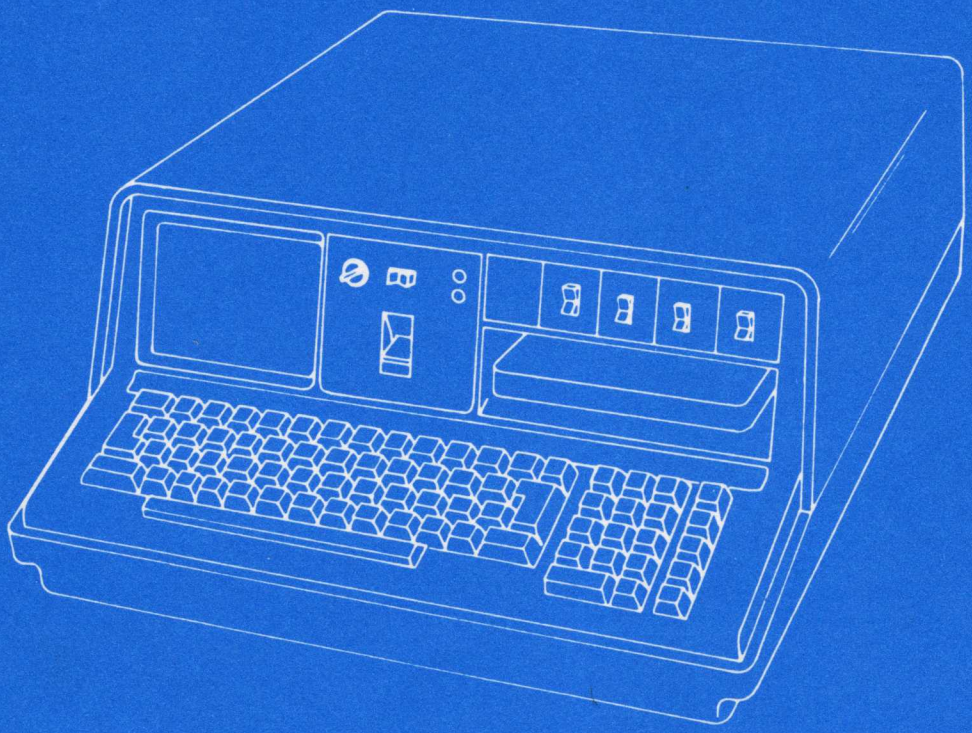
IBM

IBM 5110 System
Maintenance Analysis Procedures

5110



IBM 5110 System
Maintenance Analysis Procedures

SY31-0553-2

Third Edition (January 1979)

This a major revision of, and obsoletes, SY31-0553-1. Because the changes and additions are extensive, this publication should be reviewed in its entirety.

Changes are periodically made to the information herein; changes will be reported in technical newsletters or in new editions of this publication.

Use this publication only as an aid in servicing the IBM 5110 System.

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LOGIC CARD PART NUMBERS

Card Name	Location	Model	Part Number
I/O cable driver	A2		4360292
Async comm-serial I/O	D2		1607138
APL ROS	E4	AXX or CXX	4360442 4834732
Common and language ROS	F2	A1X[2]	4360434 4834796 4834764[1]
		B1X[2]	4834714 4834722 4834796 4834764[1]
		C1X[2]	4834712 4834724 4834796 4834764[1]
		A2X[3]	4834716 4834726 4834754 4834766[1]
		B2X[3]	4834718 4834728 4834798 4834768[1]
		C2X[3]	4834720 4834730 4834800 4834770[1]
Display	G2		4360476 4360450
		(Katakana feature only)	4834708
Base I/O	H2	X1X	4360496 4834746
		X2X	4834700 4834794
Processor	J2		1607136
Parallel I/O	K2		4360430
Feature ROS (diskette sort)	K4		4834964 4834972

[1] The Katakana feature requires one of these cards to be included.
[2] The cards in model C1X may be substituted for the cards in models A1X and B1X.
[3] The cards in model C2X may be substituted for the cards in models A2X and B2X.

Card Name	Location	Model	Part Number
Executable ROS	L2	A1X or C1X[6]	4834734 4360478 4834784[1]
		B1X[6]	4834736 4360480 4834786[1]
		A2X or C2X[7]	4834738 4360482 4360478 4834784[1]
		B2X[7]	4834740 4360484 4834788[1]
Read/write	M2-N4		8238223
Print adapter	5103		1607142[2] 1607154 1607152
		(Katakana feature only)	4834706
Tape adapter	5106		1607134[2] 1607144 1607146
Tape control	5106 or internal tape		8527645
Diskette adapter	5114		4834710 4834960 4834978[3] 4834962[3]
Diskette control	5114		8528195 4178068 4178065
VFO	5114		1607217[4]
BSCA 2	A4		4834792[2] 4834780
BSCA 1	B2		1607176[5]

[1]The Katakana feature requires one of these cards to be installed.
[2]Do not replace with the same part number.
[3]The VFO card is incorporated in this card.
[4]Not used with diskette adapter card 4834710 or 4834960.
[5]The microprocessor module on this card is part 5615702.
[6]The cards in models A1X or C2X may be substituted for the cards in the 5110 model B1X.
[7]The cards in models A2X or C2X may be substituted for the cards in the 5110 model B2X.

Communication	Location	Model	Part Number
Communication facility	C2		
EIA		Used with external modems	5864363 5864660
DDSA		Used with digital network	8527032
38LS		U.S. switched network with auto answer	1756001 8564508
38LS		U.S. non-switched network with SNBU	1756003 8564509
38LS		U.S. non-switched network without SNBU	1756005 8454510
38LS		World Trade non-switched network	1756011 8564481
38LS		World Trade switched network	1756007 8564479

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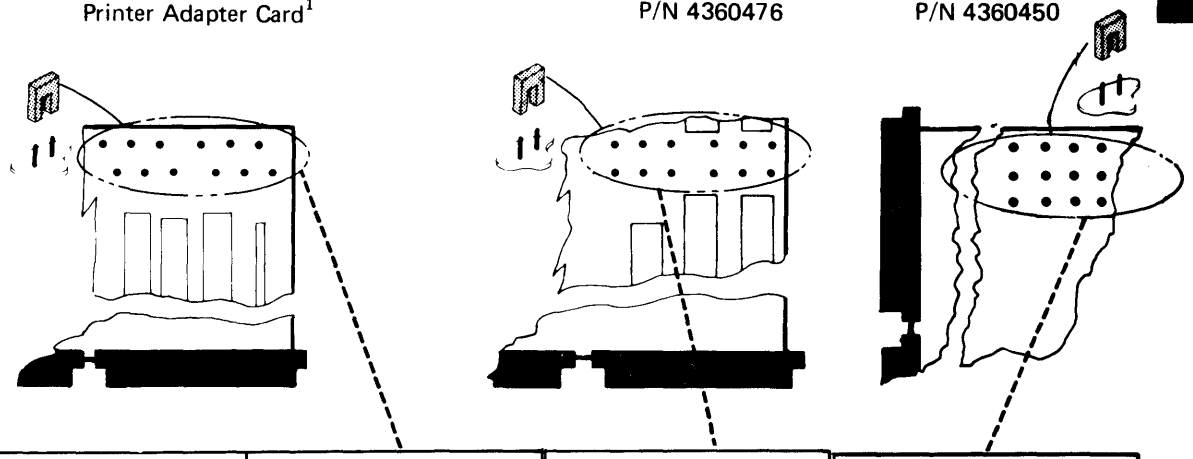
LOGIC CARD JUMPERS

Printer Adapter Card[1]

Display Card
P/N 4360476

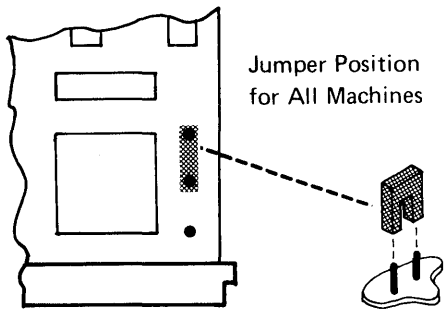
Display Card
P/N 4360450



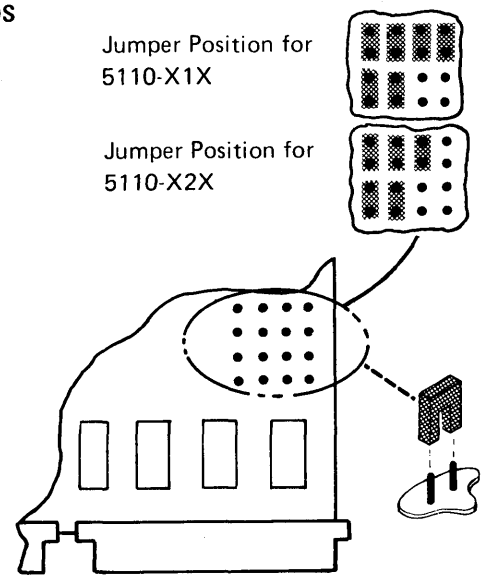
Country	Jumper Positions[1]	Jumper Positions[2]	Jumper Positions[2]
Austria/Germany			
Belgium			
Brazil			
Denmark/Norway			
EBCDIC (U.S.)[1]			
Finland/Sweden			
France			
French/Canada			
International			
Italy			
Japan[1]			
Portugal			
Spain			
Spanish Speaking			
United Kingdom			
Unassigned			

[1]Printer adapter card used with Katakana feature should have either EBCDIC (U.S.) jumpers or none at all.
[2]There is no display jumpering for the Katakana feature.

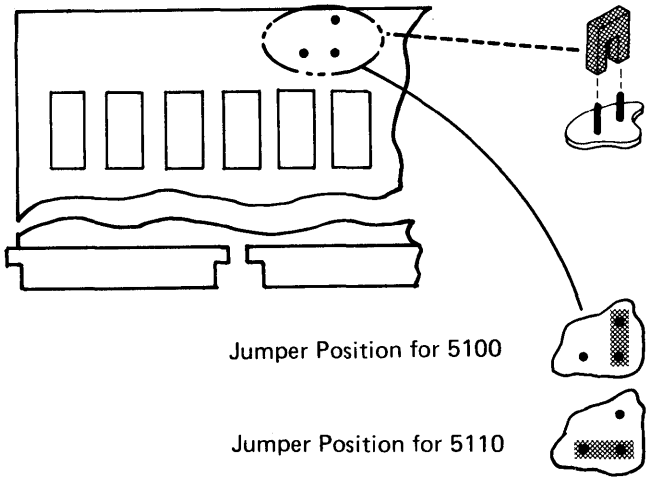
Diskette Adapter Card



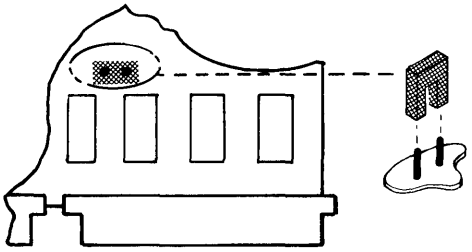
Executable ROS Card (L2)



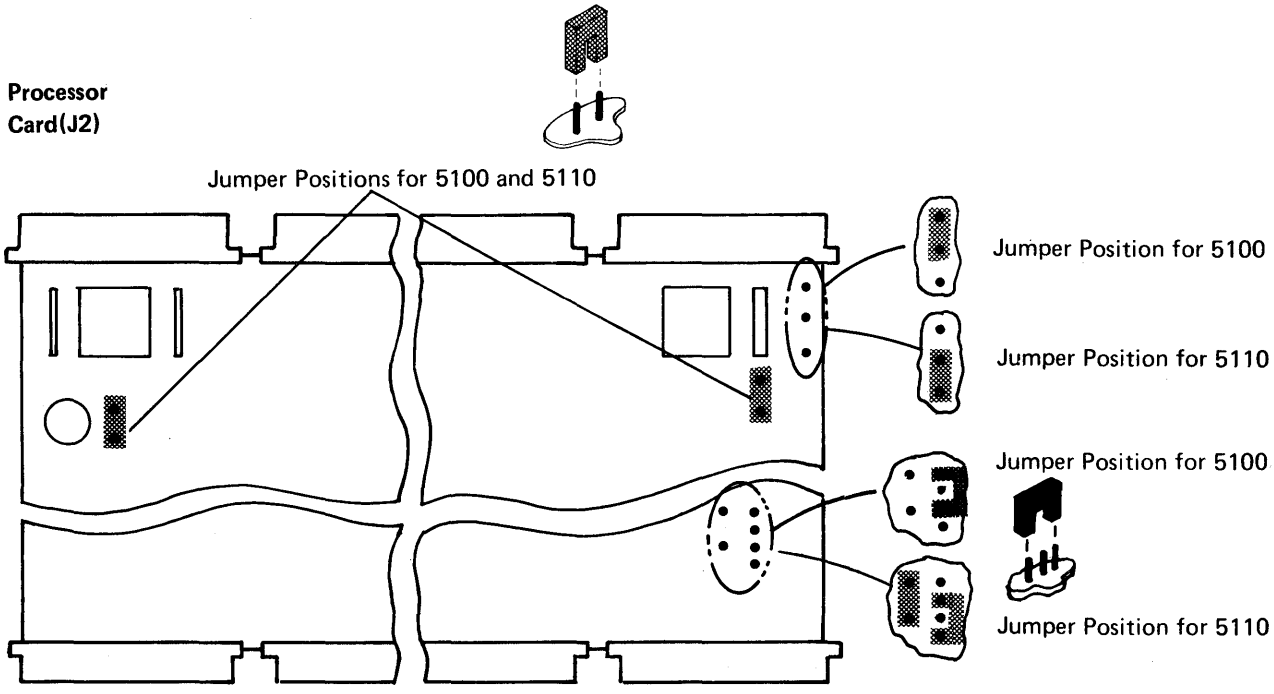
Auxiliary Tape Unit Adapter Card



Feature ROS Card (K4)



Processor Card(J2)



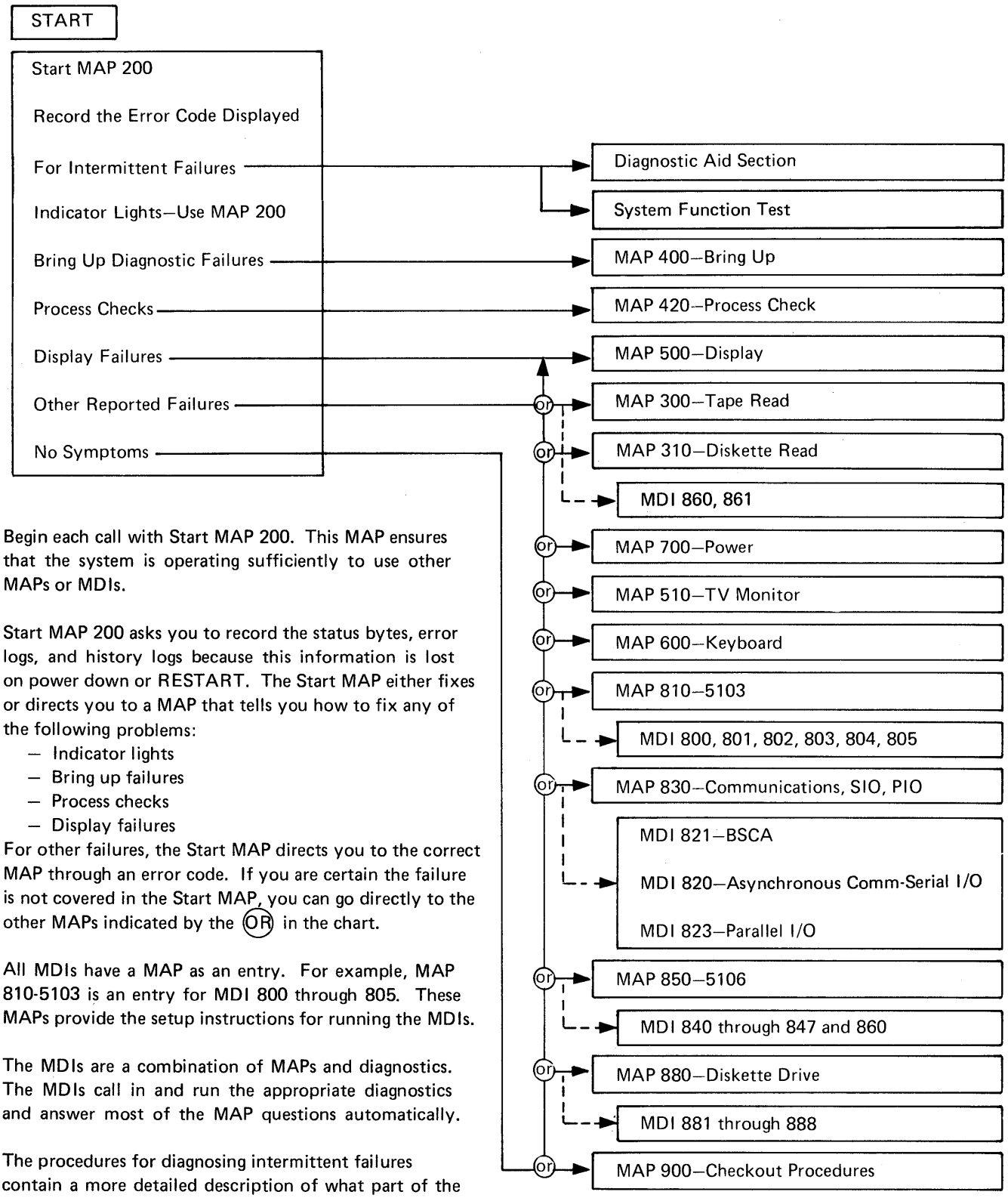
USING THE IBM 5110 SYSTEM MAPS

MAPs

The MAPs guide you through the service call using step-by-step procedures that require you to follow trace lines when responding to questions or when leaving or entering a page. The MAPs use a logical approach for isolating the possible causes of machine problems and point you to that part of the 5110 that requires adjustment or replacement.

