PRELIMINARY

INSTALLATION INSTRUCTIONS

FOR THE

IBM 7094 MODEL 2

DATA PROCESSING SYSTEM

PREFACE

     THIS PUBLICATION IS INTENDED TO SERVE AS A GUIDE FOR INSTALLING
THE IBM 7094 MODEL 2 DATA PROCESSING SYSTEM.   THE MANUAL PRESENTS
MECHANICAL DATA AND PRELIMINARY TEST PROCEDURES FOR MAKING THE
EQUIPMENT OPERATIONAL IN THE CUSTOMERS OFFICE.

     INFORMATION IS INCLUDED IN THIS MANUAL ON THE FOLLOWING UNITS-

IBM   711 CARD READER   IBM 7302-3 CORE STORAGE
IBM   716 PRINTER   IBM 7606-2 MULTIPLEXOR
IBM   721 CARD PUNCH   IBM 7607 DATA CHANNEL
IBM   729 MAGNETIC TAPE UNIT   IBM 7608 POWER CONVERTER
IBM 7109 ASU   IBM 7617 DATA CHANNEL CONSOLE
IBM 7111 IPU   IBM 7618 POWER CONTROL UNIT
IBM 7151-2 CONSOLE CONTROL

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ALL CUSTOMER ENGINEERS ARE THOROUGHLY INDOCTRINATED IN IBM SAFETY
PRACTICES DURING THE EARLY PHASES OF THEIR TRAINING. IT IS EXPECTED
THAT THIS TRAINING HAS BECOME A PART OF ROUTINE PRACTICE. HOWEVER,
PERSONAL SAFETY CANNOT BE OVER-EMPHASIZED. NO MAN SHOULD WORK ALONE ON
THE MACHINE WHENEVER POWER IS ON. AT LEAST TWO MEN SHOULD BE PRESENT
IN THE ROOM WHENEVER WORK IS PERFORMED ON THE MACHINE. EVERY MAN
SHOULD WEAR SAFETY GLASSES. DISCHARGE CAPACITORS BEFORE WORKING ON DC
POWER SUPPLIES. ALWAYS TURN POWER OFF BEFORE REPLACING ANY FUSE.
FOLLOW THE SAFETY PRACTICES OUTLINED IN THE CE SAFETY PRACTICES CARD,
IBM FORM 124-0002-1, ISSUED TO ALL CUSTOMER ENGINEERS.

SPECIFIC SAFETY ITEMS FOR THIS SYSTEM ARE-

A.   MAKE SURE THAT CO2 FIRE EXTINGUISHERS ARE AVAILABLE IN EACH
     ROOM WHERE FRAMES OF THE SYSTEM ARE SET UP.

B.   IN ORDER TO PREVENT PINCHING OF FINGERS BETWEEN THE GATE AND
     SLIDE FRAME MEMBERS, KEEP FINGERS CLEAR OF GATE SLIDES WHEN
     SLIDING A GATE INTO THE MODULE.

C.   USE CAUTION WHEN LOWERING A TAILGATE. WHEN UNLATCHED, THE
     TAILGATE WILL FREE-FALL TO THE STOP LIMIT.

D.   WHEN SLIDING A GATE IN OR OUT, ALTERNATELY OBSERVE EACH SIDE
     TO AVOID HITTING THE LAMINAR BUS CONNECTIONS.

E.   TURN DC POWER OFF WHEN REMOVING OR INSERTING AN SMS CARD. IT
     IS POSSIBLE TO CAUSE COMPONENT DAMAGE BY SHORTING TO AN
     ADJACENT CARD DURING THIS PROCESS.

F.   MAKE SURE THAT CAPACITORS ARE COMPLETELY DISCHARGED BEFORE
     WORKING ON DC POWER SUPPLIES.

G.   ALWAYS TURN OFF POWER BEFORE REPLACING ANY FUSE.

H.   DO NOT TURN POWER ON THE SYSTEM IF THE IBM 7607 IS UNGROUNDED.
     SEE CHAPTER 4, SECTION 5., 5.2.

1.   GENERAL

THIS MANUAL HAS BEEN PREPARED TO PROVIDE INSTRUCTIONS FOR INSTALLING A TYPICAL IBM 7094 MODEL 2 SYSTEM CONFIGURATION, FIGURE 1-1, RATHER THAN A SPECIAL SET OF INSTRUCTIONS FOR EACH SYSTEM CONFIGURATION WHICH MAY BE INSTALLED. IT IS THE CES RESPONSIBILITY TO BECOME FAMILIAR WITH THE MACHINE TYPES AND QUANTITIES WHICH WILL BE PROVIDED FOR A PARTICULAR INSTALLATION. BY BECOMING FAMILIAR WITH THE SYSTEM CONFIGURATION THE CE CAN TAKE EXCEPTION TO INFORMATION IN THIS MANUAL WHICH IS NOT APPLICABLE TO HIS INSTALLATION.

THE CE SHOULD ALSO BE AWARE OF SPECIAL FEATURES ORDERED FOR THE SYSTEM, AS INFORMATION ON SUCH ITEMS MAY REQUIRE SPECIAL ATTENTION THAT HAS NOT BEEN SPECIFICALLY COVERED IN THIS MANUAL.

THE OBJECTIVE OF THIS MANUAL IS TO PROVIDE INSTRUCTIONS FOR EFFICIENT AND SAFE INSTALLATION OF THE EQUIPMENT. TO ACCOMPLISH THIS OBJECTIVE, IT IS NECESSARY FOR THE CE TO READ THE MANUAL CAREFULLY BEFORE SUPPLIES OR EQUIPMENT IS RECEIVED, SO THAT FULL UNDERSTANDING OF THE INFORMATION AND THE SEQUENCE OF THE INSTALLATION PROCESS IS ACHIEVED.

THE OVERALL CONTENT AND ORGANIZATION OF THE MANUAL WITH RESPECT TO THE INSTALLATION PROCESS IS SUMMARIZED IN TABLE 1-1, RELATIVE SEQUENCE OF INSTALLATION PROCESS - IBM 7094-2. THIS TABLE IS NOT INTENDED TO SHOW THE LENGTH OF TIME REQUIRED TO PERFORM A PARTICULAR OPERATION SINCE THE TIME REQUIREMENT IS DEPENDENT UPON THE NUMBER OF MEN ASSIGNED TO A PARTICULAR TASK. THE TABLE IS INTENDED TO ASSIST THE CES IN ASSIGNING MANPOWER TO THE VARIOUS OPERATIONS BY SHOWING PERMISSIVE STARTING TIMES FOR VARIOUS OPERATIONS WITH RESPECT TO OTHER OPERATIONS AND THE POSSIBLE OVERLAP WHICH CAN EXIST. AS MAY BE SEEN FROM THE TABLE, MANY OPERATIONS CAN BE PERFORMED SIMULTANEOUSLY. IT SHOULD ALSO BE POINTED OUT THAT A PARTICULAR OPERATION IN SOME CASES NEED NOT BE PERFORMED ON ALL UNITS BEFORE PROCEEDING TO ANOTHER OPERATION IF A MORE EFFICIENT INSTALLATION CAN BE ACCOMPLISHED IN THIS WAY. FOR EXAMPLE, CORNER BRACKETS AND TRIM MUST BE INSTALLED ON THE FRONT BOTTOM CORNERS OF UNITS THAT ARE BUTTED TOGETHER BEFORE FINAL PLACEMENT OF THE UNITS. THIS OPERATION COULD BE DEFERRED ON UNITS THAT ARE NOT BUTTED TOGETHER UNTIL FINAL TESTING IS IN PROCESS. THIS HAS NOT BEEN RECOMMENDED IN THE TABLE BUT DOES ILLUSTRATE THAT ALL POSSIBLE OVERLAP IS NOT INDICATED IN THE TABLE. IT MAY BE NOTED FROM THE TABLE THAT CABLING OF THE TAPE AREA IS RECOMMENDED BEFORE MANY OF THE ASSEMBLY OPERATIONS HAVE BEEN COMPLETED.

IN THE FINAL ANALYSIS, AN EFFICIENT INSTALLATION IS DEPENDENT ON SOUND JUDGEMENT OF THE CE IN USING THE INSTRUCTIONS PROVIDED.

```
+--------+   +--------+--------+--------+--------+--------+   +-------+   +-------+
1        1   1        1        1        1        1        1   1       1   1       1
+--------+   1        1        1        1        1        1   1       1   1       1
1        1   1        1        1        1        1        1   1       1   1       1
1  7302  1   1 7606 1 7111 1 7109 1 7607 1 7607 1   1 7618 1   F1 7608 1
1   M3   1   1  M2   1        1        1        1        1   1       1   1       1
+--------+   1        1        1        1        1        1   1       1   1       1
1        1   1        1        1        1        1        1   1       1   1       1
+--------+   +--------+--------+--------+--------+--------+   +-------+   +-------+
    F            F        F        F        F        F           F
```

```
+------+        +--------+--------+--------+                      +------+
1 729 1F        1        1 7617 1 7617 1                      F1 729  1
1 M2,4 1        1  7151  +--------+-------+                    1 M2,4 1
+------+        +--------+    F        F                      +------+
1 729 1F        1        1                                    F1 729  1
1 M2,4 1        +--------+                                     1 M2,4 1
+------+    +------+   F                                      +------+
1 729 1F    1 711 1F                                          F1 729  1
1 M2,4 1    1      1                                           1 M2,4 1
+------+    +------+                                          +------+
1 729 1F                        +------+                      F1 729  1
1 M2,4 1                        1      1                       1 M2,4 1
+------+                        1      1                      +------+
1 729 1F    +------+            F1  716 1                     F1 729  1
1 M2,4 1    1      1            1      1                       1 M2,4 1
+------+    1 721 1F            1      1                      +------+
1 729 1F    1      1            1      1                      F1 729  1
1 M2,4 1    +------+            +------+                       1 M2,4 1
+------+                                                      +------+
```

FIGURE 1-1 TYPICAL IBM 7094-2 SYSTEM LAYOUT

TABLE 1-1 RELATIVE SEQUENCE OF INSTALLATION PROCESS

MANUAL SECTION	OPERATION
CHAPTER 3	------
	1 CHECK FACILITIES
PREPARATION OF	------
MACHINE AREA	2 SET UP CE ROOM
	-----
	3 INVENTORY AND STORE SPARE PARTS
	----
	4 INVENTORY AND STORE TEST EQUIP. AND TOOLS
	----
	5 CHECK AND CALIBRATE TEST EQUIPMENT
	-----
	6 SET UP RECORD SYSTEM
	-----
	7 MARK FLOORS

CHAPTER 4	----
	1 EXTERNAL POWER CABLES
CABLE	-----
INSTALLATION	2 EXTERNAL SIGNAL CABLES
AND	-----
CONNECTION	3 EXTERNAL TAPE POWER CABLES
	-----
	4 EXTERNAL TAPE SIGNAL CABLES
	--------
	5 CONNECT TAPE CABLES
	----
	6 CONNECT SIGNAL AND POWER

	CABLE CONNECTION STARTED

	7

TABLE 1-1 CONTINUED

TABLE 1-1 CONTINUED

CHAPTER 5			----	
		1	RECEIVING AND PLACEMENT	
SYSTEM		-----		
PLACEMENT		2	REMOVAL OF PACKING MATERIALS	
AND		-----		
ASSEMBLY		3	LOOSEN TOWER LOCKING SCREWS	

		4	INSTALL CASTERS AND LEVELING PADS	

		5	INSTALL CORNER BRACKETS AND TRIM	

		6	LEVEL UNITS	

		7	BOLT MAIN FRAME	

		8	KICK PLATE ASSEMBLY	

		9	LAMINAR BUS SHORT CHECK	

CHAPTER 21				
SYSTEM	TESTING		SYSTEM TESTING	
TESTING	STARTED			

NOTE

CHART SHOWS RELATIVE PERMISSIVE STARTING POINT
AND POSSIBLE OVERLAP FOR VARIOUS OPERATIONS,
BUT DOES NOT REFLECT LENGTH OF TIME FOR VARIOUS
OPERATIONS SINCE TIME IS DEPENDENT UPON NUMBER
OF MEN ASSIGNED TO A PARTICULAR OPERATION.

NOTE

1. INTER-MACHINE CABLES ARE DIVIDED INTO TWO GROUPS,
   INTER-FRAME (R), AND EXTERNAL (K).

2. AN 'R' CABLE CONNECTS TAILGATE E (OR F) OF ONE
   MODULE TO TAILGATE E (OR F) OF AN ADJACENT MODULE
   AND IS ROUTED THRU THE FRAME STRUCTURE. AN 'R'
   CABLE MAY ALSO CONNECT TAILGATE E TO TAILGATE F

3. A 'K' CABLE IS ROUTED EXTERNALLY TO THE MACHINES
   EITHER IN THE SUB-FLOOR OR AT FLOOR LEVEL.

2.   EMERGENCY OPERATION

THE CONTINUED OPERATION OF A CUSTOMERS COMPUTER IS DEPENDENT ON
INFORMATION STORED ON CARDS, TAPE, DISKS, DRUMS, ETC. ALSO EQUIPMENT
MUST BE AVAILABLE TO PROCESS THE INFORMATION. DUPLICATE OR MASTER
RECORDS SHOULD BE MAINTAINED AND STORED IN A REMOTE AREA. MAKE
ARRANGEMENTS FOR EMERGENCY USE OF OTHER EQUIPMENT, TRANSPORTATION OF
PERSONNEL DATA, AND SUPPLIES TO TEMPORARY LOCATIONS. WHERE THE
CONTINUITY OF OPERATION IS ESSENTIAL, A STAND-BY POWER SOURCE MUST BE
AVAILABLE.

3.   GENERAL PRECAUTIONS AND PERSONNEL TRAINING

ARRANGE FOR MONITORING OF THE COMPUTER ROOM, AIR CONDITIONING
EQUIPMENT ROOM, AND DATA STORAGE ROOM DURING NON-OPERATING HOURS.

INSPECT STEAM PIPES AND WATER PIPES RUNNING ABOVE THE FALSE
CEILINGS TO GUARD AGAINST POSSIBLE DAMAGE DUE TO ACCIDENTAL BREAKAGE,
LEAKAGE, OR CONDENSATION.

CHECK LOCATION OF EMERGENCY EXIT DOORS IN THE COMPUTER AREA. THE
NUMBER OF DOORS IS DEPENDENT UPON THE SIZE AND LOCATION OF THE AREA.

TRAIN PERSONNEL IN SUCH EMERGENCY MEASURES AS-

A.   PROPER METHOD AND SEQUENCE OF SHUTTING OFF ALL ELECTRICAL
     POWER.

B.   SHUTTING OFF AIR CONDITIONING SYSTEM.

C.   HANDLING FIRE EXTINGUISHERS IN THE APPROVED MANNER.

D.   PROPERLY OPERATING A SMALL-DIAMETER FIRE HOSE.

E.   EVACUATING RECORDS.

F.   EVACUATING PERSONNEL.

G.   CALLING FIRE COMPANY.

H.   FIRST AID PROCEDURES.

4.   RESPONSIBILITY ASSIGNMENTS

IT IS RECOMMENDED THAT CERTAIN ORGANIZATIONAL ASSIGNMENTS BE MADE
AND ROTATED ON A REGULAR BASIS. THIS SHOULD RESULT IN INCREASED
INDIVIDUAL RESPONSIBILITY AND ACQUAINT EACH CUSTOMER ENGINEER WITH ALL
PHASES OF OPERATION.

SOME SUGGESTED ASSIGNMENTS ARE PREVENTIVE MAINTENANCE SCHEDULING,
ENGINEERING CHANGE RECORDS, STOCK MAINTENANCE, DIAGNOSTICS, TEST TAPES,
AND TEST EQUIPMENT.

5.   ASSISTANCE

IBM 7000 SERIES TECHNICAL SPECIALISTS EXIST IN LOCAL, DISTRICT, OR
REGIONAL AREAS. THESE SOURCES SHOULD BE INVESTIGATED FOR ASSISTANCE
WHEN AN EMERGENCY SITUATION EXISTS.

POUGHKEEPSIE CUSTOMER ENGINEERING SHOULD NOT BE CONTACTED FOR
ASSISTANCE WITHOUT THE PRIOR APPROVAL OF DISTRICT AND REGIONAL CUSTOMER
ENGINEERING.

2 CE INSTALLATION ORGANIZATIONAL DATA

1.   GENERAL

     SEE LETTER FROM CE DEPARTMENT, POUGHKEEPSIE, TO LOCAL CUSTOMER
ENGINEERING MANAGERS REGARDING THE ORDERING OF PARTS, TOOLS, TEST
EQUIPMENT AND FURNITURE. FURNITURE IS ORDERED THROUGH YOUR REGIONAL
OFFICE. ALL SPARE PARTS, TOOLS AND TEST EQUIPMENT ARE TO BE ORDERED
THROUGH MECHANICSBURG NO LATER THAN 60 DAYS BEFORE SCHEDULED ARRIVAL OF
THE MACHINE UNITS. FOR NEW SYSTEMS, SPARE PARTS ARE ORDERED BY
DESCRIPTION, E.G., SPARE PARTS FOR 7094-2 SYSTEM.

     ORDER SPARE PARTS FOR EACH NEW UNIT IN THE SYSTEM USING A SEPARATE
CODE 1 P AND S REQUISITION CARD FOR EACH TYPE IF PARTS ARE TO BE
SHIPPED TO THE BRANCH OFFICE - OR - LIST ALL MACHINE TYPES ON A MES
FORM CODE 50 IF PARTS ARE TO BE SHIPPED DIRECTLY TO THE INSTALLATION.
UNDER DESCRIPTION DESIGNATE INITIAL SPARE PARTS, TYPE----------.

     FOR REPLACEMENT OF SYSTEMS AND/OR ADDITIONAL NEW TYPE UNITS THE
BRANCH OFFICE SHOULD REQUEST A DECK OF PRE-PUNCHED PARTS REQUISITION
CARDS FROM MECHANICSBURG PARTS DISTRIBUTION CENTER. REVIEW THESE PARTS
AGAINST YOUR PRESENT INVENTORY AND THEN USE THE PRE-PUNCHED CARDS AS
YOUR NEW SPARE PARTS ORDER FOR THE ITEMS YOU WANT.

     CUSTOMER ENGINEERS MUST MAKE AN EFFORT TO KEEP THE AREA CLEAN AND
IN GOOD APPEARANCE. CUSTOMERS CANNOT BE EXPECTED TO MAINTAIN A POLICY
OF CONTINUAL CLEANINESS ON TAPE OPERATION OR WITHIN THE COMPUTING ROOM
IF WE DO NOT SET AN EXAMPLE.

     ANY SHORTAGES REGARDING FURNITURE SHOULD BE REPORTED TO THE LOCAL
OFFICE MANAGER. CHECK ALL PARTS IMMEDIATELY AS THEY ARRIVE AT THE
INSTALLATION AND LOCATE THEM IN THE PARTS CABINET.

2.   POST INSTALLATION SUPPLIES

3.   PARTS STOCKING

     SET UP THE SPARE PARTS TUB FILE AND ESTABLISH PROPER ORDERING
POINTS FOR ALL PARTS. IF REQUIRED, OBTAIN ASSISTANCE IN THIS ACTIVITY
FROM THE BRANCH OFFICE STOCK PERSONNEL. NOTIFY THE PARTS ORDER
DEPARTMENT, MECHANICSBURG PARTS DEPOT, IMMEDIATELY WHENEVER ANY PARTS
SHORTAGE OR DISCREPANCIES ARE NOTED. A COMPLETE STOCK CONTROL
PROCEDURE AND PARTS SECTION IS INCLUDED UNDER SEPARATE COVER - CE BASIC
INSTRUCTION MATERIAL.

     STOCK SHOULD BE MAINTAINED AS DESCRIBED IN THE BASIC INSTRUCTION

MATERIAL. INSTRUCTIONS FOR ORDERING PARTS ON AN EMERGENCY BASIS ARE
INCLUDED IN THE INTRODUCTION TO THE EMERGENCY PARTS CENTER MANUAL.
PARTS ARE TO BE ORDERED THROUGH NORMAL BRANCH OFFICE PROCEDURES.

4.   RECORD KEEPING

MANY RECORDS MUST BE PREPARED AND MAINTAINED ON THE IBM 7094-2.
READ AND THROUGHLY UNDERSTAND INSTRUCTIONS THAT ACCOMPANY THE RECORD
FORMS. THESE RECORD FORMS AND INSTRUCTIONS SHOULD ARRIVE APPROXIMATELY
TWO WEEKS BEFORE MACHINE DELIVERY.

THE CE IS REQUIRED TO SET UP OR PREPARE AND/OR MAINTAIN THE
FOLLOWING-

A.   SET UP SPARE PARTS TUB FILE AND RE-ORDER POINTS.

B.   FILL OUT MACHINE SERIAL NUMBER RECORD AND FORWARD IT TO
      POUGHKEEPSIE.

C.   PREPARE AND MAINTAIN AN ENGINEERING CHANGE HISTORY CARD FOR
      EACH MACHINE.

D.   MAINTAIN THE CE SYSTEMS PERFORMANCE LOG WHICH PROVIDES A
      PERMANENT RECORD OF ON-THE-SITE HISTORY OF THE IBM 7094-2. IN
      ADDITION TO RECORDING DAY-TO-DAY EVENTS, A PROPERLY PREPARED
      LOG PROVIDES IBM WITH ESSENTIAL INFORMATION FOR IMPROVING THE
      RELIABILITY AND OPERATIONAL LIFE OF FUTURE SYSTEMS. THE
      POUGHKEEPSIE CE DEPARTMENT ALSO CONTAINS DUPLICATES OF THESE
      LOGS FROM SELECTED INSTALLATIONS TO IMPROVE SERVICE
      INFORMATION WHICH IS SENT TO THE FIELD.

E.   FILE DIAGNOSTIC PROGRAM WRITEUPS.

5.   SHIPPING PROCEDURES

3 PREPARATION OF MACHINE AREA

1.   GENERAL

        THE MINIMUM PHYSICAL REQUIREMENTS OF AN AREA FOR INSTALLATION OF
AN IBM 7094-2 ARE SPECIFIED IN THE IBM 7090-7094 DATA PROCESSING
SYSTEMS PHYSICAL PLANNING MANUAL, FORM NO. C22-6706. THE CE IN CHARGE
SHOULD OBTAIN AT LEAST A WEEK BEFORE CABLE DELIVERY A COPY OF THE
PHYSICAL PLANNING MANUAL, AND A COPY OF THE SCALED FLOOR PLANS FROM THE
BRANCH OFFICE OR SALES REPRESENTATIVE. A CHECK OF THE FACILITY WILL BE
MADE BY BRANCH OFFICE PERSONNEL OR THE SALES ENGINEERING REPRESENTATIVE
BEFORE MACHINE DELIVERY. THE CE IS REMINDED HOWEVER OF THE SAFETY
REQUIREMENTS SPECIFIED IN THE PREFACE OF THIS MANUAL AND OF THE
FOLLOWING-

        A. ONE WEEK BEFORE MACHINE DELIVERY, ALL AIR CONDITIONING
            EQUIPMENT SHALL HAVE BEEN INSTALLED, TESTED, AND READY FOR
            OPERATION ELECTRICAL FACILITIES, LIGHTING, FLOOR RAMPS,
            PAINTING, PLASTERING, AND DECORATING SHOULD ALSO BE COMPLETED
            AT THIS TIME.

        B. CLEANLINESS OF THE AREA MUST BE MAINTAINED ONCE THE AIR
            CONDITIONING EQUIPMENT IS READY FOR OPERATION.

        C. THE SUPPLY AIR DUCTS AND FILTERS SHOULD BE CHECKED FOR
            CLEANLINESS BEFORE THE MACHINE IS INSTALLED. IF THE AREA
            UNDER THE RAISED FLOOR IS USED AS AN AIR PLENUM, IT SHOULD BE
            FREE FROM DUST AND DIRT.

        D. THE POWER RECEPTACLES SHOULD BE CHECKED TO DETERMINE THAT
            PROPER RECEPTACLES HAVE BEEN INSTALLED AT THE CUSTOMERS SOCKET
            IN ACCORDANCE WITH THE PHYSICAL PLANNING MANUAL.

        E. THREE-PHASE POWER RECEPTACLE SHOULD BE CHECKED FOR PROPER
            PHASING IN ACCORDANCE WITH THE PHYSICAL PLANNING MANUAL.

        IT SHOULD BE REALIZED THAT THE CUSTOMER IS RESPONSIBLE FOR THE
ABOVE ITEMS AND THE CE SHOULD ADVISE CE MANAGEMENT IF DISCREPANCIES ARE
OBSERVED.

2.   ENVIRONMENT REQUIREMENTS

3.   MACHINE ENTRY REQUIREMENTS

4.   RECEIVING SPECIAL MATERIALS

IF PROPER ORDERING REQUIREMENTS HAVE BEEN OBSERVED, ORDERING
INSTRUCTIONS FOR IBM 700-7000 SERIES CUSTOMER ENGINEERING MATERIALS,
OFFICE EQUIPMENT, TEST EQUIPMENT, AND OTHER ORDERED ITEMS, SHOULD
ARRIVE APPROXIMATELY TWO WEEKS BEFORE MACHINE DELIVERY. EXTERNAL
CABLES SHOULD ALSO BE RECEIVED AT THIS TIME. ALL CAPITOL ITEMS SHOULD
BE CHECKED AT THE TIME OF DELIVERY AND ANY DAMAGE REPORTED, ON THE
SPOT, TO THE CARRIERS REPRESENTATIVE AND THE BRANCH OFFICE.

5.   PREPARATION OF THE CE ROOM

THE FURNITURE AND FIXTURES SHOULD BE PLACED IN THE CE ROOM IN
ACCORDANCE WITH THE LAYOUT OBTAINED FROM THE LOCAL SALES ENGINEERING
REPRESENTATIVE. ASSEMBLE AND POSITION THE SPARE PARTS CABINET.
INVENTORY AND STORE SPARE PARTS IN THE CABINETS, NOTIFY MECHANICSBURGH
IMMEDIATELY ON SHORTAGES. LABEL CABINETS SO THAT PARTS MAY BE READILY
LOCATED WHEN NEEDED.

KEEP THE CE ROOM CLEAN AND ORDERLY AT ALL TIMES.

6.   TOOLS AND TEST EQUIPMENT

INVENTORY AND STORE ALL TOOLS AND TEST EQUIPMENT. TEST EQUIPMENT

SHOULD BE CHECKED OVER CAREFULLY, INCLUDING A CALIBRATION CHECK,
AS SOON AS POSSIBLE.

                              NOTE

1.   INITIAL CALIBRATION OF SCOPES WILL BE CHECKED AGAINST
     THE OSCILLATOR OF THE IBM 7094-2 BEFORE ASSUMING THE
     SCOPES TO BE CORRECT. THIS IS TO AVOID POSSIBLE
     ADJUSTMENT TO THE 7094-2 WHICH MIGHT LATER BE TRACED
     TO A POORLY CALIBRATED SCOPE.
2.   REFER TO MANUFACTURERS INSTRUCTIONS AND/OR
     LATEST CE PROCEDURE FOR REPAIR AND CALIBRATION
     OF TEST EQUIPMENT.

7.   PREPARATION OF FLOOR FOR CABLE INSTALLATION

HOLES SHOULD HAVE BEEN CUT IN THE FLOOR IN ACCORDANCE WITH THE
SCALED LAYOUT OF THE SYSTEM AT LEAST TWO WEEKS BEFORE SYSTEM ARRIVAL.
THE HOLE LOCATIONS WITH RESPECT TO THE UNIT PLACEMENT ARE SPECIFIED IN
THE PHYSICAL PLANNING MANUAL.

THE FLOOR SHOULD BE CLEARLY MARKED IN ACCORDANCE WITH THE FLOOR PLAN AND FIGURES 3-1 AND 3-2. MARKING WHICH WILL NOT BE CONCEALED BY THE UNIT WHEN FINALLY POSITIONED SHOULD BE PLACED ON REMOVABLE TAPE OR OTHER SUITABLE MEANS WHICH WILL NOT DEFACE THE FLOOR. IF THE FLOOR HOLES ARE NOT CUT AS INDICATED IN FIGURES 3-1 AND 3-2, THE PHYSICAL PLANNING MANUAL AND AND THE FLOOR LAYOUT SHOULD BE CHECKED, THE REASON FOR THE DISCREPANCY DETERMINED, AND ADJUSTMENTS MADE AS REQUIRED BY THE SITUATION, SUCH AS REPLACING FLOOR PANELS OR SLIGHT ADJUSTMENT IN THE LOCATION OF THE UNIT. THESE CHANGES ARE THE RESPONSIBILITY OF THE CUSTOMER.

MARKING SHOULD INCLUDE CORNER LOCATION MARKS, MACHINE TYPE NUMBER, AND FRAME NUMBER.

8.   WALL BOXES

WALL BOXES SHOULD BE OF A TYPE THAT CAN BE LOCKED OR HELD IN AN OPEN POSITION AND CAN SERVE AS A DISCONNECT. CRIPPLE ANY DEVICE WHICH CAN LOCK THE DISCONNECT IN THE ON POSITION. COMMERCIALLY AVAILABLE COLORED METAL CLIPS CAN BE USED TO HOLD A CB SWITCH OPEN. ALL CUSTOMER ENGINEERS SHOULD BE FAMILIAR WITH THE LOCATION OF THE MAIN LINE AND WALL BOX SWITCHES AND THE MACHINES THEY SERVICE.

CAUTION

WHILE CABLING THE IBM 7094-2, MAKE SURE THAT THE
WALL BOX IS LOCKED OR HELD IN THE OPEN POSITION.

9.   PREPARING CABLE DUCTS

INSPECT ALL CABLE DUCTS. CORRECT ANY CONDITION SUCH AS SHARP EDGES IN CABLE DUCTS, WHICH MIGHT INJURE THE CABLES OR PERSONNEL. ALL DUCTS SHOULD BE COMPLETELY VACUUM CLEANED AT THE TIME THE CABLES ARE PUT IN PLACE.

CAUTION

WEAR HEAVY WORK GLOVES WHILE WORKING IN DUCTS THAT
ARE METAL LINED. THESE GLOVES MAY BE OBTAINED LOCALLY.
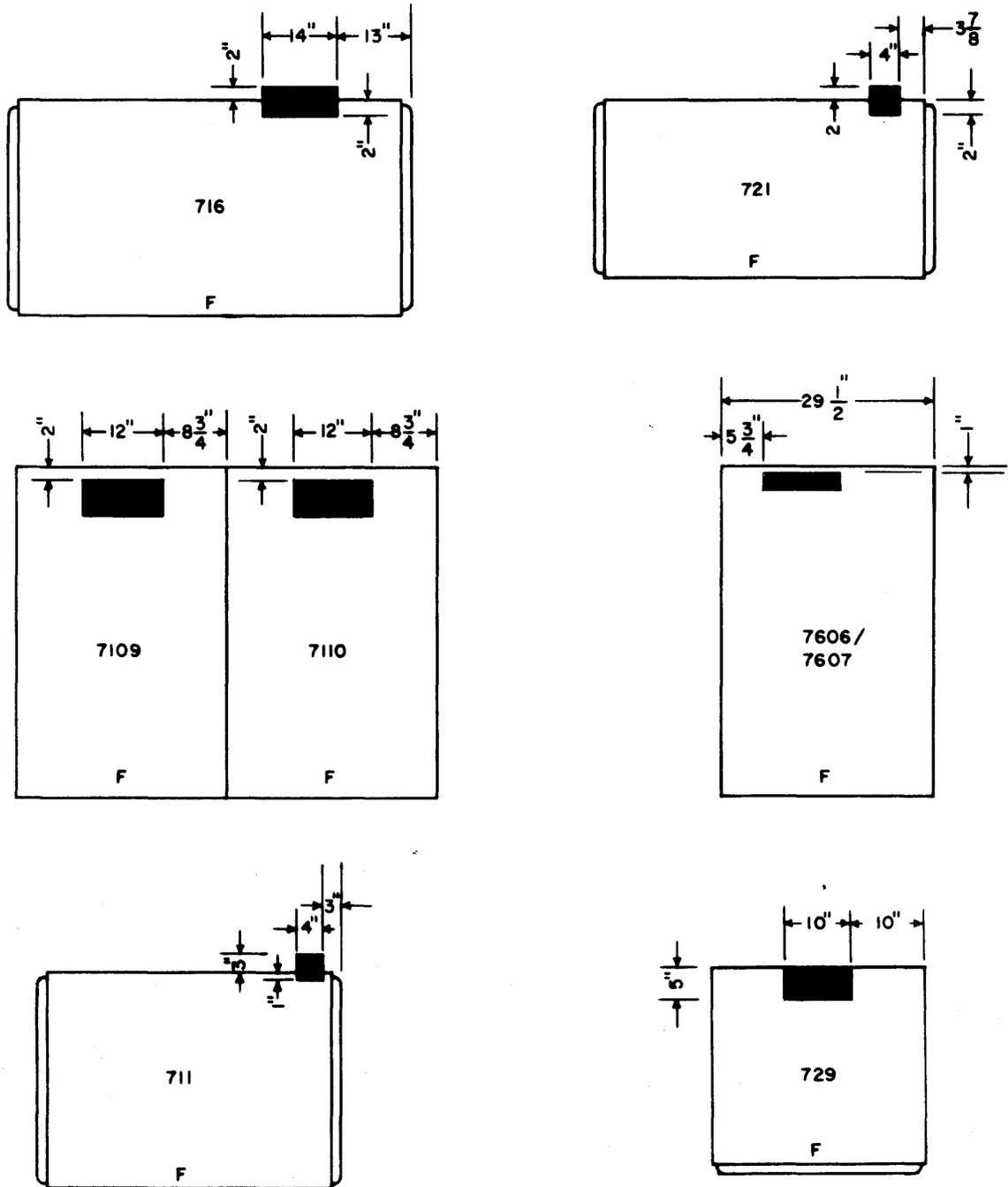
FIGURE 3-1 FLOOR MARKING
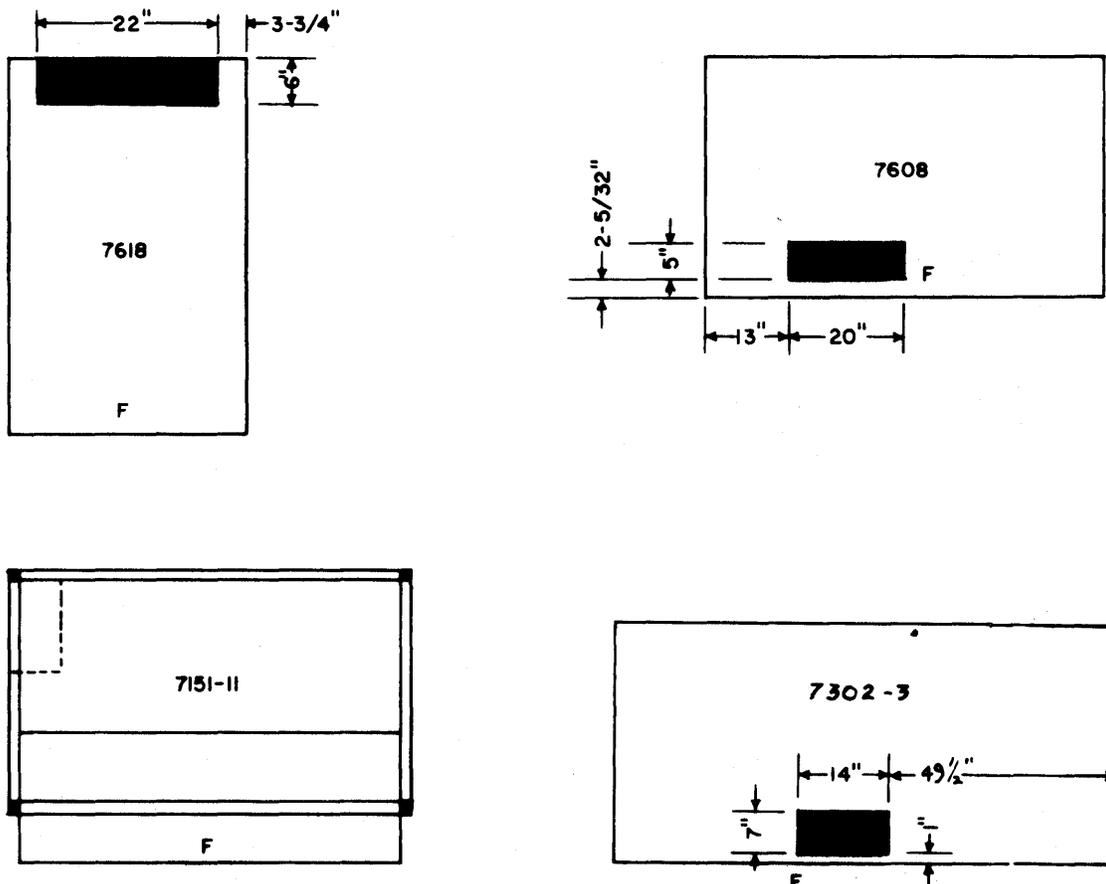
FIGURE 3-2 FLOOR MARKING

4 EXTERNAL CABLE INSTALLATION

1.   GENERAL

THIS CHAPTER CONTAINS GENERAL CABLING INFORMATION INCLUDING
PACKAGING, IDENTIFICATION, TAILGATE CONFIGURATIONS, AND CABLE PLUGGING.
INFORMATION ON THE LOCATION OF THE CABLE STRAIN-RELIEF BAR AND ITS
INSTALLATION HAS ALSO BEEN INCLUDED.

THE CABLE INSTALLATION PROCESS CONSISTS OF THE FOLLOWING BASIC
OPERATIONS-

   A.   PLACING EXTERNAL CABLES IN THE RAISED FLOOR, BEFORE THE SYSTEM
        ARRIVES.

   B.   CONNECTING EXTERNAL CABLES AFTER MACHINE PLACEMENT.

   C.   INSTALLING INTER-FRAME CABLES.

THE CABLES SHOULD ARRIVE AT THE INSTALLATION SITE APPROXIMATELY
TWO WEEKS BEFORE THE SYSTEM ARRIVES. THIS PERMITS ALL CABLES TO BE
PLACED IN THE FLOOR BEFORE ARRIVAL OF THE SYSTEM. THE REMAINING
OPERATIONS ARE DONE DURING THE VARIOUS STAGES OF MECHANICAL ASSEMBLY,
ALLOWING FOR ELECTRO-MECHANICAL CHECKS AND I/O OFF-LINE CHECKS TO BE
DONE BEFORE ALL ASSEMBLY OPERATIONS AND CABLING HAVE BEEN COMPLETED.

IF EXTERNAL CABLES ARE TO BE INSTALLED AT FLOOR LEVEL, THEY SHOULD
BE UNPACKED AND SORTED, READY FOR QUICK INSTALLATION WHEN THE SYSTEM
ARRIVES. CABLES PLACED AT FLOOR LEVEL REQUIRE PROTECTIVE RAMPS TO
PREVENT THEIR BEING DAMAGED. CONTACT THE PHYSICAL PLANNING ENGINEER IF
MORE CABLES ARE REQUIRED, OR IF THEY ARE THE WRONG LENGTH.

                          NOTE

            CABLING FOR THE 7909 DATA CHANNEL WHEN SPECIAL
            I/O EQUIPMENT OR SUPPLEMENTAL RECORD SYSTEMS
            ARE CONNECTED TO THE 7094-2 IS SHOWN IN THE
            IBM 7909 CE INSTALLATION MANUAL.

2.   CABLE PACKAGING

EXCEPT FOR MINOR VARIATIONS NECESSITATED BY INDIVIDUAL SYSTEM
CONFIGURATIONS, MACHINE CABLES ARE PACKAGED ON THE BASIS OF THEIR
ROUTING. IN THIS MANUAL WE HAVE IDENTIFIED VARIABLE-LENGTH
CUSTOMER-ORDERED CABLES BY 'KEY' NUMBERS. THESE ARE GENERALLY ROUTED
OUTSIDE THE FRAME, SUB-FLOOR. CABLES IDENTIFIED BY 'REF' NUMBERS ARE
FIXED-LENGTH INTER-FRAME CABLES, SUPPLIED BY IBM. THEY ARE GENERALLY

ROUTED THRU THE FRAMES.

THE INTER-MACHINE CABLES ARE PACKED IN EIGHT-SIDED, WIRE
REINFORCED BARRELS WHOSE CONTENTS ARE NOTED ON THE OUTSIDE.

NOTE

1. BARRELS CONTAINING EXTERNAL-SIGNAL CABLES WILL BE IDENTIFIED
    EXT 1 OF N, EXT 2 OF N, ETC.

2. BARRELS CONTAINING POWER CABLES WILL BE IDENTIFIED,
    POWER 1 OF N, POWER 2 OF N, ETC.

3. INTERFRAME CABLES WILL BE PACKAGED AS A GROUP BY B/M AND
    IDENTIFIED, INTERFRAME 1 OF N, INTERFRAME I OF N, ETC. THESE
    CABLES MAY ARRIVE SEPARATELY FROM THE FIRST TWO PREVIOUS
    GROUPS.

4. LINE CORDS FOR PRINTERS, CARD READERS, AND PUNCHES
    ARE SHIPPED WITH THOSE UNITS.

5. CABLE PACKAGE MARKED EXT WILL CONTAIN CABLE ROUTING
    AND IDENTIFICATION DIAGRAMS 5345590 SHEETS 1 AND 2.

3. CABLE IDENTIFICATION

    TO FACILITATE CABLING THE SYSTEM, A RED OR WHITE LABEL IS ATTACHED
TO EACH END OF EACH CABLE. SEE FIGURE 4-1.

    RED IDENTIFIES THE FROM END OF THE CABLE, WHITE, THE TO END.

    EACH LABEL CARRIES A KEY NUMBER. THOSE NUMBERS FROM 50 THRU 60
ARE IDENTIFIED IN THIS MANUAL AS REF NUMBERS, TO DIFFERENTIATE THEM
FROM SUB-FLOOR CABLES.

```
+-----------------------------------+
1                                   1
1    PART NO.            LENGTH     1
1                                   1
1    EC LEVEL                       1
1                                   1
1        KEY NO.                    1
1                                   1
1    FROM               TO          1
1                                   1
1    CUSTOMER CODE                  1
1                                   1
+-----------------------------------+
```

FIGURE 4-1 CABLE LABEL

BOTH THE FROM AND TO LABELS ARE CODED TO SHOW THE CABLE DESIGNATION, FRAME NUMBER, TAILGATE IDENTIFICATION AND QUICK DISCONNECT -QD- BLOCK LOCATION. THUS CODE 01E01C ON A FROM LABEL WOULD INDICATE THAT THIS IS A CABLE FROM FRAME 01, TAILGATE E, QD LOCATION 01C.

4.   CABLE PLACEMENT

CABLES AND GROUND AND BOND JUMPERS THAT ARE ROUTED SUB-FLOOR, SHOULD BE INSTALLED BEFORE THE SYSTEM ARRIVES.

OTHER BONDING JUMPERS, PRIMARY POWER CABLES AND INTERFRAME CABLES SHOULD BE SORTED BY FRAME AND SET ASIDE UNTIL THE MACHINES ARRIVE.

Y AND Z DIMENSIONS, CALLED OUT ON CABLE CHARTS, REFER TO THE LENGTH OF CABLES NEEDED TO REACH FROM THE FLOOR CUT-OUT TO THE CABLE PLUGGING LOCATION ON THE MACHINE. Y AND Z DIMENSIONS ARE INDICATED BY A ONE-INCH TAPE BAND, PLACED THE PROPER DISTANCE FROM THE -FROM- AND -TO- ENDS OF THE CABLE, RESPECTIVELY.

LINE UP THE Y AND Z BANDS WITH THE EDGE OF THE FLOOR CUT-OUTS AS YOU PLACE THE CABLES. IT IS DIFFICULT TO SHIFT A CABLE WHEN IT IS PACKED IN WITH MANY OTHERS AND YOU WILL SAVE TIME BY FOLLOWING THIS PROCEDURE.

FIGURES 4-2 AND 4-3 DIAGRAM A TYPICAL SUB-FLOOR INSTALLATION OF POWER AND SIGNAL CABLES.

FIGURES 4-4 AND 4-5 ILLUSTRATE LOCATIONS AND GENERAL CABLING RULES AS THEY APPLY TO THE 7094-2. DO NOT BUTT FRAMES OR PLUG CABLES UNTIL CORNER TRIM-EXTENSION BRACKETS ARE INSTALLED. SEE FIGURE 5-3.
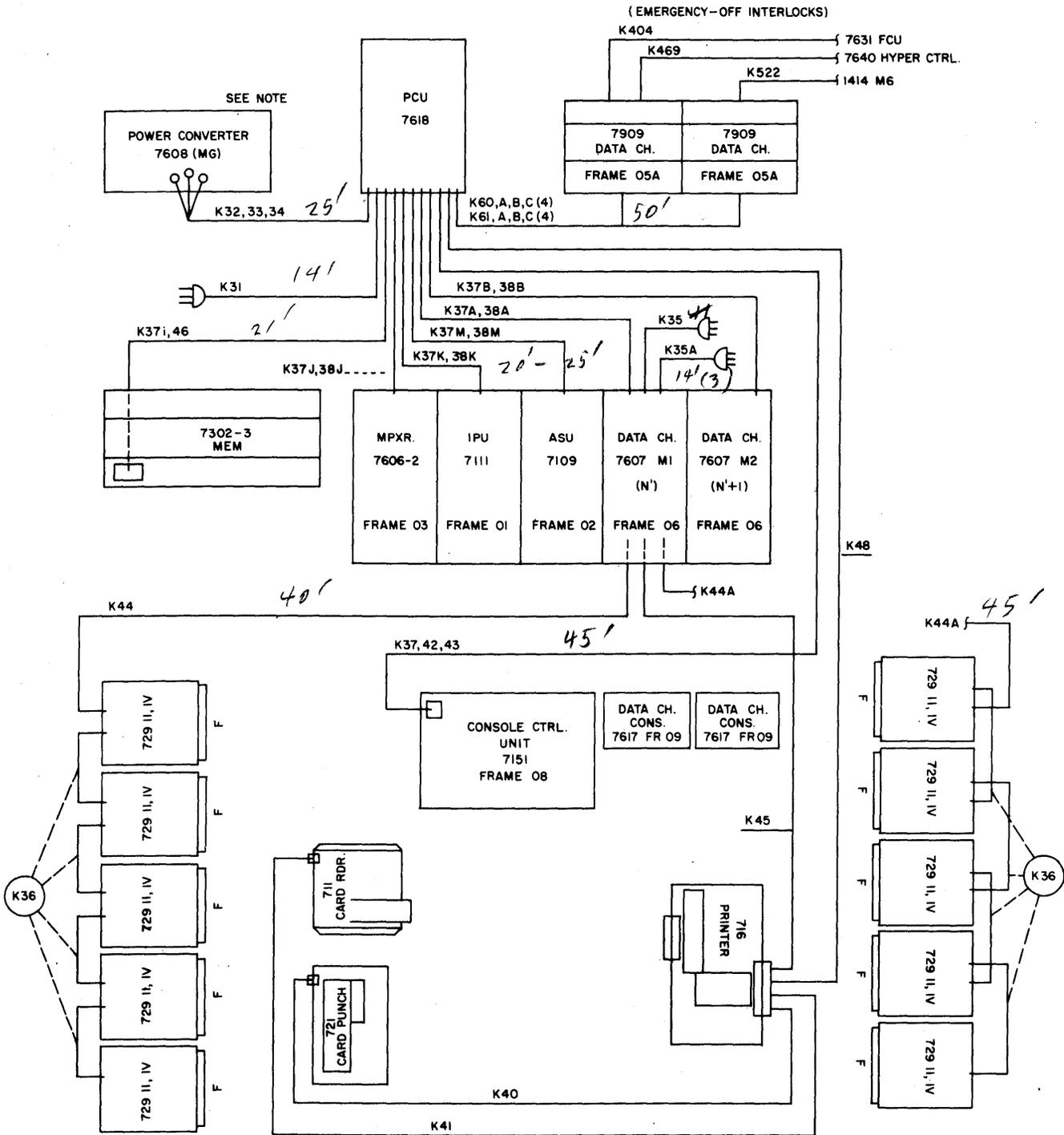
NOTE: SEE FIGURES 18-1, 18-2 FOR DETAILS OF PCU TO MG CABLING.

