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0.0 PROCESSING UNIT TEST SEQUENCE

FOR A COMPLETE TEST OF THE PROCESSING UNIT/STORAGE, LOAD AND EXECUTE PROGRAM 2000 FROM DISKETTE P/N 1635001.

SEE 3.0, THIS PROLOG, FOR A DESCRIPTION OF EACH PROGRAM.

IF DIAGNOSTICS FAIL, AND THE FRU DOES NOT CORRECT PROBLEM:
- GO TO MAP 2070, ENTRY POINT A.

IF THE DIAGNOSTICS DO NOT FAIL, AND THE 495X PROCESSING UNIT/STORAGE IS SUSPECT, LOOP ON PROGRAM 2000 (SEE SECTION 4.3, THIS PROLOG).

FOR A NOT EXPECTED CHECK CONDITIONS (MCK, PCK, PWR/THERM).
- GO TO MAP 3871, ENTRY POINT A.

IF THE FIELD REPLACEMENT UNIT IS THE PROCESSING UNIT, EXPANDER/TRANSLATOR OR STORAGE CARD(S), AND THE SYSTEM FAILS AFTER REPLACEMENT OF THE CARD(S) AND AFTER THE 207X MAPS ARE USED, AN ATTACHMENT MAY BE CAUSING THE FAILURE. MAP 0070 IS A CHANNEL ISOLATE PROCEDURE FOR THIS PROBLEM.
- GO TO MAP 0070, ENTRY POINT A.

1.0 GENERAL INFORMATION:

1.1 MINIMUM SYSTEM REQUIREMENT

- | | |
|------------------------------|-------------------|
| 1. SERIES/1 PROCESSING UNIT. | 3. DISKETTE UNIT. |
| 2. PROGRAMMER CONSOLE | 4. 16KB STORAGE |

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1.2 LOADING PROCEDURE(S)

THE MDI MAPS ARE ON DIAGNOSTIC DISKETTE P/N 1635001.

USE THE DCP LOADING METHOD:

IF THE CONSOLE IS ASSIGNED TO A KEYBOARD CONSOLE, PRESS 'C' (TO LOAD AND WAIT FOR OPTION SELECTION) OR 'B' (FOR LOAD AND GO), FOLLOWED BY THE FOUR CHARACTER MAP OR PROGRAM I.D. SEE MAP 0010, SECTION 07.00.00.

TO LOAD WITH A PROGRAMMER CONSOLE, SEE SECTION 4.1.

1.3 MESSAGE FORMAT (PROCESSING UNIT TESTS ONLY):

ALTERNATE CONSOLE MESSAGE FORMAT:

*** 02000 MAP=2000 STEP=ZZZZ *** (ZZZZ = MAP STEP NUMBER)

MESSAGES THAT ARE NOT IN THIS FORMAT ARE DCP MESSAGES. FOR MORE INFORMATION FOR ANY DCP HALT, SEE MAP 0013, COMMON HALT LIST.

PROGRAMMER CONSOLE HALTS (SEE MAP 0010, SECTION 07.01.00).

THE 'WAIT' LAMP IS ON

THE DATA LAMPS = MAP NUMBER OR DCP HALT CODE

IN THE LEVEL 3 REGISTERS ARE:

R0 = MAP STEP NUMBER

R1 | THE INFORMATION IN REGISTERS 1, 2 AND 3 IS DESCRIBED IN

R2 | EACH STEP OF MAP 2000. THE INFORMATION IS VALID ONLY

R3 | FOR THAT STEP. SEE PAPER MAP 2000 FOR THE INFORMATION.

1.4 COMMENTS

THE CONFIGURATION TABLE MUST BE CORRECT BEFORE THE PROGRAMS WILL RUN WITHOUT ERROR. SEE SECTION 5.1, THIS PROLOG.

A 'SYSTEM LEVEL' FAILURE MAY BE SEEN AS A DEVICE FAILURE. ALWAYS START AT THE SYSTEM ENTRY MAP FOR THE BEST RESULT. - GO TO MAP 0020, ENTRY POINT A.

USE THE IBM GENERAL LOGIC PROBE, PART NUMBER 453212, OR THE CSR MULTIMETER, IF INSTRUCTED.

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2.0 SPECIAL TOOLS AND DOCUMENTS:

2.1 SPECIAL TOOLS

NONE

2.2 DOCUMENTS:

1. DIAGNOSTIC SERVICE GUIDE (MAP 0010)
2. 495X THEORY DIAGRAMS MANUAL.
3. 495X MAINTENANCE INFORMATION MANUAL.
4. AXXXX LOGIC, MLD VOLUME ONE (1).
5. SERIES/1 INSTALLATION INSTRUCTIONS.

