DIAGNOSTIC USER GUIDE 0001
SYSTEM/23 WITH DISKETTE

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1.0 INTRODUCTION

Start each call with the START MAP (MAP 1000, ENTRY POINT A).

The maps list the sequence of diagnostic steps necessary to identify, isolate and repair failures. Maps will request that specific diagnostic programs be run. When selected, the programs will display prompt messages for the user. Error conditions identified by the diagnostic programs are indicated by error codes and messages. These error codes and messages are used as a guide to additional diagnostic steps.

Maintenance is performed using only the documents shown below, the GENERAL LOGIC PROBE PN 453212, the CE METER PN 1749231 and the parts contained in the CARD CADDY. Card exchange is a part of the maintenance procedure.

This document includes a summary of the various parts of the maintenance library and the standards which refer to that library. The maintenance library includes the following parts:

1. 'ROS' RESIDENT DIAGNOSTIC PROGRAMS.
2. DISKETTE RESIDENT PROGRAMS including the DIAGNOSTIC CONTROL PROGRAM, DIAGNOSTIC FAULT LOCATION TEST (FLT) PROGRAMS and CE UTILITY PROGRAMS (contained on the CE DIAGNOSTIC DISKETTE P/N 6841645 or 6842304).
3. DIAGNOSTIC USER GUIDE.
4. MAINTENANCE ANALYSIS PROCEDURES (MAPS).
5. SERVICE MANUALS (SM).

BOOK #1 of the MAINTENANCE LIBRARY MANUALS contains the SERVICE MANUALS. BOOK #2 of the MAINTENANCE LIBRARY MANUALS contains the DIAGNOSTIC USER GUIDE, MAPS and the DIAGNOSTIC DISKETTE.

1.1 SUMMARY OF TEST SEQUENCE

1. At POWER-ON TIME the ROS RESIDENT POWER-ON DIAGNOSTIC is run automatically. If this test runs correctly, it indicates that a major part of the circuits on the CPU PLANAR BOARD, the KEYBOARD CONTROLLER, the DISPLAY DRIVE CIRCUITS, the PRINTER PROCESSOR, the DISKETTE attachment, the SERIAL INTERFACE ADAPTER if installed and the system POWER SUPPLY are operating OK.
2. The user will then attempt to load the DIAGNOSTIC CONTROL (DCP) from DISKETTE DRIVE 1, 2, 3 or 4.
   a. If the DCP loads correctly, it indicates that the DIAGNOSTIC (FLT) PROGRAMS can be loaded and run.
   b. If the DCP PROGRAM cannot be loaded correctly, the ROS RESIDENT DISKETTE DRIVE (1-4) DIAGNOSTIC is selected and run to isolate the failure.
3. After the DCP is loaded, the user may load various DIAGNOSTIC FLT PROGRAMS by entering the correct program selection option from the DCP MENU DISPLAY.
4. The DIAGNOSTIC FLT PROGRAMS are run to test the SYSTEM I/O units.
5. If a DIAGNOSTIC FLT PROGRAM detects a failure, an error code and a message will be displayed. Each DIAGNOSTIC FLT PROGRAM has an associated map which is used to isolate the failure to the smallest FIELD REPLACEABLE UNIT (FRU).

2.0 ROS RESIDENT DIAGNOSTIC PROGRAMS

The ROS RESIDENT DIAGNOSTIC PROGRAMS are used to test and verify the operation of the BASE SYSTEM including the CONTROL PROCESSING UNIT (CPU), the PLANAR BOARD LOGIC, the DISKETTE ATTACHMENT LOGIC, and if it is possible to read data from DISKETTE DRIVE (1-4).

2.1 POWER-ON DIAGNOSTIC (POD) PID 1200

(See "PID 1200 (PROCESSOR POWER-ON TEST)" on page 75 for PROGRAM DESCRIPTION).

This ROS RESIDENT PROGRAM will be executed at each POWER-ON RESET time or when the program returns to LOCATION 0000.

The purpose of this program is to test and verify the operation of the BASE SYSTEM including:

1. CPU PLANAR BOARD
2. ROS CRC CHECK
3. R/W STORAGE CHECK (DATA, ADDRESS)
4. DMA
5. INTERRUPT LOGIC
6. TRANSLATOR
7. TIMERS
8. CRT, VIDEO DRIVE, HORIZONTAL and VERTICAL DRIVE
9. KEYBOARD CONTROLLER/ROS
10. SERIAL INTERFACE ADAPTER (SIA)
11. DISKETTE ADAPTER
12. PRINTER WRAP
13. PRINTER CONTROLLER
14. OPTIONAL FEATURES THAT HAVE ROS ON THEM

Test results are held in a set of CE LATCHES and displayed on the SYSTEM CRT. Failure conditions are indicated by a single display message. See "ERROR REPORTING" on page 75 for additional detail.

2.2 ROS RESIDENT DISKETTE DRIVE 1-4 TEST (PID 1500)

(See "PID 1500 (ROS RESIDENT DISKETTE DRIVE 1-4 TEST)" on page 115 for PROGRAM description).

The purpose of this ROS RESIDENT PROGRAM is to test the DISKETTE CONTROL LOGIC contained on the DISKETTE ATTACHMENT CARD and the READ DISKETTE DATA PATH from DISKETTE DRIVES (1-4). (The CE DISKETTE must be inserted before selecting drive number.)

This program is selected by pressing and holding the CMD key and pressing the TEST key, then PRESS and hold the CMD key and PRESS the ERROR RESET key after the POWER-ON DIAGNOSTIC has completed. After PID 1500 is selected the following message is displayed in the LOWER RIGHT CORNER of the CRT:

SECURE Z - PID 1500 DR X (X=DRIVE #, Z=0 (not secured) or 1 (secured)

When selected, this program permits the selection of FIVE OPTIONS:

PROGRAM OPTIONS (displayed one at a time). Answer YES (1) or NO (0) to questions.

1. SELECT DRIVE (1-4) (This option SELECTS DRIVE)
2. DISKETTE DIAG? (If YES, OPTION 3 is displayed. If NO, OPTION 4 is displayed.) (This option RUNS ROUTINES 01 thru 0A)
3. DIAG WITH LOOP? (This option LOOPS ROUTINES 01 thru 0A)
4. MAP CHART ROUTINES? (This option SELECTS ROUTINE CE)
5. LOAD DCP? (This option SELECTS ROUTINE 0D)

Results are displayed on the CRT. Failure conditions are indicated by a TWO DIGIT HEXADECIMAL ERROR CODE. If the operation indicates more than one error, all errors will be displayed. For example:

ROUTINE XX ENDING STATUS YY ZZ

XX - CURRENT ROUTINE EXECUTING
YY, ZZ - See "ERROR, ACTION AND INFORMATION MESSAGES" on page 118.

3.0 DISKETTE RESIDENT PROGRAMS

These programs are on the CE DIAGNOSTIC DISKETTE PN 6841645. The following programs are included:

1. DIAGNOSTIC CONTROL PROGRAM (DCP)
2. DIAGNOSTIC FAULT LOCATION TEST (FLT) PROGRAMS
3. CE UTILITY PROGRAMS

3.1 DIAGNOSTIC CONTROL PROGRAM (DCP)

(See "PID 0001 (DIAGNOSTIC CONTROL PROGRAM)" on page 21 for PROGRAM description)

This program has the following support functions for all programs loaded from the CE DIAGNOSTIC DISKETTE:

1. PROGRAM SELECTION/LOAD
2. MESSAGE DISPLAY
3. KEYBOARD INPUTS
4. INTERRUPT PROCESSING (except for the device being tested).

The DCP PROGRAM is loaded by first selecting the ROS RESIDENT DISKETTE DRIVE (1-4) TEST (see "ROS RESIDENT DISKETTE DRIVE 1-4 TEST (PID 1500)" on page 3) and then selecting the LOAD DCP? option of that program.

When the DCP PROGRAM is loaded the following PRIMARY PROGRAM SELECTION MENU is displayed:

- 0 - PID 1505 DISKETTE FLT (PART 1)
- 1 - PID 1300 KEYBOARD FLT
- 2 - PID 2300 PRINTER FLT
- 3 - PID 1205 CPU PROCESSOR FLT
- 4 - PID 1210 CPU STORAGE FLT
- 5 - PID 5000 TP FLT
- 6 - PID 5010 TP DOWNLINE
- 7 - PID 1400 SCREEN IMAGE TEST PATTERNS
- 8 - PID 1510 DISKETTE FLT (PART 2)
- 10 - FEATURE/RPQ PID
- 16 - DISPLAY 5247 FLT MENU
- 17 - DISPLAY 5247 UTILITY MENU
- 18 - DISPLAY CE UTILITY MENU
- 9 - END DCP

Note: 16 and 17 will only be displayed if the work station SIA Card is installed.

When the DCP PRIMARY MENU OPTION '16' is selected, the following SECONDARY DCP MENU is displayed:

- 30 - PID 1620 5247 DASD FLT
- 33 - PID 1605 5247 CPU FLT
- 35 - PID 1630 SERIAL LINK FLT
- 39 - RETURN TO INITIAL MENU

When the DCP PRIMARY MENU OPTION '17' is selected, the following SECONDARY DCP MENU is displayed (these programs are on the CE diagnostic diskette, P/N 6842304, EC 323399 or later):

- 42 - PID 0605 DASD BUILD/REBUILD UTILITY
- 43 - PID 0625 5247 EC/PN DISPLAY UTILITY
- 44 - PID 0620 5247 ERROR LOG DISPLAY UTILITY
- 45 - PID 0600 5247 DASD FORMAT UTILITY
- 47 - PID 0610 5247 DASD READ VERIFY UTILITY
- 49 - RETURN TO INITIAL MENU

When the DCP PRIMARY MENU OPTION '18' is selected, the following SECONDARY DCP MENU is displayed:

- 21 - PID 0150 CONFIGURATION DISPLAY
- 23 - PID 0125 EC/PTF SUPPORT UTILITY
- 24 - PID 0120 ERROR LOG DISPLAY UTILITY
- 25 - PID 0100 FORMAT DISKETTE UTILITY
- 26 - PID 0105 COPY DISKETTE UTILITY
- 27 - PID 0110 READ VERIFY DISKETTE UTILITY
- 28 - PID 0115 VTOC DISPLAY UTILITY
- 29 - RETURN TO INITIAL DISPLAY

DIAGNOSTIC FLT PROGRAMS or CE UTILITY PROGRAMS are loaded by entering the correct DCP MENU OPTION NUMBER.

When using OPTION '10' enter DRIVE NUMBER and PID NUMBER of the desired program in the form X YYYY.

WHERE X = DRIVE NUMBER OF DRIVE CONTAINING DIAGNOSTIC DISKETTE
YYYY = PID NUMBER OF REQUESTED PROGRAM.

3.2 DIAGNOSTIC FLT PROGRAMS

DIAGNOSTIC FLT PROGRAMS are used to run tests on the SYSTEM I/O hardware and determine failure conditions. These programs, used with the MAP CHARTS and the procedures contained in the SERVICE MANUALS, will determine, isolate and solve system failures.

The following DIAGNOSTIC FLT PROGRAMS may be loaded from the CE DIAGNOSTIC DISKETTE by entering the correct DCP MENU OPTION NUMBER:

CPU		PROGRAM DESCRIPTION
PID 1205	CPU PROCESSOR FLT	(See THIS USER GUIDE)
PID 1210	CPU STORAGE FLT	(See THIS USER GUIDE)
PID 1212	UPDATE STORAGE TEST	(See THIS USER GUIDE)
KEYBOARD		
PID 1300	KEYBOARD FLT	(See THIS USER GUIDE)
DISPLAY		
PID 1400	SCREEN IMAGE TEST PATTERNS	(See THIS USER GUIDE)
PID 1450	WORD PROCESSING SUPPORT FLT	(See THIS USER GUIDE)
DISKETTES		
PID 1505	DISKETTE FLT (PART 1)	(See THIS USER GUIDE)
PID 1510	DISKETTE FLT (PART 2)	(See THIS USER GUIDE)
PRINTER		
PID 2300	PRINTER FLT	(See THIS USER GUIDE)
PID 2400	PRINTER FLT	(See USER GUIDE 0024)
COMMUNICATIONS		
PID 5000	TP FLT	(SEE COMMUNICATION'S USER GUIDE 0005)
PID 5010	TP DOWNLINE	(SEE COMMUNICATION'S USER GUIDE 0005)
PID 5020	SERVICE AIDS	(SEE COMMUNICATION'S USER GUIDE 0005)
5247 DISK UNIT		
PID 1605	5247 CPU FLT	(SEE USER GUIDE 0006)
PID 1620	5247 DASD FLT	(SEE USER GUIDE 0006)
PID 1630	SERIAL LINK FLT	(SEE USER GUIDE 0006)

3.3 CE UTILITY PROGRAMS

These programs supply utility functions such as DISKETTE FORMAT, DISKETTE COPY and DISKETTE READ VERIFY as well as support for the 5247. The following PROGRAMS may be loaded from the CE DIAGNOSTIC DISKETTE by entering the correct DCP MENU OPTION NUMBER:

DISKETTE UTILITIES

		PROGRAM DESCRIPTION
PID 0100	FORMAT DISKETTE UTILITY	(See THIS USER GUIDE)
PID 0105	COPY DISKETTE UTILITY	(See THIS USER GUIDE)
PID 0110	READ VERIFY DISKETTE UTILITY	(See THIS USER GUIDE)
PID 0115	VTOC DISPLAY UTILITY	(See THIS USER GUIDE)
PID 0120	ERROR LOG DISPLAY UTILITY	(See THIS USER GUIDE)
PID 0125	EC/PTF SUPPORT UTILITY	(See THIS USER GUIDE)
PID 0126	ROS EC/PN DISPLAY UTILITY	(See USER GUIDE 0002)
PID 0150	CONFIGURATION DISPLAY	(See THIS USER GUIDE)

5247 UTILITIES

PID 0600	5247 DASD FORMAT UTILITY	SEE USER GUIDE 0006)
PID 0605	DASD BUILD/REBUILD UTILITY	SEE USER GUIDE 0006)
PID 0610	5247 DASD READ VERIFY UTILITY	SEE USER GUIDE 0006)
PID 0620	5247 ERROR LOG DISPLAY UTILITY	SEE USER GUIDE 0006)
PID 0625	5247 EC/PN DISPLAY UTILITY	SEE USER GUIDE 0006)

3.4 PROGRAM RULES

The following standard rules are used for the diagnostic programs:

3.4.1 ROS RESIDENT POWER-ON DIAGNOSTIC and DISKETTE ADAPTER/DRIVE DIAGNOSTIC

1. KEYBOARD INPUTS ARE MADE BY USING THE NUMERIC KEYPAD KEYS ONLY.
2. KEY 0 = NO ANSWER
3. KEY 1 = YES ANSWER
4. KEY 9 = TERMINATE THE DISKETTE DIAGNOSTIC PROGRAM AND RETURN TO THE START OF THE POWER-ON DIAGNOSTIC PROGRAM.
5. ERROR CODES = TWO DIGIT HEXADECIMAL

3.4.2 DIAGNOSTIC FLT OR UTILITY PROGRAMS

1. KEYBOARD INPUTS ARE MADE USING THE STANDARD TYPEWRITER KEYS (EXCEPT NUMERIC KEYS) AND THE NUMERIC KEYPAD KEYS. (See NOTE 1 below).
2. KEY 0 = NO ANSWER
3. KEY 1 = YES ANSWER
4. KEYS ATTN-9 = TERMINATE THIS PROGRAM AND RETURN TO THE NEXT HIGHER MENU.
5. KEYS ATTN-E = EXIT FROM PROGRAM/ROUTINE LOOP
6. PID NO. DISPLAY - THE PID NO. OF THE PROGRAM LAST LOADED IS DISPLAYED IN THE LOWER RIGHT HAND CORNER OF THE SYSTEM CRT.
7. DRIVE NUMBER DISPLAY - FOR DISKETTE, DRIVE 1, 2, 3 or 4 IS DISPLAYED IN LOWER RIGHT HAND CORNER OF SYSTEM CRT, NEXT TO PID NUMBER. THE 5247 DISK IS DRIVE 5.
8. WHEN A KEYBOARD RESPONSE IS EXPECTED, THE DISPLAY SCREEN WILL SHOW A QUESTION MARK (?) FOLLOWED BY A FLASHING CURSOR IN THE LOWER LEFT CORNER OF THE SCREEN.
9. DISPLAY MESSAGES ARE SCROLLED FROM THE BOTTOM TO THE TOP OF THE SCREEN.
10. ERROR CODE - IS A PART OF THE ERROR MESSAGE. THE ERROR CODE FORMAT IS AS FOLLOWS:

    3-DIGIT ERROR CODE - DIAGNOSTIC FLT PROGRAMS
    4-DIGIT ERROR CODE - DCP AND UTILITY PROGRAMS

Note: 1. KEYBOARD INPUTS MAY INCLUDE ANY OF THE FOLLOWING KEYS:
- ALPHABETIC (A-Z)
- NUMERIC KEYPAD KEYS (0-9)
- +, -, ATTN, ENTER KEYS

SPECIAL FUNCTIONS
- ATTN = (COPY D), TURN ON THE ALTERNATE PRINT MODE
- ATTN 0, TURN OFF THE ALTERNATE PRINT MODE
- <-- , BACKSPACE

3.4.3 KEYBOARD INPUT FORMAT

The following terms are used by the programs and maps to request an input from the keyboard:

1. PRESS '9' INDICATES PRESS AND RELEASE THE 9 KEY.
2. ATTN-E INDICATES PRESS AND RELEASE THE ATTN KEY, THEN PRESS AND RELEASE THE E KEY.
3. CMD-TEST INDICATES PRESS AND HOLD THE CMD KEY, THEN PRESS AND RELEASE THE TEST KEY.
4. PRESS 'ENTER' INDICATES PRESS THE 'ENTER' KEY.

3.4.4 PROGRAM MESSAGE FORMAT

The following MESSAGE FORMATS are used by the programs:

1. INFORMATION MESSAGE:

   I-NNN INFORMATION MESSAGE TEXT

2. ACTION MESSAGE TO INDICATE THAT AN INPUT FROM THE OPERATOR IS REQUIRED:

   A-NNN ACTION MESSAGE TEXT

3. ERROR MESSAGE:

   E-NNN ERROR MESSAGE TEXT

4.0 DIAGNOSTIC USER GUIDE (THIS DOCUMENT)

The DIAGNOSTIC USER GUIDE contains information on the content of the MAINTENANCE LIBRARY, DIAGNOSTIC STANDARDS AND RULES, and a program description for each of the DIAGNOSTIC PROGRAMS.

Program descriptions contain the following information:

1. PURPOSE OF THE PROGRAM.
2. PROGRAM OPERATING PROCEDURES.
3. INDEX OF STOPS AND MESSAGES.
4. DETAILED DESCRIPTION OF TESTS.

5.0 MAINTENANCE ANALYSIS PROCEDURES (MAPS)

MAPS are used to guide the CE through the various system test procedures. The MAPS will instruct the user to select and run a specific DIAGNOSTIC PROGRAM or perform a specific test and note the results. For some failures, the MAPS will refer the user to detailed REMOVAL/ADJUSTMENT/REPLACEMENT procedures contained in the SERVICE MANUALS (SM).

See 5322/5324 COMPUTER SERVICE MANUAL (SY34-0171 or SY34-0241), CHAPTER 1, for an example of MAP format.

5.1 MAP ORGANIZATION

Start each call with the START MAP 1000. This MAP ensures that enough of the system is operating to use other MAPS or to run DIAGNOSTIC FLT PROGRAMS.

The START MAP 1000 requests that you record the STATUS BYTES, ERROR LOGS, and HISTORY LOGS since this information is lost on POWER DOWN or SYSTEM RESTART. The START MAP will instruct the user to run tests that will verify the operation of the system, starting with the BASE CPU and adding other units until the operation of the complete system has been verified. In case of failures, the START MAP will direct the user to the correct map or procedure.

If the user is positive of the failing unit, the START MAP gives the following map list to enable the user to go to the correct map.

FAILURE	MAP
POWER-ON DIAGNOSTIC	1200
KEYBOARD	1300
DISPLAY	1400
DISKETTE(S) (DRIVE 1,2,3,4)	1500
SERIAL INTERFACE ADAPTER	1016
PRINTERS	1900
COMMUNICATION	NONE

6.0 SERVICE MANUALS

The information contained in these manuals is used as reference material when you are diagnosing machine failures. The SERVICE MANUAL contains the LOCATION FIGURES, MAINTENANCE PROCEDURES and THEORY OF OPERATION.

The LOCATION FIGURES and the MAINTENANCE PROCEDURES are assigned a four digit section number. MAPS and DIAGNOSTIC PROGRAMS will use this four digit number to refer to SERVICE MANUAL sections. The SERVICE MANUALS are assigned four digit number series as follows:

IBM FORM NO.	SYSTEM UNIT	NUMBER SERIES
SY34-0171	5322 COMPUTER	1000 - 1999
SY34-0241	5324 COMPUTER	1000 - 1999
SY34-0172	5241 PRINTER (80 CPS)	2000 - 2999
SY34-0173	5242 PRINTER (160 CPS)	3000 - 3999
SY34-0174	5246 EXTERNAL DISKETTE	4000 - 4999
SY34-0617	RPQ EXTENDED FEATURE	R4900 - R4910
SY34-0175	COMMUNICATIONS	5000 - 5999
SY34-0243	5247 DISK UNIT	6000 - 6999

The 4-digit number indicates which manual and which section of that manual is being selected. The following is an example of the form used when programs or maps refer to a SERVICE MANUAL procedure:

"DO HEAD CARRIAGE ASSEMBLY SERVICE CHECK (SEE SM 1530)"

7.0 DOCUMENT TO DOCUMENT REFERENCE

The following standard methods are used to refer the user to another maintenance document:

1. PROGRAM TO SERVICE MANUAL..... (SEE SM XXXX)
2. PROGRAM TO MAP..... (GO TO MAP XXXX, ENTRY X)
3. PROGRAM TO PROGRAM..... (SEE PID XXXX)
4. MAP TO PROGRAM..... (SEE PID XXXX)
5. MAP TO SERVICE MANUAL..... (SEE SM XXXX)
6. MAP TO MAP..... (GO TO MAP XXXX, ENTRY X)

8.0 ERROR LOG DATA

Data associated with errors that are identified by the BASIC translator and IOCS routines will be stored in the ERROR LOG section of the CPU READ/WRITE STORAGE. At intervals determined by the SYSTEM CONTROL PROGRAM this ERROR LOG data will also be sent to a diskette.

8.1 ERROR LOG FORMAT

See "PID 0120 (ERROR LOG DISPLAY UTILITY)" on page 49.

8.2 ERROR LOG DISPLAY

Select PID 0120 to display and/or print the ERROR LOG data.

9.0 TRAP DATA

Note: (If the TRAP ERROR is for the 5247, see 'TRAP INFORMATION' in USER GUIDE 0016.)

When a MACHINE CHECK occurs either during the running of a BASIC CUSTOMER PROGRAM or during the running of a DIAGNOSTIC PROGRAM, the system will display a line of TRAP DATA at the bottom of the CRT screen. MAP 1220 is used to interpret this data. The data format is shown below.

DATA DISPLAY is as follows:

```
TRAP XXXX AB00 CCCC DDEE FFGG HHII JJJJ KKKK LLLL MMMM NNPP QQQQ RRRR SSSS TTTT

UUUU VVVV WWWW YYYY ZZZZ 1111 2222 3333 4444 5555 6666 7777 8888 9999 @@@@ ????
```

```
   XXXX  = TRAP CLASS BITS
  '80XX' = POWER CHECK
  '40XX' = WRITE TO ROS TRAP
  '20XX' = I/O CHANNEL TRAP
  '10XX' = STORAGE PARITY CHECK
  '00XX' = SYSTEM PROGRAMMING ERROR TRAP    SEE MAP 1220

A     = PAGE IN USE AT THE TIME OF THE TRAP
B     = HIGH ORDER ADDRESS BITS AT TIME OF TRAP
00    = ALWAYS 00
CCCC  = DMA CHANNEL 0 ADDRESS (DISKETTE)
DD    = INTERRUPT CONTROLLER INTERRUPT MASK
EE    = PROCESSOR INTERRUPT MASK
FF    = R/W STORAGE WRITE PAGE REGISTER
GG    = R/W STORAGE READ PAGE REGISTER
HH    = ROS PAGE REGISTER
II    = DMA PAGE REGISTER
JJJJ  = STACK POINTER VALUE LESS EIGHT AT TIME OF TRAP
KKKK  = H/L REGISTER CONTENTS
LLLL  = D/E REGISTER CONTENTS
MMMM  = B/C REGISTER CONTENTS
NN    = A REGISTER
PP    = FLAGS
QQQQ  = PROGRAM COUNTER AT TIME OF TRAP
RRRR THROUGH ???? = STACK CONTENTS (MAY NOT HAVE ANY MEANING)
```

10.0 INTERMITTENT ERROR PROCEDURE

Correction of INTERMITTENT FAILURES relies on the analysis of ERROR STATUS DATA. When this fails to isolate the problem, the CE will be instructed to attempt to generate and analyze the failure through the use of the ROUTINE and PROGRAM LOOP options of the DIAGNOSTIC PROGRAMS.

INTERMITTENT MAP 1225 lists the steps to be used for INTERMITTENT FAILURE correction.

11.0 SPECIAL TOOLS/TEST EQUIPMENT

11.1 SHIP GROUP TOOLS

DESCRIPTION	PART NUMBER
DIAGNOSTIC DISKETTE	6841645
DIAGNOSTIC DISKETTE FOR 5247 ATTACHMENT	6842304
3 EACH JUMPER	4410751
4 EACH JUMPER	829117

11.2 BRANCH OFFICE TOOLS

DESCRIPTION	PART NUMBER
TEKTRONIX 465 SCOPE OR EQUAL	453214
ROS MODULE PULLER	1715889
MODULE PIN ALIGNING TOOL	453473
GROUND CHECK TOOL	9900453

RECOMMENDED CARD KIT FOR BASE PROCESSORS:

QTY	DESCRIPTION
1	CPU PLANAR BOARD
1	STORAGE CARD (32K)
1	STORAGE CARD (64K)
1	DISKETTE ATTACHMENT CARD
1	KEYBOARD

RECOMMENDED ADDITIONS IF FEATURE/DEVICE ATTACHED:

QTY	DESCRIPTION
1	TP ADAPTER CARD
1	DISKETTE MULTIPLEXER CARD
1	UPDATE STORAGE CARD
1	PRINTER PORT II FEATURE CARD
1	5241 PRINTER PLANAR BOARD
1	5242 PRINTER PLANAR BOARD
1	31SD DRIVE CONTROL CARD
1	51TD DRIVE CONTROL CARD
1	WORD PROCESSING SUPPORT CARD
1	DISPLAY DRIVER/RECEIVER CARD (FOR 5324 ONLY)
1	WORK STATION SIA CARD

11.3 REQUIRED TOOL KIT TOOLS

DESCRIPTION	PART NUMBER
CE METER	1749231
METRIC TOOL KIT (BILL OF MATERIAL)	1749235
GLP II LOGIC PROBE	453212
CRT ADJUSTMENT TOOL(PLASTIC SCREWDRIVER)	460811
PRINTER CODE PLATE ALIGNMENT TOOL	460028

11.4 RECOMMENDED ADDITIONAL TOOLS

DESCRIPTION	PART NUMBER
IBM 'MINIPROBE'	453718
SCALE PUSH PULL (0-6 LBS.)	460870

12.0 PROGRAM OPERATION SUMMARY CHART

A. POWER-ON DIAG. (PID 1200)

1. TURN POWER OFF
2. TURN POWER ON
3. OBSERVE TEST STATUS DISPLAY.

B. DISK DRIVE DIAG. (PID 1500) (SEE NOTE 1)

1. POWER-ON DIAG. IS COMPLETED. (SEE A)
2. PRESS 'CMD/TEST' KEYS.
3. PRESS 'CMD/ERROR RESET' KEYS.
4. SELECT DRIVE AND PROGRAM OPTIONS: (DISPLAYED ONE AT A TIME)
   * SELECT DRIVE (1-4). (KEY: 1,2,3 OR 4)
   * DISKETTE DIAG.? (KEY: 1=YES,0=NO)
   * DIAG. WITH LOOP? (KEY: 1=YES,0=NO) (SEE NOTE 2)
   * MAP CHART ROUTINE? (KEY: 1=YES,0=NO)
   * LOAD DCP? (KEY: 1=YES,0=NO)
5. OBSERVE TEST STATUS MESSAGES.
6. KEY: '9' - TO TERMINATE PROGRAM.

NOTE 1: Use numeric keypad keys only

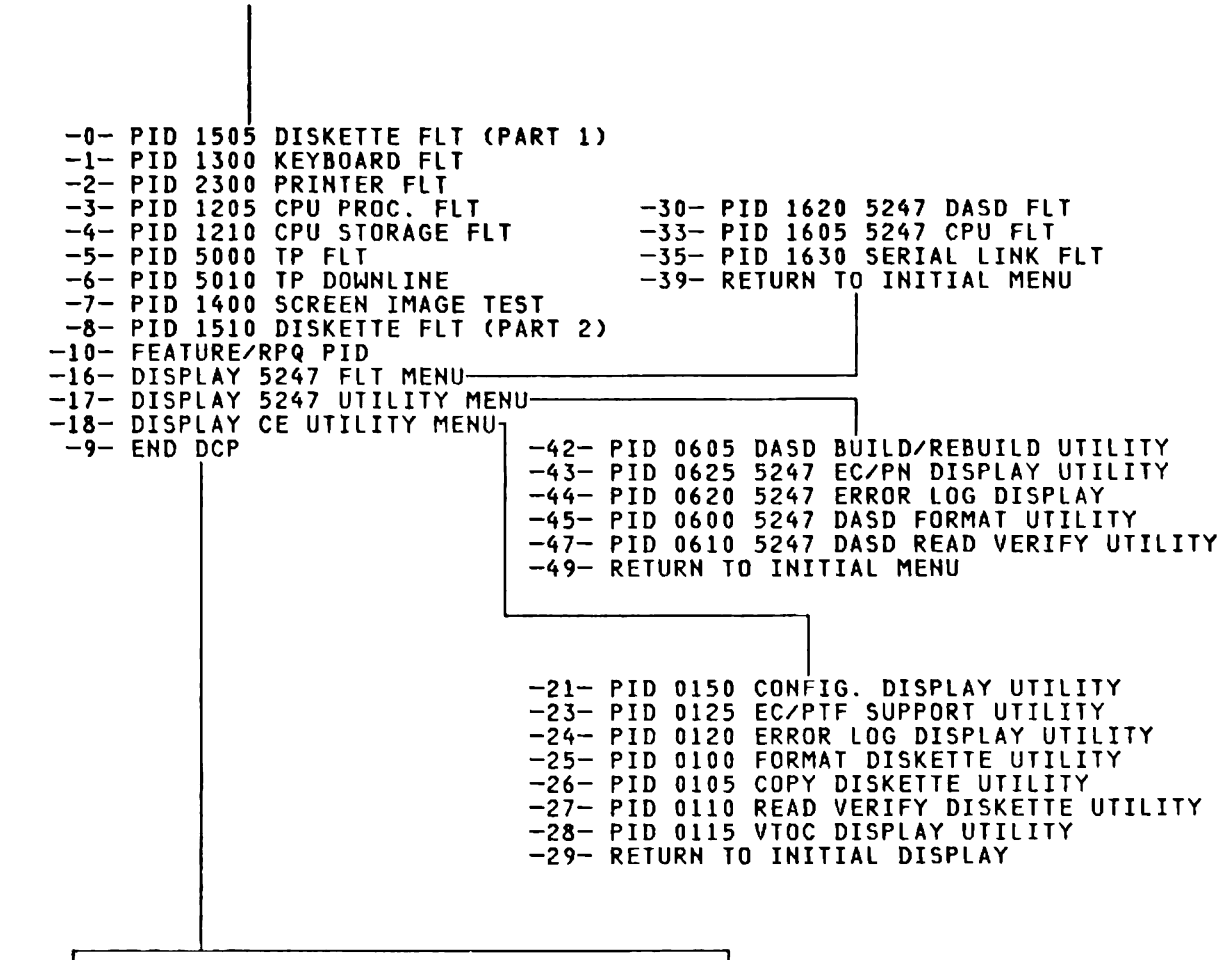
NOTE 2: Displayed only if diskette diag. is selected.

C. LOAD DCP PROGRAM (PID 0001)

1. SELECT DISK DRIVE DIAGNOSTIC. (SEE B)
2. SELECT 'LOAD DCP?' OPTION.
3. PROGRAM WILL DISPLAY THE DCP MAIN MENU.

Continued on next page

12.0 PROGRAM OPERATION SUMMARY CHART (CONTINUED)



D. LOAD DIAGNOSTIC FLT OR UTILITY PROGRAM

1. SELECT DCP MENU OPTION. (SEE C)
2. PROGRAM WILL DISPLAY A MENU OR PROMPT MESSAGE.
3. SELECT MENU OPTIONS (REQUESTED).
4. SET PROGRAM PARAMETERS (REQUESTED).
5. OBSERVE TEST STATUS/PROMPT MESSAGES.
6. ENTER 'ATTN E' - TO END A LOOP.
7. ENTER 'ATTN 9' - TO TERMINATE A PROGRAM AND RETURN TO THE OPTION MENU OF THAT PROGRAM.

13.0 PID 0001 (DIAGNOSTIC CONTROL PROGRAM)

13.1 PROGRAM SUMMARY

13.1.1 PURPOSE

This program gives a supervisor function to the Fault Locating Tests and CE utilities.

***** CAUTION *****

The alphabetic keys (A-Z only), the numeric keypad (0-9 only), the <-- (cursor back space key), the COPY D key and the ENTER key are the only keys active while DCP is operating.

13.2 OPERATING PROCEDURES

13.2.1 LOADING

After PID 1500 has been selected enter a '1' in response to the LOAD DCP? menu (Refer to PID 1500 "MENU DISPLAY" on page 116). After loading, the DCP MAIN MENU will be displayed.

13.2.2 MENU DISPLAY

```
DCP MAIN MENU

- 0 - PID 1505 DISKETTE FLT (PART 1)
- 1 - PID 1300 KEYBOARD FLT
- 2 - PID 2300 PRINTER FLT
- 3 - PID 1205 CPU PROCESSOR FLT
- 4 - PID 1210 CPU STORAGE FLT
- 5 - PID 5000 TP FLT
- 6 - PID 5010 TP DOWNLINE TEST
- 7 - PID 1400 SCREEN IMAGE TEST PATTERNS
- 8 - PID 1510 DISKETTE FLT (PART 2)
- 10 - FEATURE/RPQ PID
- 16 - DISPLAY 5247 FLT MENU
- 17 - DISPLAY 5247 UTILITY MENU
- 18 - DISPLAY CE UTILITY MENU
- 9 - END DCP

ENTER CHARACTER FOR DESIRED ROUTINE
 THEN PRESS ENTER

CE UTILITY MENU

- 21 - PID 0150 CONFIGURATION DISPLAY
- 23 - PID 0125 EC / PTF SUPPORT UTILITY
- 24 - PID 0120 ERROR LOG DISPLAY UTILITY
- 25 - PID 0100 FORMAT DISKETTE UTILITY
- 26 - PID 0105 COPY DISKETTE UTILITY
- 27 - PID 0110 READ VERIFY DISKETTE UTILITY
- 28 - PID 0115 VTOC DISPLAY UTILITY
- 29 - RETURN TO INITIAL DISPLAY

ENTER CHARACTERS FOR DESIRED UTILITY
 THEN PRESS ENTER

5247 FLT MENU

- 30 - PID 1620 5247 DASD FLT
- 33 - PID 1605 5247 CPU FLT
- 35 - PID 1630 SERIAL LINK FLT
- 39 - RETURN TO INITIAL MENU

ENTER CHARACTERS FOR DESIRED ROUTINE
 THEN PRESS ENTER

5247 UTILITY MENU

- 42 - PID 0605 DASD BUILD/REBUILD UTILITY
- 43 - PID 0625 5247 EC/PN DISPLAY UTILITY
- 44 - PID 0620 5247 ERROR LOG DISPLAY UTILITY
- 45 - PID 0600 DASD FORMAT UTILITY
- 47 - PID 0610 DASD READ VERIFY UTILITY
- 49 - RETURN TO INITIAL MENU

ENTER CHARACTERS FOR DESIRED UTILITY
 THEN PRESS ENTER
```

Note: DCP MAIN MENU options 16 and 17 will be displayed only if the work station SIA Card is installed.