FIGURE 4-2 IBM 7094-2 EXTERNAL POWER CABLES
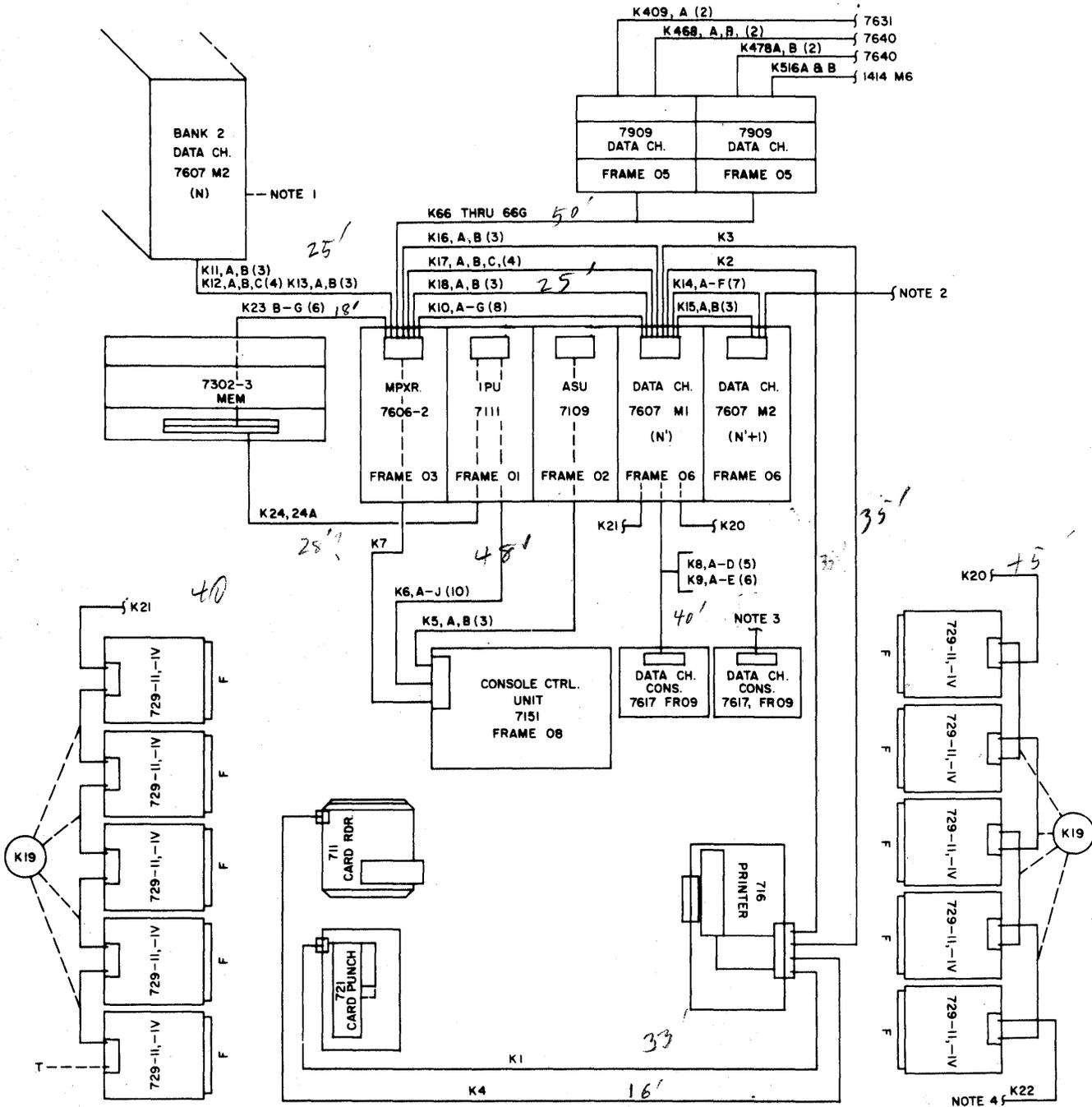
NOTES: 1. REFER TO SEQUENCE PLUGGING LISTS AND TAILGATE DIAGRAMS FOR DETAILED CABLING INFORMATION.
2. TO N'+2. TAILGATE DIAGRAM N' SHOWS TERMINATORS WHERE NO BOXES ARE ADDED.
3. ONE 7617 REQUIRED FOR EACH DATA CHANNEL.
4. 200 POS. CABLE TO CONNECT OTHER CONTROLS OR SYSTEMS, OR TERMINATED BY PN 529285.

FIGURE 4-3 IBM 7094-2 EXTERNAL SIGNAL CABLES
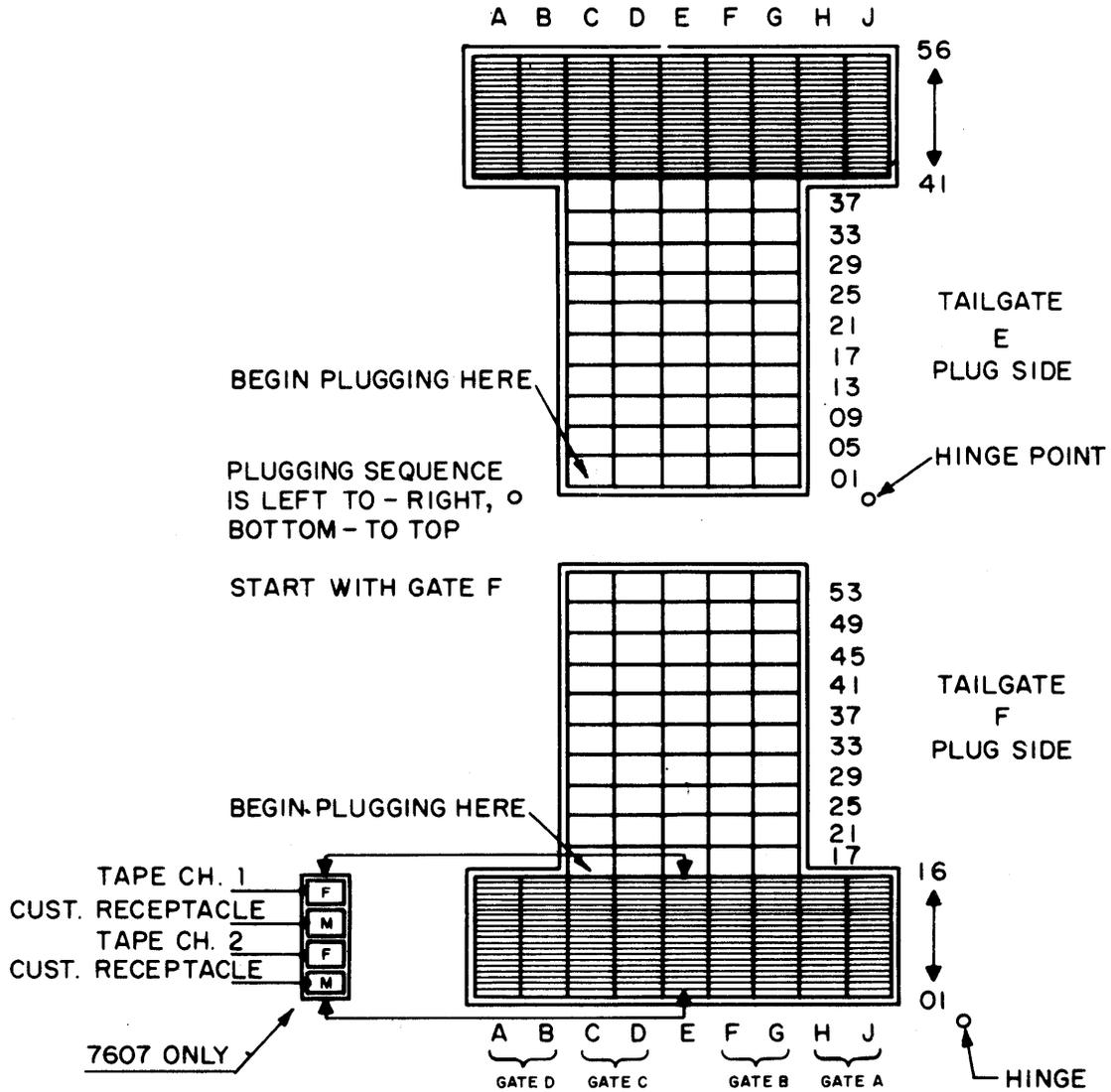
WITH THE EXCEPTION OF SOME POWER CABLES, ALL INTER-MODULE
CABLES ARE PLUGGED INTO TAILGATES AT THE REAR OF
EACH MODULE.

FIGURE 4-4 GENERAL TAILGATE CONFIGURATION - IBM 7094-2
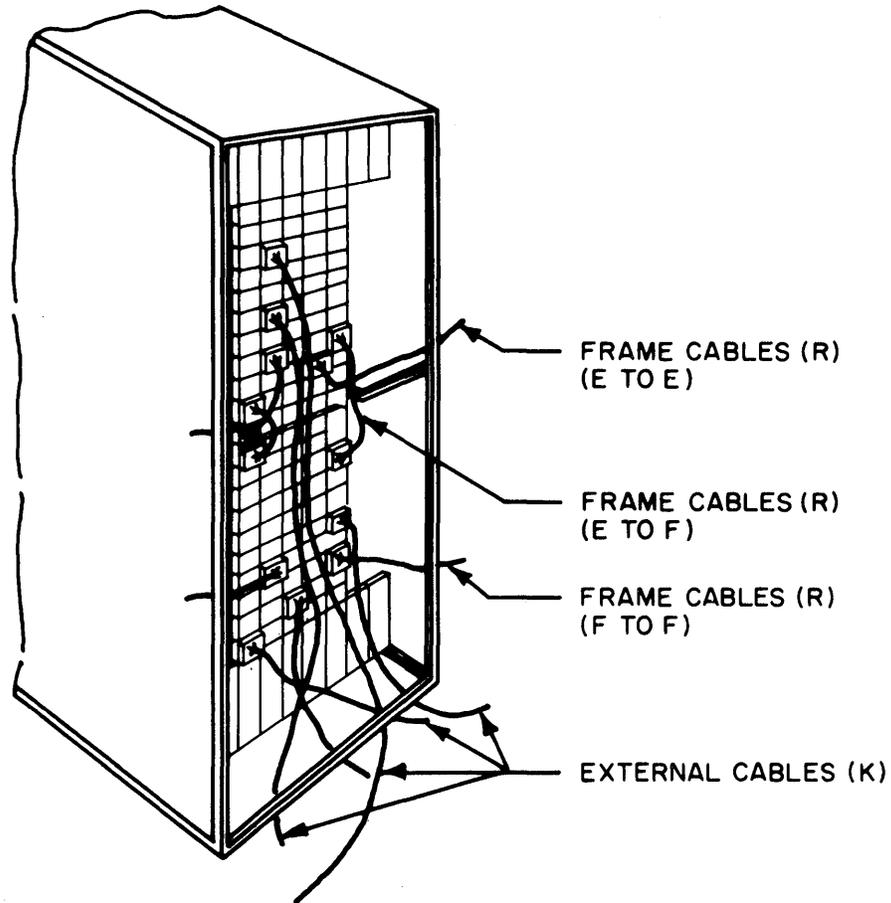
FRAME CABLES (R)
(E TO E)

FRAME CABLES (R)
(E TO F)

FRAME CABLES (R)
(F TO F)

EXTERNAL CABLES (K)

NOTE

1. INTER-MACHINE CABLES ARE DIVIDED INTO TWO GROUPS, INTERFRAME (R)
AND EXTERNAL (K).

2. AN "R" CABLE CONNECTS TAILGATE E (OR F) OF ONE MODULE TO TAILGATE E
(OR F) OF AN ADJACENT MODULE AND IS ROUTED THROUGH THE FRAME
STRUCTURE. AN "R" CABLE MAY ALSO CONNECT TAILGATE E TO
TAILGATE F IN THE SAME MODULE.

3. A "K" CABLE IS ROUTED EXTERNALLY TO THE MACHINES EITHER IN THE
SUB-FLOOR OR AT FLOOR LEVEL.

FIGURE 4-5 TAILGATE CABLING

5.   CABLE PLUGGING

    BEFORE PLUGGING CABLES, INSTALL A CABLE STRAIN RELIEF ON THE REAR
OF THE MODULE.   SEE FIGURE 4-6.

                              NOTE
          CABLE STRAIN RELIEFS AND CORNER TRIM-EXTENSION BRACKETS
          WITH ASSOCIATED HARDWARE, DEPENDING ON THE NUMBER
          NEEDED, ARE PACKED SEPARATELY.

    ON INDIVIDUAL FRAMES, ALL GROUND AND BOND CONNECTIONS AND POWER
CABLING SHOULD BE COMPLETED BEFORE INSTALLING THE SIGNAL CABLES.

    ALL SUB-FLOOR CABLES SHOULD HAVE BEEN PLACED PRIOR TO SYSTEM
ARRIVAL.   IF THE KEY CABLES ARE TO RUN ABOVE-FLOOR, THEY SHOULD HAVE
BEEN UNPACKED AND SORTED PRIOR TO SYSTEM ARRIVAL.

    TABLE 4-1 IS A NUMERICAL LISTING OF CABLES AND THEIR PLUGGING
LOCATIONS.

    CABLES FOR DIRECT-COUPLING THE 7094-2 TO A 7040/44 SYSTEM ARE
LISTED IN CHAPTERS 10 (7109), 14 (7606-2), 15 (7607), AND 18 (7618).

    THE FOLLOWING INFORMATION WILL HELP YOU CABLE A MAXIMUM IBM 7094-2
IN MINIMUM TIME.

STRAIN RELIEF

SMS FRAME

BRACKET 598275
SCREWS 32042

STRAIN RELIEF ASSM.
587315
SCREWS 55918

REAR OF MODULE

CABLE DIAMETER ADAPTER 589601 (AS REQ D)

I/O CABLE

*

I/O CABLE CLAMP (AS REQ'D)
598636 FOR MAGNETIC TAPES
598637 FOR PRINTER
*-TAPE CLAMP RADIUS .734
    PRINTER CLAMP RADIUS .578
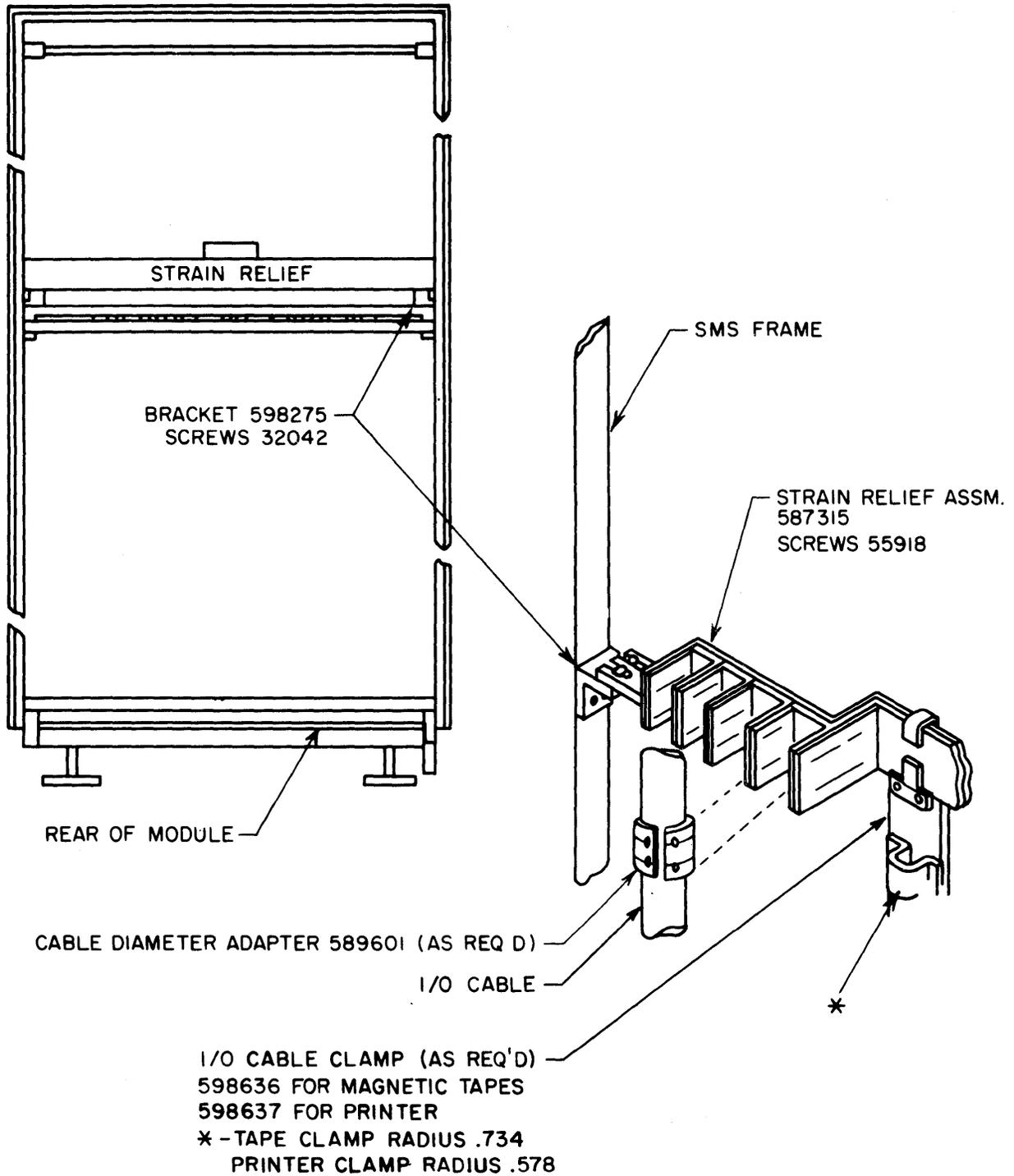
FIGURE 4-6 STRAIN RELIEF HARDWARE

TABLE 4-1 EXTERNAL CABLE ROUTING - IBM 7094-2 SYSTEM

| KEY NO. | PART NUMBER | RED TAG - FROM | | WHITE TAG - TO | | NAME |
		FRAME AND GATE	CABLE CONN.	FRAME AND GATE	CABLE CONN.	
1	533724					PRINTER TO CARD PUNCH
2	532120	PRINTER	PR-1	06E	25G	PRINTER NO.1 TO DATA CHANNEL
					21G	
					17G	
3	532120	PRINTER	PR-2	06E	13G	PRINTER NO.2 TO DATA CHANNEL
					09G	
					05G	
4	533717					PRINTER TO CARD READER
5	587323	08H	01D	02E	25C	7151 CONSOLE TO 7109 ASU
5A	587323	08H	05D	02E	25D	7151 CONSOLE TO 7109 ASU
5B	587323	08H	09D	02F	33G	7151 CONSOLE TO 7109 ASU
6	587323	08H	09A	01F	41G	7151 CONSOLE TO 7111 IPU
6A	587323	08H	01B	01E	21D	7151 CONSOLE TO 7111 IPU
6B	587323	08H	05C	01F	37E	7151 CONSOLE TO 7111 IPU
6C	587323	08H	01A	01F	33E	7151 CONSOLE TO 7111 IPU
6D	587323	08H	01C	01F	33E	7151 CONSOLE TO 7111 IPU
6E	587323	08H	05B	01F	45C	7151 CONSOLE TO 7111 IPU
6F	587323	08H	05A	01F	37F	7151 CONSOLE TO 7111 IPU
6G	587323	08H	09B	01F	37E	7151 CONSOLE TO 7111 IPU
6H	587323	08H	13B	01E	17C	7151 CONSOLE TO 7111 IPU
6J	587323	08H	13C	01E	17D	7151 CONSOLE TO 7111 IPU
7	587323	08H	09C	03F	37E	7151 CONSOLE TO MULTIPLEXOR
8	587323	CONSOLE PANEL	37C	06E	37C	CE CONSOLE TO DATA CHANNEL

TABLE 4-1 CONTINUED

TABLE 4-1 CONTINUED

8A	587323	CONSOLE PANEL	33C	06E	33C	CE CONSOLE TO DATA CHANNEL
8B	587323	CONSOLE PANEL	37D	06E	37D	CE CONSOLE TO DATA CHANNEL
8C	587323	CONSOLE PANEL	33D	06E	33D	CE CONSOLE TO DATA CHANNEL
8D	587323	CONSOLE PANEL	29D	06E	29D	CE CONSOLE TO DATA CHANNEL
9	587323	CONSOLE PANEL	53C	06F	53C	CE CONSOLE TO DATA CHANNEL
9A	587323	CONSOLE PANEL	53D	06F	53D	CE CONSOLE TO DATA CHANNEL
9B	587323	CONSOLE PANEL	49C	06F	49C	CE CONSOLE TO DATA CHANNEL
9C	587323	CONSOLE PANEL	49D	06F	49D	CE CONSOLE TO DATA CHANNEL
9D	587323	CONSOLE PANEL	45C	06F	45C	CE CONSOLE TO DATA CHANNEL
9E	587323	CONSOLE PANEL	45D	06F	45D	CE CONSOLE TO DATA CHANNEL
10	587323	03F	53D	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10A	587314	03F	53E	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10B	587314	03F	53F	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10C	587314	03F	53G	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10D	587314	03F	49D	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10E	587314	03F	49E	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10F	587314	03F	49F	06F	25C	MULTIPLEXOR TO DATA CHANNEL
10G	587314	03F	49G	06F	25C	MULTIPLEXOR TO DATA CHANNEL
11	587314	03E	37G	06E	21D	MPLXR TO DATA CHANNEL N BANK 2
11A	587314	03E	33G	06E	17D	MPLXR TO DATA CHANNEL N BANK 2
11B	587314	03E	29G	06E	05D	MPLXR TO DATA CHANNEL N BANK 2
12	587314	03F	21E	06E	13F	MPLXR TO DATA CHANNEL N BANK 2

TABLE 4-1 CONTINUED

TABLE 4-1 CONTINUED

1 12A	1 587314	1 03F	1 25E 1 06E	1 17F	1 MPLXR TO DATA 1	
1	1	1	1	1	1	1 CHANNEL N BANK 2	1
1 12B	1 587314	1 03F	1 21F	1 06E	1 21C	1 MPLXR TO DATA	1
1	1	1	1	1	1	1 CHANNEL N BANK 2	1
1 12C	1 587314	1 03F	1 33E	1 06E	1 17C	1 MPXR TO DATA	1
1	1	1	1	1	1	1 CHANNEL N BANK 2	1
1 13	1 587314	1 03F	1 37F	1 06F	1 41F	1 MPXR TO DATA	1
1	1	1	1	1	1	1 CHANNEL N BANK 2	1
1 13A	1 531641	1 03F	1 41E	1 06F	1 33F	1 MPXR TO DATA	1
1	1	1	1	1	1	1 CHANNEL N BANK 2	1
1 13B	1 587314	1 03F	1 41F	1 06F	1 37F	1 MPXR TO DATA	1
1	1	1	1	1	1	1 CHANNEL N BANK 2	1
1 14	1 587314	1 06E	1 17E	1 06E	1 17F	1 DATA CHANNEL N TO	1
1	1	1	1	1	1	1 DATA CHANNEL N+1	1
1 14A	1 587314	1 06E	1 13E	1 06E	1 13F	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 14B	1 587314	1 06E	1 13C	1 06E	1 17C	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 14C	1 587314	1 06E	1 13D	1 06E	1 17D	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 14D	1 587314	1 06E	1 09C	1 06E	1 21C	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 14E	1 587314	1 06E	1 09D	1 06E	1 21D	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 14F	1 587314	1 06E	1 05C	1 06E	1 05D	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 15	1 587314	1 06F	1 41C	1 06F	1 41F	1 DATA CHANNEL N TO	1
1	1	1	1	1	1	1 DATA CHANNEL N+1	1
1 15A	1 587314	1 06F	1 37C	1 06F	1 37F	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 15B	1 531641	1 06F	1 33C	1 06F	1 33E	1 DATA CHANNEL N*TO	1
1	1	1	1	1	1	1 DATA CHANNEL N*+1	1
1 16	1 587314	1 03E	1 29F	1 06E	1 05D	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1
1 16A	1 587314	1 03E	1 33F	1 06E	1 17D	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1
1 16B	1 587314	1 03E	1 37F	1 06E	1 21D	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1
1 17	1 587314	1 03F	1 21D	1 06E	1 13F	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1
1 17A	1 587314	1 03F	1 29D	1 06E	1 21C	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1
1 17B	1 587314	1 03F	1 25D	1 06E	1 17F	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1
1 17C	1 587314	1 03F	1 33D	1 06E	1 17C	1 MPXR TO DATA CHAN	1
1	1	1	1	1	1	1 N* (BANK 1)	1

TABLE 4-1 CONTINUED

TABLE 4-1 CONTINUED

18	587314	03F	37D	06F	41F	MPXR TO DATA CHAN N° (BANK 1)
18A	531641	03F	41D	06F	33C	MPXR TO DATA CHAN N° (BANK 1)
18B	587314	03F	45D	06F	37F	MPXR TO DATA CHAN N° (BANK 1)
19	535099					TAPE UNIT TO TAPE UNIT
20	532121	06F	21F 25F 29F	FIRST TU BANK 1	AMP CON	DATA CHANNEL TO 729 TAPE UNIT
21	532121	06F	21E 25E 29E	FIRST TU BANK 2	AMP CON	DATA CHANNEL TO 729 TAPE UNIT
22	352464		200 POS CONN		200 POS CONN	729 TU TO OTHER CONTROLS OR SYSTEMS
23B	587314	03E	17G	MEM H	16A	MPXR TO MEMORY
23C	587314	03E	21G	MEM H	12A	MPXR TO MEMORY
23D	587314	03E	25G	MEM H	06A	MPXR TO MEMORY
23E	587314	03E	25F	MEM H	02A	MPXR TO MEMORY
23F	587314	03F	29G	MEM H	07A	MPXR TO MEMORY
23G	587314	03F	33G	MEM H	03A	MPXR TO MEMORY
24	587314	01F	17G	MEM J	01A	7111 TO MEMORY
24A	587314	01F	21G	MEM G	01A	7111 TO MEMORY

5.1   PROCEDURE

A.   PLAN THE JOB. REVIEW CHAPTER 5 AND OBSERVE THE RECOMMENDED
     PLACEMENT PROCEDURE FOR THE MAIN-FRAME.

B.   YOUR EXTERNAL CABLES ARE ALREADY IN POSITION AND SHOULD BE THE
     FIRST ONES CONNECTED.

C.   CONTINGENT ON MANPOWER AVAILABILITY, YOU MAY BEGIN TO CABLE
     EACH FRAME AS SOON AS IT HAS BEEN LEVELLED OR WAIT UNTIL ALL
     MAJOR UNITS HAVE BEEN PLACED.

D.   IF YOU HAVE A LARGE SYSTEM WITH DIFFERENT TYPES OF I/O
     EQUIPMENT, YOU SHOULD PLAN TO HAVE ONE TWO-MAN TEAM CABLING THE
     MAIN-FRAME, ANOTHER CABLING TAPE AND DISK STORAGE, AND A THIRD
     TEAM FOR STANDBY OR CABLING ADDITIONAL EQUIPMENT.

E.   CONNECT ALL EXTERNAL CABLES TO PCU-7618 BEFORE PROCEEDING WITH
     INSTALLATION OF MODULES IN THE BASIC GROUP. MAKE SURE THAT
     CORNER BRACKETS AND TRIM ARE IN PLACE BEFORE BUTTING EACH
     MODULE.

F.   AS EACH CABLE IS PLUGGED, PLACE A GROMMET, P/N 598601, ON THE
     CABLE BEFORE INSERTING IT IN THE STRAIN RELIEF BAR. FIGURE 4-6
     ILLUSTRATES THE USE OF THIS GROMMET AND ALSO THE ATTACHMENT OF
     SPECIAL CABLE CLAMPS FOR HEAVY I/O CABLES.

NOTE

WHEN A FRAME USUALLY CONSIDERED PART OF THE BASIC GROUP
(JOINED BY 'KEY' CABLES). IS LOCATED AWAY FROM THE BASIC
GROUP, SPECIALLY ORDERED CABLES THAT CONNECT IT TO THE
MAIN-FRAME ARE RUN SUB-FLOOR. WHEN A FRAME NORMALLY SEPARATED
FROM THE MAINFRAME IS BUTTED TO THE BASIC GROUP, THE CABLES
THAT CONNECT IT TO ITS ADJACENT FRAMES ARE ROUTED THROUGH THE
FRAME. THESE CABLES WILL RETAIN THE SAME KEY NUMBERS AND
DESIGNATION.

5.2   GROUNDING CHECK

THE GROUND SYSTEM IN THE 7094 PROVIDES FOR TIEING TOGETHER
ELECTRONIC GROUND AND FRAME GROUND AT ONLY ONE POINT IN THE SYSTEM.
THIS TIE POINT IS IN THE 7607 UNIT AT CH-A.

THE UNITS ARE CHECKED DURING MECHANICAL ASSEMBLY OPERATIONS TO
DETERMINE THAT NO SHORT CIRCUITS EXIST BETWEEN ELECTRONIC AND FRAME
GROUND PRIOR TO ANY CABLE CONNECTING.

IT IS POSSIBLE THAT A DEFECTIVE CABLE COULD CAUSE AN ELECTRONIC

GROUND-TO-FRAME LOOP WHICH WOULD BE DIFFICULT TO ISOLATE IF NOT
DETECTED IMMEDIATELY UPON PLUGGING THE CABLE. LEAVE TAPE UNITS
DISCONNECTED AND CONNECT AN OHMMETER BETWEEN ELECTRONIC GROUND AND THE
FRAME. IF A SHORT OCCURS WHILE PLUGGING CABLES, LOCATE THE CAUSE OF
TROUBLE BEFORE PROCEEDING.

CAUTION

CABLES BETWEEN THE 7607 AND 7606 SHOULD BE THE LAST ONES
CONNECTED, TO PREVENT READING A SHORT CONDITION. DO NOT TURN
POWER ON THE SYSTEM IF THE 7607 IS UNGROUNDED, A WARNING SIGN
SHOULD BE TIED TO THE 7618, INDICATING THAT THE JUMPER IS
DISCONNECTED.

WHEN ALL UNITS HAVE BEEN CABLED TOGETHER AND THE GROUND CIRCUIT
HAS BEEN COMPLETED, THE FOLLOWING CIRCUITS SHALL BE COMMON-

A.   400 CYCLE AC NEUTRAL
B.   60 CYCLE CONVENIENCE OUTLET NEUTRAL
C.   FRAME BOND
D.   ELECTRONIC GROUND

CHECK THESE POINTS AT EACH UNIT BY CONNECTING BETWEEN EACH NEUTRAL
AND THE FRAME WITH A TEST LIGHT. ITEMS A, B, AND C ARE PHYSICALLY TIED
TOGETHER IN THE 7618. WITHIN THE 7618, THE COMMON POINT ON THE TWO
RELAYS IN THE 48 VOLT GROUND SENSING CIRCUIT AND BUILDING GROUND, SHALL
BE COMMON WITH THESE CIRCUITS.

5.3 TABLES AND ILLUSTRATIONS

TABLES AND/OR DIAGRAMS OF CABLING INFORMATION ARE IN EACH UNIT
CHAPTER, WHERE THEY ARE LISTED IN THE RECOMMENDED SEQUENCE FOR CABLING
THE SYSTEM. THEY ARE ALSO LISTED BY INDIVIDUAL FRAMES, PROVIDING A
CROSS REFERENCE, OR A GUIDE, IN THE EVENT CABLING BETWEEN SEVERAL
MODULES MUST BE DONE INDEPENDENTLY. THE KEY COLUMN LISTS EXTERNAL
CABLES, SHOWN ON ENGINEERING DRAWINGS 5345590, SHEETS 1 AND 2, WHICH
ARE ALREADY IN POSITION AND SHOULD BE THE FIRST ONES CONNECTED.

5.4   SPECIAL CABLES

TABLE 4-2 SPECIAL EXTERNAL CABLES

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
1	PRINTER 716	PUNCH 721	533724	SIGNAL
4	PRINTER 716	READER 711	533717	
15	06F 41C	06F 41F	587314	EXCEPT WHERE NOTED, THESE CABLES ARE USED IN BANKS 1 AND 2 (N AND N*) TO INTERCONNECT ADJACENT DATA CHANNELS, SEE FIGURE 4-3.
15A	06F 37C	06F 37F	587314	
15B	06F 33E	06F 33C	531641	IN BANK 2, FROM 06(N)F33C TO 06(N+1)F33E
14	06E 17E	06E 17F	587314	
14A	06E 13E	06E 13F	587314	
14B	06E 13C	06E 17C	587314	
14C	06E 13D	06E 17D	587314	
14D	06E 09C	06E 21C	587314	
14E	06E 09D	06E 21D	587314	
14F	06E 05C	06E 05D	587314	
19	729	729	535099	AS REQUIRED. SEE FIG. 4-3
22	729	TO OTHER CONTROLS OR SYSTEMS.	352464	SEE FIGURE 4-3.

5 SYSTEM PLACEMENT AND ASSEMBLY

1.   GENERAL

THIS SECTION CONTAINS COMPLETE INSTRUCTIONS FOR RECEIVING,
PHYSICAL PLACEMENT, UNPACKING, AND MECHANICALLY ASSEMBLING THE SYSTEM.
THE INFORMATION IS ARRANGED IN THE BASIC ORDER FOR THE VARIOUS
OPERATIONS FROM AN OVERALL SYSTEMS STANDPOINT, WITH SPECIAL
INSTRUCTIONS PROVIDED FOR SPECIFIC UNITS AS REQUIRED. TABLE 5-1 LISTS
ALL OPERATIONS CONTAINED IN THIS SECTION WITH A COLUMN FOR EACH MACHINE
TYPE NUMBER. THE CHECK MARKS IN THE COLUMN INDICATE WHICH OPERATIONS
MUST BE PERFORMED ON EACH OF THE UNITS. THE INSTALLER SHOULD BE
CAUTIONED HOWEVER THAT IT IS NOT NECESSARY TO PERFORM EACH OPERATION ON
ALL UNITS BEFORE PROCEEDING TO THE NEXT OPERATION. ONE OF THE MAIN
CONSIDERATIONS IS THE EFFICIENT USE OF MANPOWER.

IT IS RECOMMENDED THAT CABLING OF THE TAPE SYSTEM BE STARTED AS
SOON AS THE OPERATIONS INDICATED FOR THE 7607 AND 729S HAVE BEEN
COMPLETED. THIS WILL PERMIT POWER TESTING OF THE TAPE AREA AND TAPE
SUB SYSTEMS TESTING TO COMMENCE WHILE CABLING OF OTHER UNITS IS IN
PROCESS.

2.   UNLOADING AND MOVEMENT OF UNITS

THE CARRIER WILL NORMALLY PROVIDE MOVERS TO UNLOAD THE UNITS FROM
THE VAN AND MOVE THEM INTO THE MACHINE AREA. THE CE SHOULD MAKE SURE
THAT THE CARRIER IS INFORMED OF THE FOLLOWING REQUIREMENTS FOR HANDLING
THE EQUIPMENT, TO PREVENT INJURY TO PERSONNEL, DAMAGE TO EQUIPMENT, AND
DAMAGE TO THE INSTALLATION.

CAUTION

A. ALL MACHINE MOVEMENTS ARE TO BE MADE ON
   TEMPERED MASONITE OR PLY WOOD TO PREVENT
   DAMAGE TO CUSTOMER FLOORS. THESE UNITS MAY
   EACH WEIGH IN EXCESS OF ONE TON AND CONSIDER-
   ABLE DAMAGE TO FLOORING COULD OCCUR.

B. SUFFICIENT MANPOWER MUST BE USED IN HANDLING
   AND MOVING THE UNITS TO PREVENT INJURY TO
   PERSONNEL AND DAMAGE TO EQUIPMENT. IT IS
   PARTICULARLY IMPORTANT TO BE EXTRA CAREFUL
   WHEN MOVING THE UNITS ON RAMPS OR WHERE
   OBSTRUCTIONS SUCH AS CABLES AND CABLE FLOOR
   HOLES EXIST. IF A CASTER SHOULD DROP INTO A FLOOR
   OPENING OR OFF THE SIDE OF A RAMP IT WOULD BE
   VERY DIFFICULT BECAUSE OF THE HEIGHT AND WEIGHT
   OF THE UNIT TO PREVENT IT FROM TIPPING OVER,
   CAUSING SERIOUS INJURY TO PERSONNEL AND DAMAGE
   TO THE UNIT.

TABLE 5-1 OPERATIONS TO BE PERFORMED ON EACH MACHINE

	MACHINE UNITS									
	7302	7111	7606	7607	7618	7608	7151	7617	729	7109
RECEIVING AND PLACEMENT	X	X	X	X	X	X	X	X	X	X
REMOVAL OF PACKING MATERIAL	X	X	X	X	X	X	X	X	X	X
LOOSEN TOWER LOCKING SCREWS	X	X	X	X						X
INSTALL CASTERS AND LEVELING PADS	X	X	X	X	X					X
INSTALL CORNER BRACKETS AND TRIM	X	X	X	X	X					X
LEVEL UNITS	X	X	X	X						X
BOLT MAIN FRAME	X	X	X	X			X			X
INSTALL KICK PLATES	X	X	X	X	X					X
LAMINAR BUS SHORT CHECK	X	X	X	X			X			X
ASSEMBLE CONSOLE							X			X

C. AVOID TWISTING OF UNITS DURING MOVING ON THEIR
   CASTERS. WHEN APPROACHING OR LEAVING A RAMP
   THE UNIT MUST BE ALIGNED SQUARELY WITH THE RAMP
   TO PREVENT A TWISTING FORCE ON THE TOWER CASTERS,
   WHICH DO NOT SWIVEL. THE WEIGHT OF THE MACHINE
   MAY ALSO BE ABSORBED ON ONLY THREE CASTERS IF
   THE UNIT IS NOT ALIGNED WITH THE RAMP, CAUSING
   CASTER DAMAGE.

D. CHECK EACH UNIT AS IT IS BEING UNLOADED FOR A
   SIGN OF PHYSICAL DAMAGE. A THOROUGH CHECK CANNOT
   BE MADE UNTIL PACKING MATERIALS HAVE BEEN REMOVED.

3.   PLACEMENT OF UNITS

     ALL UNITS MAY BE MOVED INTO THEIR FINAL LOCATION, EXCEPT THOSE
WHICH ARE TO BE BUTTED TOGETHER IN THEIR FINAL POSITION. SMS UNITS
WHICH ARE BUTTED TOGETHER MUST BE TEMPORARILY POSITIONED TO ALLOW
ADEQUATE SPACE TO INSTALL TRIM EXTENSIONS.

     THE FINAL PLACEMENT OF UNITS SHOULD BE IN ACCORDANCE WITH THE
CUSTOMER FLOOR PLAN AND THE INSTRUCTIONS CONTAINED IN CHAPTER 3
PREPARATION OF MACHINE AREA. IF THESE INSTRUCTIONS HAVE BEEN FOLLOWED,
IMMEDIATE POSITIONING AND/OR ALIGNMENT OF UNITS CAN BE ACCOMPLISHED, BY
ALIGNING THEM WITH THE MARKING ON FLOORS.

4.   REMOVAL OF PACKAGING MATERIAL

     MOST OF THE PROTECTIVE COVERINGS AND PACKING MATERIALS ARE EASILY
SEEN AND REQUIRE NO SPECIAL INSTRUCTIONS FOR REMOVAL.

     WHEN PACKAGING MATERIALS HAVE BEEN REMOVED, CAREFULLY INSPECT ALL
UNITS FOR POSSIBLE DAMAGE AND CHECK THE FOLLOWING SPECIFIC ITEMS.

                              NOTE

          GATES ON SMS UNITS CANNOT BE OPENED UNTIL GATE
          CASTERS HAVE BEEN INSTALLED, TOWER CASTERS
          ADJUSTED, AND THE TOWER LOCKING SCREW LOOSENED.

          A. CHECK POWER AND SIGNAL CONNECTORS FOR BENT OR
             BROKEN PINS, LOOSE WIRES AND MECHANICAL TIGHTNESS.

          B. CHECK GATES FOR BENT PINS, BROKEN WIRING, LOOSENED
             CARDS AND CONNECTORS.

5.   TOWER LOCKING SCREWS

     LOOSEN THE LOCK NUT ON THE TOWER LOCKING SCREW AND LOWER THE
LOCKING SCREW.   SEE FIGURE 5-1 FOR LOCATION OF TOWER LOCKING SCREWS ON
29-1/2 INCH FRAMES.

                              NOTE

          TOWER CASTERS SHOULD BE LOWERED SUFFICIENTLY
          TO PREVENT THE TOWER FROM BOTTOMING ON THE FRAME
          CROSS MEMBER WHEN LOOSENING THE LOCKING SCREW.
          USE TOOL NO. 461136 WHEN UNLOCKING THE TOWER SCREW.
          FINAL ADJUSTMENT OF THE TOWER CASTER WILL BE MADE
          WHEN UNITS HAVE BEEN LEVELED.
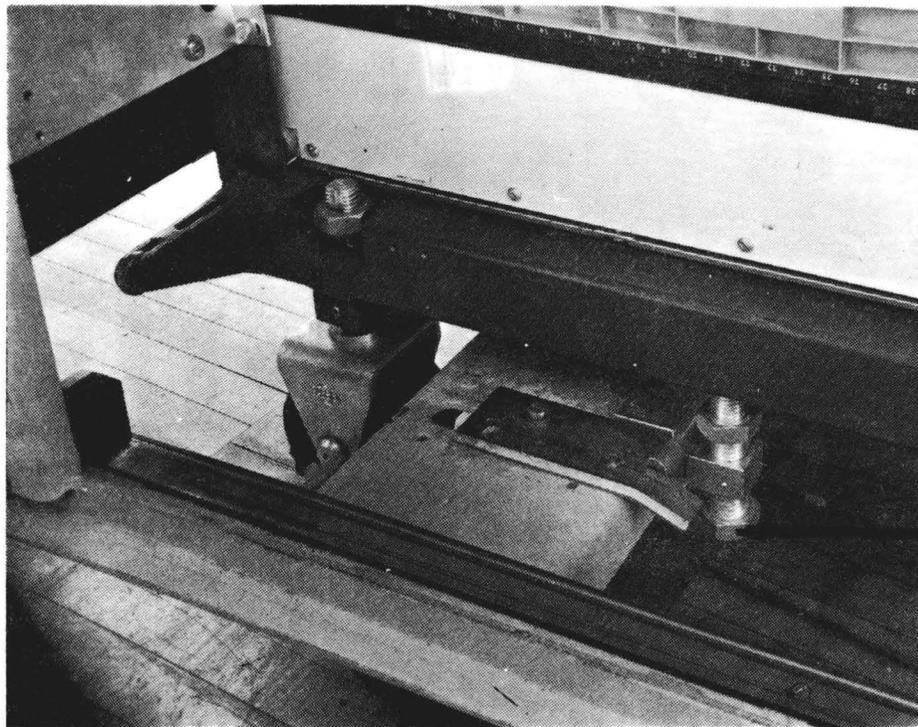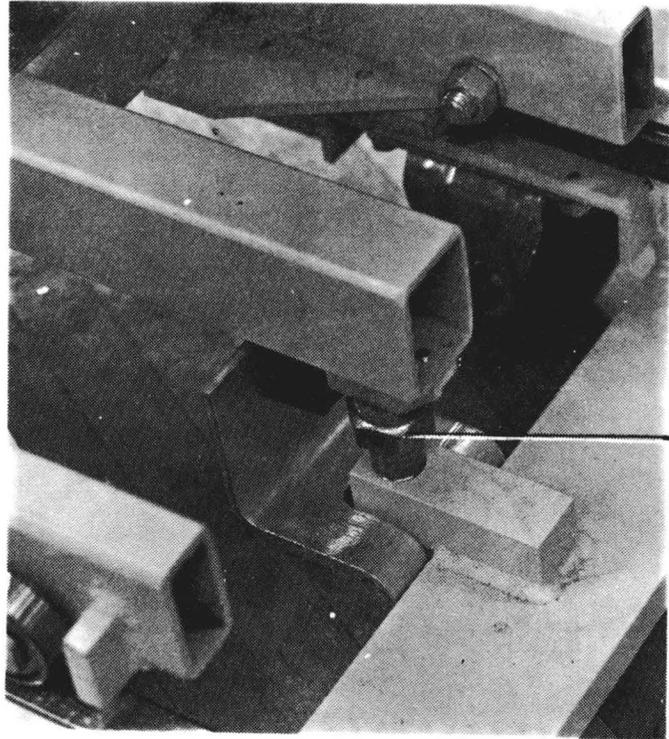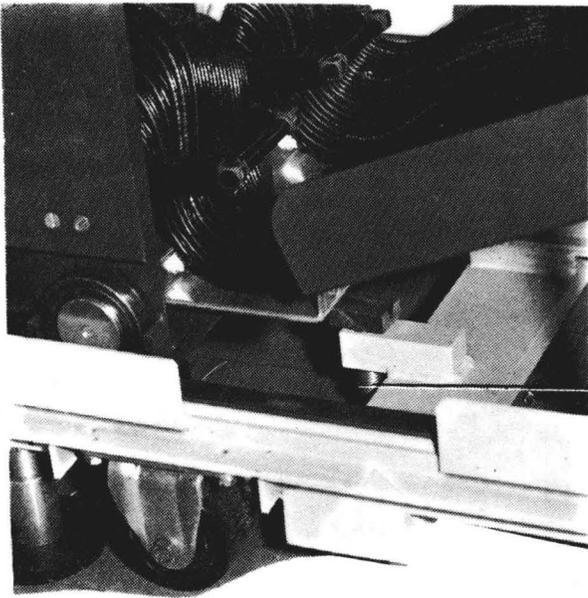
* TOWER LOCKING
  SCREW.

FIGURE 5-1 TOWER LOCKING SCREWS FOR 29 1/2 INCH FRAMES

6.   INSTALLING GATE CASTERS AND LEVELING PADS

THE CASTER WHEELS SHOULD FACE THE CENTER OF THE UNIT AS SHOWN IN
FIGURE 5-2. THE CASTERS SHOULD CLEAR THE FLOOR WHEN THE GATES ARE
LOCKED TO THE TOWER.

THE LEVELING PADS SHOULD NOT BE ADJUSTED TO CARRY THE WEIGHT OF
THE UNIT UNTIL THE UNIT IS IN ITS PROPER POSITION.

7.   INSTALLING CORNER BRACKETS AND TRIM

THE INSTALLATION REQUIREMENTS FOR CORNER BRACKETS AND TRIM ARE
SHOWN IN FIGURE 5-3. THESE PARTS SHOULD BE CAREFULLY INSTALLED TO
PRESENT A NEAT TRIM LINE ON THE UNITS. FINAL ADJUSTMENTS MUST BE MADE
BEFORE BUTTING UNITS TOGETHER.

8.   LEVELING UNITS

LEVELING OF UNITS IS REQUIRED TO IMPROVE THEIR APPEARANCE AND TO
PERMIT PROPER TRACKING OF THE SLIDING GATES WHEN THEY ARE MOVED IN AND
OUT.