Two types of MAPs are used in the 5110 maintenance library. First, there are the hard-copy (printed) MAPs within the MLM binder. These MAPs are contained in a separate removable binder. The second type of MAP is the MDI (MAP diagnostic integration). These MAPs are located on the diagnostic tape/diskette and are shown on the display screen. The system automatically pages through the MAPs when you respond to the questions on the display.

MAP ORGANIZATION



Begin each call with Start MAP 200. This MAP ensures that the system is operating sufficiently to use other MAPs or MDIs.

Start MAP 200 asks you to record the status bytes, error logs, and history logs because this information is lost on power down or RESTART. The Start MAP either fixes or directs you to a MAP that tells you how to fix any of the following problems:

- Indicator lights
- Bring up failures
- Process checks
- Display failures

For other failures, the Start MAP directs you to the correct MAP through an error code. If you are certain the failure is not covered in the Start MAP, you can go directly to the other MAPs indicated by the (OR) in the chart.

All MDIs have a MAP as an entry. For example, MAP 810-5103 is an entry for MDI 800 through 805. These MAPs provide the setup instructions for running the MDIs.

The MDIs are a combination of MAPs and diagnostics. The MDIs call in and run the appropriate diagnostics and answer most of the MAP questions automatically.

The procedures for diagnosing intermittent failures contain a more detailed description of what part of the system each MDI checks.

USING THE MAPS

When using the MAPs, you must:

READ CAREFULLY. The MAPs can help you find the problem only if you follow instructions and answer questions accurately.

FOLLOW THE SEQUENCE. Proceed step-by-step at all times. At times, the MAP instructions might seem irrelevant. However, they can be important in determining the correct error indications.

FOLLOW INSTRUCTIONS. Instructions must be carried out exactly in the order given. Questions are based on instructions immediately preceding the questions. Do not change the conditions established by the instructions before answering the questions. Do not press the RESTART switch until you are told to do so in the MAPs.

When you are asked to probe a line in the MAPs, the line name and its active level are given. For example:

- Probe H2-G06 (- machine check).

The - (minus) in front of machine check indicates that this line is active at a down level.

MAP EXAMPLE

PROCESS CHECK MAP 0420 — MAP name and number

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Entry and exit points—show all entry and exit points to and from this MAP.

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0300	A	1	001
0600	A	1	001
0810	A	1	001
0830	A	1	001
0850	A	1	001
0900	A	1	001
830C	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
5	044	0400	A
18	218	0400	A
75	828	0500	A

001 — Step number

(Entry Point A) — Entry point—indicates a possible starting point in this MAP. It is usually referenced from a step within a MAP.

Is the PROCESS CHECK light on?

Y N — Y=yes, N=no

002

Can you create the PROCESS CHECK?

Y N

003

The MAPs depend on having the PROCESS CHECK on the machine or being able to create the PROCESS CHECK. Gather and record all available information pertaining to the PROCESS CHECK. Advise the customer that if the PROCESS CHECK appears again,to leave the machine in the failing condition until you arrive.

004

Is the PROCESS CHECK intermittent?

Y N

Off-page reference—identifies the page and trace on which this MAP leg continues. The 2 indicates that this leg continues on page 2. The C indicates that this leg continues at trace C.

2A 2B 2C

MAP EXAMPLE (continued)

A B C
1 1 1 **PROCESS CHECK MAP**

PAGE 2 OF 75

On-page reference—indicates the trace and page from which this MAP leg came. The 1 indicates that this leg came from page 1. The C indicates that this leg came from trace C.

005
Create the PROCESS CHECK.

Did the PROCESS CHECK come on as a result of pressing RESTART or powering on the 5110?
Y N

006
We will assume that the PROCESS CHECK comes on as a result of running a job.
Go to Step 010, Entry Point H.

Internal exit point—indicates the page, step, and entry point to go to within this MAP.

007
We will use the RESTART condition to create the PROCESS CHECK.
Go To Map 0400, Entry Point A.

External exit point—indicates the MAP and entry point to go to.

008
Create the PROCESS CHECK
Go to the INTERMITTENT FAILURE CHART in the 5110 SERVICE AIDS.

Instruction—establishes conditions for answering the next question.

009
Is the PROCESS CHECK intermittent?
Y N

Question—answer either yes or no. Continue from your answer to the next question or instruction.

010
(Entry Point H)

Bad RESTART switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 210, 241).

Action—possible fixes for the failure. Replace, repair, or adjust in the order given. (Check/replace means to check first, then replace if defective.)

Is the display blank or dark?
Y N

011
Are there any devices attached to the 5110 I/O interface port? (see MIM 271)
Y N

Reference number—refers to a location graphic, maintenance procedure, chart, or other pertinent information in the maintenance section.

7 7 1
5 5 8
D E F G

On-page reference—indicates the trace on this page from which this leg of the MAP continues.

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PAGE 1 OF 5

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0300	A	2	001
0900	A	2	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
4	020	0300	B
4	020	0310	A
3	014	0400	A
3	018	0400	D
5	030	0420	A
4	020	0420	A
4	021	0420	A
4	026	0420	A
5	027	0500	A
3	012	0500	A
4	025	0500	A
3	015	0500	A
4	020	0500	A
4	024	0500	A
4	020	0510	A
4	020	0600	A
4	020	0810	A
4	020	0830	A
4	020	0850	A
4	020	0880	A
4	020	0900	A
4	020	0900	C
4	020	0900	D
4	020	0900	F

MAP 0200, ENTRY POINT A IS ON PAGE 2

001
(Entry Point A)

When the MAP leads to a bad card, measure the voltages at the card location before replacing the card (see MIM 274, DC VOLTAGE DISTRIBUTION). If any voltages are out of tolerance Go To Map 0700, Entry Point A.
Any reference numbers in the MAPs, such as (see MIM 241), will be for the 5110 MIM, unless stated otherwise.

-Record customer supplied information including error codes, if any.
-Record the status bytes to aid in diagnosing intermittent I/O problems (see STATUS BYTES and DISPLAY REGISTERS in the Diagnostic Aids section of the MIM).
-Switch the L32-64-R32 switch to 64.
-Press the bottom of the REVERSE DISPLAY switch.
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Check that the RUN switch (under the covers) is set to run, if the covers are off (see MIM 201).

Is the PROCESS CHECK light on?
Y N

002
-Power on the 5110 or press RESTART.

Does the IN PROCESS light stay on?
Y N

003

Is the 5110 display dark for all positions of the BRIGHTNESS control?
Y N

5 5 5
A B C D

D

004
To test the indicator lights:

-Press and hold the RESTART switch.

Are both the PROCESS CHECK light and the IN PROCESS light on?
Y N

005
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad PROCESS CHECK light.
Bad IN PROCESS light.
Bad RESTART switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

006
-Release the RESTART switch. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

007
-Adjust the BRIGHTNESS control so that if there are any characters on the display they are well defined.

The 5110 display is grossly distorted if it has a black rather than a white background, or is greatly reduced in size.

Is the 5110 display grossly distorted?
Y N

008
Is the 5110 display rolling?
Y N

4 4 4 3
E F G H

009
Does the 5110 display contain wide horizontal bars similar to a TV set with the horizontal hold out of adjustment?
Y N

010
No more than 25 seconds after RESTART is pressed, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events occur before 25 seconds, in sequence, after RESTART is pressed?
Y N

011
-Switch the RUN switch under the covers to NOT RUN (see MIM 201).
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).

Do all 1024 positions contain legible, well-formed characters, with no blank spaces?
Y N

012
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Switch the RUN switch under the covers to RUN.

Go To Map 0500, Entry Point A.

013
-Switch the RUN switch under the covers to RUN.
-Observe the IN PROCESS light.
-Hold down the CMD key and press the 4 key on the Alphameric Keyboard.
-Release the keys.
-Press EXECUTE.

Does the IN PROCESS light turn on or flash?
Y N

014
-Switch the DISPLAY REGISTERS switch to NORMAL.

Go To Map 0400, Entry Point A.

015
Bringup is OK.

-Switch the DISPLAY REGISTERS switch to NORMAL.
-Press ATTN to reset the error condition.

Go To Map 0500, Entry Point A.

016
Does an error code appear on the display after RESTART is pressed?
Y N

017
Are the top 13 lines of the display entirely blank (there are 16 lines total for the display)?
Y N

018
Go To Map 0400, Entry Point D.

019
Is the PROCESS CHECK light on?
Y N

020
(Entry Point E)

-Use the customer information recorded earlier and the customer error code charts to determine the probable failure area.
-Record the status bytes to aid in diagnosing intermittent I/O problems (see STATUS BYTES and DISPLAY REGISTERS in the Diagnostic Aids section of the MIM).

Exit to the appropriate MAP :

-INTERNAL TAPE UNIT
Go To Map 0300, Entry Point B.

-5114 DRIVE 1 (only use this Map if the 5110 does NOT have an internal tape drive)
Go To Map 0310, Entry Point A.

-DISPLAY
Go To Map 0500, Entry Point A.

-TV MONITOR
Go To Map 0510, Entry Point A.

-KEYBOARD
Go To Map 0600, Entry Point A.

-PRINTER
Go To Map 0810, Entry Point A.

-BSCA, ASYNC COMM-SERIAL I/O, PARALLEL I/O
Go To Map 0830, Entry Point A.

-AUXILIARY TAPE UNIT
Go To Map 0850, Entry Point A.

-DISKETTE DRIVE
Go To Map 0880, Entry Point A.

-PROCESS CHECK
Go To Map 0420, Entry Point A.

(Step 020 continues)

(Step 020 continued)

-ALARM
Go To Map 0900,
Entry Point D.

-5110 SWITCH CHECKOUT
Go To Map 0900,
Entry Point F.

-MACHINE CHECKOUT
Go To Map 0900,
Entry Point A.

-If the failing area can not be identified from the list above:
Go To Map 0900,
Entry Point C.

021
Go To Map 0420, Entry Point A.

022
Go to Step 020,
Entry Point E.

023
Bad display assembly (see MIM 204).

024
The vertical frequency may be out of adjustment (see MIM 247 for adjustment).

****
* CAUTION *
****
High voltage is present.

If this adjustment has no effect
Go To Map 0500, Entry Point A.

025
Go To Map 0500, Entry Point A.

026
Go To Map 0420, Entry Point A.

027
-Set the BRIGHTNESS control to the center of its range.

Go To Map 0500, Entry Point A.

028
Bad G2 (display) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

029
Is the IN PROCESS light on?
Y N

030
Go To Map 0420, Entry Point A.

031
Bad G2 (display) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad RESTART switch.

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001
Use the following charts for cable problems:

CABLE	MIM	REFERENCES
KEYBOARD	5110	206,255
DISPLAY and CONTROL PANEL Z3	5110	248,249
INTERNAL TAPE UNIT CABLE Z2	5110	230,231
5110 POWER Y1	5110	272
COMMUNICATIONS	5110	282
5106 CABLES	5110	283,280
5114 CABLES	5114	101,151,170
5103 CABLES	5103 5110	304,384 280

Are you checking an I/O interface cable?
Y N

002
- Remove cable at both ends if possible.
- Set CE meter to the OHM X1 scale.
- Place one meter lead on the suspected pin at one end of the cable.
- Place the other meter lead on the suspected pin on the other end of the cable.

Is there any deflection on the meter?
Y N

2 2 2
A B C

003
The line in the cable is open.
Repair/replace the cable

004
Is there any resistance?
Y N

005
-Meter all the pins on one end of the cable to the suspected pin on the other end of the cable.

Does more than one pin cause meter to deflect?
Y N

006
Cable checks out good.

007
The cable has a short circuit.

Repair/replace cable.

008
Their is resistance in the cable line.

Repair/replace the cable

009
(See 5114 MIM 280)
If you have a 5114 and a 5103 attached to a 5110, the +5Vdc for the 5103 comes from the 5114 power supply.
The only voltages that the 5114 uses from the 5110 are -12Vdc and +12Vdc.

-Power down.
-Set the CE meter to the OHM x1 scale.
-Place one meter lead on the suspected pin at one end of the cable.
-Place the other meter lead on the suspected pin at the other end of the cable.
(Step 009 continues)

(Step 009 continued)

Is there any deflection on the meter?
Y N

010
The line in the cable is open.
Repair/replace the cable.

011
Is there any resistance?
Y N

012
-Meter all the pins on one end of the cable to the suspected pin on the other end of the cable.

Does more than one pin cause the meter to deflect?
Y N

013
Cable checks out good.

014
The cable has a short circuit.

Repair/replace cable.

015
Their is resistance in the cable line.

Repair/replace the cable.

PAGE 1 OF 45

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	B	2	007
0830	A	1	001
0860	A	1	001
0861	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	028	0200	A
2	010	0420	A
2	014	0420	A
45	529	0420	A
45	527	0600	A
41	493	0700	A
37	427	0700	A
37	437	0700	A
38	443	0700	A
27	294	0700	A
12	121	0700	A
2	009	0900	A
2	013	0900	A
3	022	0900	A
9	092	0900	A
44	525	0900	A

001
(Entry Point A)

Is the PROCESS CHECK light on?
Y N

002
The tape read diagnostic program displays an error on the display if an error is found. An error is displayed in the following format near the top of the display:

ERROR XXX E 80 GOTO MAP 0300.

Is an error displayed?
Y N

4
5 4 2
A B C

003

The characters DSP MENU are displayed when the tape read diagnostic is done.

Are the characters DSP MENU displayed?

Y N

004

The instruction PRESS EXECUTE,R,or L might be displayed on the display. Ignore this instruction if it is displayed.

Are instructions (other than PRESS EXECUTE,R,or L) or questions displayed?

Y N

005

Please observe again for:

1. PROCESS CHECK light on.
2. Error displayed.
3. Instructions or questions displayed.

Do you have any of the above conditions?

Y N

006

Have you passed this step before?

Y N

007

(Entry Point B)

-If there is a cartridge in the tape drive, remove it.
-Press RESTART and wait 25 seconds.

Use the keys in the numeric key section of the keyboard (see MIM 250).

-Hold CMD and press HOLD.
-Hold CMD and press - (minus).

(Step 007 continues)

3D 3E 3F 3G

(Step 007 continued)

If the DCP program load is OK, the characters DCP are displayed.

Are the characters DCP displayed?

Y N

008

Is the PROCESS CHECK light on?

Y N

009

Go To Map 0900, Entry Point A.

010

Go To Map 0420, Entry Point A.

011

Use the keys in the numeric key section.