13.2.3 MENU OPTION SELECTION

When the DCP MAIN MENU is displayed, enter the number for the test you want to run (or):

'10' is used to select FEATURE/RPQ PID not shown on the menus. Message A-0002 will show on the display.

'16' to display the 5247 FLT MENU.

'17' to display the 5247 UTILITY MENU.

'18' to display the CE UTILITY MENU.

'9' to EXIT DCP and return control to the system.

When other menus are displayed, enter the number for the program desired or to return to the DCP MAIN MENU.

Options available under DCP - not shown on the display - are:

ATTN E = Set a flag so that an FLT will reset a LOOP PROGRAM or LOOP ROUTINE option.

ATTN 9 = Set a flag so that an FLT will terminate and return to its last menu.

ATTN COPY D = Enable the alternate print option. (See "ALTERNATE PRINT OPTION" on page 25)

ATTN 0 = Disable the alternate print option. (See "ALTERNATE PRINT OPTION" on page 25)

13.2.4 PROGRAM RUN INSTRUCTIONS

All input to DCP will be requested by prompting messages. When DCP is waiting for input, a '?' (question mark) will be displayed on the lower left corner of the screen. The alarm will also signal when DCP is waiting for input from the keyboard. A cursor will indicate the position of the next input character. Pressing a '<--' (cursor back space) key will cause the cursor to back up, erasing the character entered. By repeatedly pressing the '<--' key or by holding the '<--' key down all characters on the input line may be deleted. The ENTER key is used to indicate the end of input.

Note: Drive number is a one digit numeric character (1-4 for diskette).

13.2.4.1 PROGRAM TERMINATE METHOD

DCP operations may be terminated by entering a '9' when the DCP MAIN MENU is displayed.

DCP operation may also be terminated at any time by turning the power switch to OFF.

***** CAUTION *** REMOVE DISKETTE BEFORE POWERING ON OR OFF.**

13.3 ERROR, ACTION AND INFORMATION MESSAGES

E-0001 WRONG ENTRY - PRESS ENTER

NOTE: Verify that correct keyboard entries were made. If display does not match key entries, GO TO MAP 1400, ENTRY POINT A.

A-0002 ENTER DRIVE NUMBER AND PID NUMBER (X YYYY)

A-0020 ENTER DRIVE NUMBER (X)

E-0021 DRIVE X NOT READY

Note: CHECK - DISKETTE inserted correctly and handle closed.
- TYPE 1 DISKETTE ONLY inserted in 31SD DRIVE.

IF ERROR CONTINUES:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

E-0022 PID NAME NOT FOUND
PRESS ENTER

Note: PROGRAM IS NOT ON THIS CE DISKETTE.

E-0023 WRONG DISKETTE INSERTED
INSERT CE DISKETTE

Note: Verify that a CE DISKETTE is inserted in drive. If error continues - REPLACE THE CE DISKETTE - TRACK 0 may have been destroyed.

E-0024 RESULTS ERROR - ISR = WW ST0 = XX ST1 = YY ST2 = ZZ
ERROR OCCURRED ON TRACK VV

NOTE WW = 80 READ/WRITE END
20 DRIVE WENT NOT READY
10 OPERATION NOT COMPLETED
08 DRIVE 4 ATTENTION
04 DRIVE 3 ATTENTION
02 DRIVE 2 ATTENTION
01 DRIVE 1 ATTENTION

XX = 00 NORMAL END
ANY OTHER VALUE INDICATES ERROR END

YY = 20 CRC ERROR
04 SECTOR NOT FOUND
01 ADDRESS MARK NOT FOUND

ZZ = 20 DATA FIELD CRC ERROR
10 CYLINDER ADDRESS NO COMPARE
01 MISSING DATA ADDRESS MARK

IF THIS ERROR OCCURS:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTES
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

E-0025 UNEXPECTED INTERRUPT LEVEL MASK = XX REQUEST = YY

NOTE: REPLACE CPU PLANAR BOARD. SEE SM 1230.

E-0026 DRIVE X CANNOT BE SECURED.

E-0027 NO RESPONSE FROM DISKETTE AFTER I/O REQUEST

IF ERROR CONTINUES:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTES
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

13.4 DETAILED DESCRIPTION OF ROUTINES

13.4.1 ALTERNATE PRINT OPTION

This is an optional feature of DCP that will print all screen messages and operator inputs to the printer, if possible. Any error condition will cancel the option with no error message. The ATTN sequence to enable or disable (See "MENU OPTION SELECTION" on page 23) may be entered at any time. The print option is disabled during operation of the KEYBOARD FLT, SCREEN IMAGE TEST PATTERNS and the PRINTER FLT.

13.4.2 OPTION FLAGS

ATTN E and ATTN 9 can be entered when an FLT is executing. These entries will set an option flag for the FLT.

ATTN E will indicate that an earlier set LOOP ROUTINE option should be reset.

ATTN 9 will indicate that FLT operation should end execution of the current routine and return to the FLT MENU.

14.0 PID 0100 (FORMAT DISKETTE UTILITY)

14.1 PURPOSE

This utility will write addresses and labels on a diskette for CE diagnostic use.

14.2 OPERATING PROCEDURES

14.2.1 LOADING

Select the UTILITY MENU (18 on the DCP MENU). Select the FORMAT UTILITY (25 on the UTILITY MENU). Message A-0250 will then be displayed on the screen.

14.2.2 MENU DISPLAY

None - All input is through prompting.

14.2.3 MENU OPTION SELECTION - None.

14.2.4 PROGRAM RUN INSTRUCTIONS

All operator input required is through prompting messages. The drive number is a one digit numeric character (1-4 only), indicating the drive containing the diskette to be formatted, followed by a 6 character numeric label or ID to be written on the diskette. The drive number and the label should be separated by one space.

If the diskette has valid information on TRACK 0, a message A-0257 will be displayed to permit the drive number and diskette to be verified before doing the format.

14.2.4.1 PROGRAM END

Many diskettes can be formatted by entering the drive number and label information when requested. To exit the program, a '9' may be entered in place of a drive number.

14.3 ERROR, ACTION AND INFORMATION MESSAGES

A-0250 ENTER DRIVE NUMBER (X) AND ID (YYYYYY) (6 NUMERIC CHARACTER)

X YYYYYY

OR 9 TO EXIT PROGRAM

E-0251 WRONG ENTRY

Note: Verify that correct keyboard entries were made. If display does not match key entries - GO TO MAP 1400, ENTRY POINT A.

E-0252 DRIVE X NOT READY

Note: (This will be followed by an A-0250 message).

Note: CHECK - DISKETTE inserted correctly and handle closed.
- TYPE 1 DISKETTE ONLY inserted in 31SD DRIVE.

IF ERROR CONTINUES:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

E-0253 RESULTS ERROR - ISR = WW ST0 = XX ST1 = YY ST2 = ZZ
ERROR OCCURRED ON TRACK VV

FORMAT OF THIS DISKETTE ABORTED

ENTER VALID DRIVE NUMBER AND ID

OR 9 TO EXIT PROGRAM

NOTE: WW = 80 READ/WRITE END
20 DRIVE WENT NOT READY
10 OPERATION NOT COMPLETED
08 DRIVE 4 ATTENTION
04 DRIVE 3 ATTENTION
02 DRIVE 2 ATTENTION
01 DRIVE 1 ATTENTION

XX = 00 NORMAL END
ANY OTHER VALUE INDICATES ERROR END

YY = 20 CRC ERROR
04 SECTOR NOT FOUND
01 ADDRESS MARK NOT FOUND

ZZ = 20 DATA FIELD CRC ERROR
10 CYLINDER ADDRESS NO COMPARE
01 MISSING DATA ADDRESS MARK

IF THIS ERROR OCCURS:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

I-0254 NO BAD SECTORS

ENTER VALID DRIVE NUMBER AND ID

OR 9 TO EXIT PROGRAM

E-0255 ERRORS DETECTED ON 1 OR MORE TRACKS

FORMAT OF THIS DISKETTE ABORTED

ENTER VALID DRIVE NUMBER AND ID

OR 9 TO EXIT PROGRAM

NOTE: This diskette may not be used for CE DIAGNOSTICS. A diskette that is formatted error free must be used. A reformat of this diskette may run error free.

A-0256 END OF FORMAT PROGRAM - PRESS ENTER

A-0257 DISKETTE IN DRIVE X CONTAINS 1 OR MORE FILES

DO YOU WANT TO FORMAT THIS DISKETTE? (1 = YES, 0 = NO)

***** WARNING *****

ANSWER = 1 WILL CLEAR ALL INFORMATION FROM THIS DISKETTE

E-0258 DRIVE X CANNOT BE SECURED.

14.4 DETAILED DESCRIPTION

This program will write all addresses and a data pattern on all tracks (0-76). A type 2D DISKETTE may be formatted for CE DIAGNOSTIC use, however, the diskette will be formatted SIDE 0 ONLY. A type 2D DISKETTE may be used in a 51TD DRIVE ONLY. A 'NOT READY' message will be displayed if a type 2D DISKETTE is used in a 31SD DRIVE. After all addresses are written, all tracks will be read to check addresses and data pattern. If no errors are detected, CE label information will be written. The CE DISKETTE COPY UTILITY may then be used to make a CE DIAGNOSTIC DISKETTE.

***** CAUTION *****

THE FORMAT AND LABEL INFORMATION WRITTEN IS SPECIFIC TO THE CE DIAGNOSTIC DISKETTE AND WILL NOT BE USABLE FOR CUSTOMER DATA OR PROGRAM FILES.

15.0 PID 0105 (COPY DISKETTE UTILITY)

15.1 PURPOSE

This utility will copy a CE DIAGNOSTIC DISKETTE or a single diagnostic PID to another CE DIAGNOSTIC DISKETTE. A diagnostic PID may also be deleted.

15.2 OPERATING PROCEDURES

15.2.1 LOADING

Select the UTILITY MENU (18 on the DCP MENU). Select the COPY UTILITY (26 on the UTILITY MENU) message I-0260 will then be displayed on the screen.

15.2.2 MENU DISPLAY

None - All input is through prompting.

15.2.3 MENU OPTION SELECTION - None.

15.2.4 PROGRAM RUN INSTRUCTIONS

All operator input is through prompting messages. The drive number is a single numeric character (1-4). To copy all of the diskette correctly, the TO diskette should be formatted first with the CE FORMAT UTILITY.

15.2.4.1 PROGRAM END

The copy program can be ended by entering a '9' when message I-0260 is displayed.

15.3 ERROR, ACTION AND INFORMATION MESSAGES

I-0260 COPY DISKETTE UTILITY

-1- COPY ONE FILE
-2- IMAGE COPY ALL FILES
-3- DELETE ONE FILE
-9- RETURN TO DCP MENU

SELECT OPTION, PRESS ENTER

A-0261 HOW MANY DRIVES WILL BE USED?

-1- ONE DISKETTE DRIVE
-2- TWO DISKETTE DRIVES

SELECT OPTION, PRESS ENTER

A-0262 INSERT DISKETTE BEING COPIED FROM
INTO DISKETTE DRIVE

ENTER DRIVE NUMBER (X)

A-0263 INSERT DISKETTE BEING COPIED TO
INTO DRIVE

ENTER DRIVE NUMBER (X)

A-0264 INSERT DISKETTE BEING COPIED TO

THEN PRESS ENTER

A-0265 INSERT DISKETTE BEING COPIED FROM

THEN PRESS ENTER

A-0266 ENTER PID NUMBER TO BE COPIED (XXXX)

E-0267 PID XXXX NOT FOUND

Note: PROGRAM IS NOT ON THE CE DISKETTE.

I-0268 DISKETTE COPY COMPLETED

E-0269 WRONG ENTRY

Note: Verify that correct keyboard entries were made. If display does not match key entries - GO TO MAP 1400, ENTRY POINT A.

I-026B NOT ENOUGH DISKETTE SPACE, OPERATION ABORTED

E-026C RESULTS ERROR - ISR=WW ST0=XX ST1=YY ST2=ZZ
ERROR OCCURRED ON TRACK VV

NOTE: WW = 80 READ/WRITE END
20 DRIVE WENT NOT READY
10 OPERATION NOT COMPLETED
08 DRIVE 4 ATTENTION
04 DRIVE 3 ATTENTION
02 DRIVE 2 ATTENTION
01 DRIVE 1 ATTENTION

XX = 00 NORMAL END
ANY OTHER VALUE INDICATES ERROR END

YY = 20 CRC ERROR
04 SECTOR NOT FOUND
01 ADDRESS MARK NOT FOUND

ZZ = 20 DATA FIELD CRC ERROR
10 CYLINDER ADDRESS NO COMPARE
01 MISSING DATA ADDRESS MARK

IF THIS ERROR OCCURS:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

E-026D WRONG DISKETTE INSERTED

INSERT A CE DISKETTE THEN PRESS
ENTER

Note: Verify that a CE DISKETTE is inserted in drive. If error continues - replace CE DISKETTE - TRACK 0 may have been destroyed.

E-026E DRIVE X NOT READY - MAKE READY

Note: CHECK - DISKETTE inserted correctly and handle closed.
- TYPE 1 DISKETTE ONLY inserted in 31SD DRIVE.

IF ERROR CONTINUES:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

A-026F DCP COPY UTILITY ENDED - PRESS ENTER

A-026G PID XXXX ALREADY ON DISKETTE, DELETE?

A-026H ENTER PID NUMBER TO BE DELETED (XXXX)

I-026I PID XXXX DELETED

E-026J DRIVE X CANNOT BE SECURED

E-026K COPY FUNCTION ABORTED, 'TO' DISKETTE MAY NOT BE USABLE

15.4 DETAILED DESCRIPTION

This program will copy TO or FROM a CE DIAGNOSTIC DISKETTE ONLY.

*** CAUTION ***

The format and label information read or written is specific to the CE DIAGNOSTIC DISKETTE and will not be usable for CUSTOMER DATA or PROGRAM FILES.

16.0 PID 0110 (READ VERIFY DISKETTE UTILITY)

16.1 PURPOSE

This program does a read verify of a CE DISKETTE on the selected drive. The diskette type and format is displayed. Each record on CYLINDER ZERO and ONE is read FOUR times. Then each CYLINDER is read FOUR times. If a soft error is sensed, then each record on the CYLINDER is read EIGHT times to find the record. A single record on a CE DISKETTE (MODE= FM WITH RECLEN= 02 (512 BYTES)) may be selected and read. EXCHANGE DISKETTES and CUSTOMER DISKETTES, SYSTEM/23 formatted, can be tested.

16.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

16.2.1 LOADING PID 0110 - DISKETTE READ VERIFY UTILITY -

With the primary DCP MENU displayed, enter an '18' and an ENTER to display the UTILITY MENU. Next enter a '27' and an ENTER.

PID 0110 will load and display start message I-2700 followed by ROUTINE 1 information message I-2710. See "ERROR, ACTION AND INFORMATION MESSAGES" on page 35 for any error messages. After ROUTINE 1 executes without error, the OPTIONS MENU will be displayed.

16.2.2 MENU DISPLAY

```
I-2701      OPTIONS:     LOOP MODE OFF - DISKETTE DRIVE SELECTED = #
       X-0- SET / RESET  LOOP MODE
       X-1- SELECT DISKETTE DRIVE
       X-2- READ VERIFY CE DISKETTE
       X-3- READ VERIFY RECORD
       X-4- READ VERIFY EXCHANGE DISKETTE
       X-5- READ VERIFY SYSTEM/23 FORMAT DISKETTE
       X-6- HEAD ALIGNMENT CHECK
       X-9- RETURN TO DCP
A-2702     ENTER OPTION

?_
```

16.2.3 MENU OPTION SELECTION

Enter the selected option number using the numeric keys on the right end of the keyboard followed by the ENTER key.

The 'X' by the option number indicates an optional routine not part of automatic sequence.

OPTION 0 Will set or reset routine loop mode and display the options menu with the loop mode indicated as on or off.

OPTION 1 Will display message I-2709 requesting the drive number of the diskette drive to be selected for the next test. An entry of 1, 2, 3 or 4 is needed to change the selected drive. The drive is then tested for a ready condition

and the VOL1 checked for the diskette type and format. If drive 3 or 4 is selected it will be secured and then released for the VOL1 header read.

OPTION 2 Will read verify the CE DISKETTE on the selected diskette drive testing for errors. If drive 3 or 4 is selected, then the drive will be secured and held during the test.

OPTION 3 Will read verify a selected record on a CE DISKETTE. If drive 3 or 4 is selected the drive will be held secured for each ten reads and then released.

OPTION 4 Will read verify a standard labeled exchange type diskette.

OPTION 5 Will read verify a SYSTEM/23 format diskette on the selected drive.

OPTION 6 Will do a quick check of diskette head alignment using Branch Office Tool part number 2455026.

OPTION 9 Will end PID 0110 and return to DCP.

16.2.4 PROGRAM RUN INSTRUCTIONS

Normal program operation is to select OPTION 1 to select the diskette needed. Next, the 2 OPTION is used to start the read verify routine. If a hard error is sensed, the routine will stop with an entry needed to continue. If soft errors are sensed, an error message will be displayed giving the CYLINDER, HEAD and RECORD number. An error counter will then be updated on the screen. At the end of the routine, the OPTIONS MENU will be displayed.

The status line, above the keyboard input line, will display the last drive number selected (DR #). If errors occur, a decimal count of the number of errors will be displayed to the left of the drive indicator. If loop mode is set, then a decimal loop counter is displayed to the left of the error counter. These indicators may be moved up the screen before a keyboard input request. During DISKETTE READ and WRITE operations the CYLINDER, HEAD and RECORD(S) selected are displayed at the center of the status line (CCHRR=#####). Soft errors are normal on used diskettes.

16.2.4.1 END COMMAND

Use the ATTN and E entry to end routine loops and go to the next routine when in loop mode or to return to the OPTIONS MENU.

Use the ATTN and 9 entry to return to the menu after the selected routine is executed.

With the menu displayed, enter OPTION 9 and ENTER to return to DCP. An ENTER is needed after the ending message.

At ERROR and ENTRY stops a '9' and ENTER will return to the main OPTIONS MENU.

16.2.4.2 LOOP COMMAND

OPTION 0 is used to set or reset ROUTINE or PROGRAM LOOP mode. The present mode selected will be displayed as part of the menu. If a routine is selected with LOOP MODE set, the ROUTINE will loop until an ATTN command or an ERROR.

16.2.5 CONTROL PROGRAM ERROR, ACTION AND INFORMATION FORMAT

If an error is sensed, an ERROR MESSAGE(S) (E-27XX) and optional INFORMATION MESSAGES (I-27XX) will be displayed, followed by an entry STOP MESSAGE (A-27XX ERROR OCCURRED).

See "PID 0001 (DIAGNOSTIC CONTROL PROGRAM)" on page 21 for CONTROL PROGRAM STOPS (other than ?-27XX).

See "TRAP DATA" on page 15 for TRAP stops.

16.3 ERROR, ACTION AND INFORMATION MESSAGES

MSG ID	ERROR MESSAGE AND STATUS MESSAGE MEANINGS
I-2700	PID 0110 START -DISKETTE READ VERIFY UTILITY- The utility has been loaded and has displayed its start message.
I-2701	OPTIONS: LOOP MODE OFF - DISKETTE DRIVE SELECTED = # X-0- SET / RESET LOOP MODE X-1- SELECT DISKETTE DRIVE X-2- READ VERIFY CE DISKETTE X-3- READ VERIFY RECORD X-4- READ VERIFY EXCHANGE DISKETTE X-5- READ VERIFY SYSTEM/23 FORMAT DISKETTE X-6- HEAD ALIGNMENT CHECK X-9- RETURN TO DCP
A-2702	ENTER OPTION The OPTIONS MENU is displayed and a DIGIT (0 TO 9) OPTION ENTRY followed by ENTER is needed.
I-2703	START AUTOMATIC SEQUENCE
I-2704	'ATTN-X' ACKNOWLEDGE Acknowledgment of an ATTN request and the end of routine.
A-2705	ERROR OCCURRED IN ROUTINE # '9' TO END LOOP 'ENTER' TO CONTINUE An error has occurred and an ENTER is needed to continue testing. Any other entry returns to OPTIONS MENU.
I-2706	LOOP MODE SET ROUTINE/PROGRAM LOOP MODE has been turned on.
I-2707	LOOP MODE RESET ROUTINE/PROGRAM LOOP MODE has been turned off.
E-2708	'X' IS NOT A VALID OPTION The first character entered was not an expected option. Enter a valid option number.

A-2709 THE PRESENT DISKETTE DRIVE SELECTED IS 'X'
ENTER NEW DRIVE NUMBER (1,2,3 OR 4)

The selected drive number is displayed. A new drive number between 1 and 4 must be entered to change drives.

I-2710 RTN-1 INSERT DISKETTE TO BE READ VERIFIED INTO ANY DRIVE AND THEN SELECT DRIVE USING OPTION '1'.

E-2711 READ/WRITE STORAGE PARITY CHECK FRU= BASE STORAGE CARD

A R/W PARITY CHECK was sensed in the first 32K of storage by the INITIALIZATION ROUTINE. Suspect the BASE STORAGE CARD.

E-2712 I/O CHANNEL TRAP SEE MAP 1225

The I/O CHANNEL ERROR LINE was activated by an attachment card.

E-2713 READ/WRITE STORAGE DATA FAILURE FRU= BASE STORAGE CARD

Data read during INITIALIZATION TESTING from a storage location in the first 32K was not as expected. Suspect BASE STORAGE CARD or the CPU PLANAR BOARD.

E-2714 WRITE TO ROS SPACE TRAP SEE MAP 1205 AND MAP 1210

A write to ROS address space error has been sensed. Either the program is destroyed and must be loaded again or the hardware failed.

E-2716 LOGIC FAILED FRU= CPU PLANAR BOARD

A failure was sensed in the storage control logic on the CPU Planar Board. The CPU Planar Board should be exchanged.

E-2718 POWER CHECK SEE MAP 1225

The POWER GOOD LINE from the POWER SUPPLY went OFF.

I-2720 RTN-2 READ VERIFY CE DISKETTE ROUTINE STARTED

E-2721 HARD ERROR OCCURRED ON CYLINDER 76 OF CE DISKETTE IN DRIVE= #
RUN PID 1510 TO CORRECT ERROR 'ENTER' TO CONTINUE '9' TO END

A hard error was sensed on the CE READ/WRITE TEST TRACK.

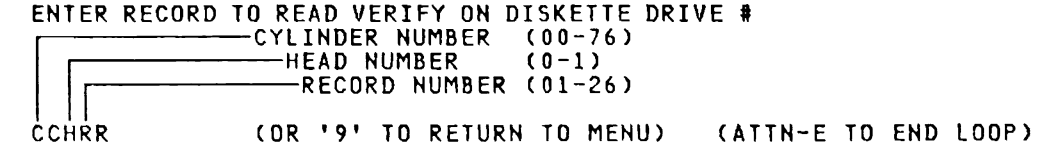
PID 1510 should be used to correct the error condition.

I-2730 RTN-3 READ VERIFY RECORD ROUTINE STARTED

A-2731 BYPASS HARD ERROR STOPS ? (1 FOR YES)

Use ENTER for normal operations. Use a '1' and ENTER to bypass error stop messages during testing and scope loops.

A-2732 ENTER RECORD TO READ VERIFY ON DISKETTE DRIVE #



The record to be read is needed in the format CCHRR.

RR = 01 TO 26 IF 'CC = 00'
OR
RR = 01 TO 08 IF 'CC OTHER THAN 00'

If the entry values are not valid an error message will be displayed.

I-2740 RTN-4 READ VERIFY EXCHANGE DISKETTE STARTED

A-2741 SYSTEM/23 FORMAT DISKETTE -- USE ROUTINE 5 PRESS 'ENTER'

The diskette in the selected drive is a CUSTOMER DISKETTE and is in the SYSTEM/23 FORMAT for data files. The use of ROUTINE 4 to READ VERIFY this diskette will cause hard error stops at records removed from available record space by system microcode because of READ/WRITE errors. Use ROUTINE 5 to READ VERIFY the usable records on the diskette. If a '3' and ENTER is used as a response, this error stop will be bypassed and ROUTINE 4 will attempt to run on this diskette.

I-2750 RTN-5 READ VERIFY SYSTEM/23 FORMATTED DISKETTE ROUTINE STARTED

E-2751 NOT A VALID SYSTEM/23 FORMAT DISKETTE -- USE ROUTINE 4

The diskette in the selected drive was not prepared as a SYSTEM/23 diskette and cannot be READ VERIFIED by ROUTINE 5. This error message may be displayed if records at CCHRR= 00008, CCHRR= 00009, CCHRR= 01001 or CCHRR= 01002 on a CUSTOMER DISKETTE have been changed. Use ROUTINE 4.

E-2752 MISSING CONTROL RECORD AT CCHRR= 00010

The SYSTEM/23 FORMAT DISKETTE uses only the first two VTOC entries. The third VTOC entry (HDR1 RECORD) should be a control record (DELETED DATA ADDRESS MARK). The diskette data integrity may not be valid.

E-2753 ERROR IN DATA SET LABEL

An error was found in a data set label. Either there was a hard read error or a record block count entry was not valid or was too large.

Recommend that customer use the CSF (CUSTOMER SUPPORT FUNCTION) utilities to correct problem.

I-2754 READING #### IN USE RECORDS

The diskette VOL1 information and data set labels have been read and a map of the records used has been initialized. The count of records IN USE on the diskette is displayed. The read verify of these records has started.

I-2755 READING #### AVAILABLE RECORDS

The read verify of the IN USE records has ended. The count of records not used and available for use in files is displayed. The map of available records from the diskette free space map is used in reading the available records.

I-2756 SKIPPED #### DELETED FAILING RECORDS

The count of skipped records is displayed. The map of IN USE records and the map of available records are combined and checked for records that are not accessible. The skipped records were found by system microcode to be causing read/write errors and were removed from the data set label IN USE map. A large number of skipped records indicate that the diskette is worn or that a hardware failure occurred during a customer program run. Use PID 0120 to display the diskette error log data and the read/write statistics. Errors found by the read verify of IN USE and available records are not associated with these skipped records. A high skipped record count may effect performance.

E-2757 RECORD(S) USED MORE THAN ONCE

One or more records are assigned by data set label pointers as IN USE more than once. Data integrity is suspect. The customer should copy each file to a good diskette and verify that all data is valid.

E-2758 RECORD(S) USED AND IN AVAILABLE RECORD MAP.

One or more records are assigned by data set label pointers as IN USE and are also in the available record map. Data integrity is suspect. The customer should copy all files to a good diskette and verify that the data is valid.

I-2760 HEAD ALIGNMENT CHECK ROUTINE STARTED
WAIT UNTIL THE ALIGNMENT DISKETTE TEMPERATURE IS STABLE IN DRIVE

The head alignment service check routine has started. The temperature of the 3742 alignment check diskette (part number 2455026) must be stable and permitted to reach machine environment temperature.

A-2761 INSERT ALIGNMENT CHECK DISKETTE P/N 2455026 INTO DRIVE TO BE CHECKED
THE PRESENT DRIVE SELECTED IS 'X'
ENTER DRIVE NUMBER (1,2,3 OR 4) OR '9' AND 'ENTER' TO END ROUTINE

The branch office tool part number 2455026 is needed for the alignment service check. The drive selected is displayed. Press ENTER to start the service check on that drive. To select another drive, enter the drive number and press ENTER. Press '9' and ENTER to end the service check routine and return to PID 0110 options menu. With a valid entry, the selected drive will be checked for the correct diskette. Then the head alignment of HEAD 0 will be checked.

I-2762 DRIVE= X HEAD ALIGNMENT OK

The head alignment is correct for the drive displayed. No adjustment is needed. The second head, if present, is not checked because it is fixed relative to HEAD ZERO.

E-2763 DISKETTE IN DRIVE IS NOT ALIGNMENT CHECK DISKETTE P/N 2455026

The VTOC header is not correct for a 3742 alignment diskette. Use the correct diskette in the selected drive.

I-2764 READ ERROR COUNT ** OUT= ### * IN= ###

The number of records that cannot be read because they were written too far in or out relative to the diskette center hole are displayed. This message is displayed if the alignment is not correct or an ATTN-E is entered during the service check. If most errors occurred in one direction, use the service check 1530 or 4530 in the Service Manual to correct the head position. Errors in both directions indicate a loose or worn mechanical part.

E-2765 DRIVE= X HEAD ALIGNMENT NOT CORRECT
** CHECK 'HEAD/CARRIAGE ASSEMBLY' (SEE SM 1530 OR 4530)

The minimum number of even and odd records cannot be read repeatedly. The head alignment is not correct or the carriage access assembly is loose. First, remove the alignment check diskette and then insert it again in the drive and repeat the alignment check. The diskette may not have been aligned on the drive collar. Errors will occur if the diskette temperature is not stable or the diskette is damaged.

Do the service check in the Service Manual using the ROS routine in PID 1500.

If the mechanical alignment and the service check is correct, no mechanical problems are found and the drive still does not pass the quick head alignment routine, then exchange the head alignment diskette. A damaged head assembly will also cause alignment problems.

A-2766 HEAD POSITION PRECISION ERRORS AFTER SEEK ON DRIVE X
** CHECK 'DRIVE BAND' TRACKING AND TENSION (SEE SM 1562 OR 4562)

Alignment records could not be read when the access assembly was moved in and out after first reading the records OK. The head position cannot be repeated. Check for a loose or worn access assembly or drive band.

This error may indicate a head alignment problem. The mechanical alignment should also be checked (See SM 1530 or 4530).

E-2767 CYLINDER ID ADDRESS NOT EXPECTED ADDRESS

The CYLINDER ID read from the diskette by a READ DATA or READ ID COMMAND did not match the expected cylinder address. The head access has moved to the wrong cylinder. The alignment may not be correct or the diskette is damaged. If the mechanical alignment and band tension is OK, check for binding parts and then run the diskette diagnostics.

E-2770 RC -80- DRIVE NOT READY - DRIVE= '#'

The diskette drive was not ready or went not ready and the operation failed or was not attempted. Ready the selected drive and use ENTER to continue the routine or end the routine and select different drive.

E-2771 RC -40- SHARED DRIVE NOT SECURED

An attempt was made to secure a shared drive (DRIVE 3 or 4) and a time out occurred before the sharing system released the drive.

E-2775 ISR-10- OPERATION NOT COMPLETE TIME OUT

A READ or WRITE operation was not completed in 500 MILLISECONDS. Other error messages may not be valid. First, attempt the operation again. This error is caused by an ID ADDRESS MARK soft read error or a missing record.

E-2776 ISR-0X- DRIVE ATTENTION

A DRIVE ATTENTION ERROR INTERRUPT occurred for a specific drive. See "STATUS BYTE DEFINITION FOR MESSAGE E-2782" on page 45 for drive number.

E-2777 ST1-20- CRC ERROR

A hard CRC ERROR in the address or data field of a record. The record cannot be correctly read.

E-2778 ST1-10- DATA OVERRUN

A data overrun occurred in the diskette controller after a DATA READ or WRITE request was made. The request was not responded to before a byte of data needed was lost. Suspect a hardware failure.

E-2779 ST1-04- RECORD NOT FOUND

The record (RR) requested by a diskette READ or WRITE operation was not found by the diskette controller on the cylinder. The record ID is missing or the record requested is not valid for this cylinder format. Check the diskette type and format for correct CE format.

E-277A ST1-01- ADDRESS MARK NOT FOUND

Either NO ID ADDRESS MARK or NO DATA ADDRESS MARK was found on the cylinder at this head position in response to a READ or WRITE command. If error message E-277F does not follow this message then the error is an ID ADDRESS MARK not found. The cylinder data has been destroyed or the cylinder was not formatted in the correct mode. If most records on a diskette have this error then the 'VOL1' record may have been changed.

E-277B ST2-40- CONTROL RECORD (DELETED DATA ADDRESS MARK)

A control record (DELETED DATA ADDRESS MARK) was sensed after cylinder ZERO and is not valid on a CE DISKETTE. On an EXCHANGE DISKETTE, the control record was sensed on a record not reserved as a header label.

E-277C ST2-20- DATA FIELD CRC ERROR

During READ or VERIFY of a record, the CRC CHECK BYTES from the diskette did not match the CHECK BYTES calculated by the diskette controller. The ID address mark was OK but the error occurred in the data field. The data is lost.

E-277D ST2-10- CYLINDER ADDRESS TO ID COMPARE ERROR

During a READ, WRITE or VERIFY operation, the cylinder ID read from the diskette did not match the ID in the cylinder counter of the controller. Either the controller is out of step with the diskette drive (heads on wrong track) or the ID address mark is written on the diskette wrong.

E-277E ST2-02- BAD CYLINDER

An error flag read from the diskette indicates that this cylinder was written and marked as a bad cylinder. The bad cylinder flag is not valid on a CE DISKETTE and is not supported by CE programs. Use a valid CE FORMAT DISKETTE for the test or bypass the error.

E-277F ST2-01- MISSING DATA ADDRESS MARK

For a READ, WRITE or VERIFY operation, the ID address mark for a record was correctly read from the diskette but the data address mark was not found. Data in the data field is lost and the diskette must be formatted to be usable.

A-2780 ERROR OCCURRED 'ENTER' TO RETRY '3' TO BYPASS '9' TO END

A hard error was sensed and a response is needed to continue testing. The error message(s) are displayed on the screen before this message. To attempt the last operation again and continue with the routine, use just ENTER.

A '3' and ENTER is used to bypass a hard diskette error and testing will continue with the next record, skipping the record in error.

Any other entry will end the routine.

E-2781 SOFT READ ERROR ON DRIVE= # AT CC= ## H= # RR= ##

A READ ERROR was sensed at the displayed cylinder and head. The operation was repeated with no error (ten attempts). If RR= ?? then the error occurred during a cylinder read operation and the program will attempt to find the record in error.

E-2782 ERROR: DR= # AT CCHRR= ##### OP= X RC= XX STATUS= XX,XX,XX,XX

A hard error has been sensed after ten attempts. The CYLINDER (CC), HEAD (H) and RECORD (RR) being read is displayed along with the request COMMAND TYPE (OP). The status byte returned from DCP is displayed along with the four diskette controller status bytes ISR,ST0,ST1 and ST2. See "STATUS BYTE DEFINITION FOR MESSAGE E-2782" on page 45 and "COMMAND TYPE REQUESTS" on page 45 for status byte definition if the error messages following do not describe the error(s).

E-2783 SELECTED DRIVE NUMBER '#' WAS NOT READY / ATTACHED

The selected diskette drive was not connected or was not ready. Select the correct diskette drive or make the drive ready. Verify that the diskette is the correct type for the drive model and that it is inserted correctly. A two-sided (TYPE 2) diskette cannot be used in a single head drive.

E-2784 SHARED DRIVE '#' NOT SECURED

The status byte returned by DCP indicates that the diskette controller could not secure and hold a shared drive (3 or 4) in the number of attempts permitted by DCP. Ensure that the system sharing DRIVE 3 and 4 is not hung and that the drive is ready. Use the DISKETTE DIAGNOSTICS to find and correct the problem or use a different drive.

E-2785 NOT A VALID CE DISKETTE

The diskette on the selected drive does not have the correct recording MODE, SIDES, RECLEN and/or SYSTEM IDENTIFICATION (in the VOL1 header) to be read as a CE FORMATTED DISKETTE. Other errors may occur.