HOLD A CARPENTERS LEVEL ON THE TOP OF THE FRAME (DO NOT REST LEVEL
ON COVERS AS IMPROPER LEVEL MAY BE OBTAINED) CHECKING LEVEL IN BOTH
DIRECTIONS. RAISE THE LEVELING PAD AT THE LOWEST CORNER SUFFICIENTLY
TO PERMIT ADJUSTMENT OF REMAINING PADS. ALL CASTERS EXCEPT THE TOWER
CASTER SHOULD BE OFF THE FLOOR WHEN LEVELING IS COMPLETE.

WHEN THE UNIT HAS BEEN LEVELED, THE TOWER SHOULD BE MOVED IN AND
OUT TO CHECK TOWER AND CASTER ADJUSTMENT AS FOLLOWS-

A.   OBSERVE WIRING SIDES OF GATES CLOSELY, CHECKING FOR POSSIBLE
     CONTACT WITH THE VERTICAL FRAME MEMBERS ON FRONT OF THE UNIT.

B.   TOWER CASTER SHOULD BE ADJUSTED SO THAT THE TOWER WILL NOT BIND
     WITH TOP FRAME MEMBERS.

C.   GATE CASTERS SHOULD BE ADJUSTED TO CLEAR THE FLOOR BY
     APPROXIMATELY 1/4 INCH WHILE SLIDING THE TOWER IN AND OUT.

D.   THE GATE CASTERS ARE LIFTED OFF THE FLOOR WHEN THEY ARE LOCKED
     TO THE TOWER BY AN ADJUSTABLE ECCENTRIC ROLLER AS IT RIDES
     ON A CAM, SEE FIGURES 5-4, 5-5, AND 5-6. IT MAY BE NECESSARY
     TO ADJUST THE ROLLER TO OBTAIN SUFFICIENT LIFT ON THE GATES,
     AND ALSO TO OBTAIN A STRAIGHT TOP COVER LINE WITH RESPECT
     TO ADJOINING GATES.
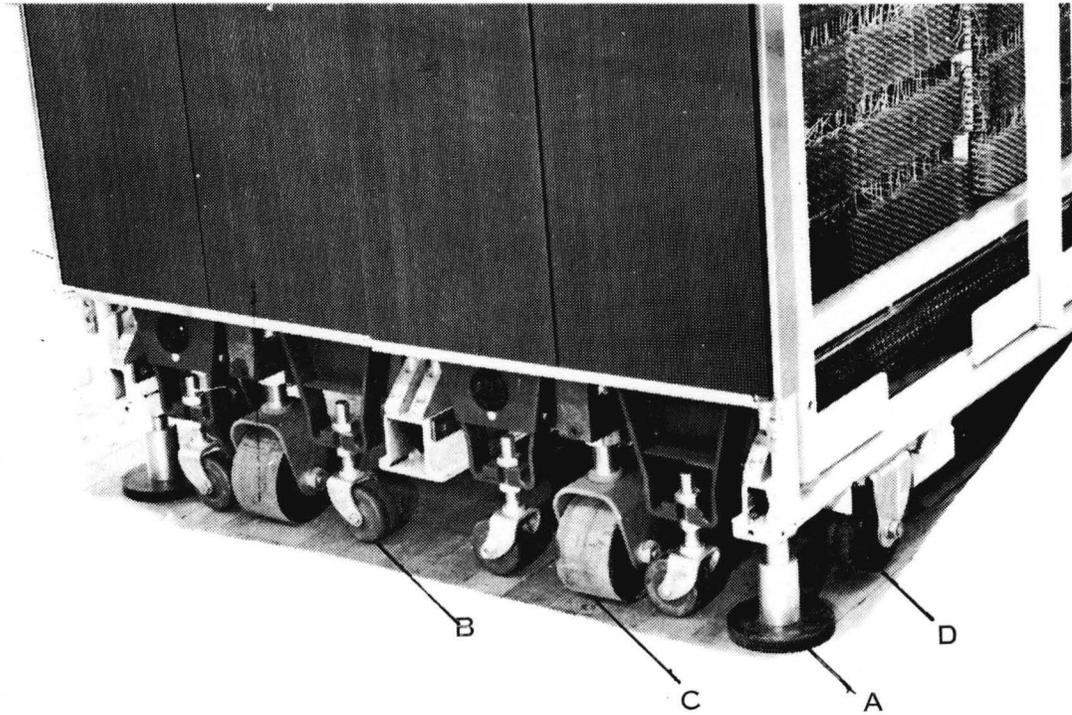
A. LEVELING FOOT   C. TOWER CASTER

B. GATE CASTER   D. FRAME CASTER

FIGURE 5-2 CASTER ORIENTATION

Trim

Frame
(Left Rear Corner)

338238
4-40NC-5/16
1 Required
(Each Corner)

Trim

598623 (Right Front, Left Rear)
598798 (Left Front, Right Rear)

Bracket
598797

257186 (4-40)
1 Required (Each Corner)

332620 (10-32NF2A-1/2)
2 Required (Each Corner

438548 (4-40NC-3/16)
2 Required (Each Corner)
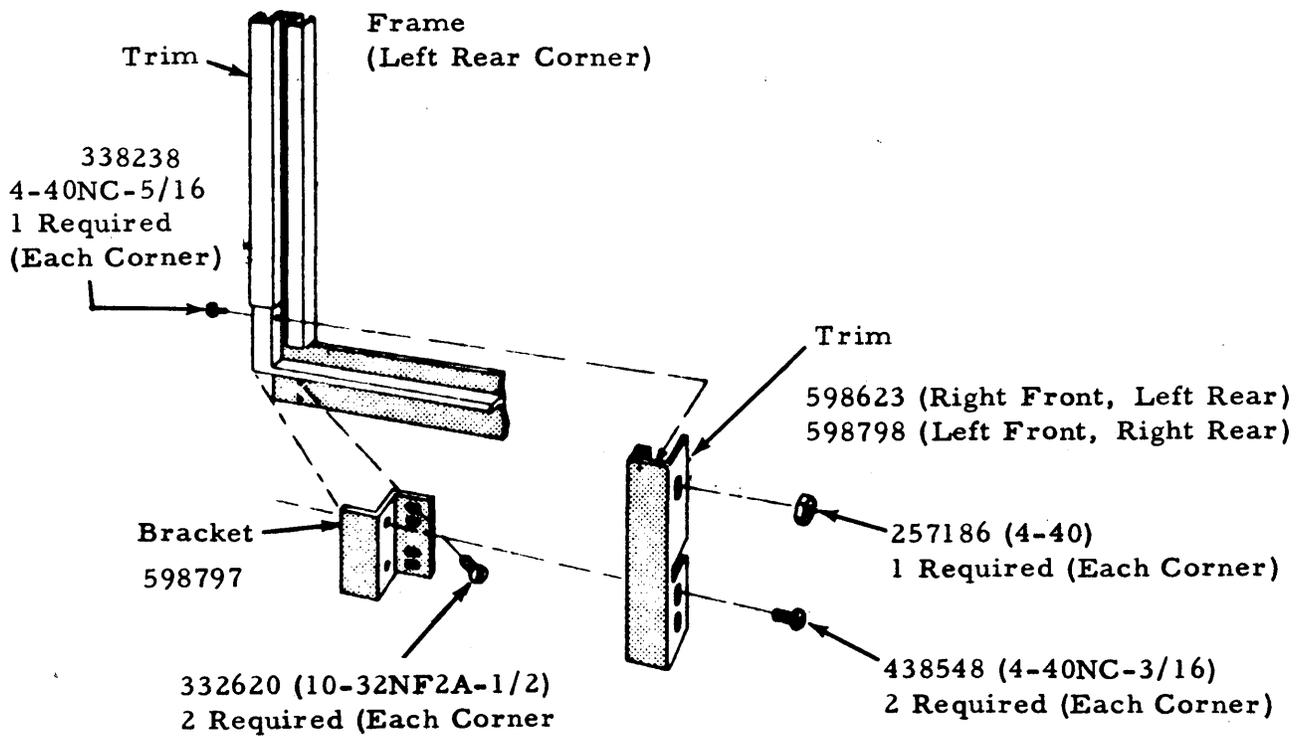
FIGURE 5-3 CORNER BRACKET AND TRIM

CAUTION

DO NOT OPEN GATES
BEFORE INSTALLING
GATE CASTERS.

②

LEVEL TOWER IN OPEN POSITION,
BY ADJUSTING CASTER

③

LEVEL GATE WITH
RESPECT TO TOWER BY
ADJUSTING ECCENTRIC
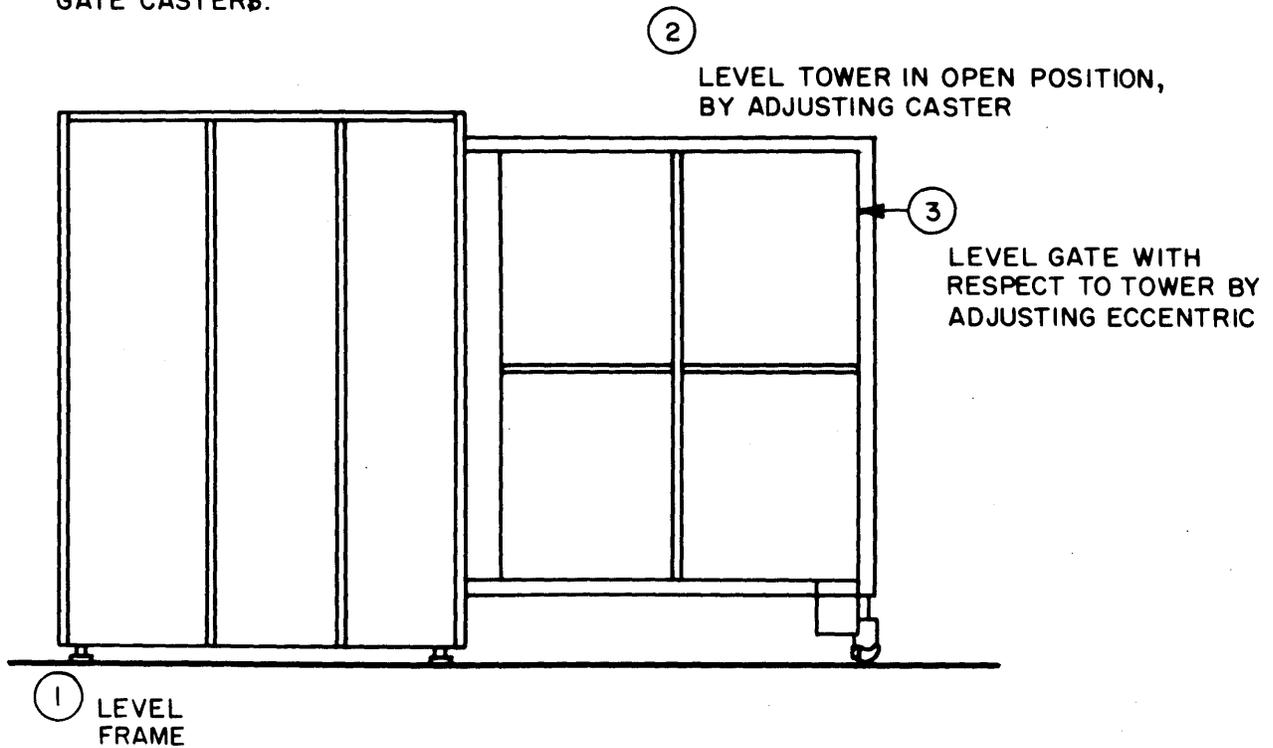
① LEVEL
FRAME

FIGURE 5-4 TOWER AND GATE LEVELING

ADJUSTABLE
ECCENTRIC

ADJUST GATES
TO SAME LEVEL
AS TOWER

FLOOR

CHECK FOR CLEARANCE
WHEN MOVING TOWER
IN AND OUT
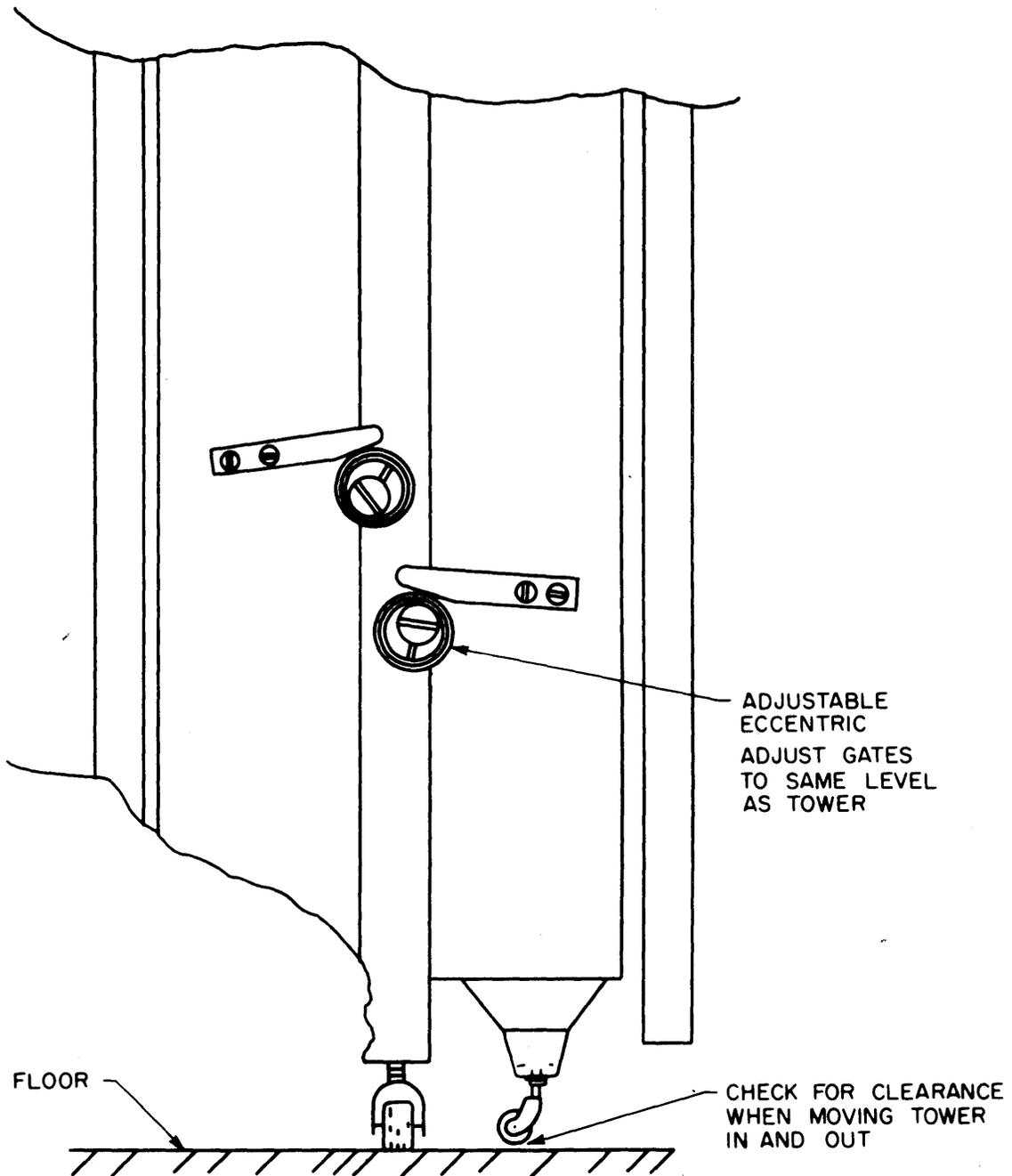
FIGURE 5-5 GATE LOCKING ADJUSTMENTS - SMS FRAMES

11/64" MAX. CLEARANCE BETWEEN TOWER AND FRAME WHEN TOWER
IS TRACKED IN AND OUT. ADJUST TOWER GUIDES (TWO PLACES) FOR
FREE TRAVEL AND EQUAL SPACE BETWEEN SIDES OF FRAMES
AND SIDES OF GATES.

3/4"

3/4"

GATE
COVER
LINE

FLOOR

COVERS PARALLEL WITH
SIDES OF FRAME

KICK PLATES
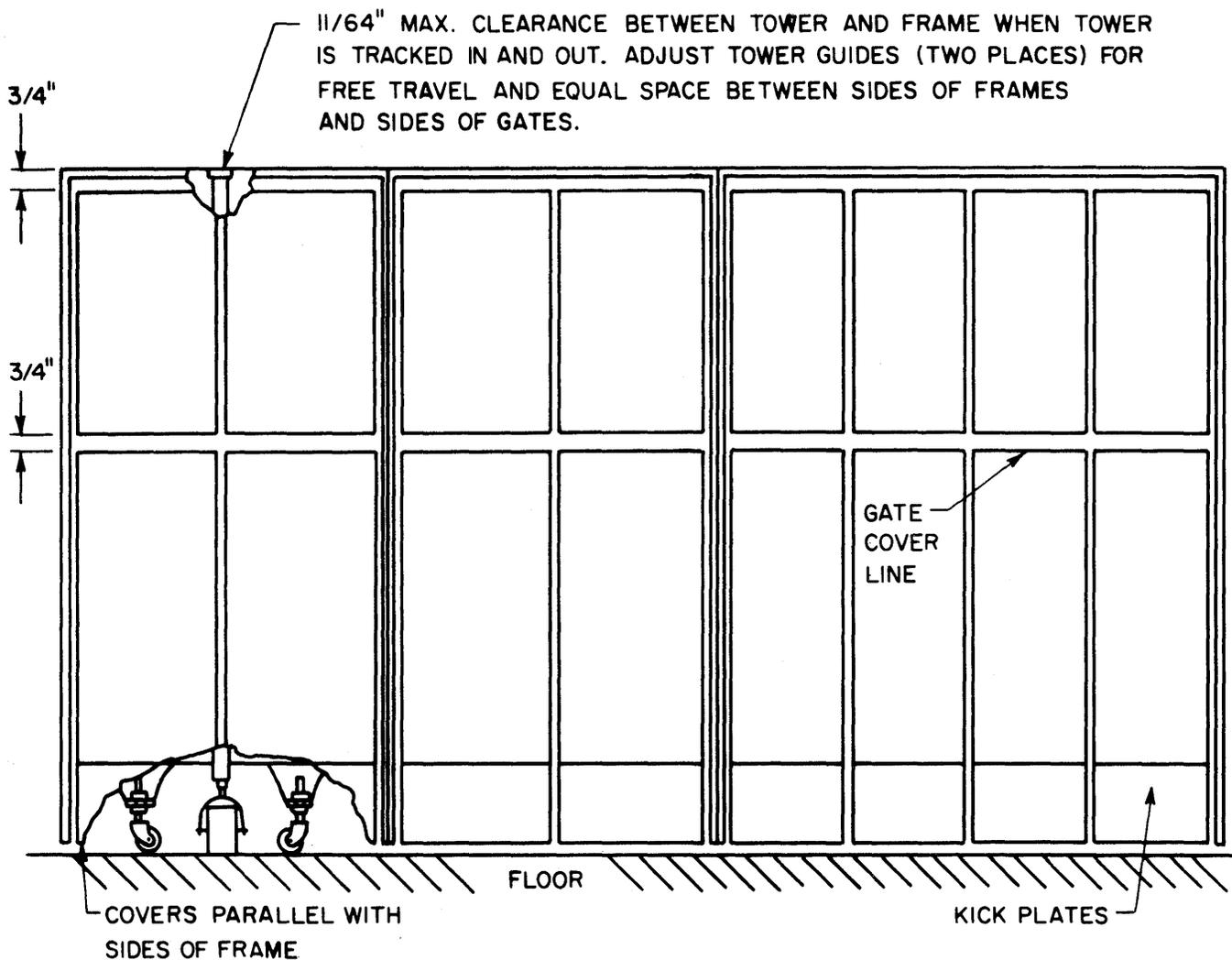
GATE CASTERS ADJUSTED TO CLEAR FLOOR
BY 1/16" AT HIGHEST POINT OF FLOOR WHEN
SLIDING TOWER IN AND OUT

NOTE: C.E. PANEL ADJUSTABLE IN THREE DIRECTIONS FOR PROPER ALIGNMENT

1/8" VERTICAL SPACING BETWEEN COVERS AND BETWEEN COVERS AND FRAME

C.E. PANEL COVER LINE SHALL BE EVEN THROUGHOUT LENGTH OF BUTTED FRAMES

FIGURE 5-6 TOWER ADJUSTMENT AND COVER ALIGNMENT

9.   BOLTING MAIN FRAME

BOLTING MAIN FRAME UNITS TOGETHER IS ACCOMPLISHED WITH TWO SETS OF
CLAMPS AT THE REAR OF A BUTTED ASSEMBLY. SEE FIGURE 5-7 FOR PART
NUMBER SELECTION AND PROPER PLACEMENT OF CLAMPS.

10.   KICK PLATE ASSEMBLY

KICKPLATES MADE OF EXPANDED METAL EXTEND THE COVER LINE AT THE
BASE OF SMS UNITS AND PERMIT AIR FLOW TO THE BLOWERS. KICKPLATES MUST
BE INSTALLED ON ALL EXPOSED SIDES AND THE FRONT AND BACK OF SMS UNITS.

THE METHOD OF ATTACHING KICKPLATES IS DEPENDENT UPON THE TYPE OF
CHANNEL USED IN THE SMS FRAME, TYPE OF BRACKETS SUPPLIED, AND LOCATION
OF THE KICKPLATE TO BE INSTALLED.

THE ASSEMBLY REQUIREMENTS FOR THE VARIOUS KICKPLATE ASSEMBLIES ARE
SHOWN IN FIGURES 5-8 AND 5-9.

4 EACH
38688 SCREW
3550 WASHER
6935 LOGIC WASHER
3960 NUT

587381
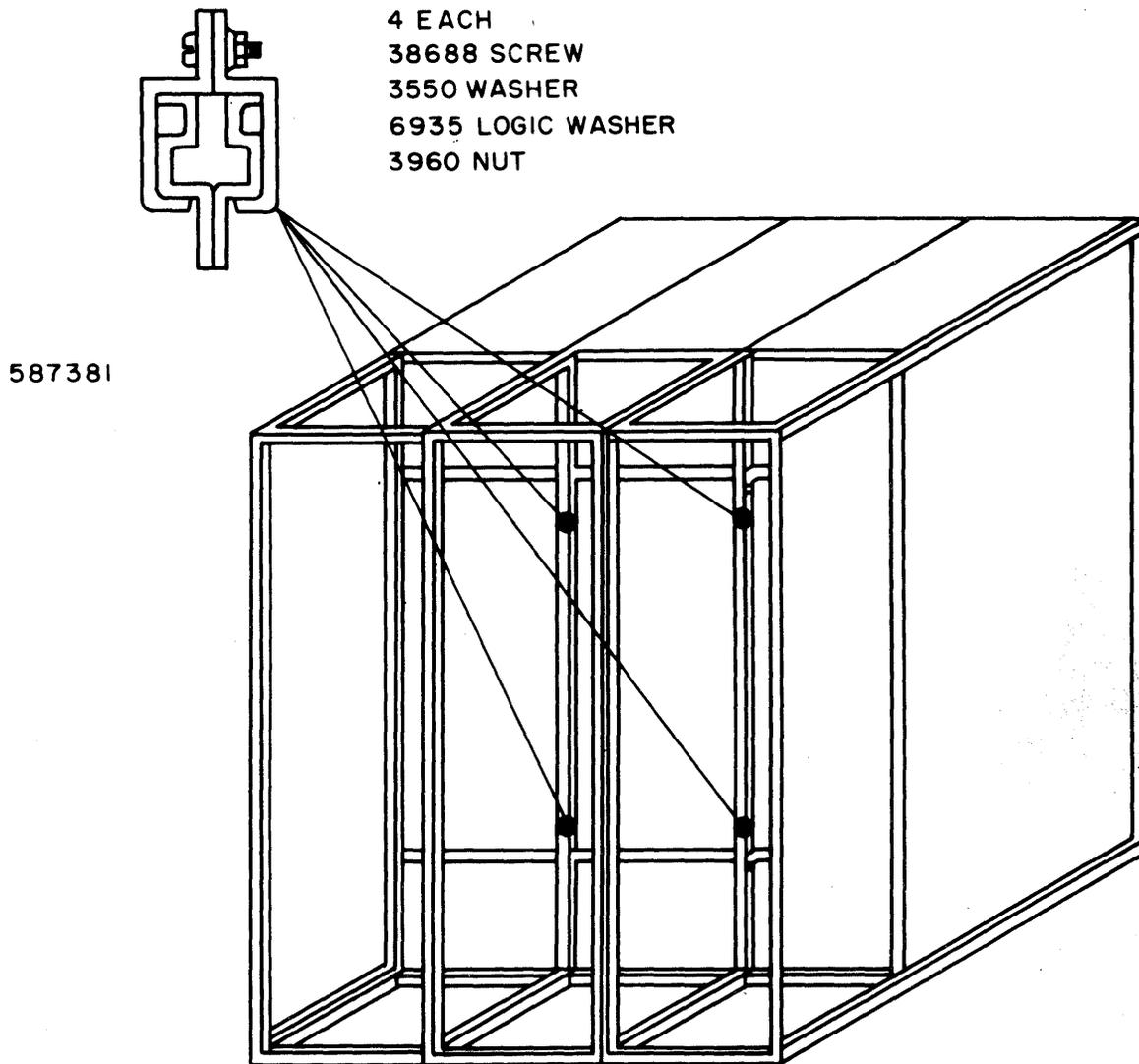
FIGURE 5-7 TIE BRACKETS - MAIN FRAME

29-1/2" FRAME

587498   587479   587949   587565
                                     2031 SCR.
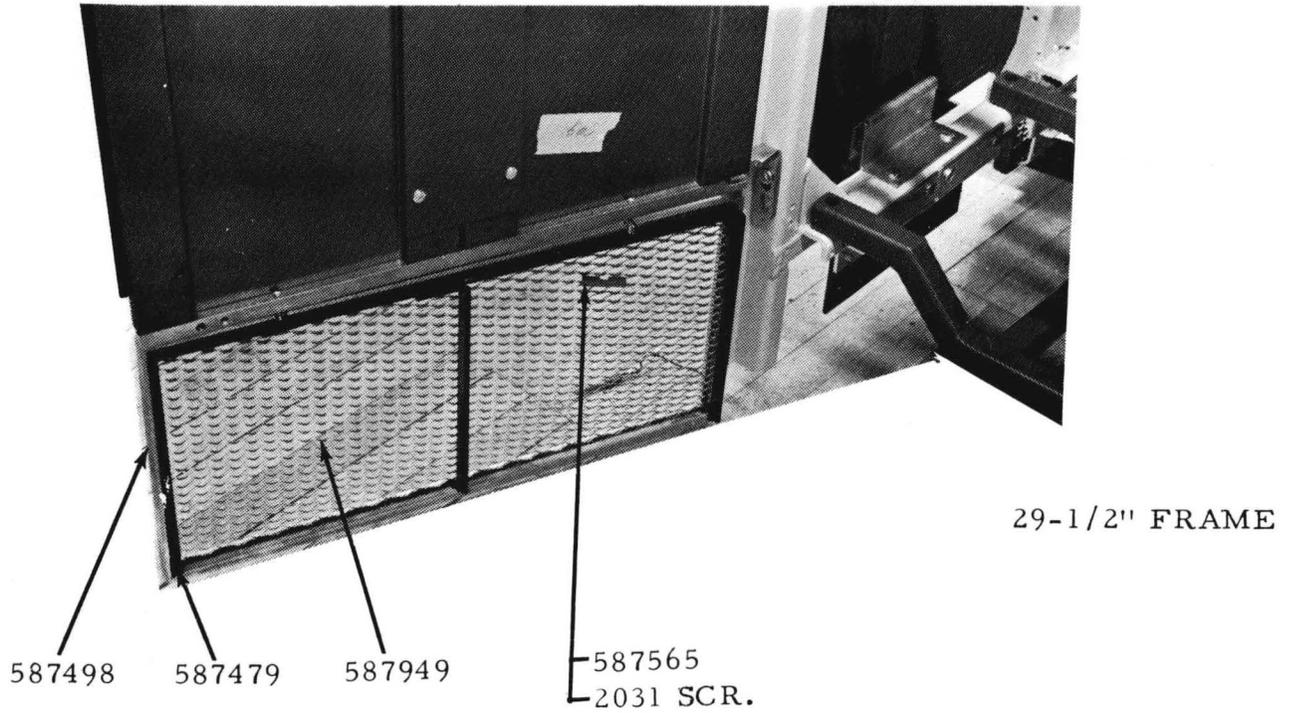
FIGURE 5-8 KICKPLATE MOUNTING - FRONT AND REAR SMS FRAMES

55726   32042

587867

587910   587524

NEW

597545 BRKT.
32617 SCR.   OLD
47242 WSHR.
9092 L'WSHR.
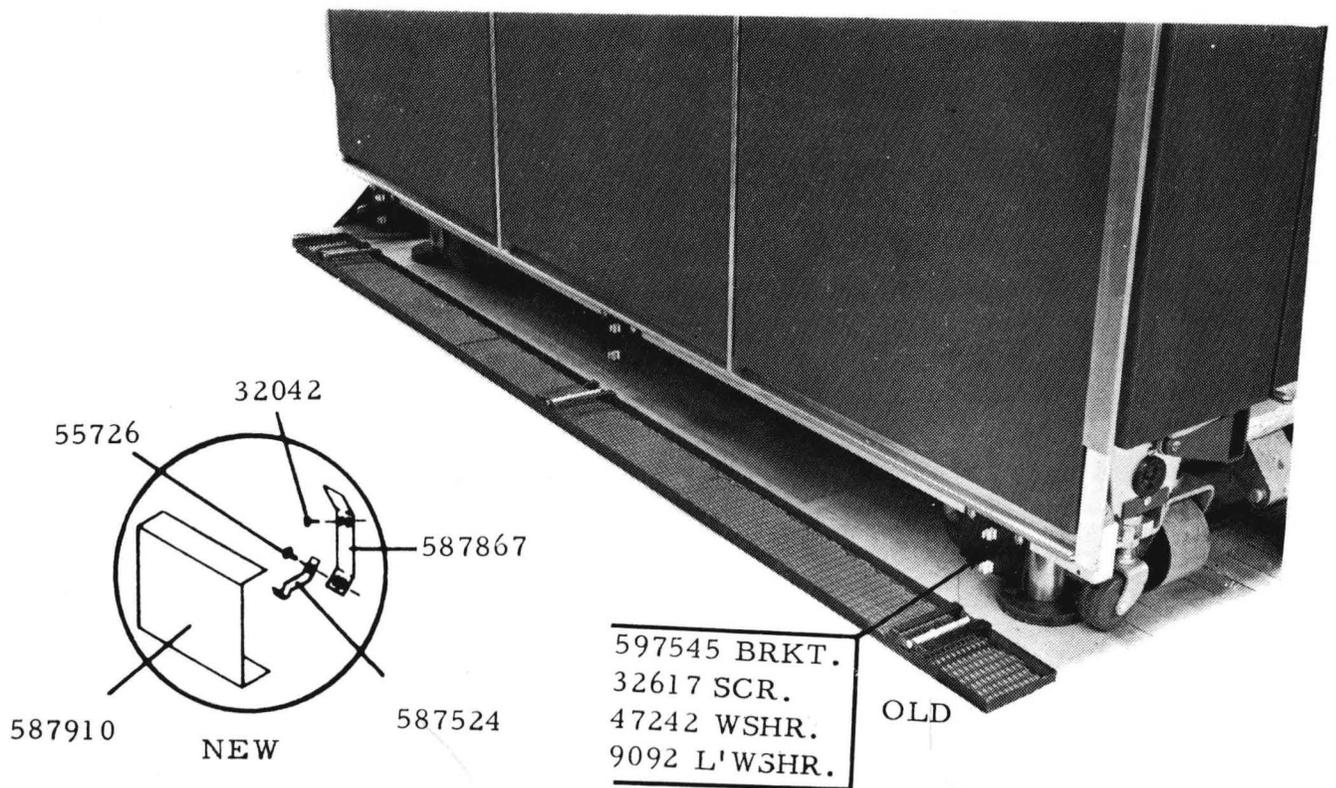
FIGURE 5-9 KICKPLATE MOUNTING - SIDES OF SMS FRAMES

11. LAMINAR BUS - SHORT CHECK

    THIS TEST IS PERFORMED TO CHECK FOR POSSIBLE SHORTS WHICH MAY HAVE
OCCURRED AS A RESULT OF SHIPMENT. ON EACH GATE, USE AN OHMMETER TO
CHECK FOR POSSIBLE SHORTS BETWEEN EACH SEGMENT OF THE LAMINAR BUS AND
ALL OTHER SEGMENTS. ALSO, CHECK BETWEEN EACH BUS SEGMENT AND FRAME.
IF ANY SHORTS ARE LOCATED, TAKE CORRECTIVE ACTION AND RECORD THE
LOCATION OF TROUBLE.

6 IBM 711 CARD READER

1.   UNPACKING AND MECHANICAL ASSEMBLY

     A.   PADDED VAN

          1.   REMOVE POLYETHYLENE BAG, SHIPPING TAPE, AND RUST
               PREVENTATIVE PAPER FROM OUTSIDE OF UNIT.

          2.   REMOVE TAPE FROM CABLE CONNECTOR.

          3.   REMOVE RUST PREVENTATIVE PAPER FROM INSIDE THE UNIT, AND
               POLYSTYRENE TAPE FROM ALONG TOPS OF SIDE COVERS.

          4.   REMOVE TAPE FROM CARD WEIGHT.

     B.   AIR FREIGHT

          1.   REMOVE POLYETHYLENE BAG AND PROTECTIVE PACKING.

          2.   RAISE UNIT OFF FLOOR AND REMOVE LAG SCREW OR BOLT HOLDING
               PALLET TO MACHINE.

          3.   REMOVE CASTER AXLE NUT AND REMOVE SHIPPING BRACKET THAT
               HOLDS THE AXLE, REPLACE NUT AND TIGHTEN.

          4.   LOWER UNIT TO FLOOR.

2.   CABLING

          REFER TO FIGURES 4-2, 4-3, 15-1 AND TABLES 7-1, 15-2.

3.   UNIT CHECKOUT PROCEDURES

          REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 10.5 (9C81)

4.   PREPARATIONS FOR RESHIPMENT

1.   UNPACKING AND MECHANICAL ASSEMBLY

     A. PADDED VAN

          1. REMOVE POLYETHYLENE BAG

          2. REMOVE TAPE FROM OUTSIDE OF UNIT, FROM ACROSS FINGERS OF
              PAPER LEVEL ASSEMBLY, CONTROL KEYS, AND FROM TOP EDGE OF
              LOWER FRONT COVER.

          3. OPEN LOWER FRON COVER AND REMOVE TAPE FROM ROTATION CRANK
              INSIDE BASE OF UNIT.

          4. REMOVE TAPE FROM PLATEN CLUTCH COVER, CABLE SHOES, AND TOP
              EDGE OF LOWER REAR COVER.

                              CAUTION

          DO NOT RUN MACHINE WITHOUT OIL IN ANALYZER.

     B. AIR FREIGHT

          1. REMOVE POLYETHYLENE BAG AND ADDITIONAL PACKING FROM UNIT.

          2. RAISE UNIT FROM FLOOR AND REMOVE WOODEN PALLET BY LOOSENING
              BOLT OR LAG SCREW.

          3. REMOVE MACHINE BOLTS FROM CASTERS AND REPLACE CASTER AXLES.

          4. LOWER UNIT TO FLOOR.

2. CABLING

TABLE 7-1 IBM 716 PRINTER CABLING

KEY NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
1	716 PRINTER	721 PUNCH	533724	SIGNAL
2	716 PR-1	06E 25G	532120	SIGNAL
		06E 21G	532120	SIGNAL
		06E 17G	532120	SIGNAL
3	716 PR-2	06E 13G	532120	SIGNAL
		06E 09G	532120	SIGNAL
		06E 05G	532120	SIGNAL
4	716 PRINTER	711 CD. RDR.	533717	SIGNAL
40	716 PRINTER	721 PUNCH	320187	PWR.
41	716 PRINTER	711 CD. RDR.	513320	PWR.
45	716 PRINTER	06(N') TBZ	532535	PWR.
48	7618 PCU	716 PRINTER	535575	PWR.

3. UNIT CHECKOUT PROCEDURES

REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 10.5 (9P51)

4. PREPARATIONS FOR RESHIPMENT

1.   UNPACKING AND MECHANICAL ASSEMBLY

     A. PADDED VAN

          1.   REMOVE POLYETHYLENE BAG COVER.

          2.   REMOVE TAPE FROM AROUND UNIT, AND POLYSTYREVE TAPE FROM
               TOP EDGE OF LOWER COVER.

          3.   REMOVE TAPE FROM CABLE SHOES AND CONTROL BUTTONS.

          4.   REMOVE TAPE HOLDING CHIP PAN IN POSITION.

     B. AIR FREIGHT

          1.   REMOVE POLYETHYLENE BAG COVERING.

          2.   REMOVE TAPE AND KIMPAC* WRAPPING FROM UNIT.

          3.   REMOVE BOLT OR SCREW HOLDING UNIT TO WOODEN PALLET.

          4.   REMOVE MACHINE BOLT AND NUT FROM SINGLE HOLE IN BRACKET,
               REPLACE CASTER AXLE AND CASTER.

2.   CABLING

          REFER TO FIGURES 4-2, 4-3, 15-1 AND TABLES 7-1, 15-2.

3.   UNIT CHECKOUT PROCEDURES

          REFER TO CHAPTER 19, SYSTEM TESTING, SECTIONS 7,10.5 (9R51)

4.   PREPARATIONS FOR RESHIPMENT

* TRADE MARK - KIMBERLY-CLARK CORP.

9 IBM 729 TAPE UNIT

1.   UNPACKING AND MECHANICAL ASSEMBLY

   A.   PADDED VAN

      1.   REMOVE POLYETHYLENE COVER, REMOVE TAPE AROUND REAR DOOR
         LATCH, DOOR FRAME, AND SLIDING WINDOW OF FRONT DOOR.

      2.   REMOVE TAPE FROM VACUUM COLUMN DOOR LATCH, SWITCH COVER,
         HEAD COVER, LOWER CENTER GATE, AND FLIP PANELS.

      3.   IF MACHINE HAS GATE SWITCHING FEATURE, REMOVE WEDGES
         BETWEEN CONNECTOR GATE LATCH AND UNDERSIDE OF CLUTCH AND
         MOTOR CONTROL BOX.

      4.   REMOVE WEDGES AND TAPE FROM UNDER GATE, AND WAD OF PAPER
         FROM BETWEEN CLUTCH ASSEMBLIES.

      5.   REMOVE RUST PREVENTATIVE PAPER FROM INSIDE COVERS.

      6.   REMOVE SHIM FROM CAPSTAN MOTOR FLYWHEEL.

NOTE

THE TAPE UNITS ARE SHIPPED WITH RUBBER OR
PLASTIC SHIMS ON THE CAPSTANS AS SHOWN IN
FIGURE 9-1. TO REMOVE THESE SHIMS, MANUALLY
OPERATE THE HEAD TAKE-UP MOTOR TO RAISE THE
READ-WRITE HEAD.

   B.   AIR FREIGHT

      1.   REMOVE LAG SCREWS HOLDING MACHINE ON SHIPPING PALLET.

      2.   REMOVE SHIPPING BRACKETS AND PAPER BAG CONTAINING AXLE
         BOLTS.

      3.   USING HYDRAULIC LIFT, RAISE MACHINE OFF FLOOR AND REPLACE
         FOUR CASTER AXLE BOLTS.

   WHEN PACKAGING MATERIALS HAVE BEEN REMOVED, CAREFULLY INSPECT ALL
UNITS FOR DAMAGE.
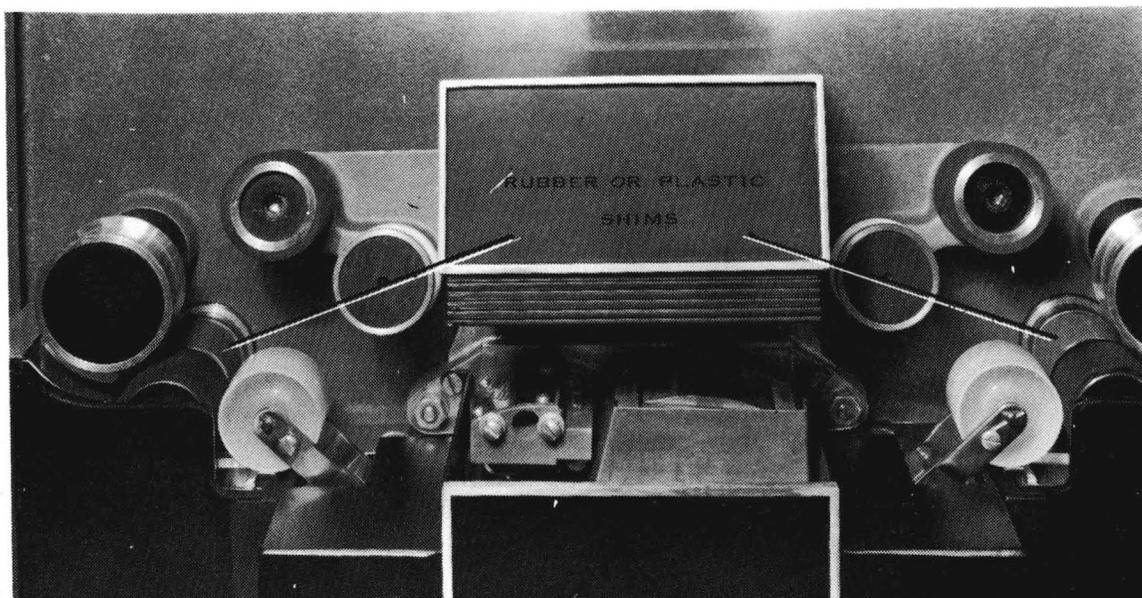
NOTE: TAPE UNITS MAY BE SHIPPED WITH CAPSTANS RETRACTED
SHIMS IN BACK.

FIGURE 9-1 CAPSTAN SHIMS - IBM 729 TAPE UNITS

2.   CABLING

TABLE 9-1 IBM 729 TAPE UNIT CABLING

		RED TAG - FROM		WHITE TAG - TO			
KEY NO.	PART NUMBER	FRAME AND GATE	CABLE CONN.	FRAME AND GATE	CABLE CONN.	NAME	
19	535099					TAPE UNIT TO TAPE UNIT	
20	532121	06F	21F 25F 29F	FIRST TU BANK 1	AMP CON	DATA CHANNEL TO 729 TAPE UNIT	
21	532121	06F	21E 25E 29E	FIRST TU BANK 2	AMP CON	DATA CHANNEL TO 729 TAPE UNIT	
22	352464		200 POS CONN		200 POS CONN	729 TU TO OTHER CONTROLS OR SYSTEMS	

REFER ALSO TO FIGURES 4-2, 4-3.

3.   UNIT CHECKOUT PROCEDURES

REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 10.5 (TAPE DIAG.)

4.   PREPARATIONS FOR RESHIPMENT

10 IBM 7109 ASU

1.   UNPACKING AND MECHANICAL ASSEMBLY

2.   CABLING

TABLE 10-1 EXTERNAL CABLES FRAME 02-7109
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
37M	02 PWR	PCU - 7618	532542	400 CYCLE POWER
38M	02 PWR	PCU - 7618	532973	60 CYCLE POWER
5B	02F 33G	08H 09D	587323	
5	02E 25C	08H 01D	587323	
5A	02E 25D	08H 05D	587323	
A74	02E 29D	*01C L25	587314	*CONTROL, DIRECT COUPLING TO 7106 OF 7040/44 SYSTEMS

REFER ALSO TO FIGURE 10-1, THIS CHAPTER.

TABLE 10-2 INTERFRAME CABLES FRAME 02-7109
SEQUENTIAL PLUGGING LIST

REF. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
56	02F 21C	03F 45G	587346	
55	02F 21D	01E 29C	587347	
56B	02F 21E	03F 29F	587345	
55A	02F 21F	01E 29D	587347	
55B	02F 21G	01E 29F	587347	
57	02F 25C	01F 29C	587345	
56A	02F 25D	03F 41G	587346	
57A	02F 25E	01F 29E	587345	
57C	02F 25F	01F 29D	587344	
57D	02F 25G	01F 33C	587343	
54B	02F 29C	02E 25F	587335	JUMPER
54A	02F 29D	02E 29E	587334	JUMPER
57B	02F 29E	01F 33E	587345	
54C	02F 29F	02E 25G	587334	JUMPER
54	02F 29G	02E 33C	587336	JUMPER
50B	02E 21F	01E 25D	587337	
51A	02E 21G	03E 21F	587342	
53A	02E 29F	01F 29G	587349	
53C	02E 29G	01F 25D	587347	
52	02E 33D	03F 33F	587351	
53	02E 33E	01F 21C	587347	
53B	02E 33F	01F 21D	587348	
50D	02E 33G	01E 37F	587339	
50	02E 37C	01E 37E	587341	
51	02E 37D	03E 21E	587345	
50A	02E 37E	01E 37C	587341	
50C	02E 37F	01E 37D	587339	
50E	02E 37G	01E 37G	587340	

C	D	E	F	G	
R-50 OIE 37E	R-51 O3E 2IE	R-50a OIE 37C	R-50c OIE 37D	R-50e OIE 37G	37
R-54 O2F 29G	R-52 O3F 33F	R-53 OIF 2IC	R-53b OIF 2ID	R-50d OIE 37F	33
	* K-74 OIC L25	R-54a O2F 29D	R-53a OIF 29G	R-53c OIF 25D	29
K-5 O8H OID	K-5a O8H O5D		R-54b O2F 29C	R-54c O2F 29F	25
			R-50b OIE 25D	R-51a O3E 2IF	21
					17
					13
					09
					05
					01

C	D	K37M PCU 400∿	K38M PCU 60∿	F	G	
						53
						49
						45
						41
						37
					K-5b O8H O9D	33
R-54b O2E 25F	R-54a O2E 29E	R-57b OIF 33E		R-54c O2E 25G	R-54 O2E 33C	29
R-57 OIF 29C	R-56a O3F 4IG	R-57a OIF 29E		R-57c OIF 29D	R-57d OIF 33C	25
R-56 O3F 45G	R-55 OIE 29C	R-56b O3F 29F		R-55a OIE 29D	R-55b OIE 29F	21
						17

* CONNECTS TO 7106 OF 7040/44 SYSTEM

FRAME ___02___   BOX ___7109___

ARITHMETIC SEQUENCE UNIT (ASU) (DCS)

FIGURE 10-1 IBM 7109 TAILGATE PLUGGING DIAGRAM

3.   UNIT CHECKOUT PROCEDURES

        REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 4.

4.   PREPARATIONS FOR RESHIPMENT

11 IBM 7111 IPU

1.   UNPACKING AND MECHANICAL ASSEMBLY

     A.   REMOVE ALL PACKAGING TAPE, TEMPORARY COVERS, ETC.

     B.   CHECK THAT REAR CONVENIENCE OUTLET IS UPSIDE DOWN. LEVELING
          PADS ARE MORE EASILY INSTALLED WHEN THE OUTLET IS INVERTED.

     C.   INSTALL VERTICAL FRAME MEMBERS WITH TRIM, ON ALL FOUR BOTTOM
          CORNERS OF THE FRAME. ALSO INSTALL KICK PLATE BRACKETS.

     D.   POSITION THE 7111 BETWEEN THE 7109 AND 7606. INSTALL LEVELING
          PADS AND LEVEL THE FRAME WITH THE ADJACENT FRAMES.