-Hold CMD and press * (BASIC multiply key).
OR
-Hold CMD and press x (APL multiply key).

If the diagnostic mode load is ok, the characters DIAG DCP are displayed (see MIM section 4, diagnostic aids).

Are the characters DIAG DCP displayed?

Y N

012

Is the PROCESS CHECK light on?

Y N

013

Go To Map 0900, Entry Point A.

014

Go To Map 0420, Entry Point A.

3H

015
-Press C
-Press 1
-Press EXECUTE

Do the words TAPE READ DIAGNOSTIC appear on the top line of the display?
Y N

016
Bad F2 (Common and language ROS) card.

017
You have loaded and are running the tape read diagnostic (see MIM section 4, diagnostic aids).
-Follow the instructions displayed to run the diagnostic.

Do the diagnostics run to completion?
Y N

018
Is the PROCESS CHECK light on, or are the characters DSP displayed?
Y N

019
Follow the instructions on the display. If the display directs you to GO TO MAP 0300, go to Entry Point A.

020
Suspect the tape control card along with the rest of the callouts.

Go to Page 1, Step 001, Entry Point A.

021
Go to Page 1, Step 001, Entry Point A.

022
Go To Map 0900, Entry Point A.

023
Go to Page 1, Step 001, Entry Point A.

024
An error instruction is displayed in the following format:

GOTO MAP 0300 ERROR XXX .

Is an error instruction displayed?
Y N

025
Do not press EXECUTE ,R ,or L unless asked to. Follow the instructions displayed on this display.

NOTE: After you follow the instructions on this display, another display might appear. Ignore this next display.

Go to Page 1, Step 001, Entry Point A.

026
Go to Page 4, Step 034, Entry Point G.

027
Are you diagnosing an internal tape drive problem?
Y N

028
Go To Map 0200, Entry Point A.

029
-Follow the instructions displayed to run the tape write diagnostic.

Did the diagnostic run to completion?
Y N

030
Follow the instructions on the display.

031
-Press RESTART. Wait 25 seconds.
-Do the test at the end of the Select Magnet Service Check (see MIM 221).

Is the tape motion rhythmic?
Y N

032
Do the Tape Select Magnet Service Check. (see MIM 221)

033
The tape unit checks out OK.

034
(Entry Point G)

These errors are valid only for the tape read diagnostic program. Scan through the errors until you find the error that is displayed on the display. Then take the Y leg to find the correct page number.

Error 001?
Y N

035
Error 002?
Y N

036
Error 003?
Y N

037
Error 004?
Y N

038
Error 005?
Y N

4 4 4 4 4
5 4 4 4 3
K L M N P Q

Q

039
Error 006?
Y N

040
Error 007?
Y N

041
Error 008?
Y N

042
Error 009?
Y N

043
Error 010?
Y N

4 4 4 4 4 _
3 3 3 3 2 5
R S T U V W

044
Error 011?
Y N

045
Error 012?
Y N

046
Error 013?
Y N

047
Error 014?
Y N

048
Error 901?
Y N

049
Error 903?
Y N

050
Error 906?
Y N

051
Error 907?
Y N

052
Error 909?
Y N

053
Error 912?
Y N

AJ5

054
Error 915?
Y N

055
Error 918?
Y N

056
Error 921?
Y N

057
Error 924?
Y N

058
Error 927?
Y N

AQ

AQ

059
Error 930?
Y N

060
Error 933?
Y N

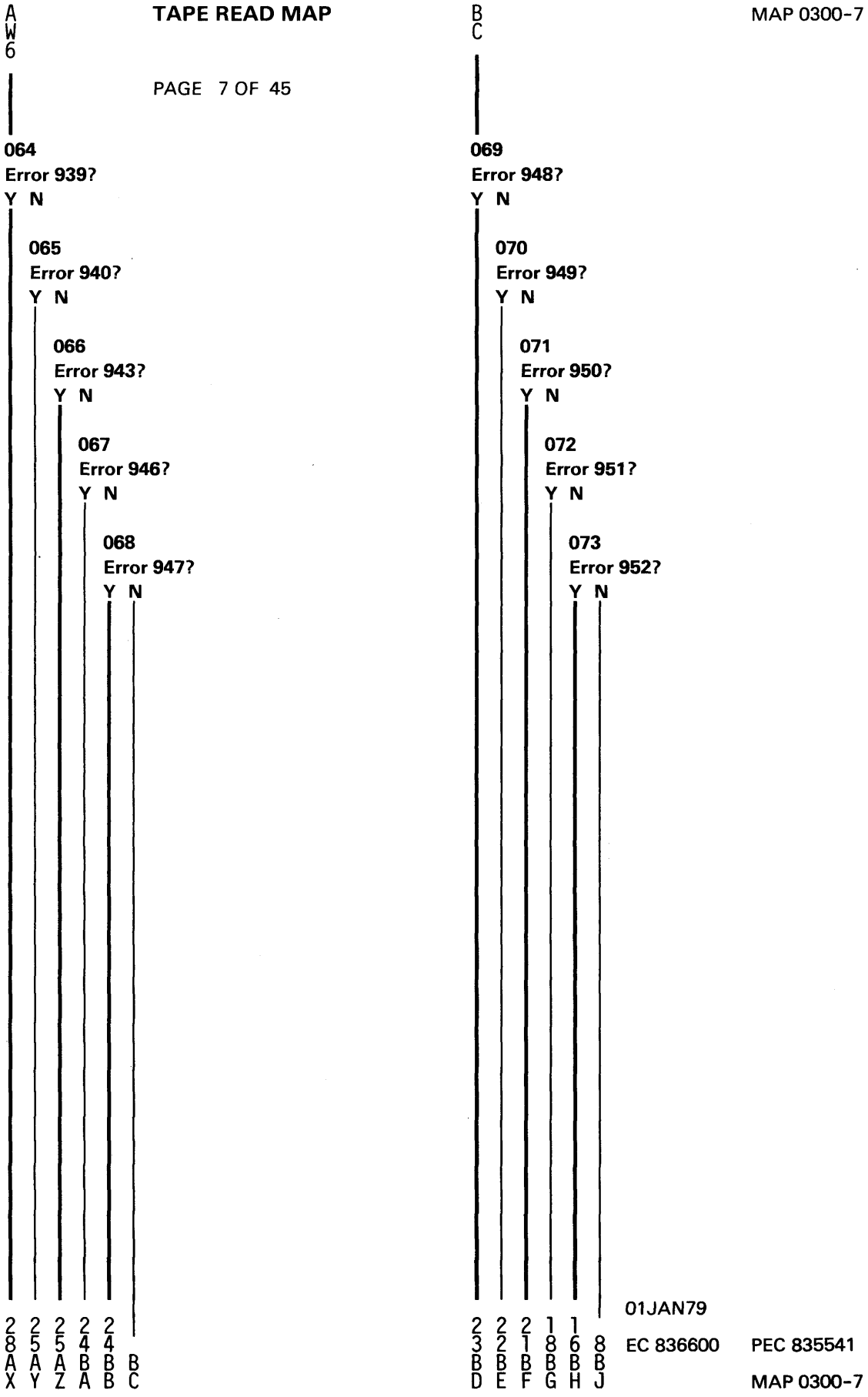
061
Error 936?
Y N

062
Error 937?
Y N

063
Error 938?
Y N

39AK 36AL 35AM 34AN 33AP AQ

32AR 32AS 30AT 29AU 29AV 7AW


AW6
064
Error 939?
Y N
065
Error 940?
Y N
066
Error 943?
Y N
067
Error 946?
Y N
068
Error 947?
Y N
28AX
25AY
25AZ
24BA
24BB
BC
BC
069
Error 948?
Y N
070
Error 949?
Y N
071
Error 950?
Y N
072
Error 951?
Y N
073
Error 952?
Y N
23BD
22BE
21BF
18BG
16BH
8BJ

BJ7

074
Error 953?
Y N

075
Error 954?
Y N

076
Error 957?
Y N

077
Error 958?
Y N

078
Error 960?
Y N

16BK 15BL 15BM 14BN 14BP BQ

BQ

079
Error 963?
Y N

080
Error 966?
Y N

081
Error 970?
Y N

082
Error 973?
Y N

083
Error 982?
Y N

13BR 13BS 12BT 12BU 12BV 9BW

084
Error 983?
Y N

085
Error 985?
Y N

086
Error 986?
Y N

087
Error 987?
Y N

088
Error 988?
Y N

1 1 1 1 1
1 1 1 1 1
BX BY BZ CA CB CC

089
Error 989?
Y N

090
Error 994?
Y N

091
Error 995?
Y N

092
Incorrect error number.

Go To Map 0900, Entry Point A.

093
ERROR 995--WRAP ERROR.
No wrap of data through tape control card.

Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

094
ERROR 994--READ DATA ERROR.
Incorrect data detected.

-Attach a jumper between tape control card pin U06 (-write enable) and tape control card pin U08 (gnd) (see MIM 230).
-Press EXECUTE

Is ERROR 995 displayed on the display?
Y N

1 1 1
0 0 0
CC CE CF

095
Remove jumper.

Bad tape control card (see MIM 203).
Bad read/write head (see MIM 203).
Dirty tape head.
Check/adjust the cartridge stop blocks (see MIM 223).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

096
Remove jumper.

Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

097
ERROR 989--READ DATA ERROR.
No sync byte detected on tape channel 0 (format track) or on tape channel 1 (data track).

-Probe H2-J06 (-read data).
(See appendix B, the general logic probe, in the 5110 MIM).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

098
-Loop on this test (press L on the keyboard).

Are both lights on and steady?
Y N

099
Is the UP light on?
Y N

C C C C
G H J K

100
Bad H2 (base I/O) card.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

101
-Probe tape control card pin S09 (-read data).

Is the DOWN light on?
Y N

102
Bad tape control card (see MIM 203).

103
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

104
Bad tape control card (see MIM 203).
Bad H2 (base I/O) card.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Bad read/write head (see MIM 203).
Dirty tape head.
Check/adjust the cartridge stop blocks (see MIM 223).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

105
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).

Is the DOWN light on?
Y N

106
Is the UP light on?
Y N

107
Bad H2 (base I/O) card.

108
Bad tape control card (see MIM 203).

109
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?
Y N

110
Is the UP light on?
Y N

111
Bad H2 (base I/O) card.

112
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

113
Bad H2 (base I/O) card.

114
ERROR 988--READ DATA ERROR.
No sync byte detected on tape channel 1 (data track).

Bad tape control card (see MIM 203).
Bad read/write head (see MIM 203).
Dirty tape head.
Check/adjust the cartridge stop blocks (see MIM 223).

115
ERROR 987--READ DATA ERROR.
No sync byte detected on tape channel 0 (format track).

Bad tape control card (see MIM 203).
Bad read/write head (see MIM 203).
Dirty tape head.
Check/adjust the cartridge stop blocks (see MIM 223).

116
ERROR 986--READ DATA ERROR.
No interrupt detected on tape channel 1 (data track).

Bad tape control card (see MIM 203).
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

117
ERROR 985--READ DATA ERROR.
No interrupt detected on tape channel 0 (format track).

Bad tape control card (see MIM 203).
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

118
ERROR 983--READ DATA ERROR.
No interrupt detected on either tape channel 0 (format track) or on tape channel 1 (data track).

-Calibrate the multimeter (see MIM 270).
-Measure -5 Vdc between N2-P08 (gnd) and tape control card pin S06 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

119
-Measure -5 Vdc between N2-P08 (gnd) and E6-D02 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

120
-Measure -5 Vdc between N2-P08 (gnd) and C1-E11 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

121
The -5 Vdc from the power supply is not in tolerance.

Go To Map 0700, Entry Point A.

122
Repair the open connection from C1-E11 to E6-D02 .

123
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

124
Bad tape control card (see MIM 203).

125
ERROR 982--STATUS ERROR.
BOT Status active once, but it is not active now.

Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

126
ERROR 973--STATUS ERROR.
Tape might be moving too slow.

Check/adjust the motor pulley (see MIM 227).
Check/adjust the cartridge stop blocks (see MIM 223).
Inspect the jackshaft housing and the spindle for binds (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Bad tape motor assembly (see MIM 203).
Bad diagnostic tape cartridge.
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).

127
ERROR 970--STATUS ERROR.
Unexpected beginning or end of tape status active.

-Observe which reel of the tape cartridge has the most tape on it.

Does the right reel have more tape on it than the left reel?
Y N

128
-Press C to call the tape repositioning option.
-Press B to call the reverse tape repositioning routine.

Go to Page 1, Step 001, Entry Point A.

129
-Press C to call the tape repositioning option.
-Press F to call the forward tape repositioning routine.

Did the tape go forward (counter clockwise motion)?
Y N

130
-Press ATTN
-Probe the tape control card U04 (-forward), while repeating the previous step.

Is the DOWN light on?
Y N

131
Bad H2 (base I/O) card.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

132
Bad tape control card (see MIM 203).

133
Go to Page 1, Step 001, Entry Point A.

134
ERROR 966--STATUS ERROR.
BOT Status cannot be cleared (status bit 7 was 0, should have been 1).

-If you do not know the answer to the next question, answer it N.

Is the tape moving too slow?
Y N

135
-Run the tape speed test by pressing EXECUTE on the keyboard.

Is ERROR 973 now displayed on the display?
Y N

136
Bad H2 (base I/O) card.

137
Check/adjust the motor pulley (see MIM 227).
Check/adjust the cartridge stop blocks (see MIM 223).
Inspect the jackshaft housing and the spindle for binds (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Bad tape motor assembly (see MIM 203).
Bad diagnostic tape cartridge.
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).

138
Tape might be moving too slow.

Check/adjust the motor pulley (see MIM 227).
Check/adjust the cartridge stop blocks (see MIM 223).
Inspect the jackshaft housing and the spindle for binds (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Bad tape motor assembly (see MIM 203).
Bad diagnostic tape cartridge.
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).

139
ERROR 963--STATUS ERROR.
Load point hole (BOT status) can not be found (status bit 7 was 1, should have been 0).

Check/adjust the cartridge stop blocks (see MIM 223).
Bad tape LED/PTX assembly (see MIM 203).
Bad tape control card (see MIM 203).
Bad diagnostic tape cartridge.

140

ERROR 960--STATUS ERROR .
BOT Status is not active (status bit 7 was 1, should have been 0).

-Jumper tape control card pin B08 (gnd) to tape control card pin D10 (+BOT PTX collector) (see MIM 230).
-Try the test again (press R on the keyboard).

This section of the tape read diagnostic program just ran again.

Is ERROR 960 still displayed?
Y N

141
Remove jumper.

Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

142

-Probe tape control card pin S04 (-BOT).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

143
Remove jumper.

Bad tape control card (see MIM 203).

144

-Probe H2-U10 (-BOT).

Is the DOWN light on?
Y N

C C
V W

145
Remove jumper.

Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

146
Remove jumper.

Bad H2 (base I/O) card.

147

ERROR 958--STATUS ERROR.
EOT Status cannot be cleared (status bit 0 was 1, should have been 0).

-If you do not know the answer to the next question, answer it N.

Is the tape moving too slow?
Y N

148
-Run the tape speed test by pressing EXECUTE on the keyboard.

Is ERROR 973 now displayed?
Y N

149
Bad H2 (base I/O) card.

150

Check/adjust the motor pulley (see MIM 227).
Check/adjust the cartridge stop blocks (see MIM 223).
Inspect the jackshaft housing and the spindle for binds (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Bad tape motor assembly (see MIM 203).
Bad diagnostic tape cartridge.
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).

TAPE READ MAP

151
Tape might be moving too slow.

Check/adjust the motor pulley (see MIM 227).
Check/adjust the cartridge stop blocks (see MIM 223).
Inspect the jackshaft housing and the spindle for binds (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Bad tape motor assembly (see MIM 203).
Bad diagnostic tape cartridge.
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).

152
ERROR 957--STATUS ERROR.
EOT Status is not active (status bit 0 was 0, should have been 1).

-Attach a jumper between tape control card pin BO8 (gnd) to tape control card pin B10 (+EOT PTX collector) (see MIM 230).
-Probe H2-J02 (-EOT).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

153
-Probe tape control card pin SO2 (-EOT).

Is the DOWN light on?
Y N

154
Remove jumper.

Bad tape control card (see MIM 203).

