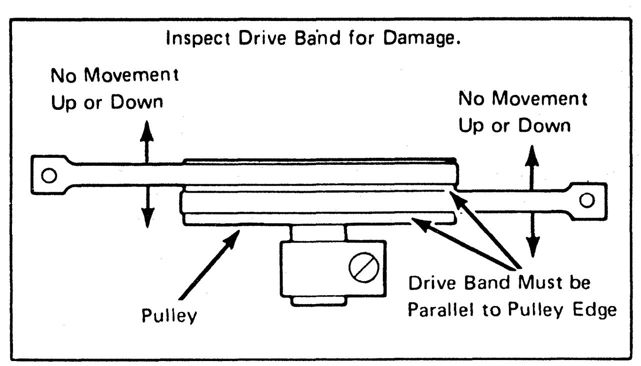
   Note: Because of the torque characteristics of the stepper motor, you can do the following service checks only once. If you are not sure of the results of the following checks, start again at the beginning of this service check to ensure correct results.
10. To verify that the head/carriage is correctly positioned for cylinder 40:
    a. Visually check the head/carriage (for no movement), as you insert a 0.483 mm (0.019 in) thickness gauge (9).
    b. Visually check for slight movement of the head/carriage, as you insert a 0.553 mm (0.021 in) thickness gauge (9).

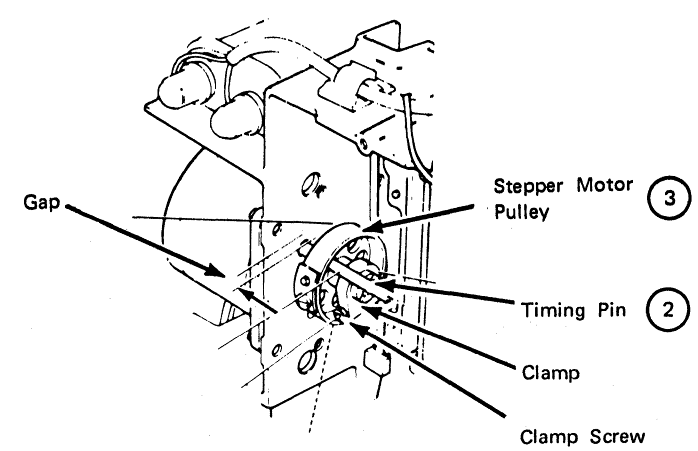
    If the results of the two preceding checks are not correct, adjust the head/carriage (see page 7-090).
11. If adjustment is not needed, install the head cable guide (1) and ensure that the head/carriage moves freely.
12. Remove all jumpers installed for this service check.
13. Return the timing pin to its storage location (see page 7-040).
14. If you replaced the head/carriage, perform the bail and solenoid service check (page 7-110).

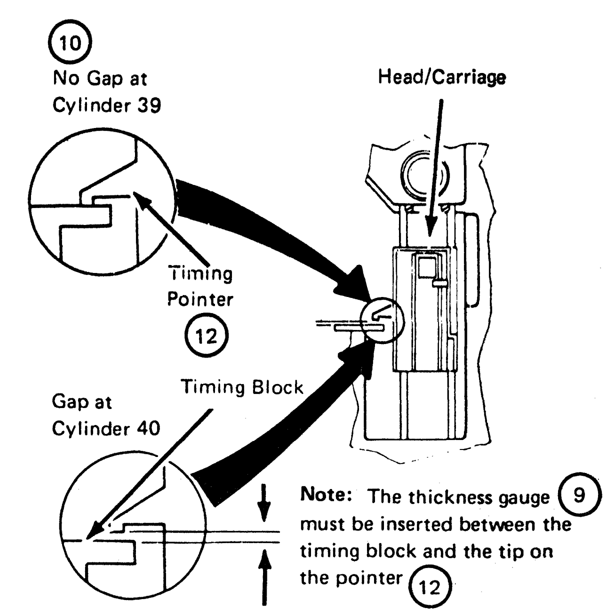












Head/Carriage Adjustment

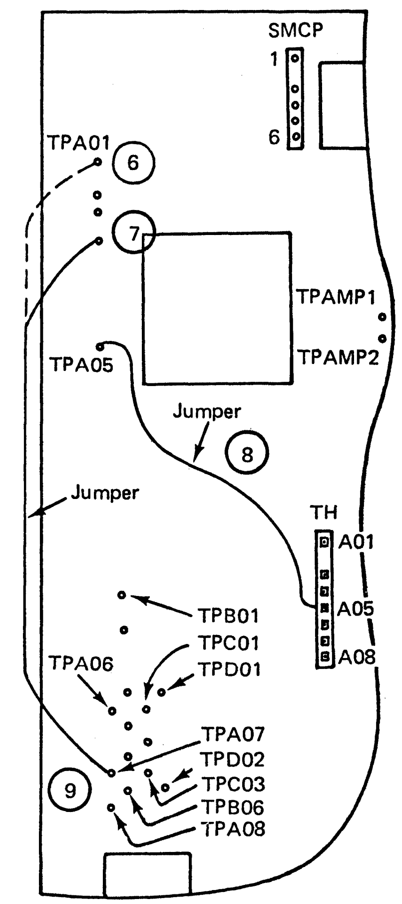
This adjustment synchronizes the movement of the head/carriage with the stepper motor.

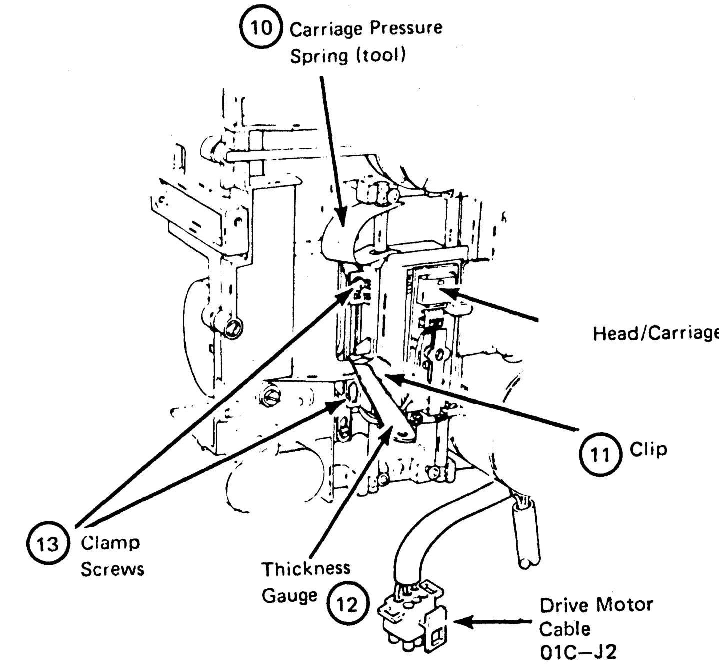
1. Power off the ac power from the diskette drive, and open the diskette drive gate (see page 7-060). Install a jumper (8) to disable the stepper motor.
2. Remove the head cable guide (1) (note the head cable routing, for reference later), and measure (using feeler gauge) the gap (6) between the stepper motor pulley 5 and the casting. Record this figure here:

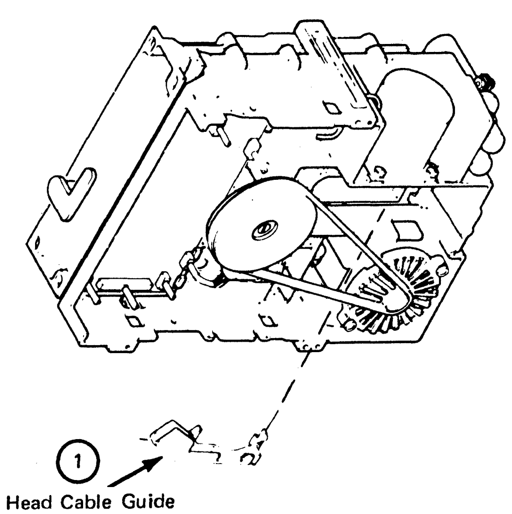
   GAP (6) is _____

3. Insert the timing pin (4) (using the straight end) through the pulley (5) and into the timing hole in the casting (move the head/carriage, as necessary, to do this).
4. Install a jumper between (9) and (7) to electrically lock the stepper motor to move to track 40.
5. Adjust the pulley-to-casting gap (6) (as recorded in a previous step) and tighten the clamp screw (3). When tightening the screw (3), ensure that the outer edge of the clamp is approximately even with the end of the stepper motor shaft.
6. Ensure that the timing pin (4) passes freely through the pulley and into the timing hole in the casting. Remove the timing-pin (4).
7. Loosen the screws (13).
8. Insert a 0.50 mm (0.020 in.) thickness gauge at (12) and secure with clip (11).
9. Use the carriage pressure spring (10) to push the head/carriage lightly against the thickness gauge.
10. Tighten the clamp screw (13).
11. Remove the thickness gauge and move the end of the jumper from (7) to (6) (to cause the stepper motor to move to track 39). Verify the track 39 position by checking for a 'no gap' (14) between the timing pointer (15) and the timing block.
12. Power off the dc drive power and remove all jumpers (see page 7-060).
13. Manually move the head/carriage all the way, in both directions, to check the drive band (2). If the drive band does not remain parallel to the edge of the pulley, begin with the drive band adjustment described on page 7-070.

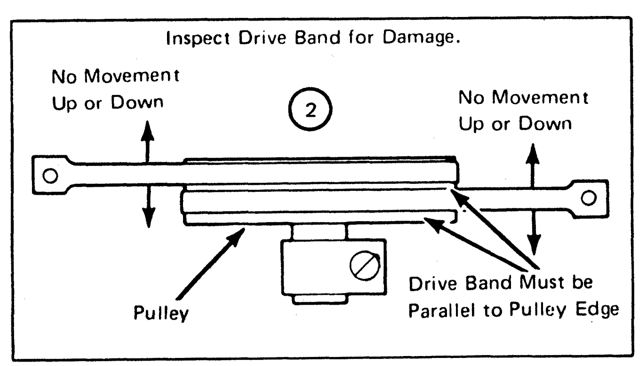
Diskette Drive Control Board

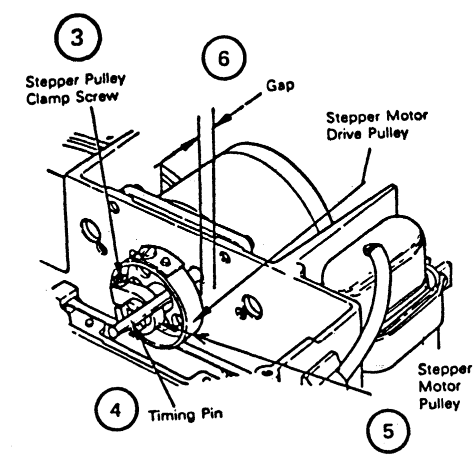


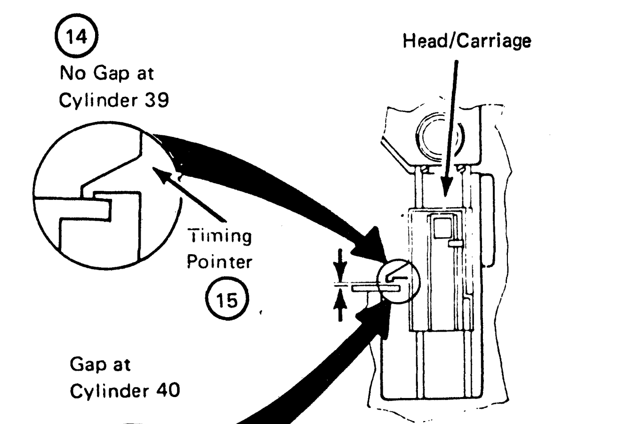




Note: Ensure that the stepper motor clamp is fully on the stepper motor shaft before it is tightened.







Note: The thickness gauge (12) must be inserted between the timing block and the tip on the pointer (15)

Head/Carriage Replacement

1. Power off the ac/dc power from the diskette drive and open the diskette drive gate (see page 7-060).
2. Remove the diskette drive (see page 7-060).
3. Remove the head signal cable connector (2).

Caution

The drive band can be easily damaged or beat.

4. Remove the cable guide (1).
5. Remove the drive band (8) by removing screws (4), (7), and (9). Notice the position of the band and clamp for proper replacement.
6. Remove the carriage bracket (3) by removing screws (6).
7. Insert clean paper between the read/write heads to prevent damaging them.
8. Remove the guide rod (5).
9. Carefully lift and turn the head/carriage to remove it from the remainig guide rod (do not let the read/write heads hit each other).

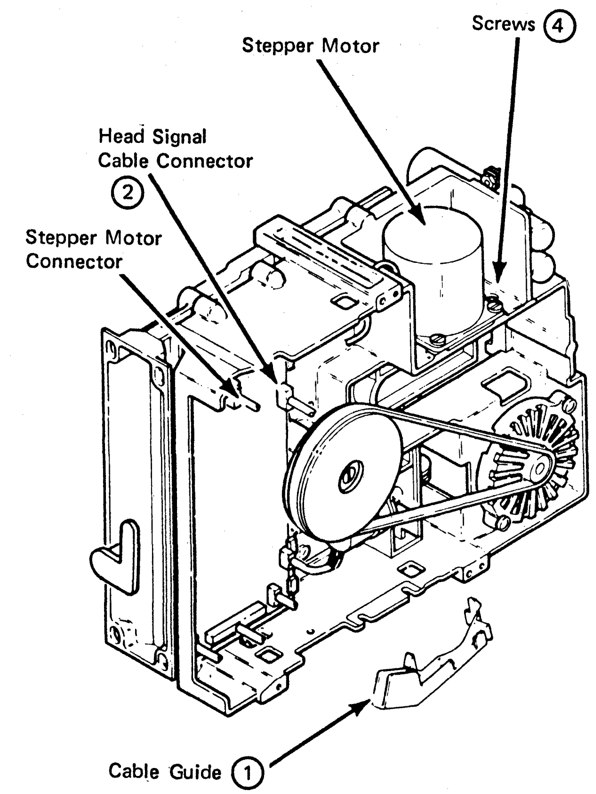
Replacement Notes:

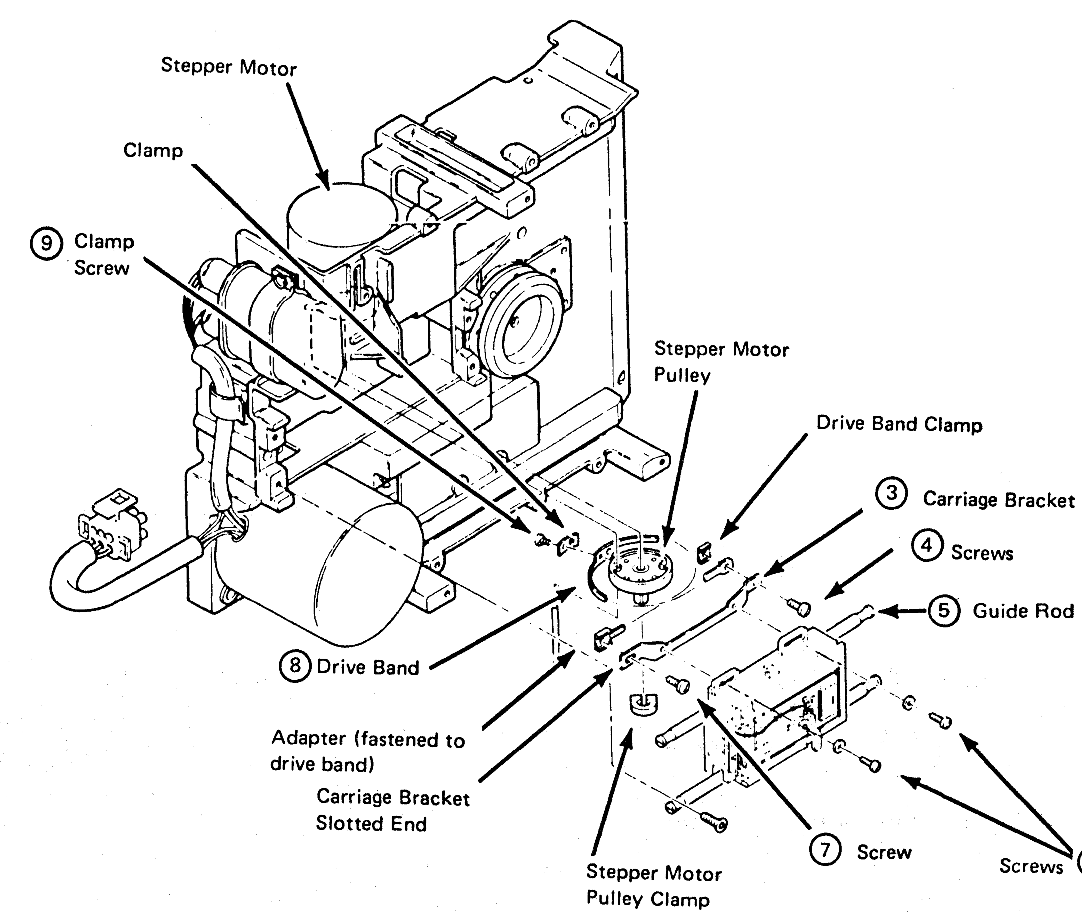
While replacing the head/carriage, ensure that:

1. A strip of clean paper is inserted between the heads to prevent damaging them.
2. The guide rod holding screws are aligned with the notches in the guide rods.

Additional procedures needed:

- 'Drive Band Replacement', page 7-070.
- 'Drive Band Adjustment', page 7-070.
- 'Head/Carriage Adjustment', page 7-090.





Bail and Solenoid Checks and Adjustments

SERVICE CHECK

1. Power off the ac power from the diskette drive, and open the diskette drive gate (see page 7-060).

2. Insert a diskette and close the diskette engaging lever (1).

3. Install jumper (2) to activate the head load solenoid and jumper (3) to deactivate the stepper motor, and power on the ac power.