     E.   INSTALL THE INTER-FRAME CLAMPS AND CONVENIENCE OUTLET.

     F.   LOWER THE SHIPPING BOLTS SO THAT THE SLIDES MOVE FREELY.
          LEVEL THE SLIDES FOR SMOOTH OPERATION. BE CAREFUL NOT TO
          DAMAGE THE GATE BLOWERS.

     G.   INSTALL AND ADJUST THE THREE GATE CASTERS.

     H.   USE AN OHMMETER TO CHECK FOR SHORTS BETWEEN ALL VOLTAGE
          TERMINALS, DC GROUND, AND FRAME GROUND ON ALL GATES.

     J.   INSTALL THE TWO POWER CABLES FROM THE 7618 TO CV-5 AND CV-6.

     K.   INSTALL ALL SIGNAL CABLES TO THE 7111. SEE TABLE 11-1
          AND FIGURE 11-1.

     L.   INSTALL THE KICK PLATES ON THE FRONT AND BACK OF THE 7111.

2.   CABLING
TABLE 11-1 INTERFRAME CABLES – FRAME 01-7111
SEQUENTIAL PLUGGING LIST

REF. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
53	01F 21C	02E 33E	587347	
53B	01F 21D	02E 33F	587348	
62A	01F 21E	03F 45E	587340	
60	01F 21F	03E 29E	587347	
62	01F 25C	03F 37E	587341	
53C	01F 25D	02E 29G	587347	
62B	01F 25E	03F 45F	587341	
59D	01F 25F	01E 33C	587336	JUMPER
57	01F 29C	02F 25C	587345	
57C	01F 29D	02F 25F	587344	
57A	01F 29E	02F 25E	587345	
59E	01F 29F	01E 33E	587336	JUMPER
53A	01F 29G	02E 29F	587349	
57D	01F 33C	02F 25G	587343	
59B	01F 33D	01E 33G	383405	JUMPER
57B	01F 33E	02F 29E	587345	
59	01F 37C	01E 33F	587335	JUMPER
59C	01F 37D	01E 29G	587335	JUMPER
59A	01F 41C	01E 33D	587334	JUMPER
59F	01F 41D	01E 13C	587333	JUMPER
60A	01F 41E	03E 17C	587347	
60D	01F 41F	03E 33E	587348	
59G	01F 45G	01E 25G	587333	JUMPER
60C	01F 45E	03E 37E	587333	
60B	01F 45F	03E 21C	587347	
61A	01E 25C	03F 29E	587339	
50B	01E 25D	02E 21F	587337	
61	01E 25F	03F 25G	587346	
59G	01E 25G	01F 45G	587333	JUMPER
55	01E 29C	02F 21D	587347	
55A	01E 29D	02F 21F	587347	
61B	01E 29E	03F 21G	587339	
55B	01E 29F	02F 21G	587347	
50A	01E 37C	02E 37E	587341	
50C	01E 37D	02E 37F	587339	
50	01E 37E	02E 37C	587341	
50D	01E 37F	02E 33G	587339	
50E	01E 37G	02E 37G	587340	

TABLE 11-2 EXTERNAL CABLES - FRAME 01-7111
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
37K	01 PWR	PCU - 7618	532542	400 CYCLE POWER
38K	01 PWR	PCU - 7618	532973	60 CYCLE POWER
6F	01F 37F	08H 05A	587323	
6G	01F 37G	08H 09B	587323	
6E	01F 45C	08H 05B	587323	
6H	01E 17C	08H 13B	587323	
6J	01E 17D	08H 13C	587323	
6	01F 41G	08H 09A	587323	
6A	01E 21D	08H 01B	587323	
6B	01F 37E	08H 05C	587323	
6C	01F 33F	08H 01A	587323	
6D	01F 33G	08H 01C	587323	

C	D	E	F	G	
R-50a O2E 37E	R-50c O2E 37F	R-50 O2E 37C	R-50d O2E 33G	R-50e O2E 37G	37
R-59d OIF 25F	R-59a OIF 4IC	R-59e OIF 29F	R-59 OIF 37C	R-59b OIF 33D	33
R-55 O2F 21D	R-55a O2F 21F	R-61b O3F 21G	R-55b O2F 21G	R-59c OIF 37D	29
R-61a O3F 29E	R-50b O2E 21F		R-61 O3F 25G	R-59g OIF 45G	25
	K-6a O8H OIB				21
K-6h O8H 13B	K-6J O8H 13C				17
R-59f OIF 41D					13
					09
					05
					01

		K37K PCU 400~	K38K PCU 60~		

C	D	E	F	G	
					53
					49
K-6e O8H 05B		R-60c O3E 37E	R-60b O3E 21C	R-59g OIE 25G	45
R-59a OIE 33D	R-59f OIE 13C	R-60a O3E 17C	R-60d O3E 33E	K-6 O8H 09A	41
R-59 OIE 33F	R-59c OIE 29G	K-6b O8H 05C	K-6f O8H 05A	K-6g O8H 09B	37
R-57d O2F 25G	R-59b OIE 33G	R-57b O2F 29E	K-6c O8H OIA	K-6d O8H OIC	33
R-57 O2F 25C	R-57c O2F 25F	R-57a O2F 25E	R-59e OIE 33E	R-53a O2E 29F	29
R-62 O3F 37E	R-53c O2E 29G	R-62b O3F 45F	R-59d OIE 33C		25
R-53 O2E 33E	R-53b O2E 33F	R-62a O3F 45E	R-60 O3E 29E	K-24a MEM-G-OIA	21
				K-24 MEM-J-OIA	17

FRAME____OI____   BOX ___7III___
INSTRUCTION PROCESSING UNIT (IPU)

FIGURE 11-1 IBM 7111 TAILGATE PLUGGING DIAGRAM

3.   UNIT CHECKOUT PROCEDURES

         REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 4.

4.   PREPARATIONS FOR RESHIPMENT

12 IBM 7151 CONSOLE CONTROL

1.   UNPACKING AND MECHANICAL ASSEMBLY

2.   CABLING

TABLE 12-1 IBM 7151 CONSOLE CONTROL CABLING

| KEY NO. | PART NUMBER | RED TAG - FROM | | WHITE TAG - TO | | NAME |
		FRAME AND GATE	CABLE CONN.	FRAME AND GATE	CABLE CONN.	
5	587323	08H	01D	02E	25C	7151 CONSOLE TO 7109 ASU
5A	587323	08H	05D	02E	25D	7151 CONSOLE TO 7109 ASU
5B	587323	08H	09D	02F	33G	7151 CONSOLE TO 7109 ASU
6	587323	08H	09A	01F	41G	7151 CONSOLE TO 7111 IPU
6A	587323	08H	01B	01E	21D	7151 CONSOLE TO 7111 IPU
6B	587323	08H	05C	01F	37E	7151 CONSOLE TO 7111 IPU
6C	587323	08H	01A	01F	33E	7151 CONSOLE TO 7111 IPU
6D	587323	08H	01C	01F	33E	7151 CONSOLE TO 7111 IPU
6E	587323	08H	05B	01F	45C	7151 CONSOLE TO 7111 IPU
6F	587323	08H	05A	01F	37F	7151 CONSOLE TO 7111 IPU
6G	587323	08H	09B	01F	37E	7151 CONSOLE TO 7111 IPU
6H	587323	08H	13B	01E	17C	7151 CONSOLE TO 7111 IPU
6J	587323	08H	13C	01E	17D	7151 CONSOLE TO 7111 IPU
7	587323	08H	09C	03F	37E	7151 CONSOLE TO MULTIPLEXOR

3.   UNIT CHECKOUT PROCEDURES

        REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 3.

4.   PREPARATIONS FOR RESHIPMENT

1.   UNPACKING AND MECHANICAL ASSEMBLY

   A.   THE 7302-3 IS PACKAGED IN THREE SECTIONS. REMOVE ALL
        PACKAGING MATERIAL AND TEMPORARY COVERS FROM THE SECTIONS.

   B.   POSITION AND LEVEL THE A-FRAME - ARRAY SECTION - OVER ITS HOLE
        IN THE FLOOR.

   C.   POSITION THE B POWER SUPPLY FRAME NEXT TO THE B-LOGIC FRAME
        AND LEVEL IT.   SEE FIGURE 13-1.

   D.   BOLT THE FRAMES TOGETHER WITH FOUR 3/8 INCH ALLEN HEAD BOLTS,
        P/N 353119.   THESE BOLTS GO THRU THE LOGIC FRAME AND THREAD TO
        THE POWER FRAME.   THE TWO HOLES ARE LOCATED ON THE CARD SIDE
        NEAR THE UPPER RIGHT-HAND CORNER OF PANEL B-1 AND BETWEEN
        PANELS B-1 AND B-3 ON THE RIGHT HAND SIDE.   USE CAP P/N 184380
        TO COVER THE TWO BOLTS LOCATED NEAR THE PANELS.   THE REMAINING
        TWO HOLES ARE LOCATED ON THE UPPER CORNERS OF THE FRONT AND
        REAR STEP FRAME.   SEE FIGURE 13-1.

2.   CABLING

   REFER TO TABLE 13-1 AND FIGURE 13-2.

   A.   CONNECT THE TWO CABLE SHIPPING PLUGS FROM THE POWER FRAME
        TO THE TWO CABLE SHIPPING PLUGS ON THE LOGIC FRAME LOCATED
        BEHIND THE TAILGATE G.   SEE FIGURE 13-2.   P/N 5344773 CONNECTS
        TO P/N 5344771 AND P/N 353922 CONNECTS TO P/N 353919.

   B.   CONNECT THE CABLE, P/N 353428, FROM THE VOLTAGE DISTRIBUTION
        BUS ON THE POWER FRAME TO THE LAMINAR BUS TERMINAL STRIP
        LOCATED NEAR THE TOP WIRING SIDE OF PANEL B-1.   SEE FIGURE
        13-2 NO. 1.

   C.   CONNECT THE CABLE, P/N 353427, FROM THE VOLTAGE DISTRIBUTION
        BUS ON THE POWER FRAME TO THE LAMINAR BUS TERMINAL STRIP
        LOCATED NEAR THE BOTTOM WIRING SIDE OF PANEL A-6.   SEE FIGURE
        13-2 NO. 2.

   D.   INSTALL THE VOLTAGE CONTROL PANEL ON THE WIRING SIDE OF PANEL
        B-3.   COMPARE HOW THE CONTROL PANEL IS INSTALLED ON PANEL C-3.
        SEE FIGURE 13-2 NO. 7.   USE FOUR MOUNTING SCREWS, P/N 81693.

E. POSITION THE C-FRAME NEXT TO THE A-FRAME. THE CABLES ATTACHED
   TO THE CORE ARRAY MUST BE FED THROUGH THE HOLES IN THE SIDE
   OF THE C-FRAME BEFORE THE C-FRAME CAN BE COMPLETELY
   POSITIONED AND LEVELED. SEE FIGURE 13-2 NO. 5.

F. PLUG THE ARRAY CABLES ACCORDING TO THEIR LABELS INTO PANEL C-1
   POSITIONS A-25 TO A-28, B-25 TO B-28, F-25 TO F-28, AND G-25
   TO G-28.

G. BOLT THE C AND A-FRAMES TOGETHER, SIMILAR TO STEP D IN SECTION
   1 ABOVE.

H. CONNECT THE THERMISTOR CABLE, P/N 5344737, WITH NYLON PLUGS,
   BETWEEN THE ARRAY HOUSING AND THE C-FRAME. SEE FIGURE
   13-2 NO. 4.

I. INSTALL THE JUMPER CABLES, P/N 539494 BETWEEN THE FOLLOWING
   LOCATIONS. SEE FIGURE 13-2 NO. 6.

             A4-C1 TO C3-G28
             A4-C2 TO C3-G27
             A4-E1 C3-J28
             A4-E2 C3-J27

J. CONNECT GROUND JUMPERS, P/N 5344766 - QUANTITY 6, FROM TWO
   J-PINS TO TWO J-PINS FOR EACH ROW ON PANEL A-4 TO THE ADJACENT
   ROWS ON PANEL C-3.

K. CONNECT THE CABLE, P/N 5344712, FROM THE LAMINAR BUS TERMINAL
   STRIP UNDER PANEL C-3 TO THE LAMINAR BUS TERMINAL STRIP UNDER
   PANEL A-4. SEE FIGURE 13-2 NO. 3.

L. CONNECT THE TWO CABLES, P/N 5344764 AND 5344765, BETWEEN THE
   POWER FRAMES B AND C. SEE FIGURE 13-3.

M. INSTALL THE TWO POWER CABLES, EIGHT SIGNAL CABLES, TWO SIGNAL
   JUMPER CABLES AND TWO TERMINATORS AS SHOWN IN FIGURE 13-3.

N. REMOVE ALL SHIPPING CASTERS AND INSURE THE FRAMES ARE LEVELED.
   INSTALL THE BLOWER ASSEMBLIES TO THE FRAMES, THEN CONNECT THE
   POWER PLUGS FROM THE FRAMES TO EACH BLOWER MOTOR. INSTALL THE
   PLATES OVER THE FRAME OPENINGS LAST. SEE FIGURE 13-4.

O. INSTALL THE REMAINING COVERS ON THE 7302-3 BEFORE THE
   COMPLETION OF THE INSTALLATION. REFER TO THE SHIPPING GROUP
   NO. 5352891 FOR REFERENCE.

GATE B   GATE C

28◄———————I   28◄———————I

                    WIRING SIDE FRAME 01
                         GATE A

CE PANEL   CE PANEL

                                    26◄————I

PANEL B 2   B1   A   K   A3   A2   A1   C1   PANEL C 2

PANEL B 3   PANEL C 3

             A6   A5   A4

I——————►7 I——————————————►18   I————►7

◄— PS. B —► ◄—GATE G—► ◄————— GATE H —————► ◄—GATE J—► ◄—PS. C—►

        *   *

*SEPARATED AT THESE POINTS, FOR SHIPMENT.

FIGURE 13-1 IBM 7302-3 COMPONENT LOCATION - WIRING SIDE

13 IBM 7302-3 CORE STORAGE
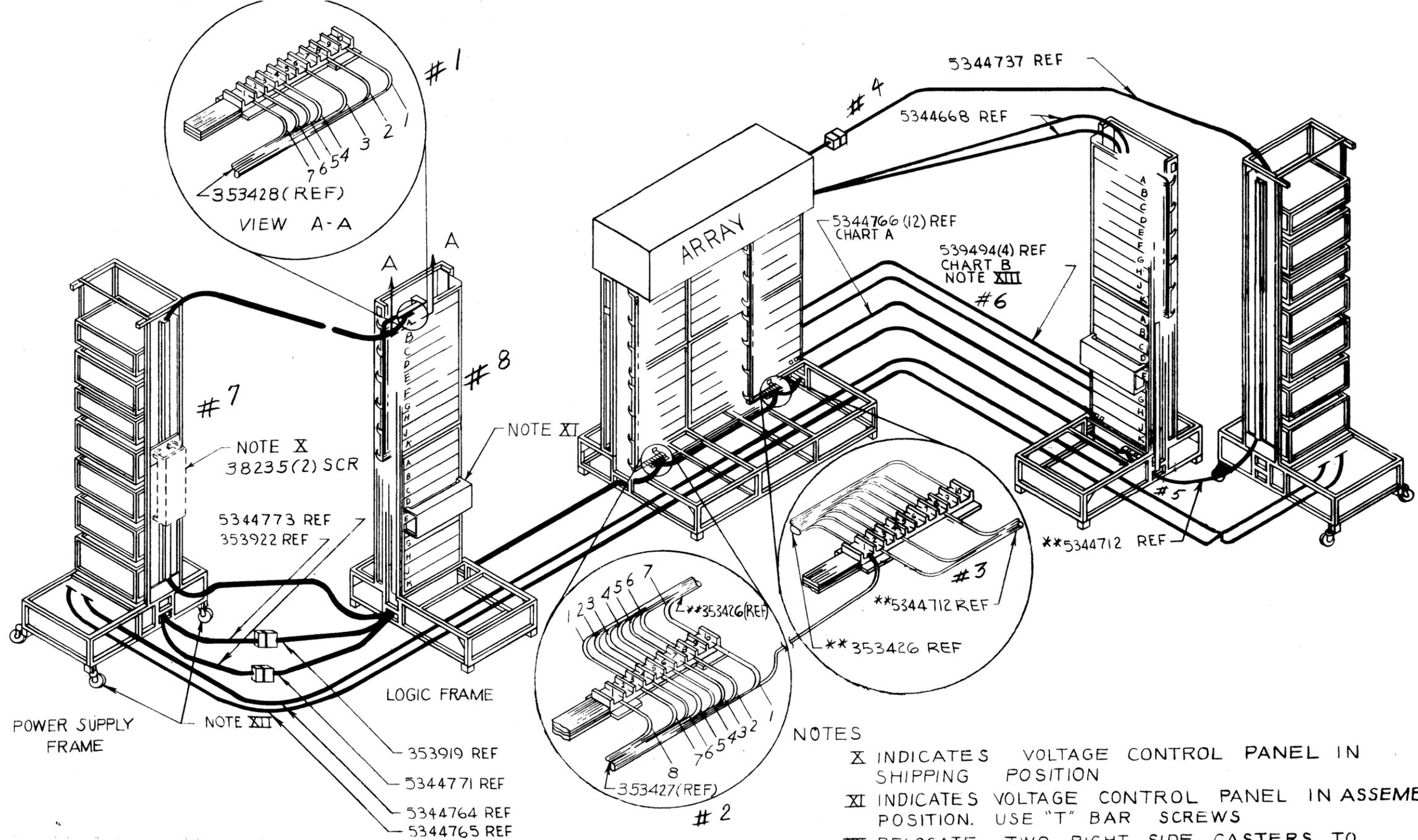
CHART A

AIAOIJ & AIAO2J	TO	CIJ28J & CIJ27J
AIBOIJ & AIBO2J	TO	CIK28J & CIK27J
AICOIJ & AICO2J	TO	C3A28J & C3A27J
AIDOIJ & AIDO2J	TO	C3B28J & C3B27J
AIEOIJ & AIEO2J	TO	C3C28J & C3C27J
AIFOIJ & AIFO2J	TO	C3D28J & C3D27J
A4AOIJ & A4AO2J	TO	C3E28J & C3E27J
A4BOIJ & A4BO2J	TO	C3F28J & C3F27J
A4COIJ & A4CO2J	TO	C3G28J & C3G27J
A4DOIJ & A4DO2J	TO	C3H28J & C3H27J
A4EOIJ & A4EO2J	TO	C3J28J & C3J27J
A4FOIJ & A4FO2J	TO	C3K28J & C3K27J

CHART B

A4CO1	TO	C3G28
A4CO2	TO	C3G27
A4EO1	TO	C3J28
A4EO2	TO	C3J27

NOTES

X   INDICATES VOLTAGE CONTROL PANEL IN SHIPPING POSITION

XI   INDICATES VOLTAGE CONTROL PANEL IN ASSEMBLED POSITION. USE "T" BAR SCREWS

XII   RELOCATE TWO RIGHT SIDE CASTERS TO POSITION SHOWN FOR SHIPPING

FIGURE 13-2 IBM 7302-3 INTERNAL CABLING

TABLE 13-1 EXTERNAL CABLES – FRAME – MEM – 7302-3
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
37I	MEM – PWR	PCU – 7618	532542	400 CYCLE POWER
46	MEM – PWR	PCU – 7618	532554	60 CYCLE
23A	MEM G 01A	03F 29E	587314	
23	MEM G 03A	03E 33D	587314	
23E	MEM H 02A	03E 25F	587314	
23G	MEM H 03A	03F 33G	587314	
23D	MEM H 06A	03E 25G	587314	
23F	MEM H 07A	03F 29G	587314	REFER TO CABLE CONNECTION
				TAILGATE DIAGRAM, FIGURE
				13-3
23B	MEM H 16A	03E 17G	587314	
23C	MEM H 12A	03E 21G	587314	

	G	H	J	

FRAME LOCATION

MEM G

	01	02	03	04	05	06	07	
A	K24 A 01F 21G							A
								B

MEM G

JUMPER 5344776

JUMPER 5344777

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	
A		K23 A 03E 25F	K23 G 03F 33G	*		K23 D 03E 25G	K23 F 03F 29G	*				K23 C 03E 21G	*	T		K23 B 03E 17G	*	T	A
B																			B

MEM H

	01	02	03	04	05	06	07		
A	K24 01F 17G							#1	#2
B									
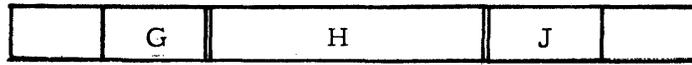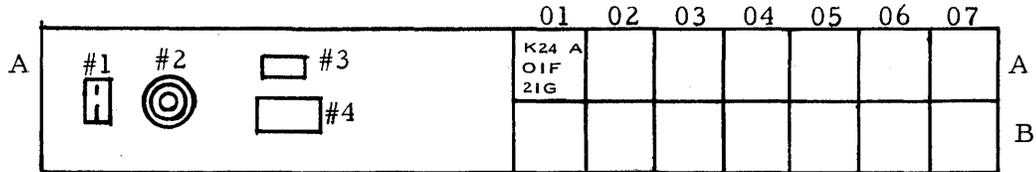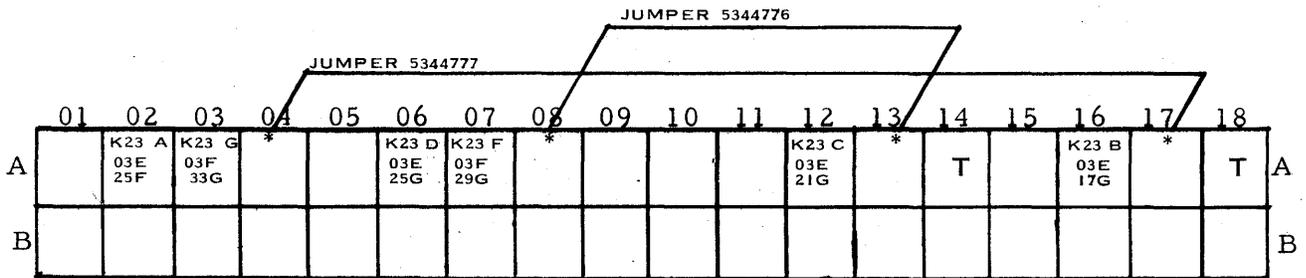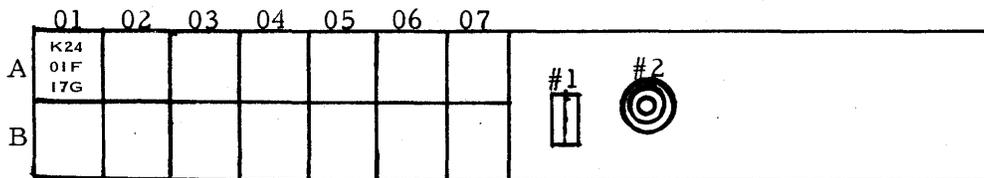
MEM J

NOTES:
    #1 Interframe Cable 5344765 (26 pos.), from MEM G to MEM J.
    #2 Interframe Cable 5344764 (37 pos.), from MEM G to MEM J.
    #3 Power Cable K37i (400∿) to PCU.
    #4 Power Cable K46 (60∿) to PCU.
    T   Terminator 532137.

FIGURE 13-3 IBM 7302-3 TAILGATE DIAGRAM

186933 (3) SCR
THRU BOTTOM MEMBER INTO MUFFLER

34512 (28) SCR

186933 (3) SCR
THRU BOTTOM
MEMBER INTO
MUFFLER

5-32 LOCKING SCR (8)
FOR LOGIC FRAMES ONLY

353077 (2)
PLATE

353259

186933 (3) SCR

353977 (2)

353019

353058 PLATE

353018 BLOWER ASM

353057 PLATE

353058 PLATE

353019 (2) BLOWER ASM

75449 (12) SCR

353013 (6) FILTER

** 186933 (3) SCR

353259 BLOWER ASM
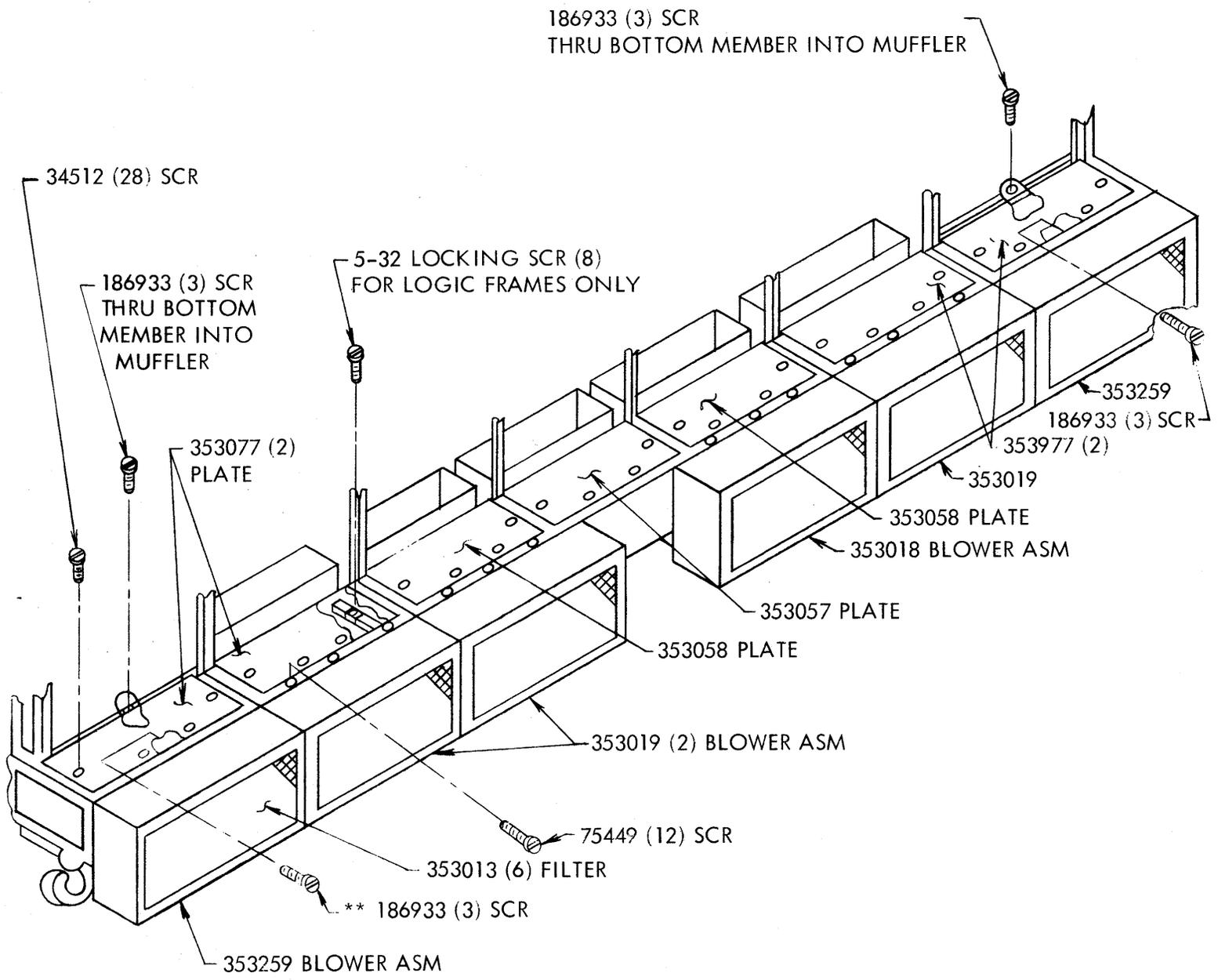
FIGURE 13-4 IBM 7302-3 BLOWER INSTALLATION

3. UNIT CHECKOUT PROCEDURES

   REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 5.

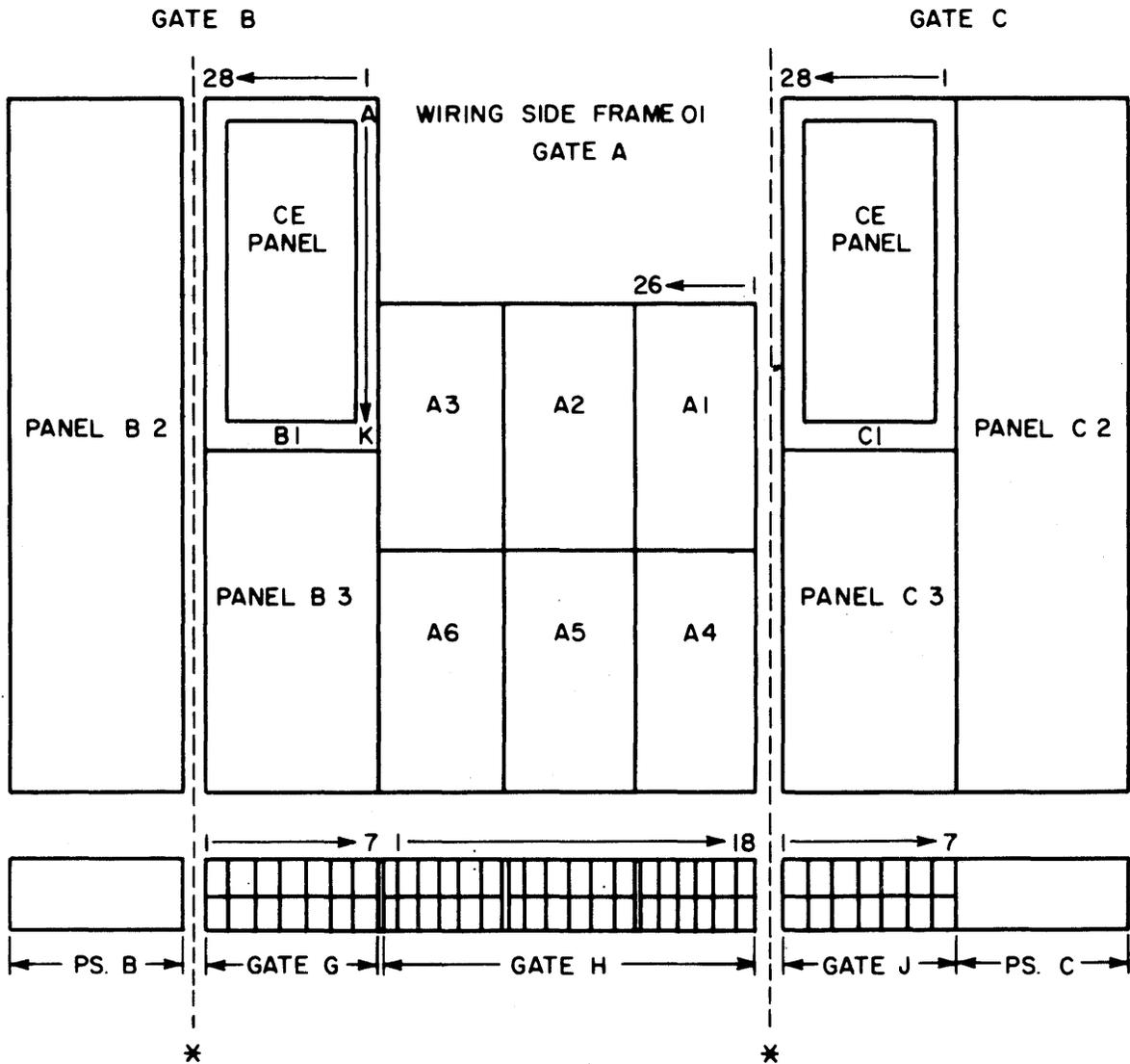4. PREPARATIONS FOR RESHIPMENT

1.   UNPACKING AND MECHANICAL ASSEMBLY

2.   CABLING

      REFER TO TABLES 14-1, 14-2 AND FIGURE 14-1 FOR GENERAL CABLING
INFORMATION.   TABLE 14-3 AND FIGURE 14-2 CONCERN DIRECT-COUPLING BETWEEN
THE 7094-2 AND 7040/44 SYSTEMS.

                              NOTE

            CABLES BETWEEN THE 7607 AND 7606 SHOULD BE
            THE LAST ONES CONNECTED, TO PREVENT READING
            A SHORT CONDITION WHEN MAKING A GROUNDING
            CHECK.

            TABLE 14-1 INTER-FRAME CABLES - FRAME 03-7606
                      SEQUENTIAL PLUGGING LIST

REF. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
62C	03F 21G	01F 21G	587339	
61	03F 25G	01E 25F	587346	
56B	03F 29F	02F 21E	587345	
52	03F 33F	02E 33D	587351	
62	03F 37E	01F 25C	587341	
56A	03F 41G	02F 25D	587346	
62A	03F 45E	01F 21E	587340	
62B	03F 45F	01F 25E	587341	
56	03F 45G	02F 21C	587346	
65	03F 53C	03E 37D	587333	JUMPER
51	03E 21E	02E 37D	587345	
51A	03E 21F	02E 21G	587342	
58	03E 25E	01E 25C	587339	
60	03E 29E	01F 21F	587347	
60A	03E 33E	01F 25G	587348	
58A	03E 37E	01E 25G	587338	

handwritten annotations: 61B, 61A, 60C, 60B 03E 41C 01F 45F, 60D 03E 33E 01F 41F

TABLE 14-2 EXTERNAL CABLES - FRAME 03-7606
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
37J	03 PWR	PCU - 7618	532542	400 CYCLE
38J	03 PWR	PCU - 7618	532973	60 CYCLE
17	03F 21D	06(N*)E 13F	587314	
12	03F 21E	06(N)E 13F	587314	
12B	03F 21F	06(N)E 21C	587314	
17B	03F 25D	06 (N*)E 17F	587314	
12A	03F 25E	06(N)E 17F	587314	
17A	03F 29D	06(N*)E 21C	587314	
23A	03F 29E	MEM G 01A	587314	
23F	03F 29G	MEM H 07A	587314	
17C	03F 33D	06(N*)E 17C	587314	
12C	03F 33E	06(N)E 17C	587314	
23G	03F 33G	MEM H 03A	587314	
18	03F 37D	06(N*)F 41F	587314	
13	03F 37F	06(N)F 41F	587314	
7	03F 37G	08H 09C	587323	
18A	03F 41D	06(N*)F 33C	531641	
13A	03F 41E	06(N)F 33E	531641	
13B	03F 41F	06(N)F 37F	587314	
18B	03F 45D	06(N*)F 37F	587314	
*10D	03F 49D	06F 25C	587314	*ONLY ONE CABLE FROM
10E	03F 49E	06F 25C	587314	GROUP 10 IS REQUIRED FOR
10F	03F 49F	06F 25C	587314	EACH DATA CHANNEL.
10G	03F 49G	06F 25C	587314	ANY 7607 CAN BE ASSIGNED
10	03F 53D	06F 25C	587314	ANY CHANNEL (A-H) BY
10A	03F 53E	06F 25C	587314	PLUGGING ITS CABLE INTO
10B	03F 53F	06F 25C	587314	THE APPROPRIATE CONNECTOR
10C	03F 53G	06F 25C	587314	ON THE MULTIPLEXOR.
23B	03E 17G	MEM H 16A	587314	TERMINATE UNUSED
23C	03E 21G	MEM H 12A	587314	CONNECTORS WITH IBM PART
23E	03E 25F	MEM H 02A	587314	NO. 532136.
23D	03E 25G	MEM H 06A	587314	
16	03E 29F	06(N*)E05D	587314	
11B	03E 29G	06(N)E 05D	587314	
23	03E 33D	MEM G 03A	587314	
16A	03E 33F	06(N*)E17D	587314	
11A	03E 33G	06(N)E 17D	587314	
16B	03E 37F	06(N*)E21D	587314	
11	03E 37G	06(N)E 21D	587314	

C	D	E	F	G	
	R-65 03F 53C	R-60c 01F 45E	K-16b 06(N') E21D	K-11 06(N) E21D	37
		R-60d 01F 41F	K-16a 06(N') E17D	K-11a 06(N) E17D	33
		R-60 01F 21F	K-16 06(N') E05D	K-11b 06(N) E05D	29
			K-23e MEM-H-02A	K-23d MEM-H-06A	25
R-60b 01F 45F		R-51 02E 37D	R-51a 02E 21G	K-23c MEM-H-12A	21
R-60a 01F 41E				K-23b MEM-H-16A	17
					13
					09
					05
					01

K37J PCU 400~   K38J PCU 60~

C	D	E	F	G	
R-65 03E 37D	* K-10 06F 25C CHANNEL A	* K-10a 06F 25C CHANNEL B	* K-10b 06F 25C CHANNEL C	* K-10c 06F 25C CHANNEL D	53
	* K-10d 06F 25C CHANNEL E	* K-10e 06F 25C CHANNEL F	* K-10f 06F 25C CHANNEL G	* K-10g 06F 25C CHANNEL H	49
	K-18b 06(N') F37F	R-62a 01F 21E	R-62b 01F 25E	R-56 01F 21C	45
	K-18a 06(N') F33C	K-13a 06(N) F33E	K-13b 06(N) F37F	R-56a 02F 25D	41
	K-18 06(N') F41F	R-62 01F 25C	K-13 06(N) F41F	K-7 08H 09C	37
	K-17c 06(N') E17C	K-12c 06(N) E17C	R-52 02E 33D	K-23g MEM-H-03A	33
	K-17a 06(N') E21C	R-61a 01E 25C	R-56b 02F 21E	K-23f MEM-H-07A	29
	K-17b 06(N') E17F	K-12a 06(N) E17F		R-61 01E 25F	25
	K-17 06(N') E13F	K-12 06(N) E13F	K-12b 06(N) E21C	R-61b 01E 29E	21
					17

*ONLY ONE CABLE FROM GROUP 10 IS REQUIRED FOR EACH 7607 DATA CHANNEL.
A 7909 CAN ALSO BE ASSIGNED ANY CHANNEL (A THRU H) BY SUBSTITUTING
CABLES K66, A-G, FOR GROUP 10 AND PLUGGING THEM INTO THE APPROPRIATE
CONNECTORS ON THE MULTIPLEXOR. TERMINATE UNUSED CONNECTORS WITH
PART NO 532136

FRAME   03   BOX   7606

MULTIPLEXOR

FIGURE 14-1 7606-2 TAILGATE PLUGGING DIAGRAM

TABLE 14-3 DIRECT COUPLING CABLES 7606 TO 7040/44 SYSTEMS

KEY NO.	FROM 7606	TO 7106	PART NUMBER	REMARKS
62	03E 29F	01C(N*) U09	587314	
	03E 29G	01C(N) U09	587314	
62A	03E 33F	01C(N*) U13	587314	
	03E 33G	01C(N) U13	587314	
62B	03E 37F	01C(N*) U17	587314	
	03E 37G	01C(N) U17	587314	
62C	03F 21D	01C(N*) U21	587314	
	03F 21E	01C(N) U21	587314	
62D	03F 25D	01C(N*) U25	587314	
	03F 25E	01C(N) U25	587314	
62E	03F 29D	01C(N*) U29	587314	
	03F 21F	01C(N) U29	587314	
62F	03F 33D	01C(N*) L21	587314	
	03F 33E	01C(N) L21	587314	
62G	03F 37D	01C(N*) U33	587314	
	03F 37F	01C(N) U33	587314	
62H	03F 45D	01C(N*) U41	587314	
	03F 41F	01C(N) U41	587314	
63	03F 41D	01C(N*) U37	531641	
	03F 41E	01C(N) U37	531641	
*66	03F 53D	01C L17	587314	CHAN. A *ONLY ONE CABLE FROM
66A	03F 53E	01C L17	587314	CHAN. B GROUP 66 IS REQUIRED FOR
66B	03F 53F	01C L17	587314	CHAN. C EACH CHANNEL (A-H). TERM-
66C	03F 53G	01C L17	587314	CHAN. D INATE UNUSED CONNECTORS
66D	03F 49D	01C L17	587314	CHAN. E WITH PART NO. 532136.
66E	03F 49E	01C L17	587314	CHAN. F
66F	03F 49F	01C L17	587314	CHAN. G
66G	03F 49G	01C L17	587314	CHAN. H

C	D	E	F	G	
	R-65 03F 53C	R-60c 0IF 45E	K-62b 0IC(N')UI7	K-62b 0IC(N)UI7	37
		R-60d 0IF 41F	K-62a 0IC(N')UI3	K-62a 0IC(N)UI3	33
		R-60 0IF 2IF	K-62 0IC(N')U09	K-62 0IC(N)U09	29
			K-23e MEM-H-02A	K-23d MEM-H-06A	25
R-60b 0IF 45F		R-51 02E 37D	R-51a 02E 2IG	K-23c MEM-H-12A	21
R-60a 0IF 41E				K-23b MEM-H-16A	17
					13
					09
					05
					01

C	D	K37J PCU 400~	K38J PCU 60~	F	G	
R-65 03E 37D	* K-66 0IC L17 CHANNEL A	* K-66a 0IC L17 CHANNEL B	* K-66b 0IC L17 CHANNEL C	* K-66c 0IC L17 CHANNEL D		53
	* K-66d 0IC L17 CHANNEL E	* K-66e 0IC L17 CHANNEL F	* K-66f 0IC L17 CHANNEL G	* K-66g 0IC L17 CHANNEL H		49
	K-62h 0IC(N')U41	R-62a 0IF 2IE	R-62b 0IF 25E	R-56 0IF 2IC		45
	K-63 0IC(N')U37	K-63 0IC(N)U37	K-62h 0IC(N)U41	R-56a 02F 25D		41
	K-62g 0IC(N')U33	R-62 0IF 25C	K-62g 0IC(N)U33	K-7 08H 09C		37
	K-62f 0IC(N')L21	K-62f 0IC(N)L21	R-52 02E 33D	K-23g MEM-H-03A		33
	K-62e 0IC(N')U29	R-61a 0IE 25C	R-56b 02F 2IE	K-23f MEM-H-07A		29
	K-62d 0IC(N')U25	K-62d 0IC(N)U25		R-61 0IE 25F		25
	K-62c 0IC(N')U21	K-62c 0IC(N)U21	K-62e 0IC(N)U29	R-61b 0IE 29E		21
						17

*ONLY ONE CABLE FROM GROUP 66 IS REQUIRED FOR EACH CHANNEL (A THRU H).
TERMINATE UNUSED CONNECTORS WITH PART NO. 532136.

FRAME ____03____   BOX ____7606____

MULTIPLEXOR (DCS)

FIGURE 14—2 7606—2 TAILGATE PLUGGING DIAGRAM (DCS)

3.   UNIT CHECKOUT PROCEDURES

        REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 4.

4.   PREPARATIONS FOR RESHIPMENT

1.   UNPACKING AND MECHANICAL ASSEMBLY

        LEVELING OF UNITS IS REQUIRED TO IMPROVE THEIR APPEARANCE AND TO
PERMIT PROPER TRACKING OF THE SLIDING GATES WHEN THEY ARE MOVED IN AND
OUT.

        TO LEVEL THE 7607, HOLD A CARPENTERS LEVEL ON THE TOP OF THE FRAME
(DO NOT REST LEVEL ON COVERS AS IMPROPER LEVEL MAY BE OBTAINED)
CHECKING LEVEL IN BOTH DIRECTIONS. RAISE THE LEVELING PAD AT THE
LOWEST CORNER SUFFICIENTLY TO PERMIT ADJUSTMENT OF REMAINING PADS. ALL
CASTERS EXCEPT THE TOWER CASTER SHOULD BE OFF THE FLOOR WHEN LEVELING
IS COMPLETE.

        WHEN THE 7607 HAS BEEN LEVELED, THE TOWER SHOULD BE MOVED IN AND
OUT TO CHECK TOWER AND CASTER ADJUSTMENT AS FOLLOWS-

        A.   OBSERVE WIRING SIDES OF GATES CLOSELY. THEY MUST NOT STRIKE
             VERTICAL FRAME MEMBERS ON THE FRONT OF THE UNIT.

        B.   TOWER CASTER SHOULD BE ADJUSTED SO THAT THE TOWER WILL NOT BIND
             WITH TOP FRAME MEMBERS.

        C.   GATE CASTERS SHOULD BE ADJUSTED TO CLEAR THE FLOOR BY
             APPROXIMATELY 1/4 INCH WHILE SLIDING THE TOWER IN AND OUT.

        D.   THE GATE CASTERS ARE LIFTED OFF THE FLOOR WHEN THEY ARE LOCKED
             TO THE TOWER BY AN ADJUSTABLE ECCENTRIC ROLLER AS IT RIDES ON
             A CAM, SEE FIGURES 5-4, 5-5, AND 5-6, CHAPTER 5. YOU MAY HAVE
             TO ADJUST THE ROLLER TO OBTAIN SUFFICIENT LIFT ON THE GATES,
             AND ALSO TO OBTAIN A STRAIGHT TOP COVER LINE WITH RESPECT TO
             ADJOINING GATES.

2.   CABLING

     CABLES BETWEEN THE 7607 AND 7606 SHOULD BE THE LAST ONES
CONNECTED, TO PREVENT READING A SHORT CONDITION WHEN MAKING A GROUNDING
CHECK.

     REFER TO TABLES 15-1, 15-2, AND FIGURE 15-1 FOR INFORMATION ON
7607 N°. REFER TO FIGURE 15-2 FOR N°+1 CABLING INFORMATION. TABLES
15-1, 15-3, AND FIGURE 15-3 GIVE CABLING INFORMATION ON 7607-2 (N).

     WHEN DIRECT-COUPLING BETWEEN THE 7094-2 AND A 7040/44 SYSTEM,
REFER TO TABLE 15-4 AND FIGURE 15-4.