CCY Z

155
Remove jumper.

Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

156
-Try the test again (press R on the keyboard).

Is the message THE PROGRAM IS LOOKING FOR BEGINNING OR END OF TAPE. displayed on the display?
Y N

157
Remove jumper.

Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

158
Remove jumper.

Bad H2 (base I/O) card.

159
ERROR 954--STATUS ERROR.
Neither BOT nor EOT status is active (status bit 0 was 0, should have been 1 and status bit 7 was 1, should have been 0).

-If you do not know the answer to the next question, answer it N.

Is the tape moving too slow or not at all?
Y N

160
Did the tape run off either reel?
Y N

161

-Try the test again (press R on the keyboard).

Wait for another error to be displayed on the display.

Go to Page 1, Step 001, Entry Point A.

162

Check/adjust the cartridge stop blocks (see MIM 223).
Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).
Bad diagnostic tape cartridge.

163

Check/adjust the motor pulley (see MIM 227).
Check/adjust the cartridge stop blocks (see MIM 223).
Inspect the jackshaft housing and the spindle for binds (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Bad tape motor assembly (see MIM 203).
Bad diagnostic tape cartridge.
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).

164

ERROR 953--COMMAND ERROR.
Unwanted tape motion.

There may be foreign material in the select magnet gaps (see MIM 203).
Bad brake arm or brake arm spring (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Check/adjust the jackshaft housing (see MIM 220).

165

ERROR 952--COMMAND ERROR.
Loss of clockwise (reverse) tape direction control.

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape reels move at all after you pressed C?
Y N

166

-If there is a cartridge in the tape drive, remove it.
-While looking into the front of the tape drive push the spindle (see MIM 203) to the right. Do not push on the rubber part of the spindle.

While the spindle is pushed to the right, the tape motor should rotate the spindle.

Does the spindle rotate?
Y N

167

There may be foreign material in the select magnet gaps (see MIM 203).
Check/adjust the jackshaft housing (see MIM 220).
Check/adjust the magnet gaps (see MIM 221).
Bad spindle-select arm assembly (see MIM 203).

168

-Insert the diagnostic cartridge into the tape drive.

****
* CAUTION *
****

Tape may run off the reel if the jumper is left on too long.

-Momentarily attach a jumper between tape control card pin D12 (-reverse magnet drive) and tape control card pin U08 (gnd) (see MIM 230).
-Remove jumper.

Did the tape move clockwise (reverse)?

Y N

169

-Calibrate the multimeter (see MIM 270).

-Measure +12 Vdc between tape control card pin D13 (+12 Vdc) and tape control card U08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?

Y N

170

Go to Page 36, Step 423, Entry Point C.

171

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure the resistance between tape control card pin D12 and D13.

Is the resistance 25 to 40 ohms?

Y N

D D D
F G H

172

Bad select magnet (reverse) (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

173

There may be foreign material in the select magnet gaps (see MIM 203).
Check/adjust the jackshaft housing (see MIM 220).
Check/adjust the magnet gaps (see MIM 221).
Bad spindle-select arm assembly (see MIM 203).

174

Bad tape control card (see MIM 203).

175

(Entry Point H)

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape reels move counterclockwise (forward) rather than clockwise (reverse)?

Y N

176

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape reels move very slowly or slow down after starting?

Y N

1 1 1
8 8 8
D D D
J K L

177

You have indicated by your answers that the tape reels moved clockwise for about 2 seconds. That is what should happen for this test. You might not have an error.

-Try the test again (press R on the keyboard).

Go to Page 1, Step 001, Entry Point A.

178

There may be foreign material in the select magnet gaps (see MIM 203).

179

-Probe tape control card pin U04 (-forward) (see 230).
(See appendix B, the general logic probe, in the 5110 MIM).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

180

Bad tape control card (see MIM 203).

181

-Remove the H2 (base I/O) card from the board.

Is the DOWN light on?

Y N

182

Is the UP light on?

Y N

183

-Reinstall the H2 card.

Bad tape control card (see MIM 203).

184

Bad H2 (base I/O) card.

185

-Reinstall the H2 card.

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

186

ERROR 951--COMMAND ERROR.
Loss of counterclockwise (forward) tape direction control.

If you do not remember the answer to the next question watch for tape motion as you put the cartridge in again. Quickly remove the cartridge if the tape moves.

Did the tape move as soon as you put the cartridge in?

Y N

187

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape reels move at all after you pressed C?

Y N

188

-If there is a cartridge in the tape drive, remove it.
-Looking into the front of the tape drive, watch for spindle rotation (see MIM 203) after pressing R and then C on the keyboard.

Does the spindle rotate?

Y N

189

-While looking into the front of the tape drive push the spindle (see MIM 203) to the left. Do not push on the rubber part of the spindle.

While the spindle is pushed to the left, the tape motor should rotate the spindle.

Does the spindle rotate?

Y N

190

-Open the covers and see if the motor is running. It is difficult to view the motor turning. You might have to view the jackshaft pulleys and the drive belt to tell if the motor is turning.

Is the motor running?

Y N

191

-Power down.
-Unplug theAC line cord for the 5110.
-Disconnect the power supply ac power connector P1 at the ac power box (see MIM 207,273).
-Disconnect the tape motor ac power connector P3 at the ac power box (see MIM 207,273).
-Connect the tape motor ac power connector (P3) to the power supply ac power connector (J1).
-Plug in the AC line cord.
-Power up. Wait 25 seconds.

Does the tape motor run now?

Y N

20 DS DT DU DV

DT DU DV

192

-Power down.
-Unplug the AC line cord.
-Replug ac power connectors in their proper locations (tape motor connector at J3 and ac power supply connector at J1 (see MIM 207,273).

Bad tape motor assembly (see MIM 203).
Bad tape motor start capacitor (see MIM 203). Check the tape motor cable and connector.

193

-Power down.
-Unplug the AC line cord.
-Replug ac power connectors in their proper locations (tape motor connector at J3 and ac power supply connector at J1 (see MIM 207,273).

Test/replace ac wiring (see MIM 273).

194

Is the jackshaft rotating (see MIM 203)?

Y N

195

Inspect the jackshaft for frozen bearings.
Bad belt (see MIM 203).
Check/adjust the motor pulley (see MIM 227).
Bad jackshaft housing assembly (see MIM 203).

196

There may be foreign material in the select magnet gaps (see MIM 203).
Check/adjust the jackshaft housing (see MIM 220).
Check/adjust the magnet gaps (see MIM 221).
Bad jackshaft housing assembly (see MIM 203).
Bad spindle-select arm assembly (see MIM 203).

197

-Insert the diagnostic cartridge into the tape drive.

****
* CAUTION *
****

Tape may run off the reel if the jumper is left on too long.

-Momentarily attach a jumper between tape control card pin B12 (-forward magnet drive) and tape control card pin U08 (gnd) (see MIM 230).
-Remove the jumper.

Did the tape move counterclockwise (forward)?

Y N

198

-Calibrate the multimeter (see MIM 270).
-Measure +12 Vdc between tape control card pin B13 (+12 Vdc) and tape control card pin U08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?

Y N

199

Go to Page 36, Step 423, Entry Point C.

200

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure the resistance between tape control card pin B12 and B13 .

Is the resistance 25 to 40 ohms?

Y N

DWXY

DPQWXY18

201

Bad select magnet (forward) (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

202

There may be foreign material in the select magnet gaps (see MIM 203).
Check/adjust the jackshaft housing (see MIM 220).
Check/adjust the magnet gaps (see MIM 221).
Bad spindle-select arm assembly (see MIM 203).

203

Bad tape control card (see MIM 203).

204

Check/adjust the cartridge stop blocks (see MIM 223).
Check/adjust the locking wheels (see MIM 222).
Bad spindle-select arm assembly (see MIM 203).
Bad diagnostic tape cartridge.

205

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape motion last about 2 seconds?

Y N

206

Bad brake arm or brake arm spring (see MIM 203).
Bad H2 (base I/O) card.

207

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape reels move clockwise (reverse) rather than counterclockwise (forward)?

Y N

208

-If you do not remember the answer to the next question, press R and then C to try the test again.

Did the tape reels move very slowly or slow down after starting?

Y N

209

You have indicated by your answers that the tape reels moved counterclockwise for about 2 seconds. That is what should happen for this test. You might not have an error.

-Try the test again (press R on the keyboard).

Go to Page 1, Step 001, Entry Point A.

210

Check/adjust the motor pulley (see MIM 227).
Inspect the jackshaft and spindle for binds (see MIM 203).
There may be foreign material in the select magnet gaps (see MIM 203).
Bad tape motor assembly (see MIM 203).
Bad spindle-select arm assembly (see MIM 203).
Bad jackshaft housing assembly (see MIM 203).
Bad diagnostic tape cartridge.

EA

211

-Probe tape control card pin U04 (-forward) (See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?

Y N

212

Bad tape control card (see MIM 203).

213

-Probe H2-J04 (-forward).

Is the UP light on?

Y N

214

Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

215

Bad H2 (base I/O) card.

216

There may be foreign material in the select magnet gaps (see MIM 203).
Bad brake arm or brake arm spring (see MIM 203).
Check/adjust the magnet gaps (see MIM 221).
Check/adjust the jackshaft housing (see MIM 220).

217

ERROR 950--STATUS ERROR.
EOT Status is always active (status bit 0 was 1, should have been 0).

-Remove the cartridge from the tape drive.

Has the tape run off either reel?

Y N

218
The tape is positioned on the end of tape (EOT) mark.

-Manually move the tape so the EOT mark (hole in tape) is past the mirror (see MIM 228).
-Replace the cartridge in the tape drive.
-Try the test again (press R on the keyboard).

219
-Thread the tape back on the reel (see MIM 229).
-Replace the cartridge in the tape drive.
-Try the test again (press R on the keyboard).

220
(Entry Point F)

ERROR 949--STATUS ERROR.
File protect status should not be active (status bit 6 was 1, should have been 0).

-Remove the cartridge from the tape drive.
-Determine if the problem is electrical or mechanical by manually pressing the file protect switch. (The file protect switch can be seen by looking into the front of the tape drive. It is the leftmost switch. See MIM 203).
-While manually pressing the file protect switch:
-Try the test again (press R on the keyboard).

Pressing R caused this section of the tape diagnostic to run again.

Is error 949 still displayed on the display?
Y N

EDE

221
The file protect switch operates electrically.

Check/adjust the switch assembly (see MIM 224).
Check/adjust the cartridge stop blocks (see MIM 223).
Bad tape switch assembly (see MIM 203).
Bad diagnostic tape cartridge.

222
The problem is an electrical problem, not an adjustment problem.

-Replace the cartridge in the tape drive.
-Probe tape control card pin D07 (+file protect) (see MIM 230).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

223
Bad tape switch assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

224
-Probe tape control card pin U13 (+file protect).

Is the DOWN light on?
Y N

225
Bad tape control card (see MIM 203).

226
-Probe H2-P04 (+file protect).

Is the DOWN light on?
Y N

227
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

228
Bad H2 (base I/O) card.

229
(Entry Point E)

ERROR 948--STATUS ERROR.
Cartridge in place status not active (status bit 3 was 0, should have been 1).

-Remove the cartridge from the tape drive.
-Determine if the problem is electrical or mechanical by manually pressing the cartridge in place switch. The cartridge in place switch can be seen by looking into the front of the tape drive, it is the rightmost switch (see MIM 203).
-While manually pressing the cartridge in place switch
-Try the test again (press R on the keyboard).

Pressing R causes this section of the tape read diagnostic program to run again.

Is ERROR 948 still displayed?
Y N

230
The cartridge in place switch operates electrically.

Check/adjust the switch assembly (see MIM 224).
Check/adjust the cartridge stop blocks (see MIM 223).
Bad tape switch assembly (see MIM 203).
Bad diagnostic tape cartridge.

E G

231
The problem is an electrical problem not an adjustment problem.

-Replace the cartridge in the tape drive.
-Probe tape control card B08 (gnd) (see MIM 230).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

232
Bad tape control card (see MIM 203).

233
-Probe tape control card pin BO7 (-cartridge in place).

Is the DOWN light on?
Y N

234
Bad tape switch assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

235
-Probe tape control card pin S12 (-cartridge in place).

Is the DOWN light on?
Y N

236
Bad tape control card (see MIM 203).

237
-Probe H2-M03 (-cartridge in place).

Is the DOWN light on?
Y N

TAPE READ MAP

238
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

239
Bad H2 (base I/O) card.

240
ERROR 947--WRAP ERROR.
No data detected for wrap through the tape control card.

Bad tape control card (see MIM 203).
Bad H2 (base I/O) card.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

241
ERROR 946--WRAP ERROR.
Missing interrupt for wrap through tape head.

-Probe tape control card pin U09 (-channel select).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

242
-Loop on this test (press L on the keyboard).
-Probe tape control card pin U09 (-channel select).

Are both lights on and steady?
Y N

243
Is the UP light on?
Y N

244
Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

245
-Probe H2-G13 (-channel select).
-Leave the probe on the pin.

Is the UP light on?
Y N

246
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

247
Bad H2 (base I/O) card.

248
Bad tape control card (see MIM 203).
Bad read/write head (see MIM 203).

249
-Remove the H2 (base I/O) card from the board.
-Probe tape control card pin U09 (-channel select).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

250
Is the UP light on?
Y N

251
-Reinstall the H2 card.

Bad tape control card (see MIM 203).

252
Bad H2 (base I/O) card.

253
-Reinstall the H2 card.

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

254
ERROR 943--WRAP ERROR.
Extra data detected for wrap through the tape control card.

-Probe tape control card pin S05 (-diagnostic mode) (see MIM 230).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

255
Bad tape control card (see MIM 203).

256
-Probe H2-G04 (-diagnostic mode).

Is the UP light on?
Y N

257
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

258
Bad H2 (base I/O) card.

259
ERROR 940--WRAP ERROR.
No interrupt detected for wrap through tape control card.

-Probe tape control card pin U02 (+tape clock) (see MIM 230).
(See appendix B, the general logic probe, in the 5110 MIM).

Are both lights on and steady?
Y N

26 EN EP

260
-Probe tape control card pin U02 (+tape clock).

Is the DOWN light on?
Y N

261
-Probe H2-D06 (+tape clock).
-Leave the probe on the pin.

Is the UP light on?
Y N

262
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

263
Bad H2 (base I/O) card.

264
-Remove the H2 (base I/O) card from the board.
-Probe tape control card pin U02 (+tape clock).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

265
Is the UP light on?
Y N

266
-Reinstall the H2 card.

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

267
Bad H2 (base I/O) card.

268
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

269

-Probe tape control card pin U06 (-write enable).

Is the DOWN light on?

Y N

270

-Loop on this test (press L on the keyboard).
-Probe tape control card pin U06 (-write enable).

Are both lights on and steady?

Y N

271

Is the UP light on?

Y N

272

Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

273

-Probe H2-G03 (-write enable).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

274

Bad H2 (base I/O) card.

275

Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

276

-Probe H2-G08 (-read clock).

Are both lights on and steady?

Y N

2 2 8 7 E E Q R E S

277

-Probe H2-G08 (-read clock).

Is the DOWN light on?

Y N

278

-Probe H2-G08 (-read clock).
-Leave the probe on the pin.

Is the UP light on?

Y N

279

Bad H2 (base I/O) card.

280

-Probe tape control card pin S10 (-read clock).

Is the DOWN light on?

Y N

281

Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

282

Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

283

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe H2-G08 (-read clock).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

2 2 7 7 E E T U

284

Is the UP light on?

Y N

285
Bad H2 (base I/O) card.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

286
Bad tape control card (see MIM 203).

287
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?

Y N

288
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

289
Bad H2 (base I/O) card.

290
-Calibrate the multimeter (see MIM 270).
-Measure -12 Vdc between tape control card pin U08 (gnd) and tape control card pin S13 (-12 Vdc) (see MIM 230).

Is the voltage in tolerance (-11.0 Vdc TO -13.2 Vdc)?

Y N

28 EV EW

EW

291
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure -12 Vdc between tape control card pin U08 (gnd) and tape control card pin S13 (-12 Vdc).

Is the voltage in tolerance (-11.0 Vdc TO -13.2 Vdc)?