   Caution

   The solenoid case becomes hot after continuous use.

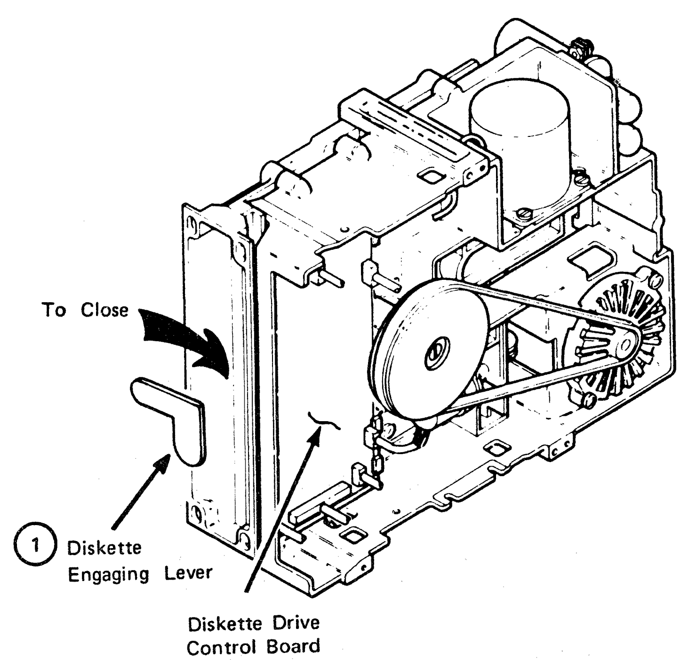
4. Check bail gap (6). Move the head/carriage from one end of the bail to the other and check the gap at both ends of the bail.

5. If the gap (6) is not correct, adjust the head gap.

6. Remove the jumpers (2) and (3), open the diskette engaging lever, remove the diskette, and close the diskette engaging lever again.

7. Visually check the gap (4) between the head surfaces. If the gap is not correct, adjust it.

8. If both the bail gap and the head gap are correct, open the diskette engaging lever and close the diskette drive gate.



HEAD GAP ADJUSTMENT

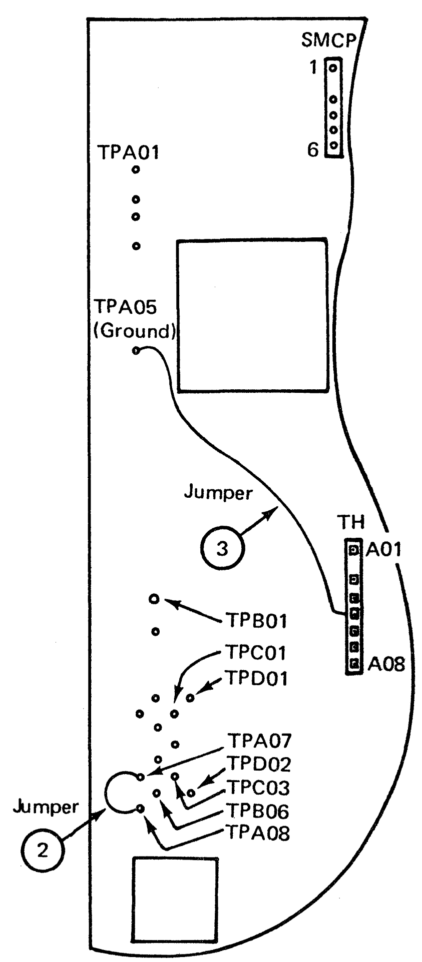
1. Power off the ac/dc power (see page 7-060) and remove diskette from the diskette drive, and loosen the bail lever screw (7) enough to allow the lever (8) to move. Close the diskette engaging lever.

2. While looking into the diskette insertion slot, move lever (8) until the heads just touch.

3. If the lever has location marks, notice the relative position of the marks and the alignment edge (9). Then move the lever (8) one space clockwise and tighten the lever screw (7). Check the gap (4) and repeat the adjustment as necessary.

4. If the lever does not have location marks, move the lever until gap (4) is correct. Check visually.

5. Perform the bail adjustment.



BAIL ADJUSTMENT

1. Power off the ac power (see page 7-060) from the diskette drive, insert a diskette, and turn the diskette engaging lever (1) to close.

2. Install jumpers (2) and (3), and power on the ac power.

   Caution

   The solenoid case becomes hot after continuous use.

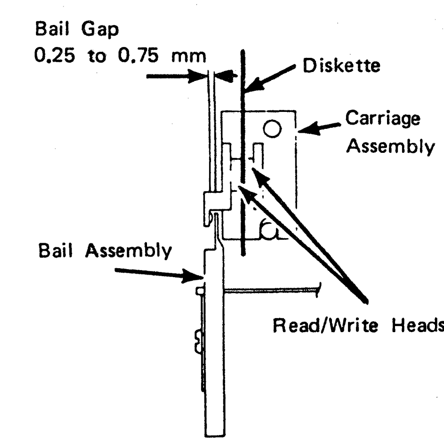
3. Loosen solenoid locking screw (5), and turn the solenoid in the mounting bracket to adjust the bail gap (6) between the head load arm and the bail (do not allow the plunger and cable to twist).

4. Tighten the solenoid locking screw, and check the bail gap (6) with the head/carriage at each end of the bail. If it is not correct, adjust it again.

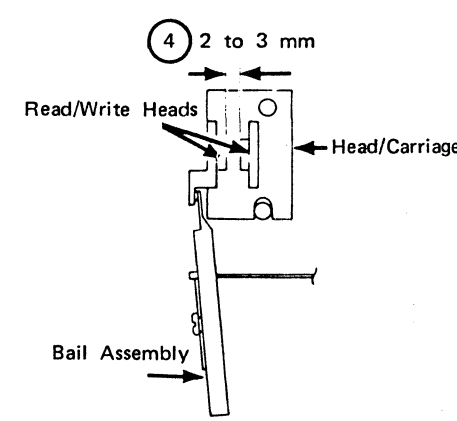
5. Remove the diskette from the diskette drive.

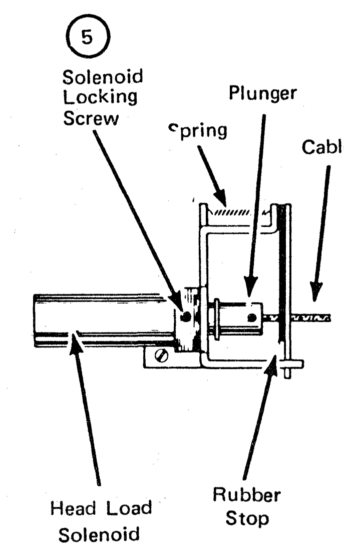
6. Power off the ac/dc power from the diskette drive, and remove jumpers (2) and (3).

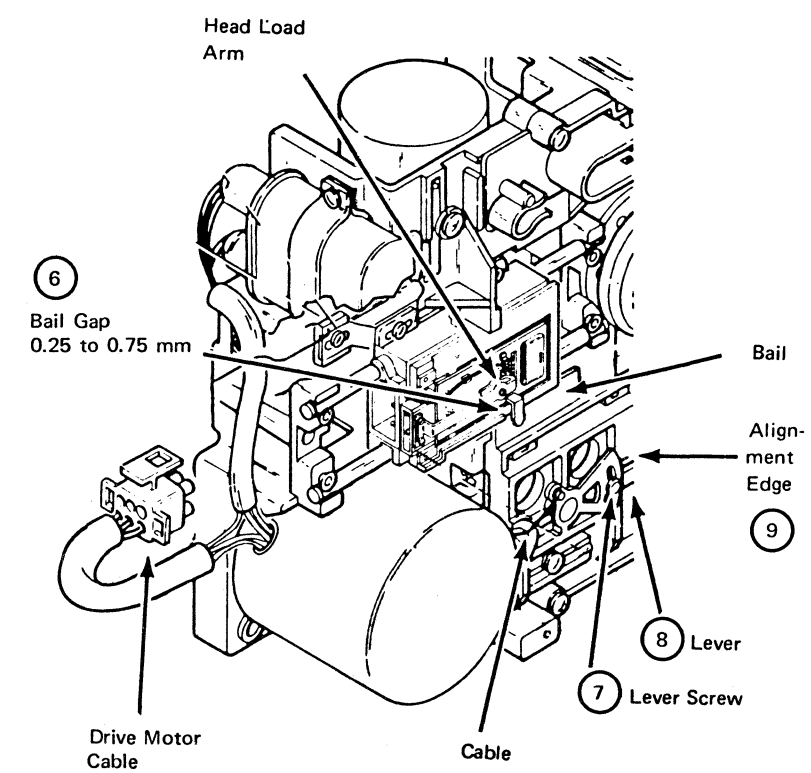
Head Load Solenoid Activated



Head Load Solenoid Deactivated



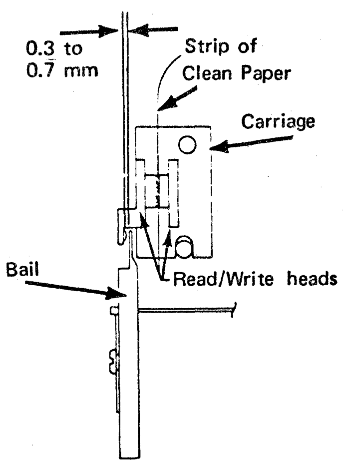




Bail and Solenoid Replacement

Do this before replacing the bail or solenoid:

1. Power off the ac/dc power from the diskette drive (page 7-060), and insert a strip of clean paper between the read/write heads (9) to prevent damage to the heads.



2. Slightly push in on bail (6) and disconnect eyelet (10) from the hook.
3. Loosen, but do not remove, screw (4) (some models have a nut that falls into the diskette drive if the screw is removed).
4. Notice the position of the spring (7), then remove the pivot rod (5) (the rod is held by a screw (4)).
5. Slide the bail (6) out from under the head load arm (8).

   Warning:

   Be careful to avoid letting the heads hit together; this can DAMAGE THEM.

6. When you install the bail (6), ensure that:

   a. The cable eyelet crimp (11) is facing out.

   b. The bail return spring is in position.

   c. The bail mounting screw (4) is tightened.

TO REPLACE the solenoid:

1. Remove the drive belt (3).
2. Remove the solenoid signal cable connector (2).
3. Remove the solenoid, bracket, and cable as one unit.
4. Loosen the solenoid locking screw (1) and unscrew the solenoid from the bracket.
5. When you replace the assembly, ensure that:

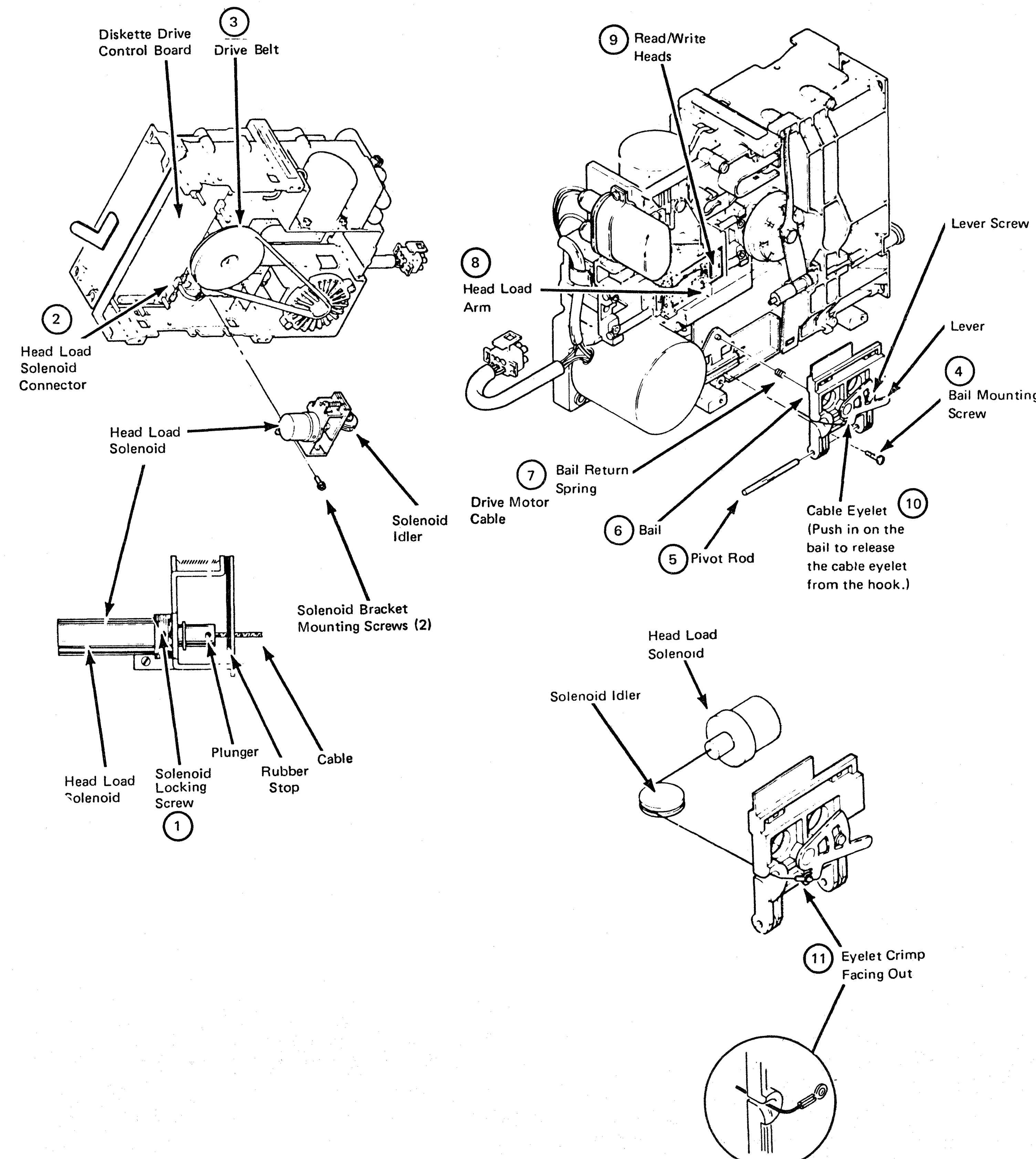
   a. The solenoid is connected to the diskette drive control card.

   b. The drive belt is installed.

   c. The cable eyelet crimp (10) is facing out.

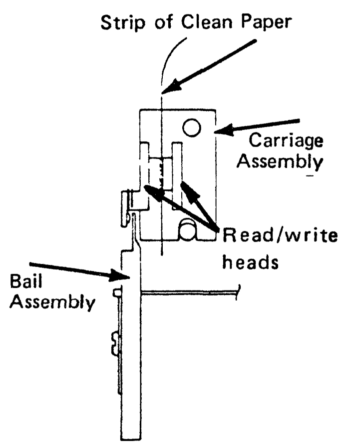
   d. The cable is on the solenoid idler.

6. Perform the 'bail and solenoid service check', page 7-110.



Collet/Flat Spring Replacement and Adjustment

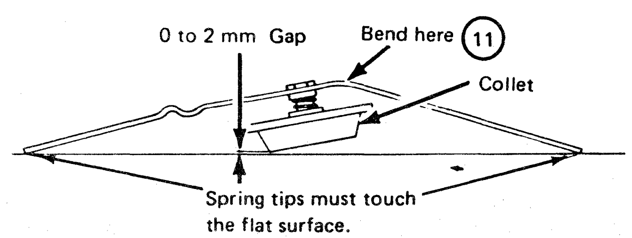
1. Power off the ac/dc power from the diskette drive (see page 7-060).
2. Insert a strip of clean paper between read/write heads (1) to protect the heads.
3. Turn the diskette engaging level (13) to the closed position.

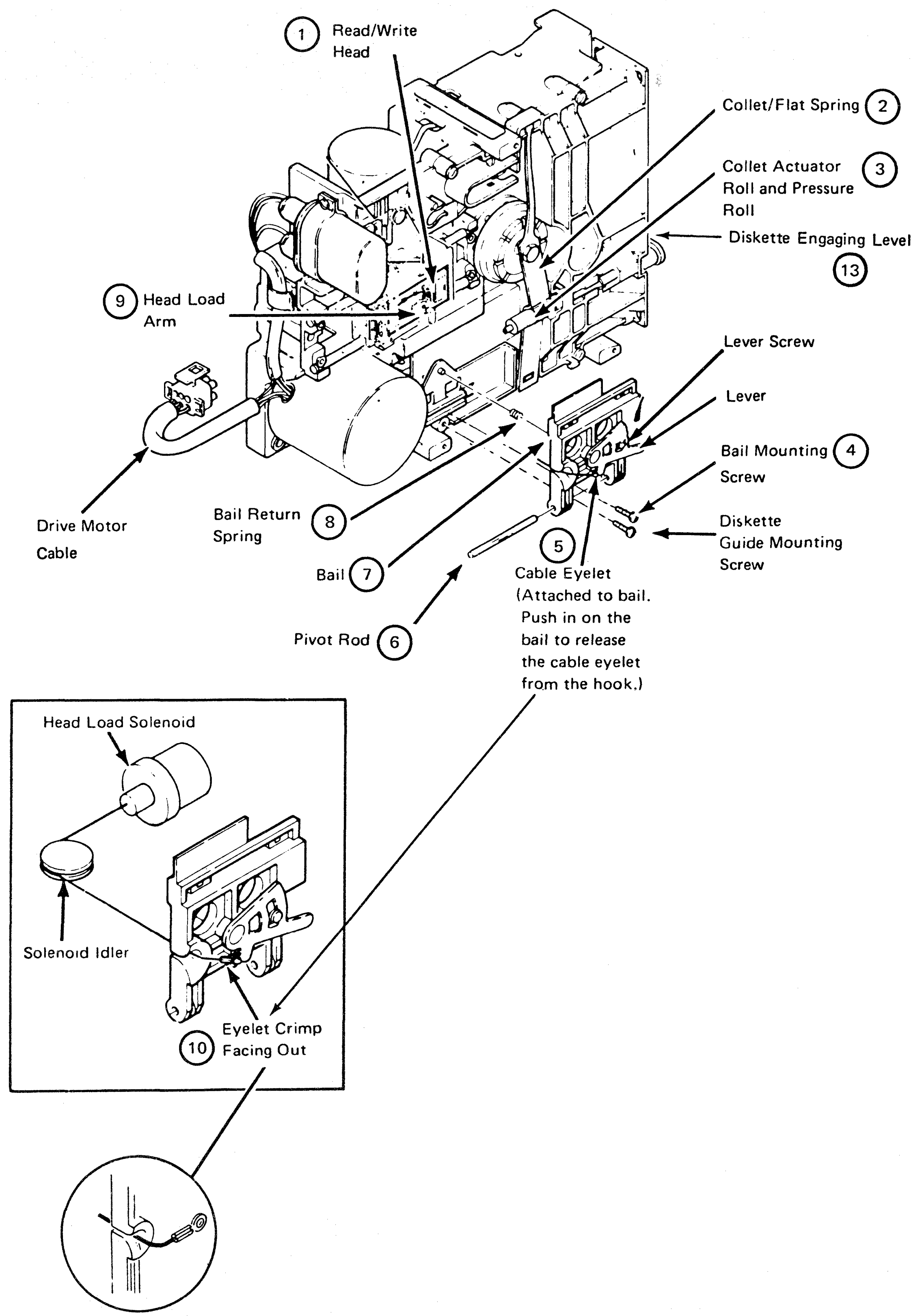


4. Push in slightly on the bail (7) and disconnect the eyelet (5) from the hook.
5. Loosen, but do not remove, screw (4) (some models have a nut that falls into the diskette drive if the screw is removed).
6. Note the position of the spring (8), then remove the pivot rod (6) (the rod is held by screw (4)).
7. Slide the bail (7) out from under the head load arm (9).