E-2786 READ DATA NOT MOVED TO STORAGE ?

The first 128 bytes of the data field did not change. Before a read operation, the read field is initialized to a fixed test pattern. After the read, the field is checked to verify that the pattern changed. If the pattern did not change, then a data transmission to storage may have failed or went to the wrong address if no other diskette attachment error occurred.

E-2787 COMMAND TO DCP IOCS WAS NOT VALID ?

The control block passed by the utility program was found by DCP to be not valid and was not executed. The program should be ended and then loaded and attempted again. If the error continues, then check any input data and ensure that it is correct.

E-2788 "VOL1" HEADER NOT VALID (RECORD SEVEN)

RECORD SEVEN of CYLINDER ZERO did not have a valid VOL1 header in either EBCDIC or ASCII format.

I-2789 DRIVE= # INDEX= # SIDES= # MODE= XXX FORMAT= XXXXXX RECLEN= ##

Information from the diskette VOL1 header on the selected drive where:

DRIVE = 1, 2, 3 OR 4
INDEX = TYPE '1' OR '2' DISKETTE INDICATED BY THE INDEX PULSE
SIDES = THE NUMBER OF SIDES FORMATTED (1 OR 2)
MODE = 'FM' OR 'MFM'
FORMAT = EITHER 'EBCDIC' OR 'ASCII' FORMAT
RECLEN = THE RECORD LENGTH INDICATOR OF RECORD SIZE
(00=128, 01=256, 02=512 AND 03=1024 BYTE RECORDS).

Note: IF SIDES= 2, INDEX= 2 AND MODE= MFM,
THEN A '2D' DISKETTE IS INDICATED.

E-278A DRIVE POWER CHECK (24V)

The diskette power good line was off for DRIVE 1 and 2. Check 24 VOLTS.

E-278B LABEL TYPE 'X' DISKETTE NOT VALID

The label type indicated is not supported.

Only type 'W' diskettes are supported by diagnostic programs.

I-278D BAD CYLINDER FLAG FOR 'CC'= ## ##

The diskette selected was formatted with the physical cylinder(s) indicated marked as bad. Alternate cylinders are assigned sequentially. Two cylinders may be marked as bad on a usable diskette.

E-278E 'ERMAP' RECORD NOT VALID (RECORD FIVE)

An entry in the ERROR MAP RECORD (CCHRR=00005) is not valid or not supported by diagnostic programs.

E-278F ALTERNATE PHYSICAL RECORD NOT VALID

The ALTERNATE PHYSICAL RECORD method for assigning records to replace bad records is not supported by diagnostic programs.

I-2790 PID 0110 END -READ VERIFY UTILITY-

I-2791 PID 0110 TERMINATED, PRESS 'ENTER'

I-2794 DATA: DRIVE= # CYLINDER= ## HEAD= # RECORD= ##

E-2795 NUMBER OF DIGITS ENTERED NOT VALID?

Only five decimal digits are valid for a CCHRR entry.

E-2796 'CC' NOT VALID?

The CC value of the CCHRR entry is not valid. It must be a decimal value in the range of '00' to '76'.

E-2797 'H' NOT VALID?

The H value of the CCHRR entry is not valid. It must be a '0' or '1'.

E-2798 'RR' NOT VALID FOR 'CC' ENTRY?

The RR value of the CCHRR entry is not valid. It must be a decimal value in the range of:

01 to 26 for 'CC=00'.
01 to 08 for 'CC' other than '00' on a CE DISKETTE.

16.4 DETAILED DESCRIPTION OF ROUTINES

This utility is used to read all the records on a CE DISKETTE. The loop option is available for extended testing with the loop counter displayed on the status line. As each record or block of records is read, the CCHRR is displayed on the status line. Any recovered error is logged as a soft error and the error counter on the status line is updated. Hard errors are logged by error types with a positive response needed to continue or bypass.

16.4.1 ROUTINE 1

Automatically executes after the program is loaded by DCP and does a test of the first 32K of storage to verify program integrity.

16.4.2 ROUTINE 2 - READ CE DISKETTE

Is the CE DISKETTE READ VERIFY UTILITY used to check the diskette for soft and hard read errors. The routine reads each record on CYLINDER 0 and 1 four times and then reads all other cylinders four times in cylinder mode. If a soft read error (readable in ten attempts) occurs, then an error message is displayed and each record is then read seven times with an error message displayed giving the CYLINDER, HEAD and RECORD number for each additional soft read error. After a hard error, a message is displayed and an ENTER response is needed to continue.

16.4.3 ROUTINE 3 - READ SINGLE RECORD

Is used to select and read a single record on a CE formatted diskette ten times. The routine will request the five digit CYLINDER, HEAD and RECORD (CCHRR) entry of the record to be read. If the entry is valid, the selected record will be read ten times with the loop counter updated. If loop mode is on, then the record will be read until an ATTN and 'E' end command is entered. Drives 3 and 4 will be held secured for ten reads and then released.

The bypass hard error stop option is used for scope loop mode when needed by the diskette maps. A good record on the selected track should be used if possible. All errors will be logged and counted.

16.4.4 ROUTINE 4 - READ EXCHANGE DISKETTE

Is used to read verify any standard label IBM formatted diskette. The routine reads the VOL1 header label. The label is checked and the diskette type is checked (1,2,2D). Then each record on the diskette is read with an error message displayed for each error.

16.4.5 ROUTINE 5 - READ CUSTOMER DISKETTE

Is used to read verify a CUSTOMER PREPARED DISKETTE. The routine will read a SYSTEM/23 format diskette, bypassing records not used because of errors during normal use. System microcode will bypass records that become bad during normal operation. If a large number of records are bypassed the customer should copy the files to another diskette.

First, the diskette is checked for a valid SYSTEM/23 format. Then the data set labels are read and a table of IN USE records is made. This table is then used to read verify all of the IN USE records. Next, the bit map table from the table of contents is used to read verify the available records. If any records have been skipped because they have been removed by system microcode as bad, then a count of skipped records is displayed.

16.4.6 ROUTINE 6 - HEAD ALIGNMENT CHECK

Is used to make a quick COVERS ON service check of diskette head alignment using the branch office tool part number 2455026. Run the diskette diagnostics before using this routine. The routine first checks that the correct diskette is in the selected drive. The special alignment tracks are then read. First, the fine alignment tracks are read and then the coarse alignment tracks are read if necessary. The routine attempts to read records written on opposite sides of the diskette on two different tracks. The records are written with offset identification and data fields.

Tracks 05 through 15 of the alignment diskette will not be readable by the verify diskette routines. The special tracks are precision written with the ID fields alternately written offset a specific distance from the normal center of the track. The data field for each record is offset the opposite direction. If the head alignment is correct and compatible with other drives, the alignment check routine can read some of the records, but not necessarily all of the special records.

The alignment check diskette should be protected from temperature and humidity changes. Replacement is needed if dimension changes from temperature or physical damage occur. The alignment check diskette is used as a service check only. If the diskette drive mechanical alignment is correct and this service check still fails, then exchange the alignment checks diskette and repeat the service check.

16.5 GENERAL INFORMATION

16.5.1 UTILITY USE

This diagnostic utility does not display a FRU list except during the ROUTINE 1 initialization. The utility is used to verify that the diskette is readable and to indicate the number of normal attempts necessary to read the diskette after normal wear. This PID will not change records on the CE DISKETTE. No map is associated with this PID. If hardware errors are sensed, the error messages should be recorded and used as an intermittent symptom with the START MAP 1000.

16.5.2 STATUS BYTE DEFINITION FOR MESSAGE E-2782

DCP RETURN CODES

RC
- 80 DISKETTE DRIVE NOT READY
- 40 SHARED DRIVE NOT SECURED
- 20 CONTROL RECORD (DELETED DATA ADDRESS MARK)
- 10 CRC ERROR
- 04 RECORD NOT FOUND
- 02 DRIVE ERROR
- 01 OTHER ERROR

STATUS= ISR, ST0, ST1, ST2

ISR
- 80 READ/WRITE COMMAND END
- 20 DRIVE WENT NOT READY
- 10 OPERATION NOT COMPLETE TIME OUT
- 08 DRIVE 4 ATTENTION
- 04 DRIVE 3 ATTENTION
- 02 DRIVE 2 ATTENTION
- 01 DRIVE 1 ATTENTION

ST0
- 00 NORMAL END
- 80 NOT A VALID OPERATION
- XX ERROR END

ST1
- 80 LAST RECORD MOVED
- 20 CRC ERROR IN ID OR DATA FIELD
- 10 DATA OVERRUN
- 04 RECORD NOT FOUND
- 01 ADDRESS MARK NOT FOUND

ST2
- 40 CONTROL RECORD (DELETED DATA ADDRESS MARK)
- 20 DATA FIELD CRC ERROR
- 10 CYLINDER ADDRESS TO ID COMPARE ERROR
- 02 BAD CYLINDER FLAG
- 01 MISSING DATA ADDRESS MARK

16.5.3 COMMAND TYPE REQUESTS

OP
- 1 NORMAL DRIVE SELECT
- 2 READ DATA RECORD(S)
- 3 WRITE DATA RECORD(S)
- 4 READ ID
- 5 WRITE CONTROL (DELETED DATA MARK) RECORD(S)
- 6 SELECT DRIVE FOR FORMAT MODE
- 7 FORMAT TRACK
- 8 RECALIBRATE DRIVE
- 9 RELEASE SHARED DRIVE
- A READ DATA RECORD(S) (NOT CE FORMAT)
- B WRITE DATA RECORD(S) (NOT CE FORMAT)
- D WRITE CONTROL RECORD (NOT CE FORMAT)

17.0 PID 0115 (VTOC DISPLAY UTILITY)

17.1 PURPOSE

This program will display a list of the fault locating tests and CE utilities available on the CE DISKETTE.

17.2 OPERATING PROCEDURES

17.2.1 LOADING

Select the UTILITY MENU ('18' on the DCP MENU). Select the VTOC LIST UTILITY ('28' on the UTILITY MENU). Message A-0282 will then be displayed on the screen.

17.2.2 MENU DISPLAY

NONE - All input is through prompting messages.

17.2.3 MENU OPTION SELECTION - NONE

17.2.4 PROGRAM RUN INSTRUCTIONS

All operator input required is through prompting messages. The drive number is a one digit numeric character (1-4 ONLY) indicating the drive containing the CE DISKETTE to be displayed. If there are 14 or more entries on the diskette, only the first 14 entries will be displayed. In this case a message will be displayed requesting the ENTER key be pressed. The next 14 entries will then be displayed. When all VTOC entries have been displayed, message A-0282 will again be displayed to permit selection of another drive, if desired.

17.2.4.1 PROGRAM TERMINATE METHOD

To exit the program, a '9' may be entered in place of a drive number.

17.3 ERROR, ACTION AND INFORMATION MESSAGES

E-0280 WRONG ENTRY

Note: Verify that correct keyboard entries were made. If display does not match key entries - GO TO MAP 1400, ENTRY POINT A.

I-0281 VTOC LIST UTILITY ENDED - PRESS ENTER

A-0282 ENTER DRIVE NUMBER (X)

E-0283 WRONG DISKETTE INSERTED
INSERT CE DISKETTE, AND/OR
ENTER DRIVE NUMBER (X) OR 9 TO EXIT PROGRAM.

Note: Verify that a CE DISKETTE was inserted in drive. If error continues - REPLACE CE DISKETTE - TRACK 0 may have been destroyed.

A-0284 PRESS ENTER FOR MORE LABELS

E-0285 RESULTS ERROR - ISR = WW ST0 = XX ST1 = YY ST2 = ZZ
ERROR OCCURRED ON TRACK VV

NOTE: WW = 80 READ/WRITE END
20 DRIVE WENT NOT READY
10 OPERATION NOT COMPLETED
08 DRIVE 4 ATTENTION
04 DRIVE 3 ATTENTION
02 DRIVE 2 ATTENTION
01 DRIVE 1 ATTENTION

XX = 00 NORMAL END
ANY OTHER VALUE INDICATES ERROR END

YY = 20 CRC ERROR
04 SECTOR NOT FOUND
01 ADDRESS MARK NOT FOUND

ZZ = 20 DATA FIELD CRC ERROR
10 CYLINDER ADDRESS NO COMPARE
01 MISSING DATA ADDRESS MARK

IF THIS ERROR OCCURS:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A.

E-0286 DRIVE X NOT READY

Note: CHECK - DISKETTE inserted correctly and handle closed.
- TYPE 1 DISKETTE ONLY inserted in 31SD DRIVE.

IF ERROR CONTINUES:
1. RECORD FAILING DRIVE NUMBER
2. REMOVE DISKETTE(S)
3. POWER OFF
4. POWER ON
5. GO TO MAP 1501, ENTRY POINT A

E-0287 DRIVE X CANNOT BE SECURED

17.4 DETAILED DESCRIPTION

This program will display the LABEL, PART NUMBER and EC LEVEL of the CE DISKETTE, followed by a list of all programs on the diskette. The list of programs will display the PART NUMBER, EC LEVEL, REA NUMBER, PID NUMBER, DISKETTE ADDRESS (CC - CYLINDER, H - HEAD, AND RR - SECTOR NUMBER) STORAGE LOADING ADDRESS and the LENGTH OF THE PROGRAM.

18.0 PID 0120 (ERROR LOG DISPLAY UTILITY)

18.1 PURPOSE

This program is used to display the CUSTOMER SYSTEM/23 FORMATTED DISKETTE ERROR LOG DATA and to clear the ERROR LOG TABLE if necessary. The ERROR LOG is used by the SYSTEM SOFTWARE to log drive and diskette problems for soft errors. A count of the number of read and write operations to a diskette is recorded by the system microcode and can be displayed.

18.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

18.2.1 LOADING PID 0120 - SYSTEM/23 DISKETTE ERROR LOG UTILITY

With the PRIMARY DCP MENU displayed, enter an '18' and an ENTER to display the UTILITY MENU. Next, enter a '24' and an ENTER.

PID 0120 will load and display START MESSAGE I-2400 followed by ROUTINE 1 INFORMATION MESSAGE I-2410. See "ERROR, ACTION AND INFORMATION MESSAGES" on page 51 for any error messages. After ROUTINE 1 executes without error, the OPTIONS MENU will be displayed.

18.2.2 MENU DISPLAY

```
I-2401      OPTIONS:    - DISKETTE DRIVE SELECTED = #
       X-1- SELECT DISKETTE DRIVE
        -2- DISPLAY DISKETTE ERROR LOG
        -3- READ/WRITE STATISTICS
       X-4- CLEAR DISKETTE ERROR LOG
       X-9- RETURN TO DCP
A-2402     ENTER OPTION

?_
```

18.2.3 MENU OPTION SELECTION

Enter the selected option number using the numeric keys on the right end of the keyboard followed by the ENTER key.

The 'X' by the option number indicates an optional routine not part of automatic sequence.

OPTION 1 Will display MESSAGE A-2409 requesting the drive number of the diskette drive to be selected for the next test. An entry of 1, 2, 3 or 4 is needed to change the selected drive. The drive is then tested for a ready condition and the VOL1 checked for the diskette type and format. If drive 3 or 4 is selected, it will be secured and then released for the VOL1 header read.

OPTION 2 Will format and display the error data in the ERROR LOG TABLE from a CUSTOMER SYSTEM/23 FORMATTED DISKETTE.

OPTION 3 Will display a count of the number of read and write operations recorded by the SYSTEM MICROCODE on a SYSTEM/23 diskette.

OPTION 4 Will clear the ERROR LOG TABLE on a CUSTOMER SYSTEM/23 FORMATTED DISKETTE and display the diskette statistics.

OPTION 9 Will end PID 0120 and return to DCP.

18.2.4 PROGRAM RUN INSTRUCTIONS

Normal program operation is to select OPTION '1' to select the diskette drive needed. Next, OPTION '2' is selected to display the ERROR LOG from the CUSTOMER SYSTEM/23 FORMATTED DISKETTE.

The status line, above the keyboard input line, will display the last drive number selected (DR #). If errors occur, a decimal count of the number of errors will be displayed to the left of the drive indicator. These indicators may be moved up the screen before a keyboard input request. During diskette read and write operations, the CYLINDER, HEAD and RECORD selected is displayed at the center of the status line (CCHRR=#####).

18.2.4.1 END COMMAND

Use the ATTN and '9' entry to end routine and return to the menu.

With the menu displayed, enter OPTION '9' and ENTER to return to DCP. An ENTER is needed after the ending message.

18.2.4.2 LOOP COMMAND NOT USED.

18.2.5 CONTROL PROGRAM ERROR, ACTION AND INFORMATION FORMAT

If an error is sensed, an ERROR MESSAGE(S) (E-24XX) and OPTIONAL INFORMATION MESSAGES (I-24XX) will be displayed, followed by an entry STOP MESSAGE (A-24XX ERROR OCCURRED).

See "PID 0001 (DIAGNOSTIC CONTROL PROGRAM)" on page 21 for control program stops (other than ?-24XX).

SEE "TRAP DATA" on page 15 for TRAP stops.

18.3 ERROR, ACTION AND INFORMATION MESSAGES

MSG ID — ERROR MESSAGE AND STATUS MESSAGE MEANINGS

I-2400 PID 0120 START -SYSTEM/23 ERROR LOG UTILITY-

The utility has been loaded and has displayed its START message.

I-2401
```
    OPTIONS:    - DISKETTE DRIVE SELECTED = #
X-1- SELECT DISKETTE DRIVE
 -2- DISPLAY DISKETTE ERROR LOG
 -3- READ/WRITE STATISTICS
X-4- CLEAR DISKETTE ERROR LOG
X-9- RETURN TO DCP
```

A-2402 ENTER OPTION

The OPTIONS MENU is displayed and a digit (0 TO 9) option entry followed by ENTER is needed.

I-2403 START AUTOMATIC SEQUENCE

The utility has started a sequential run of its automatic routines.

I-2404 'ATTN-X' ACKNOWLEDGE

Acknowledgment of an ATTN request and the end of the routine.

A-2405 ERROR OCCURRED IN ROUTINE # 'ENTER' TO CONTINUE '9' TO END

An error has occurred and an ENTER is needed to continue testing. Any other entry returns to OPTIONS MENU.

E-2408 'X' IS NOT A VALID OPTION

The first character entered was not an expected option. Enter a valid option.

A-2409 THE PRESENT DISKETTE DRIVE SELECTED IS '#'
ENTER NEW DRIVE NUMBER (1,2,3 OR 4)

The selected drive number is displayed. A new drive number between 1 and 4 must be entered to change drives.

E-240D NOT A VALID SYSTEM/23 FORMAT DISKETTE

The diskette in the selected drive was not prepared as a SYSTEM/23 DISKETTE and does not have an ERROR LOG RECORD. This error message may be displayed if records at CCHRR= 00008 or CCHRR= 00009 have been changed. Select a drive with a CUSTOMER DISKETTE or insert a valid CUSTOMER PREPARED DISKETTE.

I-2410 RTN-1 USE OPTION '1' TO SELECT DRIVE WITH SYSTEM/23 FORMAT DISKETTE.
USE OPTION '2' TO DISPLAY DISKETTE ERROR LOG AND ERROR COUNTS.
USE OPTION '3' TO DISPLAY DISKETTE READ/WRITE STATISTICS.
USE OPTION '4' TO RESET ERROR LOG ENTRIES.

E-2411 READ/WRITE STORAGE PARITY CHECK FRU= BASE STORAGE CARD

A R/W PARITY CHECK sensed in the first 32K of storage. Suspect the BASE STORAGE CARD.

E-2412 I/O CHANNEL TRAP SEE MAP 1225

The I/O CHANNEL ERROR LINE was activated by an attachment card.

E-2413 READ/WRITE STORAGE DATA FAILURE FRU= BASE STORAGE CARD

Data read from storage location was not as expected.

E-2414 WRITE TO ROS SPACE TRAP SEE MAP 1205 AND MAP 1210

A WRITE TO ROS ADDRESS SPACE ERROR has been sensed. Either the program is destroyed and must be loaded again or the hardware failed.

E-2416 LOGIC FAILED FRU= CPU PLANAR BOARD

A failure was sensed in the storage control logic on the CPU Planar Board. The CPU Planar Board should be exchanged.

E-2418 POWER CHECK SEE MAP 1225

The POWER GOOD LINE from the POWER SUPPLY went OFF.

I-2420 RTN-2 SYSTEM/23 DISKETTE ERROR LOG DISPLAY

E-2421 LOG HEADER ERROR - NOT A SYSTEM/23 FORMAT DISKETTE WITH ERROR LOG

THE ERROR LOG RECORD read from the SYSTEM/23 FORMATTED DISKETTE did not have a valid DATA BLOCK HEADER or a VALID LOG HEADER ID. Verify that the selected diskette is a SYSTEM/23 FORMAT CUSTOMER DISKETTE.

This error message may be displayed if records at CCHRR= 00008, CCHRR= 00009, CCHRR= 01001 or CCHRR= 01002 has been changed.

I-2422 VOLID= ?????? OWNERID= ?????????????? INITIALIZED YY/MM/DD
TOTAL ERROR COUNT ASSOCIATED WITH DISKETTE ON DRIVE # IS # ### ### ###.
ENTRIES IN ERROR LOG. LOG RECORD LAST RESET YY/MM/DD.

The total number of errors associated with this diskette after it was last formatted is displayed in decimal along with the number of error entries in the LOG TABLE and the DATE the LOG TABLE was LAST CLEARED. The VOLID, OWNER-ID, and SYSTEM DATE, inserted when the diskette was last initialized, are also displayed for reference.

I-2423 SEQ TYPE CMD DR NUM ST0 ST1 ST2 CYL HEAD REC RL CNT

Header for the ERROR LOG DATA DISPLAY. SEE "DISPLAY FORMAT FOR ERROR LOG DATA MESSAGE I-2424" on page 60 for display format.

I-2424 ## - XX XX XX XX XX XX XX XX XX XX XX XX

Data from one entry of the ERROR LOG TABLE. SEE "DISPLAY FORMAT FOR ERROR LOG DATA MESSAGE I-2424" on page 60 for format and data meaning.

A-2425 'ENTER' FOR NEXT ## LOG ENTRIES OR A SEQUENCE NUMBER FOR LOG DECODE

An ENTER is needed to display the next group of log entries. The count of entries to be displayed next is included in the message. Enter the sequence number of an ERROR LOG ENTRY and ENTER for a formatted display of the single entry.

A-2426 'ENTER' TO END ROUTINE OR A LOG SEQUENCE NUMBER TO DECODE

1. Press ENTER to return to utility menu.
2. Enter the sequence number of an ERROR LOG ENTRY and press ENTER for a formatted display of the entry.

E-2427 SEQUENCE NUMBER ENTRY NOT VALID

I-2428
```
COMMAND= READ RECORD(S)              AT CCHRR= 00000 ON DRIVE= #
SOFT ERROR          NUMBER OF RECORDS=  #  RECORD LENGTH= 512 BYTES
ERROR TYPE=  READ/WRITE ERROR
```

The formatted display of the data from an error log entry. The command request and error type are displayed. Error messages for ST1 and ST2 result bytes will follow this message.

I-2430 RTN-3 SYSTEM/23 DISKETTE STATISTICS DISPLAY

I-2431
```
  DATE    CHANGED TYPE  DATA SET NAME          READS       WRITES
```

I-2432
```
                        -DELETED DATA SETS   # ### ### ###  # ### ### ###
 =CCHRR YY/MM/DD  YY/MM/DD  ##  XXXXXXXXXXXXXXXX  # ### ### ###  # ### ### ###
```

Displayed are the statistics from a SYSTEM/23 FORMAT CUSTOMER DISKETTE. The first line has the count of read and write operations moved from the data set label of any deleted data set and from system operations. Each following line of data is from a data set label on the diskette. Displayed is the CCHRR of the data set label, the SYSTEM DATE the data set was placed on the diskette, the SYSTEM DATE the file was last changed, the DATA SET TYPE (see CUSTOMER OPERATIONS MANUALS), the DATA SET NAME and the number of READS and WRITES. The read and write count is the SYSTEM COUNT of reads and writes to this diskette when the file was closed and not a count of operations just to this file.

E-2435 DSL RECORD AT CCHRR= XXXXX ON DRIVE # NOT VALID?

The data set label at the CCHRR displayed has a header flag byte that is not valid. The record is not correct or the count of data set labels on the diskette is not correct. The customer should attempt to recover the data files.

A-2438
```
    ERRORS= #              TOTAL R/W=  # ### ### ###  # ### ### ###
```

The total count of soft errors associated with this diskette is first displayed along with the total count of read and write operations associated with the diskette as of the last prepare operation. These counts are used to determine diskette use and wear. Soft errors are normal on diskettes, but high error to read/write counts indicate a worn or damaged diskette that should be replaced. The counters are initialized to zero when the diskette is prepared by the customer. The largest count is 4 294 967 295.

A-2439 'ENTER' TO CONTINUE (OR '9' TO END)

I-2440 RTN-4 CLEAR ERROR LOG TABLE

A-2441
```
ENTER DATE
YYMMDD
```

The date to be entered into the error log is needed. Its format is YYMMDD for YEAR, MONTH and DAY.

E-2442 ENTRY LENGTH NOT VALID

The date entry did not have only SIX DIGITS and is not valid.

E-2443 YY NOT VALID

The YY (YEAR) value for the date entry was not numeric.

E-2444 MM NOT VALID

The MM (MONTH) value for the date entry is not '01' to '12'.

E-2445 DD NOT VALID

The DD (DAY) value for the date entry is not '01' to '31'.

E-2446 DATE ENTRY NOT VALID

The date entry was not valid. Either the MM or DD value was out of range or one of the characters entered was not numeric. Check the error message above this one for source of problem.

A-2447 VERIFY ERROR LOG ON DRIVE # IS TO BE CLEARED. ('1' = YES)

A YES response (use '1' and ENTER) is needed to continue and clear all of the entries in the ERROR LOG and update the date. Any other entry will abend the clear operation and return to the menu. The error count is not cleared.

I-2448 ERROR LOG NOT CLEARED

I-2449 ERROR LOG CLEARED

E-2470 RC -80- DRIVE NOT READY - DRIVE= '#'

The diskette drive was not ready or went not ready and the operation failed or was not attempted. Ready the selected drive and use ENTER to continue the routine or end the routine and select different drive.

E-2471 RC -40- SHARED DRIVE NOT SECURED

An attempt was made to secure a shared drive (DRIVE 3 or 4) and a time out occurred before the sharing system released the drive.

E-2475 ISR-10- OPERATION NOT COMPLETE TIME OUT

E-2476 ISR-0X- DRIVE ATTENTION

E-2477 ST1-20- CRC ERROR

A hard CRC ERROR occurred in the address or data field of a record. The record cannot be correctly read.

E-2478 ST1-10- DATA OVERRUN

A DATA OVERRUN occurred in the diskette controller after a data read or write request was made. The request was not responded to before a byte of data needed was lost. Suspect a hardware failure.

E-2479 ST1-04- RECORD NOT FOUND

The RECORD (RR) requested by a diskette read or write operation was not found by the diskette controller on the cylinder. The record ID is missing or the record requested is not valid for this cylinder format. Check the diskette type and format for correct SYSTEM/23 format.

E-247A ST1-01- ADDRESS MARK NOT FOUND

Either no ID ADDRESS MARK or no DATA ADDRESS MARK was found on the cylinder at this head position in response to a read or write command. If ERROR MESSAGE E-247F does not follow this message then the error is an ID ADDRESS MARK NOT FOUND. The cylinder data has been destroyed or the cylinder was not formatted in the correct mode. If most records on a diskette have this error, then the VOL1 record may have been changed.

E-247B ST2-40- CONTROL RECORD (DELETED DATA ADDRESS MARK)

A control record (DELETED DATA ADDRESS MARK) was sensed after cylinder zero and is not valid on a SYSTEM/23 DISKETTE.

E-247C ST2-20- DATA FIELD CRC ERROR

During read or verify of a record, the CRC check bytes from the diskette did not match the check bytes calculated by the diskette controller. The ID ADDRESS MARK was OK but the error occurred in the data field. The data is lost.

E-247D ST2-10- CYLINDER ADDRESS TO ID COMPARE ERROR

During a read, write or verify operation, the cylinder ID READ from the diskette did not match the ID in the cylinder counter of the controller. Either the controller is out of step with the diskette drive (heads on wrong track) or the ID address mark written on the diskette is wrong.

E-247E ST2-02- BAD CYLINDER

An error flag read from the diskette indicates that this cylinder was written and marked as a bad cylinder. The bad cylinder flag is not valid on a CE DISKETTE and is not supported by CE programs. Use a valid CE FORMAT DISKETTE for the test or bypass the error.

E-247F ST2-01- MISSING DATA ADDRESS MARK

For a read, write or verify operation, the ID ADDRESS MARK for a record was correctly read from the diskette but the data address mark was not found. Data in the data field is lost and the diskette must be formatted to be usable.

A-2480 ERROR OCCURRED 'ENTER' TO RETRY '3' TO BYPASS '9' TO END

A hard error was sensed and a response is needed to continue testing. The error message(s) are displayed on the screen before this message. To attempt the last operation again and continue with the routine, use just ENTER.

A '3' and ENTER is used to bypass a hard diskette error and testing will continue with the next record, skipping the record in error.

Any other entry will end the routine.

E-2481 SOFT READ ERROR ON DRIVE= # AT CC= ## H= # RR= ##

A READ ERROR was sensed at the displayed cylinder and head. The operation was repeated with no error (TEN ATTEMPTS). If RR= ?? then the error occurred during a cylinder read operation and the program will attempt to find the record in error.

E-2482 ERROR: DR= # AT CCHRR= ##### OP= X RC= XX STATUS= XX,XX,XX,XX

A hard error has been sensed after ten attempts. The CYLINDER (CC), HEAD (H) and RECORD (RR) being read is displayed along with the request COMMAND TYPE (OP). The status byte returned from DCP is displayed along with the four diskette controller status bytes ISR,ST0,ST1 and ST2. See "STATUS BYTE DEFINITION FOR MESSAGE E-2482 AND I-2424" on page 59 and "COMMAND TYPE REQUESTS" on page 59 for status byte definition if the error messages following do not describe the error(s).

E-2483 SELECTED DRIVE NUMBER '#' WAS NOT READY / ATTACHED

The selected diskette drive was not connected or was not ready. Select the correct diskette drive or make the drive ready. Verify that the diskette is the correct type for the drive model and that it is inserted correctly. A two sided (TYPE 2) diskette cannot be used in a single head drive.

E-2484 SHARED DRIVE '#' NOT SECURED

The status byte returned by DCP indicates that the diskette controller could not secure and hold a shared drive (3 or 4) in the number of attempts permitted by DCP. Ensure that the system sharing drive 3 and 4 is not hung and that the drive is ready. Use the diskette diagnostics to find and correct the problem or use a different drive.

E-2485 NOT A VALID CE DISKETTE

The diskette on the selected drive does not have the correct recording MODE, SIDES, RECLEN and/or SYSTEM IDENTIFICATION (in the VOL1 header) to be read as a CE FORMATTED DISKETTE. Other errors may occur.

E-2486 READ DATA NOT MOVED TO STORAGE?

The first 128 bytes of the data field did not change. Before a read operation, the read field is initialized to a fixed test pattern. After the read, the field is checked to verify that the pattern changed. If the pattern did not change, then a data transmission to storage may have failed or went to the wrong address if no other diskette attachment error occurred.

E-2487 COMMAND TO DCP IOCS WAS NOT VALID?

The control block passed by the utility program was found by DCP to be not valid and was not executed. The program should be ended and then loaded and attempted again. If the error continues, then check any input data and ensure that it is correct.

E-2488 'VOL1' HEADER NOT VALID (RECORD SEVEN)

Record seven of cylinder zero did not have a valid VOL1 header in either EBCDIC or ASCII format.

I-2489 DRIVE= # INDEX= # SIDES= # MODE= XXX FORMAT= XXXXXX RECLEN= ##

Information from the diskette VOL1 header on the selected drive where:

```
DRIVE  = 1, 2, 3 OR 4
INDEX  = TYPE 1 OR 2 DISKETTE INDICATED BY THE INDEX PULSE
SIDES  = THE NUMBER OF SIDES FORMATTED (1 OR 2)
MODE   = 'FM' OR 'MFM'
FORMAT = EITHER 'EBCDIC' OR 'ASCII' FORMAT
RECLEN = THE RECORD LENGTH INDICATOR OF RECORD SIZE
         (00=128, 01=256, 02=512 AND 03=1024 BYTE RECORDS).
```

Note: IF SIDES= 2, INDEX= 2 AND MODE= MFM, then a '2D' diskette is indicated.

E-248A DRIVE POWER CHECK (24V)

The diskette power good line was off for drive 1 and 2. Check 24 volts.

E-248B LABEL TYPE 'X' DISKETTES ARE NOT VALID.

The label type indicated is not supported.
Only type 'W' diskettes are supported by diagnostic programs.

I-248D BAD CYLINDER FLAG FOR 'CC'= ## ##

The diskette selected was formatted with the physical cylinder(s) indicated marked as bad. Alternate cylinders are assigned sequentially. Two cylinders may be marked as bad on a usable diskette.

E-248E 'ERMAP' RECORD NOT VALID (RECORD FIVE)

An entry in the error map record is not valid or not supported by diagnostic programs.

E-248F ALTERNATE PHYSICAL RECORD NOT VALID

The alternate physical record method for assigning records to replace bad records is not supported by diagnostic programs.

I-2490 PID 0120 END -ERROR LOG UTILITY-

A-2491 PID 0120 TERMINATED, PRESS 'ENTER'

I-2494 DATA: DRIVE=# CYLINDER= ## HEAD= # RECORD= ##

E-2495 NUMBER OF DIGITS ENTERED NOT VALID?

E-2496 'CC' NOT VALID?

E-2497 'H' NOT VALID?

E-2498 'RR' NOT VALID FOR 'CC' ENTRY?'

18.4 DETAILED DESCRIPTION OF ROUTINES

18.4.1 ROUTINE 1

Automatically executes after the program is loaded by DCP and does a test of the first 32K of storage to verify program integrity.

18.4.2 ROUTINE 2 - ERROR LOG DISPLAY

Displays a formatted error log from CYLINDER 1, HEAD 0, RECORD 2. The error log is recorded by the system software for errors associated with the diskette. It includes the system date the diskette was last initialized, the date the log was last reset, the total number of errors, and an entry for each error. The error entry includes the drive number the diskette was on, the operation, record location, error status and the number of attempts. See "ERROR, ACTION AND INFORMATION MESSAGES" on page 51, MESSAGE I-2422, MESSAGE I-2424 and "DISPLAY FORMAT FOR ERROR LOG DATA MESSAGE I-2424" on page 60 for detailed format.

A formatted display of a single entry can be displayed by sequence number. This option will translate the hexadeciaml data to decimal format or status byte messages.

18.4.3 ROUTINE 3 - READ/WRITE STATISTICS

Will display a count of the number of read and write operations associated with a CUSTOMER DISKETTE. The system microcode counts each read and write operation and updates counters in the directory when a file is closed. This count is used as an indicator of diskette wear. The counts recorded in any one file are not necessarily associated with just that file, only the diskette. When a file is deleted, the counts are transferred to the history counters. The largest count is 4 294 967 295.

The routine will display each counter entry and a count of read and write operations along with the total number of errors associated with the diskette. See MESSAGE A-2438.

Each data set label display line will display the record address, the system date the data set was initialized, and the system date of the last change to the data set.

18.4.4 ROUTINE 4 - CLEAR ERROR LOG

Will reset the error log table pointer and update the reset date. The detailed error log entries will be cleared, but the total error count will not be changed. The error log will contain the last 41 errors recorded by the system microcode and it is usually not necessary to clear the log area. The error log is a wrap around type.