3.0 MAP/MDI DESCRIPTION

THE 2000 MAPS LISTED BELOW VERIFY CORRECT OPERATION OR FIND AND ISOLATE THE FAILING FIELD REPLACEMENT UNIT IN THE PROCESSING UNIT, TRANSLATOR/EXPANDER AND STORAGE CARD(S).

PROGRAM	DESCRIPTION
2X00	-- INNER STORAGE (LESS THAN 64K). PCK AND MCK. DIAGNOSTIC OPERATION AND PARITY.
2X01	-- BASIC PROCESSING UNIT/REGISTER FUNCTIONS
2X02	-- BASIC PROCESSING UNIT FUNCTIONS.
2X03	-- BASIC PROCESSING UNIT/PCK/SUPERVISOR CALL
2X04	-- BASIC PROCESSING UNIT. NOT VALID FUNCTIONS. PROGRAM LEVEL AND TRACE.
2X05	-- BASIC TRANSLATOR/EXPANDER/CLOCK FUNCTIONS. SEE NOTE TWO (2).
2X06	-- OUTER STORAGE, TRANSLATOR/EXPANDER FUNCTIONS SEE NOTES TWO (2), THREE (3) AND FOUR (4).

NOTE 1: 2X0Y = 495X

NOTE 2: THERE IS NO 2305 OR 2306 TEST.

NOTE 3: IF IN MANUAL MODE, '2X06' RUN TIME IS DETERMINED BY 495X TYPE AND AMOUNT OF OUTER STORAGE INSTALLED.

NOTE 4: IF LOOP OPTION (0020) IS SELECTED, 16K OF STORAGE WILL BE TESTED AND RUN IN ABOUT ONE (1) MINUTE PER LOOP.

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3.1 AUTO MODE MAPS:

PROCESSING UNIT MAP 2000 IS THE FIRST AUTO MODE TEST. IT LOADS 2X01, 2X02, 2X03 AND 2X04. IF NEEDED, IT LOADS 2X05 AND 2X06 TO COMPLETE THE AUTO TEST.

3.2 MANUAL MODE MAPS:
NONE

3.3 PAPER ONLY MAPS:

MAP 2070 TEST OF PROCESSING UNIT POWER ON AND IPL CIRCUITS.
MAP 2071 VOLTAGES, POWER ON RESET AND PROGRAMMER/CE CONSOLE.

3.4 FAILURE ONLY MAPS:
NONE

3.5 UTILITIES, EXERCISERS, OFF LINE TEST(S):
NONE

4.0 PROGRAMMER'S COMMENTS:

THIS MAP WILL SHOW 'EXPECTED/RECEIVED' DATA IF AN ALTERNATE CONSOLE IS ASSIGNED.

4.1 LOADING WITH THE PROGRAMMER OR MAINTENANCE CONSOLE.

TO EXECUTE THE PROCESSING UNIT TEST WITH THE PROGRAMMER OR C E MAINTENANCE CONSOLE AS THE INPUT DEVICE:

ENTER ON THE CONSOLE AS FOLLOWS:

(B) B (I) (B) = DATA BUFFER
(B) 2000 (I) (I) (I) = CONSOLE INTERRUPT

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4.2 RETURN CODES.

THE RETURN CODE FROM A TEST IS DETERMINED AS FOLLOWS:

- (1) NOTE THE FAILING TEST NUMBER.
- (2) NOTE THE VALUE OF THE RETURN CODE.
- (3) SEE THE PROGRAM FOR THE FAILING TEST NUMBER.
- (4) FIND THE ADDRESS REPRESENTED BY THE RETURN CODE.
- (5) THE INSTRUCTION BEFORE THIS ADDRESS IS BRANCH AND LINK
- (6) THE SET OF INSTRUCTIONS BEFORE THIS BRANCH AND LINK IS THE TEST THAT FAILED. THIS MAY AID IN FINDING THE FIELD REPLACEMENT UNIT TO EXCHANGE.

4.3 STORAGE TEST PATTERNS.

AUTO MODE:

THE STORAGE TEST PATTERNS ARE: 0000 - 5555 - AAAA - FFFF. THE PATTERNS ARE WRITTEN IN ALL INSTALLED ADDRESSES INCLUDING THE LAST INSTALLED ADDRESS, STARTING AT HEXADECIMAL ADDRESS '0020', THEN READ BACK AND CHECKED FOR ERRORS.