   Warning: Be careful to avoid letting the heads hit together; this can DAMAGE THEM.
8. Slide the rollers (3) off the actuator rod.
9. Remove the collet/flat spring assembly (2).
10. Bend the flat spring at (11) to adjust the collet position.

    Warning: Too much binding will damage the spring.





Note: When you install the collet/flat spring (2), ENSURE that:

- The cable eyelet crimp (10) is facing out.
- The bail return spring (8) is in position.
- The bail mounting screw (4) is tightened.

LED and PTX Replacement

LED (LIGHT EMITTING DIODE) REPLACEMENT

1. Power off the ac/dc power from the diskette drive (see page 7-060).
2. Remove LED mounting screw (1).
3. Disconnect LED connector (2). Notice the LED cable routing and pull the connector back through the cable routing holes to remove the LED assembly.

PTX (PHOTOTRANSISTOR) REPLACEMENT

1. Ensure that the diskette drive ac/dc power is switched off. See page 7-060.
2. Remove the six signal cable connectors attached to the control board (3).
3. Loosen the control retainer screws (4), turn the retainers and remove the board.
4. Push the bail (10) inward, slightly, and remove the cable eyelet (9) from the hook.
5. Insert a trip of clean paper between the read/write heads to protect the heads.
6. Remove the diskette guide mounting screws (8).
7. Remove the diskette guide (5) by lifting it up and carefully sliding the bail (10) from under the head load arm (11).

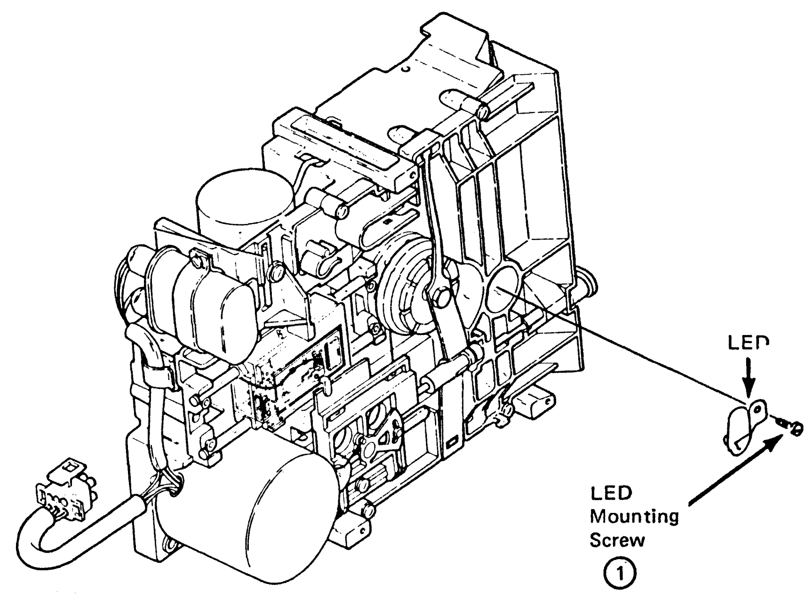
   Caution: Do not allow the heads to hit together, causing damage.

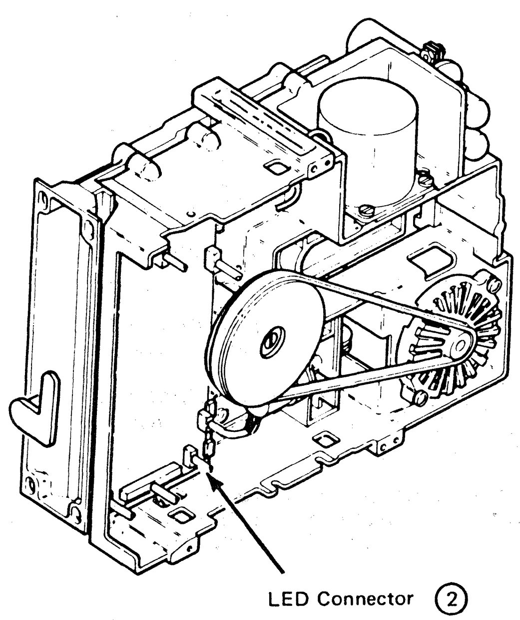
8. Remove the PTX mounting screws (7) and remove the PTX assembly (6).

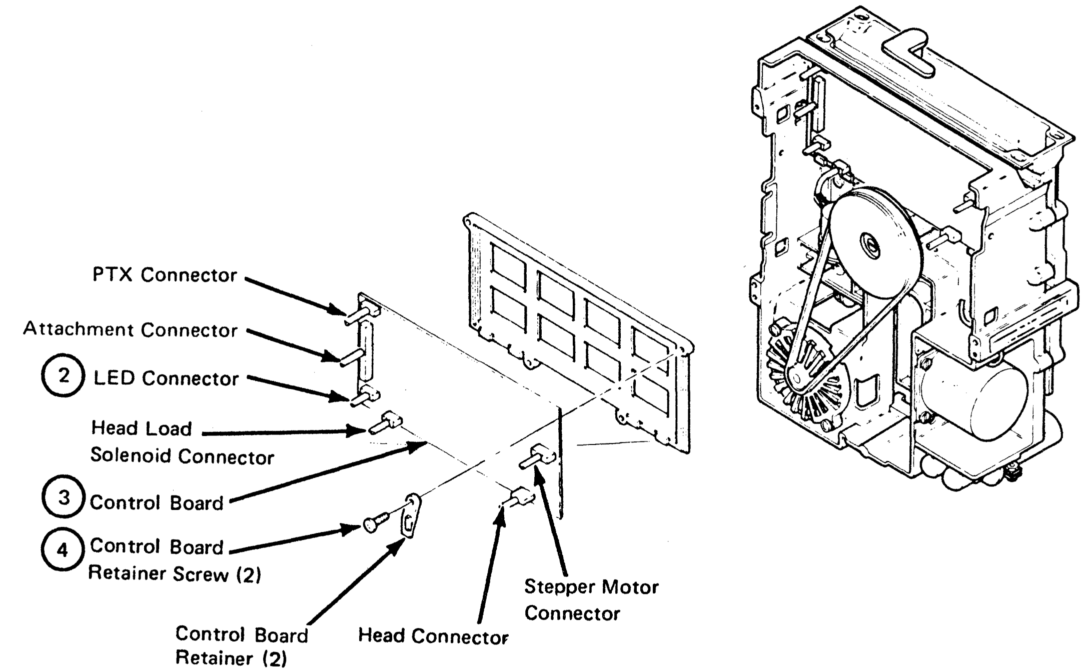
PTX INSTALLATION NOTES

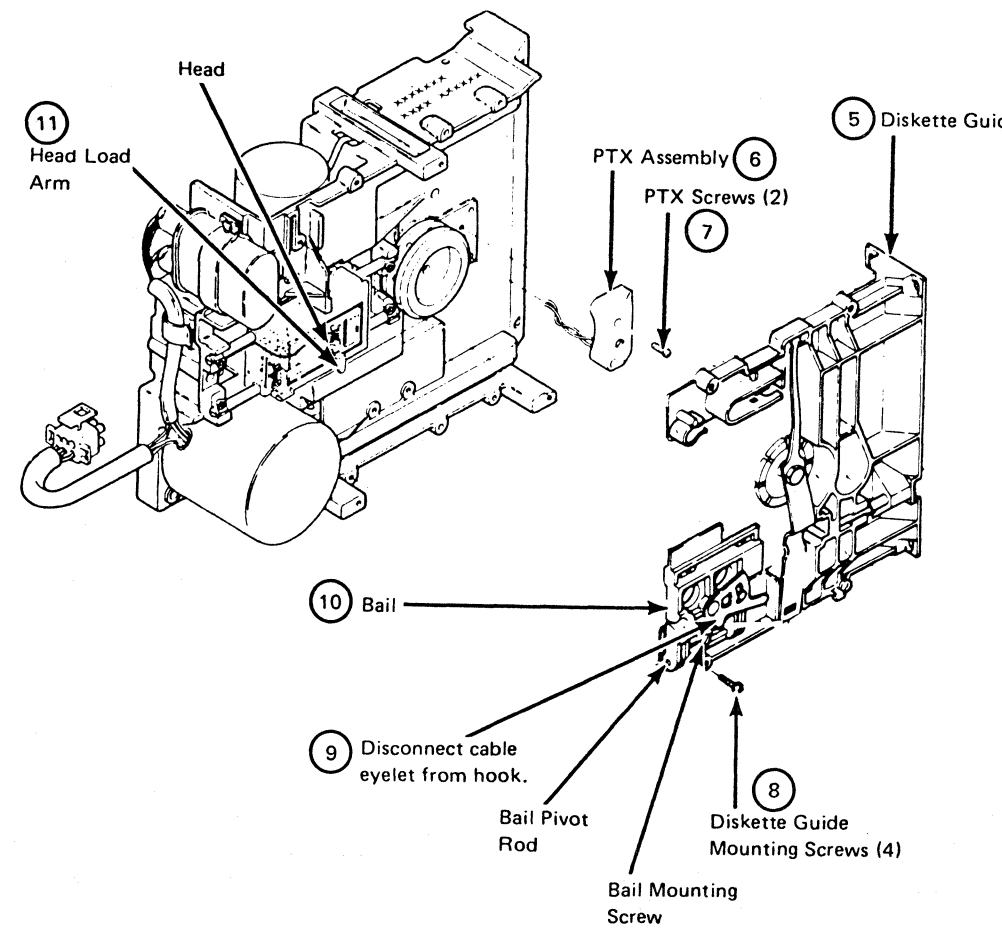
When you install a phototransistor (PTX), ensure that:

1. The cable eyelet crimp (9) is facing out.
2. The cable is on the solenoid idler.
3. All signal cable connectors are connected and seated.









Drive Motor Removal/Replacement

DRIVE MOTOR REMOVAL

1. Power off the ac power from the diskette drive (page 7-060),
2. Open the diskette drive gate and disconnect the drive motor cable (1).
3. Remove the drive belt (9).
4. Loosen the setscrew (8) and remove the pulley.
5. Remove the motor mounting screws and washers (11), then remove the motor.

DRIVE MOTOR INSTALLATION

1. Hold the ac drive motor in place and loosely install the mounting screws and washers (11).
2. Use the drive motor pulley (7), to center the motor shaft in the casting hole, and tighten the motor mounting screws.
3. Slide the drive motor pulley out of the casting hole and tighten the pulley setscrew (8) (locate the pulley so that the wrench is against the casting when you tighten the setscrew).

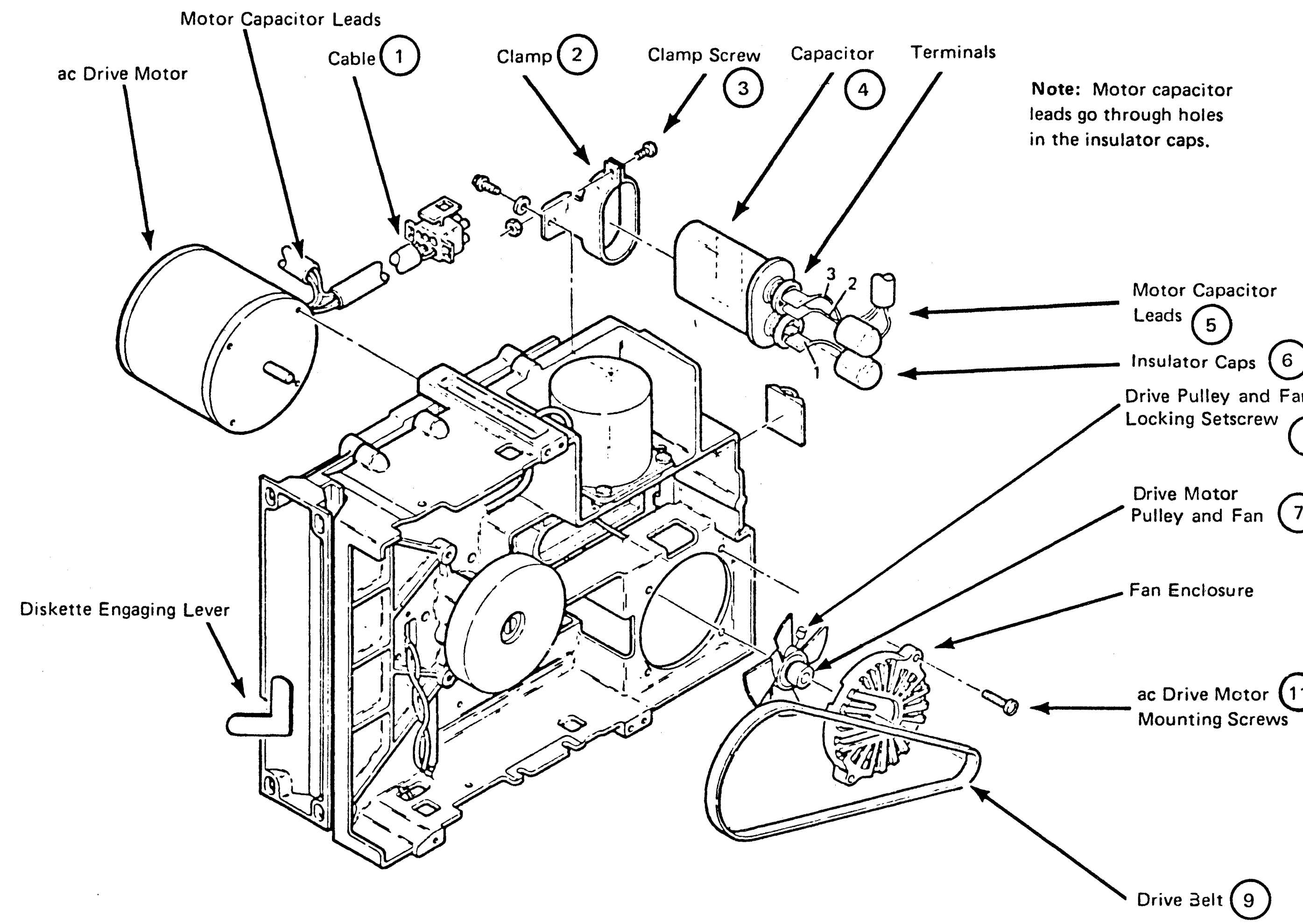
DISKETTE DRIVE MOTOR FAN

If the motor has a fan, place the fan and the pulley on the motor shaft so that there is a 0.5 ± 0.1 mm clearance between the fan and face of the motor (at the shaft).

CAPACITOR REPLACEMENT

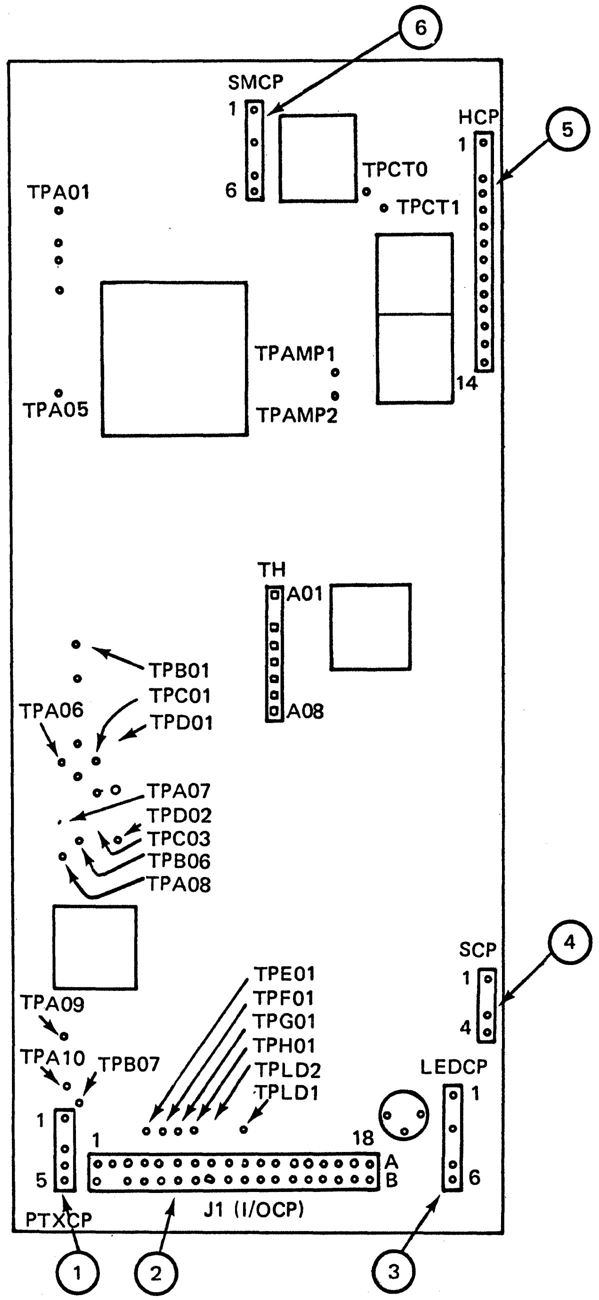
1. Power off the ac power from the diskette drive (page 7-060).
2. Disconnect ac motor power cable (1).
3. Remove insulator cap from capacitor terminals (6).