18.5 GENERAL INFORMATION

18.5.1 UTILITY USE

This diagnostic utility does not display a FRU LIST except during the ROUTINE 1 initialization. This utility is used to display the CUSTOMER SYSTEM FORMATTED DISKETTE error log of the errors associated with the diskette. It is used by the CE to identify diskette problems and to aid in locating intermittent problems associated with a diskette drive. No map is associated with this PID. If hardware errors are sensed, the error messages should be recorded and used as an intermittent symptom with the START MAP 1000.

18.5.2 STATUS BYTE DEFINITION FOR MESSAGE E-2482 AND I-2424

DCP RETURN CODES

RC
- 80 DISKETTE DRIVE NOT READY
- 40 SHARED DRIVE NOT SECURED
- 20 CONTROL RECORD (DELETED DATA ADDRESS MARK)
- 10 CRC ERROR
- 04 RECORD NOT FOUND
- 02 DRIVE ERROR
- 01 OTHER ERROR

STATUS= ISR, ST0, ST1, ST2

ISR
- 80 READ/WRITE COMMAND END
- 20 DRIVE WENT NOT READY
- 10 OPERATION NOT COMPLETE TIME OUT
- 08 DRIVE 4 ATTENTION
- 04 DRIVE 3 ATTENTION
- 02 DRIVE 2 ATTENTION
- 01 DRIVE 1 ATTENTION

ST0
- 00 NORMAL END
- 80 NOT A VALID OPERATION
- XX ERROR END

ST1
- 80 LAST RECORD MOVED
- 20 CRC ERROR IN ID OR DATA FIELD
- 10 DATA OVERRUN
- 04 RECORD NOT FOUND
- 01 ADDRESS MARK NOT FOUND

ST2
- 40 CONTROL RECORD (DELETED DATA ADDRESS MARK)
- 20 DATA FIELD CRC ERROR
- 10 CYLINDER ADDRESS TO ID COMPARE ERROR
- 02 BAD CYLINDER FLAG
- 01 MISSING DATA ADDRESS MARK

18.5.3 COMMAND TYPE REQUESTS

OP
- 1 NORMAL DRIVE SELECT
- 2 READ DATA RECORD(S)
- 3 WRITE DATA RECORD(S)
- 4 READ ID
- 5 WRITE CONTROL (DELETED DATA MARK) RECORD(S)
- 6 SELECT DRIVE FOR FORMAT MODE
- 7 FORMAT TRACK
- 8 RECALIBRATE DRIVE
- 9 RELEASE SHARED DRIVE
- A READ DATA RECORD(S) (NOT CE FORMAT)
- B WRITE DATA RECORD(S) (NOT CE FORMAT)
- D WRITE CONTROL RECORD (NOT CE FORMAT)

18.5.4 DISPLAY FORMAT FOR ERROR LOG DATA MESSAGE I-2424

One line of data is displayed for each log entry for hard and soft errors logged by the system microcode while running customer applications. The errors in the log are associated with the system formatted diskette. The log is a wrap around type.

The display fields are as follows:

SEQ This is the REFERENCE SEQUENCE NUMBER for each entry assigned by PID 0120. Entry NUMBER 1 is the oldest entry in the log record.

TYPE This is the ERROR LOG FLAG TYPE BYTE where:

-80- Indicates error sensed during a record to buffer comparison after a write.
-40- Indicates a 500 MILLISECOND time out occurred during the operation. The status bytes logged may not be valid.
-00- Indicates an error occurred during a read or write operation.

CMD Is the command issued to the DISKETTE CONTROLLER/MICROCODE interface.

-05- WRITE RECORD(S)
-06- READ RECORD(S)
-09- WRITE CONTROL RECORD(S)
-0A- READ ID
-0D- FORMAT TRACK
-0F- SEEK
-11- COMPARE RECORD(S) AND DATA BUFFER
-26- READ RECORDS, IGNORE CONTROL RECORDS

DR Is the DRIVE NUMBER the diskette was in when the error occurred.

NUM Is the number of records in the READ or WRITE operation.

ST0 Returned status byte. See "STATUS BYTE DEFINITION FOR MESSAGE E-2482 AND I-2424" on page 59

ST1 Returned status byte. See "STATUS BYTE DEFINITION FOR MESSAGE E-2482 AND I-2424" on page 59

ST2 Returned status byte. See "STATUS BYTE DEFINITION FOR MESSAGE E-2482 AND I-2424" on page 59

CYL Is the CYLINDER NUMBER on which the error occurred in Hexadecimal.

HEAD Is the SURFACE NUMBER on which the error occurred.

REC Is the RECORD NUMBER on which the error occurred in Hexadecimal.

RL Is the RECLEN indicator of record size.
(00=128, 01=256, 02=512, and 03=1024 byte records)

CNT Is the remaining value of the retry counter. The counter is initialized to eleven (0B) for a read and four for a write and decreased after each error. If the retry counter reaches one, the error is a hard error. A value of 09 indicates three errors before a correct result.

19.0 PID 0125 (EC/PTF SUPPORT UTILITY)

19.1 PURPOSE

This program is used to display the engineering change level of the SYSTEM ROS, the engineering change level of the CE DISKETTE and DISKETTE DATA. It is also used to update programs on the CE DISKETTE and for installing PTF's to the DIAGNOSTIC FLT's.

19.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

19.2.1 LOADING PID 0125 - EC/PTF UTILITY -

With the PRIMARY DCP MENU displayed, enter an '18' and an ENTER to display the UTILITY MENU. Next, enter a '23' and an ENTER.

PID 0125 will load and display START MESSAGE I-2300 followed by ROUTINE 1 INFORMATION MESSAGE I-2310. See "ERROR, ACTION AND INFORMATION MESSAGES" on page 63 for any messages. After ROUTINE 1 executes without error, the OPTIONS MENU will be displayed.

19.2.2 MENU DISPLAY

```
I-2301       OPTIONS:     - DISKETTE DRIVE SELECTED = #
        X-1- SELECT DISKETTE DRIVE
        X-2- ROS EC NUMBER DISPLAY
        X-3- FLT EC NUMBER DISPLAY
        X-4- FLT PROGRAM UPDATE
        X-5- RECORD UPDATE
        X-9- RETURN TO DCP
A-2302      ENTER OPTION

?_
```

19.2.3 MENU OPTION SELECTION

Enter the selected option number using the numeric keys on the right end of the keyboard followed by the ENTER key.

The 'X' by the option number indicates an optional routine not part of automatic sequence.

OPTION 1 Will display MESSAGE A-2309 requesting the drive number of the diskette drive to be selected for the next test. An entry of 1, 2, 3 or 4 is needed to change the selected drive. The drive is then tested for a ready condition and the VOL1 checked for the diskette type and format. If DRIVE 3 or 4 is selected, it will be secured and then released for the VOL1 header read.

OPTION 2 Will display the EC NUMBER of each ROS MODULE in the system.

OPTION 3 Will display the EC NUMBER, PART NUMBER and REA NUMBER of the FLT's on the CE DISKETTE.

OPTION 4 Will permit updating of the selected FLT on the CE DISKETTE in HEXADECIMAL.

OPTION 5 Will permit updating of any record on the CE DISKETTE in HEXADECIMAL.

OPTION 9 Will end PID 0125 and return to DCP.

19.2.4 PROGRAM RUN INSTRUCTIONS

Normal program operation is to select OPTION '1' to select the diskette drive if a diskette operation is needed. Next, the needed option is selected.

The status line, above the keyboard input line, will display the last drive number selected (DR #). If errors occur, a decimal count of the number of errors will be displayed to the left of the drive indicator. These indicators may be moved up the screen before a keyboard input request. During diskette read and write operations the CYLINDER, HEAD and RECORD selected is displayed at the center of the status line (CCHRR=#####).

19.2.4.1 END COMMAND

Use the ATTN and '9' entry to end routine and return to the menu.

With the menu displayed, enter OPTION '9' and ENTER to return to DCP. An ENTER is needed after the ending message.

19.2.4.2 LOOP COMMAND NOT USED.

19.2.5 CONTROL PROGRAM ERROR, ACTION AND INFORMATION FORMAT

If an error is sensed, an ERROR MESSAGE(S) (E-23XX) and optional INFORMATION MESSAGES (I-23XX) will be displayed followed by an ENTRY STOP MESSAGE (A-23XX ERROR OCCURRED).

See "PID 0001 (DIAGNOSTIC CONTROL PROGRAM)" on page 21 for control program stops (other than ?-23xx).

See "TRAP DATA" on page 15 for TRAP stops.

19.3 ERROR, ACTION AND INFORMATION MESSAGES

MSG ID	ERROR MESSAGE AND STATUS MESSAGE MEANINGS
I-2300	PID 0125 START -EC / PTF UTILITY- The utility has been loaded and has displayed its start message.
I-2301	OPTIONS: - DISKETTE DRIVE SELECTED = # X-1- SELECT DISKETTE DRIVE X-2- ROS EC NUMBER DISPLAY X-3- FLT EC NUMBER DISPLAY X-4- FLT PROGRAM UPDATE X-5- RECORD UPDATE X-9- RETURN TO DCP
A-2302	ENTER OPTION The OPTIONS MENU is displayed and a digit (0 TO 9) option entry followed by ENTER is needed.
I-2303	START AUTOMATIC SEQUENCE
I-2304	'ATTN-X' ACKNOWLEDGE Acknowledgment of an ATTN request and the end of the routine.
A-2305	ERROR OCCURRED IN ROUTINE # 'ENTER' TO CONTINUE '9' TO END An error has occurred and an ENTER is needed to continue testing. Any other entry returns to OPTIONS MENU.
E-2308	'X' IS NOT A VALID OPTION The first character entered was not an expected option. Enter a valid option.
A-2309	THE PRESENT DISKETTE DRIVE SELECTED IS '#' ENTER NEW DRIVE NUMBER (1,2,3 OR 4) The selected drive number is displayed. A new drive number between 1 and 4 must be entered to change drives.
I-2310	RTN-1 USE OPTION '1' TO SELECT DRIVE WITH CE DISKETTE.
E-2311	READ/WRITE STORAGE DATA FAILURE FRU= BASE STORAGE CARD A R/W PARITY CHECK sensed in the first 32K of storage.
E-2312	I/O CHANNEL TRAP SEE MAP 1225 The I/O CHANNEL error line was activated by an attachment card.
E-2313	READ/WRITE STORAGE DATA FAILURE FRU= BASE STORAGE CARD Data read from storage location was not as expected.
E-2314	WRITE TO ROS SPACE TRAP SEE MAP 1205 AND MAP 1210 A WRITE TO ROS address space error has been sensed. Either the program is destroyed and must be loaded again or the hardware failed.

E-2316 LOGIC FAILED FRU= CPU PLANAR BOARD

A failure was sensed in the storage control logic on the CPU Planar Board. The CPU Planar Board should be exchanged.

E-2318 POWER CHECK SEE MAP 1225

The POWER GOOD LINE from the Power Supply went off.

I-2320 RTN-2 ROS ENGINEERING CHANGE AND PART NUMBER DISPLAY

I-2321 PAGE ADDR EC # PART # PAGE ADDR EC # PART #

I-2322 # ## ###### ######## # ## ###### ########

For the ROS MODULES found, the PAGE number (0 TO F), the starting ADDRESS, the ENGINEERING CHANGE NUMBER (EC) and the MODULE PART NUMBER are displayed.

A-2323 END ROS EC AND PART NUMBER DISPLAY - 'ENTER' TO CONTINUE

All of the ROS STORAGE INFORMATION has been displayed and an ENTER will return to the OPTIONS MENU.

E-2325 ROS PAGE REGISTER ERROR SEE MAP 1210

I-2330 RTN-3 FLT EC NUMBER DISPLAY ROUTINE STARTED

I-2331
```
 DRIVE= #   'HDR1' RECORD  -   'FLT' HEADER         SEQUENCE= ##
AT  CCHRR= #####    NAME     -  NAME= PID ####       AT CCHRR= #####
LOAD ADDR= ####   PID ####   -  START ADDR= ####     DATE= MM/DD/YY
END  ADDR= ####              -  P/N= ########   EC= ######   REA= ########
```

The data from the HDR1 header is displayed on the left and the data from the FLT HEADER is displayed on the right. The two name entries should be the same. The SEQUENCE NUMBER is the sequence of the program in the DISKETTE VTOC.

A-2332 'ENTER' FOR NEXT ENTRIES (OR SEQUENCE / PID NUMBER)

One or more I-2331 messages are displayed and an ENTER is needed to display the next three in sequence. If a one or two digit sequence number is entered then the I-2331 message for that VTOC sequence entry will be displayed. If a four digit PID number is entered, then the I-2331 message for that PID will be displayed.

A-2333 'ENTER' TO END (OR SEQUENCE / PID NUMBER)

One or more I-2331 messages are displayed and an ENTER is needed to return to the PTF UTILITY MENU. If a one or two digit sequence number is entered, then the I-2331 message for that VTOC sequence entry will be displayed. If a four digit PID NUMBER is entered, then the I-2331 message for that PID will be displayed.

E-2334 ENTRY REQUEST NOT VALID

The digits entered are not valid for a SEQUENCE NUMBER (1-50) or a PID NUMBER (0001-9999) on the CE DISKETTE.

I-2335 CE DISKETTE PN= ######## EC= ###### ID LABEL= ###### ON DRIVE= #

Data from the VOL1 header on the CE DISKETTE in the selected drive.

I-2336 AT REA= ######## REA= ######## REA= ######## REA= ########

The REA LEVELS indicated in the VOL1 header for the diskette.

I-2340 RTN-4 FLT PROGRAM UPDATE ROUTINE STARTED

A-2341 ENTER NUMBER OF PID TO BE CHANGED ON DRIVE # (OR '9' FOR MENU)
XXXX

The drive number selected is displayed and the four digit PID NUMBER of the program to be changed is needed. A '9' and ENTER will return to the utility OPTIONS MENU.

I-2342
```
PID #### AT CCHRR= ##### ON DRIVE #   LOAD ADDRESS = ####
         EC NUMBER =  ######          START ADDRESS = ####
         REA NUMBER = ########        END  ADDRESS = ####
```

Data from the HDR1 record and the program header of the PID to be changed. Displayed is the CCHRR of the FLT record on the diskette in the SELECTED DRIVE, the ENGINEERING CHANGE NUMBER, the PID REA NUMBER, the PROGRAM LOAD ADDRESS, the PROGRAM EXECUTE ADDRESS and the last address of the program that can be changed on the diskette.

A-2343 ENTER ADDRESS AND DATA TO CHANGE OR 'ENTER' FOR PID OPTION.
AAAA DD DD DD DD DD DD DD DD DD DD DD DD DD DD DD DD DD DD DD <

The data input for the change is needed. AAAA is the address or the offset in the FLT of the first byte of data to be changed. Next, each sequential byte of data ('0' to 'FF') to be changed, separated by spaces, is entered. Up to 63 characters can be entered in one line followed by an ENTER. A '..<' on the status line is used to mark the last entry position. The input data will be checked and displayed.

I-2344
```
 RRRR/   0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
ADDR=####  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX  XX
CHANGE TO: DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD
```

Displayed is the data to be changed. RRRR is the offset from the load address of the PID for the data to be changed. '####' is the address in the PID of the source data displayed. 'XX' is the source data on the diskette at the address displayed. 'DD' is to change to data input from the A-2343 message, that will be written to the diskette if a verify response is given to MESSAGE A-2345.

Verify that the 'RRRR' and the '####' is correct and that the 'XX' data is the correct source. Next, verify that the 'DD' data displayed is the correct change to data. If not correct, use just ENTER in response to the following A-2345 message and the data will not be written to the diskette and the A-2343 request message will be displayed.

A-2345 'V' AND 'ENTER' TO WRITE CHANGED DATA

A positive response is needed before the changed data will be written to the diskette. Any other response will bypass the write operation and display MESSAGE A-2343 for new change data. A 'V' and ENTER will write the changed record to the diskette and display MESSAGE I-2359.

A-2346 'ENTER' (OR NEW REA NUMBER - OLD REA= ########)
XXXXXXXX

One or more records in a PID have been changed. The REA NUMBER now in the PID HEADER is displayed. Enter a new eight digit REA NUMBER if the old number is to be changed. Use just ENTER for no change to the REA NUMBER.

E-2347 INPUT ADDRESS NOT VALID?

The change address or offset entered was not a valid address value inside the address range of this PID. MESSAGE I-2342 will be displayed with the valid address range followed by MESSAGE A-2343 for the correct change data.

E-2348 INPUT DATA NOT VALID?

The input data was not valid. Either the format was not correct or characters entered were not hexadecimal or the input data was too long.

E-2349 ADDRESS OF LAST DATA BYTE LARGER THAN END ADDRESS OF PID

The START INPUT ADDRESS and DATA was valid but the change address of one or more of the data bytes extended past the end of PID as stored on the diskette. Enter the correct address and data.

I-2350 RTN-5 RECORD UPDATE ROUTINE STARTED

A-2351 ENTER RECORD TO BE UPDATED ON DISKETTE DRIVE #.

```
┌──────────────CYLINDER NUMBER  (00-76)
│ ┌────────────HEAD NUMBER    (0-1)
│ │ ┌──────────RECORD NUMBER (01-26)
│ │ │
CCHRR          (OR '9' TO RETURN TO MENU)   (ATTN-E TO END LOOP)
```

The record to be read is needed in the format CCHRR.

RR = 01 TO 26 IF 'CC = 00'
OR
RR = 01 TO 08 IF 'CC OTHER THAN 00'

If the entry values are not valid, an error message will be displayed.

The record will be displayed if the entry is valid.

I-2352 CONTROL (DELETED DATA ADDRESS MARK) RECORD

The record to be updated was found to be a control record (DELETED DATA ADDRESS MARK). If the record is changed, it will be written as a control record only if it is on CYLINDER 0, HEAD 0.

A-2354 ENTER 'AAA DD DD DD DD DD ...' OR 'V' TO WRITE DATA OR '9' TO END

The source of the data is displayed showing the DRIVE, the CYLINDER, the HEAD, and the RECORD NUMBER ('CCHRR'). This is followed by the data from the record in hexadecimal. Each line starts with the offset into the record of the first byte of the line and is followed by 32 bytes of data from the record.

The data input is needed. First the offset into the record of the first byte of data to be changed ('0' to '1FF') and then one or more spaces. Next, each sequential byte of data ('0' to 'FF') to be changed, separated by spaces, is entered. Up to 63 characters of data can be entered in one line followed by an ENTER. The input data will be checked and the display updated. If the input data extends past the end of the record, the extra data will not be used.

If the first digit entered is a '9', then the routine will abend and return to the OPTIONS MENU.

If a 'V' is entered, then the record as changed will be written on the diskette.

I-2359 ***** RECORD UPDATED ******

The changed record has been written on the diskette.

E-2370 RC -80- DRIVE NOT READY - DRIVE= '#'

The diskette drive was not ready or went not ready and the operation failed or was not attempted. Ready the selected drive and use ENTER to continue the routine or end the routine and select different drive.

E-2371 RC -40- SHARED DRIVE NOT SECURED

An attempt was made to secure a shared drive (DRIVE 3 or 4) and a time out occurred before the sharing system released the drive.

E-2375 ISR-10- OPERATION NOT COMPLETE TIME OUT

E-2376 ISR-0X- DRIVE ATTENTION

E-2377 ST1-20- CRC ERROR

A hard CRC ERROR in the address or data field of a record.

E-2378 ST1-10- DATA OVERRUN

A DATA OVERRUN occurred in the diskette controller after a data read or write request was made. The request was not responded to before a byte of data needed was lost. Suspect a hardware failure.

E-2379 ST1-04- RECORD NOT FOUND

The RECORD (RR) requested by a diskette read or write operation was not found by the diskette controller on the cylinder. The record ID is missing or the record requested is not valid for this cylinder format. Check the diskette type and format for correct CE format.

E-237A ST1-01- ADDRESS MARK NOT FOUND

Either no ID ADDRESS MARK or no DATA ADDRESS MARK was found on the cylinder at this head position in response to a read or write command. If error MESSAGE E-237F does not follow this message, then the error is an ID ADDRESS MARK NOT FOUND. The cylinder data has been destroyed or the cylinder was not formatted in the correct mode. If most records on a diskette have this error, then the VOL1 record may have been changed.

E-237B ST2-40- CONTROL RECORD (DELETED DATA ADDRESS MARK)

A CONTROL RECORD (DELETED DATA ADDRESS MARK) was sensed after cylinder zero and is not valid on a CE DISKETTE.

E-237C ST2-20- DATA FIELD CRC ERROR

During read or verify of a record, the CRC check bytes from the diskette did not match the check bytes calculated by the diskette controller. The ID ADDRESS MARK was OK, but the error occurred in the data field. The data is lost.

E-237D ST2-10- CYLINDER ADDRESS TO ID COMPARE ERROR

During a READ, WRITE or VERIFY operation, the cylinder ID read from the diskette did not match the ID in the cylinder counter of the controller. Either the controller is out of step with the diskette drive (heads on wrong track) or the ID ADDRESS MARK written on the diskette is wrong.

E-237E ST2-02- BAD CYLINDER

An error flag read from the diskette indicates that this cylinder was written and marked as a bad cylinder. The bad cylinder flag is not valid on a CE DISKETTE and is not supported by CE programs. Use a valid CE FORMAT DISKETTE for the test or bypass the error.

E-237F ST2-01- MISSING DATA ADDRESS MARK

For a READ, WRITE or VERIFY operation, the ID ADDRESS MARK for a record was correctly read from the diskette, but the DATA ADDRESS MARK was not found. Data in the data field is lost and the diskette must be formatted to be usable.

A-2380 ERROR OCCURRED 'ENTER' TO RETRY '3' TO BYPASS '9' TO END

A hard error was sensed and a response is needed to continue testing. The error message(s) are displayed on the screen before this message. To attempt the last operation again and continue with the routine, use just ENTER.

A '3' and ENTER is used to bypass a hard diskette error and testing will continue with the next record, skipping the record in error.

Any other entry will end the routine.

E-2381 SOFT READ ERROR ON DRIVE= # AT CC= ## H= # RR= ##

A READ ERROR was sensed at the displayed cylinder and head. The operation was repeated with no error (TEN ATTEMPTS). If RR= ??, then the error occurred during a cylinder read operation and the program will attempt to find the record in error.

E-2382 ERROR: DR= # AT CCHRR= ##### OP= X RC= XX STATUS= XX,XX,XX,XX

A hard error has been sensed after ten attempts. The CYLINDER (CC), HEAD (H) and RECORD (RR) being read is displayed along with the request COMMAND TYPE (OP). The status byte returned from DCP is displayed (RC) along with the four diskette controller status bytes ISR,ST0,ST1 and ST2. See "STATUS BYTE DEFINITION FOR MESSAGE E-2382" on page 72 and "COMMAND TYPE REQUESTS" on page 72 for status byte definition, if the error messages following do not describe the error(s).

E-2383 SELECTED DRIVE NUMBER '#' WAS NOT READY / ATTACHED

The selected diskette drive was not connected or was not ready. Select the correct diskette drive or make the drive ready. Verify that the diskette is the correct type for the drive model and that it is inserted correctly. A TYPE 2 DISKETTE cannot be used in a single head drive.

E-2384 SHARED DRIVE '#' NOT SECURED

The status byte returned by DCP indicates that the diskette controller could not secure and hold a shared drive (3 or 4) in the number of attempts permitted by DCP. Ensure that the system sharing drive 3 and 4 is not hung and that the drive is ready. Use the diskette diagnostics to find and correct the problem or use a different drive.

E-2385 NOT A VALID CE DISKETTE

The diskette on the selected drive does not have the correct recording MODE, SIDES, RECLEN and/or SYSTEM IDENTIFICATION (in the VOL1 header) to be read as a CE FORMATTED DISKETTE. Other errors may occur.

E-2386 READ DATA NOT MOVED TO STORAGE ?

The first 128 bytes of the data field did not change. Before a read operation, the read field is initialized to a fixed test pattern. After the read, the field is checked to verify that the pattern changed. If the pattern did not change, then a data transmission to storage may have failed or went to the wrong address if no other diskette attachment error occurred.

E-2387 COMMAND TO DCP IOCS WAS NOT VALID ?

The control block passed by the utility program was found by DCP to be not valid and was not executed. The program should be ended and then loaded and attempted again. If the error continues, then check any input data and ensure that it is correct.

E-2388 'VOL1' HEADER NOT VALID (RECORD SEVEN)

Record seven of cylinder zero did not have a valid VOL1 header in either EBCDIC or ASCII format.

I-2389 DRIVE= # INDEX= # SIDES= # MODE= XXX FORMAT= XXXXXX RECLEN= ##

Information from the diskette VOL1 header on the selected drive where:

INDEX = TYPE '1' OR '2' DISKETTE INDICATED BY THE INDEX PULSE
SIDES = THE NUMBER OF SIDES FORMATTED (1 OR 2)
MODE = 'FM' OR 'MFM'
FORMAT = EITHER 'EBCDIC' OR 'ASCII' FORMAT
RECLEN = THE RECORD LENGTH INDICATOR OF RECORD SIZE
(00=128, 01=256, 02=512 AND 03=1024 BYTE RECORDS).

Note: IF SIDES= 2, INDEX= 2 AND MODE= MFM, then a '2D' diskette is indicated.

E-238A DRIVE POWER CHECK (24V)

The diskette power good line was off for drive 1 and 2. Check 24 volts.

E-238B LABEL TYPE 'X' DISKETTE NOT VALID

The label type indicated is not supported.
Only TYPE 'W' diskettes are supported by diagnostic programs.

I-238D BAD CYLINDER FLAG FOR 'CC'= ## ##

The diskette selected was formatted with the physical cylinder(s) indicated marked as bad. Alternate cylinders are assigned sequentially.

E-238E 'ERMAP' RECORD NOT VALID (RECORD FIVE)

An entry in the error map record is not valid or not supported by diagnostic programs.

E-238F ALTERNATE PHYSICAL RECORD NOT VALID

The ALTERNATE PHYSICAL RECORD method for assigning records to replace bad records is not supported by diagnostic programs.

I-2390 PID 0125 END -EC / PTF UTILITY-

A-2391 PID 0125 TERMINATED, PRESS 'ENTER'

I-2394 DATA: DRIVE= # CYLINDER= ## HEAD= # RECORD= ##

E-2395 NUMBER OF DIGITS ENTERED NOT VALID?

Only five decimal digits are valid for a 'CCHRR' entry.

Only four decimal digits are valid for a PID NUMBER entry.

E-2396 'CC' NOT VALID?

The 'CC' value of the CCHRR entry is not valid. It must be a decimal value in the range of '00' to '76'.

E-2397 'H' NOT VALID?

The 'H' value of the CCHRR entry is not valid. It must be a '0'.

E-2398 'RR' NOT VALID FOR 'CC' ENTRY?

The 'RR' value of the CCHRR entry is not valid. It must be a decimal value in the range of:

01 TO 26 FOR 'CC=00'.
01 TO 08 FOR 'CC OTHER THAN 00' ON A CE DISKETTE

E-23A1 PID #### NOT FOUND ON DRIVE #

The PID displayed was not found on the selected drive. Select the correct diskette and drive or enter the correct PID NUMBER. Use Routine 3 to check the diskette for the PID.

E-23A2 EXTENTS FOR PID IN 'HDR1' AT CCHRR= ##### NOT VALID?

The VTOC HEADER check routine has found an error in the HDR1 data that makes the header not valid. Errors may occur if the PID is used. A valid diskette or copy of the PID should be obtained.

E-23A3 ERROR: PID HEADER RECORD AT CCHRR= ##### NOT VALID?

The PID HEADER check routine has found an error in the header record that makes the header not valid. Errors may occur if the PID is used. Use Routine 3 to check that the HDR1 PID number and the FLT header PID number are the same. A valid diskette or copy of the PID should be obtained.

19.4 DETAILED DESCRIPTION OF ROUTINES

19.4.1 ROUTINE 1

Automatically executes after the program is loaded by DCP and does a test of the first 32K of storage to verify program integrity.

19.4.2 ROUTINE 2 - ROS EC AND PART NUMBER DISPLAY

Reads the EC NUMBER and PART NUMBER from each ROS module and displays it along with page address. This permits the CE to verify the level of the system software and feature microcode.

19.4.3 ROUTINE 3 - FLT EC NUMBER DISPLAY

Permits the CE to check the level of the FLT's on the diskette.

The information from both the VTOC HEADER RECORD and the PID HEADER will be displayed.

19.4.4 ROUTINE 4 - PID UPDATE

Is used to update a program on a CE DISKETTE.

The PID to be changed is entered. Next, the address or the offset into the program is entered, followed by the data separated by spaces. Up to 63 digits may be entered before the ENTER key. The OLD data will be displayed before the change is written to the diskette record.

This routine can be used to install release updates to the CE DISKETTE from an engineering change document.

19.4.5 ROUTINE 5 - RECORD UPDATE

Is used to update a single record on a CE FORMATTED DISKETTE. The CYLINDER, HEAD and RECORD NUMBER (CCHRR) is entered. The routine will test for a valid entry and then read and display the record. To end the update with no change, use a '9' and ENTER.

For changes:

1. Enter the location offset in hexadecimal of the first byte to be changed and a space.
2. Follow with the data separated by spaces (free format permitted). Up to 63 digits may be entered before the ENTER key. After the ENTER key, the display will be updated with the changed data marked with an underline and the next entry requested.
3. To write a changed record to the diskette, use a 'V' and ENTER.
4. Use a '9' and ENTER to abend the routine.

19.5 GENERAL INFORMATION

19.5.1 UTILITY USE

This diagnostic utility does not display a FRU LIST, except during the Routine 1 initialization. The utility is used to display ROS EC information and to maintain the CE DISKETTE under the direction of field support or an engineering change document. This PID is not usable to change CUSTOMER DISKETTES. No MAP is associated with this PID. If hardware errors are sensed, the error messages should be recorded and used as an intermittent symptom with the START MAP 1000.

19.5.2 STATUS BYTE DEFINITION FOR MESSAGE E-2382

DCP RETURN CODES

RC - 80 DISKETTE DRIVE NOT READY
- 40 SHARED DRIVE NOT SECURED
- 20 CONTROL RECORD (DELETED DATA ADDRESS MARK)
- 10 CRC ERROR
- 04 RECORD NOT FOUND
- 02 DRIVE ERROR
- 01 OTHER ERROR

STATUS= ISR, ST0, ST1, ST2

ISR - 80 READ/WRITE COMMAND END
- 20 DRIVE WENT NOT READY
- 10 OPERATION NOT COMPLETE TIME OUT
- 08 DRIVE 4 ATTENTION
- 04 DRIVE 3 ATTENTION
- 02 DRIVE 2 ATTENTION
- 01 DRIVE 1 ATTENTION

ST0 - 00 NORMAL END
- 80 NOT A VALID OPERATION
- XX ERROR END

ST1 - 80 LAST RECORD MOVED
- 20 CRC ERROR IN ID OR DATA FIELD
- 10 DATA OVERRUN
- 04 RECORD NOT FOUND
- 01 ADDRESS MARK NOT FOUND

ST2 - 40 CONTROL RECORD (DELETED DATA ADDRESS MARK)
- 20 DATA FIELD CRC ERROR
- 10 CYLINDER ADDRESS TO ID COMPARE ERROR
- 02 BAD CYLINDER FLAG
- 01 MISSING DATA ADDRESS MARK

19.5.3 COMMAND TYPE REQUESTS

OP - 1 NORMAL DRIVE SELECT
- 2 READ DATA RECORD(S)
- 3 WRITE DATA RECORD(S)
- 4 READ ID
- 5 WRITE CONTROL (DELETED DATA MARK) RECORD(S)
- 6 SELECT DRIVE FOR FORMAT MODE
- 7 FORMAT TRACK
- 8 RECALIBRATE DRIVE
- 9 RELEASE SHARED DRIVE
- A READ DATA RECORD(S) (NOT CE FORMAT)
- B WRITE DATA RECORD(S) (NOT CE FORMAT)
- D WRITE CONTROL RECORD (NOT CE FORMAT)

20.0 PID 0150 (CONFIGURATION DISPLAY)

20.1 PURPOSE

The purpose of this program is to display:

1. R/W STORAGE CONFIGURATION.
2. BAUD RATE OF ATTACHED PRINTER (If there is a printer connected).
3. COUNTRY SELECT JUMPER OPTIONS.
4. TEST JUMPERS THAT ARE PRESENT.
5. ATTACHED DISKETTE INFORMATION.
6. IF 2ND PRINTER ATTACHMENT IS INSTALLED.
7. BAUD RATE OF PRINTER ATTACHED TO 2ND PRINTER ATTACHMENT.
8. IF COMMUNICATIONS ATTACHMENT IS INSTALLED.
9. IF SERIAL INTERFACE ADAPTER IS INSTALLED.

20.2 OPERATING PROCEDURES (DCP CONTROLLED SECTION)

20.2.1 LOADING

Select the DCP UTILITY MENU and then select PID 0150. There are no other inputs needed.

20.2.2 MENU DISPLAY - NONE

20.2.3 MENU OPTION SELECTION - NONE

20.2.4 PROGRAM RUN INSTRUCTIONS

20.2.4.1 END COMMAND

After the configuration is displayed, an ENTER key entry will return control to DCP.

20.2.4.2 LOOP PROGRAM COMMAND - NONE

20.2.4.3 LOOP ROUTINE COMMAND - NONE

20.3 ERROR, ACTION AND INFORMATION MESSAGES - NONE

20.4 DETAILED DESCRIPTION OF TESTS - NONE

21.0 PID 1200 (PROCESSOR POWER-ON TEST)

21.1 PURPOSE

21.1.1 POWER ON RESET ERROR INDICATOR

The purpose of this program is to test and verify the correct operation of the BASE CPU SYSTEM. The program is stored in ROS and is run at each POWER-ON TIME or when program flow branches to location 0000. Run time is 25 to 35 seconds (as determined by the system configuration).

21.1.2 ERROR REPORTING

Errors are identified by two different methods during POWER-ON RESET TESTING. During the first section of the test (before the CRT is started, Routines 01-06) an error will cause the machine to stop and an error code will be contained in a set of hardware latches. These latches may be probed by the customer engineer to determine the error code. (See SM 1230 for location of the latch probe pins and MAP 1100 for probe set up).

After the CRT is started, the contents of the error code latches are displayed on the screen. Attribute characters are used to report the ending status of each test. Definitions of ending attributes are:

NORMAL DISPLAY -- Test routine ran without error.

FLASHING REVERSE VIDEO DISPLAY -- An error was found during a test of a system part that is critical to system operation. System stops after ending the POWER-ON SEQUENCE.

REVERSE VIDEO DISPLAY -- An error was found during the test of a system part that is not critical to system operation. Depression of the ERROR RESET key permits system initialization to continue.

UNDERLINE DISPLAY -- The feature that this specific test checks is not present on this system.

TRAP ERROR -- If a TRAP occurs during POD testing, the failure occurred in the routine following the last routine displayed.

21.2 OPERATING PROCEDURES

21.2.1 LOADING

POWER-ON DIAGNOSTICS are started by:

1. POWERING ON THE PROCESSING UNIT.
2. TERMINATING THE ROS RESIDENT DISKETTE TEST BY PRESSING THE '9' KEY COMMAND.
3. TERMINATING DCP.

21.2.2 MENU DISPLAY -- NONE

21.2.3 MENU OPTION SELECTION

NONE (See "PROGRAM OPTIONS" for run options).

21.2.4 PROGRAM OPTIONS

There are two options that may be selected by the customer engineer by the installation of jumpers on the CPU board. See SM 1230 for location of jumpers.

21.2.4.1 LOOP PROGRAM OPTION

The program will loop until the jumper is removed.

Note: If external diskettes are attached to the system, disconnect the external diskette attachment cable before looping the POWER-ON-TEST.

21.2.4.2 STOP ON ERROR OPTION

Without this option, the test sequence will not terminate until all test routines have been run. With this option jumper installed, the system will enter a stop condition after the failure indicator has been displayed on the CRT. It is recommended that this jumper be installed if the loop jumper is installed and the system is left unattended.