NOTE: THE TEST RUN TIME CAN BE FROM ONE (1) TO 'X' MINUTES. 495X TYPE AND AMOUNT OF STORAGE DETERMINES TEST RUN TIME

MANUAL MODE:

THE STORAGE TEST PATTERNS ARE: 0000, 5555, AAAA, FFFF AND ADDRESS IN ADDRESS. THE HEXADECIMAL ADDRESS IS WRITTEN IN THE STORAGE ADDRESS. THE PATTERNS ARE WRITTEN IN ALL INSTALLED ADDRESSES INCLUDING THE LAST INSTALLED ADDRESS, STARTING AT HEXADECIMAL ADDRESS '0020', THEN READ BACK AND CHECKED FOR ERRORS.

0000 THRU FFFF

THE PATTERNS ARE WRITTEN IN ALL INSTALLED ADDRESSES INCLUDING THE LAST INSTALLED ADDRESS, STARTING AT HEXADECIMAL ADDRESS '0020'. THERE IS A 30 SECOND DELAY, THEN THE PATTERNS ARE READ BACK AND CHECKED FOR ERRORS.

NOTE: THE TEST RUN TIME CAN BE FROM ONE (1) TO 'X' MINUTES. 495X TYPE AND AMOUNT OF STORAGE DETERMINES TEST RUN TIME.

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4.4 LOOPING AND OTHER OPTIONS.

OPTION BITS FOR PROGRAM 2000 AND ITS ASSOCIATED PROGRAMS ARE:

OPTION WORD -----	DESCRIPTION -----
8000	TERMINATE THE PROGRAM.
0800	LOOP INNER (BELOW 64K) STORAGE TEST 2X00
0200	REQUEST THE PROGRAM NAME. 2X00, 2X01, 2X02, 2X03, 2X04, 2X05 OR 2X06
0100	LOOP ON OUTER STORAGE TEST PROGRAM 2X06. TEST OUTER STORAGE FROM 10000 UP TO THE LAST INSTALLED ADDRESS ON THE SYSTEM. SEE NOTE TWO (2) AND SECTION 4.5.
0080	LOOP ON THE PROCESSING UNIT/STORAGE TESTS. LOOP 2X00 2X01 2X02 2X03 2X04 2X05 2506. 2X05 AND 2X06 WILL NOT RUN ON THE 4953.
0040	LOOP ON A SELECTED PROGRAM. LOOP PROGRAM SELECTED IN OPTION BIT 0200.
0020	LOOP ON SELECTED 16K BLOCK OF OUTER STORAGE. LOOP 16K BLOCK OF OUTER STORAGE. RUN TIME IS LESS THAN ONE MINUTE FOR THIS OPTION. SEE NOTE TWO (2). THE MESSAGE FOR THIS OPTION IS AS FOLLOWS: ONE (1) LOOP COMPLETE. LOOPING WILL CONTINUE ON XXXX OUTER STORAGE BLOCK. NO MORE INFORMATION MESSAGES.
0004	LOOP ON BASIC PROCESSING UNIT TESTS. LOOP PROGRAMS 2X00 2X01 2X02 2X03 2X04.

NOTE 1: TEST CAN RUN ONE OPTION AT A TIME. OPTION BITS 0200
AND 0040 CAN BE USED AT SAME TIME. OPTION 0240 IS VALID.

NOTE 2: ON THE 4953, OPTION 0100 AND 0020 WILL CAUSE OPTION
0800 TO RUN.

NOTE 3: TO TERMINATE THE LOOP, ENTER DCP COMMAND 9.
CAUTION: ONLY ENTER THIS COMMAND IF THE RUN LED IS
FLASHING. IF YOU DO NOT KNOW HOW TO TERMINATE USING THE
9 COMMAND, PRESS THE LOAD KEY.

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4.5 STORAGE ADDRESS LOCATION CHART.

SEE LOGIC AXXXX, READ THE STORAGE ADDRESS IN THE LEFT COLUMN. READ THE PROCESSING UNIT AT THE TOP. THE MATRIX OF THE TWO NUMBERS IS THE CARD/MODULE THE STORAGE IS INSTALLED ON.