   Warning: High voltage may be present at the capacitor's terminals.
4. Discharge the capacitor (4) by shorting both terminals together using a large screwdriver with an insulated handle.
5. Remove capacitor leads (5) from capacitor terminals.
6. Remove screw and capacitor bracket assembly (2).
7. Reinstall new capacitor (2) with the red dot positioned (5) at the top.
8. Reinstall motor capacitor leads on capacitor (lead 2 and 3 on top terminals and lead 1 on the bottom terminal).
9. Reinstall insulator caps (6) on capacitor terminals.
10. Replug ac motor power cable (1).
11. Restore ac power to the diskette drive (page 7-060).



Diskette Drive Connectors (Part 1 of 2)

DISKETTE DRIVE CONTROL CARD



Legend:

PTXCP	PTX Connector Pins
I/O CP	I/O Connector Pins 01C-J1
LEDCP	LED Connector Pins
SCP	Solenoid Connector Pins
HCP	Head Connector Pins
SMCP	Stepper Motor Connector Pins

DISKETTE DRIVE CONTROL CARD CONNECTORS

(1)	PTX Connector
A01	Diskette 1 Coll (+5Vdc)
A02	Blank
A03	Diskette 1 PTX Emitter
A04	Diskette 2,2D PTX Emitter
A05	Diskette 2,2D Coll (+5Vdc)

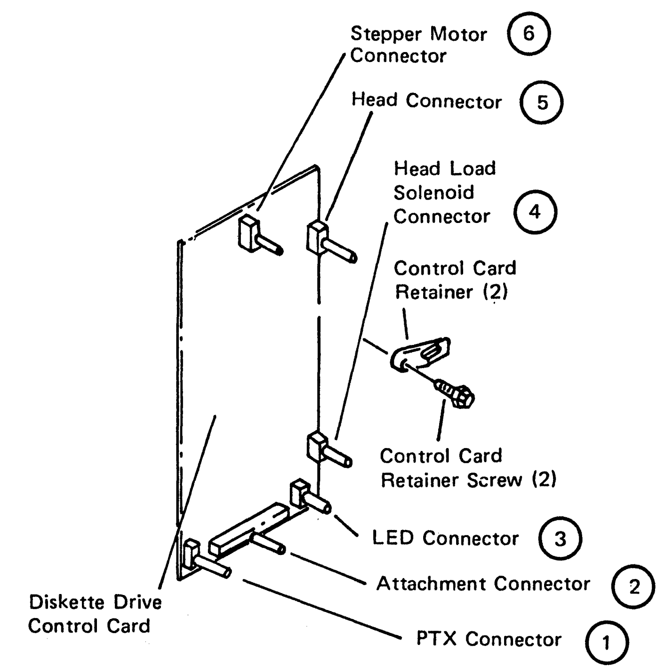
(2)	Attachment Connector J1 (I/O CP)
A01	-5 Vdc
A02	Power Supply Ground
A03	)
through	) Ground
A18	)
B01	+5 Vdc
B02	Blank
B03	+24 Vdc
B04	+Index
B05	+Diskette Sense
B06	+Write/Erase Enabled
B07	+File Data
B08	+Inner Tracks
B09	+Erase Gate
B10	+Access 0
B11	+Select Head 1
B12	NC
B13	+Access 1
B14	+Write Gate
B15	+Head Engage
B16	+Switch Filter
B17	Write Data
B18	NC

(3)	LED Connector
A01	Diskette 2,2D Ground
A02	Blank
A03	Diskette 2,2D Ground
A04	Blank
A05	Diskette 1 Ground
A06	Diskette 1 Anode

(4)	Solenoid Head Load Connector
A01	NC
A02	Blank
A03	+Head Load
A04	-Head Load

(5)	Head Connector
A01	NC
A02	Blank
A03	Head 0 Read/Write Coil
A04	Head 0 Center Tap
A05	Head 0 Read/Write Coil
A06	Head 0 Erase
A07	Head 0 Erase Common
A08	Ground
A09	Ground
A10	Head 1 Erase Common
A11	Head 1 Erase
A12	Head 1 Read/Write Coil
A13	Head 1 Center Tap
A14	Head 1 Read/Write Coil

(6)	Stepper Motor Connector
A01	+24 Vdc
A02	Blank
A03	MC-3
A04	MC-2
A05	MC-1
A06	MC-0



Test Points	Line Names
TPA01	MC-3
TPA02	MC-1
TPA03	MC-2
TPA04	MC-0
TPA05	Ground
TPA06	+Erase Gate
TPA07	Ground
TPA08	-Head Load
TPA09	+5 Vdc
TPA10	D2 PTX
TPB01	+24 Vdc
TPB02	Ground
TPB03	+Select Head 1
TPB04	+Write Gate
TPB05	+Head Engage
TPB06	Write Data
TPB07	D1 PTX
TPC01	+Access 0
TPC02	+Inner Tracks
TPC03	-5 Vdc
TPC01	+Access 1
TPD02	+Switch Filter
TPE01	+Index
TPF01	+Diskette Sense
TPG01	+Write/Erase Enabled
TPH01	+File Data
TPLD1	D1 LED Voltage
TPLD2	D2 LED Voltage
TPAMP1	Preamp TP1
TPAMP2	Preamp TP2
TPCT0	Center Tap Head 0
TPCT1	Center Tap Head 1
THA01	Diff Read B
THA02	No Pin
THA03	Diff Read A
THA04	-High Gain
THA05	-Disable Stepper Motor
THA06	+14 Vdc
THA07	Access Clamp Voltage
THA08	Oscillator

MMB CABLE CONNECTOR TEST PROCEDURE

Use the following table to check the continuity of the signal cable attaching the MOSS board to the diskette drive control card.

To locate pins on diskette, MMB board connector, and DAC card, see diagram on page 7-050.

	MMB		Diskette		Note 1
	01A-A1YR		01C-J1		Wire No
Note 3	D03		B01		1 (+5 V)
		D11		A01	2 (-5 V)
		D08 Note 2		A02 Note 2	3 (Gnd)
	B04		B04		4
		Bus		A04	T4
	D04		B05		5
		Bus		A05	T5
	B05		B06		6
		Bus		A06	T6
	D05		B07		7
		Bus		A07	T7
	B06		B08		8
		Bus		A08	T8
	D06		B09		9
		Bus		A09	T9
	B07		B10		10
		Bus		A10	T10
	D07		B11		11
		Bus		A11	T11
	B08		B13		12
		Bus		A13	T12
	B09		B14		13
		Bus		A14	T13
	D09		B15		14
		Bus		A15	T14
	B10		B16		15
		Bus		A16	T15
	D10		B17		16
		Bus		A17	T16
Note 4			B03		17

Notes:

1. For signal names, see signal tables in Chapter 4 (cable 15).
2. The cable wires connecting to A02 through A11 and A13 through A17 are terminated at the ground bus located on the connector at 01A-A1YRD08.
3. Cable to MMB socket 01A-A1YR. Refer to page 4-020 for MMB board pin assignments, and to page 7-030 for socket location.
4. Single wire carrying +24 Vdc from primary power box 01N-J1-1.

Diskette Drive Testing

The diskette drive logic and hardware are tested during MOSS IML.

1. Power off the ac power from the diskette drive (page 7-060), and wait at least 10 seconds.

2. Set Function Select switch to MOSS IML, then power on the diskette drive and note the hexadecimal display on the control panel.

3. If the controller initialization is not completed, and a hexadecimal display code is displayed or not, go back to the MIM Part 2, START entries.

4. Wait for the completion of IML (if IML is successfully completed, the diskette drive is operating correctly).

5. If intermittent diskette drive failures are suspected, use the MIM Part 2 main troubleshooting procedure 2 (Chapter 2).

Chapter 8. B/M Installation and Preventive Maintenance

Contents

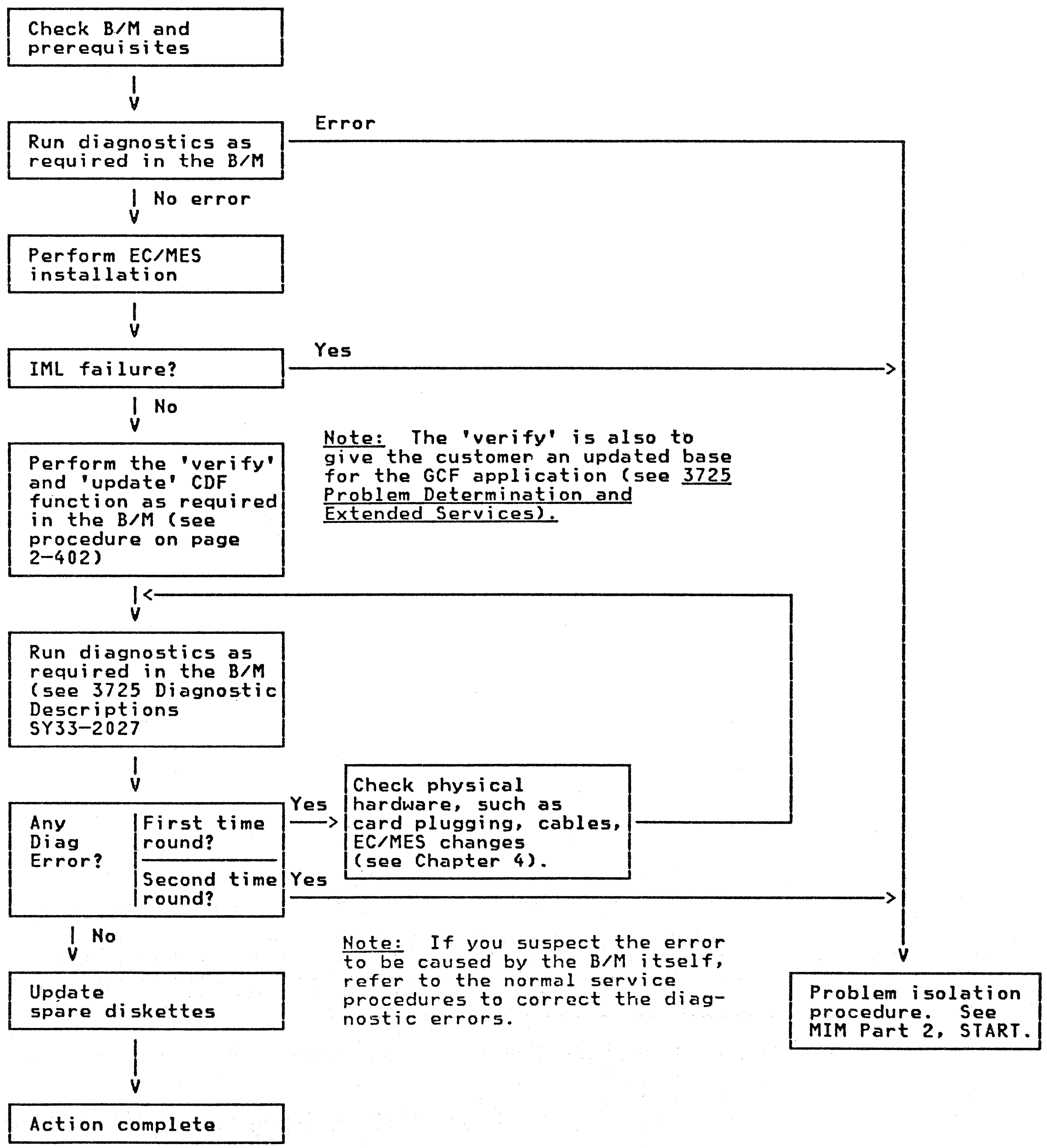
B/M Installation

HARDWARE EC/MES INSTALLATION

The following flowchart shows which actions must be performed to install a new EC or an MES.

When you have to install a "Record Purpose Only MES" with specify code 5000, concerning a LIC or ICC move, go to page 8-030.

ECs that require long machine down times are split into several parts. Each of these sequential parts can be installed in less than 2 hours.



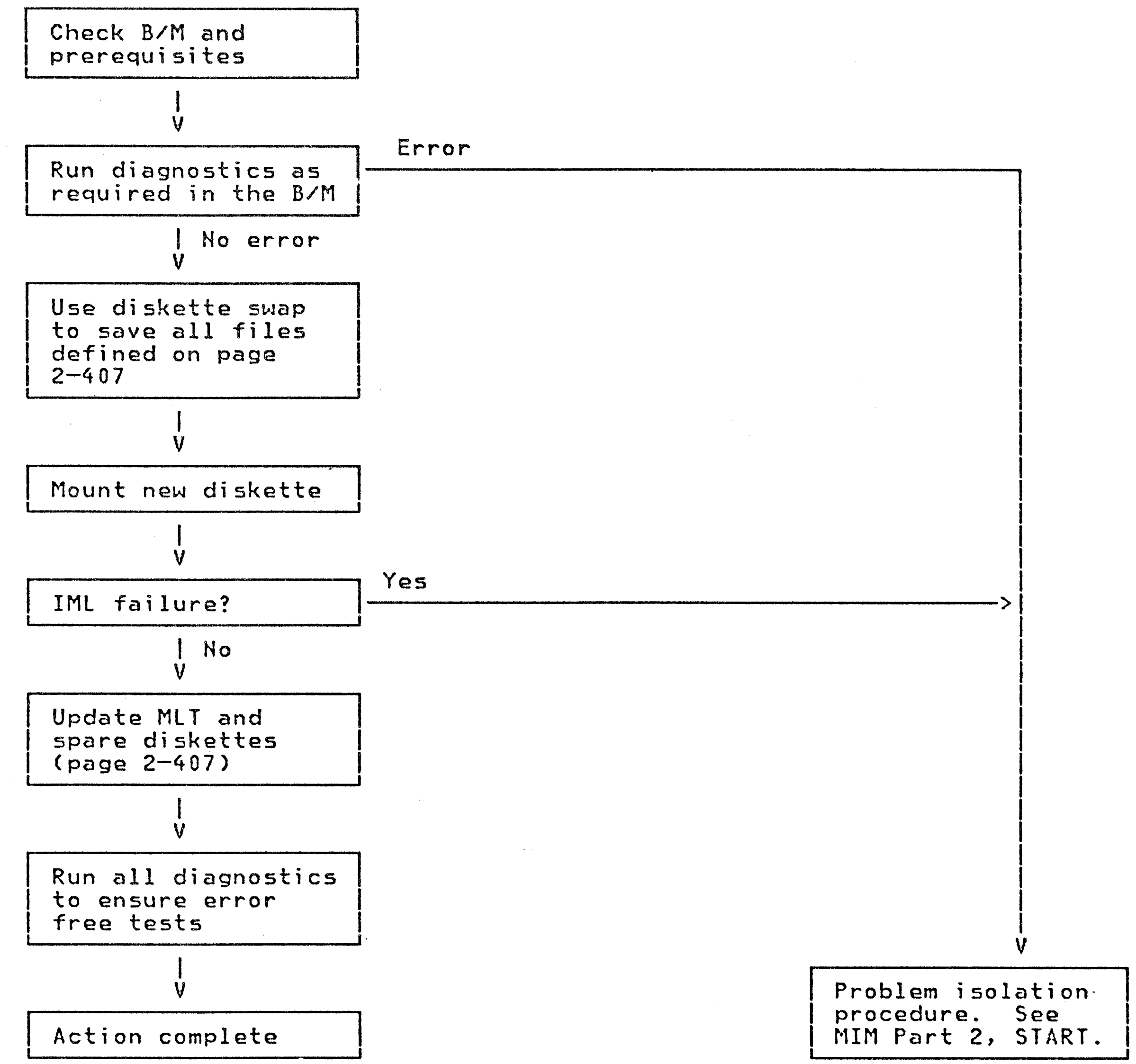
Note: The 'verify' is also to give the customer an updated base for the GCF application (see 3725 Problem Determination and Extended Services).

Note: If you suspect the error to be caused by the B/M itself, refer to the normal service procedures to correct the diagnostic errors.

MICROCODE AND DIAGNOSTIC EC INSTALLATION

Each EC is installed via a new diskette.

The following flowchart shows which actions must be performed to install a new EC on microcode or diagnostic programs:



Note: The new diskette is probably the cause of the IML error.

Preventive Maintenance

The only preventive maintenance for the 3725/3726 is the following:

Frequency	Check
Six months after installation	Tighten all the screw type connectors of the power system.
As required by the operating environment (six months is recommended in most cases)	Check cooling fans. Check air filters and replace as necessary.
Every 12 months	Check line cord, plugs, terminals, and grounding.

LIC or ICC Move from One Board to Another

INTRODUCTION

- The following installation instruction is to be used only in accordance with a "Record Purpose Only MES Order" specify code 5000. This MES is furnished by IBM for the specific machine type and serial number. It concerns the moving of a hardware part from one place to another (no hardware parts are necessary).
- Before starting, the customer must provide you with the Graphic Configuration File (GCF), described in the Operator's Guide, GA33-0044, under the heading "GCF Printout." This configuration determines the card location and the line address(es) to be removed. The IBM representative may also give you a printout of the new HONE configuration (see 3725 Model 1 Communication Controller, Configuration Guide, SA33-0012, or 3725 Model 2 Communication Controller, Configuration Guide, SA33-0022).
- Normal safety precautions should be observed. Before any physical rework is done make sure that CB1 is turned off on the 3725 and on the 3726, if present. If status 3 machine, see "CE General Safety" guidelines in this manual.
- Reporting: Use reporting code 31.