Y N

292
-Install the tape control card (see MIM 203).
-Measure -12 Vdc between N2-P08 (gnd) and G6-A02 (-12 Vdc).

Is the voltage in tolerance (-11.0 Vdc TO -13.2 Vdc)?

Y N

293
-Measure -12 Vdc between N2-P08 (gnd) and C1-E13 (-12 Vdc).

Is the voltage in tolerance (-11.0 Vdc TO -13.2 Vdc)?

Y N

294
The -12 Vdc from the power supply is not in tolerance.

Go To Map 0700, Entry Point A.

295
Repair the open connection from C1-E13 to G6-A02 .

296
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

297
Bad tape control card (see MIM 203).

298

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Test the continuity of a wire in the tape internal cable (probe on the cable not on the card) by testing for continuity from tape control card pin B09 (raw data) to tape control card pin D09 (raw data) (see MIM 230).

Is there continuity between the pins?

Y N

299

Bad tape control card (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

300

****
* CAUTION *
****

A bad read/write head can cause the tape control card to go bad. GO TO ERROR 004 to check out the read/write head, before replacing the tape control card.

Bad tape control card (see MIM 203).
Bad H2 (base I/O) card.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

301

-Remove the H2 (base I/O) card from the board.
-Probe tape control card pin U06 (-write enable).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

302

Is the UP light on?

Y N

303

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

304

Bad H2 (base I/O) card.

305

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

306

ERROR 939--INTERRUPT ERROR.
Incorrect interrupt response.

-Probe tape control card pin S05 (-diagnostic mode) (see MIM 230).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?

Y N

307

Bad tape control card (see MIM 203).
Bad H2 (base I/O) card.

308

-Remove the H2 (base I/O) card from the board.
-Probe tape control card pin S05 (-diagnostic mode).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

309

Is the UP light on?

Y N

310
-Reinstall the H2 card.

Bad tape control card (see MIM 203).

311
Bad H2 (base I/O) card.

312
-Reinstall the H2 card.

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

313
ERROR 938--STATUS ERROR.
Select magnet active status for reverse operation should be active (status bit 2 was 1, should have been 0).

-Probe H2-P11 (-select magnet active)
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?

Y N

314
Bad H2 (base I/O) card.

315
-Probe tape control card pin U12 (-select magnet active) (see MIM 230).

Is the UP light on?

Y N

316
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

317
-Probe tape control card pin D12 (-reverse select magnet).

Is the UP light on?

Y N

318
Bad tape control card (see MIM 203).

319
-Probe tape control card pin U05 (-run).

Is the UP light on?

Y N

320
Bad tape control card (see MIM 203).

321
-Probe H2-M13 (-run).

Is the UP light on?

Y N

322
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

323
Bad H2 (base I/O) card.

324
ERROR 937--STATUS ERROR.
Select magnet active status for forward operation should be active (status bit 2 was 1, should have been 0).

-Probe H2-P11 (-select magnet active).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?

Y N

325
Bad H2 (base I/O) card.

326
-Probe tape control card pin U12 (-select magnet active) (see MIM 230).

Is the UP light on?
Y N

327
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

328
-Probe tape control card pin B12 (-forward select magnet).

Is the UP light on?
Y N

329
Bad tape control card (see MIM 203).

330
-Probe tape control card pin U05 (-run).

Is the UP light on?
Y N

331
Bad tape control card (see MIM 203).

332
-Probe H2-M13 (-run).

Is the UP light on?
Y N

333
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

334
Bad H2 (base I/O) card.

335
ERROR 936--STATUS ERROR.
Select magnet active status was active, should not have been active(status bit 2 was 1, should have been 0).

-Probe H2-P11 (-select magnet active).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

336
Bad H2 (base I/O) card.

337
-Probe tape control card pin U05 (-run) (see MIM 230).

Is the DOWN light on?
Y N

338
-Probe tape control card pin B13 (+12 Vdc).

Is the UP light on?
Y N

339
Bad tape control card (see MIM 203).

340
-Probe tape control card pin B12 (-forward select magnet).

Is the UP light on?
Y N

341
Bad tape control card (see MIM 203).
Bad select magnet (forward) (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

342
-Probe tape control card pin D13 (+12 Vdc).

Is the UP light on?
Y N

343
Bad tape control card (see MIM 203).

344
-Probe tape control card pin D12 (-reverse select magnet).

Is the UP light on?
Y N

345
Bad tape control card (see MIM 203).
Bad select magnet (reverse) (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

346
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe H2-P11 (-select magnet active).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

347
Is the UP light on?
Y N

348
Bad H2 (base I/O) card.

349
Bad tape control card (see MIM 203).

FFG30

350
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?
Y N

351
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

352
Bad H2 (base I/O) card.

353
-Remove the H2 (base I/O) card from the board.
-Probe tape control card pin U05 (-run).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

354

Is the UP light on?
Y N

355
Bad tape control card (see MIM 203).

356
Bad H2 (base I/O) card.

357
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

358

ERROR 933--STATUS ERROR.
Erase active status for tape track channel 1 should be active (status bit 4 was 0, should have been 1).

-Probe H2-U09 (-erase inactive).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?

Y N

359
Bad H2 (base I/O) card.

360
-Probe tape control card pin U11 (-channel 1 erase) (see MIM 230).

Is the UP light on?

Y N

361
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe H2-U09 (-erase inactive).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

362
Is the UP light on?

Y N

363
Bad H2 (base I/O) card.

364
Bad tape control card (see MIM 203).

F F
H J

365
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?

Y N

366
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

367
Bad H2 (base I/O) card.

368
-Probe H2-S08 (-channel 1 erase).

Is the UP light on?

Y N

369
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

370
Bad H2 (base I/O) card.

371

ERROR 930--STATUS ERROR.
Erase active status for tape channel 0 should be active (status bit 4 was 0, should have been 1).

-Probe H2-U09 (-erase inactive).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?

Y N

372
Bad H2 (base I/O) card.

373
-Probe tape control card pin U10 (-channel 0 erase) (see MIM 230).

Is the UP light on?
Y N

374
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe H2-U09 (-erase inactive).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

375
Is the UP light on?
Y N

376
Bad H2 (base I/O) card.

377
Bad tape control card (see MIM 203).

378
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?
Y N

379
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

380
Bad H2 (base I/O) card.

381
-Probe H2-J07 (-channel 0 erase).

Is the UP light on?
Y N

382
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

383
Bad H2 (base I/O) card.

384
ERROR 927--STATUS ERROR.
Status indicates that the tape drive is in erase mode when it should not be (status bit 4 was 1, should be 0).

-Probe H2-U09 (-erase inactive).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

385
Bad H2 (base I/O) card.

386
-Probe tape control card pin S03 (-erase inactive) (see MIM 230).

Is the UP light on?
Y N

387
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

388

-Probe tape control card pin U10 (-channel 0 erase) and pin U11 (-channel 1 erase).

Is the DOWN light on for either probe point?

Y N

389

Bad tape control card (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

390

-Remove the H2 (base I/O) card from the board.
-Probe tape control card pin U10 (-channel 0 erase) and pin U11 (-channel 1 erase).

Is the DOWN light on for either probe point?

Y N

391

Is the UP light on for both probe points?

Y N

392

Bad tape control card (see MIM 203).

393

Bad H2 (base I/O) card.

394

Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

395

ERROR 924--STATUS ERROR.
EOT Status was active but should not have been active (status bit 0 was 1, should have been 0).

-Probe H2-JO2 (-EOT).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?

Y N

396

Bad H2 (base I/O) card.

397

-Calibrate the multimeter (see MIM 270).
-Measure greater than +1 Vdc between tape control card pin B10 (+EOT PTX collector) and tape control card pin U08 (gnd) (see MIM 230).

Is the voltage greater than 1 Vdc?

Y N

398

Bad tape control card (see MIM 203).
Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

399

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe H2-J02 (-EOT).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

400

Is the UP light on?

Y N

401

Bad H2 (base I/O) card.

402
Bad tape control card (see MIM 203).

403
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?
Y N

404
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

405
Bad H2 (base I/O) card.

406
ERROR 921--STATUS ERROR.
BOT Status is active but should not have been active (status bit 7 was 0, should have been 1).

-Probe H2-U10 (-BOT).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

407
Bad H2 (base I/O) card.

408
-Calibrate the multimeter (see MIM 270).

-Measure greater than 1 Vdc between tape control card pin D10 (+BOT PTX collector) and tape control card pin U08 (gnd) (see MIM 230).

Is the voltage greater than 1 Vdc?
Y N

F F
Q R

409
Bad tape control card (see MIM 203).
Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

410
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe H2-U10 (-BOT).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

411
Is the UP light on?
Y N

412
Bad H2 (base I/O) card.

413
Bad tape control card (see MIM 203).

414
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?
Y N

415
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

416
Bad H2 (base I/O) card.

417

ERROR 918--STATUS ERROR.
Status indicates the the LED used for detecting BOT-EOT is not on (status bit 5 was 0, should have been 1).

NOTE: All probes or meter tests for this error require that the ground wire of the probe or meter be attached to N2-P08 (gnd) in the 5110.

-Probe H2-J13 (-LED and erase ok).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

418
Bad H2 (base I/O) card.

419
-Probe tape control card pin S07 (-LED and erase ok) (see MIM 230).

Is the UP light on?
Y N

420
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

421
-Calibrate the multimeter (see MIM 270).
-Measure greater than +8 Vdc between tape control card pin B11 (+LED conducting) and N2-P08 (gnd).

Is the voltage greater than +8 Vdc?
Y N

3 7 F S F T

422

-Measure +12 Vdc between tape control card pin D11 (+12 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

423
(Entry Point C)

-Measure +12 Vdc between tape control card pin S11 (+12 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

424
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure +12 Vdc between tape control card pin S11 (+12 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

425
-Install the tape control card (see MIM 203).
-Measure +12 Vdc between F6-D02 (+12 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

3 7 F U 3 7 F V 3 7 F W 3 7 F X 3 7 F Y

TAPE READ MAP

426
-Measure +12 Vdc between C1-D13 (+12 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

427
+12 Vdc is not in tolerance.

Go To Map 0700, Entry Point A.

428
Repair the open connection between C1-D13 and F6-D02 .

429
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

430
Bad tape control card (see MIM 203).

431
Bad tape control card (see MIM 203).

432
Bad tape LED/PTX assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

433
-Measure +5 Vdc between tape control card pin U03 (+5 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+4.6 Vdc to +5.5 Vdc)?
Y N

38FZ GA

434
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure +5 Vdc between tape control card pin U03 (+5 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+4.6 Vdc to +5.5 Vdc)?
Y N

435
-Install the tape control card (see MIM 203).
-Measure +5 Vdc between E6-A04 (+5 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+4.6 Vdc to +5.5 Vdc)?
Y N

436
-Measure +5 Vdc between J2-U03 (+5 Vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+4.6 Vdc to +5.5 Vdc)?
Y N

437
+5 Vdc is not in tolerance

Go To Map 0700, Entry Point A.

438
Repair the open connection between J2-U03 and E6-A04

439
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

440
Bad tape control card (see MIM 203).

441

-Measure 0 Vdc between tape control card pin U08 (gnd) and N2-P08 (gnd).

Is the ground voltage in tolerance (0.0 Vdc TO 0.3 Vdc)?

Y N

442

-Measure for 0 Vdc between F6-A02 (gnd) and N2-P08 (gnd).

Is the ground voltage in tolerance (0.0 Vdc TO 0.3 Vdc)?

Y N

443

Ground voltage is not in tolerance.

Go To Map 0700, Entry Point A.

444

Go to Step 445, Entry Point D.

445

(Entry Point D)

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Test for continuity from tape control card pin U08 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

446

-Install the tape control card (see MIM 203).
-Test for continuity from F6-A02 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

447

Pin F6-A02 is part of the board ground plane; it must be ground. Retry this MAP :

Go to Page 2, Step 007, Entry Point B.

448

Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

449

-Test for continuity from tape control card pin S08 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

450

-Install the tape control card (see MIM 203).
-Test for continuity from F6-A04 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

451

-Test for continuity from F6-A02 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

452

Pin F6-A02 is part of the board ground plane, it must be ground.
Retry this map

Go to Page 2, Step 007, Entry Point B.

453

Repair the open connection between F6-A02 and F6-A04 .

454
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

455
Bad tape control card (see MIM 203).

456
ERROR 915--STATUS ERROR.
File protect status should be active (status bit 6 was 0, should have been 1).

-Probe H2-P04 (+file protect).
(See appendix B, the general logic probe, in the 5110 MIM).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

457
Bad H2 (base I/O) card.

458
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).

Is the UP light on?
Y N

459
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the UP light on?
Y N

460
Bad H2 (base I/O) card.

461
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

AGG

AGH
G5

462
-Test for continuity from tape control card pin D07 (+file protect) to pin B08 (gnd).

Is there continuity between the pins?
Y N

463
Bad tape control card (see MIM 203).

464
Bad tape switch assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).
Check/adjust the locking wheels (see MIM 222).
Check/adjust the cartridge stop blocks (see MIM 223).

465
ERROR 912--STATUS ERROR.
Cartridge in place status should not be found (bit 3 should be 0).

-Probe H2-M03 (-cartridge in place).
(See appendix B, the general logic probe, in the 5110 MIM).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

466
Bad H2 (base I/O) card.

467
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).

Is the UP light on?
Y N

468
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the UP light on?
Y N

469
Bad H2 (base I/O) card.

470
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

471
-Test for continuity from tape control card pin B07 (- cartridge in place) to pin B08 (gnd).

Is there continuity between the pins?
Y N

472
Bad tape control card (see MIM 203).

473
Bad tape switch assembly (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

474
ERROR 909--WRAP ERROR.
Error occurred during a test of the H2 (base I/O) card, no wrap of data.

Bad H2 (base I/O) card.

475
ERROR 907--INTERRUPT ERROR.
Incorrect interrupt response.

-Probe H2-G08 (-read clock).
(See appendix B, the general logic probe, in the 5110 MIM).

Are both lights on and steady?
Y N

476

Is the DOWN light on?
Y N

477
-Probe H2-D13 (-int req 2).

Is the DOWN light on?
Y N

478
-Remove the A2, B2, and D2 if installed.
-Press RESTART. Wait 25 seconds.
-Retry loading the TAPE READ TESTS (see MIM section 4, Diagnostic Aids)

Did you get an ERROR 907?
Y N

479
One of the cards you removed is bad. Install each card one at a time, pressing RESTART and retrying the TAPE READ TEST after each card is installed. The card which causes a 907 error is bad.

480
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

481
Bad J2 (processor) card (see MAP 050 for jumpering).

482
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Probe J2-G08 (-read clock).
-Leave the probe on the pin.

Is the DOWN light on?
Y N

483
Is the UP light on?
Y N

484
Bad H2 (base I/O) card.

485
Bad tape control card (see MIM 203).

486
-Disconnect the tape drive cable Z2 from the board (see MIM 231).

Is the DOWN light on?
Y N

487
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

488
Bad H2 (base I/O) card.

489
-Calibrate the multimeter (see MIM 270).
-Measure -5 Vdc between N2-P08 (gnd) and tape control card pin S06 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

490
-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure -5 Vdc between N2-P08 (gnd) and tape control card pin S06 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

491
-Install the tape control card (see MIM 203).
-Measure -5 Vdc between N2-P08 (gnd) and E6-D02 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

492
-Measure -5 Vdc between N2-P08 (gnd) and C1-E11 (-5 Vdc).

Is the voltage in tolerance (-4.6 Vdc to -5.5 Vdc)?
Y N

493
The -5 Vdc from the power supply is not in tolerence.

Go To Map 0700, Entry Point A.

TAPE READ MAP

494
Repair the open connection from C1-E11 to E6-D02 .

495
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

496
Bad tape control card (see MIM 203).

497
Bad tape control card (see MIM 203).

498
Error 906--status error.
Subdevice address response status from internal tape drive not active (status bit 1 was 1, should have been 0).

Bad H2 (base I/O) card.

499
Error 903--status error.
Expected ROS status from internal tape drive was not active (special status bit 4 was 1, should have been 0).

Bad H2 (base I/O) card.

500
ERROR 901--STATUS ERROR.
Status other than FF after an all device reset.

Bad H2 (base I/O) card.