              TABLE 15-1 INTER-FRAME CABLES - FRAME 06-7607
                        SEQUENTIAL PLUGGING LIST

REF. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
66	06F 45E	06E 09E	587332	JUMPER
66A	06F 49E	06E 05E	587332	JUMPER
66B	06F 49F	06E 05F	587332	JUMPER
66C	06F 53F	06E 01F	587331	JUMPER

TABLE 15-2 EXTERNAL CABLES - FRAME 06-7607-1 (N°)
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
35	06 PWR	CUST. REC.	532953	208 3-PHASE TAPE PWR.
35A	06 PWR	CUST. REC.	532953	208 3-PHASE TAPE PWR.
37A	06 PWR	7618 PCU	532542	400 CYCLE POWER,
				37A THROUGH H.
38A	06 PWR	7618 PCU	532973	60 CYCLE POWER,
				38A THROUGH H.
44	06 PWR	729 BANK 1	532536	TAPE PWR
44A	06 PWR	729 BANK 2	532536	TAPE PWR
45	06 PWR	716 PRINTER	532535	TBZ
21	06F21,25,29E	729 BANK 2	532121	
20	06F21,25,29F	729 BANK 1	532121	
10	06F 25C	03F 53D	587314	ONLY ONE CABLE NEEDED IN
				10 - A THRJ H GROUP.
18A	06(N°)F 33C	03F 41D	531641	
15A	06F 37C *	06(N°+1)F37F	587314	* OR TERMINATOR 532135
18B	06(N°)F 37F	03F 45D	587314	
18	06(N°)F 41F	03F 37D	587314	
9D	06(N°)F 45C	*09 - 45C	587323	* 7617 DATA CH. CONSOLE
9E	06(N°)F 45D	09 - 45D	587323	
9B	06(N°)F 49C	09 - 49C	587323	
9C	06(N°)F 49D	09 - 49D	587323	
9	06(N°)F 53C	09 - 53C	587323	
9A	06(N°)F 53D	09 - 53D	587323	
16	06(N°)E 05D	03E 29F	587314	
3	06(N°)E 05,01	PRINTER #2	532120	
14A	06(N°)E 13E	06(N°+1)E13F	587314	
17	06(N°)E 13F	03F 21D	587314	
17C	06(N°)E 17C	03F 33D	587314	
16A	06(N°)E 17D	03E 33F	587314	
17B	06(N°)E 17F	03F 25D	587314	
2	06(N°)E 17,21	PRINTER #1	532120	
17A	06(N°)E 21C	03F 29D	587314	
16B	06(N°)E 21D	03E 37F	587314	
8D	06(N°)E 29D	09 - 29D	587323	
8A	06(N°)E 33C	09 - 33C	587323	
8C	06(N°)E 33D	09 - 33D	587323	
8	06(N°)E 37C	09 - 37C	587323	
8B	06(N°)E 37D	09 - 37D	587323	

C	D	E	F	G	
K-8 7617-37C	K-8b 7617-37D				37
K-8a 7617-33C	K-8c 7617-33D				33
	K-8d 7617-29D				29
				K-2 PRINTER-1	25
K-17a 03F 29D	K-16b 03E 37F	(N+1) E17F		K-2	21
K-17c 03F 33D	K-16a 03F 33F	$\top$	K-17b 03F 25D	K-2	17
(N+1) E17C (OR T-532132)	(N+1) E17D (OR T-532131)	K-14a 06(2)E 13F	K-17 03F 21D	K-3 PRINTER-2	13
(N+1) E21C (OR T-532133)	(N+1) E21D (OR T-532131)	* R-66 06F 45E		K-3	09
	K-16 03E 29F	* R-66a 06F 49E	* R-66b 06F 49F	K-3	05
			* R-66c 06F 53F		01

*INSTALL T-532136
IN UNUSED BLOCKS

C	D	K37A PCU 400~	K45 716 PR	K38A PCU 60~	F	G	
K-9 7617-53C	K-9a 7617-53D				R-66c		53
K-9b 7617-49C	K-9c 7617-49D	* R-66a			R-66b		49
K-9c 7617-45C	K-9e 7617-45D	* R-66					45
		$\top$			K-18 03F 37D		41
K-15a 06(2)F 33E (OR T-532135)					K-18b 03F 45D		37
K-18a 03F 41D (OR T-533700)		NOTE (N+1) F33C (OR T-533700)					33
		K-21 729			K-20 729		29
K-10 (a-h) 03F 53D-H		K-21 729			K-20 729		25
		K-21 729			K-20 729		21
							17

NOTE
   USE T-533700 ON
   LAST CHANNELS OF
   EACH BANK OF 7607S
   (06F33E - BK 1.
   06F33C - BK 2)

ALSO
   K-35   K-35A - FROM CUST REC
   K-44   TO 729(1)
   K-44A TO 729(2)

FRAME_____06_____   BOX____7607 1____

DATA CHANNEL — N' —

FIGURE 15-1 IBM 7607-1 (N°) TAILGATE PLUGGING DIAGRAM

	C	D	E	F	G	
	K-8 09 37C	K-8b 09 37D				37
	K-8a 09 33C	K-8c 09 33D				33
		K-8d 09 29D				29
						25
	K-69b 05A 25U	K-69e 05A 37U				21
	K-69g 05A 45U	K-69f 05A 41U	K-67d 05A 33L	K-69d 05A 33U		17
	K-67g 05A 45L	K-67f 05A 41L	K-67c 05A 29L	K-69c 05A 29U		13
	K-67b 05A 25L	K-67e 05A 37L	* R-66 06F 45E			09
	K-67h 05A 49L	K-69h 05A 49U	* R-66a 06F 49E	* R-66b 06F 49F		05
				* R-66c 06F 53F		01

*INSTALL T-532136 IN
ALL UNUSED BLOCKS

	C	D	E	F	G	
			K37B PCU 400~	K38B PCU 60~		
	K-9 09 53C	K-9a 09 53D		* R-66c		53
	K-9b 09 49C	K-9c 09 49D	* R-66a	* R-66b		49
	K-9d 09 45C	K-9e 09 45D	* R-66			45
	K-67 05A 09L			K-69 05A 09U		41
	K-67a 05A 21L			K-69a 05A 21U		37
	K-70 05A 13U #		K-68 05A 13L #	K-15a 06F 37C		33
						29
	K-10a 03F 53E CHANNEL B					25
						21
						17

NOTE
   THIS DIAGRAM SHOWS CONNECTIONS TO DATA CHANNEL 7909 (FRAME 05A)
   # U AND L DESIGNATIONS REFER TO CABLES COMING FROM UPPER AND TO
   LOWER 7909 CABLE CONNECTORS

FRAME _____06_____   BOX _7607 II_

DATA CHANNEL N' + I

FIGURE 15-2 IBM 7607-2 (N'+I) TAILGATE PLUGGING DIAGRAM

TABLE 15-3 EXTERNAL CABLES - FRAME 06-7607-2 (N)
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
37E*	06 PWR	PCU - 7618	532542	400 CYCLE. * CABLES E THROUGH H PROVIDE POWER FOR (N) THROUGH (N+).
38E*	06 PWR	PCU - 7618	532973	60 CYCLE. * CABLES E THROUGH H PROVIDE POWER FOR (N) THROUGH (N+3).
15B	06(N)F 33C	(N+1)F 33E	531641	
13A	06(N)F 33E	03F 41E	531641	
15A	06(N)F 37C	(N+1)F 37F	587314	
13B	06(N)F 37F	03F 41F	587314	
15	06(N)F 41C	(N+1)F 41F	587314	
13	06(N)F 41F	03F 37F	587314	
14F	06(N)E 05C	(N+1)E 05D	587314	
11B	06(N)E 05D	03E 29G	587314	
14D	06(N)E 09C	(N+1)E 21C	587314	
14E	06(N)E 09D	(N+1)E 21D	587314	
14B	06(N)E 13C	(N+1)E 17C	587314	
14C	06(N)E 13D	(N+1)E 17D	587314	
14A	06(N)E 13E	(N+1)E 13F	587314	
12	06(N)E 13F	03F 21E	587314	
12C	06(N)E 17C	03F 33E	587314	
11A	06(N)E 17D	03E 33G	587314	
14	06(N)E 17E	(N+1)E 17F	587314	
12B	06(N)E 21C	03F 21F	587314	
11	06(N)E 21D	03E 37G	587314	

	C	D	E	F	G	
						37
						33
						29
						25
	K-12b 03F 21F	K-11 03E 37G				21
	K-12c 03F 33E	K-11a 03E 33G	K-14 06E 17F (N+1)			17
	K-14b (N+1) E17C	K-14c (N+1) E17D	K-14a (N+1) E13F	K-12 03F 25E		13
	K-14d (N+1) E21C	K-14e (N+1) E21D				09
	K-14f (N+1) E05D	K-11b 03E 29G				05
						01

		K37E PCU 400~	K38E PCU 60~		

	C	D	E	F	G	
						53
						49
						45
	K-15 (N+1) F41F			K-13 03F 37F		41
	K-15a (N+1) F37F			K-13b 03F 41F		37
	K-15b (N+1) F33E		K-13a 03F 41E			33
						29
						25
						21
						17

K-37E TO 7618 400 CY (06#5)
K-37F THRU H TO 7618 - 400 CY (06#6-8)
K-38E THRU H TO 7618 - 60 CY (06#5-8)

FRAME ____06____   BOX ___7607 II___

DATA CHANNEL —N—

FIGURE 15-3 IBM 7607-2 (N) TAILGATE PLUGGING DIAGRAM

TABLE 15-4 DIRECT COUPLING CABLES 7607-2 TO 7040/44 SYSTEMS
SEQUENTIAL PLUGGING LIST

KEY NO.	7607-2 (N'+1)	7106/ 704X	PART NUMBER	REMARKS
10A	06F 25C	03F 53E	587314	7606 CHAN. B
70	06F 33C	01D L41	531641	OR TERMINATOR 533700
68	06F 33E	01C U37	531641	
15A	06F 33F	06F 37C	587314	7607 (N')
67G	06F 37C	01C U41	587314	
69G	06F 37F	01D L45	587314	OR TERMINATOR 532135
67H	06F 41C	01C U33	587314	
69H	06F 41F	01D L37	587314	OR TERMINATOR 532134
9D	06F 45C	09 45C	587323	7617
9E	06F 45D	09 45D	587323	7617
9B	06F 49C	09 49C	587323	7617
9C	06F 49D	09 49D	587323	7617
9	06F 53C	09 53C	587323	7617
9A	06F 53D	09 53D	587323	7617
37B	06 TBZ	PCU	532542	7618-400 CYCLE POWER
38B	06 TBZ	PCU	532973	7618-60 CYCLE POWER
67	06E 05C	01C U09	587314	
69	06E 05D	01D U33	587314	
67A	06E 09C	01C U29	587314	
67B	06E 09D	01C U17	587314	
67C	06E 13C	01C L21	587314	
67D	06E 13D	01C U13	587314	
67E	06E 13E	01C U21	587314	
69E	06E 13F	01D U45	587314	
69C	06E 17E	01D L49	587314	OR TERMINATOR 532132
69D	06E 17D	01D U37	587314	OR TERMINATOR 532131
67F	06E 17E	01C U25	587314	
69F	06E 17F	01D U49	587314	
69A	06E 21C	01D L33	587314	OR TERMINATOR 532133
69B	06E 21D	01D U41	587314	OR TERMINATOR 532131
8D	06E 29D	09 29D	587323	7617
8A	06E 33C	09 33C	587323	7617
8C	06E 33D	09 33D	587323	7617
8	06E 37C	09 37C	587323	7617
8B	06E 37D	09 37D	587323	7617

C	D	E	F	G	
K-8 O9 37C	K-8b O9 37D				37
K-8a O9 33C	K-8c O9 33D				33
	K-8d O9 29D				29
					25
K-69a OID L33	K-69b OID U41				21
K-69c OID L49	K-69d OID U37	K-67f OIC U25	K-69f OID U49		17
K-67c OIC L21	K-67d OIC UI3	K-67e OIC U21	K-69e OID U45		13
K-67a OIC U29	K-67b OIC UI7	* R-66 O6F 45E			09
K-67 OIC U09	K-69 OID U33	* R-66a O6F 49E	* R-66b O6F 49F		05
			* R-66c O6F 53F		01

C	D	K37B PCU 400~	K38B PCU 60~	F	G	
K-9 O9 53C	K-9a O9 53D			* R-66c		53
K-9b O9 49C	K-9c O9 49D	* R-66a		* R-66b		49
K-9d O9 45C	K-9e O9 45D	* R-66				45
K-67h OIC U33				K-69h OID L37		41
K-67g OIC U41				K-69g OID L45		37
K-70 OID L41		K-68 OIC U37		K-15a O6F 37C		33
						29
K-10a O3F 53E CHANNEL B						25
						21
						17

* INSTALL T-532136 IN ALL UNUSED BLOCKS

NOTE
     THIS DIAGRAM SHOWS DIRECT COUPLING CONNECTIONS TO 7040/44 SYSTEM,
     7106 PROCESSOR (FRAME OI) U AND L DESIGNATIONS REFER TO UPPER
     AND LOWER CABLE CONNECTORS ON THE 7106.

                              FRAME   06   BOX   7607 II

                                   DATA CHANNEL N' + 1 (DCS)

     FIGURE 15—4 IBM 7607-2 (N'+ I) TAILGATE PLUGGING DIAGRAM (DCS)

3.   UNIT CHECKOUT PROCEDURES

        REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 6, 8.9 (TAU).

                            CAUTION

        DO NOT TURN POWER ON THE SYSTEM IF THE 7607 IS
        UNGROUNDED. A WARNING SIGN SHOULD BE TIED TO THE
        7618, INDICATING THAT THE JUMPER IS DISCONNECTED.

3.1 TAPE ADAPTER UNIT

        REFER TO CHAPTER 19, SECTIONS 8 AND 9.

4.   PREPARATIONS FOR RESHIPMENT

16 IBM 7608 POWER CONVERTER

1.   UNPACKING AND MECHANICAL ASSEMBLY

2.   CABLING

      REFER TO FIGURE 18-1 FOR MG TO PCU CABLING.

3.   UNIT CHECKOUT PROCEDURES

      CHECK LUBRICATION OF THE 7608.   SEE CE REFERENCE MANUAL FOR
LUBRICATION INSTRUCTIONS.   SEE ALSO CHAPTER 19, SECTIONS 1 AND 2.

4.   PREPARATIONS FOR RESHIPMENT

17 IBM 7617 DATA CHANNEL CONSOLE

1.   UNPACKING AND MECHANICAL ASSEMBLY

2.   CABLING

TABLE 17-1 IBM 7617 DATA CHANNEL CONSOLE CABLING

KEY NO.	PART NUMBER	RED TAG - FROM		WHITE TAG - TO		NAME
		FRAME AND GATE	CABLE CONN.	FRAME AND GATE	CABLE CONN.	
8	587323	CONSOLE PANEL	37C	06E	37C	CE CONSOLE TO DATA CHANNEL
8A	587323	CONSOLE PANEL	33C	06E	33C	CE CONSOLE TO DATA CHANNEL
8B	587323	CONSOLE PANEL	37D	06E	37D	CE CONSOLE TO DATA CHANNEL
8C	587323	CONSOLE PANEL	33D	06E	33D	CE CONSOLE TO DATA CHANNEL
8D	587323	CONSOLE PANEL	29D	06E	29D	CE CONSOLE TO DATA CHANNEL
9	587323	CONSOLE PANEL	53C	06F	53C	CE CONSOLE TO DATA CHANNEL
9A	587323	CONSOLE PANEL	53D	06F	53D	CE CONSOLE TO DATA CHANNEL
9B	587323	CONSOLE PANEL	49C	06F	49C	CE CONSOLE TO DATA CHANNEL
9C	587323	CONSOLE PANEL	49D	06F	49D	CE CONSOLE TO DATA CHANNEL
9D	587323	CONSOLE PANEL	45C	06F	45C	CE CONSOLE TO DATA CHANNEL
9E	587323	CONSOLE PANEL	45D	06F	45D	CE CONSOLE TO DATA CHANNEL

3.   UNIT CHECKOUT PROCEDURES

REFER TO CHAPTER 19, SYSTEM TESTING, SECTION 7.

4.   PREPARATIONS FOR RESHIPMENT

1.   UNPACKING AND MECHANICAL ASSEMBLY

2.   CABLING

TABLE 18-1 AND FIGURE 18-1 HAVE BEEN REVISED TO INCLUDE CABLE A76, USED WHEN THE 7094-2 IS DIRECT-COUPLED TO A 7040/44 SYSTEM. FIGURE 18-2 SHOWS THE VOLTAGE PANEL CONNECTORS ON THE REAR OF THE UNIT.

WHEN THE PCU IS INTENDED FOR DIRECT-COUPLING, A SMALL BRACKET CONTAINING THREE EMERGENCY POWER-OFF (EPO) CONNECTORS (2 FEMALE, 1 MALE) IS AFFIXED TO THE LOWER RIGHT-HAND FRAME MEMBER THAT EXTENDS BELOW THE VOLTAGE CONNECTOR PANEL (VIEWING UNIT FROM THE REAR). CABLE A76 MAY BE PLUGGED INTO EITHER CONNECTOR B OR C (FEMALE).

THREE EPO TERMINATORS (2-5342330, 1-5342331) ARE INCLUDED IN THE SHIPPING GROUP. THEY MUST BE PLUGGED INTO THE UNUSED CONNECTORS, OR INTO ALL THREE CONNECTORS WHEN THE SYSTEM IS NOT DIRECT-COUPLED.

TABLE 18-1 EXTERNAL CABLES - PCU TO 7618
SEQUENTIAL PLUGGING LIST

KEY. NO.	RED TAG FROM	WHITE TAG TO	PART NUMBER	REMARKS
31	PCU 7618	CUST. REC.	532969	NOTE- REFER TO FIGURES
48	PCU 7618	PRINTER 716	535575	18-1, 18-2, AND 4-2.
32	PCU 7618	M.G. 7608	532967	60 CYCLE
33	PCU 7618	M.G. 7608	532970	400 CYCLE
34	PCU 7618	M.G. 7608	532542	CONTROL
42	PCU 7618	CONSOLE 7151	532553	
37	PCU 7618	CONSOLE 7151	532542	400 CYCLE
43	PCU 7618	CONSOLE 7151	532554	
46	PCU 7618	MEM	532554	
37I	PCU 7618	MEM	532542	400 CYCLE
37K	PCU 7618	IPU - 7111	532542	400 CYCLE
38K	PCU 7618	IPU - 7111	532973	60 CYCLE
38M	PCU 7618	ASU - 7109	532973	60 CYCLE
37M	PCU 7618	ASU - 7109	532542	400 CYCLE
37J	PCU 7618	MPXR - 7606	532542	400 CYCLE
38J	PCU 7618	MPXR - 7606	532973	60 CYCLE
38H	PCU 7618	7607 #8	532973	60 CYCLE
37H	PCU 7618	7607 #8	532542	
37G	PCU 7618	7607 #7	532542	
38G	PCU 7618	7607 #7	532973	60 CYCLE
38F	PCU 7618	7607 #6	532973	60 CYCLE
37F	PCU 7618	7607 #6	532542	400 CYCLE
37E	PCU 7618	7607 #5	532542	400 CYCLE
38E	PCU 7618	7607 #5	532973	
38D	PCU 7618	7607 #4	532973	
37D	PCU 7618	7607 #4	532542	
37C	PCU 7618	7607 #3	532542	
38C	PCU 7618	7607 #3	532973	
38B	PCU 7618	7607 #2	532973	
37B	PCU 7618	7607 #2	532542	
37A	PCU 7618	7607 MOD I	532542	
38A	PCU 7618	7607 MOD I	532973	
36	729	729	535098	AS REQUIRED
40	PRINTER 716	PUNCH 721	320187	
41	PRINTER 716	READER 711	513320	
A76	PCU 7618	7106-704X	381492	EPO DIRECT COUPLED SYSTEM

REAR

PCU   7618

SEE
NOTE

A76
EPO (DCS)

POWER CONVERTER 7608

PN 532537

AC CONVENIENCE
OUTLETS

K47

7302

PN 532969

PN 535575

PN 532970

K48
716
PR.

K32
60~

K31
CUST.
REC.

K34
CTRL

K33
400~

PN 532967

PN 532542

NOTE: SEE FIGURE 18-2 FOR DETAIL.

FIGURE 18-1 PCU TO MG CABLING

```
          ┌─────────── 400 ∿ ───────────┐
   K38B      K37B          K37A      K38A
      I/O CHANNEL 2          I/O CHANNEL 1

   K38D      K37D          K37C      K38C
      I/O CHANNEL 4          I/O CHANNEL 3

   K38F      K37F          K37E      K38E
      I/O CHANNEL 6          I/O CHANNEL 5

   K38H      K37H          K37G      K38G
      I/O CHANNEL 8          I/O CHANNEL 7

   K38M 7109  K37M         K37J 7606  K38J
        ASU                    MPLXR

   K46        K37I         K37K 7110  K38K
       MEMORY                    IPU

   K42              K37        K43
   CONSOLE   SPARE   CONSOLE   CONSOLE
```

FIGURE 18-2 PCU CONNECTOR DETAIL

3.   UNIT CHECKOUT PROCEDURES

        REFER TO CHAPTER 19, SYSTEM TESTING, SECTIONS 1 AND 2.

4.   PREPARATIONS FOR RESHIPMENT

1.   GENERAL

THIS SECTION CONTAINS INSTRUCTIONS FOR CHECKING AND DETERMINING PROPER OPERATION OF THE IBM 7094-2 SYSTEM. THE INFORMATION IS ARRANGED IN THE BASIC ORDER FOR THE VARIOUS OPERATIONS FROM AN OVERALL SYSTEMS STANDPOINT, WITH SPECIAL INSTRUCTIONS PROVIDED FOR SPECIFIC UNITS AS REQUIRED.

2.   POWER TESTING

2.1   PHASING CHECK

THE INPUT VOLTAGES ON THE 7618 MAY BE INCORRECTLY PHASED WHICH WILL CAUSE BLOWERS ON THE SYSTEM TO RUN IN REVERSE. THE BLOWERS SHOULD BE CHECKED AS SOON AS POWER IS RECEIVED ON THE SYSTEM. CHECK THE BLOWER ROTATION AS FOLLOWS-

A.   THE BLOWERS ON ALL GATES MUST ROTATE IN A CLOCKWISE DIRECTION WHEN VIEWED FROM THE HINGED END OF THE GATE.

B.   CHECK BLOWER ROTATION BY HOLDING A STRIP OF HEAVY PAPER OR IBM CARD STOCK LIGHTLY AGAINST THE ROTATING SHAFT AND OBSERVE DIRECTION IN WHICH THE PAPER IS MOVED.

NOTE

TO CHANGE PHASING THAT IS INCORRECT, CHANGE ANY TWO INPUT CONNECTIONS IN THE 7618.

2.2   POWER-ON CHECK

THE POWER DISTRIBUTION SYSTEM SHOULD BE CHECKED THOROUGHLY IN ACCORDANCE WITH THE FOLLOWING PROCEDURE-

A.   SET ALL POWER SWITCHES TO THE -OFF- POSITION.

B.   SET ALL CIRCUIT BREAKERS TO THE -ON- POSITION.

C.   SET ALL EMERGENCY OFF SWITCHES TO THE -ON- POSITION.

D.   SET TEST AREA MAIN POWER CIRCUIT BREAKER TO THE -ON- POSITION.

E.   DEPRESS THE 7618 UNIT POWER ON RESET SWITCH.

NOTE
THE 60 CYCLE POWER IS AVAILABLE IN THE
7618 AND THE 48V SUPPLY IS ENERGIZED
WHEN THE POWER ON RESET SWITCH IS
ENERGIZED IN THE 7618 UNIT.

F.   SET THE 7608 UNIT CIRCUIT BREAKER TO THE -OFF- POSITION, AND
     THEN TO THE -ON- POSITION.

G.   DEPRESS THE 7618 UNIT POWER ON SWITCH TO START THE 7608 UNIT
     AND/OR INITIATE D-C POWER-ON SEQUENCE.

H.   CHECK THAT THE VOLT METER ON THE 7618 UNIT INDICATES A VOLTAGE
     WHEN THE METER SELECTOR SWITCH IS SET TO POSITIONS PHASE 1 AND
     2, PHASE 2 AND 3, AND PHASE 3 AND 1.

I.   SET THE POWER SWITCHES ON THE 7606-2, 7111, 7109, 7607,
     7302, 7151, 711, 716, AND 721 TO THE -ON- POSITION AND CHECK
     THAT THE POWER INDICATOR LIGHTS ARE LIT.

2.3 EMERGENCY OFF SWITCH CHECK

A.   WITH POWER UP ON THE SYSTEM, PULL THE EMERGENCY OFF SWITCH ON
     THE 7151 CONSOLE TO THE -OFF- POSITION.

B.   CHECK THAT ALL POWER IS REMOVED FROM THE SYSTEM AND ALL
     INDICATOR LIGHTS TURN OFF AND ALL BLOWERS STOP.

NOTE
POWER WILL STILL BE PRESENT IN THE
7618 UNIT.

C.   DEPRESS EMERGENCY-OFF SWITCH ON THE 7151 CONSOLE.

D.   DEPRESS THE POWER-ON RESET SWITCH ON THE 7618 UNIT.

E.   SET THE CIRCUIT BREAKER ON THE 7608 UNIT TO THE -OFF- POSITION
     AND THEN TO THE -ON- POSITION.

F.   DEPRESS THE POWER-ON SWITCH ON THE 7618 UNIT AND CHECK THAT
     POWER COMES UP ON THE SYSTEM.

G.   PULL THE EMERGENCY-OFF SWITCH ON THE 7618 UNIT AND CHECK THAT
     ALL POWER IS REMOVED FROM THE SYSTEM.

NOTE
ALL POWER WILL BE PRESENT IN THE
7618 HOT BOX.

H.   DEPRESS THE EMERGENCY-OFF SWITCH AND THE POWER-ON RESET SWITCH
     ON THE 7618 UNIT.

      I.   SET THE CIRCUIT BREAKER ON THE 7608 TO THE -OFF- POSITION THEN
         TO THE -ON- POSITION.

      J.   DEPRESS THE POWER-ON SWITCH ON THE 7618 UNIT AND OBSERVE THAT
         POWER COMES UP ON THE SYSTEM.

2.4 CONVENIENCE OUTLET CHECKS

THE FOLLOWING PROCEDURE WILL BE USED TO CHECK ALL CONVENIENCE
OUTLETS IN THE SYSTEM.

PLUG A TEST LAMP INTO ANY CONVENIENCE OUTLET ON THE 7607, 7606,
7109, 711, 716, 721, 7151, 7618, OR 7302-3. UNIT AND DO THE FOLLOWING-

      1. SET THE TEST LAMP SWITCH TO THE -ON- POSITION AND
        CHECK THAT THE TEST LAMP LIGHTS.

      2. UNPLUG THE TEST LAMP FROM THE CONVENIENCE OUTLET, PLUG
        A POLARITY TESTER INTO THE CONVENIENCE OUTLET AND
        CHECK THAT THE POLARITY TESTER LIGHTS.

      3. UNPLUG THE POLARITY TESTER FROM CONVENIENCE OUTLET.

2.5 REFERENCE VOLTAGE CHECK - IBM 7618

ADJUST THE OUTPUT OF THE 7618 TO 142V DC +OR- 2 V. WITH THE MG
UNDER FULL LOAD, USE A 1/4 PERCENT DEVIATION METER TO MEASURE ACROSS
C-1 ON THE MG CONTROL PANEL. ADJUST THE OUTPUT BY ROTATING THE CONTROL
KNOB. THE FINAL VOLTAGE SETTING SHOULD BE MADE AFTER MEASURING,
RECORDING AND ANALYSING THE LOGIC VOLTAGES ON THE VARIOUS UNITS IN THE
SYSTEM AND DETERMINING THAT FURTHER ADJUSTMENT OF OUTPUT VOLTAGE WILL
REDUCE THE NUMBER OF INDIVIDUAL POWER SUPPLY ADJUSTMENTS NEEDED TO
BRING ALL LOGIC VOLTAGES WITHIN TOLERANCE.

2.6 BIAS CHECK

THE METERS ON THE OPERATORS CONSOLE ARE ACROSS THE INPUT OF THE
MARGINAL SUPPLIES. IT IS POSSIBLE TO HAVE AN INDICATION THAT VOLTAGES
ARE BEING VARIED ON A PARTICULAR UNIT WITHOUT ACTUALLY VARYING THE
VOLTAGE ON THE GATES. IT IS, THEREFORE, NECESSARY TO CHECK THE BIAS
VOLTAGES AT THE GATES DURING THE FIRST OCCASION OF DIAGNOSTIC BIAS
RUNS.

2.7 THERMAL AND FUSE CHECK

THESE CHECKS MAY BE MADE AT THE CONVENIENCE OF THE INSTALLER. WITH
SYSTEM POWER UP, CHECK THE ITEMS LISTED IN SECTIONS 2.7.1 AND 2.7.2.

2.7.1   THERMAL SWITCH CHECK

CHECK THE OPERATION OF EACH THERMAL SWITCH LISTED BY HOLDING A HOT SOLDERING IRON NEAR THE SWITCH.   POWER SHOULD DROP IF SWITCHES AND CONTROL, CIRCUITS ARE OPERATING PROPERLY.

UNIT	THERMAL SWITCH LOCATION
7111	TOP OF GATES - ROW A
7109	TOP OF GATES - ROW A
7606-2	TOP OF GATES - ROW A
7607	TOP OF GATES - ROW A
7302-3	TOP OF GATES - ROW A

CAUTION

INSERT A PIECE OF ASBESTOS BETWEEN SOLDERING IRON AND ADJOINING CARD TO PREVENT DAMAGE TO COMPONENTS.

2.7.2   FUSE AND CB CHECK

CHECK THE FUSE PROTECTION CIRCUITRY IN EACH SMS MODULE BY REMOVING A FUSE.   POWER SHOULD DROP ON ALL UNITS IN THE POWER GROUP.   CHECK 7111 A/B GATES AND 7302-3 BY OPENING DC CB'S.

2.8 SERVICE VOLTAGE CHECK

MEASURE AND RECORD THE FOLLOWING VOLTAGES, USING A 1/4 PERCENT DEVIATION METER ON THE LOAD SIDE OF THE FUSES. (7111 A/B GATES AND THE 7302-3 POWER OUTPUTS ARE PROTECTED BY CB'S) IN THE 7302-3, ALL SERVICE VOLTAGES EXCEPT THE -6 ARE ADJUSTED AT THE TEST JACKS ON THE VOLTAGE CONTROL PANELS.

| MACHINE | V | O | L | T | A | G | E | S | | |
UNIT	+3	-3	+6	+6M	-6	-12	-12M	+20	-20	+30	-36
7109											
7111											
7151-M2					*						
7302-M3											
7606-M2											
7607											
7608											
7618											

NOTE

ALLOWABLE VOLTAGE DEVIATION +OR- 2 PERCENT.

* ALLOWABLE DEVIATION ON 7151-M2 -6.2V TO -6.5V.

NOTE

LOOSE CONTACT PRESSURE BETWEEN FUSE AND FUSE CLIPS OR A LOOSE CONNECTION AT THE WIRE LUG ON FUSE CLIP MAY CAUSE LOW VOLTAGE. IF ANY LOW VOLTAGES ARE OBSERVED, TIGHTEN THESE CONTACTS AND RECHECK VOLTAGE.

A LOW VOLTAGE COULD ALSO BE CAUSED BY
OXIDATION BETWEEN FUSE AND FUSE CLIP.
BURNISHING WITH CROCUS CLOTH WILL CORRECT
THIS CONDITION.

ANALYZE RECORDED VOLTAGES AND DETERMINE WHETHER OR NOT AN
ADJUSTMENT OF THE OUTPUT VOLTAGE FROM THE 7618 WILL BRING HIGH OR LOW
VOLTAGES WITHIN THE ALLOWABLE TWO PERCENT DEVIATION OR REDUCE THE
NUMBER OF SUPPLIES WHICH WOULD REQUIRE ADJUSTMENT. IF THE 7618 IS
READJUSTED, RECHECK VOLTAGES WHICH WERE OUT OF ADJUSTMENTS AND ANY
OTHERS WHICH MAY HAVE BEEN DRIVEN OUT OF TOLERANCE.

IF VOLTAGES ARE STILL OUT OF TOLERANCE, ADJUST THE SUPPLIES IN
ACCORDANCE WITH PROCEDURES IN THE REFERENCE MANUAL.

NOTE

IF ALL VOLTAGES ON A PARTICULAR SUPPLY ARE
EITHER HIGH OR LOW, ADJUSTMENT OF THE BASIC
VOLTAGE (9 VOLTS) SHOULD BE MADE BEFORE
ADJUSTING INDIVIDUAL VOLTAGES.

3.   IBM 7151-2 CONSOLE CONTROL UNIT

3.1 OPERATORS PANEL

3.1.1 ENTER MQ

WITH THE MACHINE IN MANUAL STATUS AND BY USE OF THE ENTER MQ AND
OPERATOR'S PANEL ENTRY KEYS, IT SHOULD BE POSSIBLE TO ENTER ANY 36 BIT
BINARY NUMBER INTO THE MQ REGISTER. THE MQ REGISTER INDICATORS SHOULD
ALWAYS SHOW THE INFORMATION CONTAINED IN THE MQ. THE ENTER MQ KEY
SHOULD BE INOPERATIVE WHEN THE MACHINE IS IN AUTOMATIC STATUS.

3.1.2 ENTER INSTRUCTION

WITH THE MACHINE IN MANUAL STATUS AND THE AUTOMATIC LIGHT OFF,
DEPRESSING THE ENTER INSTRUCTION KEY SHOULD PERFORM COMPLETELY AND
CORRECTLY ANY LEGITIMATE INSTRUCTION ENTERED ON THE OPERATOR'S PANEL 36
ENTRY KEYS. THE CONTENTS OF THE INSTRUCTION COUNTER SHOULD REMAIN
UNCHANGED WHEN ANY INSTRUCTION IS EXECUTED OTHER THAN ONE RESULTING IN
A TRANSFER OR TRAP. THE KEY SHOULD NOT BE EFFECTIVE WITH THE MACHINE
IN AUTOMATIC STATUS.

3.1.3 DISPLAY STORAGE

THE DISPLAY STORAGE KEY SHOULD BE CAPABLE OF DISPLAYING IN THE
STORAGE REGISTER, THE CONTENTS OF ANY ADDRESS IN CORE STORAGE
REGARDLESS OF WHAT THE CONTENTS MAY BE. THE DISPLAY STORAGE KEY MUST
NOT MODIFY THE CONTENTS OF ANY STORAGE LOCATION. THIS KEY SHOULD BE
EFFECTIVE ONLY WHEN THE MACHINE IS IN MANUAL STATUS AND THE AUTOMATIC
LIGHT IS OFF. IF INDEXING AND/OR INDIRECT ADDRESSING IS SPECIFIED, THE
CONTENTS OF THE EFFECTIVE ADDRESS WILL BE DISPLAYED. THE CONTENTS OF
THE IBR CANNOT BE GUARANTEED AFTER A DISPLAY STORAGE OPERATION.

PUSHING THIS KEY SHOULD, WHEN THE 7094-2 IS IN MANUAL STATUS AND
THE AUTOMATIC LIGHT IS OFF, DISPLAY THE CONTENTS OF THE SENSE INDICATOR
REGISTER (0-35) IN THE STORAGE REGISTER INDICATORS (S-35). THE
INFORMATION SHOULD REMAIN DISPLAYED UNTIL ANOTHER OPERATION INVOLVING
THE STORAGE REGISTER IS PERFORMED, OR THE RESET KEY IS DEPRESSED. THE
CONTENTS OF THE SENSE INDICATOR REGISTER SHOULD IN NO WAY INFLUENCE THE

ACCURACY OF THE DISPLAY NOR SHOULD DEPRESSING THE DISPLAY INDICATORS
KEY IN ANY WAY CHANGE THE CONTENTS OF THE SENSE INDICATOR REGISTER.

3.1.5 DISPLAY EFFECTIVE ADDRESS

DEPRESSING THIS KEY WILL MODIFY THE ADDRESS PORTION OF THE STORAGE
REGISTER BY THE CONTENTS OF THE INDEX REGISTER TAGGED IN THE STORAGE
REGISTER AND REPLACE THE CONTENTS OF THE STORAGE REGISTER WITH THIS
-EFFECTIVE ADDRESS. STORAGE REGISTER POSITIONS S, 1-20 ARE CLEARED.
THIS KEY OPERATES ONLY IN MANUAL STATUS WITH THE AUTOMATIC LIGHT OFF.

3.1.6 SINGLE STEP

A. WHEN THE MACHINE IS NOT IN OVERLAP MODE, DEPRESSING THE SINGLE
STEP KEY RESULTS IN EXECUTING THE INSTRUCTION WHOSE ADDRESS
APPEARS IN THE INSTRUCTION COUNTER PREVIOUS TO DEPRESSING THE
KEY. THE INSTRUCTION COUNTER WILL BE ADVANCED OR ALTERED
UNDER CONTROL OF THE INSTRUCTION EXECUTED. IF AN I/O
OPERATION IS EXECUTED THE MACHINE WILL CONTINUE TO EXECUTE
INSTRUCTIONS AT HIGH SPEED UNTIL THE END OF THE I/O OPERATION
(ALTHOUGH THIS FEATURE MAY BE SUPPRESSED BY THE I/O INTERLOCK
SWITCH, SECTION 3.2.1). THIS KEY WILL NOT OPERATE IF EITHER
THE AUTOMATIC OR PROGRAM STOP LIGHTS ARE ON.

B. WHEN THE MACHINE IS IN OVERLAP MODE, DEPRESSING THE SINGLE-
STEP KEY IS THE SAME AS ABOVE EXCEPT THAT THE MACHINE WILL
CONTINUE TO EXECUTE INSTRUCTIONS AT HIGH SPEED UNTIL A NON-
OVERLAPPED INSTRUCTION IS EXECUTED.

3.1.7 MULTIPLE STEP

HOLDING THE MULTIPLE STEP KEY DOWN SHOULD RESULT IN A SERIES OF
SINGLE STEP INSTRUCTION EXECUTIONS. ALL SPECIFICATIONS FOR SINGLE STEP
OPERATION SHOULD APPLY EXCEPT THAT THE MACHINE SHOULD NOT STOP, UNTIL
EITHER THE MULTIPLE STEP KEY IS RELEASED OR A PROGRAM OR CHECK STOP
OCCURS. THE FREQUENCY OF INSTRUCTION EXECUTION IS SPECIFIED IN SECTION
3.2.3.

3.1.8   NORMAL OFF

DEPRESSING THE NORMAL OFF KEY SHOULD START THE FOLLOWING SEQUENCE OF EVENTS-

A.   IMMEDIATE REMOVAL OF 60 CYCLE POWER FROM THE MG SET, MG BLOWER, AND ALL FRAME BLOWERS.

B.   IMMEDIATE REMOVAL OF 400 CYCLE POWER FROM THE SPECIAL STORAGE POWER SUPPLIES AND FROM ALL THE STANDARD POWER SUPPLIES IN ALL FRAMES EXCEPT CORE STORAGE.

C.   AFTER 5 +OR- 1 SECONDS, 400 CYCLE POWER REMOVAL FROM THE STANDARD STORAGE SUPPLY AND, AFTER 3 +OR-0.5 MINUTES, POWER SHOULD BE OFF THE STORAGE BLOWERS. THE MACHINE IS THEN IN NORMAL-OFF STATUS WITH 60 CYCLE POWER STILL PRESENT IN THE PDF AND AT ALL CONVENIENCE OUTLETS.

3.1.9   POWER ON

IF THE SYSTEM IS IN THE NORMAL-OFF STATUS, PUSHING THE POWER-ON KEY WILL RESTORE POWER. THE READY STATUS SHOULD BE REACHED IN 20 +OR-6 SECONDS.

3.1.10   EMERGENCY OFF

WHEN THIS SWITCH IS PULLED, IT SHOULD IMMEDIATELY REMOVE ALL POWER FROM THE 7094-2 WITH THE EXCEPTION OF LINES INSIDE THE HOTBOX IN THE PCU.

3.1.11   RESET

THE RESET KEY SHOULD TURN OFF ANY REGISTER OR TRIGGER TRIGGER WHOSE INDICATOR APPEARS ON THE OPERATOR'S CONSOLE. THE AUTOMATIC LIGHT SHOULD BE OFF AS A RESULT OF THE RESET. THIS RESET SHOULD AFFECT NEITHER THE CONTENTS OF THE SENSE INDICATOR REGISTER NOR THE STATUS OF THE MULTIPLE TAG MODE INDICATOR. RESET WILL ALSO RESET ALL CHANNELS THAT ARE NOT IN MANUAL STATUS. (SEE 7607 RESET).

3.1.12   CLEAR

WITH THE MACHINE IN AUTOMATIC STATUS, THE CLEAR KEY SHOULD PERFORM ALL THE FUNCTIONS OF THE RESET BUTTON AND SHOULD, IN ADDITION, RESET THE MACHINE CLOCK AND RESET ALL CORE STORAGE LOCATIONS TO ZEROS. THIS KEY SHOULD NOT BE EFFECTIVE WHEN THE MACHINE IS IN MANUAL STATUS. THE CLEAR KEY SHOULD ALSO RESET THE SENSE INDICATOR REGISTER. THE CLEAR KEY MUST TURN ON THE MULTIPLE TAG MODE INDICATOR. THE CLEAR KEY WILL ALSO RESET ALL CHANNELS THAT ARE NOT IN MANUAL STATUS. (SEE 7607 RESET).

3.1.13 LOAD CARDS AND LOAD TAPE

DEPRESSION OF ONE OF THESE KEYS RESULTS IN STORING THE FIRST THREE WORDS FROM EITHER THE CARD READER OR TAPE UNIT 1 ON CHANNEL A, INTO MEMORY ADDRESSES 0, 1, AND 2 PROVIDING DATA CHANNEL A WITH THE FIRST WORD AS AN I/O COMMAND, AND STARTING THE CPU WITH THE SECOND WORD STORED AS ITS FIRST INSTRUCTION. THE MACHINE MUST BE IN AUTOMATIC STATUS AND THE READY LIGHT SHOULD BE ON FOR PROPER PERFORMANCE. DEPRESSION OF A LOAD KEY WILL THEN--

A. RESET THE INSTRUCTION COUNTER, ADDRESS REGISTER, PROGRAM STOP LIGHT, SIMULATE LIGHT AND ALL INDICATORS AND REGISTERS IN ALL CHANNELS IN AUTOMATIC STATUS.

B. SET CARD READER SELECT (OR TAPE READ SELECT AND UNIT SELECT 1), CONTROL INDICATOR S AND WORD COUNTER INDICATORS 16 AND 17, IN CHANNEL A (IF CHANNEL A IS ATTACHED AND IN AUTOMATIC STATUS).

C. CHANNEL A WILL NORMALLY STORE THREE WORDS AND THEN READ A COMMAND FROM STORAGE ADDRESS 00000.

D. AS CHANNEL A READS OUT ITS COMMAND, THE MASTER STOP TRIGGER IN THE CPU SHOULD GO OFF AND ADDRESS REGISTER POSITION 17 SHOULD BE SET ON, THUS STARTING THE CPU WITH THE INSTRUCTION AT ADDRESS 00001.

3.1.14 START

THE START KEY SHOULD RESET THE PROGRAM STOP TRIGGER. AT ANY TIME REGARDLESS OF THE STATUS OF THE AUTOMATIC MANUAL SWITCH. WHEN THE AUTO/MANUAL SWITCH IS IN AUTOMATIC, THE START KEY SHOULD ALSO RESET THE MASTER STOP TRIGGER.

3.1.15 AUTOMATIC/MANUAL SWITCH

THE SWITCH MUST OPERATE IN A MANNER DESCRIBED IN SECTIONS 3.1.1 TO 3.1.7 AND 3.1.12 TO 3.1.14, IN ADDITION, SWITCHING FROM AUTOMATIC STATUS TO MANUAL STATUS WHILE RUNNING A PROGRAM SHOULD CAUSE THE MACHINE TO STOP. IF AN I/O PROGRAM IS RUNNING, THIS STOP WILL NOT OCCUR UNTIL WHATEVER UNITS WERE SELECTED HAVE DISCONNECTED. THE PROGRAM STOP LIGHT IS NOT AFFECTED BY THIS SWITCH.

3.1.16 SENSE SWITCHES

THE SENSE SWITCHES OPERATE WHEN CONSULTED BY THE APPROPRIATE SENSE INSTRUCTION, SKIPPING WHEN THE SWITCH IS DOWN, NOT SKIPPING WHEN THE SWITCH IS UP.

3.1.17 OPERATORS PANEL ENTRY KEYS

THE CONTENTS OF THESE KEYS MAY BE ENTERED INTO THE STORAGE REGISTER AND MULTIPLIER-QUOTIENT REGISTER USING THE ENTER MQ KEY OR THE ENK INSTRUCTION. THE CONTENTS OF THESE KEYS WILL BE SET INTO THE STORAGE REGISTER, INSTRUCTION REGISTER AND THE TAG REGISTER WHEN USING THE ENTER INSTRUCTION KEY, OR WHEN USING THE CONTINUOUS ENTER INSTRUCTION SWITCH AND START, SINGLE-STEP, MACHINE CYCLE OR MULTIPLE STEP KEYS. AN ENTRY KEY BEING DOWN REPRESENTS A ONE OR A MINUS.

3.1.18 OPERATORS PANEL ENTRY KEYS RESET

PRESSING THIS KEY SHALL RESTORE ALL 36 ENTRY KEYS TO THE ZERO POSITION. THIS OPERATION SHALL TAKE A MAXIMUM OF TWO SECONDS AND MUST NOT AFFECT THE MACHINE IN ANY WAY OTHER THAN RESETTING THE KEYS.

3.2   CE TEST PANEL

3.2.1 I/O INTERLOCK SWITCH

THIS SWITCH IS EFFECTIVE WHEN THE AUTOMATIC/MANUAL SWITCH IS SET TO MANUAL. WITH BOTH SWITCHES SET TO MANUAL POSITIONS, THE MACHINE WILL STOP AFTER EXECUTING EACH INSTRUCTION. WITH THE I/O INTERLOCK SWITCH SET ON AUTOMATIC, THE MACHINE WILL NOT STOP IF AN I/O DEVICE IS IN OPERATION. THIS NORMAL SETTING (AUTOMATIC) ALLOWS THE COMPUTER TO CONTINUE AT HIGH SPEED AFTER I/O SELECTION TO PROVIDE INSTRUCTIONS TO SERVE THE I/O DEVICE. THE MACHINE WILL STOP AFTER EACH INSTRUCTION PROVIDING THAT NO I/O DEVICE OR DATA CHANNEL IS IN USE.

3.2.2 CONTINUOUS ENTER INSTRUCTION

THIS SWITCH IS EFFECTIVE IN AUTOMATIC OR MANUAL STATUS. WITH THIS SWITCH ON, ALL INSTRUCTIONS ARE OBTAINED FROM THE OPERATOR'S PANEL ENTRY KEYS RATHER THAN FROM STORAGE. THE INSTRUCTION COUNTER DOES NOT ADVANCE FOR EACH INSTRUCTION, AND THE INSTRUCTION COUNTER'S CONTENTS WILL NOT BE ALTERED UNLESS A TRAP OR TRANSFER RESULTS FROM THE INSTRUCTION IN THE ENTRY KEYS.

3.2.3 MULTIPLE STEP

IF THIS SWITCH IS IN THE HIGH SPEED POSITION, THE 7094 SHOULD, WHEN THE MULTIPLE STEP KEY IS DEPRESSED, EXECUTE 50 +OR-10 INSTRUCTIONS PER SECOND. THE RATE WHEN THE SWITCH IS IN THE LOW SPEED POSITION SHOULD BE 10 +OR-2 INSTRUCTIONS PER SECOND.

3.2.4 NO OVERLAP

THE NORMAL POSITION OF THIS SWITCH IS DOWN. WHEN PLACED IN THE UP POSITION THIS SWITCH RESETS THE OVERLAP MODE TRIGGER, TURNS OFF THE READY LIGHT AND ALLOWS THE INSTRUCTIONS ELAP AND LLAP TO BE EXECUTED.

3.2.5   DISPLAY IBR

DEPRESSING THIS KEY REPLACES THE CONTENTS OF THE STORAGE REGISTER WITH THE CONTENTS OF THE INSTRUCTION BACK-UP REGISTER. THIS KEY IS EFFECTIVE WHEN THE MACHINE IS IN MANUAL STATUS.

3.2.6   MEMORY DIAGNOSTIC

THE NORMAL POSITION OF THIS SWITCH IS OFF OR DOWN. WHEN ON, THIS SWITCH TURNS OFF THE READY LIGHT AND ALLOWS THE INSTRUCTIONS EDAT AND LDAT TO BE EXECUTED.

3.2.7   DC ON

THIS SWITCH CONTROLS THE 400 CYCLE POWER SUPPLIED TO THE 7151-2. PUTTING IT IN THE OFF POSITION WILL IMMEDIATELY REMOVE ALL POWER EXCEPT THAT TO THE CONVENIENCE OUTLETS AND RESET MOTOR. ALL VOLTAGES SHOULD BE NORMAL IN THE CONSOLE WITHIN 10 +OR- 6 SECONDS OF PUTTING THIS SWITCH ON.

3.2.8   MACHINE CYCLE JACK

WHEN THE MACHINE CYCLE KEY IS INSERTED IN THIS PLUG, DEPRESSING THE KEY ONCE SHOULD CAUSE THE MACHINE TO EXECUTE ONE AND ONLY ONE CYCLE. IN ALL FLOATING POINT OPERATIONS (EXCEPT DIVIDE) AND FIXED POINT MULTIPLY THERE SHALL BE ONE ITERATION FOR EACH DEPRESSION OF THE MACHINE CYCLE HAND KEY. SHIFTING INSTRUCTIONS SHALL SHIFT THREE PLACES FOR EACH DEPRESSION OF THE MACHINE CYCLE HAND KEY. WHEN THE MACHINE CYCLE KEY IS NOT PLUGGED IN, A PLUG SHORTING PINS 1 AND 3 OF THE JACK MUST BE INSERTED.