DESCRIPTION OF THE LIC OR ICC MOVE PHASES

Phase One (Before Moving)

1. Record the actual LIC or ICC configuration. The boards to where the LIC(s) or ICC(s) may be moved are:

Machine	Board Location	Board Type	Scanner Number	LAB A	LAB B
3725 Model 1	01A-A3	CLAB1	1		
	01B-A2	CLAB2	3		
	01B-A1	LAB		5	6
	02A-A3	LAB		7	8
	02A-A2	LAB		9	10
	02A-A1	LAB		11	12
	02B-A3	LAB		13	14
	02B-A2	LAB		15	16
3725 Model 2	01A-A3	C2LB	1 (for LIC move only)		
	01B-A2	C2LB2	3		
	01B-A1	LAB		5	6

2. With the help of the CDF, the GCF, and HONE configurator, fill in the "From-To" table.
3. Run the appropriate diagnostics, to check that the machine operates properly.

Phase Two

WHEN MOVING LICs
See the corresponding "LIC Move Procedure" for detailed instructions on moving LIC cards.

1. Record the positions of the card(s), flat cables, and dummy connectors to be moved ("From-To" table).
2. Move the flat cables between the LIC(s) and the tailgate connector(s).
3. Move the LIC card(s) from one board to another.
4. Also move the DCE or direct attached terminal cable(s) on the tailgate.
5. Check that, except for LIC2, there is an ICC card on the receiving board, if needed.
6. Update the CDF.

WHEN MOVING ICCs
See the corresponding "ICC Move Procedure" for detailed instructions on moving ICC cards.

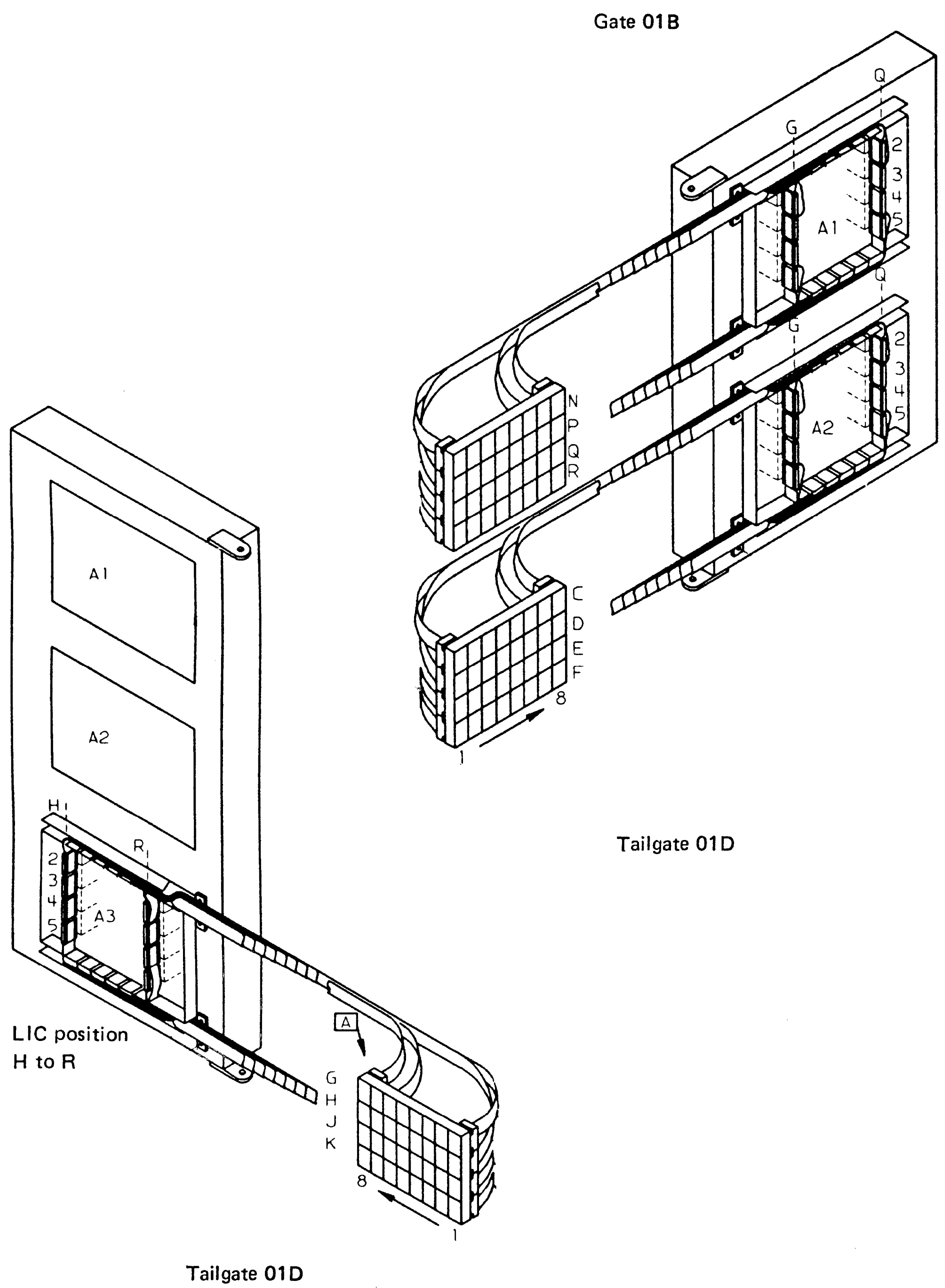
1. Record the position of the card(s) to be moved ("From-To" table).
2. Move the ICC card(s) from one board to another.
3. On the emptied location(s):
   - Install spacer(s)
   - Remove the clock signal distribution jumpers.
4. On the filled location(s):
   - Install the clock signal distribution jumpers.
5. Update the CDF.

Phase Three (Housekeeping/Bring-up)

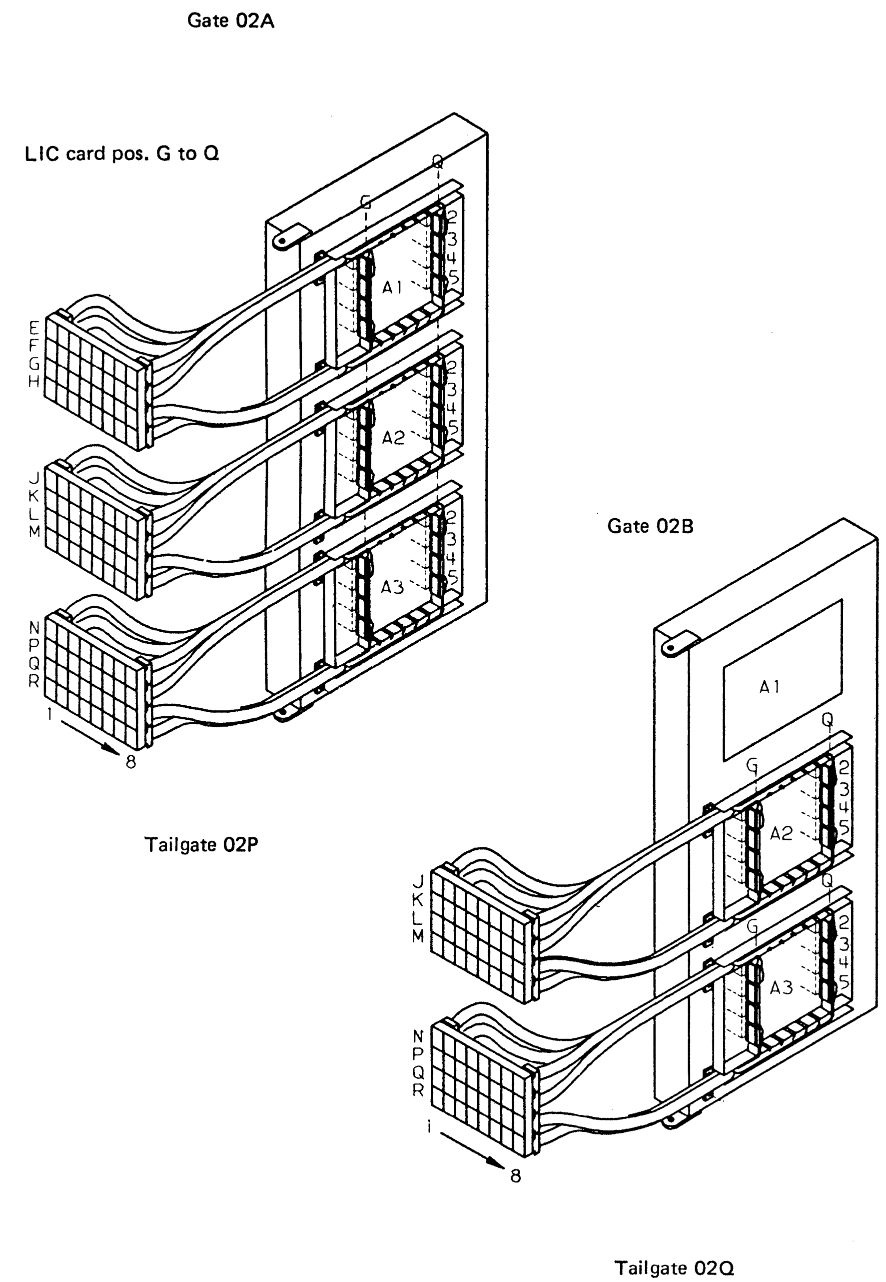
1. Run the appropriate diagnostics to check that the machine operates properly again.
2. Diskette Swap (update the GCF).
3. IPL the machine.

Physical Representation of LIC Move

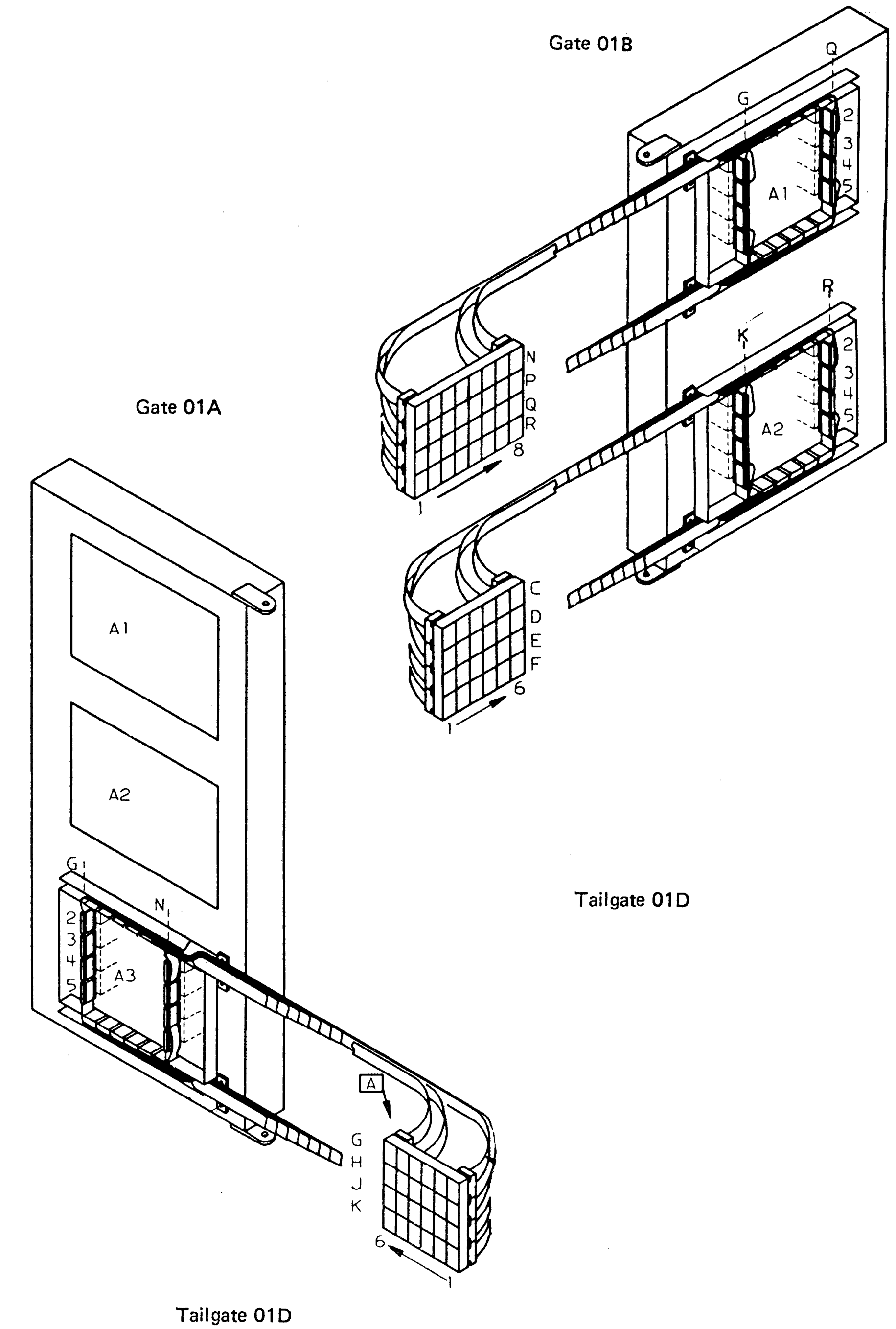
3725 MODEL 1



3726



3725 MODEL 2



Before Moving the LIC(s) or the ICC(s)

RECORDING THE MACHINE CONFIGURATION

Display the present machine configuration to verify and aid in determining physical position for moving the LIC(s) or ICC(s).
Follow the sequence below:

1. Open machine covers.
2. Mount the normal service diskette.
3. On the control panel:
   - Disable all channels: ALL CHANNEL ADAPTERS DISABLED light must be on.
   - Note the position of the POWER CONTROL switch, then turn it to LOCAL.
   - Turn FUNCTION SELECT switch to MOSS IML
   - Press FUNCTION START switch.
   - Wait until "FEF" is displayed on control panel.
4. On the 3727 operator console, to display the CDF:
   - For a LIC move,
     - Select "UTILITY PGM": Enter "U", press Send
       Select "CDF": Enter "5", press Send
       Select "DISPLAY": Enter "3", press Send
       Select "LAB/CAB": Enter "3", press Send
     - Record the "LIC/Line Installed" portion of the frame;
       it will be used after CDF update to compare with new configuration.
     - Explanation of the hexadecimal presentation:
       no hex value = no LIC installed
       hex value of'0' thru 'F' = LIC installed
   - For an ICC move,
     - Select "UTILITY PGM": Enter "U", press Send
       Select "CDF": Enter "5", press Send
       Select "DISPLAY": Enter "3", press Send
       Select "LAB/CAB": Enter "3", press Send
       Select "SCANNER": Enter "5", press Send
       Enter the scan. numb. Enter "*", press Send

       Refer to "Phase One (Before Moving)" page 8-030.
     - Verify on the CDF that the ICC feature is installed. ICC-1 or ICC-2 = 10 (type 1) or 11 (type 2).
     - Explanation of the hexadecimal presentation: See page 2-403.
5. Use CDF display. Compare the CDF with GCF printout and with HONE configuration, to ensure that the proposed LIC or ICC position exists (From), and that the receiving position (To) is empty.
   Copy the "From - To" table below and fill in the table according to the information collected from this step.

	Board Type (C2LB, or CLAB CLAB or LAB)	Tailgate	Scanner	Board	Card
From					
To					

6. To terminate: press SELN AREA, enter "T", and press SEND.

TESTING THE MACHINE BEFORE THE LIC OR ICC MOVE

Run the diagnostics on the 3727 operator console:

- Select "DIAGNOSTICS": enter "D", press SEND
- Select "TSS", then scanner number:

  Enter DIAG=='5', ADP#=='*', press SEND.

  (*)= scanner number determined on page 8-030, "Phase One". If LAB B, there are two scanners to test.

  If no error found:

  - For LIC move follow the "LIC Move Procedure" page 8-045
  - For ICC move follow the "ICC Move Procedure" page 8-060

  If any error, go to chapter R-3 "Repair Action Code (RAC) Index" in MIM-2 and follow the appropriate procedure.

  To terminate: press SELN AREA, enter "T", and press SEND.

LIC Move Procedure (Part 1 of 3)

STEP A. DCE CABLE MOVING

1. Operate the POWER OFF switch of the 3725.

   CAUTION
   Switch off CB1 in the 3725 and 3726, if present.

2. To remove an external DCE cable:

   - Determine the address, and the tailgate connector involved, to disconnect the existing external DCE cable(s).
   - Label and unplug the external DCE cable(s) from the tailgate. For one LIC card to be removed, 1 to 4 ports have to be deleted.

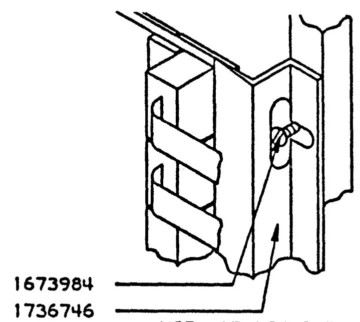
STEP B. FLAT CABLE REMOVAL

Using the following table, select the YZ page you need.

3725 Model 1		3725 Model 2	
Board	YZ Page 3725 Vol B01	Board	YZ Page 3725 Vol B01
CLAB1 CLAB2 LAB pos 3 A LAB pos 3 B	YZ026 YZ031 YZ036 YZ041	C2LB2 LAB pos 3 A LAB pos 3 B	YZ031 YZ036 YZ041

3726	
Board	YZ Page 3726 Vol A01
LAB pos 4-8 A LAB pos 4-8 B	YZ321 YZ326

1. Remove the cover and the two clamps (part 2194940) from the board.
2. Remove both insulators (part 5729007).
3. Unplug the cable connectors from the top of the LIC card to be removed.
4. Remove the cables from the raceway.
5. Reinstall the clamps and the insulators. Tighten the screws.
6. If some tailgate connectors are installed between the retainer and the LIC position to be moved, label and disconnect the external DCE cables from the tailgate.