21.3 INDEX OF ROUTINES

TEST DESCRIPTION TABLE		
ROUT TEST	AREA TESTED	CRITICAL=C NOT CRITICAL=N
01	CPU AND DATA BUS	C
02	ROS	C
03	RESERVED	C
04	R/W STORAGE	C
05-07	CRT CONTROLLER	C
08	PAGE REGISTERS	C
09-19	ROS INSTALLED ON PLANAR BOARD	C
1A-29	FEATURE ROS INSTALLED ON I/O CARDS	C
2A-30	R/W STORAGE	C
31	R/W STORAGE PAGE REGISTER	C
32	DMA PAGE REGISTER	C
33	INTERRUPT CONTROLLER	C
34	INTERVAL TIMER	C
35	KEYBOARD	C
36	PRINTER ATTACHMENT	N
37	DIAGNOSE COMMAND TO PRINTER	N
38	DISKETTE ATTACHMENT	N
39	+24 VOLTS TO DISKETTE (INTERNAL)	N
3A	SECOND PRINTER ATTACHMENT (FEATURE)	N
3B	DIAGNOSE CMD TO SECOND PRINTER (FEATURE)	N
3C	INTERNAL WRAP OF SERIAL INTERFACE ADAPTER	N
3D	OPEN LINK TO A 5247	N
3E	CHECK 5247 DISK UNIT FOR 'READY' STATUS	N
FD	SYSTEM DISKETTE INSTALLATION	N/A

21.4 DETAILED DESCRIPTION OF ROUTINES

21.4.1 POWER-ON ROUTINES

21.4.1.1 ROUTINE 01

1. ADDRESS and DATA BUS CHECK
2. CPU FLAGS and REGISTERS are tested

21.4.1.2 ROUTINE 02

CRC CHECK of first ROS MODULE.

This is the module containing this test.

21.4.1.3 ROUTINE 03

Reserved.

21.4.1.4 ROUTINE 04

Test of the first 16K of standard R/W STORAGE.

21.4.1.5 ROUTINE 05

INITIALIZATION AND SYNCHRONIZATION TEST of CRT CONTROLLER

21.4.1.6 ROUTINE 06

Test of CRT interface lines (HORIZONTAL, VERTICAL and VIDEO).

Note: OFF CARD DRIVE CIRCUITS ARE 'NOT' CHECKED BY THIS TEST. They may be verified by probing the CRT connector with a General Logic Probe.

21.4.1.7 ROUTINE 07

Same as ROUTINE 06.

21.4.1.8 ROUTINE 08

Basic test of ROS, R/W STORAGE and DMA PAGE REGISTERS.

21.4.1.9 ROUTINE 09 THROUGH 19

CRC TEST of ROS on Planar Board

21.4.1.10 ROUTINE 1A THROUGH 29

CRC TEST of ROS on I/O FEATURE CARDS

21.4.1.11 ROUTINE 2A-30

Test of 16K blocks of R/W STORAGE (up to 128K).

If a TRAP message is displayed at the bottom of the screen during these tests, the test 'FOLLOWING' the last displayed test number is the failing test.

TEST	BASE SOCKET	FEATURE SOCKET
2A	X	
2B		X
2C		X
2D	X	
2E	X	
2F		X
30		X

21.4.1.12 ROUTINE 31

Test to verify that the R/W STORAGE PAGE REGISTERS will access the correct section of R/W STORAGE.

21.4.1.13 ROUTINE 32

TEST DMA PAGE REGISTERS.

21.4.1.14 ROUTINE 33

Test of INTERRUPT CONTROLLER. If a HOT interrupt is found, the POWER ON DIAGNOSTICS will stop and the number of the interrupt causing the failure will be displayed on the fourth line from the top of the screen.

NUMBER	
1	KEYBOARD
2	PRINTER RECEIVE
3	PRINTER TRANSMIT
4	PRINTER 2 RECEIVE
5	DISKETTE
6	PRINTER 2 TRANSMIT
7	TP RECEIVE
8	TP TRANSMIT

21.4.1.15 ROUTINE 34

Interval timer is tested for correct operation.

21.4.1.16 ROUTINE 35: KEYBOARD RESET TEST

A reset is issued to the keyboard. The keyboard processor then executes a diagnostic routine and reports back with an 'X'2A55 data pattern.

1. If the diagnostic routine fails, an 'X'552A is returned.
2. If 'X'2A55 is not returned, the 2 characters that are returned are printed on the fourth line from the top of the screen.
3. If the keyboard has an active key, the scan code of the key is shown on the fourth line from the top of the screen.

21.4.1.17 ROUTINE 36: ELECTRONIC WRAP OF PRINTER ATTACHMENT

The attachment of a printer is sensed. If there is a cable attached, an electronic wrap of the printer attachment is performed. If no cable is sensed, this test and the next one (PRINTER DIAGNOSE COMMAND) are bypassed.

21.4.1.18 ROUTINE 37: PRINTER DIAGNOSE.

A DIAGNOSE COMMAND is issued to the attached printer and the response is analyzed for correct status.

Note: This test and ROUTINE 36 are NOT CRITICAL and system initialization may continue after the ERROR RESET key is pressed.

21.4.1.19 ROUTINE 38

Diskette attachment is tested for correct communications with the CPU. It is NOT necessary to have a diskette installed in the drives for this test to run correctly.

21.4.1.20 ROUTINE 39

+24 VOLTS to the diskette drives is tested.

21.4.1.21 ROUTINE FD

'FD' is displayed on the CRT at the end of the POWER ON TEST routines to indicate that system diskette initialization is in process.

If the POWER ON TEST hangs with 'FD' shown as the last routine indicator and no errors (REVERSE VIDEO) are shown, it means that the diskette initialization could not be completed. This is usually caused by failure to access an external diskette.

This may be caused by:

1. HARDWARE FAILURE.
2. EXTERNAL DISKETTE IS BEING USED IN SHARED MODE BY ANOTHER PROCESSOR.

21.4.2 FEATURE ROUTINES

21.4.2.1 ROUTINE 3A - SECOND PRINTER ATTACHMENT

Electronic wrap of second printer attachment feature. If no printer cable is attached, this Routine and Routine 3B are skipped.

21.4.2.2 ROUTINE 3B - DIAGNOSE COMMAND TO SECOND PRINTER

A diagnose command is issued to the printer attached to the second printer attachment feature, and the response is analyzed for correct status.

21.4.2.3 ROUTINE 3C - INTERNAL WRAP OF SERIAL INTERFACE ADAPTER

This routine checks the internal logic of the work station SIA Card. If this routine fails, Routines 3D and 3E are bypassed.

21.4.2.4 ROUTINE 3D - OPEN LINK TO A 5247

This routine attempts to initialize and open the link to the 5247.

If this routine fails, one byte of status is displayed immediately following the 3D. These error bytes are defined in "WORK STATION SERIAL LINK ERROR CONDITIONS" on page 84.

Note: If the characters '*3' appears on the bottom line of the display, it may take up to 4 minutes for Routine 3E to complete. This may be an indication of excessive SOFT link errors.

21.4.2.5 ROUTINE 3E - CHECK 5247 DISK UNIT FOR 'READY' STATUS

This routine requests status from the 5247 DISK UNIT and checks to see if the 5247 is in a READY condition. Selected status information is displayed on line 5 of the CRT (see "ROUTINE 3E (5247 STATUS ERRORS)" on page 83 for the description). If the 5247 is in a ready condition and the CE wishes to view the status information, the space bar should be pressed down and held while the power on diagnostics are running, so that the power on display will not be erased after the test ends.

ROUTINE 3E (LINK ERRORS): If a link error occurs during Routine 3E, a single byte of error status will be displayed, following the 3E sequence indicator. (See "WORK STATION SERIAL LINK ERROR CONDITIONS" on page 84 for an explanation of the link error status.)

ROUTINE 3E (5247 STATUS ERRORS): Four words of status are displayed on line 5 of the CRT. The format is:

3E = AAAA BBBB CDEE FFGG

where

AAAA = TRAP CODE (See 'TRAP ERROR (XXXX YYYY)' in 'TRAP INFORMATION' in USER GUIDE 0016).
BBBB = DASD DIAGNOSTIC CHECKPOINT (See 'SUPERVISOR FOR DRIVE DIAGNOSTICS' through 'ROUTINE 0E - LOADS MICROCODE' in USER GUIDE 0016.
C = LAST DASD DIAGNOSTIC ROUTINE EXECUTED.
D = DASD DIAGNOSTIC RESULT (F = PASS, 0 = FAIL).
EE = DASD SIZE (A1 = 15MB, A2 = 30MB).
00 = Non valid Defect Map
BB = Status indicates A1, Defect Map indicates A0
CC = Status indicates A0, Defect Map indicates A1
FF = Binary code of number of link drivers on the 5247 that tested good (See 'ROUTINE B (SIA LINE 1 EXTERNAL WRAP)' in 'BASE PLANAR ROUTINES' in USER GUIDE 0016).
0 = NOT GOOD or ABSENT
1 = GOOD
Example: FF = 03 (Binary 0000 0011) indicates that link drivers for Station 1 and Station 2 tested OK, drivers for Station 3 and 4 BAD or ABSENT.

FF = 0B (Binary 0000 1011) indicates that Station 1, 2 and 4 drivers tested GOOD, driver for Station 3 is BAD.
GG = STATION ID for this station.
GG = 01 = Station 01
02 = Station 02
04 = Station 03
08 = Station 04

21.5 WORK STATION SERIAL LINK ERROR CONDITIONS

The following error conditions are returned following an SIA call.

00 = No Error Detected. The function requested was completed without error. **Operator Action = None**

01 = CALL Parameter Error. An invalid parameter was found in the RQB or a function was requested with the link Closed. **Operator Action = Power off then power on station.**

02 = Receiver Not Ready (Primary). Not able to request link service because the primary station is busy. No request is waiting. (Another station has the primary LOCKED or disk unsafe error processing in progress?) **Operator Action = Wait for other function to complete then try the operation again.**

03 = Receiver Not Ready (Request Waiting). The link request has been sent and the primary station is busy servicing the request and a response is waiting. (Disk unsafe error processing in progress?) **Operator Action = Wait for function to complete, then try the operation again.**

04 = INFO Received When INFO to Send. RCB exchange types not compatible. (RCB/RQB do not match?).

- Work station expects

  RCB--->

  DATA-->

  <---RCB

- 5247 expects

  RCB--->

  <---RCB

Operator Action = Power off then power on station.

05 = No RCB Received When Expected. RCB exchange types not compatible. (RCB/RQB do not match?).

- Work station expects

  RCB--->

  <---RCB

- 5247 expects

  RCB--->

  DATA-->

  <---RCB

Operator Action = Power off then power on station.

06 = No DATA Received When Expected. RCB exchange types not compatible. (RCB/RQB do not match?).

- Work station expects

  RCB--->

  (DATA-->)

  <---RCB

  <--DATA

- 5247 expects

  RCB--->

  (DATA-->)

  <---RCB

Operator Action = Power off then power on station.

07 = DATA Received for POLL. RCB exchange types not compatible. This error may be the result of an error in the previous RCB/RQB. (Previous RCB/RQB do not match?).

- Work station expects

  RCB--->

  (DATA-->)

  <---RCB

- 5247 expects

  RCB--->

  (DATA-->)

  <---RCB

  <--DATA

Operator Action = Power off then power on station.

10 = Lost Transmit Interrupt. A frame was transmitted and no transmit complete interrupt was received. (SIA card hardware failure?) **Operator Action = Power off then power on station.**

11 = Transmit Status Error. At the completion of a transmitted frame, a transmit status error was found. (DMA Underrun or SIA card hardware failure?) **Operator Action = Power off then power on station.**

12 = Input Buffer Full (IBF) Hung. A command or data was written to the SIA card and was never acknowledged. This error may be caused by a Lost Receive Interrupt if the SIA card is in an Automatic Response mode. (Primary not powered on?). **Operator Action = Verify disk unit is powered on and READY. Power off then power on station.**

13 = I-FRAME Not Acknowledged. An I-frame was sent to the primary station and a valid acknowledgement was not received. (Excessive primary receive errors?). **Operator Action = Power off then power on station.**

14 = Protocol Error - NR Count Out of Range. An I-frame was acknowledged that was never sent or an I-frame that was acknowledged before is now not acknowledged (the primary NR count decremented). (Micro-code problem?) **Operator Action = Power off then power on station.**

15 = Protocol Error - Invalid Command Received. An invalid or a command that is not supported was received. (Micro-code problem?) **Operator Action = Power off then power on station.**

16 = Protocol Error - INFO Present When Not Permitted. A command was received which contained an information field when an I-field is not permitted (RR with Info). (Micro-code problem?) **Operator Action = Power off then power on station.**

17 = Protocol Error - INFO Too Long (Overrun). A valid I-frame was received that was longer than expected. The RQB receive count was invalid. (RCB/RQB do not match?) **Operator Action = Power off then power on station.**

18 = Frame Reject Not Acknowledged. A frame reject condition is present and was not acknowledged by the primary station with a SNRM or DISC command. (VERY excessive link error rate?) **Operator Action = Power off then power on station.**

20 = Lost Receive Interrupt. A receive command was taken by the SIA card and no receive complete interrupt was sent. (Primary receiver INOP, Interrupts are masked?) **Operator Action = Verify disk unit is powered on and READY. Power off then power on station.**

21 = SIA Command Reject. The last command written to the SIA card was invalid or improper for the current SIA mode. (Micro-code problem - transmit command issued while in Automatic response mode?). **Operator Action = Power off then power on station.**

22 = Receive Status Error. Following a receive complete interrupt the receive status indicates the frame was invalid. The receive is attempted several times. (Excessive link error rate?) **Operator Action = Power off then power on station.**

30 = Power on Test Failed. Following an SIA card reset, valid power on status was not sent by the SIA card (AA55). (SIA card hardware failure?) **Operator Action = Power off then power on station.**

40 = Disconnect Received. A disconnect command (DISC) was received while the link was OPEN. (Excessive link error rate?) **Operator Action = Power off then power on station.**

41 = Excessive TEST Commands. Excessive TEST commands were received. (Primary receiver failure or excessive link error rate?) **Operator Action = Power off then power on station.**

42 = Not able to OPEN Link. After repeated attempts a valid SNRM was not received. (Excessive link error rate or another station has the primary LOCKED or disk unsafe error processing in progress?)

80 = SNRM Received. The link was OPEN and a mode set command (SNRM) was received. (Excessive link errors or primary started again or power off requested at primary?) **Operator Action = Wait for other function to complete, then attempt the operation again.**

81 = Unable to Disconnect. After repeated attempts a DISC command was not received after Request Disconnect (RD) was transmitted. (Excessive link error rate?) **Operator Action = Wait for other function to complete, then attempt the operation again.**

22.0 PID 1205 (CPU PROCESSOR FLT)

22.1 PURPOSE

This program tests the system processor and instruction set for correct operation.

22.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

22.2.1 LOADING PID 1205 - CPU INSTRUCTION SET TEST -

With the PRIMARY DCP MENU displayed, enter a '3' and an ENTER.

PID 1205 will load and display START MESSAGE I-300 followed by Routine 1, start message I-310. See "ERROR, ACTION AND INFORMATION MESSAGES" on page 90 for any error messages. After Routine 1 executes without error, the OPTIONS MENU will be displayed.

22.2.2 MENU DISPLAY

```
I-301       OPTIONS:      LOOP MODE OFF
      X-0- SET / RESET    LOOP MODE
      X-1- RUN AUTOMATIC ROUTINES
       -2- INSTRUCTION SET TEST
       -3- PROCESSOR TEST
      X-8- TRAP INTERRUPT TEST
      X-9- RETURN TO DCP
A-302     ENTER OPTION

?_
```

22.2.3 MENU OPTION SELECTION

Enter the selected option number, using the numeric keys on the right end of the keyboard, followed by the ENTER key.

The 'X' by the option number indicates an optional routine not part of automatic sequence.

OPTION 0 Will set or reset routine/program loop mode and display the menu with the loop mode indicated as on or off.

OPTION 1 Will execute all the automatic routines and loop the program if loop mode is set.

OPTION 2 Will execute the CPU instruction set test and loop the routine if loop mode is set.

OPTION 3 Will test error checking and processor logic.

OPTION 8 An optional test of TRAP interrupt logic and microcode.

OPTION 9 Will end PID 1205 and return to DCP.

22.2.4 PROGRAM RUN INSTRUCTIONS

Normal program operation is to select OPTION '1' and run the automatic routines. If additional testing is needed, first select OPTION '0' to set loop mode and then select OPTION '1' to loop routines.

The status line, above the keyboard input line, will display the last drive number selected (DR #). If loop mode is set, then a decimal loop counter is displayed to the left of the drive number. A decimal pass count for the instruction set test is displayed to the left of the loop counter. These indicators may be moved up the screen before a keyboard input request.

22.2.4.1 END COMMAND

Use the ATTN and 'E' entry to end routine loops and return to the menu or continue with the next routine.

Use ATTN and '9' entry to return to the menu after normal running of selected routine(s) when loop mode is set.

With the menu displayed, enter OPTION '9' and ENTER to return to DCP. An ENTER is needed after the ending message.

22.2.4.2 LOOP COMMAND

OPTION '0' is used to set or reset routine or program loop mode. The present mode selected will be displayed as part of the menu. If a routine is selected with loop mode set, the routine will loop until an ATTN 'E', ATTN '9' command or an error. If OPTION '1' is selected when in loop mode, all of the automatic routines will be executed in sequence and then the sequence repeated until an end command is entered to stop program looping.

22.2.5 CONTROL PROGRAM ERROR, ACTION AND INFORMATION FORMAT

If an error is sensed, an ERROR MESSAGE(S) (E-3XX) and optional INFORMATION MESSAGES (I-3XX) will be displayed followed by an entry STOP MESSAGE (A-3XX ERROR OCCURRED).

See "PID 0001 (DIAGNOSTIC CONTROL PROGRAM)" on page 21 for control program STOPS (other than ?-3XX).

See "TRAP DATA" on page 15 for TRAP stops.

22.3 ERROR, ACTION AND INFORMATION MESSAGES

MSG ID	ERROR MESSAGE AND STATUS MESSAGE MEANINGS
I-300	PID 1205 START -CPU FLT- The utility has been loaded and has displayed its start message.
I-301	OPTIONS: LOOP MODE OFF X-0- SET / RESET LOOP MODE X-1- RUN AUTOMATIC ROUTINES -2- INSTRUCTION SET TEST -3- PROCESSOR TEST X-8- TRAP INTERRUPT TEST X-9- RETURN TO DCP
A-302	ENTER OPTION The options menu is displayed and a digit (0 TO 9) option entry followed by ENTER is needed.
I-303	START AUTOMATIC SEQUENCE
I-304	'ATTN-X' ACKNOWLEDGE Acknowledgment of an ATTN request and the end of the routine.
A-305	ERROR OCCURRED IN ROUTINE # 'ENTER' TO CONTINUE '9' TO END An error has occurred and an ENTER is needed to continue testing.
I-306	LOOP MODE SET Routine/program loop mode has been turned on.
I-307	LOOP MODE RESET Routine/program loop mode has been turned off.
E-308	'X' IS NOT A VALID OPTION The first character entered was not an expected option. Enter a valid option.
I-310	RTN-1 INITIALIZATION STARTED
E-311	READ/WRITE STORAGE PARITY CHECK FRU= BASE STORAGE CARD A R/W PARITY CHECK was sensed in the first 32K of storage.
E-312	I/O CHANNEL TRAP SEE MAP 1225 The I/O CHANNEL ERROR line was activated by an attachment card.
E-313	READ/WRITE STORAGE DATA FAILURE FRU= BASE STORAGE CARD Data read from storage location in the first 32K was not as expected.
E-314	WRITE TO ROS SPACE TRAP FRU= CPU PLANAR BOARD A WRITE TO ROS ADDRESS SPACE error has been sensed. Either the program is destroyed and must be loaded again or the hardware failed.

E-316 LOGIC FAILED FRU=CPU PLANAR BOARD

A failure was sensed in the storage control logic on the CPU Planar Board. The CPU Planar Board should be exchanged.

E-318 POWER CHECK SEE MAP 1225

The power good line from the power supply went off.

I-320 RTN-2 INSTRUCTION SET TEST STARTED

I-321 TEST PASSED. REPEATING 255 TIMES

The first pass of the CPU instruction set test ran OK and will be repeated 255 times with the loop counter displayed.

E-329 INSTRUCTION FAILED -ABEND- FRU= CPU PLANAR BOARD

A CPU error has been sensed by the FLT during the testing of the instruction set. The CPU is stopped after the message is displayed.

I-330 RTN-3 PROCESSOR TEST STARTED

E-331 PROCESSOR TEST ERROR NUMBER= ## STATUS= ?? FRU= CPU PLANAR BOARD

An error was sensed while testing the PLANAR BOARD LOGIC. Error code STATUS is the TRAP INTERRUPT CONTROL REGISTER. Error numbers are:

01 = page register error
02 = trap interrupt failed to reset
03 = trap interrupt after read and write to R/W STORAGE
04 = control of trap enable error
05 = trap error after a read from ROS STORAGE
06 = write to ROS TRAP INTERRUPT failed when expected
07 = CE error latch failed to latch correct address

I-380 RTN-8 TRAP INTERRUPT TEST STARTED

A-381 THIS ROUTINE WILL GENERATE A 'TRAP' ERROR TO TEST ERROR CHECKING LOGIC.
USE '1' AND 'ENTER' FOR 'TRAP' OR 'ENTER' FOR MENU OPTIONS.

I-382 CHECK FOLLOWING 'TRAP' DISPLAY. SEE MAP 1205 IF NOT CORRECT.
POWER OFF THEN ON TO RESTART SYSTEM.

?023 0000 ???? ???? F0F0 F0F0 ???? 0123 4567 89AB C044 ???? ????

The TRAP INTERRUPT test has been started and the system trap routine should display a TRAP message that matches the reverse video status line above the trap status line. If the two lines do not match then a PROCESSOR or MICRO-CODE error has occurred. Use the trap display information in MAP 1220 to determine what is different. The trap error should be caused by either a WRITE TO ROS TRAP or a STORAGE PARITY CHECK. Suspect the CPU PLANAR BOARD if not correct.

E-384 TRAP INTERRUPT ERROR FRU= CPU PLANAR BOARD

An error was detected by the TRAP INTERRUPT test. The TRAP INTERRUPT did not interrupt the processor and execute the trap microcode and then stop the system. The CPU PLANAR BOARD cannot respond to trap hardware errors and should be replaced if possible.

I-390 PID 1205 END -CPU FLT-

A-391 PID 1205 TERMINATED, PRESS 'ENTER'

22.4 DETAILED DESCRIPTION OF ROUTINES

22.4.1 ROUTINE 1

Automatically executes after the program is loaded by DCP and does a test of the first 32K of storage to verify program storage integrity.

22.4.2 ROUTINE 2 - INSTRUCTION SET TEST

Is the CPU INSTRUCTION SET TEST. After the first pass the routine is automatically repeated 255 times. If an error is sensed, the FLT attempts to display an error message before stopping the CPU.

22.4.3 ROUTINE 3 - PROCESSOR LOGIC TEST

Is a test of the TRAP ERROR CHECKING LOGIC and selected processor logic not tested by POWER ON TESTS. Errors are generated and reset under program control and tests are made for correct response. Should a TRAP error message be displayed during this routine, then the Planar Board Logic cannot control or reset error conditions.

22.4.4 ROUTINE 8 - TRAP DISPLAY CHECK

Is an optional test of the TRAP INTERRUPT LOGIC and of the TRAP DISPLAY MICROCODE. A storage parity check is generated (or failing that, a write to ROS check is used) and the expected TRAP status is displayed. Then the TRAP error is permitted to interrupt the system microcode. The status displayed should match the system trap error message. Power must be turned off to reset the TRAP error condition.

22.5 GENERAL INFORMATION

This diagnostic test attempts to display an error message indicating the failing FRU. This FLT tests the instruction set for correct function and it is assumed that the remainder of the system is OK. Unusual failures of the system during this test can also be caused by STORAGE CARDS, ELECTRICAL NOISE and HIGH TEMPERATURE. Most system failures will be sensed by the POWER ON DIAGNOSTICS and that test should be used for INTERMITTENT FAILURE ISOLATING. See the CPU MAP 1205 for additional information on problem diagnosis.

23.0 PID 1210 (CPU STORAGE FLT)

23.1 PURPOSE

This program tests the system READ/WRITE STORAGE, ROS STORAGE and CPU BOARD HARDWARE associated with the STORAGE PAGE ADDRESS and ERROR SENSING. FRU's are displayed when hardware errors are sensed. An exerciser routine is included.

23.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

23.2.1 LOADING PID 1210 - CPU STORAGE TEST -

With the PRIMARY DCP MENU displayed, enter a '4' and an ENTER.

PID 1210 will load and display start message I-400 followed by ROUTINE 1 start message I-410 and R/W STORAGE size configuration message I-419. See "ERROR, ACTION AND INFORMATION MESSAGES" on page 95 for any error messages. After ROUTINE 1 executes without error, the OPTIONS MENU will be displayed.

23.2.2 MENU DISPLAY

```
I-401       OPTIONS:     LOOP MODE OFF
      X-0- SET / RESET  LOOP MODE
      X-1- RUN AUTOMATIC ROUTINES
       -2- BASE R/W STORAGE TEST
       -3- FULL R/W STORAGE TEST
       -4- ROS CRC STORAGE TEST
       -5- CONTROL STORAGE TEST
      X-8- STORAGE EXERCISER
      X-9- RETURN TO DCP
A-402      ENTER OPTION

?_
```

23.2.3 MENU OPTION SELECTION

Enter the selected option number using the numeric keys on the right end of the keyboard followed by the ENTER key.

The X by the option number indicates an optional routine not part of automatic sequence.

OPTION 0 Will set or reset ROUTINE/PROGRAM LOOP MODE and display the menu with the loop mode indicated as on or off.

OPTION 1 Will execute all the automatic routines and then loop the program if loop mode is set. (ROUTINES 1,2,3 and 4).

OPTION 2 Will execute the BASE STORAGE TEST (FIRST 32K) and loop the routine if loop mode is set.

OPTION 3 Will execute the full READ/WRITE STORAGE TEST and loop the routine if loop mode is set. ATTN commands are disabled during much of this routine.

OPTION 4 Will execute the ROS CRC TEST and loop the routine if loop mode is set.

OPTION 5 Will execute the feature CONTROL STORAGE TEST and loop the routine if loop mode is set.

OPTION 8 Will execute the STORAGE EXERCISER. This routine will run until an error is sensed or system power is switched off.

OPTION 9 Will end PID 1210 and return to DCP.

23.2.4 PROGRAM RUN INSTRUCTIONS

Normal program operation is to select OPTION 1 and run the automatic routines. If storage is suspect and additional testing is needed, first select OPTION 0 to set loop mode and then select OPTION 1 to loop the automatic routines. For extended full storage testing use OPTION 8 for the STORAGE EXERCISER.

The status line, above the keyboard input line, will display the last drive number selected (DR #). If errors occur, a decimal count of the number of errors will be displayed to the left of the drive indicator. If loop mode is set, then a decimal loop counter is displayed to the left of the error counter. These indicators may be moved up the screen before a keyboard input request.

It is normal to see extra characters flash on the screen during all storage routines (display storage being tested). During ROUTINE 3, the screen image may go blank for two seconds.

23.2.4.1 END COMMAND

Use the ATTN and E entry to end routine loops and go to the menu or next routine.

Use ATTN and 9 entry to return to the menu after normal running of selected ROUTINE(s) when loop mode is set.

With the menu displayed, enter option 9 and ENTER to return to DCP. An ENTER is needed after the ending message.

23.2.4.2 LOOP COMMAND

OPTION 0 is used to set or reset routine or program loop mode. The present mode selected will be displayed as part of the menu. If a routine is selected with loop mode set, the routine will loop until an ATTN command or an error. If OPTION 1 is selected when in loop mode, then all of the automatic routines will be executed in sequence and repeated until an end command is entered to stop program looping.

23.2.5 CONTROL PROGRAM ERROR, ACTION AND INFORMATION FORMAT

If an error is sensed, an ERROR MESSAGE(s) (E-4XX) and optional INFORMATION MESSAGES (I-4XX) will be displayed followed by an entry STOP MESSAGE (A-4XX ERROR OCCURRED).

See "PID 0001 (DIAGNOSTIC CONTROL PROGRAM)" on page 21 for control program STOPS (other than ?-4XX).

See "TRAP DATA" on page 15 for TRAP stops.

23.3 ERROR, ACTION AND INFORMATION MESSAGES

MSG ID	ERROR MESSAGE AND STATUS MESSAGE MEANINGS
I-400	PID 1210 STARTED -STG FLT- The utility has been loaded and has displayed its start message.
I-401	OPTIONS: LOOP MODE OFF X-0- SET / RESET LOOP MODE X-1- RUN AUTOMATIC ROUTINES -2- BASE R/W STORAGE TEST -3- FULL R/W STORAGE TEST -4- ROS CRC STORAGE TEST -5- CONTROL STORAGE TEST X-8- STORAGE EXERCISER X-9- RETURN TO DCP
A-402	ENTER OPTION The OPTIONS MENU is displayed and a digit (0 TO 9) option entry followed by ENTER is needed.
I-403	START AUTOMATIC SEQUENCE
I-404	'ATTN-X' ACKNOWLEDGE Acknowledgment of an ATTN request and the end of the routine.
A-405	ERROR OCCURRED IN ROUTINE # 'ENTER' TO CONTINUE '9' TO END An error has occurred and an ENTER is needed to continue testing.
I-406	LOOP MODE SET ROUTINE/PROGRAM LOOP MODE has been turned on.
I-407	LOOP MODE RESET ROUTINE/PROGRAM LOOP MODE has been turned off.
E-408	'X' IS NOT A VALID OPTION The first character entered was not an expected option. Enter a valid option.
I-410	RTN-1 INITIALIZATION STARTED
E-411	READ/WRITE STORAGE PARITY CHECK FRU= BASE STORAGE CARD A R/W PARITY CHECK was sensed in the first 32K of storage.
E-412	I/O CHANNEL TRAP SEE MAP 1225 The I/O CHANNEL error line was activated by an attachment card.

E-413 READ/WRITE STORAGE DATA ERROR FRU= BASE STORAGE CARD

Data read from storage location in the first 32K was not as expected.

E-414 WRITE TO ROS SPACE TRAP FRU= CPU PLANAR BOARD

A WRITE TO ROS ADDRESS SPACE ERROR has been sensed. Either the program is destroyed and must be loaded again or the hardware failed.

E-416 LOGIC FAILED FRU= CPU PLANAR BOARD

A failure was sensed in the storage control logic on the CPU Planar Board. The CPU Planar Board should be exchanged.

E-417 R/W STORAGE CONFIGURATION ERROR - STATUS= ? SEE MAP 1210

The R/W STORAGE SIZE determined from the jumpers connected by the storage cards is not valid. The storage configuration is not valid and base storage size of 32K is assumed. Go to MAP 1210.

E-418 POWER CHECK SEE MAP 1225

The power good line from the power supply went off.

I-419 ###K R/W STORAGE CONFIGURATION

Indicates the R/W STORAGE size determined from jumpers connected by the base storage card and the feature storage card being plugged in.

I-420 RTN-2 BASE STORAGE TEST STARTED - PAGE= 0 ADDR= 80

I-421 TEST PASSED. REPEATING 2 TIMES - PAGE= 0 ADDR= 80

The first pass of the base storage test for the first 32K ran OK and the routine is being repeated. This routine tests the program storage space without destroying data. Routine 3 should also be run. An OK is displayed to the right of the message if no errors are sensed.

E-423 READ/WRITE STORAGE DATA ERROR FRU= BASE STORAGE CARD

Data read from storage location in the first 32K was not as expected.

I-430 RTN-3 FULL STORAGE TEST STARTED - PAGE= 0 ADDR= 80

E-431 STORAGE DATA ERROR FRU= BASE STORAGE CARD

A R/W PARITY CHECK was sensed by the trap interrupt logic or data read from a storage location was not correct. Suspect the base storage card.

E-432 PAGE REGISTER ERROR FRU= CPU PLANAR BOARD

The diagnostic sensed a failure in the page register logic for storage. The CPU Planar is bad.

E-433 STORAGE DATA ERROR FRU= FEATURE STORAGE CARD

Data read from a storage location in the feature storage card was not as expected during test. The feature storage card is suspect. If no R/W PARITY CHECK is sensed, the parity checking logic may be failing and the CPU Planar Board must also be exchanged. This failure can also be caused by electrical noise or bad grounding.

E-437 READ/WRITE STORAGE DATA/PARITY ERROR AT I/O BUS PAGE= #.

A R/W PARITY CHECK or a data not as expected error was sensed at a page address on the I/O bus. Run feature tests.

E-438 STORAGE CONTROL ERROR FRU= CPU PLANAR BOARD

An error was sensed that indicates the processor board may be causing READ/WRITE STORAGE ERRORS. The CPU Planar Board is suspect first and then the storage cards.

I-440 RTN-4 ROS STORAGE TEST STARTED - PAGE= 0 ADDR= 00

E-441 ROS STORAGE ERROR - PAGE= # - ADDRESS= #### - SEE MAP 1210

ROS STORAGE DATA READ ERROR or a ROS CRC TEST FAILURE. The PAGE number is displayed. If PAGE= is '8' through 'F', then the ROS error is on a feature card plugged into the I/O bus.

E-442 ROS PAGE ERROR WAS= # WRITTEN= # FRU=CPU PLANAR BOARD

ROS PAGE ADDRESS hardware failed. Suspect CPU Planar Board. The PAGE written and read are displayed.

I-443 ###K ROS STORAGE CONFIGURATION

Indicates the ROS STORAGE SIZE found and tested during the check for valid ROS modules.

I-450 RTN-5 FULL CONTROL STORAGE TEST

I-451 UPDATE STORAGE JUMPER INSTALLED - PAGE= F ADDR= 40

The MACHINE UPDATE CARD INSTALLED jumper was sensed (SM 1230) and the control storage on the card at PAGE= F will be tested. Run PID 1212 or use MAP 1212 if any error.

I-452 WORD PROCESSING CONTROL STORAGE - PAGE= 8 ADDR= 40

Read/Write storage was sensed at PAGE= 8 on the WORD PROCESSING FEATURE CARD and will be tested. Run PID 1450 or use MAP 1450 to test the correct operation of the word processing feature.

E-456 CONTROL STORAGE DATA COMPARE ERROR- PAGE= ?

Data read from a storage location in the FEATURE CONTROL STORAGE being tested was not as expected. Use the PAGE= data to determine the feature card that failed. If no I/O CHANNEL CHECK is sensed (message E-457), then the edge connector contacts may be causing the failure. This failure can also be caused by electrical noise or bad grounding. Use the feature diagnostic to test the feature card.

E-457 CONTROL STORAGE I/O PARITY CHECK - PAGE= ?

An I/O CHANNEL CHECK was sensed during the control storage test. A feature card being tested sensed a STORAGE PARITY CHECK and activated the I/O channel check line. Use the PAGE= data to determine the feature being tested. Use the feature diagnostic to test the feature card.

I-458 xxxK OF FEATURE CONTROL STORAGE - PAGE= ? ADDR= 40

The size of control storage found and tested is displayed. The control storage is tested again.

I-459 NO FEATURE CONTROL STORAGE

No standard features with control storage were sensed during the test. If a feature is installed, then use the PID and MAP for that feature to test the feature.

I-480 RTN-8 STORAGE EXERCISER STARTED

A-481 THIS EXERCISER ROUTINE RUNS UNTIL POWER OFF (OR UNTIL '9' FOR POD)
ENTER A '1' TO CONTINUE.

The storage exerciser has been selected and if a '1' is entered this routine will run until power is switched off. See Routine 8 description.

I-482 STORAGE EXERCISER PASS 00000

The storage exerciser has started. The decimal pass count will be updated and displayed at the start of each pass. Power off system to stop.