<center>NOTE</center>

<center>DO NOT USE THIS KEY-</center>

1. TO PERFORM I/O INSTRUCTIONS.

2. WHEN CYCLING FLOATING POINT INSTRUCTIONS IN OVERLAP MODE.

3.2.9   AUXILIARY START AND RESET JACK

WHEN THE AUXILIARY START AND RESET BUTTONS ARE PLUGGED INTO THIS JACK, THEY SHOULD OPERATE IN THE SAME WAY THAT THE OPERATOR'S PANEL START AND RESET BUTTONS WORK.

3.2.10   MEMORY BIAS SWITCH - ODD, EVEN

THIS SWITCH SELECTS EITHER THE ODD OR EVEN SECTION OF THE 7302-3 FOR REMOTE BIASING FROM THE CONSOLE.

4.   IBM 7111, 7109, 7606 UNITS

4.1 WAVEFORMS AND VARIABLE DELAYS

ALL VARIABLE DELAYS SHALL BE INITIALLY SET TO THE NOMINAL VALUES
SPECIFIED ON SYSTEMS PAGE 00.92.01.1 BEFORE PROCEEDING WITH THE
FOLLOWING. TIMINGS FOR 'F' LINES SHOULD BE MEASURED AT 1.5 V LEVEL

   A.   ODD AND EVEN CLOCK DRIVE LINE PULSES, SYSTEMS DIAGRAM
        08.00.44.1 SHOULD CONFORM TO THE CONFIGURATION SHOWN ON
        19-1 WHEN OBSERVED AT 03A4C15F.
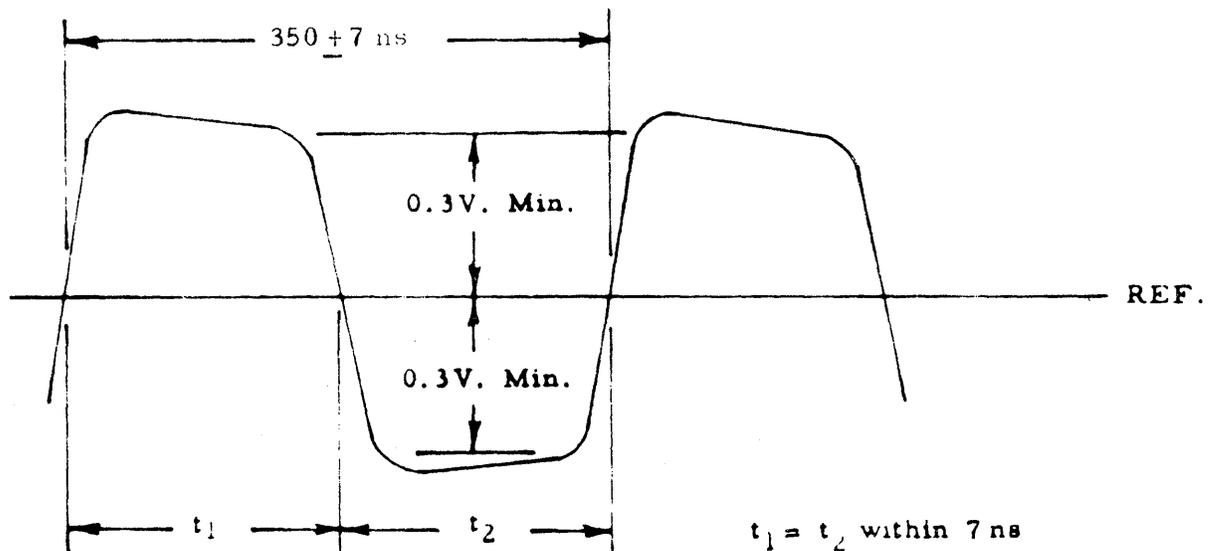
FIGURE 19-1 EVEN CLOCK DRIVE LINE PULSES

   B.   THE CP SET PULSES SHOULD MEET ALL REQUIREMENTS OF FIGURE 19-2
        WHEN OBSERVED AT 01A1C12C ON SYSTEMS PAGE 02.61.1 AND AT
        01B1C20B ON SYSTEMS PAGE 02.15.61.2.
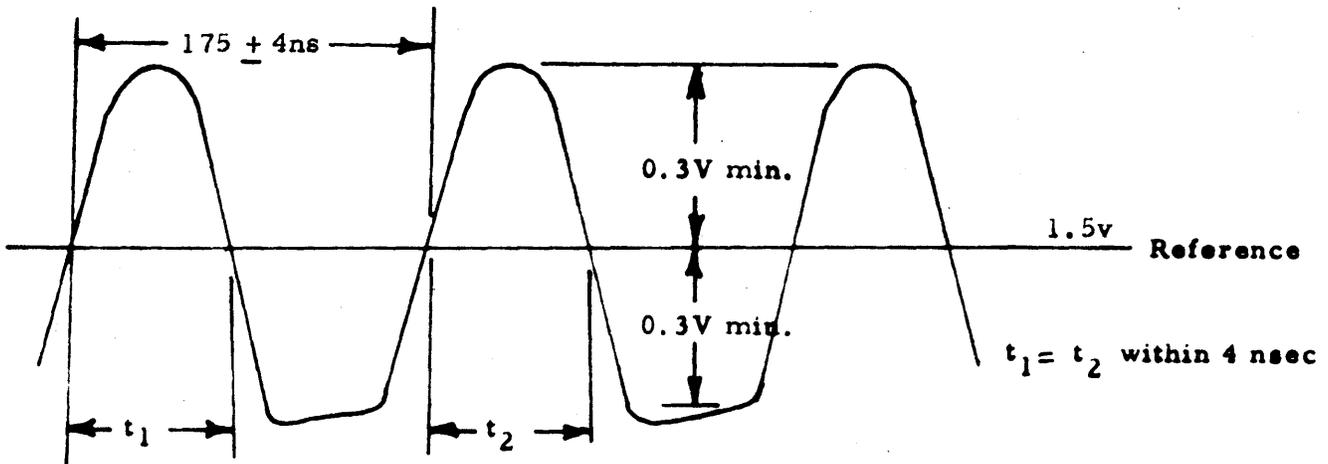
FIGURE 19-2 CP SET PULSES

C. TO INSURE PROPER MACHINE FUNCTIONING ON ALL INSTRUCTIONS,
    THE CP SET MUST BE ALIGNED AS FOLLOWS-

    1. PERFORM THE FOLLOWING INSTRUCTION IN CONT. ENTER INSTR.
        MODE-

INSTR.	OPERATION	TAG	ADDRESS
LDQ	560	0	00000

    2. SYNC. SCOPE ON +F E TIME LATE LN1B AT 01B2E09H, SYSTEMS
        PAGE 02.13.47.1.

    3. CONNECT ONE SCOPE PROBE TO THE -F A7D1G5 LNB CLOCK PULSE
        AT 01B1C05E, SYSTEMS PAGE 02.15.70.8.

    4. CONNECT A SECOND PROBE TO THE SET PULSE AT 01B1E24C,
        SYSTEMS PAGE 02.15.61.2.

    5. ROTATE THE VARIABLE DELAY CONTROL AT 03B3D03 UNTIL THE
        FALL OF THE SET PULSE OCCURS 10 NSEC BEFORE THE FALL
        (LEADING EDGE) OF THE -F A7D1 PULSE. SEE FIGURE 19-3.

-F A7D1G5 LNB

|← —— 10 ns

Ref. = 1. 5 volts
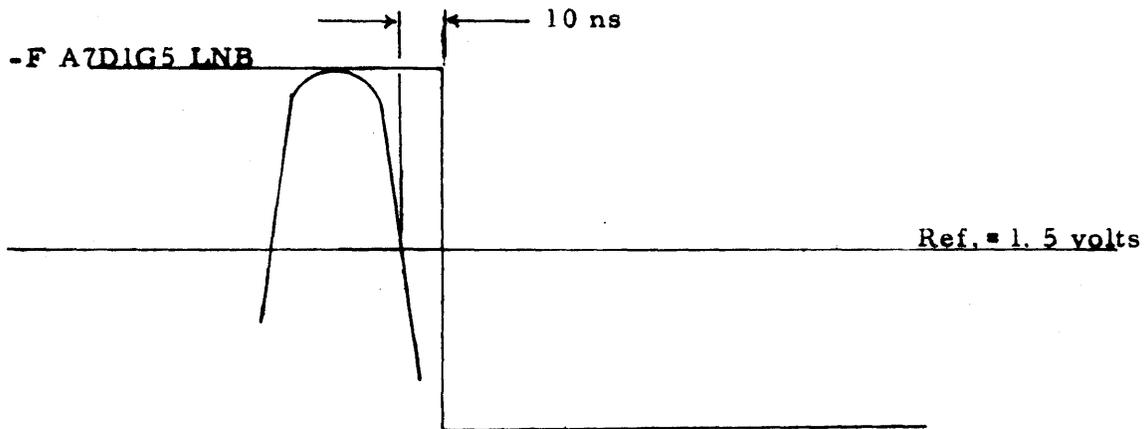
FIGURE 19-3 CP SET ALIGNMENT AND WIDTH ADJUSTMENT

6. CONNECT A SCOPE PROBE TO THE TEST POINTS SHOWN IN THE
    TABLE BELOW AND ASSURE THAT THE SET PULSE WIDTH (MEASURED
    AT 1.5 VOLT LEVEL) IS CORRECT.

TEST POINT	PULSE	WIDTH	+ OR -	ADJUSTMENT	SYSTEMS
01A1E13E	-F	50 NS	3	01A1E14 (A-H)	02.15.61.1
01B1E24B	-F	60 NS	3	01B1E25 (B-G)	02.15.61.2
01B1F21C	+F	40 NS	3	01B1E12 (D-E)	02.15.61.2

7. THE OPTIMUM MULTIPLEXOR DELAY LINE OPERATION POINT IS
    DETERMINED BY RUNNING 9M81. IT IS MIDPOINT OF THE ERROR
    FREE OPERATING RANGE OF 9M81 RUNNING AT NORMAL VOLTAGE
    AS THE DELAY LINE AT 03B3D03 IS VARIED. AFTER
    DETERMINING THE OPTIMUM OPERATING POINT AND WITHOUT
    DISTURBING THE DELAY LINE ADJUSTMENT, REMOVE AND RE-
    INSTALL THE DELAY LINE KNOB AT 03B3D03 TO READ ZERO.

4.2 MEMORY SELECT

SYNC SCOPE + ON A6D1 AT 01A1C09D SYSTEMS PAGE 02.15.70.7

PROBE A ON A7D15 AT D1A4J24G SYSTEMS PAGE 03.06.29.4

PROBE B ON CHANNEL A2D1 DLYD AT 01A4J24E SYSTEMS PAGE
03.06.29.4

ADJUST DELAY LINE AT 03A4J17 SYSTEMS PAGE 08.00.40.1 UNTIL
THE RISE OF THE CHANNEL A2D1 DLYD CROSSES REFERENCE AT THE
SAME TIME AS THE A7D15 PULSE + OR - 3 NS.

4.3 TIMING ON MANUAL CONTROLS SINGLE-SHOTS

SINGLE-SHOT	SYSTEMS PAGE	LOCATION	TIMING + OR - 10 PERCENT
MINUS ON ANY SWITCH	04.20.04.1	02C1C04 VRPF(EJV<)	1 US
		02C1D03 HL--	30 MS
		02C1D06 AX--	350 US
CLEAR	02.20.12.1	02C2G02 VRPF(EJV<)	1 US
MULTI-STEP	04.20.17.1	02C2G13 HL--	12 MS
		02C2G10 HL--	12 MS
		02C2G15 HL--	40 MS
		02C2G18 HL--	40 MS

5. CORE STORAGE

THE FOLLOWING RELIABILITY AND PERFORMANCE CHECKS MUST BE MADE
BEFORE THE MACHINE IS TURNED OVER TO THE CUSTOMER.

5.1 GENERAL PERFORMANCE

A. CHECK THAT THE MAXIMUM CAPACITY OF THE MEMORY IS 32,768 WORDS
    AT 36 BITS/WORD.

B. CHECK THAT MEMORY CAN COMPLETE A CYCLE ONCE EVERY 1.4 USEC.

C. CHECK THAT ACCESS TIME, THE TIME BETWEEN THE MEMORY SELECT
    PULSE REACHING THE TAILGATE AND THE BIT 35 READ-OUT

INFORMATION LEAVING THE TAILGATE DOES NOT EXCEED 0.75 USEC.

5.2   STANDARD VOLTAGE SUPPLY

WHEN ALL SUPPLIES ARE TURNED ON, THE LOGIC VOLTAGES (-6, +6, -12, -12M, +20, -20 VDC) MUST BE AT THEIR NOMINAL VALUES. THE REGULATION OF THESE SUPPLIES MUST BE AT + OR - 2 PERCENT.

5.3   SPECIAL MEMORY VOLTAGE SUPPLY

A.   THE +60 X AND Y DRIVER VOLTAGE MUST BE CONTINUOUSLY VARIABLE FROM +45V DC TO AT LEAST 62V DC, BUT NOT MORE THAN 64V DC. THE REGULATION AT THE SUPPLY MUST BE +OR- 2 PERCENT.

B.   THE +60 Z DRIVER VOLTAGE MUST BE CONTINUOUSLY VARIABLE FROM +45V DC TO AT LEAST 62V DC, BUT NOT MORE THAN 64V DC. THE REGULATION AT THE SUPPLY MUST BE +OR- 2 PERCENT.

C.   CHECK THE +60 XY TEMPERATURE COMPENSATION RATE.

D.   MAKE SURE THAT THE +60 SPECIAL MEMORY SUPPLIES CANNOT BE CYCLED UP UNTIL THE LOGIC SUPPLIES ARE OPERATING PROPERLY.

E.   ON NORMAL 'POWER OFF', MAKE SURE THE PCU TURNS OFF THE +60 SPECIAL POWER SUPPLIES BEFORE THE LOGIC SUPPLIES.

5.4   DRIVER VOLTAGE BIAS AND MARGINAL CHECKING

A.   ALL DIAGNOSTIC TESTS MUST RUN ERROR-FREE WHILE THE XY AND Z DRIVER VOLTAGES ARE VARIED (ONE AT A TIME) + OR - 3 PERCENT ABOUT THEIR RESPECTIVE OPTIMUM POINTS.

B.   VARY THE -12M + OR - 3.0 VOLTS, WHILE RUNNING ALL DIAGNOSTICS.

5.5   ENVIRONMENTAL CONDITIONS

CHECK THAT AMBIENT TEMPERATURE IS BETWEEN 50 AND 80 DEGREES F, AND BETWEEN 20 AND 80 PERCENT RELATIVE HUMIDITY, FOR BEST MACHINE PERFORMANCE.

5.6   CUSTOMER ENGINEER'S PANEL

A.   B PANEL ONLY

1.   DEPRESSING THE POWER OFF SWITCH MUST TURN OF ALL 400 CYCLE POWER INTO MEMORY.

2. THE POWER ON LIGHT MUST TURN OFF WHENEVER A CIRCUIT
    BREAKER IN THE STANDARD OR SPECIAL POWER SUPPLY OPENS.

3. THE TEST STATUS CONTROL MUST ALLOW THE COMPUTER TO CYCLE
    THROUGH THE ADDRESSES, UNTIL THERE IS AN ERROR STOP.

B. B AND C PANELS

1. 'WRITE ONES' CONTROL MUST RESET ALL MEMORY LOCATIONS TO
    ONES.

2. 'WRITE ZEROS' CONTROL MUST RESET ALL MEMORY LOCATIONS TO
    ZEROS.

3. 'CHECK ONES' CONTROL MUST, IF A ONE IS DROPPED,STOP THE
    ADDRESS CYCLING, AND LIGHT THE 'ERROR' INDICATOR SHOWING
    THE ADDRESS IN ERROR AS WELL AS THE DROPPED BIT.

4. 'CHECK ZEROS' CONTROL MUST, IF A ONE IS PICKED UP, STOP
    THE ADDRESS CYCLING, AND LIGHT THE 'ERROR' INDICATOR
    SHOWING THE ADDRESS IN ERROR AS WELL AS THE PICKED UP BIT.

5. 'CHECK RESET' CONTROL MUST TURN OFF ALL ERROR INDICATORS
    AND START THE MEMORY CYCLING FROM THE ADDRESS WHERE THE
    ERROR OCCURRED.

5.7 CHECK BLOWERS

A. BLOWERS MUST CONTINUE TO RUN FOR A MINIMUM OF THREE MINUTES
    AFTER THE DC SUPPLIES ARE TURNED OFF.

B. MAKE SURE THAT BLOWERS ROTATE COUNTER CLOCKWISE WHEN VIEWED
    FROM THE RIGHT HAND END OF THE 7302-3, FORCING AIR UPWARD
    THROUGH THE CARDS.

5.8 SYSTEM COMPATIBILITY

THE 7302-3 MUST, IN ADDITION TO MEETING ITS OWN UNIT REQUIREMENTS,
COMPLY WITH THE REQUIREMENTS OF THE SYSTEM TO WHICH IT IS ATTACHED.

5.9 MEMORY SELECT AND MAR

A. CHECK THE TIME RELATIONSHIP BETWEEN THE MAR SETS AND MAR
    ADDRESS. BOTH SECTIONS OF MEMORY ARE CHECKED USING AN STQ
    INSTRUCTION IN CONT. ENTER MODE.

B. SYNC +F E TIME AT 01AZE12P, SYSTEMS PAGE 08.00.19.3.

C. CONNECT SCOPE PROBES TO THE TEST POINTS LISTED BELOW AND

CHECK THAT THE MAR ADDRESS PRECEDES THE MAR SETS BY A MINIMUM OF 20 NS.

	EVEN MEMORY	ODD MEMORY	
INSTRUCTION	ST Q 77776	ST Q 77777	
MAR SETS	01B3C16D	01C3C16D	A PROBE
MAR 4	01B3C16E	01C3C16E	B PROBE
MAR 16	01B3C22V	01C3C22V	B PROBE

6.   IBM 7607 DATA CHANNEL

6.1 SINGLE -SHOT MULTIVIBRATOR TIMINGS

     EACH OF THE SINGLE-SHOT MULTIVIBRATOR OR VARIABLE-DELAY CIRCUITS LISTED BELOW MUST MEET THE SPECIFIED TIMING DURATION-

TABLE 19-1 SINGLE-SHOT MULTIVIBRATOR TIMINGS

SYSTEMS	NAME	NOMINAL DURATION	ACCEPTABLE DURATION
60.36.02.2	BACKSPACE INTERLOCK	10.0 US (11.5us)	9.0 - 11.0 US
60.36.02.2	EOR PULSE	10.0 US	9.0 - 11.0 US
60.40.12.1	MANUAL SWITCH	3.0 MS	2.7 - 3.3 MS
60.40.12.1	MANUAL SWITCH	118.0 US	105.0 - 130.0 US
60.50.10.1	TAPE SELECTED	3.0 US	2.8 - 3.2 US
80.40.01.1	MANUAL PULSE	215.0 US	212.0 - 218.0 US
80.50.04.1	SELECT PULSE	4.0 US	3.5 - 4.5 US
80.60.01.1	DISCONNECT PULSE	4.0 US	3.5 - 4.5 US
80.80.01.2	CARD SAMPLE PULSE	4.0 US	3.5 - 4.5 US
60.36.05.1	SELECT AND READY	3.0 US	2.8 - 3.2 US
80.50.03.1	CARD EOR PULSE	4.0 US	3.5 - 4.5 US
61.60.50.1	SELECT AND REWIND DLYD	3.5 US	3.2 - 4.0 US

6.2   CHANNEL ERROR CIRCUITS

   A.   CHECK WRITE COMPARE CIRCUITS BY-

      1.   REMOVING ONE AT A TIME THE CARDS IN THE FOLLOWING
           POSITIONS, AND WRITING TAPE ALL ONES, WITH DATA CHANNEL IN
           MANUAL OFF-LINE STATUS. THE CARDS LISTED ARE LOCATED ON
           PAGE 61.40.10.1 OF TAU SYSTEMS MANUAL.

                6B4G15   6B4G22
                6B4G16   6B4G23
                6B4G17   6B4G24
                6B4G18   6B4G25
                6B4G19   6B4G26
                6B4G20   6B4G27
                6B4G21   6B4G28

                         NOTE

           THE CHANNEL SHOULD BE RESET AFTER EACH CARD
           IS PULLED AND REINSERTED.

      2.   ERROR TRIGGER SHOULD COME ON FOR EACH CARD PULLED.

   B.   TEST R/W VRC TRIGGER

      1.   FROM THE DATA CHANNEL CONSOLE MANUALLY WRITE A RECORD
           CONTAINING ALL ONES.

      2.   WITH EACH OF THE FOLLOWING PAIRS OF CARDS REMOVED, THE
           ERROR TRIGGER AND RW/VRC TRIGGERS SHOULD BE TURNED ON WHEN
           THE ABOVE MENTIONED RECORD IS READ.

                     6B4G15 AND 16

                     6B4G17 AND 18

                     6B4G19 AND 20

                     6B4G21 AND 22

                     6B4G23 AND 24

                     6B4G25 AND 26

                     6B4G27 AND 28

   C.   TEST GATING OF SKEW REG B TO R/W REGISTER WHEN REGISTER A
        IS REDUNDANT.

      1.   FILL MEMORY WITH ALL ONES.

2. MANUALLY REWIND DRIVE AND LOAD A CONTROL WORD OF 77777 ADDRESS 00000

3. WRITE TAPE AND REWIND.

4. REMOVE CARD 06B4G28.

5. CLEAR MEMORY.

6. LOAD SAME CONTROL WORD MENTIONED ABOVE AND READ TAPE.

7. GIVE A MEMORY TEST (ONES). ONLY ONE POSITION IN MEMORY

   SHOULD BE ZERO. ADDRESS 77777.

8. RE-INSERT CARD 06B4G28.

D. TEST LRCR ERROR GATING ERROR TRIGGER.

1. MANUALLY WRITE RECORD CONTAINING ALL ONES, AND REWIND.

2. REMOVE CARD 06B2K18.

3. REMOVE THE FOLLOWING CARDS, ONE AT A TIME AND READ THE RECORD MENTIONED ABOVE.

       6B4C09   6B4C17
       6B4C11   6B4C19
       6B4C13   6B4C21
       6B4C15

4. THE ERROR TRIGGER SHOULD COME ON FOR EACH CARD REMOVED. THE ABOVE MENTIONED CARDS ARE LOCATED ON PAGE 61.50.40.1 OF THE TAU SYSTEMS MANUAL.

E. TEST ECHO CHECK CIRCUIT

1. JUMPER 6B2K10E AND 6B2K10F.

2. WRITE A RECORD ON TAPE.

3. THE NO ECHO, ECHO ERROR, AND ERROR TRIGGERS SHOULD COME ON.

F. TEST TWI ERROR CIRCUIT

1. WRITE CYCLE ONE WORD RECORDS IN BINARY (BIT 2 IN FIRST FIVE CHARACTERS AND BIT 1 IN 6TH CHARACTER) FROM DATA CHANNEL CONSOLE.

2. REWIND AND REMOVE FINAL AMP CARD FOR TRACK ONE (06B4J27).

3. READ FROM DATA CHANNEL CONSOLE IN BINARY MODE, NOT CYCLE, AND TWI SWITCH ON (DOWN).

4. THE TWI INDICATOR AND REGISTER A ERR TGR SHOULD TURN ON.

5. TURN TWI SWITCH TO OFF POSITION (UP).

6. READ IN BINARY MODE, NOT CYCLE.

7. TWI INDICATOR SHOULD NOT TURN ON, THERE WILL BE REGISTER A ERR.

8. READ IN BCD MODE, NOT CYCLE, AND TWI SWITCH ON.

9. TWI INDICATOR SHOULD NOT TURN ON, REG. A ERR AND R/W VRC WILL BE ON.

10. REPLACE CARD 06B4J27.

G. TEST WD NOISE ERROR CIRCUITS

1. WRITE A LONG RECORD OF ALL BITS (FROM DATA CHANNEL CONSOLE).

2. BACKSPACE AND RESET CHANNEL WHEN BACKSPACE IS APPROXIMATE IN THE MIDDLE OF THE RECORD.

3. WRITE AN END OF FILE.

4. WD NOISE INDICATOR SHOULD TURN ON, WR COMP AND REGISTER A ERROR MAY ALSO TURN ON.

H. TEST WR SKEW--ERROR CIRCUITS

1. REMOVE ABZW LOCATION 06B4D12, AND PLACE ANZZ IN THE SAME LOCATION.

2. WRITE TAPE CONTINUOUSLY ALL BITS FROM DATA CHANNEL CONSOLE.

3. WRITE SKEW ERROR INDICATOR SHOULD TURN ON.

4. REMOVE ANZZ (06B4D12) AND INSERT ORIGINAL ABZW.

I. TEST ERROR RETENTION LOGIC (BABY SITTERS)

1. FROM CPU WRITE APPROXIMATELY 1/4 REEL OF 1 WORD RECORDS OF ALL BITS IN BINARY.

2. REWIND TAPE AND PUT CHANNEL IN AUTOMATIC AND OFF-LINE OPERATION.

3. FROM CPU READ ONE WORD RECORD IN BCD, LOOP PROGRAM TO
    CONTINUE READING.

4. CHANNEL TAPE ERROR TRIGGERS REG. A AND RW/VRC SHOULD
    TURN ON AND REMAIN ON.

5. PERFORM FOLLOWING STEPS WHILE READING TAPE FROM CPU.

6. DEPRESS CHANNEL RESET BUTTON, ERROR TRIGGERS SHOULD BE
    RESET AND REMAIN RESET WHILE BUTTON IS HELD DEPRESSED.

7. LIFT CHANNEL *ON/OFF LINE* SWITCH TO PLACE CHANNEL IN
    ON-LINE OPERATION.

8. ERROR TRIGGERS SHOULD NOT REMAIN ON, RESET BEING
    ACCOMPLISHED BY LOGICAL RESET AT BEGINNING OF EACH
    READ OPERATION.

J. TO INSURE GATING OF SKEW REGISTER B WITH READ CLOCK GATE
    DURING REG. A ERROR.

    1. WRITE CYCLE SEVERAL ONE WORD RECORDS (1,2, AND B BIT
        IN 1ST, 2ND, AND 3RD CHARACTERS) FROM CHANNEL CONSOLE
        IN BINARY MODE.

    2. REMOVE HI CLIP C SKEW REGISTER. A AMP CARD (06B4H16).

    3. READ IN NOT CYCLE AND IN BINARY MODE, THE ABOVE RECORDS,
        WITH TWI SWITCH TURNED ON. RECORDS SHOULD BE READ
        WITHOUT TWI ERROR, REGISTER A ERROR WILL TURN ON.

    4. EXECUTE STEPS 1,2, AND 3 FOR MODEL 2, 4, 5 AND 6 (HI AND
        LO DENSITY).

K. 7607 MODELS 3 AND 4, DATA CHANNELS (800 BPI) WILL HAVE A
    BINARY TRIGGER USED FOR SWITCHING THE READ CLIPPING LEVELS
    WHEN RE-READING A REDUNDANCY. THE TRIGGER SHOULD BE TESTED
    AS FOLLOWS-

    1. WITH THE DATA CHANNEL RESET, MEASURE THE VOLTAGE (20,00
        OHMS/VOLT METER AS A MINIMUM) AT 06B4J27A WITH
        RESPECT TO -12 VOLTS. ADJUST THE POTENTIOMETER ON THE ARF
        CARD AT 06B4F13 TO READ -0.6V.

    2. MANUALLY WRITE SEVERAL ONE WORD RECORDS IN THE BINARY
        MODE. REWIND THE TAPE UNIT AND READ TWO RECORDS, THEN
        READ THE NEXT RECORD IN BCD MODE. THE TAU ERROR TRIGGER
        SHOULD SIGNAL A REDUNDANCY. BACKSPACE RECORD AND READ
        FORWARD (BCD) AND THE CLIPPING VOLTAGE AT 06B4J27A SHOULD
        DROP TO 0.0 VOLTS. THE VOLTAGE AT 06B4J27D SHOULD REMAIN
        AT +1.8 VOLTS. ANOTHER BACKSPACE AND READ FORWARD
        SHOULD CHANGE THE LOW CLIP LEVEL AT 06B4J27A TO -0.6V.

THE CLIPPING LEVEL SHOULD CHANGE ALTERNATELY WHEN A
REDUNDANCY IS RE-READ. AT THE ZERO CLIPPING LEVEL, FIRST
BIT OFF REGISTER B IS INOPERATIVE.

3. BACKSPACE RECORD AND READ FORWARD (BCD) THE LOW CLIP
    LEVEL SHOULD CHANGE TO 0.0 VOLTS. WITH THE TAU ERROR
    TRIGGER STILL ON READ FORWARD, THE NEXT RECORD AND THE
    LOW CLIP LEVEL SHOULD GO TO -0.6 VOLTS WITH THE RISE
    OF READ DELAY.

4. MEASURE 06B4J27A AS BEFORE AND BACKSPACE SEVERAL RECORDS
    TO BE SURE THAT THE LOW CLIP LEVEL REMAINS AT -0.6 VOLTS
    WHILE BACKSPACING.

6.3   7607 UNIT AND SYSTEM TEST PROCEDURES

A.   SYSTEM INTERLOCK REQUIREMENTS

     IF THE AUTOMATIC/MANUAL SWITCH FOR A DATA CHANNEL IS
PLACED IN THE MANUAL STATUS POSITION, THE EFFECT ON A 7094
PROGRAM WILL BE THE SAME AS IF THAT CHANNEL WERE NOT
CONNECTED TO THE SYSTEM.

     THE FOLLOWING INSTRUCTIONS ARE AFFECTED AS INDICATED
WHEN A CHANNEL (N) IS IN MANUAL STATUS-

1. TRANSFER ON CHANNEL (N) IN USE--WILL NOT TRANSFER

2. TRANSFER ON CHANNEL (N) NOT IN USE--WILL TRANSFER

3. TRANSFER ON CHANNEL (N) EOF--WILL NOT TRANSFER

4. TRANSFER ON CHANNEL (N) REDUNDANCY CHECK--WILL NOT
    TRANSFER

5. STORE CHANNEL (N) SAME AS IN AUTOMATIC STATUS

6. RESET AND LOAD CHANNEL(N)--WILL HANG UP THE MAIN FRAME.
    THIS INSTRUCTION, HOWEVER, SHOULD BE PRECEDED BY A READ
    OR WRITE INSTRUCTION, WHICH WOULD ALSO HANG UP THE
    MAIN FRAME.

7. LOAD CHANNEL (N)--SAME AS (6) RESET AND LOAD OPERATION

                         NOTE
          ANY OF THE FOLLOWING INSTRUCTIONS (8-13) WILL
               TIE UP THE MAIN FRAME IN L TIME.

8. READ CHANNEL (N)

9. WRITE CHANNEL (N)

10. BACKSPACE TAPE CHANNEL (N)

11. BACKSPACE FILE CHANNEL (N)

12. REWIND CHANNEL (N)

13. WRITE END OF FILE CHANNEL (N)

14. SENSE PRINTER CHANNEL (N)--ACTS AS NO OPERATION

15. SENSE PUNCH CHANNEL (N)--ACTS AS NO OPERATION

16. BEGINNING OF TAPE TEST CHANNEL (N)--WILL SKIP
    NEXT INSTRUCTION AND PROCEED.

17. END OF TAPE TEST CHANNEL (N)--WILL SKIP NEXT
    INSTRUCTION AND PROCEED.

18. LOAD CARDS BUTTON--MAIN FRAME--OPERATES NORMALLY AS LONG
    CHANNEL A IS NOT IN MANUAL STATUS. IF CHANNEL A IS IN
    MANUAL STATUS, ONLY THE INTERLOCK RESET IN MAIN FRAME
    WILL BE EXECUTED.

19. LOAD TAPE KEY--MAIN FRAME--SAME AS LOAD CARDS KEY.

B. READ/WRITE SELECT LIGHT WILL ONLY BE ON WHEN A CHANNEL IS IN
   AUTOMATIC OPERATION OF A READ OR WRITE OPERATION. A MANUALLY
   INITIATED READ OR WRITE FROM THE DATA CHANNEL WILL NOT TURN
   ON THE READ/WRITE LIGHT.

C. THE 'AUTOMATIC OPERATION' LIGHT WILL NOT BE HELD ON BY A
   CHANNEL WHICH IS IN MANUAL STATUS, EVEN THOUGH THIS CHANNEL
   MAY BE DOING AN I/O OPERATION.

D. NEITHER THE 'CHANNEL SELECT' NOR THE 'TAPE CHECK' LIGHTS, NOR
   THE I/O CHECK ON THE MAIN CONSOLE WILL BE TURNED ON BY
   OPERATIONS OF A CHANNEL IN MANUAL STATUS OR TEST STATUS.

7. IBM 7617 DATA CHANNEL CONSOLE

    THE 7617 DATA CHANNEL CONSOLE IS A COMBINED OPERATOR'S CONSOLE AND
CE TEST PANEL. THE OPERATOR'S PANEL ON THE 7617 DATA CHANNEL CONSOLE
IS CHECKED AS LISTED IN SECTIONS 7-1 THROUGH 7-14 AND THE CE TEST PANEL
ON THE 7617 DATA CHANNEL CONSOLE IS CHECKED AS LISTED IN SECTIONS 7-15
THROUGH 7-21.

7.1 AUTO/MANUAL SWITCH

IN THE AUTOMATIC POSITION, THIS SWITCH PERMITS NORMAL OPERATION OF
THE MACHINE WHILE ALSO ISOLATING THE ENTRY KEYS AND MANUAL CONTROL
SWITCHES IN THE CHANNEL. IT ALSO PERMITS ALL RESETS INITIATED BY THE
7094 TO RESET THE CHANNELS.

7.2 RESET SWITCH

THIS KEY IS OPERATIVE ONLY IF THE AUTOMATIC/MANUAL SWITCH IS IN
THE MANUAL STATUS. IF IN MANUAL STATUS, DEPRESSION OF THE RESET KEY
WILL RESET ALL INDICATORS, REGISTERS, AND COUNTERS IN THE CHANNEL
EXCEPT THE WC-ZERO INDICATOR. WHEN THE CHANNEL IS IN AUTOMATIC STATUS,
ALL RESETS ARE UNDER CONTROL OF THE 7094-2. (REFER TO SECTION 7.8).

7.3 LOAD DATA REGISTER

DEPRESSION OF THIS KEY GATES THE ENTRY KEYS TO THE DATA REGISTER
IF THE CHANNEL IS IN MANUAL STATUS. THIS KEY HAS NO EFFECT IF THE
CHANNEL IS IN AUTOMATIC STATUS.

7.4 STORE DATA REGISTER

IF THE CHANNEL IS IN MANUAL STATUS, DEPRESSION OF THIS KEY WILL
CAUSE THE CONTENTS OF THE DATA REGISTER TO BE STORED IN MAGNETIC CORE
STORAGE AT THE ADDRESS SET UP IN THE ADDRESS COUNTER. THIS KEY HAS NO
EFFECT IF THE CHANNEL IS IN AUTOMATIC STATUS.

7.5 DISPLAY STORAGE

DEPRESSION OF THIS KEY WILL CAUSE THE CONTENTS OF THE STORAGE
LOCATION WHOSE ADDRESS IS SET UP IN THE ADDRESS COUNTER TO BE DISPLAYED
IN THE DATA REGISTER IF THE CHANNEL IS IN MANUAL STATUS. THIS KEY HAS
NO EFFECT IF THE CHANNEL IS IN AUTOMATIC STATUS. EACH TIME THE KEY IS
DEPRESSED, THE ADDRESS COUNTER IS STEPPED ONCE, DISPLAYING THE NEXT
SUCCESSIVE STORAGE LOCATION.

7.6 LOAD COMMAND

DEPRESSION OF THIS KEY CAUSES INFORMATION SET UP ON THE ENTRY KEYS
TO BE ENTERED INTO THE INDICATORS, WORD COUNTER, AND ADDRESS COUNTER.
ENTRY KEYS S, 1, 2, AND 19 ARE GATED TO THE CORRESPONDING INDICATORS
ENTRY KEYS 3 THROUGH 17 ARE GATED TO THE WORD COUNTER AND ENTRY KEYS 21
THROUGH 35 ARE GATED TO THE ADDRESS COUNTER. THE DATA REGISTER IS
CLEARED BY THIS OPERATION. THIS SWITCH SHOULD BE USED ONLY IN MANUAL
STATUS.

7.7 LOAD LOCATION COUNTER

DEPRESSION OF THIS KEY CAUSES THE INFORMATION SET UP IN ENTRY KEYS 21 THRU 35 TO BE ENTERED INTO THE LOCATION COUNTER IF THE CHANNEL IS IN MANUAL STATUS.

7.8 ON/OFF LINE

IN MANUAL STATUS AND WITH THE ON/OFF SWITCH IN THE ON LINE POSITION, DATA MAY BE TRANSMITTED TO OR FROM CORE STORAGE. IN MANUAL STATUS AND THE SWITCH IN THE OFF LINE POSITION, NO INFORMATION WILL BE TRANSMITTED TO OR FROM CORE STORAGE EXCEPT BY USING CSRI OR CSRO SWITCHES OR DISPLAY STORAGE OR STORE DATA REGISTER KEYS. WHEN WRITING MANUALLY IN THE OFF LINE POSITION, THE CONTENTS OF THE DATA REGISTER WILL BE WRITTEN REPEATEDLY. WITH THE CHANNEL IN AUTOMATIC OPERATION AND THE SWITCH IN THE ON LINE POSITION, TAPE ERROR TRIGGERS WILL BE RESET LOGICALLY AT THE BEGINNING OF EACH OPERATION. IN AUTOMATIC STATUS AND THE SWITCH IN THE OFF LINE POSITION, THE TAPE ERROR TRIGGERS WILL REMAIN ON UNTIL THE CHANNEL RESET KEY IS DEPRESSED. THE TAPE MASTER ERROR TRIGGER WHICH TURNS ON CHANNEL TAPE CHECK IS NOT AFFECTED.

7.9 BCD SELECT

THIS IS A LATCHING TYPE OF SWITCH. WHEN IN THE LATCHED POSITION AND IN MANUAL STATUS, TAPES WILL BE READ AND WRITTEN IN THE BCD MODE.

7.10 STOP WRITE

THIS SWITCH IS EFFECTIVE ONLY IF THE CHANNEL IS IN MANUAL STATUS. THE STOP WRITE SWITCH IS PRIMARILY A SERVICE TOOL BUT IS LOCATED WITH THE MANUAL SELECT SWITCHES BECAUSE IT IS USED IN CONJUNCTION WITH THE WRITE TAPE SWITCH. THE STOP WRITE SWITCH IS USED TO STOP WRITE TAPE TEST OPERATIONS.

7.11 READ TAPE, WRITE TAPE, READ CARD READER, WRITE PRINTER, WRITE PUNCH

THE OPERATIONS OF EACH OF THESE KEYS IS SIMILAR IN THAT EACH ONE MAY BE USED TO INITIATE SOME TYPE OF DATA TRANSMISSION OPERATION SUBJECT TO THE EFFECT OF THE ON/OFF SWITCH AND THE REQUIREMENTS THAT THE CHANNEL BE IN MANUAL STATUS. IF A COMMAND IS LOADED PRIOR TO THE SELECTION OF THE I/O OPERATION, WHILE ON LINE, THE OPERATION IS BASICALLY THE SAME AS IF A SELECT INSTRUCTION AND THE RCH INSTRUCTION WERE EXECUTED BY THE CENTRAL PROCESSING UNIT.

7.12 WEOF SELECT, REWIND SELECT, BACKSPACE RECORD,
     AND BACKSPACE FILE

     EACH OF THESE SWITCHES MAY BE USED TO INITIATE THE APPROPRIATE
NON-DATA SELECT OPERATION WHEN THE CHANNEL IS IN MANUAL STATUS.

7.13 UNIT SELECT (ROTARY SWITCH)

     THE ROTARY UNIT SELECT SWITCH IS EFFECTIVE ONLY IF THE CHANNEL IS
IN MANUAL STATUS. FOR TAPE OPERATIONS, THE UNIT SELECT SWITCH
DETERMINES WHICH TAPE DRIVE IS TO BE SELECTED. FOR MANUAL PRINTER AND
PUNCH OPERATIONS, THE SWITCH SETTING MAY BE USED TO SELECT SENSE EXITS.

7.14 TAPE DENSITY SELECTION SWITCH (ROTARY SWITCH)

     THIS THREE POSITION SWITCH DETERMINES WHICH PAIR OF DENSITIES MAY
BE SELECTED IN THE 7607 MODEL III AND IV DATA CHANNEL.

SWITCH SETTING	DENSITY (BPI)
A	800-556
B	800-200
C	556-200

7.15 PRINT BINARY/TWI

     FOR PRINTER TEST - IN THE ON POSITION (UP) - IF THE CHANNEL IS IN
MANUAL STATUS AND THE WRITE PRINTER SWITCH IS DEPRESSED, THE PRINTER
WILL BE SELECTED AND PRINT OUT THE CONTENTS OF STORAGE LOCATIONS AS
SELECTED BY THE ADDRESS COUNTER. ONES WILL BE PRINTED FOR EACH BINARY
BIT IN A STORAGE LOCATION. TWO BINARY WORDS WILL BE PRINTED PER LINE.
THE PRINT BINARY TEST FEATURE IS INOPERATIVE WITH CHANNEL IN AUTOMATIC
STATUS.

     THE TWI FUNCTION OF THIS SWITCH IS AS FOLLOWS- EITHER IN AUTOMATIC
STATUS OR MANUAL STATUS READ TAPE OPERATION, WITH THE SWITCH IN THE
DOWN POSITION (TWI) AND BINARY MODE SELECTED, TAPE CIRCUITRY WILL TEST
AT THE END OF RECORD TO SEE THAT A MULTIPLE OF SIX CHARACTERS HAVE BEEN
READ. IF THE TAPE GROUP COUNTER IS AT A POSITION OTHER THAN GROUP SIX,
A TAPE-WORD-INCOMPLETE ERROR WILL BE SELECTED. WITH THIS SWITCH IN THE
UP POSITION (NOT TWI), THE TAPE WORD INCOMPLETE CIRCUITS ARE
DECONDITIONED TO PERMIT READING SPECIAL TAPES WHICH DO NOT HAVE
MULTIPLES OF SIX CHARACTERS PER WORD.

7.16 TAPE CYCLE SWITCH

THIS SWITCH, WHEN USED IN CONJUNCTION WITH THE READ TAPE SWITCH WILL PERMIT READING UNTIL A TAPE MARK RECORD IS SENSED AND THEN FORCE A REWIND AND RE-READ OPERATION. WHEN USED IN CONJUNCTION WITH THE WRITE TAPE SWITCH, THIS SWITCH WILL CAUSE A SERIES OF ONE WORD RECORDS FROM THE DATA REGISTER TO BE WRITTEN UNTIL THE STOP WRITE SWITCH IS DEPRESSED. CYCLE BACKSPACE RECORD AND BACKSPACE FILE IS ALSO POSSIBLE. THE RESET KEY SHOULD BE USED BETWEEN DIFFERENT SELECT OPERATIONS. THE TAPE CYCLE SWITCH IS USED ONLY WITH THE ON/OFF LINE SWITCH IN THE OFF LINE STATUS.

7.17 CARD CYCLE SWITCH

THIS SWITCH PROVIDES A GATE FOR THE HAND KEY FOR THE SIMULATION OF CARD MACHINE CB OPERATIONS.   (REFER TO SECTION 7.18).

7.18 CARD HAND KEY PLUG

THIS PLUG IS USED TO CONNECT A PORTABLE HAND KEY. WHEN THE CARD CYCLE SWITCH IS IN THE OFF POSITION, HOLDING THE HAND KEY DEPRESSED WILL CAUSE CONTINUOUS STEPPING OF THE CARD RING AND CB COUNTER.

WHEN THE CARD CYCLE SWITCH IS IN THE ON POSITION, EACH DEPRESSION GENERATES ONLY ONE WRITE OR READ PULSE AND THE CB COUNTER IS STEPPED AFTER EACH GROUP OF FOUR DEPRESSIONS. THE ACTUAL READ OR WRITE PULSES WILL NOT BE GENERATED UNLESS A CARD MACHINE HAS BEEN SELECTED, BUT THE CARD RING AND CB COUNTER WILL ADVANCE WITH OR WITHOUT A CARD MACHINE SELECTED. THE SELECTED CARD MACHINE MUST NOT BE IN READY STATUS.

7.19 CONTINUOUS STORAGE READ-IN SWITCH

IN MANUAL STATUS, THE CONTENTS OF THE DATA REGISTER OF THE CHANNEL IS CONTINUOUSLY STORED AT THE ADDRESS IN THE CHANNEL'S ADDRESS COUNTER. IN AUTOMATIC STATUS, THE ADDRESS COUNTER AND WORD COUNTER ARE STEPPED UNTIL THE WORD COUNT EQUALS ZERO. THE DATA IS STORED IN SEQUENTIAL ADDRESSES IN STORAGE. A CORE STORAGE CYCLE SHOULD BE REQUESTED ONCE EVERY FOURTH CYCLE.

7.20 CONTINUOUS STORAGE READ-OUT SWITCH

THE CONTENTS OF THE STORAGE LOCATION SPECIFIED IN THE ADDRESS COUNTER IS CONTINUOUSLY SET INTO THE DATA REGISTER, WITH THE ADDRESS COUNTER BEING STEPPED IN AUTOMATIC STATUS AND PREVENTED FROM BEING STEPPED IF THE CHANNEL IS IN MANUAL STATUS. IN AUTOMATIC STATUS, THE WORD COUNTER IS STEPPED DOWN UNTIL IT REACHES ZERO AND STOPS OPERATION.

7.21 STOP ON ERROR

THIS SWITCH IS EFFECTIVE ONLY IN MANUAL AND OFF-LINE STATUS. WHEN IT IS ON, TAPE WRITING WILL STOP WHENEVER THE TAPE ERROR TRIGGER GOES ON. WHEN READING TAPE, THE TAPE WILL STOP AT THE END OF THE RECORD IN WHICH A TAPE ERROR OCCURS.

8.   TAPE ADAPTER UNIT (62.5 KC) FOR THE IBM 7607 MODEL 1 AND 2 DATA CHANNEL

8.1   TAPE ADAPTER OSCILLATORS

THERE ARE TEN DIFFERENT OSCILLATOR CARDS NECESSARY TO SUPPLY TIMING REFERENCE PULSES FOR SIX DIFFERENT CHARACTER RATES. THREE OSCILLATORS ARE GATED FOR USE WITH A GIVEN TAPE UNIT AND DENSITY.