VIEW OF RETAINER MOUNTING

7. Loosen the two screws (part 1673984) holding the retainer (part 1736746) from the selected tailgate (From), and remove the retainer. Then slide out the tailgate connectors in use and the dummy connectors, if any.
8. Remove the LIC flat cables involved from the tailgate.
9. From the receiving tailgate (To), loosen the two screws (part 1673984) holding the retainer (part 1736746) and remove the retainer. Then slide out the dummy connectors and the tailgate connector, if any.

   Note: If some tailgate connectors are installed between the retainer and the LIC position to be installed, label and disconnect the external DCE cables from the tailgate.

10. Install on the same tailgate the tailgate connectors removed in step 7 in the position given by the "From-To" table, and reinstall the tailgate and dummy connectors if previously removed.
11. Install on the "From" tailgate, in place of the tailgate connector removed, the dummy connectors (see "From-To" table), and reinstall the tailgate and dummy connectors if previously removed.
12. Reinstall the retainers (part 1736746) on both tailgates, and tighten the two screws (part 1673984).

LIC Move Procedure (Part 2 of 3)

STEP C. LIC CARD MOVE

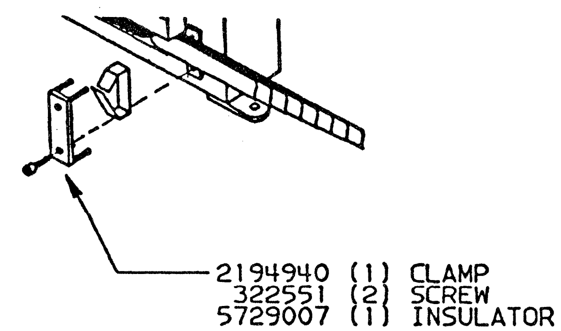
1. Remove spacer (part 819632, dummy card) from the receiving location (To).
2. Remove the LIC card from the location involved (From).
   - Plug spacer part 819632 (dummy card) into this location.
   - If an internal clock circuit was used with this LIC, plug the jumper corresponding to this LIC position to the initial factory plugging (U07 to S09). Refer to page 4-270 for details.
   - Connect the external DCE cables, if disconnected.
   - Close the board cover.
3. Plug the LIC card in the new location (To).
4. Plug the ICC card, if a direct attachment clock circuit is needed.
   - To select a clock for the line attached to a LIC, plug a jumper from the selected clock pin to the LIC input clock pin (board pin side).
   - Check with the customer or marketing representative for requirements.
     Note: This jumper is already installed if ICC feature is present.
   - See the following table for jumper position.

ICC local clock	ICC clock bus on LIC card	LIC input clock pin
2400BPS	U06	S09
4800BPS	U09	S09
9600BPS	U07	S09
19200BPS	S07	S09
245760BPS	M12	S09

These jumpers provide clock signals to terminals attached to the communication controller without modems (direct attached terminals). On the boards, ICC position 1 distributes the clock signals to LIC positions 1 through 4, and ICC position 2 distributes clock signals to LIC positions 5 through 8.

STEP D. FLAT CABLE INSTALLATION

1. Remove the two clamps (part 2194940) from the board, and remove the insulators.
2. Plug the cable connectors on top of the LIC card (the positioning depends on the LIC type).
3. Install the flat cable assemblies in the raceway in their proper order (see page 8-035).
4. Wrap the insulator (part 5729007) around all cables.
5. Secure each of the two flat cables on gate side with clamp (part 2194940) and with two screws (part 322551) on both places.



TAILGATE CONNECTOR INSTALLATION

Refer to the corresponding YZ page (see "Flat Cable Removal").

1. Loosen the two screws (part 1673184); remove the retainer (part 1736746) from the tailgate.
2. Locate tailgate connector positions.
3. If some tailgate connectors are used in front of LIC position to be installed, label and disconnect external data set cables from tail gate connectors to be moved; then slide out these tail gate connectors from tail gate.
4. Remove the dummy tailgate connectors from the positions to be used.
5. Install the tailgate connectors in place of the dummy connectors removed.
6. Reinstall the tailgate connectors if moved at step 3.
7. Reinstall the retainer (part 1736746); tighten the two screws (part 1673984).
8. Re-plug the external dataset cable(s) previously removed. For each LIC installed, the ports will be defined according to the line addresses; if necessary see "CDF Display/Update," page 2-402).

POWER ON

Ensure that the normal service diskette is mounted.

On control panel:

- Verify that the FUNCTION SELECT switch is on MOSS IML position.
- Switch on CB1 in the base of the 3725 (and 3726).
- Operate the POWER ON switch.
- Wait until "FEF" is displayed.

UPDATING THE CONFIGURATION DATA FILE (CDF) FOR THE LIC

1. On the 3727 operator console:

```
Select "UTILITY PGM":     Enter "U", press SEND
Select "CDF":             Enter "5", press SEND
Select "VERIFY"           Enter "2", press SEND
```

Update the vacant fields where card(s) were installed.

The first screen updates the LIC type (an example follows):

```
CDF - VERIFY OPTION IN PROGRESS.
         SCANNER       01
         LIC POS       01
DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE
     VALUE FROM THE MACHINE   :  00
     VALUE FROM THE DISKETTE  :  01
TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y,
                                OTHERWISE  ENTER N
```

If the scanner and the LIC position is the MES position involved: enter "Y"

The second screen updates the cable information (an example follows):

```
CDF - VERIFY OPTION IN PROGRESS.
       SCANNER       01
       LIC POS       01
       CABLE ID
DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE
  VALUE FROM THE MACHINE    :  0000
  VALUE FROM THE DISKETTE   :  1511
TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y,
                                OTHERWISE ENTER N
```

If the scanner and the LIC position is the MES position involved: enter "Y"

LIC Move Procedure (Part 3 of 3)

1. At end of verify: CDF is completed and updated on the diskette.

2. If no internally clocked or direct attached lines are installed, skip to step 5.

3. When there are internally clocked or direct attached lines installed:

   - Select "CDF": Enter "5" press SEND
     Select "DISPLAY/UPDATE": Enter "3" press SEND
     Select "SCANNER": Enter "5" press SEND
     Enter "SCANNER NUMBER": (selected at step 7 of Machine Configuration Record).

     The LIC information is displayed (see pages 2-402 and 2-403).

   - To update: press PF1

     Move cursor under the installed LIC position, under "C" position of ports which are internally clocked or direct attached, enter:
     enter: "1" for internal clock (business machine clock)
     or "3" for direct attachment
     continue on all ports of this LIC.

     See clock information (C) on various clock types:

     0: not defined clock
     1: business machine clock
     2: external clock (default for installed cable)
     3: direct attachment

   - To file, press SEND.

     Note: If terminate function is selected before filing updates, the modifications entered are lost.

4. Compare new and old configuration

   - Display CDF:

     Select CDF: Enter "5", press SEND
     Select DISPLAY: Enter "3", press SEND
     Select LAB/CAB: Enter "3", press SEND

   - Compare with configuration at step 5 of "Machine Configuration Record". A new LIC type installed must appear on "LIC/Line Installed" chart. The hexadecimal value, under L (pos. installed), indicates the ports in use.
     The hex value is "0" with no external cables installed in any position of the LIC.
     With external cables installed, the value will vary from "1" thru "F" depending on the number and position of the installed cables. Go to page 8-065 to end the LIC move procedure (Run TSS Diags, Diskette swap, and IPL the machine).

ICC Move Procedure

ICC REMOVAL/INSTALLATION

Using the following table, select the YZ page you need, and determine the ICC "From-To" locations.

3725 Model 1		3725 Model 2	
Board	YZ Page 3725 Vol B01	Board	YZ Page 3725 Vol B01
CLAB1 CLAB2 LAB pos 3 A LAB pos 3 B	YZ026 YZ031 YZ036 YZ041	C2LB2 LAB pos 3 A LAB pos 3 B	YZ031 YZ036 YZ041
3726			
Board	YZ Page 3726 Vol A01		
LAB pos 4-8 A LAB pos 4-8 B	YZ321 YZ326		

1. Operate the POWER OFF switch of the 3725.

   CAUTION
   Switch off CB1 in the 3725 and 3726, if the 3726 is present.

2. Open the board covers.
3. Remove the two ICC cards from the location determined above.
4. At the "To" location remove the two dummy cards, and plug in the ICC cards previously removed.
5. Install the dummy cards in place of the removed ICC cards.
6. Remove the jumpers which distribute the clock signals to the LICs (if internal clock distribution), from the emptied ICC position. Then install them into the new position (see "From-To" table).
   For speed selection see the table below:

ICC local clock	ICC clock bus on ICC card	ICC input clock pin
2400BPS	U06	S09
4800BPS	U09	S09
9600BPS	U07	S09
19200BPS	S07	S09
245760BPS	M12	S09

   See "Clock Select Jumper", page 4-270, if necessary.

7. Close the board covers.

POWER ON AFTER ICC CARD MOVE

Ensure that the normal service diskette is mounted.

On control panel:

- Verify that the FUNCTION SELECT switch is on MOSS IML position.
- Switch on CB1 in the base of the 3725 (and 3726).
- Operate the POWER ON switch.
- Wait until "FEF" is displayed.

UPDATING THE CONFIGURATION DATA FILE (CDF) FOR ICC

To update the appropriate fields where ICC cards have been removed/installed, you will use the verify option of the CDF.

1. On the 3727 operator console:

```
Select "UTILITY PGM":      Enter "U", press SEND
Select "CDF":              Enter "5", press SEND
Select "VERIFY":           Enter "2", press SEND
```

   An example of screen that may appear is the following:

```
          CDF - VERIFY OPTION IN PROGRESS.
SCANNER                    03
ICC-1 TYPE
DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE

   VALUE FROM THE MACHINE   :  11
   VALUE FROM THE DISKETTE  :  00

-TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y
==>
   OTHERWISE  ENTER N
```

   <u>If the scanner and the ICC position is the MES position involved: enter "Y".</u>
   After entering "Y" you will be prompted automatically by the next screen.

```
          CDF - VERIFY OPTION IN PROGRESS.
SCANNER                    03
ICC-2 TYPE
DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE

   VALUE FROM THE MACHINE   :  11
   VALUE FROM THE DISKETTE  :  00

-TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y
==>
   OTHERWISE  ENTER N
```

   <u>If the scanner and the ICC position is the MES position involved: enter "Y".</u>
   After entering "Y" you will be prompted automatically by the next screen.

```
          CDF - VERIFY OPTION IN PROGRESS.
SCANNER                    05
ICC-1 TYPE
DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE

   VALUE FROM THE MACHINE   :  00
   VALUE FROM THE DISKETTE  :  11

-TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y
==>
   OTHERWISE  ENTER N
```

   <u>If the scanner and the ICC position is the MES position involved: enter "Y".</u>
   After entering "Y" you will be prompted automatically by the next screen.

```
          CDF - VERIFY OPTION IN PROGRESS.
SCANNER                    06
ICC-2 TYPE
DIFFERENCE BETWEEN THE MACHINE AND THE DISKETTE

   VALUE FROM THE MACHINE   :  00
   VALUE FROM THE DISKETTE  :  11

-TO UPDATE DISKETTE WITH MACHINE VALUE ENTER Y
==>
   OTHERWISE  ENTER N
```

   <u>If the scanner and the ICC position is the MES position involved: enter "Y".</u>
   At end of verify: CDF is completed and updated on the diskette.

2. Compare new and old configuration: On the 3727 operator console display the CDF:

```
Select "CDF":              Enter "5" press SEND
Select "DISPLAY/UPDATE":   Enter "3" press SEND
Select "SCANNER":          Enter "5" press SEND
Select "ALL SCANNERS":     Enter "0" press SEND
```

   - Compare with the "From-To" table. The ICCs installed must appear on the scanner screen.

     To quit press "PF3", then terminate.

     To end the ICC removal/installation procedure continue next page.

Housekeeping (Part 1 of 2)

RUNNING TSS DIAGNOSTICS AFTER LIC OR ICC MOVE PROCEDURE

1. Run TSS Diagnostics:
   - For the scanner in which the card(s) are now installed.
   - For the scanner from where the card(s) were removed.
2. On the 3727 operator console:

   Select "DIAGNOSTICS":
   Enter"D", press "SEND"
   Select "TSS", then the scanner number:
   Enter DIAG=="5", ADP#=="*", press "SEND"

   (*)= scanner number determined in page 8-030 "Phase One".
3. If any error, go to Chapter R-3 "Repair Action Code (RAC) Index" in MIM-2 and follow the appropriate procedure.
4. If no error found, terminate. Press "SELN AREA, enter "T", and press "SEND"

DISKETTE SWAP

Note: Once you have been requested to change diskettes, and until you return to the original diskette, you must not terminate the function. If for any reason you do not want to continue the function, do the following:

- Mount the original diskette.
- Turn FUNCTION SELECT switch to MOSS IML.
- Operate FUNCTION START switch.
- Wait until 'FEF' is displayed in hex display panel.
- Restart the particular diskette swap in progress from the beginning.

1. Copy the normal service diskette onto the spare controller diskette:
   - On the 3727 operator console:

     Select "UTILITY PGM": Enter "U", press SEND
     Select "DISKETTE SWAP": Enter "7", press SEND
     Select "SERVICE TO CONTROLLER DISKETTE":
     Enter "3", press SEND

     The following files will be copied:

     MLT ==> Y
     CDF ==> Y
   - Mount the spare controller diskette; when "CHANGE DISKETTE" is displayed, press SEND.
   - When "MOUNT ORIGINAL DISKETTE" is displayed: mount the normal service diskette (to complete the swap).
     - press "SEND".
     - screen displays: "SWAP COMPLETED"
   - Remove the normal service diskette; put it in the right-hand cover box.
   - Mount the spare controller diskette, and press the FUNCTION START switch.
2. The graphic configuration file (GCF) must be updated by the customer before continuing with the diskette updating procedures.

   Refer to <u>3725 Problem Determination and Extended Services,</u> Chapter 12.

   Update the GCF on the spare controller diskette.

   Note: If the new installed line is to be used as an IPL port, the IPL ports have to be updated accordingly.
3. Copy the spare controller diskette onto the spare service diskette.
   - On the control panel:
     - Verify that FUNCTION SELECT switch is on position MOSS IML.
     - Press FUNCTION START switch.
   - On the 3727 operator console:

     Select "MAINTENANCE": Enter "M", press SEND
     Select "UTILITY PGM": Enter "U", press SEND
     Select "DISKETTE SWAP": Enter "7", press SEND
     Select "CONTROLLER TO SERVICE DISKETTE":
     Enter "2", press SEND

     BER(s) saved on service diskette may be erased.
     To confirm selection, enter "Y"; else enter "N"==>.
     Enter "Y" to continue the procedure.
     - The following files will be copied:

       MLT ==> Y
       CDF ==> Y
       BER FILE ==> Y

       <u>LIC MOVE PROCEDURE (PART 4 OF 4)</u>
   - Mount the spare service diskette,

   When "CHANGE DISKETTE" is displayed press Send.

   When "MOUNT ORIGINAL DISKETTE" is displayed:

   Remove the spare service diskette, put it in the right-hand cover box. Mount the spare controller diskette (to complete the swap), and press "SEND".

   The screen displays: "SWAP COMPLETED"
4. Copy the spare controller diskette onto the normal controller diskette.
   - On the 3727 operator console:
     Select "DISKETTE SWAP": Enter "7", press SEND
     Select "CONTROLLER TO CONTROLLER DISKETTE":
     Enter "1", press SEND

     Select the files to be copied:

     MLT ==> Y
     CDF ==> Y
     BER file ==> N
     GCF ==> Y
     IPL ports ==> N (Y if the IPL ports were updated)
     CNTRL PGM PROC ==> N
     LDF ==> N
     Port swap file ==> N

     Press SEND.

Housekeeping (Part 2 of 2)

- Mount the normal controller diskette.
  - Press "SEND"
  - When "MOUNT ORIGINAL DISKETTE" is displayed: mount the spare controller diskette (to complete the swap), and press SEND; the screen displays: "SWAP COMPLETED".
  - Terminate.
- Remove the spare controller diskette; put it in the right-hand cover box.

GENERAL IPL

1. Mount the normal controller diskette.
2. Close machine covers.
3. On the control panel:
   - Turn Function SELECT switch to position NORMAL.
   - Enable all channel interfaces to be used.
   - Operate FUNCTION START switch; observe the 3727 screen:

     The screen will display "IPL PHASE 1", "IPL PHASE 2", "IPL PHASE 3".

     At phase 3 time, "ALL CHANNEL ADAPTERS DISABLED" light must be off.

     When "IPL PHASE 4" is displayed on the 3727, the control panel will display 'FF4'.

     The machine will stay in phase 4 until the control program is loaded from the host.
   - If possible, ask the customer to load the control program for this machine.

     When "IPL COMPLETE" is displayed on the 3727, the 3725 is operational. The control panel will display '000'.
   - Return the POWER CONTROL switch to its original position.

<u>Note:</u> A new GCF may be printed when NCP/EP is loaded through the host.

Chapter 9. System Operations

Contents

CHAPTER 9. SYSTEM OPERATIONS

System Interrupts

The following figure shows the interrupts
| raised in the CCU, MOSS, CSP, or TRA.

Examples

1. A PCI condition in the CCU interrupts the CCU itself at level 2, 3, or 4.
2. A 'MOSS Inoperative' condition in the MOSS raises a level 1 interrupt to the CCU.
3. A 'Service to MOSS' condition in the CSP raises a level 4 interrupt to the MOSS.