PLUG THE 512K CARD CLOSEST TO PROCESSOR											4956 MOD B - C - D		
											4956 MOD B - C - D		
											4956 MOD B - C - D		
											4955 MOD F		
											4955 MOD E		
4952 MOD A,B,C			4953 MOD C,D			4955 MOD C,D							
4953 MOD A - B			4955 MOD A - B										
STORAGE ADDRESS	K SIZE		BLOCK								512		
4952/53/55/56											AND		
FROM	TO	FROM - TO	SIZE						256	512	256		
INNER STORAGE													
0000 TO	3FFF	000K - 016K	1	1	1	1	1	1	1	1	1		
4000 TO	7FFF	017K - 032K	2	2	1	1	1	1	1	1	1		
8000 TO	BFFF	033K - 048K	3	3	2	1	1	1	1	1	1		
C000 TO	FFFF	049K - 064K	4	4	2	1	1	1	1	1	1		
OUTER STORAGE													
10000 TO	13FFF	065K - 080K	1	5	3	2	1	1	1	1	1		
14000 TO	17FFF	081K - 096K	2	6	3	2	1	1	1	1	1		
18000 TO	1BFFF	097K - 112K	3	7	4	2	1	1	1	1	1		
1C000 TO	1FFFF	113K - 128K	4	8	4	2	1	1	1	1	1		
20000 TO	2FFFF	129K - 192K	5-8	*	*	3	2	1	1	1	1		
30000 TO	3FFFF	193K - 256K	9-C	*	*	4	2	1	1	1	1		
40000 TO	5FFFF	257K - 384K	D-14	*	*	*	3	2	1	1	1		
60000 TO	7FFFF	385K - 512K	15-1C	*	*	*	4	2	1	1	1		
80000 TO	BFFFF	513K - 768K	1D-2C	*	*	*	*	3	2	2	2		
C0000 TO	FFFFF	769K - 1024K	2D-3C	*	*	*	*	4	2	3	3		

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495X PROCESSING UNIT AND STORAGE

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* NOT APPLICABLE.

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4954	STORAGE ADDRESS	16K	MODULE IF	SAR BIT
	FROM TO	BLOCK	14 OFF	14 ON
INNER	0000 TO FFFF	1 - 4	1 OR 2	0 OR 3
OUTER	10000 TO 1FFFF	1 - 4	5 OR 6	4 OR 7
OUTER	20000 TO 2FFFF	5 - 8	9 OR A	8 OR B
OUTER	30000 TO 3FFFF	9 - C	D OR E	C OR F

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5.0 SERVICE INFORMATION:

5.1 CONFIGURATION INFORMATION:

PROCESSING UNIT TYPE AND STORAGE INSTALLED

ENTRY 00 BYTE 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
|00|00|00|00|00|2X|XY|YY|00|00|00|00|00|00|00|

BYTE 05 = PROCESSING UNIT TYPE.
BIT 4 - 7 = X 2X = 495X PROCESSING UNIT
BYTE 06 = TRANSLATOR/EXPANDER/STORAGE SIZE.
BIT 0 - 3 = X 3 = 16K, 7 = 32K, B = 48K, F = 64K
OF INNER STORAGE INSTALLED.
BIT 4 = 0 TRANSLATOR/EXPANDER 0 = NO, 1 = YES
BIT 5 - 7 = Y WITH BYTE 07 IS HEXADECIMAL NUMBER OF
16K BLOCKS OF OUTER STORAGE INSTALLED.
BYTE 07 = STORAGE SIZE.
BIT 0 - 7 = YY WITH BYTE 06 BITS 5-7 IS HEXADECIMAL
NUMBER OF 16K BLOCKS OF OUTER STORAGE.

EXAMPLE ENTRY: 4952, 64K INNER AND 64K OUTER STORAGE, TRANSLATOR.

BYTE 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
|00|00|00|00|00|22|F8|04|00|00|00|00|00|00|00|00|
*|00|37|00|00|00|00|00|00|00|00|00|00|00|00|00|

* THIS IS A DUMMY NATIVE TIMER ENTRY. DO NOT DELETE OR CHANGE.
PROCESSORS 4952, 4954 AND 4956 HAVE A NATIVE TIMER ON THE
PROCESSING UNIT CARD. THE PROGRAM INSERTS THE DUMMY ENTRY IF
PROCESSING UNIT TYPE IS CHANGED. IT IS USED BY SYSTEM TEST.

TO CHANGE THE PROCESSING UNIT TYPE IN ENTRY 00:

OUTPUT HAS KEYBOARD INSTALLED - GO TO MAP 3881, ENTRY POINT A.
PROGRAMMER CONSOLE ONLY - GO TO MAP 3882, ENTRY POINT A.
OUTPUT HAS NO KEYBOARD INSTALLED GO TO MAP 3881, ENTRY POINT A.

NOTE: IF BASIC DIAGNOSTIC DISKETTE CONFIGURATION TABLE IS
CORRECT, USE CONFIGURATION PROGRAM 38F0, OPTION 0D TO
WRITE THE CONFIGURATION TABLE (38F1) FROM BASIC DISKETTE
TO THE DIAGNOSTIC, SYSTEM TEST AND RPQ DISKETTES.