501
ERROR 014-- SYSTEM ERROR.
Device not selected.

Bad H2 (base I/O) card.

502
ERROR 013-- SYSTEM ERROR.
Device not attached.

Bad H2 (base I/O) card.

503
ERROR 012-- SYSTEM ERROR.
Physical end of tape.

Rewind the diagnostic tape. It may not be located correctly.
Bad diagnostic tape cartridge.

504
ERROR 011-- SYSTEM ERROR.
End of marked tape.

Rewind the diagnostic tape. It may not be located correctly.
Bad diagnostic tape cartridge.

505
ERROR 010-- SYSTEM ERROR.
End of file.

Rewind the diagnostic tape. It may not be located correctly.
Bad diagnostic tape cartridge.

506
ERROR 009--SYSTEM ERROR.
End of data.

Bad diagnostic tape cartridge.

507
ERROR 008-- SYSTEM ERROR.
Records/signals out of sequence (position error).

Bad diagnostic tape cartridge.
Dirty tape head.
Check/adjust the cartridge stop blocks (see MIM 223).
Bad tape control card (see MIM 203).

508
ERROR 007-- SYSTEM ERROR.
Unrecoverable data error (CRC error).

Is there a cable attached to the 5110 I/O interface port?

Y N

509
Bad diagnostic tape cartridge.
Dirty tape head.
Check/adjust the cartridge stop blocks (see MIM 223).
Bad tape control card (see MIM 203).
Bad A2 (I/O cable driver) card and cable assembly.

510
-Disconnect the cable at the 5110 I/O interface port.
-Try to load the diagnostic again.

Does ERROR 007 appear again?

Y N

G G
S T

511
The problem is in one of the I/O devices that was attached to the 5110 I/O interface port.
Connect the I/O devices up one at a time to the 5110. Use the cable terminator to terminate the I/O device if available, otherwise use the 5103 as the terminating device.
Rerun the failing diagnostic again for each I/O device you attach. The device that causes the ERROR 007 to appear is bad.
The most likely cause of the problem is either a bad adaptor card in that device, the I/O interface cable for that device, the cables that go out to that devices interface port, or the cable terminator.

512
Bad diagnostic tape cartridge.
Dirty tape head.
Bad tape control card (see MIM 203).
Bad A2 (I/O cable driver) card and cable assembly.

513
ERROR 006-- SYSTEM ERROR.
File protect on. Same as error 949.

Go to Page 22, Step 220, Entry Point F.

514
ERROR 005-- SYSTEM ERROR.
Cartridge not inserted. Same as error 948.

Go to Page 23, Step 229, Entry Point E.

515
ERROR 004-- SYSTEM ERROR .
Timeout

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (See MIM 203).
-Measure the resistance between tape control card pin BO4 (+channel 0 coil) and B05 (+channel 0 center tap) (see MIM 230).

Is the resistance between 6 ohms and 15 ohms?
Y N

516
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

517
-Measure the resistance between tape control card pin BO6 (-channel 0 coil) and B05 (+channel 0 center tap).

Is the resistance between 6 ohms and 15 ohms?
Y N

518
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

519
-Measure the resistance between tape control card pin DO4 (+channel 1 coil) and D05 (+channel 1 center tap).

Is the resistance between 6 ohms and 15 ohms?
Y N

520
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

G U

521
-Measure the resistance between tape control card pin DO6 (-channel 1 coil) and D05 (+channel 1 center tap).

Is the resistance between 6 ohms and 15 ohms?
Y N

522
Bad read/write head (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

523
Rewind the diagnostic tape. It may not be located correctly.
Bad diagnostic tape cartridge.
Dirty tape head.
Bad read/write head (see MIM 203).
Bad tape control card (see MIM 203).
Check/replace the tape internal cable (see MAP 0210 and MIM 203).

524
ERROR 003-- SYSTEM ERROR.
Machine error.

Bad H2 (base I/O) card.
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).

525
ERROR 002-- SYSTEM ERROR.
Command error. Incorrect command detected.

Go To Map 0900, Entry Point A.

526

ERROR 001-- SYSTEM ERROR.
ATTN Key pressed during tape I/O.

Did you press ATTN key during tape I/O?

Y N

527
Go To Map 0600, Entry Point A.

528
Go to Page 2, Step 007, Entry Point B.

529
Go To Map 0420, Entry Point A.

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PAGE 1 OF 27

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	010	0420	A
2	006	0420	A
23	261	0700	A
2	005	0900	A
3	009	0900	A
27	315	420	A

001
(Entry Point A)

Is the PROCESS CHECK light on?
Y N

002
If a PROCESS CHECK occurs while using the MDI, reload the MDI. If the PROCESS CHECK persists, go to MAP 420, Entry Point A.

Make sure the diskette is not damaged and the problem occurs on more than one customer diskette before using the MDI.

Look for any of the following obvious defects. If defects are found, repair or replace the failing components.

Foreign material in the diskette or diskette drive
Belt off or damaged
Broken cover/pivots
Loose pulleys
Accessing band broken or damaged
Loose cables or cards
Pulleys not turning
Fan not turning

(Step 002 continues)

(Step 002 continued)

Is the diskette difficult to insert or remove from the drive?
Y N

003
(Entry Point B)

If there is a diskette in Drive 1, remove it.

-Press RESTART and wait 25 seconds.

Use the keys in the Numeric Key section of the keyboard.

-Press HOLD
-Hold CMD and press -(minus key)

If the DCP program loads correctly, the characters DCP will be displayed.

Are the characters DCP displayed?
Y N

004
Is the PROCESS CHECK light on?
Y N

005
Go To Map 0900, Entry Point A.

006
Go To Map 0420, Entry Point A.

2
7 3
B C

007

Use the keys in the Numeric Key section.

-Hold CMD and press * (BASIC multiply key).
or
-Hold CMD and press X (APL multiply key).

If the diagnostic mode loads correctly, the characters DIAG DCP will be displayed (See section 4, Diagnostic Aids in the 5110 MIM).

Are the characters DIAG DCP displayed?
Y N

008
Is the PROCESS CHECK light on?
Y N

009
Go To Map 0900, Entry Point A.

010
Go To Map 0420, Entry Point A.

011
-Press C
-Press 1
-Press EXECUTE.

The following are the tests being run, along with the error number displayed if an error occurs while running the diagnostics.

Test	Error Number
Subdevice select	001
Set write, diag 1 and erase lines	002
Set read and diag 2 lines	003
Set MFM	004
Set FM	005
Test current select line and status	006
Test head 1 and head 0 select	008
Test access lines	009
Test overrun status	010
Test loop write/read	011
	012
	013

(Step 011 continues)

(Step 011 continued)

New media	014
Index pulse timing	015
Index pulse width	016
Head access test	017
Auto head engage/disengage test	018
Head initialize	019
Sense side 0, cylinder 0	020
Sense side 1, cylinder 0	021
Random access test	022
Load DSP	023

Are the words DISKETTE READ DIAGNOSTIC displayed on the top line of the display?

Y N

012
Bad 5110 F2 (Common and Language ROS) card.

013
An error instruction is displayed in the following format:

ERROR XXX DRIVE 1 GO TO MAP 0310.

Is an error instruction displayed?

Y N

014
Follow the instructions displayed until the characters DSP MENU are displayed.
The diskette diagnostics are being run on DRIVE 1.

Is DSP MENU displayed?

Y N

6 5 5
D E F

015
If the instruction PRESS EXECUTE, R, OR, L is displayed, ignore it.

Please observe again for:

1. PROCESS CHECK light on.
2. Error displayed.
3. Questions displayed.

Do you have any of the above conditions?
Y N

016
Were you at this step before?
Y N

017
Go to Page 2, Step 003, Entry Point B.

018
-Probe A1C1-G13 (-Put strobe) in the 5114.
Information on the use of the CE probe can be found in Appendix B of the 5110 MIM.

Is the DOWN light on or pulsing?
Y N

019
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

020
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

021
Is an error message displayed?
Y N

022
Go to Page 1, Step 001, Entry Point A.

G

023
Go to Page 6, Step 029, Entry Point P.

024
-Insert the CE diagnostic diskette (with the label to to the right) in drive 1.
-Enter 881
-Press EXECUTE

-Follow the instructions displayed to run the diagnostic.

If the PROCESS CHECK light comes on, go to MAP 0420 entry point A. Suspect the diskette adapter card along with any other callouts.

If you have swapped cables, be sure to select the proper logical drive number.

Return the cables to their proper locations after repairing the failing diskette drive (Drive 1 A1D4, Drive 2 A1B4).

Did the MDI's run to completion?
Y N

025
Follow the instructions displayed on the screen.

026
Did you remove a second 5114?
Y N

027
No failure found.

028
The trouble is in the 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

029
(Entry Point P)

Are two 5114's installed on the system?
Y N

030
Are two drives installed in the 5114?
Y N

031
(Entry Point E)

Is the error code 001?
Y N

032
Is the error code 002?
Y N

033
Is the error code 003?
Y N

27H 26J 22K 21L 21M N

N

034
Is the error code 004?
Y N

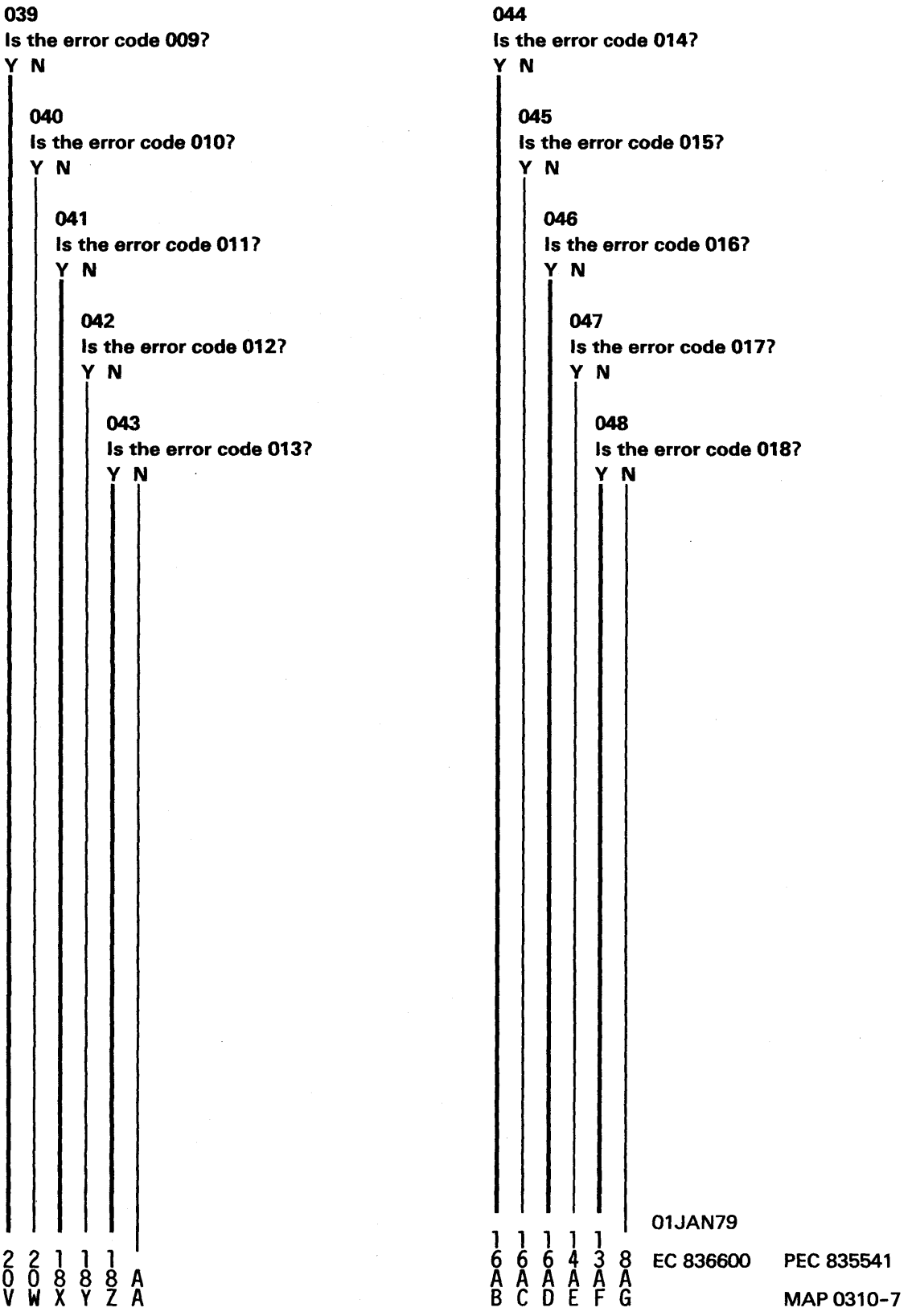
035
Is the error code 005?
Y N

036
Is the error code 006?
Y N

037
Is the error code 007?
Y N

038
Is the error code 008?
Y N

21P 21Q 20R 20S 20T 7U


039
Is the error code 009?
Y N
040
Is the error code 010?
Y N
041
Is the error code 011?
Y N
042
Is the error code 012?
Y N
043
Is the error code 013?
Y N
044
Is the error code 014?
Y N
045
Is the error code 015?
Y N
046
Is the error code 016?
Y N
047
Is the error code 017?
Y N
048
Is the error code 018?
Y N
20V
20W
18X
18Y
18Z
AA
16AB
16AC
16AD
14AE
13AF
8AG

049
Is the error code 019?
Y N

050
Is the error code 020?
Y N

051
Is the error code 021?
Y N

052
Is the error code 022?
Y N

053
Is the error code 023?
Y N

054
No error found.

055
Bad CE diagnostic diskette.

056
Go to Page 14, Step 149, Entry Point C.

057
-Press L
-Probe A1C1-U07 (+Select head 1) on the 5114.
Information on the use of the CE probe can be found in Appendix B of the 5110 MIM.

Is the UP light ON?
Y N

1 3 9 A A A A H J K L

A A K L

058
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad head/carriage assembly.
Bad diagnostic diskette.

059
-Probe A1D4-D07 (+Select head 1) on the 5114.

Is the UP light ON?
Y N

060
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad drive control card.

061
-Probe on the diskette drive control card.

TPA-5 ... (+Select head 1)
TPA-13 .. (Gnd)

Is the UP light ON?
Y N

062
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

063
Bad head/carriage assembly.
Bad drive control card.
Bad CE diagnostic diskette.
Check/replace the D4 cable in 5114 (see MAP 0210).

064
-Perform the head load service check (see 5114 MIM 130).

Is the service check OK?
Y N

065
Does the diskette drive have a Taper Pin Block on the rear of the drive?
Y N

066
-Measure +24Vdc on TPA-11 of the drive control card.

Is the voltage OK?
Y N

067
-Check fuse 2.

Is fuse 2 OK?
Y N

068
-Replace fuse 2.

Does the fuse blow again?
Y N

069
Bad fuse 2.

070
Is there a second diskette drive installed?
Y N

1AM 10AN 10AP AAQ AAR AAS

AAQ AAR AAS

071
Bad drive control card.
Bad head load solenoid.
Bad drive stepper motor.

072
-Ensure diskette drive 1 is plugged into A1D4.
-Unplug drive 2 from A1B4.
Replace fuse.

Does the fuse blow?
Y N

073
-Unplug drive 1 from A1D4.
-Plug drive 2 into A1D4.

Does the fuse blow?
Y N

074
Bad A1 board in the 5114.

075
The trouble is in drive 2.

Bad drive control card.
Bad head load solenoid.
Bad drive stepper motor.

076
Bad drive control card.
Bad head load solenoid.
Bad drive stepper motor.

077
Go to Page 11, Step 095, Entry Point J.

078
-Turn the 5114 IPO switch off.
-Measure the resistance of the head load solenoid (see LOGIC 440).

Is the resistance approximately 140 ohms?
Y N

079
Bad head load solenoid.

080
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

081
-Measure the +24 Vdc at the Taper Pin Block on the rear of the failing drive (see 5114 MIM 130).
+24 Vdc on pin H
Ground on the ground strap.

Is the voltage OK?
Y N

082
-Measure +24 Vdc on A1D4-D10 on the 5114.