INTERRUPT LEVELS

```
                                   Interrupt Levels
                             C C U   M O S S      C S P
                             12345   01234567     01237
                             |||||   ||||||||     |||||
 C C U Condition             12345
                             |||||
 Checkers              -->--1
 Address Compare       -->--1
 PCI, SVC              -->---234
 Timer                 -->----3
 Program request IPL   ---->----------1
 CCU hard check        ---->----------1
 Out X'70'             ---->----------1
 IOC error             ---->----------1
 CCU clock check       ---->----------1
 Program display 1 & 2 ---->--------------4
 CCU address compares  ---->--------------4
 CCU branch trace      ---->--------------4
 CCU program request   ---->--------------4
 CCU program response  ---->--------------4

           Console     ---->------------3

           Diskette    ---->--------------5
```

```
                             C C U   M O S S      C S P
                             12345   01234567     01237
                             |||||   ||||||||     |||||
 M O S S Condition                   01234567
                                     ||||||||
 IPL level 1           -->--1
 MOSS inoperative      -->--1
 Diagnostics           -->---23
 CE operator interrupt -->----3
 Service request SVC   -->-----4
  (mailbox)
 Service response SVC  -->-----4
  (mailbox)
 Hard check            ---->---------0
 SVC                   ---->---------------6
```

```
                         Interrupt Levels
                       C C U   M O S S    C S P
                       12345   01234567   01237
                       |||||   ||||||||   |||||
 C A  Condition
 Operation error  -->--1
 Normal operation -->----3

                       C C U   M O S S    C S P
                       12345   01234567   01237
                       |||||   ||||||||   |||||
 C S P  Condition                         01237
                                          |||||
 Operation error  -->--1
 Normal operation -->---2
 Service to MOSS  ---->-------------4
 PCI/hard error   ---->-----------------------0
 PIO or AIO       ---->------------------------1
 PCI only         ---->--------------------------3

                       C C U   M O S S    C S P
                       12345   01234567   01237
                       |||||   ||||||||   |||||
 F E S  Condition
 All services     ---->-----------------------2

                       C C U   M O S S
                       12345   01234567
                       |||||   ||||||||
 TRA    Condition
 Operation error  -->--1
 Normal operation -->---2
 Service to MOSS  ---->-------------4
```

Message Exchanges

NSC ADDRESS WITH NCP

Message Format

The channel used is either a byte or block multiplex, or a selector channel. Every message uses a unique address, which is the NSC address. The message format identifier (FID) depends on the environment: FID0 for non-SNA, FID1 for SNA, and FID4 for SNA4.

These messages can be exchanged only if the 3725 control program is NCP, and:

- Between the host and the 3725 on the channel interface
- Between intermediate network nodes (INN) such as 3725 to 3725, or 3725 to 370X.

The message format is as follows:

```
┌─────────────//──────────────┐
│ FIDx |        Data          │
└─────────────//──────────────┘
```

The FIDx contains the physical unit address to which the data must be sent.

Exchange Sequence

In the following, the host is assumed to initiate an exchange operation with the 3725.

A complete message makes a path information unit (PIU) of the SNA protocol. On the host, the transmit buffers have a defined length and a PIU may need several buffers. Data chaining (DC) points to the next PIU buffer in sequence. Command chaining points to the next write PIU command.

```
Write PIU1  |Buffer 1|Buffer 2|Buffer 3|
                  -->      -->      -┐
                  DC       DC       CC
        ┌────────────────────────────┘
        v
Write PIU2  |Buffer 1|Buffer 2|
                  -->
                  DC
```

PIU sent from the host

Host	CA	CCU
Write start --->		--> Initial select level 3 <-- Ready
Write PIU1 ---> Write PIU2 ---> Write break --->	CE, DE <----	If NCP/EP wants to send data to host <-- Attention is sent
Read start --->		<-- Status ready
Read NOP --->		

PIU received by the host

Host	CA	CCU
		<-- Attention
Read Start --->		<-- PIU1
Read PIU1 --->		<-- PIU2
Read PIU2 --->	<---- CE,DE	--- Status ready
Read No-op --->		

A write break indicates a transmit operation end; a No-op indicates a receive operation end. The number of read commands depends on the host buffer resources. There is one read command per buffer, and command chaining between read commands.

ESC ADDRESS WITH EP

Message Format

The channel used must be a byte channel. There is one ESC address for each line. Exchanges are up to 4 bytes. Only data is exchanged, but it can be either control or data characters as all the line controls are performed from the host.

Exchange Sequence

The sequences used depend on the line protocols, the terminal attached, and the code used. The protocols controlled by the access method (BTAM) can be:

- BSC multipoint, point-to-point with contention, and point-to-point switched contention
- Start-stop

Each time a data or control character is to be sent to a particular line, a start I/O command passes the selected line to the EP. The message contents are transparent to EP. In the following example, ESC1 = 7D and ESC2 = 7F.

SIO to 7D

```
┌───────┐
│ Data1 │
└───────┘
```

SIO to 7F

```
┌───────┐
│ Data2 │
└───────┘

┌───────┐
│ Data3 │
└───────┘
```

CCU/Scanner Exchanges

Each telecommunication line has a transmit and a receive interface. A parameter and status area (PSA) is assigned to each line interface. The PSA is divided into two areas:

- A parameter area (16 bytes) to transfer data from the CCU to the scanner

- A status area (12 bytes) to transfer data from the scanner to the CCU

Exchanges between the CCU and scanners are performed either in normal mode or in character mode.

NORMAL MODE

Normal mode is used for BSC and SDLC. The following figure shows how the PSA is used, and the sequence of actions performed by the CCU and the scanner when a start line or start line initial instruction is issued for a particular line.

CCU	Scanner
. IOH/IOHI instruction for start line, or start line initial	
(16 bytes)	. Identifies the line interface
PARM area ----->	. Gets PARM area information (NCP/EP data buffer address)
Status area <---	. Fetches the buffer data and executes the command
(12 bytes)	. Loads the status area with the command results
	. Saves the line identifier
<--	. Requests a level 2 interrupt
. NCP/EP issues an IOH/IOHI read to get the line identifier	
-->	. Provides the line identifier
. NCP/EP analyzes the line status area	

CHARACTER MODE

Character mode is used only for start-stop and BSC operations. Performance is degraded as data is exchanged on a character basis. Interrupt processing is necessary between every character.

The sequence of operation is exactly the same as in normal mode except that the parameter area holds the character to be sent on the line, and the status area holds the character received from the line.

BURST MODE

Burst mode is used only for start-stop operations. Data is exchanged by bursts of up to four characters.

Protocol Handling

	Host	CCU
NCP	Access Method: VTAM/TCAM -Transmits PIUs with single command -Receives PIU in one or more commands based on PIU length -Does not directly control polling -One subchannel per NCP -Any type of channel	-Controls polling and link schedul-ing -Transmits PIUs as single chain of buffers via CSP -Receives PIU in a single buffer chain with intermediate buffer allocation -Passes data to host only when PIU is fully received -Handles ERPs
EP	Access Method: BTAM/ERTAM/TCAM -Controls polling and link scheduling -Transmits data in line code with all control characters -Receives all characters in line code -Handles ERPs -One subchannel per line -Byte multiplex channel only	In Start-Stop: - Exchanges 4 bytes at a time with host - Exchanges one byte at a time with CSP In BSC: - Exchanges one buffer at a time with host and CSP - Reports line hardware errors

			CCU	CSP Micorocode	F E S Modem Change Management Driver Check Survey Serialization/Deserialization
SS	Xmit		Exchange byte per byte		<- Start-stop bit generation -Underrun management
	Receive		Exchange byte per byte		Start-stop bit deletion Stop check reporting to CSP code <- -Overrun management
BSC	Xmit	NCP	Control polling Provide chain of buffers to CSP	Generation of control characters Translate if needed Exchange at message level	CRC/VRC-LRC accumulation and send SYN insert processing (every sec) Transparency support <- -Underrun management
		EP	Relay data to CSP, one buffer at time With control characters	Exchange at message level	
	Receive	NCP	Receive block in a chain of buffers Without control characters	Deletion of control characters Exchange at message level Translate if needed	Synchronization seek CRC/VRC-LRC accumulation & check SYN deletion <- -Overrun management
		EP	Receive data from CSP, one buffer at a time With all control characters	Exchange at message level	
SDLC	Xmit		NCP ONLY Control polling Send PIU in a chain of buffers	Insertion of flag: Address and control (FAC) Exchange at frame level	CRC accumulation and SEND NRZI function No ZI function <- -Underrun management
	Receive		NCP ONLY Receive control frame and infor-mation frame in buffer chain Allocate more buffers if needed	Separation of address from control in checking of address Exchange at frame level	CRC accumulation and checking NRZI function Zero deletion function Flag: Abort idle processing

Abbreviations and Glossary

Abbreviations and Glossary

A	ampere
ABEND	abnormal end of task
ac, AC	(1) alternating current (2) abandon call (signal) (3) address compare
ACB	adapter control block
ACF	Advanced Communication Function
ACK	affirmative acknowledgment (BSC)
ACLK	adapter clock (card)
ACR	add character register (instruction)
ACU	automatic calling unit
AE	address exception
AEK	address exception key
AGC	automatic gain control (signal)
AHR	add halfword register (instruction)
AIO	adapter-initiated operation
AIT	average instruction time
ALU	arithmetic and logic unit
AR	(1) add register (instruction) (2) amplifier
ARC1	auto-restart card in unit 01
ARC2	auto-restart card in unit 02
ARI	add register immediate (instruction)
ASCII	American National Standard Code for Information Interchange
ATTN	attention (3727 operator console key)
B	branch (instruction)
BAL	branch and link (instruction)
BALR	branch and link register (instruction)
BB	branch on bit (instruction)
BCC	block check character (BSC)
BCCW	bit clock control word
BCL	branch on C latch (instruction)
BCLE	
BCT	branch on count (instruction)
BER	box error record
BG	background
B/M	bill of material
bps	bits per second
BSC	binary synchronous communication
BSM	basic storage module
BSMI	basic storage module interconnection (card)
BT	branch trace
BTAC	branch trace/address compare (card)
BTAM	basic telecommunication access method
BUSTERM	IOC bus terminator (card)
BZL	branch on Z latch (instruction)
C	(1) Celsius (2) control (X.21 signal)
CA	channel adapter
CAB	channel adapter board
CAC	common adapter code
CADR	channel adapter driver receiver (card)
CADRUK	channel adapter driver receiver type UK (card)
CB	circuit breaker
CCA	communication common adapter (card)
CCIN	channel-to-CCU interface (card)
CCITT	Comite Consultatif International Telegraphe et Telephone
CCLK	CCU clock (card)
CCMD	current command (storage)
CCN	communications controller node
CCR	compare character register (instruction)
CCU	central control unit
CCUB	CCU board
CCW	channel control word
CDF	configuration data file
CDS	configuration data set (NCP/EP)
CE	(1) customer engineer (WTC term for FE) (2) channel end (channel status)
CELIA	CE latched indicator analytic (card)
CHCW	channel control word
CHIN	channel interface (card)
CHR	compare halfword register (instruction)
CLAB	channel and line attachment board
CLDP	controller load/dump program
CNM	communication network management
CNMI	communication network management interface
CNSL	console
CP	command processor, control program
CPA	control panel adapter (card)
CPIT	control progam information table
CPM	connection point manager
CPT	checkpoint trace
CR	(1) compare register (instruction) (2) call request (signal)
CRC	cyclic redundancy check
CRI	compare register immediate (instruction)
CRP	check record pool
CS	(1) cycle steal (2) communication scanner
CSCW	cycle steal control word
CSG	cycle steal grant
CSGH	cycle steal grant high
CSGL	cycle steal grant low
CSM	communication scanner memory (card)
CSP	communication scanner processor
CSP1	communication scanner processor (card) type 1
CSP2	communication scanner processor (card) type 2
CSR	cycle steal request
CSRH	cycle steal request high
CSRL	cycle steal request low
CSS	control subsystem
CSW	channel status word
CTS	clear to send (signal)
CTL1	control type 1 (card)
CTL2	control type 2 (card)
CVTL	card vendor transistor logic
CZ	Carry/zero (latch)
C2LB	CLAB in 3725 Model 2
DAC	diskette adapter card
DAF	destination address field (SNA)
DB	data byte (signal)
dc, DC	(1) direct current (2) data chaining (channel status)
DCE	data circuit-terminating equipment
DCF	diagnostic control facility
DCM	diagnostic control monitor
DE	device end (channel status)
DFLx	data flow type x (card) (where x = 1, 4, or 5)
DIFF	differentiator
DLO	data line occupied (signal)
DMA	direct memory access
DP	digit present (signal)
DSx	digit signal 2 to power x
DSC	distant station connected
DSR	data set ready (signal)
DSRS	data signaling rate selection (signal)
DTE	data terminal equipment
DTR	data terminal ready (signal)
DVB	asynchronous-devices (SNA)
DX	duplex (full-duplex)
EBCDIC	extended binary-coded decimal interchange code
EC	engineering change
ECC	error checking and correction (card)
EDE	elementary data exchange
EIA	Electronic Industries Association
ENQ	enquiry (BSC)
EOT	end of transmission (BSC)
EP	emulation program
EPO	emergency power off
ERC	error reference code
EREP	environmental recording, editing, and printing (program)
ERP	error recovery procedure
ESC	emulation subchannel
ESCH	emulation subchannel high
ESCL	emulation subchannel low
ESD	(1) electrostatic discharge (2) external symbol dictionary
ETB	end-of-transmission block character (BSC)
ETX	end-of-text character (BSC)
EXP	expected
FAC	flag address control
FCC	Federal Communications Commission
FCPS	final call progress signals (X.21)
FES	front-end scanner (card)
FIC	FRU isolation code
FM	frequency modulation
FNCTN	function (CCU FNCTN) (3727 operator console key)
FPS	FES parameter/status
FRU	field-replaceable unit
ft	foot
GCF	graphic configuration file
GPR	general purpose register
GPT	generalized PIU trace
GTF	generalized trace facility
HDX	half-duplex
HDR1	header 1 (diskette)
HLIR	high level interface request
HSC	high speed channel
HW	hardware
Hz	Hertz
IAR	instruction address register
IC	insert character (instruction)
ICA	integrated communication adapter
ICB	interface control block (storage)
ICC	internal clock control
ICT	insert character and count (instruction)
ICW	interface control word
ID	identifier (diskette)
IFT	internal function test
IMB	in mailbox (MOSS)
IML	initial microcode load(er)
in.	inch
IN	input (instruction)
INN	intermediate network node
INOP	inoperative (line, modem, or terminal)
IOC	input/output control
IOCB	input/output control bus
IOCS	input/output control system
IOH	adapter input/output halfword (instruction)
IOHI	adapter input/output halfword immediate (instruction)
IOIRR	input/output interrupt request register
IML	initial microcode load
INN	intermediate network node
IPF	instruction pre-fetch
IPL	initial program load(er)
IPR	isolated pacing response (SNA)
IRR	interrupt request removed
ITB	intermediate text block (BSC)
IVT	isolation verification tests
K	1024 (bytes or words)
KBD	keyboard
kbps	kilobits per second
kg	kilogram
kHz	kilohertz
ko	not ok
L	load (instruction)
LA	load address (instruction)
LAB	line attachment board
LABA	line attachment board type A
LABB	line attachment board type B
LABC	line attachment board type C
LAN	local area network
LAR	lagging address register
LCB	line control block (storage)
LCD	line control definer (storage)
LCOR	load character with offset register (instruction)
LCR	load character register (instruction)
LCS	line communication status (storage)
LDF	line description file
LED	light-emitting diode
LH	load halfword (instruction)
LHOR	load halfword with offset register (instruction)
LHR	load halfword register (instruction)
LIB	line interface buffer
LIC	line interface coupler
LIC1	line interface coupler type 1 (card)
LIC2	line interface coupler type 2 (card)
LIC3	line interface coupler type 3 (card)
LIC4A	line interface coupler type 4A (card)
LIC4B	line interface coupler type 4B (card)
LID	line identification
LLIR	low level interrupt request
LL2	link level 2 test
LNVT	line vector table (storage)
LOGREC	error logging program of access method
LOR	load with offset register (instruction)
LPDA	link problem determination aid
LR	load register (instruction)
LRC	longitudinal redundancy check
LRI	load register immediate (instruction)
	local storage