E-485 ERROR

A data error was sensed during the exerciser routine.

Run PID 1210 Routines 2 and 3.

E-486 ERROR

A page register error was sensed. Suspect Planar Board.

I-490 PID 1210 END -STG FLT-

A-491 PID 1210 TERMINATED, PRESS 'ENTER'

23.4 DETAILED DESCRIPTION OF ROUTINES

23.4.1 ROUTINE 1

Automatically executes after the program is loaded by DCP and does a test of the first 32K of storage to verify program storage integrity. It then displays the READ/WRITE storage size indicated by configuration jumpers connected by the storage cards. If the configuration is not valid and supported, error message E-417 will be displayed with a response needed.

23.4.2 ROUTINE 2 - BASE STORAGE TEST

Is the BASE STORAGE TEST for the first 32K of storage. It tests the program storage area without destroying the program. The ATTN commands are available during routine operation.

23.4.3 ROUTINE 3 - FULL STORAGE TEST

Is a full storage test of the READ/WRITE STORAGE, the ERROR SENSE CIRCUITS and the PAGE LOGIC for storage. The storage used by the program is not tested by this routine. The ATTN commands are disabled, but if the '9' key is pressed, the routine will end.

23.4.4 ROUTINE 4 - ROS STORAGE CHECK

Is the test for ROS STORAGE DATA INTEGRITY and PAGE ADDRESSING. Each ROS storage module has check bytes that are used to test for missing or extra data bits. Any single bit error and most other failures will be sensed during this test routine. The WRITE TO ROS ERROR SENSE CIRCUITS are also tested.

23.4.5 ROUTINE 5 - CONTROL STORAGE

Is the test of the write/read FEATURE CONTROL STORAGE on standard features. If the MACHINE UPDATE CARD INSTALLED jumper is present (see SM 1230), then the write/read UPDATE STORAGE (PAGE= F) is tested. If the WORD PROCESSING FEATURE CARD is installed, then the write/read control storage (PAGE= 8) is tested.

After all standard features are checked, the total feature control storage size is displayed and all feature control storage is tested again.

23.4.6 ROUTINE 8 - STORAGE EXERCISER

Is an optional routine that will test all of storage with data patterns and a moving test routine until an error is sensed or power is switched off. Status information is displayed and error messages are attempted.

Errors are indicated by:

1. Error messages E-485 or E-486.
2. No status display (I-482) or screen update.
3. TRAP error message.
4. The running of power on tests.

The ATTN commands are disabled by this routine and there is no return to DCP. Pressing the '9' key will end the routine at the end of the pass and run the power on diagnostics.

23.5 GENERAL INFORMATION

This diagnostic test attempts to display an error message indicating the failing FRU. When test results are not clear, storage cards should be swapped when possible. The card in the feature position will be more completely tested. See the STORAGE MAP 1210 for additional information on problem diagnosis. ROS failures may need the removal of feature cards to identify the failing FRU.

The TRAP DATA display format is included here to aid in failure analysis. It can be used to indicate the source of errors. If a machine check occurred either during the running of a BASIC customer program or during the running of a diagnostic program, the system will display one or two lines of TRAP DATA on the display. MAP 1220 is used to interpret this data. The data format is shown below. If the problem is an intermittent storage parity check ('10??'), the PAGE IN USE value ('A') can be used as the PAGE= value in MAP 1210 to determine the suspect card. A write to ROS address space TRAP ('40??') can result from CPU ERRORS, STORAGE ERRORS, MICROCODE LOGIC PROBLEMS or WRONG NESTING of BASIC STATEMENTS.

Data display is as follows:

```
TRAP XXXX AB00 CCCC DDEE FFGG HHII JJJJ KKKK LLLL MMMM NNPP QQQQ RRRR SSSS TTTT
UUUU VVVV WWWW YYYY ZZZZ 1111 2222 3333 4444 5555 6666 7777 8888 9999 aaaa ????

 XXXX  = TRAP CLASS BITS
'80XX' = POWER CHECK
'40XX' = WRITE TO ROS TRAP
'20XX' = CHANNEL TRAP
'10XX' = STORAGE PARITY CHECK
'00XX' = SYSTEM PROGRAMMING ERROR TRAP      SEE MAP 1220

  A    = PAGE IN USE AT THE TIME OF THE TRAP
  B    = HIGH ORDER ADDRESS BITS AT TIME OF TRAP
  00   = ALWAYS 00
  CCCC = DMA CHANNEL 0 ADDRESS (DISKETTE)
  DD   = INTERRUPT CONTROLLER INTERRUPT MASK
  EE   = PROCESSOR INTERRUPT MASK
  FF   = R/W STORAGE WRITE PAGE REGISTER
  GG   = R/W STORAGE READ PAGE REGISTER
  HH   = ROS PAGE REGISTER
  II   = DMA PAGE REGISTER
  JJJJ = STACK POINTER VALUE LESS EIGHT AT TIME OF TRAP
  KKKK = H/L REGISTER CONTENTS
  LLLL = D/E REGISTER CONTENTS
  MMMM = B/C REGISTER CONTENTS
  NN   = A REGISTER
  PP   = FLAGS
  QQQQ = PROGRAM COUNTER AT TIME OF TRAP
  RRRR THROUGH ???? = STACK CONTENTS (MAY NOT HAVE ANY MEANING)
```

24.0 PID 1212 (UPDATE STORAGE TEST)

24.1 PURPOSE

This program tests the 16K of memory used for IMF's.

24.2 OPERATING PROCEDURES

24.2.1 LOADING

PID 1212 is loaded by DCP by entering a -10- (FEATURE/RPQ PID). See "MENU DISPLAY" on page 22 for PRIMARY MENU.

After a -10- is entered, the menu will display ENTER DRIVE NUMBER and PID NAME (X - YYYY).

ENTER 1 1212 TO LOAD THE PROGRAM.

24.2.2 MENU DISPLAY

The following MENU will be displayed:

```
I-200 UPDATE STORAGE TEST OPTIONS
       -0-  RUN ROUTINE 1 TIME
       -1-  LOOP STORAGE TEST
       -9-  RETURN TO DCP
A-221  SELECT OPTION
```

24.2.3 MENU OPTION SELECTION:

OPTION 0 Selecting this option either by entering a 0 or just pressing the ENTER key will run the storage test once.

OPTION 1 Will loop the test until either ATTN E or ATTN 9 is pressed.

OPTION 9 Will return to DCP MENU.

24.2.4 PROGRAM RUN INSTRUCTIONS

24.2.4.1 OPERATION

A message will appear on the screen as follows:

```
I-209  IF SCREEN GOES BLANK
       REPLACE THE STORAGE UPDATE CARD
       REPLACE THE CPU PLANAR BOARD
  PRESS ENTER TO START TEST
```

24.2.4.2 OPERATION

As the program is executed, a storage test start message and routine started and routine complete messages will display as follows:

```
I-200  START STORAGE TEST
I-202  ROUTINE 0  STARTED
I-203  ROUTINE 0  COMPLETED
I-202  ROUTINE 1  STARTED
I-203  ROUTINE 1  COMPLETED
I-202  ROUTINE 2  STARTED - THIS ROUTINE RUNS FOR ABOUT 4 MINUTES
I-203  ROUTINE 2  COMPLETED
I-202  ROUTINE 3  STARTED
I-203  ROUTINE 3  COMPLETED
I-204  STORAGE TEST COMPLETE.
```

24.2.4.3 END COMMAND

1. Enter ATTN - 9 to terminate program and display PRIMARY MENU.

   Enter '9' then press ENTER key to return to DCP.

2. Enter ATTN - E to end loop program or exit Routine 2 and return to PRIMARY MENU.

24.3 ERROR, ACTION AND INFORMATION MESSAGES

24.3.1 INFORMATION

I-200 UPDATE MEMORY TEST OPTIONS

I-201 START STORAGE TEST

I-202 ROUTINE X STARTED

I-203 ROUTINE X COMPLETE

Note: Routine 2 will give the message that this routine runs for about 4 minutes.

I-204 STORAGE TEST COMPLETE

I-207 ERROR OCCURRED

I-208 STORAGE TEST TERMINATED

I-209 IF SCREEN GOES BLANK
REPLACE THE STORAGE UPDATE CARD
REPLACE THE CPU PLANAR BOARD

24.3.2 OPERATOR ACTION

A-221 SELECT OPTION

A-223 PRESS ENTER TO RETURN TO MENU

A-226 REPLACE UPDATE STORAGE CARD
REPLACE CPU PLANAR BOARD

A-228 PRESS ENTER TO RETURN TO DCP MENU

24.3.3 ERROR MESSAGES

E-251 INVALID ENTRY, RETRY

E-252 STORAGE DATA ERROR OCCURRED

E-253 STORAGE PARITY ERROR

E-254 STORAGE DISABLE ERROR

E-255 UPDATE STORAGE CARD NOT INSTALLED

E-256 I/O CHECK ERROR

24.4 DETAILED DESCRIPTION OF ROUTINES

24.4.1 ROUTINE 0

Initializes the update storage logic and checks that it is correctly operating. It then checks to see if the I/O check (PARITY CHECK) is working. Note this test should be run after the system has been powered off and powered on.

24.4.2 ROUTINE 1

Writes a pattern of 00 FF throughout the 16K of storage. It waits 20 MILLISECONDS for several refresh cycles and reads the pattern written and writes back a reverse pattern. This routine runs alternate patterns 10 times. It also checks that the correct page register is selected.

24.4.3 ROUTINE 2

This routine takes about 4 minutes to run. It writes each pattern as determined by the address and reads it back. This pattern writes every bit and runs 256 times through the 16K.

24.4.4 ROUTINE 3

Writes several instructions throughout the 16K of storage. It then executes these instructions and checks to see if it executed 16K of instructions. This routine runs 10 times.

Note: If a TRAP or LOOP occurs or if the screen becomes blank, replace the STORAGE CARD or the CPU PLANAR BOARD. Go to MAP 1212 Entry A.

25.0 PID 1300 (KEYBOARD FLT)

25.1 PURPOSE

SECTION	ROUTINE DESCRIPTIONS
0	TEST SEPARATE KEYS
1	TEST FULL KEYBOARD

25.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

25.2.1 LOADING

Enter test number 1 from the DCP MAIN MENU.

25.2.2 MENU DISPLAY

Enter desired option on numeric keypad.

KEY	
0	TEST SINGLE KEY
1	TEST FULL KEYBOARD
9	RETURN TO DCP

25.2.3 SUBROUTINE MENUS

25.2.3.1 ROUTINE 0

1. Press any key as many times as you want.
2. Press the TEST key one time to reset count.
3. Press the TEST key twice to return to MENU.

25.2.3.2 ROUTINE 1

An image of the keyboard is displayed along with instructions on how to execute the test.

DIRECTIONS DISPLAYED ON THE SCREEN MUST BE FOLLOWED EXACTLY!

25.2.4 PROGRAM RUN INSTRUCTIONS

25.2.4.1 END COMMAND

A '9' key entry on the numeric keypad returns control to DCP.

25.2.4.2 EXIT ROUTINE PROCEDURE

1. ROUTINE 0 - may be ended by pressing the TEST key twice.
2. ROUTINE 1 - may be ended by forcing 2 ERRORS (hitting the wrong key on purpose) and then pressing the TEST key.

25.2.4.3 LOOP ROUTINE COMMAND - Not affected

25.2.5 CONTROL PROGRAM ERROR MESSAGES

1. ROUTINE 0 - There are no error messages.
2. ROUTINE 1 - One retry is permitted after each of these error messages.

ERROR CODES	MESSAGE	ACTION REQUIRED
E-110	WRONG SCAN CODE	ENTER KEY AGAIN
E-120	NO SCAN CODE RECEIVED	ENTER KEY AGAIN
E-130	MORE THAN ONE SCAN CODE RECEIVED ON MAKE-ONLY KEYS	ENTER KEY AGAIN
E-140	CORRECT SCAN CODE RECEIVED BUT TYPAMATIC FUNCTION FAILED	DO OPERATION AGAIN

25.3 ERROR, ACTION AND INFORMATION MESSAGES

1. ROUTINE 0 (TEST SINGLE KEY) - There are no error messages in this routine.
2. ROUTINE 1 - If after one retry, failure still occurs, the following message(s) will be displayed:

ERROR CODES	MESSAGE	ACTION
E-150	AN INVALID SCAN CODE WAS RECEIVED FROM KEYBOARD	REPLACE KBD
E-160	A WRONG SCAN CODE WAS RECEIVED ON THE SECOND ATTEMPT	REPLACE KEYBOARD
E-170	NO INPUT RECEIVED ON SECOND ATTEMPT	REPLACE KBD
E-180	TWO OR MORE SCAN CODES RECEIVED FROM A KEY THAT SHOULD HAVE ONLY SENT A SINGLE INTERRUPT	REPLACE KEYBOARD
E-190	TYPAMATIC FUNCTION FAILED ON SECOND ATTEMPT	REPLACE KBD

25.4 DETAILED DESCRIPTION OF ROUTINES

25.4.1 ROUTINE 0

This routine receives interrupts from any key (with the exception of the test key) and displays the scan code received on the CRT. See SM 1310 for scan codes.

A running count of the total number of interrupts serviced is also displayed (in HEX) to verify correct operation of the typamatic keys.

25.4.2 ROUTINE 1

This is a test of the complete keyboard to verify correct operation of each key. The program requests that a key be pressed by blinking the desired key on an image of the keyboard that is displayed on the CRT screen. The program indicates the correct action by a message on the ACTION line of the CRT (PRESS and HOLD, PRESS and RELEASE). The response for each key is inspected and the results are displayed on a STATUS LINE showing KEY TYPE (MAKE ONLY, MAKE BREAK or typamatic SHOULD BE scan codes and RECEIVED scan codes.

Error messages (See "CONTROL PROGRAM ERROR MESSAGES" on page 105 and "ERROR, ACTION AND INFORMATION MESSAGES") are displayed if necessary.

26.0 PID 1400 (SCREEN IMAGE TEST PATTERNS)

26.1 PURPOSE

This program displays patterns and character sets to test CRT alignment and verify the correct display of all character sets and visual attributes. See SM 1450 for examples of the display patterns. If the pattern is not as expected, go to MAP 1400.

OPTION	ROUTINE DESCRIPTIONS
0	DISPLAY CRT ALIGNMENT PATTERN 80 X 24
1	DISPLAY CHARACTER SET 1 (UNITED STATES/ENGLISH)
2	DISPLAY CHARACTER SET 2 (CANADIAN FRENCH)
3	DISPLAY GBGI CHARACTER SET 3 (AUSTRIA,GERMANY,BELGIUM,DENMARK, FINLAND,FRANCE,ITALY,NETHERLANDS,NORWAY,SWEDEN, SWITZERLAND,U.K.,AUSTRALIA,INTERNATIONAL)
4	DISPLAY CHARACTER SET 4 (NORDIC)
5	DISPLAY CHARACTER SET 5 (SPANISH)
6	DISPLAY CHARACTER SET 6 (RESERVED)
7	DISPLAY CHARACTER SET 7 (JAPAN-KATAKANA)
8	DISPLAY ATTRIBUTE TEST

26.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

26.2.1 LOADING

With the MAIN DCP MENU displayed, enter a '7' followed by ENTER. Follow directions given on screen.

26.2.2 MENU DISPLAY

ENTER OPTION NUMBER

0. ALIGNMENT PATTERN 80 X 24
1. DISPLAY CHARACTER SET 1 (UNITED STATES/ENGLISH)
2. DISPLAY CHARACTER SET 2 (CANADIAN FRENCH)
3. DISPLAY GBGI CHARACTER SET 3 (AUSTRIA,GERMANY,BELGIUM,DENMARK, FINLAND,FRANCE,ITALY,NETHERLANDS,NORWAY,SWEDEN,SWITZERLAND,U.K., AUSTRALIA, INTERNATIONAL)
4. DISPLAY CHARACTER SET 4 (NORDIC)
5. DISPLAY CHARACTER SET 5 (SPANISH)
6. DISPLAY CHARACTER SET 6 (RESERVED)
7. DISPLAY CHARACTER SET 7 (JAPAN-KATAKANA)
8. ATTRIBUTE TEST
9. TERMINATE PROGRAM

26.2.3 MENU OPTION SELECTION

See the program menu, enter the option number desired, then press ENTER to select the option.

26.2.4 PROGRAM RUN INSTRUCTIONS

26.2.4.1 END COMMAND

ATTN and '9' returns the program to its main option menu.

'9' and ENTER will terminate the program and return control to DCP.

26.2.4.2 LOOP PROGRAM COMMAND -- NONE

26.2.4.3 LOOP ROUTINE COMMAND -- NONE

26.3 ERROR, ACTION AND INFORMATION MESSAGES

There are no messages in this program except for messages to the C.E. about invalid test selection and directions on how to go from one display to another.

26.4 DETAILED DESCRIPTION OF ROUTINES (CRT PATTERN AND ATTRIBUTE TEST)

26.4.1 ROUTINE 0 ALIGNMENT PATTERN

This routine displays an alignment pattern for the purpose of performing adjustments on the CRT assembly.

26.4.2 ROUTINE 1 THROUGH 7 CHARACTER SET DISPLAYS

These routines select and display each of the character sets available. See SM 1450 for example of the output of each routine.

If the character set is not correct, see MAP 1400, ENTRY POINT A.

26.4.3 ROUTINE 8 ATTRIBUTE TEST

This test shows the ability of the CRT controller to generate visual attributes. Attribute fields shown are UNDERLINE, HIGHLIGHT, REVERSE VIDEO, FLASHING, CHARACTER GRAPHICS, and NO DISPLAY. If faulty operation of any of the attributes is found while this test is running, go to MAP 1400, ENTRY POINT A.

27.0 PID 1450 (WORD PROCESSING SUPPORT TEST)

27.1 PURPOSE

This program tests the 16K of memory and the attributes used for word processing.

27.2 OPERATING PROCEDURES

27.2.1 LOADING

PID 1450 is loaded by DCP by entering a -10- (FEATURE/RPQ PID). Refer to the DCP PRIMARY MENU.

After a -10- is entered, the menu will display:

ENTER DRIVE NUMBER AND PID NUMBER (X - YYYY).

TO LOAD THE PROGRAM, ENTER: 1 1450

27.2.2 MENU DISPLAY

The following menu will be displayed:

```
I-200 WORD PROCESSING SUPPORT TEST OPTIONS
          -0-  RUN ROUTINE 1 TIME
          -1-  LOOP STORAGE TEST
          -2-  ATTRIBUTE
          -9-  RETURN TO DCP
        A-221  SELECT OPTION
```

27.2.3 MENU OPTION SELECTION:

OPTION 0 Selecting this option either by entering a 0 or just pressing the ENTER key will run the storage test once.

OPTION 1 Will loop the test until either ATTN 'E' or ATTN '9' is pressed.

OPTION 2 Selects the attribute routine.

OPTION 9 Will return to DCP MENU.

27.2.4 PROGRAM RUN INSTRUCTIONS

27.2.4.1 OPERATION - OPTION 0 OR 1

A message will appear on the screen as follows:

```
I-209  IF SCREEN DISAPPEARS
       REPLACE THE WORD PROCESSING SUPPORT CARD
       REPLACE THE CPU PLANAR BOARD
  PRESS ENTER TO START TEST
```

1. OPERATION - As the program is executed, a storage test start message and routine started and routine complete messages will display as follows:

```
I-200  START STORAGE TEST
I-202  ROUTINE 0  STARTED
I-203  ROUTINE 0  COMPLETED
I-202  ROUTINE 1  STARTED
I-203  ROUTINE 1  COMPLETED
I-202  ROUTINE 2  STARTED - This routine runs for about 4 minutes
I-203  ROUTINE 2  COMPLETED
I-202  ROUTINE 3  STARTED
I-203  ROUTINE 3  COMPLETED
I-204  STORAGE TEST COMPLETE.
```

27.2.4.2 OPERATION -OPTION 2-

The following message will appear on the screen:

```
                ATTRIBUTE TEST STARTED

          PRESS ENTER TO DISPLAY THE ATTRIBUTES ON THE SCREEN AS FOLLOWS

  ATTRIBUTE TEST STARTED      ATTENTION E EXITS ROUTINE

  BLINKING CHARACTERS  ( LINE IS BLINKING)

                 UNDERLINED CHARACTERS  (LINE IS UNDERLINED)

                                HIGHLIGHTED CHARACTERS   (LINE IS HIGHLIGHTED)

                                        REVERSE VIDEO (LINE IS IN REVERSE VIDEO)

                                        R/V HIGHLIGHTED  (LINE IS REVERSE VIDEO
                                         AND HIGHLIGHTED)

  REVERSE VIDEO AND BLINKING CHARACTERS  (LINE IS IN REVERSE VIDEO AND BLINKING)

                                     HIGHLIGHTED AND UNDERLINED (LINE IS HIGHLIGHTED
                                       AND UNDERLINED)

                          ALL ATTRIBUTES  (LINE HAS ALL ATTRIBUTES ON)

  REVERSEVIDEOBLINKINGHIGHLIGHTEDUNDERLINED  (THIS LINE HAS ALL ATTRIBUTES ON)
```

There should be no spaces between characters and attributes in the above line.

27.2.5 END COMMAND

1. Enter ATTN - E to end loop program or exit Routine 2 and return to PRIMARY MENU.
2. Enter '9', then press ENTER key to return to DCP.

27.3 ERROR, ACTION AND INFORMATION MESSAGES

27.3.1 INFORMATION

I-200 WORD PROCESSING SUPPORT TEST OPTIONS

I-201 START STORAGE TEST

I-202 ROUTINE X STARTED

I-203 ROUTINE X COMPLETE

Note: -ROUTINE 2 will give the message that this routine runs for about 4 minutes.

I-204 STORAGE TEST COMPLETE

I-205 ATTRIBUTE TEST STARTED

I-206 ATTRIBUTE TEST COMPLETE

I-207 ERROR OCCURRED

I-208 SUPPORT TEST TERMINATED

I-209 IF SCREEN DISAPPEARS
REPLACE THE WORD PROCESSING SUPPORT CARD
REPLACE THE CPU PLANAR BOARD

27.3.2 OPERATOR ACTION

A-221 SELECT OPTION

A-223 PRESS ENTER TO RETURN TO MENU

A-226 REPLACE THE WORD PROCESSING SUPPORT CARD
REPAIR OR REPLACE CABLE FROM CARD TO CPU
REPLACE CPU PLANAR BOARD

A-228 PRESS ENTER TO RETURN TO DCP MENU

27.3.3 ERROR MESSAGES

E-251 INVALID ENTRY, RETRY

E-252 STORAGE DATA ERROR OCCURRED

E-253 STORAGE PARITY ERROR

E-254 STORAGE DISABLE ERROR

E-256 I/O CHECK ERROR

E-257 PAGE ERROR

E-258 INTERRUPT ERROR

E-259 TIMEOUT ERROR

E-260 CRT ERROR

E-261 CRT SYNC ERROR

27.4 DETAILED DESCRIPTION OF ROUTINES

27.4.1 ROUTINE 0

Initializes the storage logic and checks that it is correctly operating. It then verifies that the I/O check (PARITY CHECK) is working.

Note: This test should be run after the system has been powered off and powered on.

27.4.2 ROUTINE 1

Writes a pattern of 00 FF throughout the 16K of storage. It waits 20 milliseconds and reads the pattern written and a reverse pattern is then written. This routine runs alternate patterns 10 times. It also checks that the correct page register is selected.

27.4.3 ROUTINE 2

This routine takes about 4 minutes to run. It writes each pattern as determined by the address and reads it back. This pattern writes every bit and runs 256 times through storage.

27.4.4 ROUTINE 3

This routine writes several instructions throughout the 16K of storage. It then executes these instructions and verifies that 16K of instructions are executed correctly. This routine runs 10 times.

27.4.5 OPTION 2

The attribute test displays different patterns of attributes on the screen. It also verifys that the two CRT's are in SYNC.

Note: If a TRAP or LOOP occurs or if the screen blinks or disappears, replace the WORD PROCESSING CARD and CABLE or the CPU PLANAR BOARD. Go to MAP 1450, Entry Point A.

28.0 PID 1500 (ROS RESIDENT DISKETTE DRIVE 1-4 TEST)

28.1 PURPOSE

This ROS RESIDENT PROGRAM will test and verify operation of the diskette attachment card control logic and the read data logic path for DISKETTE DRIVE 1 through DRIVE 4 (as selected). This program, along with MAPS 1500 through 1560, will isolate failures to the failing FRU.

ROUTINE	ROUTINE DESCRIPTIONS
00	INITIALIZE
01	MICRO CONTROLLER ATTACHMENT ROUTINE
02	ATTACHMENT WRAP DATA ROUTINE (NO DMA)
03	ATTACHMENT WRAP DATA ROUTINE (DMA)
04	VFO IN-SYNC ROUTINE
05	SELECT DISKETTE DRIVE ROUTINE
06	INDEX DURATION CHECK ROUTINE
07	SEEK READ ID 'ALL TRACKS EXCEPT TRACK 76'
08	(RESERVED)
09	READ STRESS PATTERN ROUTINE
0A	RANDOM SEEK ROUTINE
0D	LOAD DCP PROGRAM
CE	MAP CHART SUPPORT

28.2 OPERATING PROCEDURES

28.2.1 SELECTING

This program is ROS RESIDENT and is selected as follows:

1. TURN CPU POWER OFF.
2. TURN CPU POWER ON.
3. After the end of the POWER-ON DIAGNOSTIC, PRESS and HOLD the CMD key and press TEST key, then PRESS and HOLD the CMD key and press the ERROR RESET key to select this program. After PID 1500 is selected, the following message is displayed in the lower right corner of the CRT:

   SECURE - Z PID 1500 DR X (X = DRIVE #, Z = 0 (NOT SECURED), 1 (SECURED))

4. INSERT CE DISKETTE BEFORE CONTINUING.

28.2.2 MENU DISPLAY

The PROGRAM MENU is displayed one line at a time at the top of the screen. The first option is used to select the DRIVE NUMBER (1 through 4). Ensure that the CE DISKETTE is inserted before selecting drive. After the drive is selected, when each MENU is displayed, enter 1 = YES to select the option or 0 = NO to bypass the option.

28.2.2.1 MENU ITEMS:

```
 1. SELECT DRIVE (1-4)          (THIS OPTION SELECTS DRIVE)
 2. DISKETTE DIAG? (IF YES, OPTION 3 IS DISPLAYED. IF NO, OPTION 4 IS
                    DISPLAYED.) (THIS OPTION RUNS ROUTINES 01 THRU 0A)
 3. DIAG WITH LOOP?             (THIS OPTION LOOPS ROUTINES 01 THRU 0A)
*4. MAP CHART ROUTINE?          (THIS OPTION SELECTS ROUTINE CE)
 5. LOAD DCP?                   (THIS OPTION SELECTS ROUTINE 0D)
 *See "MAP CHART SUPPORT ROUTINE OPERATION" on page 117
```

Test results are displayed on the SYSTEM CRT. Failure conditions are indicated by a TWO DIGIT HEXADECIMAL ERROR CODE. If the current operation indicates more than one error, all errors will be displayed. For example:

ROUTINE XX ENDING STATUS YY ZZ

XX - CURRENT ROUTINE EXECUTING

YY, ZZ - SEE "ERROR, ACTION AND INFORMATION MESSAGES" on page 118

28.2.3 MENU OPTION SELECTION

The first option is used to select the diskette drive to be used (enter 1, 2, 3 OR 4).

After the drive has been selected, when each menu item is displayed, enter 1 = YES to select the option or 0 = NO to bypass the option. If no option has been selected following the last option display, the MENU DISPLAY will be restarted.

28.2.4 PROGRAM RUN INSTRUCTIONS

28.2.4.1 END COMMAND

Press the '9' key (located on the numeric keypad) to terminate this program and return to the start of the POWER-ON DIAGNOSTIC.

28.2.4.2 LOOP PROGRAM COMMAND

See "MENU DISPLAY"

Select the 'DIAG WITH LOOP?' option to loop this program.

Line one of the CRT will show a pass count. It is the HEX value of the number of passes correctly completed.

28.2.4.3 LOOP ROUTINE COMMAND - NONE

28.2.4.4 MAP CHART SUPPORT ROUTINE OPERATION

When the MAP CHART ROUTINE? option is selected, the following message is displayed:

ROUTINE CE END STATUS

After this message is displayed, the CE may use any of the following options:

ENTER KEY(S)	FUNCTION
0	RECAL.
1 (AND) FIELD +	SEEK IN ONE TRACK
4 (AND) FIELD +	SEEK IN FOUR TRACKS
4 (AND) FIELD -	SEEK OUT FOUR TRACKS
1 (AND) FIELD -	SEEK OUT ONE TRACK
7	HEAD ALIGN (TRK 40,39,40)
9	END, GO TO POWER-ON DIAGNOSTICS

Note: Command will be rejected if an attempt to seek past TRACK 0 or TRACK 76.

28.2.4.5 SHARED EXTERNAL DRIVES (DRIVE 3 AND 4)

PID 1500 ROUTINES with or without loop option may be executed by both processors, to either external drive, by selecting Drive 3 or 4 on both processors.

PID 1505, PART 1, OPTION 2 may be run on one processor with PID 1500 running on the other processor.

MAP CHART ROUTINES will secure the external drives until the routine is ended.

A PROCESSOR will attempt to secure an external drive for approximately 4 MINUTES. If external drives could not secure after this time, an ending status '32' is displayed.

All write tests secure until completed.

BOTH PROCESSORS may load DCP from the same external drive.

28.3 ERROR, ACTION AND INFORMATION MESSAGES

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
00	DMA TERMINAL COUNT 0 DID NOT STOP TRANSFER	09
01	PORT REGISTER FAILURE DISKETTE ATTACHMENT	01
02	CURRENT ENABLED	ALL
03	VFO DID NOT GO IN SYNC	03
04	DIAGNOSTIC WRAP OF INDEX FAILURE	01
05	DATA NOT AS EXPECTED	02,03,04
06	MISSING DATA/DMA REQUEST	02,03,04
07	TERMINAL COUNT 0 NOT INDICATED BY DMA (DISKETTE)	03,09
08	DISKETTE CONTROLLER DID NOT RESPOND	ALL
09	DISKETTE NOT READY	05,0A,CE
0A	COULD NOT SELECT A DISKETTE	05,CE,0D
0B	(RESERVED)	
0C	(RESERVED)	
0D	CRC ERROR	07-0A
0E	MISSING INTERRUPT	07-0A
0F	NO RECORD FOUND	07-0A
10	MISSING 24V TO DISKETTE	07-0A
11	UNEXPECTED BUSY	07-0A
12	SEEK ERROR	07-0A
13	DATA OVERRUN (LOST DATA)	07-0A
15	UNEXPECTED VFO IN SYNC.	04
16	ROTATIONAL SPEED TOO SLOW	06
17	ROTATIONAL SPEED TOO FAST	06
18	INDEX DURATION TOO SMALL	06
19	INDEX DURATION TOO LARGE	06
1A	DID NOT COME BUSY AS EXPECTED	02,03

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
1B	DATA DOES NOT COMPARE	09
1C	MISSING INDEX PULSES	06
1D	READY IS ACTIVE AND SHOULD NOT BE	01
1E	BUSY DID NOT COME ACTIVE	01
1F	DATA DID NOT TRANSFER WITH DMA SHORTER THAN SECTOR SIZE	03
21	UNEXPECTED INT. LEVEL 1	ALL
22	UNEXPECTED INT. LEVEL 2	ALL
23	UNEXPECTED INT. LEVEL 3	ALL
24	UNEXPECTED INT. LEVEL 4	ALL
25	UNEXPECTED INT. LEVEL 5	ALL
26	UNEXPECTED INT. LEVEL 6	ALL
27	UNEXPECTED INT. LEVEL 7	ALL
31	UNEXPECTED 'DRIVE WAS NOT READY' INTERRUPT	ALL
32	COULD NOT SECURE EXTERNAL DRIVE	05-0A,CE,0D
E1	MICRO PROCESSOR SEQUENCE 001	ALL
E2	MICRO PROCESSOR SEQUENCE 002	ALL
E3	MICRO PROCESSOR SEQUENCE 003	ALL
E4	MICRO PROCESSOR SEQUENCE 004	ALL
E5	MICRO PROCESSOR SEQUENCE 005	ALL
E6	MICRO PROCESSOR SEQUENCE 006	ALL
E7	MICRO PROCESSOR SEQUENCE 007	ALL
E8	MICRO PROCESSOR SEQUENCE 008	ALL
E9	MICRO PROCESSOR SEQUENCE 009	ALL
EA	MICRO PROCESSOR SEQUENCE 010	ALL
EB	MICRO PROCESSOR SEQUENCE 011	ALL
F1	FILE CONTROLLER SEQUENCE 001	ALL
F2	FILE CONTROLLER SEQUENCE 002	ALL

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
F3	FILE CONTROLLER SEQUENCE 003	ALL
F4	FILE CONTROLLER SEQUENCE 004	ALL
F5	FILE CONTROLLER SEQUENCE 005	ALL
F6	MISSING ADDRESS MARKS	ALL
F7	BAD CYLINDER	ALL
F8	AFTER SEEK COMMAND AND READ ID, THE ADDRESS DID NOT COMPARE	ALL
F9	ERROR END AFTER ATTACHMENT COMMAND	ALL
FA	INVALID COMMAND TO DISKETTE CONTROLLER	ALL
FB	DCP NOT FOUND ON DISKETTE	0D
FC	COMMAND TIMEOUT INTERRUPT	ALL
FF	GOOD ENDING SEQUENCE	ALL

28.4 DETAILED DESCRIPTION OF ROUTINES

(See "MENU ITEMS:" on page 116 for routine run sequence).

28.4.1 ROUTINE 0

Initialize system in preparation for diskette testing.

28.4.2 ROUTINE 1

Perform tests on diskette attachment card. Test the ports for the controller and issue a restart to the micro controller.

This restart causes the micro controller to run internal diagnostics. An 'AA','55' response from the micro controller indicates a good sequence.

28.4.3 ROUTINE 2

Test diagnostic wrap. Verifies the data path and deserializer. A READ ID command is issued and a line of data is supplied to simulate an ID.

28.4.4 ROUTINE 3

Check diagnostic wrap of read data. Verifies the DATA PATH, DESERIALIZER and DMA TRANSFER OF DATA TO STORAGE. A simulated data pattern is supplied to the diskette controller after a READ SECTOR command is issued. Status at the end is checked as well as the data that is transferred.

28.4.5 ROUTINE 4

Check the time for VFO IN SYNC line to become active. A FORMAT TRACK command is issued to the diskette controller without a drive selected (DIAG. MODE). The index pulse will be supplied by a write to the control register. A R/W RESET ends the operation (DMA is used).

28.4.6 ROUTINE 5

Select and ready DRIVE 1-4 (as selected).

28.4.7 ROUTINE 6

Will check index pulse width and time between index pulses. (PULSE WIDTH 1.5 - 3.0 MS) (INDEX TO INDEX 166 + OR - 4.2 MS). This routine is looped 16 times.

28.4.8 ROUTINE 7

This routine will perform a SEEK ONE TRACK and perform a READ ID. The data path between the diskette and the attachment card is checked. After each command, the status bytes are checked.

28.4.9 ROUTINE 8 (RESERVED)

28.4.10 ROUTINE 9

Will read a prerecorded TRACK 03. The data recorded on this sector is 512 BYTES and is worst case DB6DB6DB6. After each command, status will be checked for correct operation. All sectors for TRACK 3 are read and verified.

28.4.11 ROUTINE 0A

Performs RANDOM SEEKS with the verify option and checks status after every operation.

28.4.12 ROUTINE CE

Special routines to interface with MAP CHARTS for the diskette. The routine will perform on command, a RECAL, a SEEK ONE TRACK IN OR OUT, a SEEK 4 TRACKS IN OR OUT, or position the access for head alignment. (The option for head alignment will: ISSUE A RECAL, SEEK TO TRACK 40, SEEK TO TRACK 39, SEEK TO TRACK 40).