Is the voltage OK?
Y N

083
-Check fuse 2.

Is fuse 2 OK?
Y N

084
-Replace the fuse.

Does the fuse blow again?
Y N

085
Bad fuse 2.

AT AU AV AW

AW

086
Is there a second diskette drive installed?
Y N

087
(Entry Point M)

-Turn off the IPO switch.
-Unplug the yellow and black cable from the Taper Pin Block on the back of the drive (see the 5114 MIM 130).
-Replace the fuse.
-Turn on the IPO switch.

Does the fuse blow again?
Y N

088
Bad resistor, capacitor, or solenoid.
Bad black and yellow cable or Taper Pin Block (see 5114 MIM 130).

089
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad AC or DC power supply (see LOGIC 440).

090
-Ensure diskette drive 1 is plugged into A1D4.
-Unplug drive 2 from A1B4.
-Replace the fuse.

Does the fuse blow again?
Y N

091
-Unplug drive 1 from A1D4.
-Plug drive 2 into A1D4.

Did the fuse blow again?
Y N

092
Bad 5114 A1 board.

AX AY

DISKETTE READ MAP

093
Go to Page 10, Step 087, Entry Point M.

094
Go to Page 10, Step 087, Entry Point M.

095
(Entry Point J)

-Measure +24 Vdc on A1A4-D10 on the 5114.

Is the voltage OK?
Y N

096
Bad DC power supply.
Bad cable A1A4 to the power supply.

097
Bad A1 board in 5114.

098
Bad connection from the +24 Vdc to the Taper Pin Block (see LOGIC 440).
Bad resistor, capacitor or connection (see 5114 MIM 130 and LOGIC 440).
Bad drive control card.

099
-Turn off the 5114.
-Measure the resistance of the head load solenoid (see LOGIC 440).

Is the resistance approximately 140 ohms?
Y N

100
Bad head load solenoid.
Check the wires and connectors from the diskette drive control card to the Terminal Pin Block (see LOGIC 440).

AZ

101
Check the wires and connectors from the diskette drive control card to the Terminal Pin Block (see LOGIC 440).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

102
-Check the head load springs and head load mechanism.

Does everything look OK mechanically?
Y N

103
Repair or replace the defective components.

104
Are the head/carriage guide rods seated properly (see 5114 MIM 120)?
Y N

105
Adjust the rods.

106
-Press L
-Probe A1D4-B07 (+File Data) on the 5114.

Are both lights on and steady?
Y N

107
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad drive control card.
Bad head assembly.

108

-Probe A1C1-P13 (+File Data) on the 5114.

Are both lights on and steady?

Y N

109

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

110

On the drive control card, Probe:
TPB-5 (+File Data)
TPA-13 (gnd)
(See 5114 MIM 173).

Are both lights on and steady?

Y N

111

Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

112

-Turn off the IPO switch on 5114.
-Move the head assembly to the center of its travel.
-Turn on the IPO switch.
-Rerun the diagnostics.

Does the head/carriage move to the outside edge of the diskette?

Y N

113

(Entry Point N)

-Look for obvious mechanical problems.

Are there any obvious problems?

Y N

1 1 3 3 B B B B C D

114

Is the drive band OK?

Y N

115

Repair or replace the failing components.

116

-Carefully try to move the head/carriage assembly by hand.

Does the assembly move easily?

Y N

117

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

118

-Turn off the IPO switch.
-Measure the resistance of the stepper motor coils. Measure from TPA-11 (Motor Coil Common) to:
TPA-10
TPB-10
TPB-11
TPB-12
Each coil should measure approximately 200 ohms (See 5114 MIM 150 and 173).

Is the resistance check OK?

Y N

119

Check the connections.
Replace the stepper motor.
(See 5114 MIM 150).

120

Loose pulley screw or broken pulley.
Loose or missing band clamp screw.
(See 5114 MIM 150).

121
Repair or replace the defective components.

122
-Check the mounting screws on the stepper motor.

Are they tight?
Y N

123
Tighten the screws.
-Perform the head/carriage service check (see 5114 MIM 120).

124
-Perform the drive band service check (see 5114 MIM 152).

Is the service check OK?
Y N

125
Repair, replace or adjust the failing components.

126
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad head/carriage assembly.
Bad CE diagnostic diskette.

127
Go to Page 12, Step 113, Entry Point N.

128
-Remove the covers and observe the failing drive.
-Press L

Are the heads loading?
Y N

14 BE

BF

129
-Probe TPB-7 (+HD Engage) on the drive control card (see LOGIC 440).

Is the down light on and the up light pulsing?
Y N

130
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

131
Does the failing drive have a Taper Pin Block at the rear of the drive?
Y N

132
-Measure +24Vdc on TPA-11 of the drive control card.

Is the voltage OK?
Y N

133
Go to LOGIC 440 to isolate the +24Vdc problem.

134
Bad drive control card.
Bad head load solenoid.

135
-Measure +24 Vdc at the Taper Pin Block on the rear of the failing drive:

+24 Vdc on pin H
Ground on the ground strap.
(See 5114 MIM 130).

Is the voltage OK?
Y N

14 BG

136
-Measure +24 Vdc on A1A4-D10.

Is the voltage OK?
Y N

137
-Check fuse 2.

Is the fuse OK?
Y N

138
-Replace the fuse.

Does the fuse blow again?
Y N

139
Bad fuse.

140
-Turn off the 5114.
-Unplug the yellow and black leads on the Taper Pin Block.
-Replace the fuse.
-Turn on 5114.

Does the fuse blow again?
Y N

141
Bad resistor, capacitor, or solenoid.
Bad black and yellow cable (see 5114 MIM 130).

142
Bad power supply (see LOGIC 440).

143
Use LOGIC 440 to isolate the +24Vdc problem.

B J

A E 7 B E 1 B G 1 B J 3

144
Bad connection from the +24 Vdc power supply to the TPB.
Bad resistor, capacitor or connections on the Taper Pin Block (see 5114 MIM 130).

145
-Perform the head load service check (see 5114 MIM 130).

Is the service check OK?
Y N

146
Perform the head load adjustment (see 5114 MIM 130).

147
Bad drive control card.
Bad head load solenoid.
Check/replace the D4 cable in 5114 (see MAP 0210).

148
No failure found.

149
(Entry Point C)

-Press L

On the 5114, Probe:
A1D4-B02 (+Access 0)
A1D4-B03 (+Access 1)
A1D4-B04 (+Access 2)
A1D4-B05 (+Access 3)

Are both lights on for all probe points?
Y N

150
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

151
-Set the drive in a position to allow probing.

On the drive control card, Probe:
TPB-1 (+Access 0)
TPB-2 (+Access 1)
TPB-3 (+Access 2)
TPB-4 (+Access 3)
TPA-13 (gnd)

(See 5114 MIM 173).

Are both lights on for all probe points?
Y N

152
Bad drive control card.
Check/replace the B4 cable in 5114 (see MAP 0210).

153
-Turn off the 5114 IPO switch.
-Remove the failing drive and check the resistance of each stepper motor coil as follows.
On the drive control card, Measure:

TPA-10, TPB-10, TPB-11 and TPB-12 to TPA-11 (coil common).
Each coil should measure approximately 200 ohms.
(See 5114 MIM 150 and 173).

Is the resistance check OK?
Y N

154
Check the connections.
Replace the stepper motor.
Bad drive control card.

155
-Perform the head/carriage service check (see 5114 MIM 120).

Is the service check OK?
Y N

156
Failure found.

157
-Turn on the 5114 IPO switch.
-Observe the stepper motor pulley while carefully trying to move the head/carriage assembly.

Does the stepper pulley turn?
Y N

158
-Perform the drive band service check (see 5114 MIM 152).

Is the service check OK?
Y N

159
Repair or replace the failing components.

160
-Check the idler assembly for binds or broken parts.

Are there any binds or broken parts?
Y N

161
-Check the head/carriage guide rods for proper seating (see 5114 MIM 120).

Are the rods seated properly?
Y N

162
Adjust the rods.

163
-Replace the drive control card.
-Replace the diskette covers and insert the CE diskette.
-Retry the diagnostic.

Does the drive still fail?
Y N

164
Bad drive control card.

165
Check/replace the B4 cable in 5114 (see MAP 0210).
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

166
Repair/replace the failing components.

167
Adjust and tighten the stepper pulley (see 5114 MIM 151).
Bad stepper motor.
Bad CE diagnostic diskette.

168
Go to Step 170, Entry Point D.

169
Go to Step 170, Entry Point D.

170
(Entry Point D)

-Remove the covers and observe the failing drive (See 5114 MIM 110 and 116).

Is the drive motor turning?
Y N

171
-Turn off the 5114 IPO switch.
-Try to turn the drive motor by hand.

Does the motor turn freely?
Y N

172
Bad motor.

173
Check the AC distribution in 5114 (see LOGIC 440).

174
Is the drive belt installed and tracking correctly (see 5114 MIM 140)?
Y N

175
Replace the belt and perform the service check (see 5114 MIM 140).
Run the diskette diagnostics.

176
Does the spindle pulley appear to be turning at the correct speed?
Y N

177
Check for loose parts or binds in the drive motor or spindle assemblies.

178
Is the diskette turning?
Y N

179
-Turn off the IPO switch.
-Turn the spindle pulley by hand.

Does the diskette turn?
Y N

180
-Open the cover and remove the diskette.
-Turn the spindle pulley.

Does the drive hub turn?
Y N

181
Replace the drive assembly.

182
-Remove the diskette cover and check the collet assembly (see 5114 MIM 111 and 113).

Are the collet components free of wear and assembled correctly?
Y N

183
Replace the worn or broken parts.
Assemble the collet and cover assemblies.

184
-Check the cover latch assembly (see 5114 MIM 112).

Is the latch functioning properly?
Y N

185
Replace the bad components.

186
Replace the drive assembly.

187
-Turn on the IPO switch.

Does the diskette turn?
Y N

188
Check for a loose pulley or a bind in the spindle assembly.
Replace the drive assembly if no failures are found.

BW

189
(Entry Point F)

On the drive control card, Probe:
TPB-9 (+Index)
TPA-13 (gnd)
(See LOGIC 440)

Is the down light on and the up light pulsing?
Y N

190
-Perform the PTX/LED alignment (See 5114 MIM 161).

Is the PTX/LED alignment OK?
Y N

191
Bad PTX/LED.

192
Perform the LED and PTX service checks for the failing drive (see 5114 MIM 162).

Is the LED service check OK?
Y N

193
Bad LED.
Bad drive control card.

194
Is the PTX service check OK?
Y N

195
Bad PTX assembly.
Bad drive control card.

196
-Perform the PTX amplifier service check (see 5114 MIM 163).

Is the output correct?
Y N

197
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).

198
Bad drive control card.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the D4 cable in 5114 (see MAP 0210).
Damaged or dirty index hole in the diskette or envelope.

199
-Probe A1C1-U13 (+Index) on the 5114.

Is the line pulsing?
Y N

200
-Probe A1D4-B13 (+Index) on the 5114.

Is the line pulsing?
Y N

201
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad drive control card.

202
Bad A1 board in the 5114.

B Z

203
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Bad diskette.
Check/replace the D4 cable in 5114 (see MAP 0210).
Worn or binding collet assembly (see 5114 MIM 114).

204
Go to Page 17, Step 189, Entry Point F.

205
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A1B1 (VFO) card, if installed (see MAP 050 before replacing this card).
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad head/carriage assembly.
Bad drive control card.

206
Bad A1B1 (VFO) card, if installed (see MAP 050 before replacing this card).
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

207
On the 5114 measure:
+5 Vdc on A1A4-D04.
-5 Vdc on A1A4-B10.

Are the voltages OK?
Y N

208
-Check fuse 1, (+5 Vdc).
(See LOGIC 440).

Is the fuse OK?
Y N

209
(Entry Point G)

-Replace the blown fuse.

Does the fuse blow again?
Y N

210
Bad fuse.

211
-Disconnect the cable from A1D4 to Drive 1 and A1B4 from Drive 2 if installed.
-Replace the fuse.

Does the fuse blow again?
Y N

212
-Plug in Drive 1 (A1D4).

Did the fuse blow?
Y N

213
Did you disconnect a cable from A1B4?
Y N

214
No failure found.
(See LOGIC 440).

215
-Plug in Drive 2 (A1B4).

Did the fuse blow?
Y N

216
No failure found.
(See LOGIC 440).

217
Check/replace the B4 cable in 5114 (see MAP 0210).
Bad drive control card.

218
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad drive control card.

219
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A1B1 (VFO) card, if installed (see MAP 050 before replacing this card).
Bad cable from the power supply to A1A4.
Bad DC power supply (see LOGIC 440).

220
-Check fuse 3 (-5 Vdc).
(see LOGIC 440).

Is fuse 3 OK?
Y N

221
Go to Step 209, Entry Point G.

222
Check the +5 Vdc and -5 Vdc again. If they are not OK, replace the DC power supply (see LOGIC 440).

223
-Press L
-On the 5114, probe A1C1-B12 (-Interrupt request 2).
Information on the use of the CE probe can be found in Appendix B of the 5110 MIM.

Are both lights on and steady?
Y N

224

On the 5114, probe A1A1-B12 (-Interrupt request 2).

Are both lights on and steady?

Y N

225

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad 5114 B1 (VFO) card, if installed.
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

226

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad H2 (base I/O) card.

227

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad A1B1 (VFO) card, if installed (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5110 A1L2 (exec ROS) card (see 5110 MAP 050 for jumpering).
Bad 5110 F2 (Common and Language ROS) card.
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

228

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

229

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

230

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

231

Press EXECUTE to bypass this test, then follow the instructions on the display.

232

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

233
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

234
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

235
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

236
-Probe A1A3-B13 (-put strobe) on the 5114.

Is the UP light on?
Y N

C C
J K

237
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

238
Is a diskette in the drive?
Y N

239
-Perform the LED/PTX alignment (see 5114 MIM 161).
-Perform the LED/PTX service checks (see 5114 MIM 162 and 163).

Are the service checks OK?
Y N

240
Replace the failing components.

241
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad drive control card.
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the D4 cable in 5114 (see MAP 0210).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

242
Remove the diskette and retry the diagnostic.

243
-Perform the LED and PTX service checks (see 5114 MIM 162.)

Is the LED service check OK?
Y N

244
-Measure +5 Vdc at TPB-15 on the diskette drive control card (ground on the ground strap).

Is the voltage OK?
Y N

245
-Check fuse 1 (see 5114 MIM 183 and LOGIC 440).

Is fuse 1 OK?
Y N

246
-Replace fuse 1.

Does the fuse blow again?
Y N

247
Bad fuse.

248
-Disconnect the cable from A1D4 to the drive.
-Replace the fuse.

Does the fuse blow again?
Y N

249
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad drive control card.
Bad LED or PTX assemblys.

250
-Disconnect the cable from A1B4 to the drive.

Does the fuse blow again?
Y N

251
Check/replace the B4 cable in 5114 (see MAP 0210).
Bad drive control card.
Bad LED or PTX assemblys.

252
Is there a 5103 attached?
Y N

253
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad cable from A1A4 to the DC power supply.
Bad DC power supply (see LOGIC 440).

254
(Entry Point K)

-Disconnect the 5103 from the 5114.
-Insert a new fuse.

Does the fuse blow again?
Y N

255
Suspect a short or open in the DC voltage distribution in the 5103 (see LOGIC 430).
Check the I/O cables.

256
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A1B1 (VFO) card, if installed (see MAP 050 before replacing this card).
Bad cable from A1A4 to the power supply.
Bad DC power supply (see LOGIC 440).
Bad cable from A1A2 to the I/O port.

257
-Measure +5 Vdc on A1A4B02 on the 5114.

Is the voltage OK?
Y N

258
Is a 5103 attached?
Y N

259
(Entry Point H)

Is the drive motor turning?
Y N

260
-Measure +12 Vdc on A1A4-B12 and -12 Vdc on A1A4-D12 on the 5114.

Are the voltages OK?
Y N

261
Go To Map 0700, Entry Point A.

262
Is the relay inside of the AC box picked?
Y N

263
Bad relay R1.
Bad cable to the relay (see LOGIC 440).

264
Missing AC voltages (see LOGIC 440).

265
-Measure +24 Vdc on A1A4-D10 in the 5114.