LSAR	local storage address register
LSI	large scale integration
LSR	local storage register (CSP)
LSSD	level sensitive scan design
m	meter
MAC	medium access control
MAP	maintenance analysis-procedure
MCPC	machine check/program check
MCC	MOSS control card
MCT	machine configuration table
MDOR	MOSS data operand register
MDR	miscellaneous data recorder
MEM	memory (card)
MES	miscellaneous equipment specifications
MFM	modified frequency modulation
MHz	megahertz
MICB	MOSS interface control block
MIM	maintenance information manual
MIO	MOSS input/output
MIOC	MOSS input/output control (card)
MIOH	MOSS input/output halfword
MIOHI	MOSS input/output halfword immediate
MLC	machine level control
MLT	machine load table (diskette)
mm	millimeter
MMB	memory and MOSS board
MMC	MOSS memory card
MMM8	MOSS memory module 8K
MMM24	MOSS memory module 24K
MMM32	MOSS memory module 32K
mn	minute
MOD	modifier
MOSS	maintenance and operator subsystem
MPC	MOSS processor card
ms	millisecond
MSA	machine status area (console)
MSD	machine status display
mV	millivolt
NAK	negative acknowledgment (BSC)
NCCF	network communication control facility (CNM)
NCP	network control program
NCR	AND character register (instruction)
NEO	network expansion option
NHR	AND halfword register (instruction)
NLDM	network logical data management
NOSP	network operation support program (VTAM)
NPDA	network problem determination application (CNM)
NR	AND register (instruction)
NRI	AND register immediate (instruction)
NRZI	non return-to-zero inverted
ns	nanosecond
NSC	native subchannel
NTO	network terminal option
NTRI	NCP Token Ring Interconnection
NTT	Nippon Telegraph Telephone
oc	overcurrent
OCR	OR character register (instruction)
OEM	original equipment manufacturer
OEMI	original equipment manufacturer's information
OHR	OR halfword register (instruction)
OLTEP	online test execution program
OLTSEP	online test standalone execution program
OLTS	online test system
OLTT	online terminal test
OMB	out mailbox
OP	operation decode
OR	OR register (instruction)
ORI	OR register immediate (instruction)
OUT	output (instruction)
ov	overvoltage
PCF	primary control field (storage)
PCI	program-controlled interrupt
PCR	power check reset
PCW	processor control word
PDF	parallel data field (storage)
PEP	partitioned emulation program
PF	program function (3727 operator console keys)
PFAR	prefetch address register
PH1-x	phase control power block x unit 01
PH2-x	phase control power block x in unit 02
PH4-x	phase control power block x in unit 02
PIO	program initiated operation
PIRR	program interrupt request register
PN	part number
POPR	prefetch operation register
POR	power-on reset
PS	power supply
PSA	parameter/status area (storage)
PSW	program status word
PTT	post, telephone and telegraph (agency)
PTX	phototransistor
PV	parity valid (signal)
PWB1	power board unit 01
PWB2	power board in unit 02
PWCA1	power-control analog in unit 01 (card)
PWCA2	power-control analog in unit 02 (card)
PWCL1	power-control logic in unit 01 (card)
PWCL2	power-control logic in unit 02 (card)
PWRC	power resistor card
RA	register to immediate address (instruction)
RAC	repair action code
RAM	random access memory
RAS	reliability, availability, and serviceability
RCAM	RC access method
RCV	receive
RD	receive data (signal)
RDV	redrive (card)
RDVAD	redrive adapter (card)
	register external (instruction)
RECFMS	record formatted maintenance statistics
RECMS	record maintenance statistics
REQMS	request for maintenance statistics
RFS	ready for sending (signal) (or clear to send CTS)
RI	register to immediate operand (instruction)
RIM	request initialization mode
ROK	read-only key
ROS	read-only storage
ROSAR	read-only storage address register
rpm	revolutions per minute
RPO	remote power off
RPQ	request for price quotation
RR	register to register (instruction)
RS	register to storage (instruction)
RSA	register to storage with addition (instruction)
RT	branch (instruction)
RTC	retry count (X.21)
RTM	retry timer (X.21)
RTS	request to send
RVI	reverse interrupt (BSC)
R/W	read/write
s	second
SALT	stand-alone link test
SAR	storage address register
SCB	(1) scanner control block (storage) (2) system control block
SCF	secondary control field (storage)
SCR	(1) subtract character register (instruction) (2) silicon-controlled rectifier
SCTL	storage control (card)
SDF	serial data field (storage)
SDLC	synchronous data link control (SNA)
SE	system engineer
SELN	selection (3727 operator console key)
SES	secondary status (storage)
SHR	subtract halfword register (instruction)
SIM	set initialization mode
SIO	start input/output
SIT	scanner interface trace
SKA	storage key address
SKDR	storage-protect key data register
SNRM	set normal response mode
SOH	start of heading (BSC)
SP	storage protect
SPAE	storage protect/ address exception
SPK	storage protect key
SR	subtract register (instruction)
SRI	subtract register immediate (instruction)
SRL	shift left register
SS	start-stop
SSB	system status block
SSP	system support programs
ST	store (instruction)
STC	store character (instruction)
STCT	store character and count (instruction)
STH	store halfword (instruction)
STG	storage
STX	start of text (BSC)
SVC	supervisor call
SYN	synchronous idle (BSC)
SYSGEN	system generation
TA	time address
TAP	trace analysis program
TAR	temporary address register
TC	time command
TCAM	telecommunications access method
TCB	task control block
TCC	trace correlation counter (storage)
TCP	test connector pin
TCS	two channel switch (see TPS)
TD	time data
TERMA1	terminator type A in unit 01 (card)
TERMB1	terminator type B in unit 01 (card)
TERM2	terminator in unit 02 (card)
TG	transmission group (NCP line trace)
TIC	token ring interface coupler card
TICB	trace interface control block
TIO	test I/O
TPS	two-processor switch (feature) (also referred to as TCS)
TPSA	trace parameter status area
TRA	token ring interface adapter
TRM	test register under mask (instruction)
TRM	token ring interface multiplexor card
TRSS	token ring subsystem
TRU	trace record unit
TSET	transmitter signal element timing
TSS	transmission subsystem
TTA	translate table area
TTD	temporary text delay (BSC)
UA	unnumbered acknowledgment
UCW	unit control word
UE	unit exception (channel status)
UEPO	unit emergency power off
UK	United Kingdom
UKA	user key address
UKP	user key program
UKDR	user key data register
UKL	user key level interrupt
USASCII	(see ASCII)
us	microsecond
uv	undervoltage
V	volt
VB	valid byte (signal)
Vac	volts, alternating current
Vdc	volts, direct current
VFO	variable frequency oscillator
VH	valid halfword (signal)
VRC	vertical redundancy check
VTAM	virtual telecommunication access method
V.24	CCITT V.24 recommendation
V.25	CCITT V.25 recommendation
V.28	CCITT V.28 recommendation
V.35	CCITT V.35 recommendation

W	watt
WACK	wait before transmit positive acknowledgment (BSC)
WB	wrap back (signal)
WKR	working register
WSDR	working storage data register
XID	exchange identification
XCR	exclusive OR character register (instruction)
XHR	exclusive OR halfword register (instruction)
XOR	exclusive OR
XR	exclusive OR register (instruction)
XREG	external registers
XRI	exclusive OR register immediate (instruction)
X.21	CCITT X.21 recommendation
YZxxx	Wiring diagram
ZAP	control program modifier function
ZI	zero insert
ZREG	Z register
50PH1	50-Hz phase control in unit 01 (card)
50PH2	50-Hz phase control in unit 02 (card)
60PH1	60-Hz phase control in unit 01 (card)
60PH2	60-Hz phase control in unit 02 (card)

This glossary defines all new terms used in this manual. It also includes terms and definitions from the IBM Vocabulary for Data Processing Telecommunications, and Office Systems, GC20-1699.

A

access line:

In the diskette drive, a line that transmits pulses to turn the stepper motor.

adapter-initiated operation (AIO):

A transfer of up to 256 bytes between an adapter (channel or scanner) and the CCU storage. The transfer is initiated by an IOH/IOHI instruction, and is performed in cycle stealing via the IOC bus.

addressing:

A technique where the control station selects, among the DTEs that share a transmission line, the DTE to which it is going to send a message.

alcohol pad:

A pad soaked with iso-propyl alcohol.

alternate cylinder:

In the diskette drive, the area containing sectors that can be assigned in place of sectors that are not usable.

alternate track:

In the diskette drive, a track designated to contain data in place of a defective primary track.

asynchronous transmission:

Transmission in which each character is individually synchronized, usually by the use of start and stop elements. The start-stop link protocol, for example, uses asynchronous transmission contrast with 'synchronous transmission.'

auto-answer:

A machine feature that allows a DCE to respond automatically to a call that it receives over a switched line.

auto-call:

A machine feature that allows a DCE to initiate a call automatically over a switched line.

availability:

The degree to which a system or resource is ready when needed to process data.

B

bail assembly:

In the diskette drive, a mechanical arm that operates under control of the head load-solenoid to load or release the read/write head load arm.

belt clearance slots:

In the diskette drive, grooves in the fan enclosure that permit the ac motor belt to turn without rubbing against the fan enclosure.

binary synchronous communication (BSC):

A uniform procedure, using standardized set of control characters and character sequences, for synchronous transmission of binary-coded data between stations.

box error record (BER):

Information about an error detected by the controller. It is recorded on the diskette and can be displayed on the operator console for error analysis.

C

carriage:

In the diskette drive, the part that carries the read/write head under control of the stepper motor drive.

central control unit (CCU):

In the 3725, the controller hardware unit that contains the circuits and data flow paths needed to execute instructions and to control its storage and the attached adapters.

channel adapter (CA):

A communication controller hardware unit used to attach the controller to a host processor.

channel interface:

The interface between the controller and the host processors.

channel and line attachment base (CLAB):

A board that includes the first CAB and LAB of the controller.

collet:

In the diskette drive, the part that centers and holds the diskette to the drive hub.

common carrier:

In the USA and Canada, a government regulated private company that furnishes the general public with telecommunication service facilities. For example, a telephone or telegraph company (see also "post telephone and telegraph" for countries outside the USA and Canada).

communication controller:

A communication control unit that is controlled by a program stored and executed in the unit. Examples are the IBM 3705 and IBM 3725/3726.

Communication Network Management (CNM):

An IBM product program that assists the user in identifying network problems from a control point. It is stored in the host processor and comprises the network problem determination application (NPDA) and the network communication control facility (NCCF).

communication scanner:

See 'scanner'.

communication scanner processor (CSP):

The processor of a scanner.

configuration data file (CDF):

A file of the diskette that contains a description of all the hardware features (presence, type, address, and characteristics).

control panel:

A panel on the 3725 that contains switches and indicators for the use of the customer's operator and service personnel.

control subsystem (CSS):

The part of the controller that stores and executes the control program, and monitors the data transfers over the channel and transmission interfaces.

customer engineer (CE):

An individual who provides field services for IBM products.

cooling fan:

In the diskette drive, a fan that cools the stepper motor.

crosstalk:

In the diskette drive, data bits sensed from one track of the diskette while the read/write head is reading another track.

cyclic redundancy check (CRC):

A method of error checking performed at the receiving station after a block check character has been received.

D

data circuit-terminating equipment (DCE):

The equipment installed at the user's premises that provides all the functions required to establish, maintain, and terminate a connection, and the signal conversion and coding between the data terminal equipment (DTE) and the line. For example, a modem is a DCE (see "modem".)

Note: The DCE may be separate equipment or an integral part of other equipment.

data terminal equipment (DTE):

That part of a data station that serves as a data source, data sink, or both, and provides for the data communication control function according to protocols. In the 3725/3726, the DTE function is achieved by the FES with the associated LIC.

differentiator-amplifier:

An electronic circuit whose output signal is a function of the time rate of change of the input signal.

direct attachment:

The attachment of a DTE to the controller without a DCE.

diskette:

A thin, flexible magnetic disk, and its protective jacket, that records the 3725 microcode, diagnostics, error logs, and monitored data.

diskette 2D:

A diskette used for storing data on both surfaces with twice the usual bit density.

diskette drive:

A mechanism that reads and writes diskettes.

drive band:

In the diskette drive, a metal band connected to the stepper motor pulley and the head carriage assembly.

drive hub:

In the diskette drive, a continuously running part that turns the diskette at 360 rpm.

duplex transmission:

Data transmission in both directions at the same time. Contrast with 'half duplex.'

E

emulation program (EP):

The function of a network control program to perform activities equivalent to those of an IBM 2701 Data Adapter Unit, an IBM 2702 Transmission Control, or an IBM 2703 Transmission Control.

enclosure:

The diskette drive motor cooling fan safety cover.

error recovery procedure (ERP):

A procedure designed to help isolate and, where possible, to recover from errors in equipment. The procedures are often used in conjunction with programs that record the statistics of machine malfunctions.

F

front-end scanner (FES):

A circuit that scans the transmission lines, serializes and deserializes the transmitted characters, and manages the line services. It is part of the scanner.

H

half-duplex:

Data transmission in either direction, one direction at a time. Contrast with 'duplex.'

Note: The functional unit using the data circuit determines the choice of direction.

head/carriage:

In the diskette drive, the unit that contains the read/write head.

host processor:

(1) A processor that controls all or part of a user application network. (2) In a network, the processing unit in which the access method for the network resides. (3) In an SNA network, the processing unit that contains a system services control point (SSCP). (4) A processing unit that executes the access method for attached communication controllers. Also called 'host'

I

identifier:

In the diskette drive, a character or group of characters used to identify or name an item of data and possibly used to indicate some properties of that data.

initial microcode load (IML):

The process of loading the microcode into a scanner or into MOSS.

initial program load (IPL):

The initialization procedure that causes 3725 control program to commence operation.

input/output control (IOC):

The circuit that controls the input/output from/to the channel adapters and scanners via the IOC bus.

internal clock circuit (ICC):

An optional circuit that provides, through the LICs, the clock control to the DCEs or DTEs that need it.

internal function test (IFT):

A set of diagnostic programs designed and organized to detect and isolate a malfunction.

J

jacket:

A permanently attached cover that protects the diskette surface.

L

line:

See 'transmission line'.

line attachment base (LAB):

The unit of modularity of the transmission subsystem. It corresponds to one board and includes mainly the scanners and the line interface couplers.

line interface coupler (LIC):

A circuit that attaches up to four transmission cables to the controller.

Link Problem Determination Aid (LPDA):

A set of test facilities resident in the IBM 386X modems and activated from the control program in the controller.

link protocol:

The set of rules by which a logical data link is established, maintained, and terminated, and by which data is transferred across the link.

longitudinal redundancy check (LRC):

A system of error checking performed at the receiving station after a block check character has been accumulated.

M

maintenance and operator subsystem (MOSS):

The part of the controller that provides operating and servicing facilities to the customer's operator and customer engineer.

microcode:

A program, that is loaded in a processor (for example, the MOSS processor) to replace a hardware function. The microcode is not accessible to the customer.

modem (MOdulator-DEModulator):

A functional unit that transforms logical signals from a DTE into analog signals suitable for transmission over telephone lines (modulation), and conversely (demodulation). A modem is a DCE. It may be integrated in the DTE.

MOSS input/output control (MIOC):

The circuit that controls the input/output from/to the MOSS.

multiplexing:

The division of a transmission facility into two or more channels by allotting the common channel to several different channels, one at a time.

multipoint connection:

A connection established among more than two data stations for data transmission. The connection may include switching facilities.

N

network:

See 'user application network'.

Network Control Program (NCP):

A program, generated by the user from a library of IBM-supplied modules, that controls the operation of a communication controller.

nonswitched line:

A permanent dedicated transmission line that connects two or more DTEs. The connection can be point-to-point or multipoint. The line can be leased or private. Contrast with 'switched line.'

O

online tests:

Testing of a remote data station concurrently with the execution of the user's programs (that is, with only minimal effect on the user's normal operation).

operator console:

The IBM 3727 Operator Console that is used to operate and service the 3725 through the MOSS. A primary operator console must be located within 5 m (16 ft) of the 3725. Optionally an alternate operator console may be installed up to 150 m (492 ft) from the 3725.

P

partitioned emulation programming (PEP):

A feature of NCP that permits some lines to operate in network control mode while simultaneously operating others in emulation mode.

phototransistor:

An electronic part used to sense the light of a light-emitting diode.

point-to-point connection:

A connection established between two data stations for data transmission. The connection may include switching facilities.

polling:

The process whereby stations are invited, one at a time, to transmit.

post telephone and telegraph (PTT):

A generic term for the government-operated common carriers in countries other than the USA and Canada. Examples of the PTT are the Post Office Corporation in the United Kingdom, the Deutsche Bundespost in Germany, and the Nippon Telephone and Telegraph Public Corporation in Japan.

program-initiated operation (PIO):

A transfer of four bytes between a general register in the CCU and an adapter (channel or scanner). The transfer is initiated by IOH/IOHI instruction and is executed via the IOC bus.

R

redrive card:

A card that repowers the IOC bus signals at board entry. It also has logical and checking functions.

reliability:

The ability of a functional unit to perform its intended function under stated conditions, for a stated period of time.

S

scanner:

A device that scans and controls the transmission lines. It is composed of one communication scanner processor (CSP) and one front-end scanner (FES).

services:

A set of functions designed to facilitate the maintenance of a device or system.

serviceability:

The capability to perform effective problem determination, diagnosis, and repair on a data processing system.

solenoid plunger:

In the diskette drive, a moving part of the solenoid that operates the bail assembly to load and release the read/write head load arm.

start-stop:

A data transmission system in which each character is preceded by a start signal and is followed by a stop signal.

stepper motor:

In the diskette drive, the motor that steps the head carriage assembly from track to track.

switched line:

A transmission line with which the connections are established by dialing, only when data transmission is needed. The connection is point-to-point and uses a different transmission line each time it is established. Contrast with 'nonswitched line.'

synchronous data link control (SDLC):

A discipline for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. SLDC conforms to subsets of the Advanced Data Communication Control Procedures of the American National Standards Institute and High-level Data Link Control (HDLC) of the International Standards Organization.

synchronous transmission:

Data transmission in which the sending and receiving instruments are operating continuously at substantially the same frequency and are maintained, by means of correction, in a desired phase relationship. Contrast with 'asynchronous transmission.'

systems network architecture (SNA):

The description of the logical structure, formats, protocols, and operational sequences for transmitting information through a user application network. The structure of SNA allows the users to be independent of specific telecommunication facilities.

T

timeout:

The time interval allotted for certain operations to occur.

transmission interface:

The interface between the controller and the user application network.

transmission line:

The physical means for connecting two or more DTEs (via DCEs). It can be nonswitched or switched. Also called a 'line.'

transmission subsystem (TSS):

The part of the controller that controls the data transfers over the transmission interface.

tunnel erase circuit:

In the diskette drive, an electronic circuit that is used to erase the edge of the track just recorded during a write operation. This erasing prevents cross-talk between track during later read operations.

two-processor switch (TPS):

A feature of the channel adapter that connects a second channel to the same adapter.

U

user application network:

A configuration of data processing products, such as processors, controllers, and terminals, for the purpose of data processing and information exchange. This configuration may use circuit-switched, packet-switched, and leased-circuit services provided by carriers or PTT. Also called a 'user network.'

V

variable frequency oscillator:

An electronic circuit that is used to synchronize the MOSS reading circuits with the diskette drive when it is performing a read operation.

vertical redundancy check (VRC):

An odd parity check performed on each character of a block as the block is received.

W

write/erase:

Writing data to and erasing from a diskette.

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