28.4.13 ROUTINE 0D

Load DCP will search header records on the CE DISKETTE for the DCP program. Locates DCP on diskette and loads it.

29.0 PID 1505 (DISKETTE FLT, PART 1)

29.1 PURPOSE

This program is loaded by and runs under control of the DCP. The purpose of the program is to test and verify the operation of the diskette attachment card control logic and the diskette read/write ability. The program test routines may be run on any attached diskette drive.

ROUTINE	ROUTINE DESCRIPTIONS
00	INITIALIZE
01	MICRO CONTROLLER ATTACHMENT ROUTINE
02	ATTACHMENT WRAP DATA ROUTINE (NO DMA)
03	ATTACHMENT WRAP DATA ROUTINE (DMA)
04	VFO IN-SYNC ROUTINE
05	SELECT DISKETTE DRIVE ROUTINE
06	INDEX DURATION CHECK ROUTINE
07	SEEK-READ ID-READ (ALL TRACKS EXCEPT 76)
08	(RESERVED)
09	READ STRESS PATTERN ROUTINE
0A	RANDOM SEEK ROUTINE
0C	WRITE TEST - TRACK 3 AND TRACK 76
0E	WRITE TRACK 76 SELECT PATTERN TEST
CE	MAP CHART SUPPORT

29.2 OPERATING PROCEDURES

29.2.1 LOADING

This program is loaded by the DCP. Refer to the DCP PRIMARY MENU and enter '0' to load this program.

29.2.2 MENU DISPLAY

The following menu will be displayed when program load is complete:

```
 1. FILE CONTROL UNIT TEST                (THIS OPTION RUNS ROUTINE 01 THRU 04)
 2. DISKETTE DRIVE TESTS                  (THIS OPTION RUNS ROUTINE 05 THRU 0A)
*3. MAP CHART ROUTINES                         (THIS OPTION SELECTS ROUTINE CE)
 4. WRITE TRACK 3 AND 76 STRESS PATTERN TEST (THIS OPTION SELECTS ROUTINE 0C)
 5. WRITE TRACK 76 SELECT PATTERN TEST       (THIS OPTION SELECTS ROUTINE 0E)
 9. RETURN TO DCP

 A-005 - SELECT ONE OF THE ABOVE.
```

* REFER TO "MAP CHART SUPPORT ROUTINE" on page 126.

29.2.3 MENU OPTION SELECTION

1. Enter the option, then press ENTER to select the routines desired.
2. Once the option is selected, the following message will be displayed:

```
A-00F  BYPASS ERROR STOPS
I-019  0=NO BYPASS  1=BYPASS  9=RETURN TO DCP

A-007  ENTER LOOP OPTION
I-009  0=NO LOOPING  1=LOOP TEST  2=LOOP ONE ROUTINE
```

Note: To use 'LOOP ONE ROUTINE (2)' see "LOOP ROUTINE COMMAND" on page 125.

3. If OPTION 2 THRU 5 is selected, the following messages will be displayed:

```
I-003 THE SENSE INDICATES THE FOLLOWING
      DISKETTE CONFIGURATION
      0=NO      1=YES
Z - INTERNAL 24 VOLTS PRESENT -(SHOULD BE '1' IF DRIVE 1 IS INSTALLED)
Z - DRIVE 2 ATTACHED
Z - DRIVE 3 ATTACHED
Z - EXTERNAL DRIVES POWERED ON
Z - CONNECTED TO EXTERNAL PORT 1
Z - CONNECTED TO EXTERNAL PORT 2
Z - DRIVE 4 ATTACHED AND POWERED ON

A-003 ENTER DRIVE NUMBER (1-4)

I-00Y DISKETTE SENSE FOR THE SELECTED
      DRIVE INDICATES A TYPE X DISKETTE

NOTE  Y= MESSAGE NUMBER
      X= TYPE OF DISKETTE
      Z= 1  FEATURE PRESENT
      Z= 0  FEATURE NOT PRESENT

A-001 -ENTER- KEY TO CONTINUE
```

29.2.4 PROGRAM RUN INSTRUCTIONS

29.2.4.1 END COMMAND

1. ENTER: ATTN-9 TO TERMINATE THE PROGRAM AND RETURN TO THE MENU.
2. ENTER: ATTN-E TO END A ROUTINE LOOP.

29.2.4.2 LOOP PROGRAM COMMAND - NONE.

29.2.4.3 LOOP ROUTINE COMMAND

SEE "MENU OPTION SELECTION" on page 124.

If LOOP ONE ROUTINE is selected, a menu is displayed of routines for the selected group that may be looped. After selection of the routine to be looped, operation starts with the first routine of that group and sequences to the routine to be looped. Looping will continue until ATTN and E keys are entered.

When the FILE CONTROL UNIT TEST (OPTION 1) is selected, the following message is displayed:

```
A-007 ENTER LOOP OPTION
I-009 0=NO LOOPING  1=LOOP TEST  2=LOOP ONE ROUTINE

2
-1- RTN01 MICRO CONTROLLER ATTACHMENT TEST
-2- RTN02 ATTACHMENT WRAP TEST (NO DMA)
-3- RTN03 ATTACHMENT WRAP TEST (DMA)
-4- RTN04 VFO IN SYNC TEST
A-006 ENTER NUMBER OF ROUTINE TO BE LOOPED
```

When the DISKETTE DRIVE TEST (OPTION 2) is selected, the following message is displayed:

```
A-007 ENTER LOOP OPTION
I-009 0=NO LOOPING  1=LOOP TEST  2=LOOP ONE ROUTINE

2
-5- RTN05 SELECT DISKETTE
-6- RTN06 INDEX DURATION TEST
-7- RTN07 SEEK - READ ID - READ TRACK
-8- RTN08 RESERVED
-9- RTN09 READ STRESS TEST
-A- RTN0A RANDOM SEEK ROUTINE
A-006 ENTER NUMBER OF ROUTINE TO BE LOOPED
```

29.2.4.4 MAP CHART SUPPORT ROUTINE

When the MAP CHART ROUTINES, OPTION 3 is selected, the following message is displayed:

```
          KEY   COMMAND

          - 0 -  RECAL
          - 1 -  SEEK IN ONE TRACK
          - 2 -  SEEK IN FOUR TRACKS
          - 3 -  SEEK OUT FOUR TRACKS
          - 4 -  SEEK OUT ONE TRACK
          - 5 -  POSITION HEAD FOR HEAD ALIGNMENT
          - 9 -  RETURN TO DISK MENU

A-00E       ENTER COMMAND
```

After this message is displayed, the CE may use any option.

29.2.4.5 SHARED EXTERNAL DRIVES (DRIVE 3 AND 4)

PID 1505 ROUTINES with or without loop option may be executed by both processors, to either external drive, in overlap mode, by selecting DRIVE 3 or 4 on both processors.

PID 1505, PART 1, OPTION 2 may be overlapped with PID 1500.

MAP CHART ROUTINES will secure the external drives until the routine is ended.

A processor will attempt to secure an external drive for approximately 4 MINUTES. If external drives could not secure after this time, an ending status '32' is displayed.

All write tests secure the drive until completed.

Both processors may load DCP from the same external drive.

29.3 ERROR, ACTION AND INFORMATION MESSAGES

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
E000	DMA TERMINAL COUNT 0 DID NOT STOP TRANSFER	09
E001	PORT REGISTER FAILURE DISKETTE ATTACHMENT	01
E002	CURRENT ENABLED	ALL
E003	VFO DID NOT GO IN SYNC	03
E004	DIAGNOSTIC WRAP OF INDEX FAILURE	01
E005	DATA NOT AS EXPECTED	02,03
E006	MISSING DATA/DMA REQUEST	02,03
E007	TERMINAL COUNT 0 NOT INDICATED BY DMA (DISKETTE)	03,09
E008	DISKETTE CONTROLLER DID NOT RESPOND	ALL
E009	DISKETTE NOT READY	05,0A,CE
E00A	COULD NOT SELECT A DISKETTE	05,CE,0D
E00B	(RESERVED)	
E00C	(RESERVED)	
E00D	CRC ERROR	07-0A
E00E	MISSING INTERRUPT	07-0A
E00F	NO RECORD FOUND	07-0A
E010	MISSING 24V TO DISKETTE	07-0A
E011	UNEXPECTED BUSY	07-0A
E012	SEEK ERROR	07-0A
E013	DATA OVERRUN (LOST DATA)	07-0A
E014	WRITE FAILURE	0C-0D
E015	UNEXPECTED VFO IN SYNC.	04
E016	ROTATIONAL SPEED TOO SLOW	06
E017	ROTATIONAL SPEED TOO FAST	06
E018	INDEX DURATION TOO SMALL	06
E019	INDEX DURATION TOO LARGE	06

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
E01A	DID NOT COME BUSY AS EXPECTED	02,03
E01B	DATA DOES NOT COMPARE	09
E01C	MISSING INDEX PULSES	06
E01D	READY IS ACTIVE AND SHOULD NOT BE	01
E01E	BUSY DID NOT COME ACTIVE	01
E01F	DATA DID NOT TRANSFER WITH DMA SHORTER THAN SECTOR SIZE	03
E021	UNEXPECTED INT. LEVEL 1	ALL
E022	UNEXPECTED INT. LEVEL 2	ALL
E023	UNEXPECTED INT. LEVEL 3	ALL
E024	UNEXPECTED INT. LEVEL 4	ALL
E025	UNEXPECTED INT. LEVEL 5	ALL
E026	UNEXPECTED INT. LEVEL 6	ALL
E027	UNEXPECTED INT. LEVEL 7	ALL
E029	SCAN EQUAL FAILURE FRU = DISKETTE ATTACHMENT CARD	ALL
E031	UNEXPECTED 'DRIVE WAS NOT READY' INTERRUPT	ALL
E032	COULD NOT SECURE EXTERNAL DRIVE	05-0A,CE,0D
E0E1	MICRO PROCESSOR SEQUENCE 001	ALL
E0E2	MICRO PROCESSOR SEQUENCE 002	ALL
E0E3	MICRO PROCESSOR SEQUENCE 003	ALL
E0E4	MICRO PROCESSOR SEQUENCE 004	ALL
E0E5	MICRO PROCESSOR SEQUENCE 005	ALL
E0E6	MICRO PROCESSOR SEQUENCE 006	ALL
E0E7	MICRO PROCESSOR SEQUENCE 007	ALL
E0E8	MICRO PROCESSOR SEQUENCE 008	ALL
E0E9	MICRO PROCESSOR SEQUENCE 009	ALL
E0EA	MICRO PROCESSOR SEQUENCE 010	ALL
E0EB	MICRO PROCESSOR SEQUENCE 011	ALL

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
E0F1	FILE CONTROLLER SEQUENCE 001	ALL
E0F2	FILE CONTROLLER SEQUENCE 002	ALL
E0F3	FILE CONTROLLER SEQUENCE 003	ALL
E0F4	FILE CONTROLLER SEQUENCE 004	ALL
E0F5	FILE CONTROLLER SEQUENCE 005	ALL
E0F6	MISSING ADDRESS MARKS	ALL
E0F7	BAD CYLINDER	ALL
E0F8	AFTER SEEK COMMAND AND READ ID, THE ADDRESS DID NOT COMPARE	ALL
E0F9	ERROR END AFTER ATTACHMENT COMMAND	ALL
E0FA	INVALID COMMAND TO DISKETTE CONTROLLER	ALL
E0FC	COMMAND TIMEOUT INTERRUPT	ALL
E0FE	ERROR OCCURRED DURING A TRACK READ. FAILING TRACK = XX (NOTE: XX IS A HEX VALUE)	07

29.4 DETAILED DESCRIPTION OF ROUTINES

29.4.1 ROUTINE 0

Initialize system in preparation for diskette testing.

29.4.2 ROUTINE 1

Perform tests on diskette attachment card. Test the ports for the controller and issue a restart to the micro controller.

29.4.3 ROUTINE 2

Test diskette wrap. Verifies the data path and deserializer. A read command is issued and a line of data is supplied to simulate an ID.

29.4.4 ROUTINE 3

Check diagnostic wrap of read data. Verifies the data path, deserializer and DMA transfer of data to storage. A simulated data pattern is supplied to the diskette controller after a read sector command is issued, status at the end is checked as well as the data that is transferred.

29.4.5 ROUTINE 4

Check the time for VFO IN SYNC line to become active. A format track command is issued to the diskette controller without a drive selected (DIAG. MODE). The index pulse will be supplied by a write to the control register. A R/W reset ends the operation (DMA is used).

29.4.6 ROUTINE 5

Select and ready drive (as selected).

29.4.7 ROUTINE 6

Will check index pulse width and time between index pulses. (Pulse WIDTH 1.5 - 3.0 MS) (INDEX TO INDEX 166.7 + OR - 4.2 MS). This routine is looped 16 times.

29.4.8 ROUTINE 7

This routine will perform a seek one track and perform a read ID. If OK, a read track command is issued. The status is checked to verify data is OK. The data is not checked for validity. The data path between the diskette and the attachment card is checked. After each command, the status bytes are checked.

29.4.9 ROUTINE 8 (RESERVED)

29.4.10 ROUTINE 9

Will read a prerecorded TRACK 03. The data recorded on this sector is 512 BYTES and is worst case DB6DB6DB6. After each command, status will be checked for correct operation. All sectors for TRACK 3 are read and verified.

29.4.11 ROUTINE 0A

Performs random seeks with the verify option and checks status after every operation.

29.4.12 ROUTINE CE

Special routines to interface to map charts for diskette. It will perform on command:

1. A RECAL
2. A SEEK ONE TRACK IN OR OUT
3. A SEEK FOUR TRACKS IN OR OUT
4. POSITION THE ACCESS FOR HEAD ALIGNMENT. (The option for HEAD ALIGNMENT will: ISSUE A RECAL, SEEK TO TRACK 40, SEEK TO TRACK 39, SEEK TO TRACK 40).

29.4.13 ROUTINE 0C

Will write the stress pattern on TRACK 3 and TRACK 76. All sectors are written. Status is checked for correct operation.

29.4.14 ROUTINE 0E

Will display a prompt message to enter a data pattern to be written on TRACK 76. After the data is written, a RECAL is issued, a SEEK to 76, and a READ of each sector to ensure data was written correctly.

30.0 PID 1510 (DISKETTE FLT, PART 2)

30.1 PURPOSE

This program is loaded by and runs under control of the DCP. The purpose of the program is to format DISKETTE TRACK 76 in all supported sector sizes and recording modes (FM,MFM). If a DISKETTE 2D is installed, the program will format both sides of the diskette on TRACK 76 in FM and MFM modes. After formatting is complete, a stress test pattern is written and then verified.

Note: NEVER USE A TYPE '2' DISKETTE. A TYPE '2D' MUST BE USED.)

****** CAUTION ******

Data on TRACK 76 will be lost when this program is run.

ROUTINE 0E contains modules to:

1. SELECT DESIRED DISKETTE.
2. DETERMINE IF DISKETTE IS TYPE 1 OR TYPE 2.
3. FORMAT IN 128 BYTE FM, 256 BYTE FM, 512 BYTE FM, 256 BYTE MFM, 512 BYTE MFM AND 1024 BYTE MFM.
4. READ THE FORMATTED TRACK TO ENSURE THE CHARACTER USED TO FILL THE DATA RECORD WAS WRITTEN CORRECTLY.
5. WRITE A STRESS PATTERN TO ALL SECTORS ON THE TRACK THAT WAS FORMATTED.
6. READ AND VERIFY THE STRESS PATTERN.
7. LOOP TEST IF LOOP OPTION SELECTED.

30.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

30.2.1 LOADING

This program is loaded by the DCP. Refer to the DCP PRIMARY MENU and enter OPTION '8' to load this program.

30.2.2 MENU DISPLAY

There is no menu displayed. The following message will be displayed when program load is complete:

```
- PID 1510 - FORMAT TEST -

A-00F  BYPASS ERROR STOPS
I-019  0=NO BYPASS   1=BYPASS   9=RETURN TO DCP
A-007  ENTER LOOP OPTION
I-009  0=NO LOOPING  1=LOOP TEST

I-003 THE SENSE INDICATES THE FOLLOWING
      DISKETTE CONFIGURATION
    0=NO      1=YES
Z - INTERNAL 24 VOLTS PRESENT - (SHOULD BE '1' IF DRIVE 1 IS INSTALLED)
Z - DRIVE 2 ATTACHED
Z - DRIVE 3 ATTACHED                          WHERE Z=1  FEATURE PRESENT OR
Z - EXTERNAL DRIVES POWERED ON                       0  FEATURE NOT PRESENT
Z - CONNECTED TO EXTERNAL PORT 1
Z - CONNECTED TO EXTERNAL PORT 2
Z - DRIVE 4 ATTACHED AND POWERED ON

A-003 ENTER DRIVE NUMBER (1-4)

I-00Y DISKETTE SENSE FOR THE SELECTED    WHERE Y=MESSAGE ID
      DRIVE INDICATES A TYPE X DISKETTE        X=TYPE OF DISKETTE SELECTED

A-001 -ENTER- KEY TO CONTINUE
```

30.2.3 MENU OPTION SELECTION

Enter the drive number (1-4) to be tested to start the program.

30.2.4 PROGRAM RUN INSTRUCTIONS

30.2.4.1 END COMMAND

1. ENTER: ATTN-9 TO TERMINATE THE PROGRAM AND RETURN TO THE DCP.
2. ENTER: ATTN-E TO RETURN TO THE START OF THIS PROGRAM.

30.2.4.2 LOOP PROGRAM COMMAND

Normal program operation will cause the program to go back to the start after all tests are complete.

30.2.4.3 LOOP ROUTINE COMMAND - NONE

30.2.4.4 SHARED EXTERNAL DRIVES (DRIVE 3 AND 4)

It is not recommended that PID 1510 be run in overlap mode. It secures external drives until the end of test.

30.2.5 STATUS MESSAGES

30.2.5.1 START STATUS MESSAGE FOR DISKETTE TYPE 1.

The following program status message will be displayed once the drive number has been entered:

```
I-001 DISKETTE SENSE FOR THE SELECTED
      DRIVE INDICATES A TYPE 1 DISKETTE

A-001 -ENTER- KEY TO CONTINUE

 PID 1510 FORMAT TEST

I-011 PID 1510 FORMAT TRACK TEST
 CAUTION - DATA ON TRACK 76 WILL BE LOST

 - TO RETURN TO DCP   -KEYS- 9 + ENTER
 - TO END LOOP OPTION -KEYS- ATTN + E
A DISKETTE 1 IS INSTALLED IN DRIVE SELECTED.
THE FORMAT TEST WILL FORMAT SIDE 0 IN FM MODE
128, 256 AND 512 BYTE RECORDS WILL BE FORMATTED AND
A STRESS PATTERN WILL BE WRITTEN AND VERIFIED

THE ORIGINAL SIZE OF THE RECORDS WILL BE RESTORED

  ORIGINAL DATA WILL BE LOST
A-009 PRESS ENTER TO CONTINUE.
```

30.2.5.2 START STATUS MESSAGE FOR DISKETTE TYPE 2D.

The following program status message will be displayed once the drive number has been entered:

```
I-002 DISKETTE SENSE FOR THE SELECTED
      DRIVE INDICATES A TYPE 2 DISKETTE

A-001 -ENTER- KEY TO CONTINUE

 PID 1510 FORMAT TEST

I-012 PID 1510 FORMAT TRACK TEST
 CAUTION - DATA ON TRACK 76 WILL BE LOST

 - TO RETURN TO DCP   -KEYS- 9 + ENTER
 - TO END LOOP OPTION -KEYS- ATTN + E
 A DISKETTE 2 IS INSTALLED IN DRIVE SELECTED.
 THE FORMAT TEST WILL FORMAT SIDE 0 AND 1 IN
 FM AND MFM MODE WITH THE FOLLOWING RECORD
 LENGTHS.
 -1- FM MODE - 128, 256 AND 512 BYTE RECORD
 -2- MFM MODE- 256, 512 AND 1024 BYTE RECORD
  ORIGINAL DATA ON TRACK 76 WILL BE LOST

 ORIGINAL RECORD LENGTH WILL  BE RESTORED

 A-00C PRESS ENTER TO CONTINUE.
```

30.2.5.3 RUN STATUS MESSAGES

During program operation the following status messages are scrolled on the display:

```
I-00W FORMAT SIDE 'Y'  XXX BYTE 'ZZ'

I-016 TRACK 76 IS BEING VERIFIED

I-007 WRITE STRESS PATTERN

I-016 TRACK 76 IS BEING VERIFIED
```

```
      WHERE:  W = MESSAGE CHARACTER
              Y = 0 OR 1
             ZZ = FM OR MFM
            XXX = RECORD LENGTH
```

30.2.5.4 END MESSAGE

The following message is displayed at the end of all tests:

```
  I-004 GOOD ENDING SEQUENCE

  PID 0000 -FORMAT TEST-      (0000 = PID NUMBER)
  A-00F BYPASS ERROR STOPS
  I-019 0=NO BYPASS  1=BYPASS  9=RETURN TO DCP

  9
  I-008 END OF DISKETTE TESTING
  A-010 ENTER KEY TO RETURN TO DCP
```

30.3 ERROR, ACTION AND INFORMATION MESSAGES

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
E000	DMA TERMINAL COUNT 0 DID NOT STOP TRANSFER	0E
E001	PORT REGISTER FAILURE DISKETTE ATTACHMENT	0E
E002	CURRENT ENABLED	0E
E005	DATA NOT AS EXPECTED	0E
E006	MISSING DATA/DMA REQUEST	0E
E008	DISKETTE CONTROLLER DID NOT RESPOND	0E
E009	DISKETTE NOT READY	0E
E00A	COULD NOT SELECT A DISKETTE	0E
E00B	ERASE CURRENT FAILURE HEAD 0	0E
E00C	ERASE CURRENT FAILURE HEAD 1	0E
E00D	CRC ERROR	0E
E00E	MISSING INTERRUPT	0E
E00F	NO RECORD FOUND	0E
E010	MISSING 24V TO DISKETTE	0E
E011	UNEXPECTED BUSY	0E
E012	SEEK ERROR	0E
E013	DATA OVERRUN (LOST DATA)	0E
E016	ROTATIONAL SPEED TOO SLOW	0E
E017	ROTATIONAL SPEED TOO FAST	0E
E018	INDEX DURATION TOO SMALL	0E
E019	INDEX DURATION TOO LARGE	0E
E01A	DID NOT COME BUSY AS EXPECTED	0E
E01B	DATA DOES NOT COMPARE	0E
E01C	MISSING INDEX PULSES	0E
E01D	READY IS ACTIVE AND SHOULD NOT BE	0E
E01E	BUSY DID NOT COME ACTIVE	0E

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
E021	UNEXPECTED INT. LEVEL 1	0E
E022	UNEXPECTED INT. LEVEL 2	0E
E023	UNEXPECTED INT. LEVEL 3	0E
E024	UNEXPECTED INT. LEVEL 4	0E
E025	UNEXPECTED INT. LEVEL 5	0E
E026	UNEXPECTED INT. LEVEL 6	0E
E027	UNEXPECTED INT. LEVEL 7	0E
E030	STATUS INDICATES HEAD FAILED TO UNLOAD	0E
E031	UNEXPECTED 'DRIVE WAS NOT READY' INTERRUPT	0E
E032	COULD NOT SECURE EXTERNAL DRIVE	0E
E03B	FORMAT TO SIDE 1 FORMATTED SIDE 0	0E
E0E1	MICRO PROCESSOR SEQUENCE 001	0E
E0E2	MICRO PROCESSOR SEQUENCE 002	0E
E0E3	MICRO PROCESSOR SEQUENCE 003	0E
E0E4	MICRO PROCESSOR SEQUENCE 004	0E
E0E5	MICRO PROCESSOR SEQUENCE 005	0E
E0E6	MICRO PROCESSOR SEQUENCE 006	0E
E0E7	MICRO PROCESSOR SEQUENCE 007	0E
E0E8	MICRO PROCESSOR SEQUENCE 008	0E
E0E9	MICRO PROCESSOR SEQUENCE 009	0E
E0EA	MICRO PROCESSOR SEQUENCE 010	0E
E0EB	MICRO PROCESSOR SEQUENCE 011	0E
E0F1	FILE CONTROLLER SEQUENCE 001	0E
E0F2	FILE CONTROLLER SEQUENCE 002	0E
E0F3	FILE CONTROLLER SEQUENCE 003	0E
E0F4	FILE CONTROLLER SEQUENCE 004	0E
E0F5	FILE CONTROLLER SEQUENCE 005	0E

ERROR IDENTIFICATION TABLE		
STOP ID	MEANING	TEST SECTION REFERENCE
E0F6	MISSING ADDRESS MARKS	0E
E0F7	BAD CYLINDER	0E
E0F8	AFTER SEEK COMMAND AND READ ID, THE ADDRESS DID NOT COMPARE	0E
E0F9	ERROR END AFTER ATTACHMENT COMMAND	0E
E0FA	INVALID COMMAND TO DISKETTE CONTROLLER	0E
E0FC	COMMAND TIMEOUT INTERRUPT	0E
E0FD	MISSING CURRENT ENABLED	0E
E0FF	GOOD ENDING SEQUENCE	0E

30.4 DETAILED DESCRIPTION OF TESTS

This program issues a reset to the diskette attachment to ensure a known attachment condition. PID 1510 then issues a select diskette drive after ensuring the selected drive is ready. A SEEK TO TRACK 75 is issued followed by a READ ID COMMAND in FM MODE. If the read was not OK, an attempt to read in MFM MODE is made. This section determines RECORD LENGTH and RECORDING MODE TYPE to restore TRACK 76 after format test is complete. A sense to the selected diskette is issued to determine if a DISKETTE 1 or 2 is installed in the diskette drive. If a DISKETTE 1 and MFM RECORDING is detected, an error message is reported and the test is terminated. A SEEK TO TRACK 76 is issued and the format test is started.

A TYPE 1 DISKETTE will be:

FORMATTED SIDE 0 FM 128 BYTES
FORMATTED SIDE 0 FM 256 BYTES
FORMATTED SIDE 0 FM 512 BYTES

A TYPE 2D DISKETTE will be:

FORMATTED SIDE 0 AND 1 FM 128 BYTES
FORMATTED SIDE 0 AND 1 FM 256 BYTES
FORMATTED SIDE 0 AND 1 FM 512 BYTES
FORMATTED SIDE 0 AND 1 MFM 256 BYTES
FORMATTED SIDE 0 AND 1 MFM 512 BYTES
FORMATTED SIDE 0 AND 1 MFM 1024 BYTES

All of the above will verify that the fill character was written correctly. A stress pattern write and read is also performed.

31.0 PID 2300 (5241/5242 PRINTER FLT)

31.1 PURPOSE

This program will test and verify the operation of the CPU printer attachment control logic and the 5241 and 5242-1/2 printers. Error sense and fault location are supplied by this program when used with the printer MAPS. This program is loaded by and runs under control of the diagnostic program (DCP).

ROUTINE	ROUTINE DESCRIPTIONS
0	INITIALIZE
1	CPU PRINTER USART TEST
2	PRINTER STATUS COMMANDS
3	MISCELLANEOUS PRINTER COMMANDS TEST
4	PRINT H'S/H AND T OVERPRINT/EXTRA DOTS TEST
5	PRINT RIPPLE PATTERN TEST
6	SELECTIVE - CE ENTER DATA TEST
7	SELECTIVE - SIGNAL CABLE WRAP TEST
8	SELECTIVE - SET PAGE PARAMETERS TEST
A	SELECTIVE - PERFORMANCE (THROUGHPUT) TEST
B	SELECTIVE - TEXT MODE TEST (5242-2)
C	SELECTIVE - FORMS EMITTER BALANCE TEST (5242-1/2)

31.2 OPERATING PROCEDURES (DCP CONTROLLED SECTIONS)

31.2.1 LOADING

This program is loaded by the DCP. Refer to the DCP PRIMARY MENU and enter 2 to load this program. When program is loaded, the following message is displayed:

A-222 ENTER PRINTER PORT (1-2) DEFAULT=1

Enter the desired PRINTER PORT NUMBER 1 or 2, then press the ENTER key to start. If no port number is entered, this program will default to PORT 1. To select a different printer port after this program has executed, return to DCP (ATTN-9), then select this program again and repeat steps 31.2.1 to 31.2.4.

31.2.2 MENU DISPLAY

The following menu will be displayed:

```
   - 1 -  USART TEST
   - 2 -  STATUS COMMANDS TEST
   - 3 -  MISC COMMANDS TEST
   - 4 -  PRT H/H+T/EXTRA DOTS TEST
   - 5 -  PRT RIPPLE PATTERN
  X- 6 -  CE ENTER DATA TEST
  X- 7 -  SIGNAL CABLE WRAP TEST
  X- 8 -  SET PAGE PARAMETERS TEST
  X- A -  THROUGHPUT TEST
  X- B -  TEXT MODE TEST
  X- C -  FORMS EMITTER BALANCE TEST
   - 9 -  RETURN TO DCP
  X = WILL RUN ONLY IF SELECTED
  ENTER CHARACTER FOR DESIRED ROUTINE
      PRESS ONLY 'ENTER' KEY TO RUN AUTOMATIC ROUTINES (1-5)
```

31.2.3 MENU OPTION SELECTION

1. Enter the selected routine number, then press ENTER key to select desired routine.

2. To run ROUTINES 1 through 5 in automatic mode, only press the ENTER key at selection time.

3. When ROUTINE 3 (MISCELLANEOUS COMMANDS TEST) is executed, the operator will be instructed to enter 1 to test RESTART command. If restart is not to be tested, press only the ENTER key to bypass this optional test. REASON: The operator must cause an end of forms condition by tearing away printer forms and loading the forms at test end so that the restart command can be correctly tested. The restart command test is bypassed if loop program is specified - refer to "LOOP PROGRAM COMMAND" on page 141.

31.2.4 PROGRAM RUN INSTRUCTIONS

31.2.4.1 OPERATION

As the program is executed, each test displays start and end messages. During each test, error messages are displayed as failures are determined. The program will not continue until the operator has pressed the ENTER key to recognize the error condition. The program ends the current test when an error/failure condition is detected. To aid identification of problems, the failing program routine and step number precede error/failure messages in the following format:

ROUTINE XX STEP YY where XX and YY are hexadecimal values.

31.2.4.2 END COMMAND

1. ENTER: ATTN-9 to terminate the program and display the PRIMARY MENU. Enter 9, then press ENTER key to return to DCP.
2. ENTER: ATTN-E to end LOOP PROGRAM (ROUTINES 1-5) and return to PRIMARY MENU. See "LOOP PROGRAM COMMAND" for instructions for looping this program.

31.2.4.3 LOOP PROGRAM COMMAND

If only the ENTER key is pressed at selection time (for automatic mode), the following option is displayed:

```
A-221 LOOP PROGRAM? (ENTER 1=YES)
      PRESS 'ENTER' KEY TO START TEST
```

Enter 1 (YES) then press ENTER key to loop program, executing automatic routines until ended by entering ATTN-E, ATTN-9 or an error occurs. To cancel automatic mode after error occurs, press ATTN-9 (terminates the program and displays the PRIMARY MENU).

To bypass the LOOP PROGRAM OPTIONS, press only the ENTER key (NO), sequential ROUTINES 1-5 will each run once.

31.3 ERROR, ACTION AND INFORMATION MESSAGES

31.3.1 INFORMATION

I-201 USART TEST STARTED

I-202 PRT STATUS CMDS TEST STARTED

I-203 PRT CMDS TEST STARTED

I-204 H/H+T/EXTRA DOTS TEST STARTED

I-205 RIPPLE PRT TEST STARTED

I-206 CE DATA TEST STARTED

I-207 SIG CABLE WRAP TEST STARTED

I-208 SET PAGE PARAMETERS TEST STARTED

I-209 PRT THROUGHPUT RESULTS A=WWWW N=XXXX F=YYYY S=ZZZZ *D

(WWWW IS ACTUAL COUNT)
(XXXX IS NORMAL COUNT LIMIT)
(YYYY IS FAST COUNT LIMIT)
(ZZZZ IS SLOW COUNT LIMIT)
(* IS ERROR INDICATOR, IF SET, INDICATES WRONG PRINTING SPEED)
(D IS DIRECTION F=FAST, S=SLOW)

I-20A PRT THROUGHPUT TEST STARTED

I-20B TEXT MODE TEST STARTED

I-20C FORMS EMITTER TEST STARTED
(1 = UP, 0 = DOWN)
TO END TEST, PRESS ATTN-E KEYS

I-210 PRT TEST ENDED
PRESS 'ENTER' KEY TO DISPLAY DCP MENU

I-211 USART TEST ENDED

I-212 PRT STATUS CMDS TEST ENDED

I-213 PRT MISC CMDS TEST ENDED

I-214 H/H+T/EXTRA DOTS TEST ENDED

I-215 RIPPLE PRT TEST ENDED

I-216 CE DATA TEST ENDED

I-217 SIG CABLE WRAP TEST ENDED

I-218 SET PAGE PARAMETERS TEST ENDED

I-21A PRT THROUGHPUT TEST ENDED

I-21B TEXT MODE TEST ENDED

I-21C FORMS EMITTER TEST ENDED

I-22D RESTART CMD TEST BYPASSED

31.3.2 OPERATOR ACTION

A-200 PRINTER TEST ROUTINES
-1- USART TEST
-2- STATUS COMMANDS TEST
-3- MISC COMMANDS TEST
-4- PRT H/H+T/EXTRA DOTS TEST
-5- PRT RIPPLE PATTERN TEST
X-6- CE ENTER DATA TEST
X-7- SIGNAL CABLE WRAP TEST
X-8- SET PAGE PARAMETERS TEST
X-A- THROUGHPUT TEST
X-B- TEXT MODE TEST
X-C- FORMS EMITTER BALANCE TEST
-9- RETURN TO DCP
X=WILL RUN ONLY IF SELECTED
ENTER CHARACTER FOR DESIRED ROUTINE
PRESS ONLY 'ENTER' KEY TO RUN AUTOMATIC ROUTINES (1-5)

A-220 INVALID ENTRY, RETRY

A-221 LOOP PROGRAM? (ENTER 1=YES)
PRESS 'ENTER' KEY TO START TEST

A-222 ENTER PRT PORT (1-2) DEFAULT=1

A-223 ENTER LINES TO PRINT OPTION: DEFAULT=0
0 - ALL 91 LINES
1 - 10 LINES
2 - 22 LINES
3 - 45 LINES
9 - END TEST
PRESS 'ENTER' KEY

A-224 ENTER CHAR-PER-INCH:
10, 15 DEFAULT=10

A-225 ENTER LINES-PER-INCH:
6, 8, 9 (FOR 9.6) DEFAULT=6

A-226 ENTER LINES-PER-PAGE:
51/68/81, 66/88/105 DEFAULT=66/88/105

A-227 ENTER DATA MODE: DEFAULT=0
0 - CHARACTER
1 - CONTROL

A-228 ENTER CHARACTER DATA (AS:ABCD...XYZ)

A-229 ENTER CONTROL DATA (AS: HH HH HH...HH)
WHERE HH=HEX 0-F

A-22A ENTER RUN OPTION: DEFAULT=0
0 - REPEAT, USE SAME DATA
1 - ENTER NEW DATA (SAME MODE)
2 - CHANGE MODE (AND DATA)
9 - END TEST
PRESS 'ENTER' KEY

A-22B IS DATA CORRECT? (ENTER 1=YES)
PRESS 'ENTER' KEY

A-22C RESET FONT TO DRAFT MODE? (ENTER 1=YES)

A-230 TEST RESTART COMMAND? (ENTER 1=YES)

A-231 TEAR AWAY PRT FORMS FROM THE BACK

A-232 PRT END OF FORMS OCCURRED
LOAD PRT FORMS TO RESET

A-234 ERROR OCCURRED PRESS 'ENTER' KEY TO END TEST (RETURN TO MAP)

A-235 POWER OFF PRT
PUT SIGNAL CABLE IN WRAP POSITION
POWER ON PRT IF YOU WANT TO WRAP PRT

A-236 POWER OFF PRT IF ON
RETURN WRAP CABLE TO NORMAL POSITION
POWER ON PRT

31.3.3 SYSTEM ERRORS

E-241 HOLD INT DID NOT OCCUR

E-242 TXRDY INT RESPONSE TIMEOUT

E-243 ERROR BYTE INT RESPONSE TIMEOUT

E-244 STATUS BYTE INT RESPONSE TIMEOUT

E-245 DATA INT RESPONSE TIMEOUT

E-246 RESUME INT RESPONSE TIMEOUT

E-247 DATA REQUEST INT RESPONSE TIMEOUT

E-248 EXCEPTION INT RESPONSE TIMEOUT, CHECK PRT POWER IS ON

E-249 STATUS REQUEST INT RESPONSE TIMEOUT, CHECK PRT POWER IS ON

E-24A PRT ATTACHMENT FAILED

E-250 EXCEPTION OCCURRED, ERROR BYTE=XX

(XX is returned data, refer to "DIAGNOSE RESPONSE" on page 152)

E-251 DIAGNOSE ERROR OCCURRED
DIA RESPONSE=XX

(XX is returned data, refer to "DIAGNOSE RESPONSE" on page 152)

E-252 NO PRT BUSY

E-253 BAUD RATE ERROR, SENSE=XX

(XX is returned data, refer to "SENSE RESPONSE" on page 152)

E-254 DATA REQUEST EXCEPTION ERROR
DAT RESPONSE=XX XX XX XX XX

(XX is returned data, refer to "DAT RESPONSE" on page 151)

E-255 UNEXPECTED PRT STATUS
STA RESPONSE=XX

(XX is returned data, refer to "STATUS RESPONSE" on page 152)

E-256 2ND PRT PORT CARD NOT INSTALLED

E-257 PRT POWER TURNED OFF

E-258 LEFT MARGIN NOT SENSED

E-259 NO VALID DATA ENTERED

E-25A TEXT MODE NOT ACTIVE

E-25B TEXT MODE NOT RESET OFF

E-25C PRT ID NOT 03

E-25D PRT ID NOT 02 OR 03

31.3.4 USART ERRORS

E-261 EXTERNAL RESET FAILED

E-262 RECEIVER NOT READY

E-263 INTERNAL RESET FAILED

E-264 USART ERROR RESET FAILED

E-265 USART ERROR OCCURRED, STATUS=XX

(XX is returned data, refer to "CPU USART STATUS" on page 153)

E-266 UNEXPECTED USART STATUS=XX

(XX is returned data, refer to "CPU USART STATUS" on page 153)

E-267 USART DATA ERROR, S/B=XX WAS=YY

(XX is expected, YY is actual)

E-269 USART ERROR DETECT FAILED

E-26A USART NOT READY AFTER RESET, STATUS=XX

(XX is returned data, refer to "CPU USART STATUS" on page 153)

E-26B CONTINUOUS USART RECEIVE INTERRUPTS
CANNOT CONTINUE TEST,
POWER OFF PRT,
REFER TO MAP 2001 OR 3001

31.3.5 END AND WARNINGS

I-290 PRT TEST TERMINATED
PRESS 'ENTER' KEY TO RETURN TO DCP

I-292 NO PRT ATTACHED

I-294 PRT ID=XX REJECTED BY PID 2300
TEST TERMINATED
REFER TO MAP 1900 ENTRY A TO MATCH ID WITH PID

(XX IS ID OTHER THAN 01, 02 OR 03)

31.4 DETAILED DESCRIPTION OF ROUTINES

31.4.1 ROUTINE 0

Initialize the printer control logic and the system in preparation for device testing.