TABLE 19-2 TAPE ADAPTER OSCILLATORS - MODEL 1 AND 2 DATA CHANNELS

OSCILLATOR	TYPE	TAPE MACHINE	FREQUENCY ACCURACY	FUNCTION
6.67 KC	CRYSTAL	729-2	+OR-1PERC	DC MS CONTROL
10.0 KC	CRYSTAL	729-4	+OR-1PERC	DC MS CONTROL
240 KC	CRYSTAL	729-2	+OR-1PERC	DC US CONTROL AND WC DRIVE 200 BPI
240 KC	CRYSTAL	729-2	+OR-1PERC	DC US CONTROL AND WC DRIVE 200 BPI
240 KC	CLAMPED	729-2	+OR-5PERC	RC DRIVE 200 BPI
360 KC	CRYSTAL	729-4	+OR-1PERC	DC US CONTROL AND WC DRIVE 200 BPI
360 KC	CLAMPED	729-4	+OR-5PERC	RC DRIVE 200 BPI
667 KC	CRYSTAL	729-2	+OR-1PERC	DC UC CNTL AND WC DRIVE 555.5 BPI
667 KC	CLAMPED	729-2	+OR-5PERC	RC DRIVE 555.5 BPI
1 MC	CRYSTAL	729-4	+OR-1PERC	DC US CNTL AND WC DRIVE 555.5 BPI
1 MC	CLAMPED	729-4	+OR-5PERC	RC DRIVE 555.5 BPI

8.2   TAPE ADAPTER CLOCKS

BOTH A READ AND A WRITE CLOCK ARE USED. THEIR LIMITATIONS ARE AS
FOLLOWS-

8.2.1   READ CLOCK (RC)

THE READ CLOCK CONSISTS OF FOUR BINARY TRIGGERS SEPARATED BY A 400
NANOSECOND TIMING PULSE DERIVED FROM A CLAMPED OSCILLATOR AND
SINGLE-SHOT. THE TRIGGER OUTPUTS ARE USED AS READ TIMING CONTROL AND
THEIR LIMITATIONS ARE AS FOLLOWS-

TABLE 19-3 TAPE ADAPTER READ CLOCK TIMINGS

READ CLOCK OUTPUT	729-2 LO	729-2 HI	729-4 LO	729-4 HI
RC-3	13.0 USEC	5.0 USEC	8.8 USEC	3.5 USEC
RC-4	17.2 USEC	6.5 USEC	11.6 USEC	4.5 USEC
RC-7 (WR)	21.4 USEC	8.0 USEC	14.4 USEC	5.5 USEC
RC-6	25.6 USEC	9.5 USEC	17.2 USEC	6.5 USEC
RC-7 (RD)	29.8 USEC	11.0 USEC	19.9 USEC	7.5 USEC
RC-7 RESET (RD)	30.6 USEC	11.8 USEC	20.7 USEC	8.3 USEC
RC-7 RESET (WR)	22.2 USEC	8.8 USEC	15.2 USEC	6.3 USEC

NOTE

ALL READ CLOCK TIMINGS ARE +OR-5 PERCENT AND ARE
MEASURED WITH RESPECT TO THE RISE OF THE FIRST BIT LINE.

8.2.2   WRITE CLOCK (WC)

        THE WRITE CLOCK CONSISTS OF FOUR BINARY TRIGGERS SEPARATED BY 400
NANOSECOND DELAY LINES. THESE TRIGGERS ARE DRIVEN IN PARALLEL BY A 400
NANOSECOND TIMING PULSE DERIVED FROM A CRYSTAL OSCILLATOR. THE TRIGGER
OUTPUTS ARE USED AS WRITE TIMING CONTROL AND THE LIMITATIONS ARE AS
FOLLOWS-

                TABLE 19-4 TAPE ADAPTER WRITE CLOCK TIMINGS

WRITE CLOCK OUTPUT	729-2 LO	729-2 HI	729-4 LO	729-4 HI
WC-1	REFERENCE	REFERENCE	REFERENCE	REFERENCE
WC-3	8.32 USEC	3.00 USEC	5.56 USEC	2.00 USEC
WC-5	16.60 USEC	6.00 USEC	11.10 USEC	4.00 USEC
WC-9	31.50 USEC	11.50 USEC	21.10 USEC	7.75 USEC
WC-14	54.10 USEC	19.50 USEC	36.10 USEC	13.00 USEC
WC-1	66.60 USEC	24.00 USEC	44.50 USEC	16.00 USEC

NOTE

    ALL WRITE CLOCK PULSES ARE +OR-1 PERCENT WITH RESPECT
    TO THE TURN-ON OF THE WC 1 TIMING PULSE.

8.3   DELAY COUNTER (DC)

        THE DELAY COUNTER CONSISTS OF TEN BINARY TRIGGERS. THE DC 1
TRIGGER IS DRIVEN DIRECTLY FROM THE OSCILLATOR FORMING THE DRIVE TIMING
PULSE AND THE SAMPLE PULSE. THE NEXT FOUR ARE DRIVEN IN PARALLEL BY A
400 NANOSECOND TIMING PULSE WHILE THE NEXT FIVE ARE DRIVEN IN SERIES BY
THE OUTPUT OF THE PREVIOUS TRIGGER. THE PURPOSE OF THIS CIRCUIT IS TO
CONTROL TAPE MOTION AND DATA FLOW TIMINGS. DELAY COUNTER TIMINGS ARE
NAMED ACCORDING TO THE GATE LINES AND THE COUNT THAT THE AND CIRCUIT
TOTALS.

8.3.1 MICROSECOND CONTROL

READ DISCONNECT DELAY (RDD) AND WRITE DISCONNECT DELAY (WDD).

TABLE 19-5 TAPE ADAPTER DELAY COUNTER - MICROSECOND CONTROL

MICRO SECOND CONTROL	729-2 LO	729-2 HI	729-4 LO	729-4 HI
RDD-36	150 USEC	54.0 USEC	100 USEC	36.0 USEC
RDD-128	532 USEC	192.0 USEC	355 USEC	128.0 USEC
RDD-136	566 USEC	204.0 USEC	377 USEC	136.0 USEC
RDD-144	600 USEC	216.0 USEC	400 USEC	144.0 USEC
RDD-144	600 USEC	216.0 USEC	400 USEC	144.0 USEC
WDD-60	250 USEC	90.0 USEC	166 USEC	60.0 USEC
READ CLOCK GATE	33.3 TO 41.6 USEC	12.0 TO 15.0 USEC	22.2 TO 27.8 USEC	8.0 USEC 10.0 USEC

*TO MEASURE READ CLOCK GATE CYCLE WRITE ONE WORD RECORDS WITH
WITH BITS 1 AND 2 IN FIRST CHARACTER AND BIT 1 IN FOLLOWING
CHARACTERS, REMOVE HI CLIP CARD (06B4G28) AND CYCLE READ-
REWIND AND CYCLE READ, MEASURE TIMINGS DURING READ.

NOTE

ALL DELAY COUNTER MICROSECOND TIMINGS ARE +OR-1 PERCENT
EXCEPT RDD-36 WHICH IS +OR-2 PERCENT AND READ CLOCK GATE
WHICH IS +OR-6 PERCENT. ALL TIMINGS ARE MEASURED IN
RESPECT TO THE TURN-ON OF RDD OR WDD TRIGGER CONTROL.

8.3.2   MILLISECOND CONTROL - READ DELAY (RD), WRITE DELAY (WD) (RDD), (WDD), AND BACKSPACE TIMINGS

TABLE 19-6 TAPE ADAPTER DELAY COUNTER - MILLISECOND CONTROL

MILLI- SECOND CONTROL	729-2	729-4	TOLERANCE
RDD-16	2.4 MS	1.6 MS	+OR-12 PERCENT
RDD-22 RDD 38	5.7 MS +OR-1 PC	2.2 MS	+OR-2 PERCENT
RDD-64	9.6 MS	6.4 MS	+OR-1 PERCENT
RDD-152	22.8 MS	15.2 MS	+OR-1 PERCENT
WDD-20	3.0 MS	2.0 MS	+OR-3 PERCENT
RD-30	4.5 MS	3.0 MS	+OR-2 PERCENT
RD-160	24.0 MS	16.0 MS	+OR-1 PERCENT
WD-320	48.0 MS	32.0 MS	+OR-1 PERCENT
D-50	7.5 MS	5.0 MS	+OR-1 PERCENT
D-96	14.4 MS	9.6 MS	+OR-1 PERCENT
D-160	24.0 MS	16.0 MS	+OR-1 PERCENT
BACKSPACE-180	27.0 MS	18.0 MS	+OR-1 PERCENT

```
                               NOTE

       ALL DELAY COUNTER MILLISECOND TIMINGS ARE MEASURED
       IN RESPECT TO THE RISE OF THE MILLISECOND CONTROL
       GATE, EXCEPT BACKSPACE. TIMINGS ARE REFERENCED TO THE
       RISE OF RDD.
```

8.4   FINAL AMPLIFIER

THE BASIC TAU FINAL AMPLIFIER CONSISTS OF THREE SMS CARDS. EACH CARD SERVES A SPECIFIC FUNCTION IN THE CHAIN OF EVENTS BETWEEN THE READ BUS SIGNAL AND THE ULTIMATE -N CURRENT MODE PULSE WHICH SETS THE READ REGISTER. TO THE BASIC FINAL AMPLIFIER, TWO MORE CARDS FOR EACH TRACK ARE ADDED TO FORM THE B CHANNEL OF THE DUAL CHANNEL SYSTEM. THE TOLERANCE OF THESE ACCEPTANCE LEVELS AND THE RESPECTIVE CARD OUTPUTS FOLLOWS-

A.   USING A HIGH-IMPEDANCE METER (20,000 OHMS PER VOLT) ADJUST THE DC VOLTAGE, PIN A, FOR READ.

B.   ADJUST POTENTIOMETER ON CARD 06B4F13 TO SET VOLTAGE ON PIN A OF AFC (AMP CARD) TO -0.6 V. WITH RESPECT TO -12V. CHANNEL MUST BE IN RESET CONDITION.

8.4.1   DC MEASUREMENTS

AFC - Input Pin A (common -12v DC Ref.)
Write $-1.74v\ DC \le V_a \le -2.17v\ DC$
Read $-0.40v\ DC \le V_a \le -0.77v\ DC$

AFC - Output Pin D (-12v DC Ref.)
Write $+0.65 \le V_d \le +0.89v\ DC$
Read $+1.57 \le V_d \le +1.87v\ DC$

THESE MEASUREMENTS MUST BE MADE WITHOUT AC SIGNAL ON THE AMPLIFIER
SYSTEM USING A 20,000 OHM/VOLT METER.

8.4.2   AC MEASUREMENTS

AFC - Input Pin B
Write $8.35v\ PP \le V_b \le 9.25v\ PP$

AFC - Output Pin F (-12v DC Ref.)
Write $7.05v\ P \le V_f \le 8.81v\ P$ (Average base to peak)
AFC - Output Pin D (-12v DC Ref.)
Write $5.74v\ P \le V_d \le 7.70v\ P$ (Average base to peak)
FC -- Output Pin G (-12v DC Ref.)

THE FOLLOWING MUST HOLD WITH THE SAME INPUT AS PREVIOUSLY APPLIED.
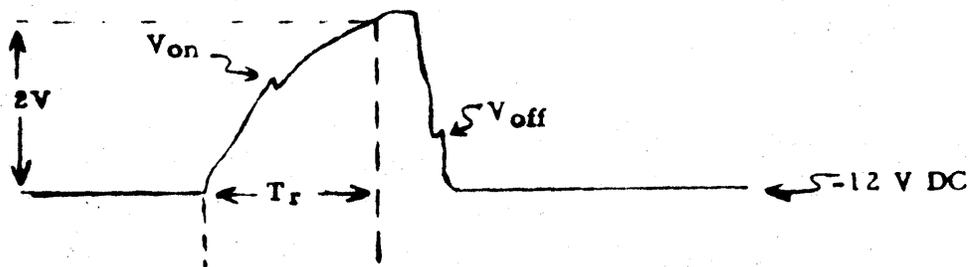
$6.9\ us \le T_r \le 8.6\ us$
$+1.20\ V\ DC \le V_{on} \le +1.80\ V\ DC$
$+0.4\ V\ DC \le V_{off} \le +0.9$

THE FOLLOWING MUST HOLD WITH THE SAME INPUT AS PREVIOUSLY APPLIED.
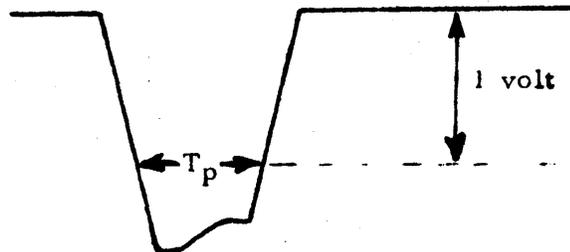
Sensing Delay $0.3 \text{ us} \leq T_p \leq 0.8 \text{ usec.}$

THE TIME FROM THE MOST NEGATIVE PORTION OF THE INPUT PEAK AT PIN 8 ON THE AFC - TO THE OUTPUT SLOPE OF PIN D OF THE FD-- FOLLOWS-

3.75 US - SD -4.25 US

8.5 INTEGRATOR LEVEL MEASUREMENTS

A.   WITH REFERENCE TO GROUND, MEASURE -12V +0.5V AT PIN 06B4H28D WITH CHANNEL IN RESET STATUS.

B.   MEASURE -6V+OR-0.3V AT 06B4H28D WHILE READING A 729-4 TAPE UNIT.

C.   MEASURE -8V+OR-0.3V AT 06B4H28D WHILE READING A 729-2 TAPE UNIT.

9.   TAPE ADAPTER UNIT (90KC) FOR THE IBM 7607 MODELS 3 AND 4
     DATA CHANNELS

9.1   TAPE ADAPTER OSCILLATORS

     THE OSCILLATORS LISTED PROVIDE THE DRIVE PULSES TO OPERATE THE TAU
CLOCKS THROUGH A RANGE OF CHARACTER RATES FROM 15 KC TO 90 KC AND
PROVIDE MOTION CONTROL FOR 75 IPS AND 112. 5 IPS TAPE UNITS - ALL
CRYSTAL TYPE ARE +OR- 1 PERCENT, GATED TYPE ARE +OR- 5 PERCENT.

TABLE 19-7 TAPE ADAPTER OSCILLATORS - MODEL 3 AND 4 DATA CHANNELS

OSCILLATOR	TYPE	TAPE UNIT	DENSITY	CONTROL
6.7 KC	XTAL	729-2, 5		DC MS CONTROL
10.00 KC	XTAL	729-4, 6		DC MS CONTROL
240.00 KC	XTAL	729-2, 5	B LO, C LO	WC + DC US CONTROL 200 BPI
240.00 KC	GATED	729-2, 5	B LO, C LO	RC 200 BPI
360.00 KC	XTAL	729-4	B LO, C LO	WC + DC US CONTROL 200 BPI
360.00 KC	GATED	729-4	B LO, C LO	RC 200 BPI
667.00 KC	XTAL	729-2, 5	A LO, C HI	WC + DC US CONTROL 556 BPI
667.00 KC	GATED	729-2, 5	A LO, C HI	RC 556 BPI
960.00 KC	XTAL	729-5	A HI, B HI	WC + DC US CONTROL 800 BPI
1000.00 KC	GATED	729-5	A HI, B HI	RC 800 BPI
		729-4, 6	A LO, C HI	RC 556 BPI
1000.00 KC	XTAL	729-4, 6	A LO, C HI	WC + DC US CONTROL 556 BPI
1440.00 KC	XTAL	729-6	A HI, B HI	WC + DC US CONTROL 800 BPI
1600.00 KC	GATED	729-6	A HI, B HI	RC 800 BPI
360.00 KC	GATED		A, B, C	RD CHECK CHARACTER

9.2 TAPE ADAPTER CLOCKS

9.2.1 READ CLOCK (RD)

THE READ CLOCK CONSISTS OF 4 BINARY TRIGGERS. THE RC 1 TRIGGER IS A HIGH SPEED DRIFT CIRCUIT CAPABLE OF OPERATING WITH A 2 MC DRIVE PULSE. A 400 MUS PULSE IS GENERATED ON THE FALL OF RC 1 AND THIS DRIVES THE REMAINING TRIGGERS IN BINARY FASHION. THE OUTPUT OF RC 1 IS USED AS A SAMPLE PULSE FOR THE READ CLOCK GATING. THE LIMITATIONS FOR THESE GATES FOLLOWS—

TABLE 19-8 TAPE ADAPTER READ CLOCK TIMINGS

	200 BPI		556 BPI		800 BPI	
	1729-2,5	729-4,6	729-2,5	729-4,6	1729-5	729-6
RC2	8.4	5.8 US	3.2	2.2 US	2.2	1.6 US
RC4*	16.9	11.3 US	6.2	4.2 US	4.2	2.7 US
RC5**					5.2	
RC6***	25.2	16.9 US	9.2	6.3 US	6.3	4.0 US
RC7	29.4	19.7 US	10.8	7.3 US	7.3	4.7 US
RC7 DELAY	29.9	20.3 US	11.3	8.0 US	8.0	5.2 US
RC7 RESET	30.3	20.7 US	11.6	8.3 US	8.3	5.6 US
RC RESET (RD)	30.3	20.7 US	11.7	8.3 US	8.3	5.6 US
RC RESET (WR)****	41.8	28.2 US	15.5 1	10.5 US	10.5	5.6 US

* SKEW GATE SET PULSE FOR 200 BPI + 556 BPI
** SKEW GATE SET PULSE FOR 800 BPI FOR 729-5
*** SKEW GATE SET PULSE FOR 800 BPI FOR 729-6
**** SKEW GATE RESET PULSE

NOTE

ALL TIMINGS ARE +OR-5 PERCENT WITH REFERENCE TO +N START READ CLOCK.

9.2.2   WRITE CLOCK (WC)

     THE WRITE CLOCK IS A 16 STEP BINARY COUNTER CONSISTING OF 4 BINARY
TRIGGERS.   THE WC 1 TRIGGER IS A HIGH SPEED DRIFT CIRCUIT CAPABLE OF
DRIVE FREQUENCIES TO 2 MC.   THE TURN OFF OF WC 1 GENERATES A 400 NS
PULSE WHICH DRIVES THE REMAINING TRIGGERS.   THE WRITE CLOCK GATES ARE
SAMPLED WITH THE OUTPUT OF WC 1.   THE LIMITATIONS FOR THESE GATES
FOLLOWS-

TABLE 19-9   TAPE ADAPTER WRITE CLOCK TIMINGS

	200 BPI		556 BPI		800 BPI	
	729-2,5	729-4,6	729-2,5	729-4,6	729-5	729-6
WC2	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE	REFERENCE
WC4	8.32	5.56 US	3.00	2.00 US	2.08	1.39 US
WC6	16.60	11.10 US	6.00	4.00 US	4.17	2.78 US
WC10	33.40	22.20 US	12.00	8.00 US	8.32	5.55 US
WC14	50.00	33.30 US	18.00	12.00 US	12.50	8.33 US
WC2	66.60	44.40 US	24.00	16.00 US	16.70	11.11 US

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+----------------------------------------------------------------+
|                                                                |
|                             NOTE                               |
|                                                                |
|      ALL WRITE CLOCK TIMINGS ARE +OR-2.0 PERCENT TO            |
|      REFERENCE WHEN  MEASURED AT SIMILAR LOGIC POINTS.         |
+----------------------------------------------------------------+
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9.3   DELAY COUNTER (DC)

THE DELAY COUNTER CONSISTS OF 9 BINARY OPERATED TRIGGERS. THE DC
1 TRIGGER IS A HIGH SPEED DRIFT CIRCUIT CAPABLE OF OPERATING WITH DRIVE
FREQUENCIES TO 2 MC. THE FALL OF THIS TRIGGER GENERATES A 400 NS PULSE
WHICH DRIVES THE NEXT FOUR TRIGGERS IN BINARY FASHION. THE OUTPUT OF
DC 16 DRIVES THE NEXT BINARY STAGE DIRECT WITHOUT DC 1 DRIVE PULSE
REFERENCE. THIS MODE OF OPERATION CONTINUES TO THE DC 256 TRIGGER.
THE DC 1 OUTPUT SERVES AS THE SAMPLE PULSE FOR DELAY COUNTER GATING.
THE LIMITATIONS OF THESE GATES FOLLOW—

9.3.1   MICROSECOND CONTROL

TABLE 19-10 TAPE ADAPTER DELAY COUNTER-MICROSECOND CONTROL

	729-2,5	729-4,6	729-2,5	729-4,6	729-5	729-6
RDD36	150.4	100 US	54.6	36.6 US	37.5	25.6 US
RDD88	366.0	244 US	132.0	88.6 US	91.5	61.2 US
RDD128	532.0	355 US	192.6	128.6 US	133.0	89.6 US
RDD136	566.0	377 US	204.0	136.6 US	142.0	95.1 US
RDD144	600.0	400 US	216.0	144.6 US	150.0	100.7 US
WDD60	250.0	166 US	90.6	60.6 US	63.0	42.3 US

NOTE

DELAY COUNTER TIMINGS ARE IN REFERENCE TO TURN-ON
OF US CONTROL. ALL DELAY COUNTER MICROSECOND TIMINGS
ARE +OR-1 PERCENT EXCEPT RDD36 WHICH IS +OR-2 PERCENT.

9.3.2 READ CLOCK GATES

TABLE 19-11 READ CLOCK GATE TIMING

BPI	UNIT	TIMING
200	729-2, 5	33.3 TO 41.6 US
	729-4, 6	22.2 TO 27.8 US
556	729-2, 5	12.0 TO 15.0 US
	729-4, 6	8.0 TO 10.0 US
800	729-5	8.12 TO 10.4 US
	729-6	5.6 TO 7.0 US

NOTE

TO MEASURE READ CLOCK GATE CYCLE WRITE ONE WORD RECORDS
WITH BITS 1 AND 2 IN FIRST CHARACTER AND BIT 1 IN
FOLLOWING CHARACTERS. REWIND AND REMOVE HI CLIP
CARD (06B4G28) AND CYCLE READ. MEASURE TIMINGS DURING
READ. READ CLOCK GATE TOLERANCE IS +OR-6 PERCENT.

9.3.3 MILLISECOND CONTROL

TABLE 19-12 TAPE ADAPTER DELAY COUNTER-MILLISECOND CONTROL

	729-2, 5	729-4, 6	TOLERANCE
RDD-16	2.4 MS	1.6 MS	+OR-3 PERCENT
RDD-22, 38	5.7 MS	2.2 MS	+OR-2 PERCENT
	+OR-1 PC		
RDD-64	9.6 MS	6.4 MS	+OR-1 PERCENT
RDD-152	22.5 MS	15.2 MS	+OR-1 PERCENT
WDD-20	3.0 MS	2.0 MS	+OR-3 PERCENT
RD-30	4.5 MS	3.0 MS	+OR-2 PERCENT
RD-160	24.0 MS	16.0 MS	+OR-1 PERCENT
WD-52	7.8 MS	5.2 MS	+OR-1 PERCENT
WD-80	12.0 MS	8.0 MS	+OR-1 PERCENT
WD-320	48.0 MS	32.0 MS	+OR-1 PERCENT
D-50	7.5 MS	5.0 MS	+OR-1 PERCENT
D-96	14.4 MS	9.6 MS	+OR-1 PERCENT
D-160	24.0 MS	16.0 MS	+OR-1 PERCENT
BACKSPACE-180	27.0 MS	18.0 MS	+OR-1 PERCENT
START RD COND-32	4.8 MS	3.2 MS	+OR-2 PERCENT

NOTE

ALL DELAY COUNTER MILLISECOND TIMINGS ARE MEASURED
IN RESPECT TO THE RISE OF MILLISECOND CONTROL GATE,
EXCEPT BACKSPACE TIMINGS WHICH ARE REFERENCED TO THE
RISE OF RDD.

9.4   FINAL AMPLIFIER

ALL MEASUREMENTS ARE TO BE MADE AT 800 BPI.   THE BASIC TAU FINAL AMPLIFIER CONSISTS OF THREE SMS CARDS.   EACH CARD SERVES A SPECIFIC FUNCTION IN THE CHAIN OF EVENTS BETWEEN THE READ BUS SIGNAL AND THE ULTIMATE-N CURRENT MODE PULSE WHICH SETS THE READ REGISTER.   TO THE BASIC FINAL AMPLIFIER, TWO MORE CARDS FOR EACH TRACK ARE ADDED TO FORM THE B CHANNEL OF THE DUAL CHANNEL SYSTEM.   THE SENSITIVITY OF THE A AND B CHANNELS IS INDEPENDENTLY CONTROLLED BY FOUR COMMON CLIPPING LEVEL CARDS.   THE TOLERANCE OF THESE ACCEPTANCE LEVELS AND THE RESPECTIVE CARD OUTPUTS FOLLOWS—

9.4.1   DC MEASUREMENTS

ARA - Input Pin A (7 common -12v DC Ref.)
Write $-1.74 \leq V_a \leq -2.17$v DC
Read $-0.40 \leq V_a \leq -0.77$v DC

ARA - Output Pin D (-12v DC Ref.)
Write $+0.65 \leq V_d \leq +0.89$v DC
Read $+1.57 \leq V_d \leq +1.87$v DC

THESE MEASUREMENTS MUST BE MADE WITHOUT AC SIGNAL ON THE AMPLIFIER SYSTEM USING A 20, 000 OHM/VOLT METER AS A MINIMUM.

9.4.2   ACCEPTANCE LEVELS

THE MINIMUM PEAK TO PEAK READ BUS SIGNAL TO INSURE AN OUTPUT FROM THE FINAL AMPLIFIER FOR EACH CHANNEL WITH THE ABOVE DC VOLTAGE IS AS FOLLOWS—

CHANNEL B
WRITE 1.37 V
READ 0.595 V

CHANNEL A
WRITE 1.86 V
READ 1.63 V

9.4.3 AC MEASUREMENTS

ARA - Input Pin B
Write $9.5v\ PP \leq V_b \leq 10.5v\ PP$

ARA - Output Pin F (-12v DC Ref.)
Write $7.33v\ P \leq V_f \leq 8.76v\ P$ (Average base to peak)
Output Pin D (-12v DC Ref.)
Write $6.44v\ P \leq V_d \leq 8.11vP$ (Average Base to peak)
FC -   Output Pin G (12v DC Ref.)

THE FOLLOWING MUST HOLD WITH THE SAME INPUT AS PREVIOUSLY APPLIED.
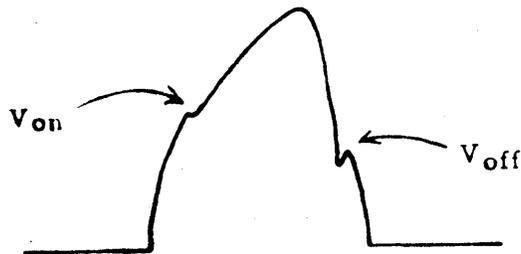
$$+1.20v\ DC \leq V_{on} \leq +1.80v\ DC$$
$$+0.4\ v\ DC \leq V_{off} \leq +0.9v\ DC$$

FD - Output Pin D (Ground Reference)

THE FOLLOWING MUST HOLD WITH THE SAME INPUT AS PREVIOUSLY APPLIED.
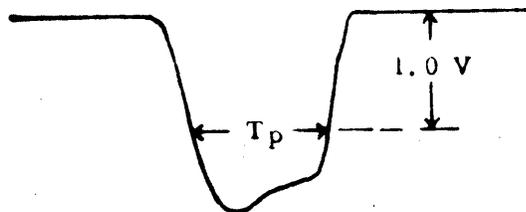
$$0.3\ us \leq T_p \leq 0.6\ us$$

9.4.4   TIME ASYMMETRY

TAU FINAL AMPLIFIER SYMMETRY ALIGNMENT FOR 90KC-

A.   MEASURE THE ASYMMETRY IN TRACK 1 IN THE USUAL MANNER AS
     FOLLOWS-

     1.   WRITE ALL ONE'S AT 800 BPI

     2.   CONNECT SCOPE TO TAU READ REGISTER A TRIGGER OUTPUT, PIN G.

     3.   SET SWEEP FOR FIVE MICROSECONDS PER CENTIMETER.

     4.   SYNC NEGATIVE INTERNAL.

     5.   WITH PROPER SYNC, ASYMMETRY RESULTS IN THE SECOND
          NEGATIVE SLOPE APPEARING DOUBLE.

     6.   TURN ON 5X MULTIPLIER.

     7.   MOVE HORIZONTAL POSITION TO VIEW THE DOUBLE SECOND
          SLOPE.

     8.   MEASURE THE TIME DIFFERENCE BETWEEN THE DOUBLE PULSES.

B.   INVERT THE TRACK 1 READ SIGNAL BY ADDING THE LAST TWO
     PRE-AMP STAGES OF TRACK 2 AS FOLLOWS-

     1.   CONNECT TRACK 2 READ DELAY LINE JUMPER TO TRACK 1
          OUTPUT (LO1H).

     2.   INTERCHANGE TRACK 1 AND TRACK 2 READ BUS COAX (EC 55A
          AND EC 55B).

C.   MEASURE THE TRACK 1 INVERTED SIGNAL ASYMMETRY AS IN STEP 1.

     1.   IF BOTH READINGS ARE ZERO, BOTH TAPE AND FINAL AMPLIFIER
          ARE PROPERLY SET, GO TO (LETTER) STEP I.

     2.   IF THE TWO READINGS ARE DIFFERENT, (BOTH TAPE AND FINAL
          AMPLIFIER HAVE ASYMMETRY) GO TO STEP D.

     3.   IF THE TWO READINGS ARE THE SAME (EITHER TAPE OR FINAL
          ASYMMETRY IS ZERO).

          A.   ADJUST THE TAPE UNIT TRACK 1 ASYMMETRY POT FOR ZERO
               ASYMMETRY.

          B.   RESTORE THE NORMAL SIGNAL BY RESTORING TRACK 1 AND 2
               READ-BUS COAXES TO THEIR RESPECTIVE PLACES (EC
               55A AND EC 55B) AND MEASURE ASYMMETRY.

C.   IF ZERO, GO TO (LETTER) STEP I.

D.   IF THE TWO READINGS ARE DIFFERENT, GO TO STEP D.

D.   USING THE CONDITION (NORMAL OR INVERTED SIGNAL) THAT
     PRODUCED THE LARGEST ASYMMETRY, DECREASE THE AMOUNT BY
     ONE-HALF THE DIFFERENCE (BETWEEN NORMAL AND INVERTED) BY
     ADJUSTING THE POTENTIOMETER IN THE TRACK 1 FINAL AMPLIFIER ARA
     CARD.

E.   SET UP THE OTHER CONDITION AND MEASURE ASYMMETRY.

F.   REPEAT UNTIL THE INVERTED SIGNAL ASYMMETRY EQUALS THE
     NORMAL SIGNAL ASYMMETRY, THIS ASYMMETRY SHOULD THEN BE DUE
     ENTIRELY TO THE TAPE UNIT.

G.   RESTORE THE READ BUS COAXES TO NORMAL.

H.   ADJUST THE TAPE UNIT TRACK 1 ASYMMETRY TO ZERO.

I.   USE THE CORRECTED TAPE UNIT TRACK 1 SIGNAL TO ADJUST THE
     FINAL AMPLIFIERS AS FOLLOWS-

     1.   WITH TRACK 2 READ DELAY LINE JUMPER STILL CONNECTED TO
          TRACK 1 OUTPUT, ADJUST TRACK 2 FINAL AMPLIFIER
          POTENTIOMETER FOR ZERO ASYMMETRY, AS OBSERVED AT THE
          TRACK 2 TAU READ REGISTER A OUTPUT.

     2.   SUCCESSIVELY CONNECT THE REMAINING READ DELAY LINE JUMPERS
          TO TRACK 1 OUTPUT (LO1H) AND ADJUST THE RESPECTIVE FINAL
          AMPLIFIER POTENTIOMETER.

9.4.5 SENSING ASYMMETRY

THE TIME DIFFERENCE BETWEEN SUCCESSIVE NEGATIVE SLOPES ON PIN G OF THE READ REGISTER A TRIGGER MUST NOT EXCEED 0.25 USEC WITH A SYMMETRICAL INPUT WAVE.
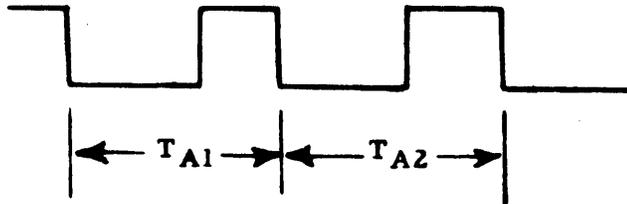
$$T_{A1} - T_{A2} \leq 0.25 \text{ usec.}$$

9.4.6 SENSING SKEW

THE TIME DIFFERENCE BETWEEN THE SETTING OF ALL READ REGISTER A TRIGGERS WITH COMMON INPUT TO THE READ BUS MUST NOT EXCEED 0.25 USEC.

9.5 INTEGRATOR LEVEL MEASUREMENTS

A. WITH REFERENCE TO GROUND, MEASURE -12V+OR-5V AT PIN 6B4H28D WITH CHANNEL IN RESET STATUS.

B. MEASURE -6.0V+OR-.3V AT 06B4H28D WHILE READING A 729 MODEL 2 OR 5 TAPE UNIT.

C. MEASURE NOMINAL -2.4V (-2.38 TO -2.6V) AT 06B4H28D WHILE READING A 729-4 OR 6 TAPE UNIT.

10. DIAGNOSTIC TESTING

10.1 LIST OF DIAGNOSTIC PROGRAMS

TABLE 19-13 GENERAL DIAGNOSTIC PROGRAMS

PROGRAM	DESCRIPTION
XCOM	704-7094-2 COMPATIBILITY
9B51	COMBINED CHANNEL COMMANDS AND CARD MACHINE TESTS
9B53	WORST CASE TIMING TEST FOR I/O REFERENCE TO MEMORY WITH MULTI-CHANNEL TAPE SYSTEM.
9C81	CARD READER RELIABILITY AND TIMING TESTS
9M81	CPU INSTRUCTIONS CHECK-OUT AND RELIABILITY TESTS
9M86	SIMPLIFIED LOAD--CPU DIAGNOSTIC (SECTION 1 OF 9M81)
9M82	ARITHMETIC SIMULATOR
9P51	PRINTER RELIABILITY AND TIMING TESTS
9R51	CARD RECORDER--RANDOM NUMBER AND RIPPLE PATTERN TEST
9S53	MEMORY RELIABILITY TEST (SIMULATED SORT)
9S82	7302-3 COMPREHENSIVE TEST FOR EVEN MEMORY
9S81	7302-3 COMPREHENSIVE TEST FOR ODD MEMORY
9S83	MEMORY CONTROL
9S84	MEMORY DRIVER TEST
9T81	TAPE FRAME AND CHANNEL RELIABILITY TEST
9T53	MULTI-CHANNEL TAPE DATA TEST
9T54	TAPE INTERCHANGEABILITY TEST
9T85	TAPE RECORD-GAP AND CREEP TEST
9T86	DATA CHANNEL TRAP TEST
9T58	DATA CHANNEL REGISTER AND MULTIPLE TAPE UNIT TEST

9T80	MULTIPLE DENSITY TEST
9Y51	GENERAL SYSTEMS OPERATION TEST
9Y52	TESTS CONCURRENT I/O AND ARITHMETIC
010 SORT	CE SORT TEST. USES 9SUG TO GENERATE INPUT TAPES
DEPRX	SENSE SWITCH INTERROGATION AND ERROR PRINT SUBROUTINE
910C	I/O INSTRUCTION MODIFICATION SUBROUTINE
9LD01	DIAGNOSTIC LOW-END LOADER
9LD02	DIAGNOSTIC HIGH-END LOADER
9SUG	RANDOM TAPE RECORD GENERATOR FOR 010 SORT
9T61	UTILITY PROGRAM (GENERATES AND MAINTAINS A DIAGNOSTIC PROGRAM TAPE)
99CSA	DIAGNOSTIC CONTROL SYSTEM
SPLAT	UTILITY PRINT PROGRAM

10.2 VIBRATION TESTING

A. TEST PROCEDURE FOR NEW SYSTEMS

PROGRAM	AREA TO BE VIBRATED
9M81	7109, 7111, 7606
9S81	7302-3
9S82	7302-3
9T81	DATA CHANNEL (EXCEPT A1, A2, A4)
9B51	DATA CHANNEL, MOD. 1 OR 3 (PANELS A1, A2, A4-PRINTER SECTION)

1. WITH POWER DOWN, RIPPLE ALL VOLTAGE JUMPERS AND REPAIR ANY LOOSE CONNECTIONS.

2. WITH POWER ON AND THE ABOVE PROGRAMS OPERATING, VIBRATE ALL SMS CARDS LIGHTLY USING A SOFT MALLET.

3.   USING A SOFT-FACED PLASTIC HAMMER, VIBRATE ALL TAILGATES.

4.   PUSH TOWER IN AND OUT (TAILGATE).

5.   OPEN AND CLOSE EACH GATE SEVERAL TIMES.

   THE SPECIFIED DIAGNOSTICS MUST RUN ERROR-FREE WHILE EACH
OF THE ABOVE-MENTIONED STEPS (EXCEPT NO. 1) IS PERFORMED.

B.   TEST PROCEDURE FOR CONVERSION UNITS

            PROGRAM   AREA TO BE VIBRATED

            9M81   7111

            9S82-9S81   7302-3

1.   WITH POWER DOWN, RIPPLE ALL VOLTAGE JUMPERS AND REPAIR
     ANY LOOSE CONNECTIONS.

2.   WITH POWER ON AND THE ABOVE PROGRAMS OPERATING, VIBRATE
     ALL SMS CARDS LIGHTLY USING A SOFT MALLET.

3.   USING A SOFT-FACED PLASTIC HAMMER, VIBRATE ALL TAILGATES.

4.   PUSH TOWER IN AND OUT (TAILGATE).

5.   OPEN AND CLOSE EACH GATE SEVERAL TIMES.

   THE SPECIFIED DIAGNOSTICS MUST RUN ERROR-FREE WHILE EACH
OF THE ABOVE-MENTIONED STEPS (EXCEPT NO. 1) IS PERFORMED.

10.3 MARGINAL VOLTAGE REQUIREMENTS

SECTION 10.1 LISTS THOSE PROGRAMS TO BE MARGINAL-TESTED. THE LATEST LEVEL OF THESE PROGRAMS SHOULD BE RUN ERROR-FREE, AS INSTRUCTED IN THE PROGRAM OPERATING PROCEDURES IN SECTION 10.5. ANY ADJUSTMENTS MADE DURING OR AFTER THESE TESTS WILL INVALIDATE PREVIOUS RESULTS FOR AREAS OF THE MACHINE AFFECTED BY THE ADJUSTMENTS.

A. VARY THE 7109, 7111, 7606-2, 7607 MARGINAL VOLTAGES (MEASURED AT THE CONSOLE METER) AS FOLLOWS, WHEN PERFORMING BIAS TESTS-

SUPPLY	LOW	HIGH
+6M	5.0V	7.0V
-12M	-11.0V	-13.0V

B. 7302-3 CORE STORAGE

1. THE +6M BIAS LIMITS DO NOT APPLY TO THE 7302 BECAUSE THE VOLTAGE IS NOT PRESENT.

2. -12M   -10.0V(LOW)   -14.0V(HIGH)

10.4 RELIABILITY REQUIREMENTS

SECTION 10.1 LISTS THOSE PROGRAMS TO BE RUN. THE LATEST LEVEL OF EACH OF THESE PROGRAMS MUST OPERATE ERROR-FREE FOR THE SPECIFIED TIME WITH ALL POWER SUPPLY VOLTAGES AT NORMAL. MACHINE ADJUSTMENTS INVALIDATE THESE TESTS IN THE MANNER SPECIFIED IN SECTION 10.3.

NOTE

WHEN VARYING THE +6M VOLTAGES SIMULTANEOUSLY ON SEVERAL UNITS, A 1-VOLT EXCURSION ON THE CONSOLE METER IS EQUIVALENT TO A 1-VOLT EXCURSION ON ALL UNITS EXCEPT THE 7111 A/B GATE, WHERE IT WILL BE APPROXIMATELY 0.5 VOLT.

10.5   PROGRAM OPERATING PROCEDURES

TABLE 19-14 DIAGNOSTIC TEST PROCEDURES

PROGRAM	DESCRIPTION
XCOM	TESTS COMPATIBILITY WITH 704 TYPE PROGRAMMING. MEMORY DIAGNOSTIC MODE AND OVLP MODE SWITCHES DOWN. TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS A. BIAS TEST - VARY VOLTAGES ON 7109, 7111, 7606 SIMULTANEOUSLY. NO BIAS REQUIRED ON 7302. 16K MODE 2 MINUTES (SET TO 16K WITH KEY 35 UP) 24K MODE, IF INSTALLED, 2 MINUTES (SET TO 24K WITH KEY 35 DOWN) NOTE - SETTING SENSE SWITCH 5 DOWN STOPS THE PROGRAM FOR SETTING MODE. ALSO, SECTION OF TEST IN WHICH KEY 34 IS DOWN, DOES NOT APPLY TO 7094-2. B. RELIABILITY RUN - NONE REQUIRED
9851	TESTS THE OPERATION OF ALL THE CONTROL WORD INDICATORS ON ALL TYPES OF I/O OPERATION AND INDIRECT ADDRESSING OF CONTROL WORDS, MEMORY DIAGNOSTIC MODE AND OVLP MODE SWITCHES DOWN. TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS A. BIAS TEST - VARY VOLTAGES ON 7109, 7111, 7606, 7302 AND 7607 SIMULTANEOUSLY - AT EACH VOLTAGE LIMIT USE THE READER, PRINTER AND PUNCH. 1. AT EACH VOLTAGE LIMIT, LOAD 9851 WITH SENSE SWITCH 6 ONLY DOWN. 2. AT HALT AT END OF PUNCH AND PRINTER OPERATIONS, READY CARD READER WITH PRE-PUNCHED DECK, SET SENSE SWITCH 5 DOWN AND PRESS START TO COMPLETE ONE PASS AT EACH VOLTAGE LIMIT. 3. AT THE SUCCESSFUL COMPLETION OF THE BIAS RUNS, READ THE DECKS PUNCHED WITH BIAS AT NORMAL VOLTAGE. NOTE THAT 3 CARDS MUST BE REMOVED FROM EACH DECK TO RUN SUCCESSFULLY. SEE PROGRAM

WRITE-UP FOR DETAILS.

B.   RELIABILITY RUN - NONE REQUIRED

9B53   TESTS MULTI-CHANNEL OPERATION, CHECKING FOR WORST
              CASE B TIME AND PRIORITY - MEMORY DIAGNOSTIC MODE AND
              OVLP MODE SWITCHES DOWN.

              TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

              A. BIAS TEST - VARY VOLTAGES ON 7109, 7111, 7606
                  AND 7606 SIMULTANEOUSLY. NO BIAS IS REQUIRED
                  FOR A 7302 FOR EACH VOLTAGE LIMIT, RUN 2 PASSES
                  ON EACH CHANNEL OF THE SYSTEM, USING 729-4'S AND
                  556 BPI OR 729-6'S AT 800 BPI, IF AVAILABLE.

              B. RELIABILITY RUN - USE ONE TAPE UNIT ON EACH
                  CHANNEL FOR A PERIOD OF TIME EQUAL TO THE NUMBER
                  OF CHANNELS ON THE SYSTEM, TIMES 10 MINUTES.

9C81   TESTS THE OPERATION OF THE CARD READER. MEMORY
              DIAGNOSTIC MODE AND OVLP MODE SWITCHES UP.

              TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

              A. BIAS TEST - NONE REQUIRED.

              B. RELIABILITY RUN - ONE PASS WITH SENSE SWITCH 5
                  UP, USING ENTRY KEYS 1 THROUGH 6 TO CHECK
                  TIMINGS.

                  1.   CARD CYCLE   235 -   245 MS

                  2.   SELECT TO RCH   70 -   80 MS

                  3.   BETWEEN WORDS   360 -   440 MS

                  4.   BETWEEN ROWS   10.6 - 11.6 MS

                  5.   BETWEEN EOR AND 9L   95 -   102 MS

                  6.   BETWEEN 12R AND EOR   9.3 - 10.7 MS

                  7.   BETWEEN 12R AND SELECT   38 -   45 MS

              C. RUN ONE PASS WITH SENSE SWITCH 5 DOWN.

9M81   TESTS ALL MAIN FRAME INSTRUCTIONS AND ESTABLISHES
                        LONG-TIME RELIABILITY REQUIREMENTS. MEMORY
                        DIAGNOSTIC MODE AND OVLP MODE SWITCH UP.

                        TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

                        A. BIAS TEST - VARY VOLTAGES ON 7109, 7111, 7606
                            SIMULTANEOUSLY AND FOR EACH VOLTAGE LIMIT.

                            1. LOAD WITH SENSE SWITCH 6 DOWN AND RUN
                                FOR 100 PASSES.

                            2. WITH SENSE SWITCHES 5 AND 6 DOWN, CHECK
                                ALL THE HALT TESTS AND MANUAL OPERATIONS AS
                                OUTLINED IN THE PROGRAM LISTING.

                            3. WITH SENSE SWITCH 5 UP AND SWITCH 6 DOWN,
                                RUN FOR 5 MINUTES.

                            4. WITH SENSE SWITCHES 4 AND 6 DOWN (EXTENDED
                                RELIABILITY TEST), RUN FOR ONE PASS (APPROX.
                                19 MINUTES).

                        NOTE - THE 7302,-12M SHOULD BE BIASED WITH THE -12M
                               ON THE 7109, 7111 AND 7606.

                        B. WITH SENSE SWITCH 4 UP AND SWITCH 6 DOWN, RUN
                            PROGRAM WITH CP SET ROTATED + OR -4 DIVISIONS
                            FROM MID-POINT FOR ONE MINUTE IN EACH DIRECTION.

                        C. RELIABILITY RUN

                            1. RUN 9M81 FOR 10 CONSECUTIVE HOURS. DURING
                                THIS TIME SENSE SWITCH 4 SHOULD BE DOWN FOR
                                A MINIMUM OF 2 HOURS AND A MAXIMUM OF 5.

                            2. WITH SENSE SWITCH 4 UP AND SWITCH 6 DOWN,
                                RUN FOUR PASSES OF 9M81 WITH 2 DATA CHANNELS
                                (IF AVAILABLE) IN MANUAL STATUS AND WITH THE
                                CONTINUOUS STORAGE READ-OUT SWITCH ON.

9M82   ARITHMETIC SIMULATOR.   MEMORY DIAGNOSTIC MODE AND
                OVLP MODE SWITCHES UP.

                TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

                A. BIAS TEST- VARY THE VOLTAGES ON THE 7109, 7111,
                    7302 AND 7606 SIMULTANEOUSLY FOR ONE MINUTE AT
                    EACH CONSOLE ENTRY KEY SETTING (1 - 8), AT EACH
                    VOLTAGE (TOTAL 32 MINUTES).

                B. RELIABILITY TEST - NONE REQUIRED.

9P51   TEST PRINTER - DIAGNOSTIC MODE AND OVLP MODE SWITCHES
                DOWN.

                TEST PROCEDURE FOR NEW SYSTEMS

                A. BIAS TEST - SUCCESSFUL COMPLETION OF THIS TEST
                    REQUIRES FOUR SUCCESSIVE, SUCCESSFUL PASSES AT
                    THE FOUR MARGINAL LIMITS. LOCATION 4141 MAY BE
                    CHANGED TO HTR 31 IN ORDER TO CHANGE THE BIAS
                    VOLTAGE BETWEEN PASSES. FOR EACH VOLTAGE LIMIT,
                    AND EACH 716 PRINTER, RUN ONE PASS, VARYING
                    THE MARGINAL VOLTAGES ON THE 7109, 7111, 7607-1
                    OR -2 SIMULTANEOUSLY.

                NOTE - THE 7302, -12M SHOULD BE BIASED WITH THE -12M
                       IN THE 7109, 7111 AND 7606.

                B. RELIABILITY RUN - NONE REQUIRED.

                TEST PROCEDURES FOR CONVERSION UNITS

                A. BIAS TEST - NONE REQUIRED.

                B. RELIABILITY RUN - ONE PASS.

9R51   TESTS CARD RECORDER - SUPPRESS TLA. MEMORY
                DIAGNOSTIC MODE AND OVLP MODE SWITCHES DOWN.