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6.0 PROCESSING UNIT ERROR LOG - PRINT/DISPLAY

- RUN CUSTOMER/DIAGNOSTIC PROGRAM UNTIL THERE IS AN ERROR.
- DO NOT POWER OFF THE SYSTEM.

IF THE PROCESSING UNIT IS A 4952, 4953 OR 4955, SEE 0.0, THIS PROLOG. ALL OTHER PROCESSING UNIT TYPES CONTINUE BELOW.

USING AN ALTERNATE CONSOLE TO PRINT OR DISPLAY THE ERROR LOG

USE THE SYSTEM TEST DISKETTE PART NUMBER 1635003, PROGRAM 34E1 TO PRINT OR DISPLAY THE ERROR LOG - GO TO MAP 0019.

USING A PROGRAMMER OR C E CONSOLE TO DISPLAY THE ERROR LOG

DISPLAY AND RECORD THE 64 WORD ERROR LOG AS FOLLOWS:

- PRESS THE STOP KEY.
- PRESS THE LOCK KEY.
- PRESS THE 'C' KEY.
- PRESS THE 'E' KEY.
- PRESS THE ZERO (0) KEY.
- PRESS THE ZERO (0) KEY.
- PRESS THE STORE KEY.

IF THE DATA LEDS EQUAL '0000', THE 64 WORD ERROR LOG IS NOT VALID. IF THE DATA LEDS EQUAL A NUMBER, THE LOG IS VALID.

PRESS THE LOCK KEY AND RECORD THE 64 WORD ERROR LOG UNTIL TWO CONSECUTIVE LED DISPLAYS EQUAL '0000'. THIS IS THE END OF THE ERROR LOG.

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MACHINE CHECK

 TIMER OVERRUN: 0001 0000 0000 0000

CPU CONTROL CHECK: 0000 1000 0000 0000

I/O CHECK: 0100 X000 DDDD AAAA
 BITS 0 - 3 0100
 BIT 4 SEQUENCE INDICATOR
 BITS 5 - 7 000
 BITS 8 - 15 DEVICE ADDRESS, IF AVAILABLE.

STORAGE PARITY: TWO (2) LOG ENTRIES.
 ENTRY ONE 1110 0XLL 0LAK 0CAK
 ENTRY TWO XXXX XXXX XXXX XXXX 16 BIT ADDRESS IS CONTENTS OF SAR

ENTRY ONE (1)
 BITS 0 - 3 1110
 BIT 4 0
 BIT 5 SUPERVISOR STATE
 BITS 6 - 7 LEVEL
 BIT 8 0
 BITS 9 - 11 LAAK (LAST ACTIVE ADDRESS KEY)
 BIT 12 0
 BITS 13 - 15 CAAK (CURRENT ACTIVE ADDRESS KEY)

PROGRAM CHECK: TWO (2) LOG ENTRIES

 ENTRY ONE 11XX 0XLL 0LAK 0CAK
 ENTRY TWO XXXX XXXX XXXX XXXX 16 BIT ADDRESS IS CONTENTS OF CIAR

ENTRY ONE (1)
 BITS 0 - 3 1100 (PROCESSOR ISA CHECK)
 1101 (SPECIFICATION CHECK)
 1111 (STORAGE PROTECT VIOLATION)
 BIT 4 0
 BIT 5 SUPERVISOR STATE
 BITS 6 - 7 LEVEL
 BIT 8 0
 BITS 9 - 11 LAAK (LAST ACTIVE ADDRESS KEY)
 BIT 12 0
 BITS 13 - 15 CAAK (CURRENT ACTIVE ADDRESS KEY)

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```
PRIORITY INTERRUPT 011X 0SLL DDDD AAAA
-----
      BITS  0 - 3   0110 (EXCEPTION)
                        0111 (ATTENTION AND EXCEPTION)
      BIT   4       0
      BIT   5       SUPERVISOR STATE.
      BITS  6 - 7   LEVEL
      BIT   8 - 15  DEVICE ADDRESS

OPERATE I/O        0XXX 0SLL DDDD AAAA
-----
      BITS  0 - 3   0010 (BUSY AFTER RESET)
                        0011 (COMMAND REJECT)
                        0101 (INTERFACE DATA CHECK)
      BIT   4       0
      BIT   5       SUPERVISOR STATE.
      BITS  6 - 7   LEVEL
      BIT   8 - 15  DEVICE ADDRESS
```

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