31.4.2 ROUTINE 1

Perform basic tests of the UNIVERSAL SYNCHRONOUS/ASYNCHRONOUS RECEIVER/TRANSMITTER (USART). The USART is placed in wrap mode while a test of rotating 1's and 0's are transmitted and received verified. USART error detection and correction is also verified.

31.4.3 ROUTINE 2

Will test and verify correct operation of each of the printer status and data commands. The commands tested are:

1. DIAGNOSE (DIA) and EXCEPTION (EXC) response
2. STATUS REQUEST (STR) and STATUS (STA) response
3. DATA REQUEST (DAR) and DATA (DAT) response

31.4.4 ROUTINE 3

Will execute and verify miscellaneous printer commands that are not separately tested in other routines. Visual inspection is required for this test. Each command is numbered 1-8 and identified as they are executed. The following commands are tested in sequence:

1. CARRIAGE RETURN (CR)
2. LINE FEED (LF)
3. FORMS FEED (FF)
4. REQUIRED PAGE IN (RPI)
5. NEW LINE (NL)
6. REQUIRED NEW LINE (RNL)
7. CLEAR (CLR)
8. RESTART (RST) - OPTIONAL

Note: The RESTART COMMAND TEST is bypassed if loop program is specified. The following message is displayed once as program executes in automatic mode:

I-22d RESTART CMD TEST BYPASSED

After commands 1-7 have executed (and loop program is bypassed), the following prompt is displayed:

A-230 TEST RESTART COMMAND? (ENTER 1=YES)

If only ENTER key is pressed (NO), the restart command test is bypassed.

If 1 (YES) is entered, the operator is instructed to:

A-231 TEAR AWAY PTR FORMS FROM THE BACK

Tear away paper forms where forms enter the printer (or tear a notch in the forms on the left side) to cause END OF FORMS condition sensed later in the test. Do not remove paper making contact with the platen, it is needed for test. Press ENTER key to continue. Test messages are printed LINE NUMBER XX where XX is increasing hexadecimal values. When END OF FORMS is sensed, the following prompt is displayed:

A-232 PRT END OF FORMS OCCURRED
LOAD PRT FORMS TO RESET

Load the paper forms (or move the notch above the print head) and press ENTER key. The restart command is issued and the printer starts printing test messages until the

print buffer is empty. Check results of restart test by observing LINE NUMBER XX messages are in numeric sequence with none missing, after forms have been loaded.

31.4.5 ROUTINE 4

Will print five lines of H's and five lines of H's overprinted with T's to permit visual checking of print quality, printer alignment and registration. Also, two lines each are printed with / (slash) print wires 1-7 and _ (underscore) print wire 8 to test for extra dots present.

31.4.6 ROUTINE 5

Will ripple print maximum 91 lines of 91 characters which includes special, numeric and upper-lower case alpha characters. ASCII values 20-7A in numeric sequence are converted to printer codes (EBCDIC). The following prompt is displayed:

```
A-223     ENTER LINES TO PRINT OPTION:  DEFAULT=0
          0 - ALL 91 LINES
          1 - 10 LINES
          2 - 22 LINES
          3 - 45 LINES
          9 - END TEST
            PRESS 'ENTER' KEY
```

Enter selected option number then press ENTER key. Operator must observe print quality and inspect for missing print wire positions and distorted characters. To exit this routine before all lines have been printed, enter ATTN-9.

31.4.7 ROUTINE 6

Permits operator to enter data from the console keyboard to be sent to the printer being tested. Two modes are supported, the following prompt is displayed:

```
A-227     ENTER DATA MODE:  DEFAULT=0
          0 - CHARACTER
          1 - CONTROL
```

Enter 0 then press ENTER key to select CHARACTER mode. This mode converts keyboard entered data to EBCDIC then outputs the characters to the printer. A new line code is inserted as the last character which causes the printer to start printing. The following prompt is displayed:

```
A-228     ENTER CHARACTER DATA (AS:ABC...XYZ)
```

Enter desired characters (64 MAXIMUM) as alpha and/or numeric characters, then press ENTER key. The same characters entered will be sent to the printer being tested. See below, message A-22A for run options.

Enter 1, then press ENTER key to select CONTROL MODE. This mode converts entered data into hexadecimal bytes; each byte requiring one or two keyboard entered characters. The following prompt is displayed:

```
A-229     ENTER CONTROL DATA (AS:HH HH HH...HH)
          WHERE HH=HEX 0-F
```

Refer to EBCDIC character set in SM 3652 or SM 2652. Enter desired keyboard characters only as values 0-F in groups of two separated by a space (OPTIONAL) for a maximum of 64

characters - including spaces. Then press the ENTER key. The input data is editted to convert ASCII code to EBCDIC and remove spaces. After editting, the following prompt is then displayed to permit the operator to verify data is correct:

HH HH HH...HH (WHERE H's ARE EDITTED CHARACTERS)

A-22B IS DATA CORRECT? (ENTER 1=YES)
PRESS 'ENTER' KEY

Enter 1 (YES) then press ENTER key if data (HH) is correct. The data displayed (but not spaces) is sent to the printer.

If data is not correct, press only the ENTER key (NO) and the program returns to permit a new entry.

This routine will display any returned data received from the printer and will wait for a response (press ENTER key) from the operator before continuing. See message A-22A below for run options.

For example, enter: 12 11 D 25 then press ENTER key.

The above characters will direct the printer to execute:

1. DATA REQUEST COMMAND 12, RETURNED DATA IS DISPLAYED.

2. DIAGNOSE COMMAND 11, RETURNED DATA IS DISPLAYED.

3. CARRIAGE RETURN COMMAND 0D (PROGRAM INSERTED HIGH ORDER 0 IN LEFT NIBBLE).

4. LINE FEED COMMAND 25.

Note: The printer runs at lower speed while executing this section.

After entered data has been sent to the printer, the following option message is displayed:

A-22A ENTER RUN OPTION: DEFAULT=0
0 - REPEAT, USE SAME DATA
1 - ENTER NEW DATA (SAME MODE)
2 - CHANGE MODE (AND DATA)
9 - END TEST
PRESS 'ENTER' KEY

Enter selected option number, then press ENTER key.

31.4.8 ROUTINE 7

Performs basic tests of the CPU USART and PRINTER SIGNAL CABLE. The printer cable is placed in wrap mode at the printer end while a test of rotating 1's and 0's are transmitted and received verified. The operator is informed to return the cable to normal at test end.

31.4.9 ROUTINE 8

Permits operator to test the printer page parameters. Start by setting the forms at the top of the page, then set the horizontal density of 10 or 15 characters per inch (CPI), vertical print density of 6, 8 or 9.6 lines per inch (LPI), number of lines per page (LPP) for 8.5 and 11 inch length forms. The operator follows the prompting of the routine by entering the requested parameters. If only the ENTER key is pressed,

default value is used. If 0 key and ENTER key is pressed, the preceding value is used following each prompt.

After the requested parameters have been sent to the printer, a test pattern is printed as blocks of T's for the specified number of CPI (10 or 15) and LPI (6, 8 or 9) followed by a forms feed command for the specified number of LPP. Observe output for correct between line spacing and forms control.

Note: The printer assumes 10 CPI, 6 LPI and 66 LPP at power on or after a diagnose command.

31.4.10 ROUTINE A

This test checks printer performance by measuring the time required to print 61 lines followed by a 5 line skip. Each line includes 130 characters (RIPPLE PRINTED) at 10 characters/inch and 6 lines/inch. After the page is printed, the total time is displayed as follows:

I-209 PRT THROUGHPUT RESULTS A=XXXX N=XXXX F=XXXX S=XXXX I

Where XXXX is hex count of .25 seconds, A is actual, N is normal, F is fast limit, S is slow limit and I is error indicator (*). If * is set, it will be followed by F for fast or S for slow, to indicate wrong printing speed. If * does not appear, then printing speed is acceptable.

31.4.11 ROUTINE B

(PRINTER ID=03 ONLY) will set font to text mode and print five lines of slash characters (/) that are overprinted placing dots between existing dots. This is followed by an underscore test which prints two lines. The first line prints single underscore at alternate character positions. The second line prints a continuous underscore at all character positions. Visual inspection is required for this test. More testing is possible by pressing only ENTER key when operator is prompted by the following:

A-22C RESET FONT TO DRAFT MODE? (ENTER 1=YES)

If only ENTER key is pressed (NO), the printer will remain in text mode. Other printer tests can be selected (e.g. Routines 3, 4 or 5) to observe print quality.

If 1 (YES) is entered, the printer is placed in draft mode and no automatic overprinting will occur.

Note: - POWER ON OR A DIAGNOSE COMMAND RESETS PRINTER TO DRAFT MODE.

31.4.12 ROUTINE C

(PRINTER ID = 02 OR 03 ONLY) moves the platen forward and reverse for the same specified time. Counts the number of emitter pulses and displays the forward and reverse pulses as 1's and 0's, respectively.

When the test has started to execute, the printer platen should rotate forward and reverse. The accuracy of the emitter adjustment is displayed with a series of 1's and 0's. If there are no binds in the carriage and the emitter is in adjustment, approximately 1 and 1/2 lines of 1's will indicate forward (UP) and 1 and 1/2 lines of 0's will indicate reverse (DOWN). If the lines of 1's and 0's are not +/- two characters of being the same length, the forms emitter needs to be adjusted.

Loosen the forms emitter and move it slightly in the direction of the larger number of 1's or 0's. The length of the lines of 1's and 0's is an indication of the relative amount of binding in the platen.

The pattern shown below would require a slight downward adjustment of the emitter to obtain the correct adjustment accuracy. This routine displays the following message:

```
I-20C     FORMS EMITTER TEST STARTED
                        (1 = UP,  0 = DOWN)
          TO END TEST, PRESS ATTN-E KEYS

  11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
  1111111111111111111111111111111111111111111
  00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  000000000000000000000000000000000000000000000000
```

This test can be stopped only by operator intervention. To end test, press ATTN-E keys.

31.5 GENERAL INFORMATION

31.5.1 PRINTER RESPONSE DATA DISPLAY.

31.5.1.1 DAT RESPONSE

DAT is a command issued by the printer in response to a data request (DAR) command. Data displayed BITS 7-0 BINARY VALUE as follows - (see note at end of chapter).

DAT RESPONSE=AA BB CC DD EE

AA = PRINTER ID BYTE (01=5241, 02=5242-1, 03=5242-2)

BB = PRINTER STATUS BYTE

hex
01 BIT 0 = LEFT MARGIN
02 BIT 1 = FORMS PRESENT
40 BIT 6 = ROS LEVEL
80 BIT 7 = TEXT PRINT MODE (PRINTER ID=03)

CC = DATA EXCEPTION BYTE -0

hex
01 BIT 0 = PARITY ERROR
02 BIT 1 = OVERRUN ERROR
04 BIT 2 = FRAME ERROR
08 BIT 3 = POWER SUPPLY ERROR
20 BIT 4 = LEFT MARGIN ERROR
40 BIT 5 = END OF FORMS ERROR
80 BIT 6 = EOF SWITCH ERROR

DD = DATA EXCEPTION BYTE -1 (PRINTER ID=01)

hex
01 BIT 0 = BUFFER OVERRUN
02 BIT 1 = PROCESSOR CHECK

DD = DATA EXCEPTION BYTE -1 (PRINTER ID=02/03)

hex
01 BIT 0 = BUFFER OVERRUN
02 BIT 1 = PROCESSOR CHECK
20 BIT 5 = FAST EMITTER CHECK
40 BIT 6 = SLOW EMITTER CHECK
80 BIT 7 = EMITTER SEQUENCE CHECK

EE = DATA EXCEPTION BYTE -2 (PRINTER ID=02/03)

hex
01 BIT 0 = FORMS EMITTER ERROR
02 BIT 1 = FORMS JAMMED
04 BIT 2 = 8041 ERROR
   BITS 3-7 = CHARACTER ROS ID BITS (PRINTER ID=03)

31.5.1.2 DIAGNOSE RESPONSE

One byte (BITS 7-0 BINARY VALUE) indicating printer exception error is displayed as follows - (see note at end of chapter).

DIAGNOSE RESPONSE=XX

XX = EXCEPTION ERROR CODE

hex
01 BIT 0 = INTERFACE CHECK
02 BIT 1 = PRT CHECK
04 BIT 2 = INVALID COMMAND
08 BIT 3 = END OF FORMS

31.5.1.3 SENSE RESPONSE

One byte (BITS 7-0 BINARY VALUE) indicating printer not attached or BAUD RATE not known is displayed as follows - (see note at end of chapter).

SENSE=XX

XX = SELECTED PRINTER BAUD RATE AT PROCESSOR END, BITS 7, 6 AND 5 OF
PRINTER PORT.

hex
E0 = PRINTER NOT CONNECTED
60 = 1200 BAUD RATE
A0 = 2400 BAUD RATE
ALL OTHER VALUES ARE INVALID

31.5.1.4 STATUS RESPONSE

One byte (BITS 7-0 BINARY VALUE) indicating printer status is displayed as follows - (see note at end of chapter).

STATUS=XX

XX = CURRENT PRINTER STATUS

hex
40 BIT 6 = PRT BUSY

31.5.1.5 CPU USART STATUS

One byte, indicating CPU USART STATUS BITS 7-0 BINARY VALUE is displayed as follows - (see note at end of chapter).

STATUS=XX

XX = CURRENT USART STATUS

hex
01 BIT 0 = TRANSMITTER READY
02 BIT 1 = RECEIVER READY
04 BIT 2 = TRANSMITTER EMPTY
08 BIT 3 = PARITY ERROR
10 BIT 4 = OVERRUN ERROR
20 BIT 5 = FRAME ERROR
40 BIT 6 = BREAK DETECT (PRT POWER TURNED OFF)
80 BIT 7 = DATA SET READY

Note: Bit 0 is right hand bit. All bytes are displayed in hexadecimal.

7	6	5	4	3	2	1	0	Bit
8	4	2	1	8	4	2	1	HEX VALUE

32.0 PID DMON (ROS RESIDENT MONITOR)

32.1 PURPOSE

This ROS RESIDENT PROGRAM supplies functions to aid in the analysis and correction of BASIC microcode program problems.

The following functions are supplied:

1. DISPLAY STORAGE (ROS OR R/W STORAGE).
2. CHANGE STORAGE (R/W STORAGE ONLY).
3. WRITE R/W STORAGE TO DISKETTE OR 5247 DISK.

Note: The COPY/DISPLAY function is not available while this monitor is active.

32.2 OPERATING PROCEDURES

32.2.1 SELECTING

This program is ROS RESIDENT and is selected as follows:

32.2.1.1 'BASIC' PROGRAM IN 'READY' MODE OR IN OPERATION.

To select the monitor:

1. PRESS AND HOLD THE 'HOLD' KEY.
2. PRESS AND HOLD THE 'TEST' KEY.
3. PRESS THE '9' KEY (TYPEWRITER KEYBOARD).

32.2.1.2 TRAP '0' OR TRAP '40' CONDITION.

To select the monitor:

1. PRESS THE '9' KEY (TYPEWRITER KEYBOARD).

   When the monitor is selected, the upper 20 lines of the display are blank and the word MONITOR appears on the first (1) line from the top of the display.

32.2.2 MENU DISPLAY - NONE

32.2.3 MENU OPTION SELECTION - NONE

32.2.4 PROGRAM RUN INSTRUCTIONS

(For JAPAN, see Note 2 below.)

32.2.4.1 DISPLAY STORAGE COMMAND

THE ENTRY FORMAT IS:

D X YYYY

Where X is the ROS or R/W STORAGE page of the memory to be displayed and YYYY is the hexadecimal address of the first location to be displayed (SEE NOTE 1 BELOW).

In response to the display storage command, 256 bytes of storage starting with location YYYY, on ROS/READ-WRITE STORAGE PAGE X are displayed on the CRT in both HEXADECIMAL and EBCDIC format. The display will be removed from the CRT on the next key stroke.

32.2.4.2 CHANGE STORAGE COMMAND

The entry format is:

A X YYYY

Where X is the R/W STORAGE page of the memory to be changed and YYYY is the hexadecimal address of the location to be changed. (SEE NOTE 1 BELOW).

In response to this command, the byte at location YYYY on R/W STORAGE page X is displayed in hexadecimal format. The next two keys pressed will form a byte which will be stored at that location. The command line including the changed byte, will remain displayed until another key is pressed. If YYYY is less than '8000', the command is automatically ended since a write into the ROS area is not permitted.

32.2.4.3 SAVE STORAGE (WRITE R/W STORAGE TO DISKETTE or 5247 DISK)

1. To save storage on a diskette:
   a. The diskette must be previously prepared properly (see Part 2.).
   b. Insert the diskette into drive 1 (or 3 if no internal diskettes).
   c. Enter: F0.
   d. When the system has finished saving information on the diskette, a lozenge will appear on the screen.
      1) Lozenge not blinking - save finished OK. Go to Step e.
      2) Lozenge blinking - save failed. Remove the diskette and save it for reuse. Turn the machine off, then on again, and continue with normal operations.
   e. (1) Press the 'E' key.
      (2) Remove the diskette.
      (3) Turn the machine off, then on again, and continue with normal operations.

f. The LISTSTOR Customer Support Function is used to selectively print the storage information from the diskette just created.

2. To prepare a diskette to save List Storage information:

   a. Insert the Customer Support Functions diskette that contains the PREPARE function into any diskette drive.

   b. Insert the diskette you wish to prepare in any other drive. (Warning: All information on the diskette to be prepared will be destroyed).

   c. Enter: PROC STGDMP on the input line.

   d. Press the ENTER key.

   e. The PREPARE DISKETTE PROCEDURE FILE display will appear on the screen.

   f. Press the ERROR RESET key.

   g. Replace the 'X' on the screen with the number of the diskette drive containing the diskette you want to prepare.

   h. Press the ENTER key.

   i. When READY INPUT appears on the status line, PREPARE is finished.

3. To save storage on 5247 disk:

   a. No special preparation of the disk is required.

   b. Enter F0. If the work station is attached to the 5247 and does not have diskette drives installed, the work station storage dump will go to the 5247 disk.

   c. (or) Enter FD. This command will force the work station storage dump to go to the 5247 disk even if the work station has diskette drives installed.

   d. When the system has finished saving information on the disk, a lozenge will appear on the screen.

      1) Lozenge not blinking - save finished OK. Go to step 'e'.

      2) Lozenge blinking - save failed. Turn the work station off, then on again, and continue with normal operations.

   e. End Instructions

      1) Press the 'E' key.

      2) Turn the work station off, then on again, and continue with normal operations.

   f. The LISTSTOR Customer Support Function is used to selectively retrieve and print the storage information from the 5247 disk.

      Note that the LISTSTOR CSF must be run before another dump work station storage to disk is attempted to free up the disk space.

32.2.4.4 END MONITOR

The entry format is:

E

The CRT will be restored to the contents before the monitor was selected. If the display is not the same as before, reselect the monitor (see "SELECTING" on page 154), then immediately press 'E' to end the monitor and restore the screen to the correct display.

Following use of the monitor, program operation may be resumed if only the 'D' or 'A' functions were used, although any change of storage made with the 'A' command may affect program operation. If storage was written to disk with the 'F' command or if the monitor was selected because of a TRAP, do not attempt to resume program operation.

Note: 1. Entries are made in HEXADECIMAL CODE (0-9, A-F) from the typewriter section of the keyboard only. (A-F are the positions on the United States keyboard).

Use of all other keys will give a HEXADECIMAL 'F' when used for data, and will be ignored when used for command entry.

Note: 2. On systems that have the Japan (KATAKANA) jumper installed, (see SM 1230) a numeric '1' will be displayed as a 'Ya' character.

32.3 ERROR, ACTION AND INFORMATION MESSAGES - NONE

32.4 DETAILED DESCRIPTION OF ROUTINES

See "PROGRAM RUN INSTRUCTIONS" on page 155.

33.0 GLOSSARY

This GLOSSARY includes definitions of terms and abbreviations used in the SM'S and MAP'S that are not part of the IBM LIMITED VOCABULARY.

ABEND: Not normal end.

ABORTED: Any job or action that fails to reach an end result.

ABSENT: Not present.

ACS: Access Control and Safety

ACTUAL: Real.

ADAPTER: A hardware device that connects two channels on the same computing system or on different systems.

ADDR: Abbreviation for address.

AGC: Auto Gain Control.

ALPHA: Abbreviation for alphabetic.

ALPHAMERIC KEYS: That part of a keyboard that is similar to a typewriter keyboard.

ANALOG CARD: Interface between read/write heads and digital card.

ARROW: Pointer.

ATTN: Attention key.

ATTRIBUTE: A distinct feature of the display image including: REVERSE VIDEO, BLINKING REVERSE VIDEO, CHARACTER UNDERLINE and BLINKING CHARACTER UNDERLINE.

BASIC: Beginners all purpose symbolic instruction code.

BAUD: Bits per second on T.P. line.

BCD: Binary Coded Decimal.

BITS PER SECOND: Communications line transmission rate.

BLINKING: To flash intermittently.

BPS: Bits per second.

BSC: BINARY SYNCHRONOUS COMMUNICATIONS.

BSCA: BINARY SYNCHRONOUS COMMUNICATIONS ADAPTER.

BUFFER: A set of latches.

BUILD/REBUILD: To reinstall system code.

CADDY: Kit.

CARTRIDGE: Plastic container for the printer ribbon. Also a plastic container that contains the microcode for the 5242 MODEL 2 printer.

CHANNEL: Logic used to connect an I/O device to the CPU.

CHAR: Abbreviation for character.

CHECKPOINT: Used to indicate failure in Disk Diagnostic.

CHECKSUM: Method of validating storage.

CMD: Keyboard command key. Second key from left on top row. For GERMANY/AUSTRIA/SWISS, the key is marked BE-FEHL. For FRANCE/BELGIUM/FRANCE/BELGIUM/SWISS, the key is marked SEL CDE. For FRENCH CANADIAN, the key is marked SEL FONC.

COMPOSITE VIDEO RPQ: IBM internal use only RPQ that allows the attachment of external monitors or projection TV.

COND: Abbreviation for condition.

CONTROLLER: The microcode processor units used in the CPU, KEYBOARD, PRINTER and 5247 BASE PLANAR BOARD.

CONFIG: Abbreviation for configuration.

CPS: Cycles per second printer.

CPU: CONTROL PROCESSING UNIT. It is the base processor located on the CPU board.

CPU BOARD: The PLANAR BOARD which contains the LOGIC for the CPU, BASE ROS, PAGE REGISTER/CONTROL, CRT PORT and CHARACTER GENERATOR KEYBOARD PORT, PRINTER PORT, TIMERS, DMA, INTERRUPT CONTROL, SENSE REGISTERS and I/O DECODE.

CRC: Cyclic redundancy check.

CRT: Cathode ray tube.

CSE:

CTRS: Abbreviation for counters.

CYCLIC: Repeating.

CYCLIC REDUNDANCY CHECK: An error check. Counting of the bits on a record.

CYLINDERS: A number of in line tracks on a diskette.

DA: Device address.

DASD: Direct Access Storage Device.

DC: Direct current.

DCP: Diagnostic control program.

DEADLOCK: When one system is waiting for a data file currently owned (locked) by a second system and the second system is waiting for a data file currently owned (locked) by the first system.

DEFECT: Indicates that the sector is no good to use on the disk.

DESERIALIZER: Logic to convert serial data to parallel data.

DETECT: To sense.

DIAG: Abbreviation for diagnostic.

DID: Document insertion device.

DIRECTORY: Index.

DISC: Abbreviation for disconnect command.

DON'T CARE: Ignore.

DOWNLINE: In communication, an over the line test.

DMA: Direct Memory Access.

DPC: Direct Program Control.

DRAFT MODE: Standard 8 X 7 character matrix on the printer.

DRIVER: A circuit that drives a signal.

DURATION: Length in time of a pulse.

ECC: Error Correction Code.

ECHO: Return the same data as received.

ECONOMY (5217 printer) Efficient use of ribbon to control print quality.

EDIT: To format.

ENCODER: Converts data from one format to another.

EOF: End of file.

EPO: Emergency Power On/Off.

ERMAP: Error map.

ERR: Abbreviation for error.

ERRATIC: Not stable.

ERROR RESET: Keyboard key. First key on left of third row from top. For:

GERMANY/AUSTRIA/SWISS, the key is marked FEHL KERR.

FRANCE/BELGIUM/SWISS/CANADIAN FRENCH, the key is marked REST APRES ERR.

ITALY, the key is marked RIPR TAST.

EXIT: Leave or go from.

EXTENT: Limit.

FAST: Opposite of slow.

FAULT: Failure.

FCS: Frame check sequence.

FILAMENT: A wire heated electrically in an electronic tube.

FIX: Repair.

FLEX TAPE: Signal cable from the Read/Write heads to the analog card.

FLT: Fault Locating Test.

FM: Frequency modulation.

FONT: Printer character mode.

FRIEND: Additional disk routines.

FRU: Field Replacement Unit. It is the smallest replacement part.

FWD: Abbreviation for forward.

GBGI: General Business Group International.

GLP: General Logic Probe.

GND: Abbreviation for ground.

HALL: Sensors used to indicate motor position and speed.

HEADER RECORD: A record containing identifying information about a group of records that follow.

HEX: Hexadecimal number.

HI: Abbreviation for high.

HIGHLIGHT: Important detail.

ID: Identification.

IMPL: Initial Micro Program Load.

INTERVENTION REQUIRED: Some operator action is required.

I/O: Input/Output.

INITIAL: First.

INT.: Abbreviation for interrupt.

INTRMT: Abbreviation for intermittent.

INTERPRETER: A processor program stored in ROS that controls operation of the basic instructions.

INTERRUPT: To break the normal flow.

INVALID: Not valid.

IOCS: Input Output Control Subroutine.

IOS: Input Output Control Subroutine.

IRQ: Interrupt Request.

ISR: Interrupt Status Register.

KBD: Keyboard.

KVA: Kilovolt amperes.

LABELED: Past tense of label.

LBS: Pounds.

LED: Light emitting diode.

LIFTER: To lift the print head.

LOCKOUT SOLENOID: Holds disk access from moving when power is off.

LOGICAL RECORD: A group of data that is not connected with its physical location.

LOOP: A group of instructions that are executed repeatedly.

LSB: Least significant bit or byte.

MANUFACTURING DEFECT MAP: A list of all sectors that are no good to use on the disk found at manufacturing time.

MAP: Maintenance Analysis Procedures.

MASK: A bit pattern that is used to control the selection of specific data bits.

MAX: Abbreviation for maximum.

MEDIA: Recording surface.

MEG: Abbreviation for megabyte.

MEM: Abbreviation for memory.

MEMORY: Storage.

MENU: A list of selections.

MFM: Modified frequency modulation.

MHZ: Megahertz.

MICROINSTRUCTION: A step of microcode.

MICROPROCESSOR: Small controller.

MIM: Maintenance Information Manual.

MIN: Abbreviation for minimum.

MISC: Abbreviation for miscellaneous.

MODIFIED: Different.

MODULATION: To change the frequency or amplitude.

MONITOR: Supervisor.

MPU: Microprocessor unit.

MS: Millisecond.

MSB:

MULTI: Many.

MULTIBYTE: More than one byte.

MULTIPLEXER: A circuit having several inputs or outputs.

NIBBLE: Four bits.

NRF: No record found.

NONVALID DEFECT MAP: Not a valid defect map.

NS: Nanosecond.

NUMERIC KEYPAD: That part of the keyboard that is similar to a calculator keyboard.

OPTION: A selection such as an optional program entry.

OVERCURRENT: More current than normal.

OVERPRINT: To print more than once in the same space.

OWNERID: Owner identification.

PARAMETERS: Values.

PC BOARD: A printed circuit board that has electrical circuits placed on a board to distribute signals and voltages. Normally used to indicate the Power Supply control board.

PES: Access Position Error Signal.

PID: Program identification.

PITCH: Is characters per inch.

PLANAR BOARD: A printed circuit board with the logic for a functional part of the system. Such as the CPU Planar Board, the Printer Planar Board and the 5247 BASE PLANAR BOARD.

PLUNGER: Armature of Solenoid.

PN: Abbreviation for part number.

POD: Power-on Diagnostic.

POLES: Motor Poles.

POR: Power-on Reset.

PORT: Connector.

POWER ON RESET: A signal occurring during power up time. Used to reset all circuits to an operational starting condition.

PRERECORDED: Recorded earlier.

PROCESSOR: Processing unit.

PROC.: Abbreviation for processor.

PROTOCOL: Sequence of commands necessary to communicate with devices.

PRT: Abbreviation for print or printer.

PSW: Program Status Word.

PTF: Program temporary fix.

PTX: Photocell transistor.

QTY: Abbreviation for quantity.

RAMP: A device that pulls the print head away from the platen when at left margin.

RAS: Reliability and Service

RASTER: Display image.

RC: Return code. A byte used to indicate end status of a diskette operation.

RCB: Disk Request Control Block.

READ ONLY STORAGE: A storage in which the contents are not changed by processor instructions.

REC: Abbreviation for receive.

RECAL: Abbreviation for recalibration.

RECALIBRATE: In diskettes, to seek to track zero.

RECEIVER: Device that receives a transmitted message.

RECLEN: Record length indicator.

RECORD: A group of similar data items.

RECOVERY: Handle error conditions transparent to user.

REF.: Reference.

REFER: To point to.

REFRESH: Dynamic memory must be addressed to keep information. This addressing is called refresh.

REGISTER: A series of electronic latches that hold data.

REPLACE: To remove a failing part and install a new one.

RET: Return (Power Supply)

REQUIRED: Needed.

RESIDENT: Located in a specific place.

RESTORE: Put back to original.

RESUME: Printer to CPU command to indicate that the printer is ready to receive more data following a hold status.

RET: Return (Power Supply).

RETRACT(S): Being pulled back.

RETRIEVE: Obtain, keep.

RETRY: Attempt again.

RIM: Read interrupt mask.

RIPPLE: Voltage change in power. Sequential print pattern in printers.

ROS: Read only storage.

ROS RESIDENT: Stored in ROS.

ROTATE: To turn.

ROTATIONAL: Adjective form of rotation.

RQB: Serial link Request Block.

RTN: Routine.

R/W STORAGE: READ/WRITE STORAGE. A storage in which processor instructions can read data from it or store data into it.

SAVE: To keep.

SCROLL: Move data on the display screen up or down.

SECTOR: A section of diskette track.

SECURE: To make safe. In diskettes, to prevent access.

SEGMENT ADDRESS: The 16 most significant bits of a 20 bit 5247 storage address.

SEL: Abbreviation for select.

SEQ: Abbreviation for sequence.

SETTLE: Time needed for machine to come to rest.

SIA: Serial Interface Adapter.

SIA EXPANDER CARD: Provides two additional SIA ports for the 5247.

SNRM: Set Normal Response Mode.

SLASH: A printer character.

SM: Service manual.

SPURIOUS: Not assigned Interrupt.

STG.: Storage.

STRESS: To force.

SYNC: Abbreviation of synchronize or synchronous.

THERM: Abbreviation for thermal.

THROUGHPUT: Measure of effective work of a system.

THRU: Abbreviation of through.

TIMEOUT: Time end.

TRANSFER: Move.

TRANSLATOR: A device or program that is used to translate basic language into machine operations.

TRANSMITTER: A circuit that transmits.

TRAPCD: Trap Code save area.

TRAPCP: Diagnostic Checkpoint save area.

TRAP HANDLER: Routine that executes if trap occurs.

T.P.: Abbreviation for teleprocessing.

T.P.: Abbreviation for test point.

TRK: Abbreviation for track.

TVT: Transfer vector table.

TXRDY: Abbreviation for transmit ready.

TYPAMATIC: A keyboard signal generated by the repeat action keys when held down for more than 700 ms.

UNATTENDED: No supervisor.

UNDERLINE: To underscore.

UNDERRUN: Next data not available when needed.

UNDERSCORE: To mark a line under.

UNEXPECTED: Not expected.

UNRECOVERABLE: Lost or error condition with no recovery.

US: Microsecond.

USART: Universal/Synchronous/Asynchronous/Receiver/Transmitter.

UTILITY: Service. Such as, Customer Utility Program.

VECTOR: A pointer.

VFO: Variable Frequency Oscillator.

VIDEO: Information referred to or used in receiving an image on the display screen.

VOLID: Volume Identification.

VTOC: Volume Table of Contents.

WR: Abbreviation for write.