                TEST PROCEDURE FOR NEW SYSTEMS

                A. BIAS TEST - NONE REQUIRED.

                B. RELIABILITY RUN - RUN WITH SENSE SWITCH 5 UP.

                    1. TWO PASSES WITH RIGHT CORNER CUT CARDS.

        2.   TWO PASSES WITH LEFT CORNER CUT CARDS.

THERE ARE NO TEST REQUIREMENTS FOR CONVERSION UNITS.

9S53	MEMORY RELIABILITY TEST SIMULATING A SORT. USES THE BASIC SYSTEM WITH A MINIMUM OF SIX TAPE UNITS. RUN WITH MEMORY DIAGNOSTIC SWITCH AND OVLP SWITCH DOWN.

TEST PROCEDURE FOR BOTH NEW AND CONVERSION UNITS.

A. BIAS TEST - NONE REQUIRED.

B. RELIABILITY RUN - RUN 9S53 WITH SENSE SWITCHES 4 AND 6 DOWN, ALL OTHER SENSE SWITCHES AND OP KEY 17 UP TO THE COMPLETION HALT AT LOCATION 77776. TAPE UNITS SHOULD BE SET TO 556 BPI. RUNNING TIME APPROXIMATELY 30 MINUTES.

9S83   MEMORY CONTROLS. MEMORY DIAGNOSTIC MODE AND OVLP MODE SWITCHES UP.

TEST PROCEDURES FOR BOTH NEW AND CONVERSIONS UNITS

A. BIAS TEST - VARY VOLTAGES ON 7109, 7111 AND 7606 SIMULTANEOUSLY.

B. RELIABILITY RUN - NONE REQUIRED.

NOTE - THE 7302, -12M SHOULD BE BIASED WITH THE -12M ON THE 7109, 7111 AND 7606.

9S81, 9S82   TESTS OPERATION OF 7302 MEMORY

TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

A. BIAS TEST - MEMORY DIAGNOSTIC MODE AND OVLP MODE SWITCHES UP.

    1. RUN ONE PASS AT EACH VOLTAGE LIMIT, VARYING THE 7109, 7111, 7302 AND 7606 SIMULTANEOUSLY.

B. RELIABILITY RUN

    1. RUN FOR ONE HOUR (1/2 HOUR FOR 9S82).

    2. RUN TWO PASSES (ALL TESTS) WITH ONE CHANNEL IN MANUAL AND THE 7617 CSRO SWITCH ON.

9S84   TESTS OPERATION OF THE 7302 MEMORY TO ESTABLISH
                    SCHMOO DIAGRAMS AND OPERATING POINTS FOR THE XY AND Z
                    VOLTAGES.

           A.   BIAS TEST - MEMORY DIAGNOSTIC MODE AND OVLP MODE
                SWITCHES UP.

                1.   RUN ONE PASS AT EACH VOLTAGE LIMIT, VARYING
                     THE 7109, 7111, 7302 AND 7606 SIMULTANEOUSLY.

                2.   DETERMINE THE OPERATING POINT OF THE XY AND Z
                     VOLTAGES FOR THE 7302 AS FOLLOWS-

                     A)   SET ALL LOGIC VOLTAGES TO NORMAL.

                     B)   FOR THE ODD MEMORY, DETERMINE THE XY
                          UPPER AND LOWER OPERATING VOLTAGES FOR
                          Z VOLTAGE SETTINGS OF 52, 54, 56, 58, 60
                          AND 62 VOLTS. THIS RESULTS IN 12 POINTS
                          THAT CAN BE USED TO PLOT A SCHMOO
                          DIAGRAM. REPEAT THE SAME PROCEDURE FOR
                          THE EVEN MEMORY.

                     C)   ON A GRAPH WHICH PLOTS XY VS Z VOLTAGE
                          ON AN EQUAL SCALE, PLOT A SCHMOO DIAGRAM
                          FOR EACH MEMORY (ODD, EVEN).

                     D)   ON EACH GRAPH, INSCRIBE A CIRCLE AS LARGE
                          AS POSSIBLE, BUT WHOLLY CONTAINED
                          WITHIN THE OPERATING POINTS. THE CENTER
                          OF EACH CIRCLE DETERMINES THE 'OPTIMUM
                          OPERATING POINT' FOR EACH OF THE
                          MEMORIES. THE RADIUS OF EACH CIRCLE
                          MUST BE EQUAL TO OR GREATER THAN
                          3 PERCENT OF THE XY OR Z VOLTAGE
                          (WHICHEVER IS GREATER) AT THE 'OPTIMUM
                          OPERATING POINT'.

           B.   RELIABILITY RUN - NONE REQUIRED.

9T81   A RELIABILITY TEST OF THE CHANNEL TAPE CIRCUITS AND
                EACH OF THE TAPE UNITS ON THE SYSTEM. MEMORY
                DIAGNOSTIC MODE AND OVLP MODE SWITCHES UP.

                TEST PROCEDURE FOR NEW SYSTEMS

                A. BIAS TEST - TWO PASSES FOR EACH VOLTAGE LIMIT ON
                    EACH CHANNEL. RUN MODEL 4 TAPE UNITS AT 556 BPI
                    OR MODEL 6'S (IF AVAILABLE) AT 800 BPI. VARY
                    VOLTAGES ON 7109, 7111, 7606.

                B. RELIABILITY RUN

                    1. RUN EACH TAPE UNIT FOR 15 MINUTES AT 200 BPI.

                    2. MANUALLY SET AT HIGH DENSITY.

                    3. RUN EACH TAPE UNIT 45 MINUTES, MODELS 2 AND 4
                        AT 556 BPI, MODELS 5 AND 6 AT 800 BPI.

                    4. EXECUTE UNIT SELECTS 0 THROUGH 9 ON EACH
                        CHANNEL AND CHANNEL BANK. ONE PASS IS
                        SUFFICIENT FOR ANY ONE UNIT SELECTION.
                        CHANNELS AND CHANNEL BANKS MAY BE CHECKED
                        CONCURRENTLY.

                    5. RELIABILITY RUNS SHALL BE SPREAD EQUALLY
                        ACROSS ALL THE CHANNELS OF THE SYSTEM AND
                        BETWEEN TAPE UNIT BANKS ON EACH CHANNEL.
                        ONE RELIABILITY RUN MUST BE MADE ON EACH
                        CHANNEL AND TAPE UNIT BANK.

                TEST PROCEDURES FOR CONVERSION UNITS

                A. BIAS TEST - TWO PASSES FOR EACH VOLTAGE LIMIT
                    ON EACH CHANNEL. RUN MODEL 4'S AT 556 BPI AND
                    MODEL 6'S (IF AVAILABLE) AT 800 BPI. VARY
                    VOLTAGES ON 7109, 7111, 7606 AND 7607
                    SIMULTANEOUSLY.

                B. RELIABILITY RUN

                    EXECUTE UNIT SELECTS 1 THROUGH 9 ON EACH CHANNEL
                    AND CHANNEL BANK. ONE PASS IS SUFFICIENT FOR
                    ANY ONE UNIT SELECTION. CHANNEL AND CHANNEL
                    BANKS MAY BE CHECKED CONCURRENTLY.

9T53   TESTS MULTI-CHANNEL DATA FLOW WITH TAPE OPERATION.
                MEMORY DIAGNOSTIC MODE AND OVLP MODE SWITCHES DOWN.

                TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

                A. BIAS TEST - 5 MINUTES FOR EACH VOLTAGE LIMIT.
                    USE ONE TAPE UNIT ON EACH CHANNEL, OPERATING AT
                    THE HIGHEST AVAILABLE DATA RATE.

                    1. USE MODELS 6 AND 5 AT 800 BPI.

                    2. USE MODELS 4 AND 2 AT 556 BPI.
                    3. VARY VOLTAGES ON THE 7109, 7111, 7606 AND
                        7607 SIMULTANEOUSLY. NO BIAS REQUIRED ON
                        7302.

                B. RELIABILITY RUN - NONE REQUIRED.

9T54   TESTS TAPE INTERCHANGEABILITY WITHIN THE SYSTEM.
                MEMORY DIAGNOSTIC MODE AND OVLP SWITCHES DOWN.

                TEST PROCEDURE FOR NEW SYSTEMS

                A. BIAS TEST - NONE REQUIRED.

                B. RELIABILITY RUN - PERFORM ALL OPERATIONS ON
                    MODELS 2 AND 4 AT 556 BPI, MODELS 5 AND 6 AT
                    800 BPI. WRITE ONCE WITH EACH TAPE UNIT IN
                    THE SYSTEM, READ EACH OF THE WRITTEN TAPES ON
                    THREE OTHER TAPE DRIVES. THE INTERCHANGE SHOULD
                    BE AS FOLLOWS-

                    1. BETWEEN ALL CHANNELS.

                    2. BETWEEN BOTH BANKS ON EACH CHANNEL.

                    3. AMONG ALL TAPE UNITS IN THE SYSTEM.

                TEST PROCEDURES FOR CONVERSION UNITS

                A. BIAS TEST - NONE REQUIRED.

                B. RELIABILITY RUN - WRITE AND READ ONE PASS WITH
                    ONE TAPE UNIT ON EACH CHANNEL AT THE HIGHEST
                    DENSITY AVAILABLE. NO TAPE INTERCHANGE IS
                    REQUIRED.

9T85   TESTS TAPE UNIT MOTION CONTROLS. MEMORY DIAGNOSTIC
                    MODE AND OVLP MODE SWITCHES UP.

                    TEST PROCEDURE FOR NEW SYSTEMS

                    A. BIAS TEST - NONE REQUIRED.

                    B. RELIABILITY RUN - ONE PASS ON EACH UNIT WITH NO
                        SINGLE LINE ERROR PRINT-OUTS. TEST MODELS 2, 4
                        AND 6 TAPE UNITS AT 556 AND 200 BPI.

                    TEST PROCEDURES FOR CONVERSION UNITS

                    SAME AS FOR NEW SYSTEMS.

9T86   CHECKS DATA CHANNEL TRAP OPERATION. MEMORY
                    DIAGNOSTIC MODE AND OVLP MODE SWITCHES UP.

                    TEST PROCEDURE FOR NEW SYSTEMS

                    A. BIAS TEST - VARY VOLTAGES ON 7109, 7111, 7606,
                        AND ALL 7607'S SIMULTANEOUSLY AND RUN TWO PASSES
                        AT EACH MARGINAL VOLTAGE LIMIT. RUN MODEL 729-4
                        AT 556 BPI OR MODEL 6 AT 800 BPI. NO BIAS IS
                        REQUIRED IN 7302.

                        MANUALLY TRA TO SYMBOLIC LOCATION MANUL TO
                    REPEAT HALT TESTS AFTER FIRST PASS.

                    B. RELIABILITY RUN

                        1. RUN FOR ONE HOUR USING ALL CHANNELS ON
                            SYSTEM.
                            RUN MODELS 2 AND 4 (TAPE UNITS) AT 556 BPI
                            OR MODELS 5 AND 6 AT 800 BPI.

                        2. RUN ONE PASS ON ONE CHANNEL WHILE PERFORMING
                            CONTINUOUS STORAGE READ-OUT IN MANUAL ON
                            THE OTHER CHANNEL.
                        3. ERROR POINTS WHICH CAN BE EXPECTED WHEN
                            RUNNING 9T86 WITH OTHER CHANNELS TAKING CSRO
                            CYCLES ARE LISTED AS FOLLOWS-

TCOA INSTRUCTIONS ARE AT THE FOLLOWING SYMBOLIC
LOCATIONS-

TROLA-1
TROLC-1
TROLJ-1
CVLOP-1

TEST PROCEDURES FOR CONVERSION UNITS

A. BIAS TEST - VARY VOLTAGES ON 7109,7111, 7606,
    AND ALL 7607'S SIMULTANEOUSLY AND RUN TWO PASSES
    AT EACH MARGINAL VOLTAGE LIMIT. RUN 729-4'S AT
    556 BPI OR MODEL 6'S AT 800 BPI. NO BIAS IS
    REQUIRED IN 7302.

    MANUALLY TRA TO SYMBOLIC LOGIC MANUL TO
    REPEAT HALT TESTS AFTER FIRST PASS.

B. RELIABILITY RUN

    1. RUN ONE PASS ON ONE CHANNEL WHILE PERFORMING
        CONTINUOUS STORAGE READ-OUT IN MANUAL ON THE
        OTHER CHANNEL.

    2. ERROR POINTS WHICH CAN BE EXPECTED WHEN
        RUNNING 9T86 WITH OTHER CHANNELS TAKING CSRO
        CYCLES ARE THE SAME AS FOR A NEW SYSTEM,
        PAR. B., 3., ABOVE.

9T58   DATA CHANNEL REGISTER AND MULTIPLE TAPE UNIT TEST-
              MEMORY DIAGNOSTIC MODE AND OVLP MODE SWITCHES DOWN.

              TEST PROCEDURE FOR NEW SYSTEMS

              A. BIAS TEST - RUN TWO MINUTES AT EACH MARGINAL
                  VOLTAGE LIMIT ON EACH CHANNEL AT 556/200 BPI
                  SWITCH SETTING. VARY VOLTAGES ON 7109, 7111,
                  7606, AND ALL 7607'S SIMULTANEOUSLY. NO BIAS
                  IS REQUIRED ON 7302.

              B. RELIABILITY RUN - DETERMINE RUNNING TIME FOR
                  EACH CHANNEL BY MULTIPLYING THE NUMBER OF UNITS
                  BY 3 MINUTES. OPERATE 729 MODELS 2, 4,5, AND 6
                  AT 556/200 BPI.

TEST PROCEDURES FOR CONVERSION UNITS

A.   BIAS TEST - NONE REQUIRED.

B.   RELIABILITY RUN - OPERATE FOR TIME EQUAL TO 5
     MINUTES PER CHANNEL.   RUN 729 MODELS 2, 4, 5,
     AND 6 AT 556/200 BPI.

9T80   MULTIPLE DENSITY FEATURE TEST - MEMORY DIAGNOSTIC
              MODE AND OVLP MODE SWITCHES UP.

              TEST PROCEDURE FOR NEW SYSTEMS

              A.   BIAS TEST - VARY VOLTAGES ON THE 7109, 7111,
                   7606, AND 7607'S SIMULTANEOUSLY.

                   1.   RUN TWO PASSES AT EACH MARGINAL VOLTAGE
                        LIMIT ON EACH 7607 MODEL 1 OR 2.

                   2.   RUN ONE PASS FOR EACH DENSITY SWITCH SETTING
                        (A, B, AND C) AT EACH MARGINAL VOLTAGE LIMIT,
                        ON EACH 7607 MOD. 3 OR 4.   USE 729 MODELS
                        5 OR 6.

              B.   RELIABILITY RUN

                   1.   RUN ERROR-FREE ON EACH 729 MOD. 2 AND 4 FOR
                        5 MINUTES AT 556/200 BPI.

                   2.   RUN ERROR-FREE ON EACH 729 MOD. 5 AND 6 FOR
                        5 MINUTES PER DENSITY SWITCH SETTING FOR
                        THE 7607 MODELS 3 AND 4.

                             800-556 BPI
                             800-200 BPI
                             556-200 BPI

              TEST PROCEDURES FOR CONVERSION UNITS

              A.   BIAS TEST - VARY VOLTAGES ON THE 7109, 7111,
                   7606, AND 7607'S SIMULTANEOUSLY. RUN TWO PASSES
                   AT EACH MARGINAL VOLTAGE LIMIT ON EACH 7607
                   MODEL 1 OR 2.

              B.   RELIABILITY RUN - NONE REQUIRED.

9Y51   GENERAL SYSTEMS OPERATION TEST - MEMORY DIAGNOSTIC
              MODE AND OVLP MODE SWITCHES DOWN.

              TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS.

              A. BIAS TEST - NONE REQUIRED.

              B. RELIABILITY RUN - RUN FOR A PERIOD OF TIME
                  EQUAL TO THE PRODUCT OF THE NUMBER OF CHANNELS
                  INSTALLED, TIMES TEN MINUTES. SET SENSE SWITCH
                  5 DOWN.

9Y52   TESTS THE CONCURRENT OPERATIONS OF I/O AND ARITHMETIC
              SECTIONS. DIAGNOSTIC MODE AND OVLP MODE SWITCHES
              DOWN.

              TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS.

              A. BIAS TEST - VARY VOLTAGES ON ALL FRAMES IN THE
                  SYSTEM.(7109, 7111, 7607). BIAS 7302 -12M
                  VOLTAGE WITH THE SYSTEM -12M.

                  1. RUN ONE PASS AT EACH VOLTAGE LIMIT ON ALL
                      CHANNELS AT THE HIGHEST DENSITY, USING 729
                      MODELS 4 OR 6.

                  2. RUN ONE PASS AT EACH VOLTAGE LIMIT USING ALL
                      PRINTERS AND LOWEST DENSITY 729 MODEL 2 OR
                      5 AVAILABLE.

              B. RELIABILITY RUN

                  1. RUN ONE PASS ON ALL CHANNELS AT THE HIGHEST
                      DENSITY, USING 729 MODELS 4/6 IF AVAILABLE.

                  2. RUN ONE PASS USING ALL PRINTERS AND THE
                      LOWEST DENSITY 729 MODELS 2/5, IF AVAILABLE.

9FT9   CE FORTRAN TEST - MEMORY DIAGNOSTIC MODE AND OVLP
              MODE SWITCHES DOWN.

              TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS

              A) BIAS TEST - NONE REQUIRED

              B. RELIABILITY RUN - RUN TO SUCCESSFUL COMPLETION
                  AT THE HIGHEST DENSITY AVAILABLE.
----

010 SORT   CE SORT TEST. RUN WITH OVLP MODE AND MEMORY
                  DIAGNOSTIC SWITCHES DOWN. CHANNELS MUST BE RUN AT
                  THE HIGHEST DENSITY AVAILABLE.

                  TEST PROCEDURES FOR BOTH NEW AND CONVERSION UNITS.

                  A. BIAS TEST - NONE REQUIRED.

                  B. RELIABILITY RUN - RUN 010 SORT TO SUCCESSFUL
                      COMPLETION, USING TWO FULL REELS OF INPUT DATA
                      GENERATED BY 9SUG. REFER TO THE 010 SORT
                      WRITE-UP FOR OPERATING INSTRUCTIONS.

                          ALL TAPE UNITS ON CHANNELS A AND B MUST
                      PARTICIPATE IN MERGE PASSES. ON CONVERSION
                      UNITS, PROGRAM CONTROL MUST BE ARRANGED FOR A
                      MINIMUM OF A 3-WAY MERGE.

                          THE FOLLOWING REQUIREMENTS MUST BE MET FOR
                      SUCCESSFUL COMPLETION.

                      1. A MAXIMUM OF 4 WRITE CHECKS PER UNIT PER
                          PASS.

                      2. A MAXIMUM OF ONE TEMPORARY READ ERROR PER
                          UNIT PER PASS.

                      3. NO PERMANENT READ ERRORS.

                      4. NO TAPE DUMPED INTO VACUUM COLUMNS.

                      5. NO TAPE BREAKAGE.

                      6. NO WRITE DELAY NOISE INDICATION ON THE
                          DATA CHANNEL CONSOLES.

                      7. NO BOT OR EOT PRINT-OUTS.

                      8. NO ON-LINE ERROR MESSAGES SUCH AS-

                          A) HASH TOTALS DO NOT AGREE

                          B) RECORD COUNTS DO NOT AGREE

                          C) OUT OF SEQUENCE

                          D) OUT OF SORT

                  ----

11.   USE-METER CHECK

THE INFORMATION IN THIS SECTION IS FOR THE CE WHO RECEIVES A
MACHINE OR SYSTEM THAT HAS FACTORY-INSTALLED USE METERS. IT EXPLAINS
THE METER'S FUNCTION, AND PROVIDES ENOUGH ELECTRO-MECHANICAL DETAIL
TO HELP HIM CHECK THEIR OPERATION AND TROUBLE-SHOOT CIRCJITRY IF
NECESSARY WHILE INSTALLING A METERED MACHINE. IN THE 7094-2, THE
FOLLOWING UNITS ARE AFFECTED - 7109 ASU, 7151-2 CONSOLE CONTROL, 7606-2
MULTIPLEXOR, 7607 DATA CHANNELS (MODELS 1 AND 3).

RECORDING METERS ARE USED ON RENTED SYSTEMS AND MACHINES TO
DETERMINE THE USE-TIME CHARGEABLE TO THE CUSTOMER. ALL METER BOXES
AND THEIR ASSOCIATED CIRCUITS ARE SEALED AT THE FACTORY BY THE USE OF
DETERRENT DEVICES, SUCH AS PADDLE CARD LOCKS, COVER RETAINERS, AND
THERMO-PLASTIC CAPS. THESE DEVICES ARE ILLUSTRATED AND THEIR USE
EXPLAINED IN A LATER PART OF THIS SECTION.

11.1 RECORD KEEPING

METERS CANNOT BE RESET OR ADJUSTED. WHEN YOU HAVE COMPLETED
THE INSTALLATION, READ THE METERS AND RECORD THE READINGS IN THE
MAINTENANCE LOG. THIS BECOMES THE STARTING POINT FOR CUSTOMER BILLING.

MAINTENANCE TIME, HOWEVER, IS NOT BILLED TO THE CUSTOMER, AND A
CE KEY-SWITCH ON THE 7151 CONSOLE IS USED TO DISCONNECT ALL CUSTOMER
METERS EXCEPT THE ONE ON THE CE CONSOLE, DURING THE TIMES WHEN
PERFORMING MAINTENANCE ON THE SYSTEM.

CUSTOMERS ARE ASKED TO READ THE METERS ON ALL UNITS AT THE CLOSE OF
THE LAST WORK-DAY IN EACH MONTH AND REPORT THE READINGS TO IBM ON THE
'BILLABLE TIME AUTHORIZATION' FORM. THIS FORM, ALONG WITH THE
'MAINTENANCE LOG' IS MAILED TO THE IBM BRANCH OFFICE.

11.2 PROCEDURE

THE FOLLOWING ITEMS MUST BE OBSERVED BEFORE THE METERING FEATURE IS
CONSIDERED OPERATIONAL -

    A.   SOME MACHINES USED WITH THE SYSTEM MAY HAVE METER WIRING OR
         ASSOCIATED CABLES DETACHED, TO FACILITATE SHIPMENT OF THE UNIT.
         MAKE SURE THAT ANY DETACHED WIRES OR CABLES ARE RECONNECTED.

    B.   MAKE SURE THAT THE METERS RECORD PROPERLY BEFORE TAMPER-
         PROOFING THE CIRCUITS. METERS MAY BE UNIT OR SYSTEM-TESTED
         BY FIELD INSTRUCTIONS, SPECIAL CE TESTS, DIAGNOSTIC PROGRAMS,
         OR COMBINATIONS OF THESE PROCEDURES. REFER TO TEST PROCEDURE
         GIVEN LATER IN THIS SECTION.

    C.   MOST TAMPER-PROOFING IS COMPLETED AT THE FACTORY. HOWEVER,
         SOME CONNECTIONS MAY REQUIRE TAMPER-PROOFING TO BE INSTALLED

IN THE FIELD AS PART OF THE INSTALLATION PROCEDURE. REFER TO
THE PARAGRAPH ON TAMPER-PROOFING FOR INSTRUCTIONS AND FOR THE
MACHINE LOCATIONS TO WHICH THESE INSTRUCTIONS APPLY.

11.3 WIRING DETAILS

UNITS ARE MONITORED THROUGH THE METER-BOX, MOUNTED ON THE RIGHT-
HAND SURFACE OF THE (7151-2) CONSOLE TABLE TOP. SEVEN WIRES (3 POWER,
4 SIGNAL) ARE THREADED FROM THE METER-BOX THROUGH THE TABLE TOP, INTO
THE UPPER FRONT COVER OF THE CONSOLE. THEY ARE ATTACHED AS FOLLOWS -

A. POWER WIRES

WHITE -   FROM METER TB POSITION 1 TO THE LEAD IN THE OPERATORS
             PANEL WHICH IS BETWEEN CONNECTOR CNX70 AND THE FUSE
             OF THE EXISTING CABLE. REFER TO LOGIC 09.02.08.1 AND
             09.02.06.1.

BLACK -   FROM METER TB POSITION 3 TO 'RESET MOTOR' LEAD IN
             EXISTING CABLE IN OPERATORS PANEL.

GREEN -   FROM METER TB GROUND SCREW TO THE HINGE-MOUNTING
             SCREW ON THE OPERATORS PANEL.

B. SIGNAL WIRES

YELLOW -   TWO WIRES, NUMBERED 1 AND 2, ARE ATTACHED TO THE
             CE/CUSTOMER METER KEY-SWITCH, AND PERMIT CURRENT TO
             FLOW ONLY THROUGH THE CE METER WHEN THE KEY IS IN
             THAT POSITION, AND THROUGH BOTH METERS AND TO OTHER
             METERING DEVICES THROUGH TAILGATE POSITION 08H 05D,
             WHEN THE KEY IS IN 'CUSTOMER' POSITION. REFER TO
             LOGIC PAGE 09.02.08.1.

BLACK -   NUMBER 3, SUPPLIES -36 VOLTS THROUGH TB POSITION 2
             OF METER CARD PN 372688.

BROWN - NUMBER 4, IS A DC RETURN FOR -36 VOLTS THROUGH
          POSITION 6 OF THE METER CARD TB. REFER TO LOGIC PAGE
          09.02.08.1.

11.4 TESTING

AFTER PREVIOUSLY MENTIONED ITEMS HAVE BEEN CHECKED, TEST THE USE-METER AS FOLLOWS -

A. WITH CPU MASTER STOP TRIGGER 'OFF', RUN A MAIN-FRAME DIAGNOSTIC (9M51 OR 9M71).

    1. PLACE THE CE SWITCH IN CE MODE AND CHECK THAT ONLY THE CE CLOCK RECORDS.

    2. SCOPE PIN 03A4D14A, BLOCK 4G, LOGIC 08.00.49.1. WITH THE CE SWITCH IN CE MODE, THE OUTPUT SHOULD BE AT A +N LEVEL. PLACE THE CE SWITCH IN CUSTOMER MODE, THE OUTPUT SHOULD BE AT A -N LEVEL.

    3. PLACE THE CE SWITCH IN CUSTOMER MODE AND CHECK THAT ONLY THE CUSTOMER CLOCK RECORDS.

B. CHECK THAT THE CLOCKS DO NOT RECORD WHILE MEMORY POWER IS CYCLING UP. SCOPE PIN 02C2F18H, BLOCK 3G, LOGIC 04.20.13.1 WITH MEMORY POWER TURNED OFF--SHOULD BE -S LEVEL (-12V). (MEMORY POWER ON 'CLEAR' WILL CAUSE 400 MS PROCESS TIME.)

C. CHECK THAT THE CLOCK RECORDS MANUAL CPU OPERATIONS, (400 MS + OR - 30 PERCENT) SCOPE PIN 02C1F19E, BLOCK 2H, LOGIC PAGE 04.20.13.1. PRESS 'DISPLAY STORAGE' KEY AND OUTPUT SHOULD BE AT A -P LEVEL FOR APPROXIMATELY 400 MS + OR - 30 PERCENT. THE FOLLOWING MANUAL OPERATIONS DO NOT STEP THE CLOCK - ENTER MQ, RESET, DISPLAY INDICATORS, DISPLAY EFFECTIVE ADDRESS.

D. CHECK THAT THE CLOCK RECORDS DURING 'CHANNEL IN USE'. KEY IN THE FOLLOWING LOOP -

LOCATION

000	WRS	A1
001	RCH	100
002	HTR	
100	IOCP	77777,0
101	TCH	100

TRANSFER TO LOCATION 000 AND START. CLOCK SHOULD RECORD.

E. CHECK THAT THE CLOCK RECORDS WHEN A CHANNEL IS IN MANUAL, ON-LINE, AND BUSY STATUS.

    1. PLACE CHANNEL 'A' IN MANUAL AND ON-LINE STATUS.

    2. LOAD A CONTROL WORD WITH WC EQUALS 77777, ADR EQUALS 000.

3. DEPRESS WR PRINTER.

4. CHECK THAT THE CLOCK RECORDS.

5. PLACE CHANNEL 'A' IN OFF-LINE STATUS. PRESS WRITE PRINTER
    AND CHECK THAT THE CLOCKS DO NOT RECORD.

F. PULL RESET MOTOR FUSE. METER SHOULD RUN WHILE PROCESSING. IF
    METER DOES NOT RUN AFTER PULLING FUSE, WRONG WIRE IS SPLICED
    TO FUSE. REFER TO PARAGRAPH 11.3 AND MAKE CORRECTIONS.

G. CHECK THAT LINE DRIVERS ARE PROPERLY TERMINATED. REFER TO
    BLOCKS 2G AND 2H, PAGE 08.00.49.1, AND LOGIC PAGES 00.00.06.0
    AND 60.40.11.1.

11.5 TAMPER-PROOFING

THE FOLLOWING REFERENCE MATERIAL IS INCLUDED TO ASSIST IN TROUBLE-
SHOOTING METER CIRCUITS IF THAT SHOULD BECOME NECESSARY. THIS PARAGRAPH
TELLS WHICH CIRCUITS AND MECHANICAL FEATURES MUST BE SECURED. PARAGRAPH
11.5.1 DESCRIBES HOW.

A. THE FOLLOWING CARDS MUST BE TAMPER-PROOFED.

7109	02C 1D15	02C 2F16	02C 2F18
	02C 1F19	02C 2F17	02C 2F19

7606	03A 4C19
	03A 4D14

B. THE FOLLOWING PIN LOCATIONS MUST BE TAMPER-PROOFED.

7109	LOCATION	PINS
	02C 1A17	H,K
	02C 1DU5	D,C,A
	02C 1J28	M
	02C 1F19	E,H
	02C 2A13	F
	02C 2F16	A,B,D
	02C 2F17	G,F
	02C 2F18	H,C
	02C 2F19	A,H,B,P,G,C
	02C 2A07	B
	02C 2D15	A,C,D
	02C 1B22	C
	02C 1G11	A,F,D,E
	02C 2J01	M
	02C 2K01	C
	02C 1K28	C

7607	LOCATION	PINS
	06A 3G10	G
	06C 3G01	P
	06C 3H08	F,E,G
	06C 3G07	E,H
	06D 3F19	G
	06A 3K28	R
	06C 3K13	P,R
	06D 3G01	P

7606	LOCATION	PINS
	03A 3D28	R
	03A 4D01	R
	03A 4D14	A,D,B
	03A 4C13	E,G
	03A 4C14	D,B
	03A 4C19	A,H,D,E
	03A 3K27	P
	03A 4K25	H
	03A 4K28	D

11.5.1   TAMPER-PROOFING METHODS

A.   GROUND RULES

IBM'S RENTAL CONTRACT SPECIFIES THAT THE METER READINGS WILL BE
THE BASIS FOR DETERMINING EXTRA SHIFT USAGE AND IT WILL BE FRAUDULENT TO
TAMPER WITH METER CIRCUITRY.   THE FOLLOWING RULES HAVE BEEN ESTABLISHED
TO DETER SMS CARD REMOVAL AND PIN-JUMPERING.

1.   ALL PIN CONNECTIONS WITHIN A LOGIC NET PERTAINING
     EXCLUSIVELY TO METERING SHOULD BE SEALED.

2.   NO OTHER PINS OR CONNECTIONS WILL BE SEALED.

3.   ALL CARDS OR PADDLE CARDS WHICH ARE EXCLUSIVELY METERING
     CARDS, WILL BE SEALED.

4.   IF A BASIC CARD IN A MACHINE IS BEING USED IN METERING, IT
     WILL NOT BE LOCKED.

5.   THE CARD ADJACENT TO THE COMPONENT SIDE OF THE 400 MS
     TIMING CARD, WILL BE LOCKED.

6.   WHEN A METERING CARD IS THE ONLY CARD LOCATED WITHIN A
     CHASSIS ROW, BOTH ENDS OF THE JUMPER PINS MUST BE SEALED.
     VOLTAGE PINS NEED NOT BE SEALED UNLESS THE JUMPER REMOVAL
     DISABLES THE METER.

7. IN 700 SERIES SYSTEMS, TAMPER-PROOF ONLY THOSE PLUGGABLE
UNITS WHICH CONTAIN EXCLUSIVELY METER CIRCUITS. NO SIGNAL
CABLE OR BACK PANEL PIN INSULATORS NEED BE SEALED.

8. ON-LINE I/O UNITS DO NOT REQUIRE TAMPER-PROOFING.

9. NO INTERLOCK OR FEED-BACK CIRCUITS WILL BE REQUIRED.

10. CABLE BISCUIT CONNECTIONS NEED NOT BE SEALED UNLESS THE
BISCUIT CONTAINS ONLY METER SIGNALS.

11. ALL POWER CONNECTIONS TO THE METER CIRCUIT MUST BE SPLICED
INTO LINES THAT COME DIRECTLY FROM THE POWER SOURCE, AND
MUST BE PROPERLY SEALED.

B. SMS SINGLE CARD

USE P/N 362609 FOR SINGLE SMS CARDS HAVING A CARD-PULLER HOLE IN
THE TOP AREA. CARDS THAT HAVE A REED SWITCH, IF LOCKED, MUST HAVE THE
RIGHT ADJACENT CARD OR DUMMY ALSO LOCKED.

TO LOCK A SINGLE SMS CARD OR PADDLE CARD, REFER TO FIGURE 19-4 AND
PROCEED AS FOLLOWS -

1. IF SPACE IS POPULATED, REMOVE THE CARD AND INSERT CARD
LOCK INTO THE TWO CENTER POSITIONS OF THE CARD SOCKET. USE
P/N 362610 FOR PADDLE CARD AND P/N 362609 FOR SMS SINGLE
CARD.

NOTE

WHEN LOCKING PADDLE CARDS, WORK FROM RIGHT TO
LEFT. REMOVE CARD ON LEFT TO AID IN ASSEMBLY.

2. INSERT CARD. SOME PADDLE CARDS WHICH ARE SHORTER THAN
STANDARD SHOULD NOT BE INSERTED COMPLETELY TO BOTTOM OF
SOCKET UNTIL STEP 4.

3. PULL STRAP TO TEST LOCKING OF STRAP.

4. PLACE THE PIN PORTION OF THE LOCKING STRAP INTO THE CARD
HOLE AND UPSET THAT PORTION WHICH EXTENDS THROUGH THE CARD
TO FORM A HEAD, AS SHOWN ON FIGURE 19-4.

USE PLIERS TO FORM THE LOCKING HEAD ON WHITE LOCKS, FOR SMS
SINGLE CARDS.

USE SOLDERING IRON TO FORM LOCKING HEAD ON GRAY LOCKS, FOR
SMS SINGLE CARDS.

USE SOLDERING IRON TO FORM LOCKING HEAD ON GRAY LOCKS, FOR
PADDLE CARDS.

    TO REMOVE A CARD, CUT THE HEAD OFF THE PIN PORTION OF THE LOCKING
STRAP WITH CUTTING PLIERS. REMOVE THE CARD AND REMOVE THE STRAP.
REPEAT STEPS 1 THROUGH 4 TO LOCK CARD AGAIN. ALWAYS USE A NEW STRAP.

    WITH PADDLE CARDS, IF THE LEFT CARD ADJACENT TO THE ONE BEING
REMOVED IS LOCKED, CARDS WILL HAVE TO BE SPREAD TO ALLOW ASSEMBLY OF PIN
INTO THE CARD HOLE.

Card
Socket

Pin

Center
Positions

Card
Component Side

Locking
Bead

Card
Lock
(PN 362609 or
  362610)

Front View
Card Socket
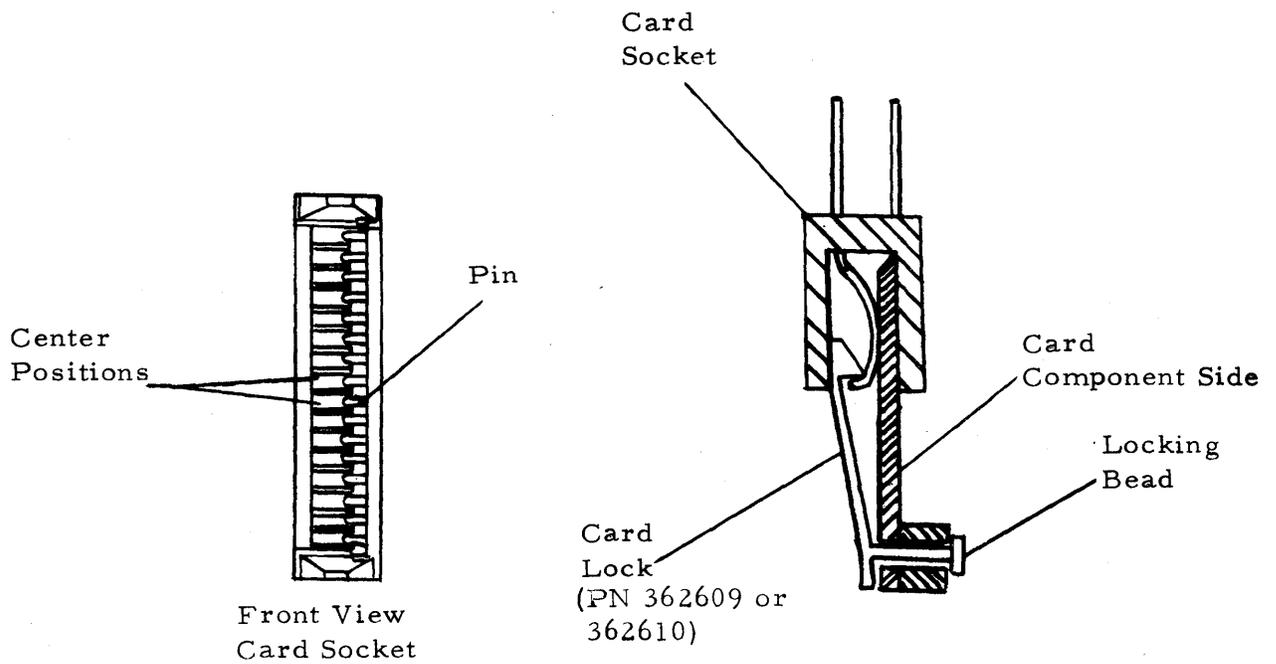
FIGURE 19-4 TAMPER-PROOFING PADDLE CARDS

C. PINS AND SLIP-ON TERMINALS

USE THERMAL-SETTING PLASTIC CAP P/N 362522, REFER TO FIGURE 19-5 AND FOLLOW THESE INSTRUCTIONS.

1. PREPARE THE AREA AROUND THE PIN BY PUSHING OTHER WIRES AWAY FROM THE PIN TO BE CAPPED.

2. IF THE PIN CONTAINS A WIRE-WRAP CONNECTION, PUSH THE WIRE DOWN TOWARD THE PIN BASE. IF THERE IS INSUFFICIENT SLACK IN THE WIRE, RE-WRAP IT SO THAT THE WIRE CAN BE PUSHED DOWN. THIS WILL INSURE COMPLETE PIN COVERAGE.

3. IF THE PIN CONTAINS SLIP-ON TERMINAL P/N 596255, SEE THAT THE WIRE FROM THE SLIP-ON TERMINAL EXITS FROM THE END CLOSEST TO THE PANEL. IF A SLIP-ON TERMINAL IS ON A PIN WITHOUT ANY WIRE-WRAPS, ADD WIRE-WRAP TO THE PIN ABOVE THE SLIP-ON TERMINAL AND CUT OFF EXCESS WIRE.

4. SLIP PLASTIC CAP OVER PIN, COMPLETELY COVERING THE PIN AND ALL CONNECTIONS TO IT.

5. PREPARE AN UNGER* SOLDERING IRON BY INSTALLING A 23-1/2 WATT HEATING ELEMENT P/N 461393 AND SPECIAL SOLDERING IRON TIP, P/N 461394. DO NOT USE PLIERS OR EQUIVALENT ON THE HOLLOW PORTION OF THE SPECIAL TIP WHEN TIGHTENING IT ON THE HEATING ELEMENT.

NOTE

COMPLETE EACH SEALING OPERATION
BEFORE PROCEEDING TO THE NEXT PIN.

6. WHEN THE TIP HAS REACHED FULL HEAT, SLIP THE TIP OVER THE CAP AS FAR AS POSSIBLE, BUT DO NOT FORCE AGAINST WIRES UNDER THE END OF THE TIP. KEEP THE TIP OVER THE CAP APPROXIMATELY 15 TO 20 SECONDS. REMOVE THE TIP AND LET THE CAP COOL. WHEN THE CAP IS COOL, PULL WITH THE FINGERS TO SEE IF IT IS SECURELY IN PLACE. IF CAP IS NOT SECURE AND YOU CAN PUSH IT BACK INTO POSITION, DO SO AND REAPPLY HEAT UNTIL IT IS SECURE.

TO REMOVE PLASTIC CAP, REHEAT IT WITH THE TOOLS MENTIONED ABOVE AND USE PLIERS TO PULL IT FROM THE PIN WHILE IT IS STILL SOFT. ALWAYS REPLACE CAP.

Pin

Slip-on
Terminal
(PN 596255)

Cap (PN 362522)

Wire Wrap

Card Block in Panel
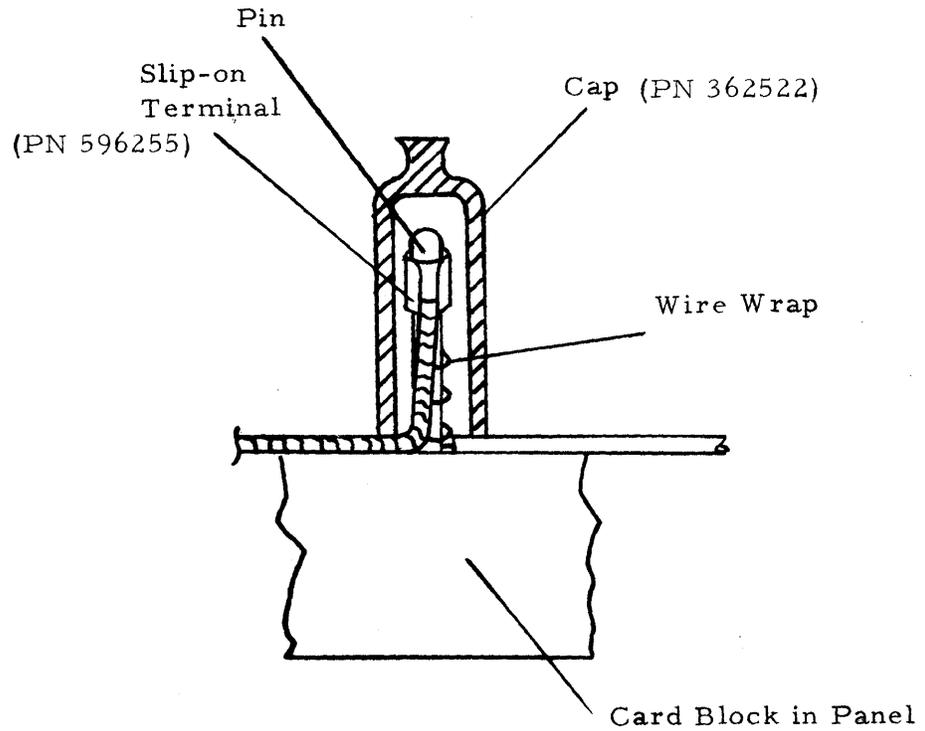
FIGURE 19-5 TAMPER-PROOFING PANEL WIRING PINS

Stamp * (PN 362915)

Cover

Stamp *
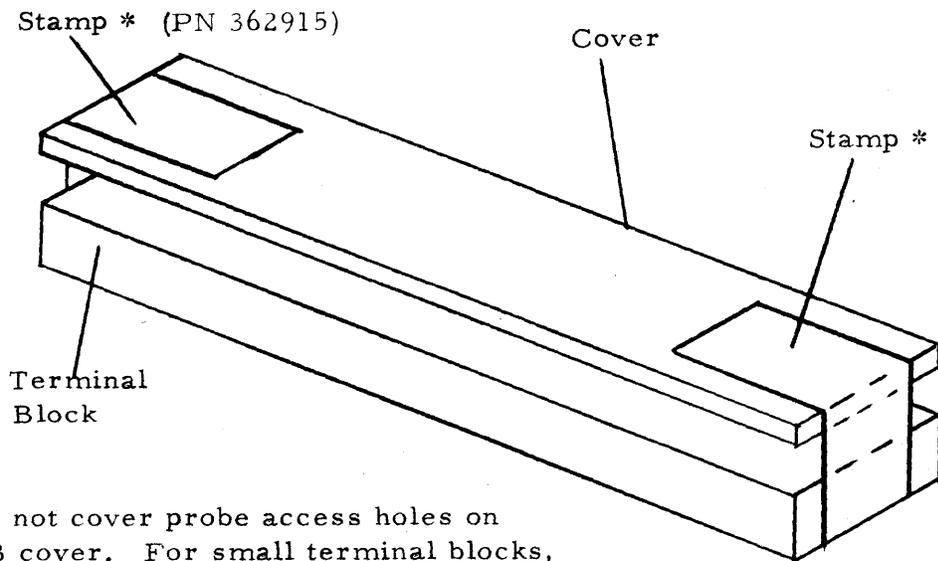
Terminal
Block

* Do not cover probe access holes on
  TB cover. For small terminal blocks,
  cut stamp to fit.

FIGURE 19-6 TAMPER-PROOFING TERMINAL BLOCKS

D. PAPER STAMPS

PAPER STAMPS OF VARIED LENGTHS ARE USED TO SEAL SOME AREAS OR
CONNECTORS.   YOU WILL BE MORE CONCERNED WITH THEIR APPLICATION AS
SHOWN IN FIGURE 19-6, WHERE A TERMINAL BOARD SAFETY SHIELD IS USED TO
COVER TB MOUNTING SCREWS OR CLIPS.   IN ADDITION, STAMPS ARE USED TO
SECURE A 32 POSITION DOUBLE GOLD LEAF CONNECTOR HOOD OVER A LATCHING
SCREW.   STAMPS ARE ALSO USED TO SECURE THE LATCHING SCREWS ON 20
POSITION COAX CONNECTORS OR 40 POSITION DOUBLE GOLD LEAF CONNECTORS.
STAMPS MAY BE REMOVED WITH A SHARP INSTRUMENT.   REMOVE COMPLETELY.
REPLACE WITH NEW STAMP.

E. COVER RETAINER

1.   INSTALLATION - AFTER THE METERING FEATURE HAS BEEN
     COMPLETELY CHECKED OUT, SEAL THE METER BOX ON THE CE
     CONSOLE.   SLIDE THE TOP COVER P/N 740482 OVER THE METER BOX
     AND INSERT RETAINER P/N 740489 INTO THE HOLE IN THE REAR
     OF THE METER ASSEMBLY (OR POWER PACK).   PRESS ON THE
     RETAINER UNTIL IT IS SEATED, USING CARE TO PREVENT BREAKING
     IT.   IF THE RETAINER DOES BREAK, REPLACE IT WITH A NEW ONE.

2.   REMOVAL - WHEN YOU HAVE TO SERVICE THE METER OR POWER PACK,
     BREAK THE RETAINER WEB BY INSERTING A SCREWDRIVER IN THE
     SLOT OF THE RETAINER AND ROTATING IT.   AFTER BREAKING THE
     WEB, PUSH THE PLUG INTO THE BOX UNTIL THE COVER CAN BE
     REMOVED.   REMOVE AND DISCARD THE PLUG.   REPLACE WITH A
     NEW PLUG AFTER SERVICE IS COMPLETED.

20 PREPARATIONS FOR RESHIPMENT

1.   TOOLS AND TEST EQUIPMENT REQUIRED

2.   DISASSEMBLY

3.   PACKING

4.   ITEMS TO BE SHIPPED