Is the voltage OK?
Y N

24CCQ 24CCR 24CCS C T

266
-Check fuse 2.

Is the fuse OK?
Y N

267
(Entry Point L)

-Replace the fuse.

Does the fuse blow again?
Y N

268
Bad fuse.

269
-Disconnect the cable from A1A4.
-Replace the fuse.

Does the fuse blow again?
Y N

270
-Unplug the cables at A1D4 and A1B4 if present.
-Replug the A1A4 cable.

Does the fuse blow?
Y N

271
-Replug the cable at A1D4.

Does the fuse blow?
Y N

272
-Replug the cable at A1B4.

Does the fuse blow?
Y N

24CCU 24CCV 24CCW 24CCX 24CCY 24CCZ

273
The trouble is fixed.

274
Check/replace the B4 cable in 5114 (see MAP 0210).
Bad drive control card.
Bad stepper motor.
Bad head load solinoid, capacitor or resistor (see LOGIC 440).

275
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad drive control card.
Bad stepper motor.
Bad head load solinoid, capacitor or resistor (see LOGIC 440).

276
Bad A1A4 cable.
Bad 5114 A1 board.

277
Bad AC/DC power supply.
Bad cable A1A4 (See LOGIC 440).

278
-Check fuse 4.

Is fuse 4 OK?
Y N

279
Go to Page 23, Step 267, Entry Point L.

280
Bad AC/DC power supply.
Bad cable A1A4 (See MAP 0210 and LOGIC 440).

281
Bad cable A1A4 (See MAP 0210 and LOGIC 440).
Bad AC/DC power supply.
Bad A1 board.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

282
-Disconnect the 5103 from the I/O channel.
-Measure +5 Vdc at A1A4-B02 on the 5114.

Is the voltage OK?
Y N

283
Go to Page 23, Step 259, Entry Point H.

284
Look for a short or an open in the DC voltage distribution in the 5103 using LOGIC 430. Check the cables from the I/O port to the 5103.

285
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad 5114 A1 board.

286
Bad LED assembly.
Bad drive control card.

287
Is the PTX service check OK?
Y N

288
Bad PTX assembly.
Bad drive control card.

289
On the diskette drive control card, Measure:
+24 Vdc on TPA-8.
-5 Vdc on TPA-9.
(Ground on the ground strap)

(See 5114 MIM 173).

Are the voltages OK?
Y N

290
-Check fuse 2 (+24 vdc) and fuse 3 (-5 vdc) in the 5114.

Are the fuses OK?
Y N

291
Replace the blown fuse.

Does the fuse blow again?
Y N

292
Bad fuse.

293
-Disconnect the cables A1D4 and A1B4.
-Replace the blown fuse.

Does the fuse blow again?
Y N

294
Bad drive control card.
Bad A1D4 or A1B4 cable to the drive control card.

DDCDE

295
Is a 5103 attached?
Y N

296
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad cable from the power supply to A1A4.
Bad DC power supply.

297
Go to Page 22, Step 254, Entry Point K.

298
Bad DC power supply.
Bad cable A1A4 to the DC power supply.
Bad external I/O cable to the printer if attached (see 5114 MIM 183).

299
-Perform the PTX amplifier service check (see 5114 MIM 163).

Is the service check OK?
Y N

300
Bad drive control card.

301
-Perform the LED/PTX alignment (see 5114 MIM 161).

Is the alignment OK?
Y N

302
Adjust the LED/PTX alignment.
Bad LED or PTX assembly.

303

Check the device address lines.

-Press L

On the 5114, probe:
A1C1-G03
A1C1-G04
A1C1-G05
A1C1-G06
A1C1-G07
A1C1-G08
A1C1-G09
A1C1-B10

Are BOTH lights on for each of the probed lines?

Y N

304

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad drive control card.
Bad Cable from the diskette drive to the adapter board; A1D4 (Drive 1) or A1B4 (Drive 2) (see MAP 0210)
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad H2 (base I/O) card in 5110.
Bad cable terminator.

305

-Probe on the 5114;
A1C1-D13 +OP code E
A1C1-G12 +control strobe

Are BOTH lights on for each of the probed lines?

Y N

D D
G H

J D D
6 G H

306

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5110 A1L2 (exec ROS) card (see MAP 050 for jumpering).
Bad 5110 A1F2 (Ros control card.
Bad cable terminator.

307

Bad drive control card.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the D4 cable in 5114 (see MAP 0210).
Bad head/carriage assembly.
Bad CE diagnostic diskette.

308

Have you been here before?

Y N

309

Swap A1D4 and A1B4 cables (Drive 2 is now drive 1 and drive 1 is drive 2).
Go to Page 2, Step 003, Entry Point B.

310

After the failing FRU has been isolated, remember to swap the cables back to their original locations (A1D4 drive 1 and A1B4 drive 2).
Go to Page 6, Step 031, Entry Point E.

311
The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect 5114-2 and attach the terminator or printer to 5114-1.

Go to Page 2, Step 003, Entry Point B.

312
Are the heads loaded all the time?
Y N

313
Check the head load bail return spring and bail stop screw (see 5114 MIM 130).
Preform the head load service check (see 5114 MIM 130).
Bad drive control card.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

314
Bad drive control card.
Use LOGIC 440 to check for shorts in the head load circuitry.

315
The 5114 MDI cannot be loaded.

Go To Map 420, Entry Point A.

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BRING UP MAP 0400

PAGE 1 OF 23

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0200	D	2	013
0900	A	1	001

001
(Entry Point A)

This MAP isolates failures that occur during the bring up test.
-Switch the L32-64-R32 switch to 64.

Are there any devices attached to the 5110 I/O interface port (see MIM 271)?
Y N

002
(Entry Point J)

Is there a card in A2, B2, D2 or K2?
Y N

003
(Entry Point M)

-Press RESTART. Wait 25 seconds.
-Switch the RUN switch under the covers to NOT RUN.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).

Are all of the characters displayed hex characters (that is 0,1,2,3,4,5,6,7,8,9 A,B,C,D,E,F)?
Y N

1 1
6 4
A B C D

004
Go to Page 2, Step 013, Entry Point D.

005
-Switch the RUN switch under the covers to RUN.
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the machine at halt Q?
(See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)
Y N

006
Is the machine at halt P?
Y N

007
Is the machine at halt L or N?
Y N

008
Is the machine at halt J, K or M?
Y N

009
Is the machine at halt H?
Y N

1 1 1
4 0 0 9 6 2
E F G H J K

010
Is the machine at halt E?
Y N

011
Is the machine at halt C?
Y N

012
Is the machine at halt A?
Y N

013
(Entry Point D)

Look for a failure in the R/W storage cards.

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Switch the RUN switch under the covers to NOT RUN.

Is there a FFFF in R7L0?
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
Y N

014
Check the RUN switch.

-Switch the RUN switch under the covers to RUN.
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Probe H6-C02 (-run switch and not IPL).
(See MIM 248 display Z3 socket locations).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

6 5 5 4 4
L M N P Q R

015
Check the DISPLAY REGISTERS switch.

-Probe H6-E02 (-display reg sw).

Is the DOWN light on?
Y N

016
Check the L32-64-R32 switch.

-Ensure that the L32-64-R32 switch is set to 64.
-Probe J6-D04 (-right 32 select)

Is the DOWN light on?
Y N

017
If R0L0 contains 0002, the processor card is suspect.

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Switch the RUN switch under the covers to NOT RUN.

Is R0L0 0002?
Y N

018
Now determine if the POR reset line is bad.

-Switch the DISPLAY REGISTERS switch to NORMAL.
-Switch the RUN switch under the covers to RUN.
-Probe H2-B03 (-POR reset).

Is the DOWN light on?
Y N

4 4 3 3 3
S T U V W

019
(Entry Point H)

Does the machine have an APL-BASIC switch (see MIM 205)?
Y N

020
Go to Page 22, Step 222, Entry Point G.

021
-Remove E4 (APL ROS)
-Set the APL-BASIC switch to BASIC
No more than 25 seconds after RESTART is pressed, the following events should occur:
1. ABCDEFGH ppears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and LOAD0 appears once on one and only one line of the 5110 display.

-Press RESTART. Wait 25 seconds.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

022
-Install the E4 (APL ROS) card.
Go to Page 22, Step 222, Entry Point G.

023
Bad E4 (APL ROS) card.

024
-Probe H2-B03.

Remove the following cards in order until the DOWN light goes off. The last card removed is defective:
F2, J2, K4.
If the DOWN light remains ON, then:
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

025
-Switch the RUN switch under the covers to RUN.
-Probe the card select lines listed below. Record conditions other than the DOWN light on and the UP light off.

0 J2-S10 2 J2-U10
1 J2-U13 3 J2-S13.

Is the DOWN light on and the UP light off for all four probe points?
Y N

026
Are both lights on for any of the four probe points?
Y N

027
Bad J2 (processor) card (see MAP 050 for jumpering).

028
-Switch the DISPLAY REGISTERS switch to NORMAL.

Go to Step 019, Entry Point H.

029
-Switch the DISPLAY REGISTERS switch to NORMAL.

Go to Page 3, Step 019, Entry Point H.

030
-Remove the G2 (display) card.
-Probe J6-D04.

Is the DOWN light on?
Y N

031
Bad G2 (display) card (see MAP 050 for jumpering).

032
Bad display L32-64-R32 switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

033
-Remove the G2 (display) card.
-Probe H6-E02.

Is the DOWN light on?
Y N

034
Bad G2 (display) card (see MAP 050 for jumpering).

035
-Reinstall the G2 (display) card.

Bad DISPLAY REGISTERS switch (see MIM 249).
Check/replace Z3 (display and control panel) cable (see MIM 248,249).

036
Bad RUN switch (see MIM 201,249).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad RESTART switch (see MIM 210).

037
-Power down.
-Remove the read/write storage cards from M4, N2, and N4, if installed.
-Switch the RUN switch under the covers to RUN.
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

038
-Remove the K4 card if installed
-Press RESTART. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

039
Was there a card installed in M4?
Y N

040
Bad M2 (read/write storage) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

041
-Power down.
-Remove the read/write storage card M2.
-Install the card you removed from M4 into the M2 location.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

042
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

043
The card that was in M2 is bad.

044
Bad K4 (ROS feature) card (see MAP 050 for jumpering).

045
One of the read write storage cards removed is bad. Power down. Install the cards one at a time, (M4 first, then N2, N4), to find the bad card. Power up after each card is installed. Use the preceeding step to determine which card is bad.

046
Halt A is the BUS IN bit test.

-Probe all the bus in bits listed below:

H2-G11 5	H2-P12 0
H2-M07 4	H2-P13 6
H2-M05 3	H2-S10 P
H2-P09 2	H2-U05 1
H2-P10 7	

Are all bus in bits UP or pulsing?
Y N

047
-Probe the bus in bit that is DOWN.
-Remove the following cards until the DOWN light goes off:
A2, F2, and L2.

Is the DOWN light on?
Y N

048
Replace the card that caused the DOWN light to turn off.

049
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

050
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

051
Halt C is the op code test.

Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

052
Halt E is the interrupt test.

Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

053
Halt H is the stuck key test, and read/write storage test.

Is there a key code on the second line from the top of the display?
Y N

054
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is there a card in N4?
Y N

055
Is there a card in N2?
Y N

056
Is there a card in M4?
Y N

057
Bad M2 (read/write storage) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

058
Is the recorded RFLO between or including 0000 and 3FFF?
Y N

059
Is the recorded RFLO between or including 4000 and 7FFF?
Y N

060
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

061
-Power down.
-Swap M2 and M4
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 0000 and 3FFF?
Y N

062
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

063
Bad card is now at M2.

064
-Power down.
-Swap M2 and M4
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 0000 and 3FFF?
Y N

065
Bad card is now at M4.

066
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).

067
Is the recorded RFLO between or including 0000 and 3FFF?
Y N

068
Is the recorded RFLO between or including 4000 and 7FFF?
Y N

069
Is the recorded RFLO between or including 8000 and BFFF?
Y N

070
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

071
-Power down.
-Remove the N2 and M4 cards
-Install the N2 card in the M4 location
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 4000 and 7FFF?
Y N

072
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

073
Bad card is now in M4 location.

074
-Power down.
-Swap M2 and M4 cards.
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.
(Step 074 continues)

(Step 074 continued)

Is the machine at halt H?
Y N

075
The bad card is now at M2.

076
Is the recorded RFLO between or including 0000 and 3FFF?
Y N

077
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

078
The bad card is now at M2.

079
(Entry Point N)

-Power down.
-Swap M2 and M4
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 4000 and 7FFF?
Y N

080
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).

AL

081
The bad card is now at M4.

082
Is the recorded RFLO between or including 0000 and 3FFF?
Y N

083
Is the recorded RFLO between or including 4000 and 7FFF?
Y N

084
Is the recorded RFLO between or including 8000 and BFFF?
Y N

085
Is the recorded RFLO between or including C000 and FFFF?
Y N

086
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

087
-Power down.
-Remove N2 and N4.
-Install N4 in the N2 location
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 8000 and BFFF?
Y N

088
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

089
The bad card is now at N2.

090
-Power down.
-Swap M4 and N2.
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 4000 and 7FFF?
Y N

091
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

092
The bad card is now at M4.

093
-Power down.
-Swap M4 and N2.
-Power up. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the recorded RFLO between or including 8000 and BFFF?
Y N

094
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

095
The bad card is now at N2.

096
Go to Page 8, Step 079, Entry Point N.

097
-Use the hex code displayed in positions 5 and 6 of the second line from the top to determine the defective key (see MIM 250).

Bad key module (see MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

098
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad F2 (Common and language ROS) card.

099
Bad K4 (ROS feature) card (see MAP 050 for jumpering).

100
Halt P is the ROS content test.

-Remove the K4 card if installed.
-Press RESTART. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

101
-Install the K4 card if removed.

Is there a ROS 40 ERR on the second line from the top of the display?
Y N

102
Is there a ROS error code of 001 on the bottom line of the display?
Y N

103
Is there a ROS error code of 002 or 014 on the bottom line of the display?
Y N

104
Is there a ROS error code of 008 on the bottom line of the display?
Y N

1 1 1 1 1
4 4 4 3 1
A A A A A A
S T U V W X

105
Is there a ROS error code of 007 on the bottom line of the display?
Y N

106
Is there a ROS error code of 005 on the bottom line of the display?
Y N

107
(See appendix B, the general logic probe, in the 5110 MIM).
-Probe H6-B04 (+APL switch).
(See MIM 248,249, display and control panel cable).

Note: when the BASIC-APL switch is switched, RESTART must be pressed to initialize the 5110 with the new language.

Is the UP light on?
Y N

108
Is there an 8 in position 15 of the bottom line of the display?
Y N

109
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

110
Bad F2 (Common and language ROS) card.

1 1 1
1 1 1
A A B
Y Z A

111
-Probe the APL select lines:

F2-P02 (-sel APL HWDS 0-15359)
F2-P04 (-sel APL HWDS 15360-30719)
F2-P05 (-sel APL HWDS 30720-46079)
F2-P06 (-sel APL HWDS 46080-61439)

Are 3 lines UP and one line DOWN?
Y N

112
Are all 4 lines UP?
Y N

113
-Remove E4 (APL ROS) card .

Now are 3 lines UP and one DOWN?
Y N

114
Bad F2 (Common and language ROS) card.

115
Bad E4 (APL ROS) card.

116
Bad F2 (Common and language ROS) card.

117
Bad E4 (APL ROS) card.

118
Bad H2 (base I/O) card.
Bad F2 (Common and language ROS) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).

119
The following questions all refer to positions 14 and 15 of the bottom line of the display (the message starts in position 2).

Is 02 displayed?
Y N

120
Is 04 displayed?
Y N

121
Is 08 displayed?
Y N

122
Bad F2 (Common and language ROS) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

123
Bad F2 (Common and language ROS) card.

124
Bad E4 (APL ROS) card.
Bad F2 (Common and language ROS) card.

125
Bad F2 (Common and language ROS) card.

126
-Record the bottom line of the display.

Is there an 02 in positions 14 and 15 of the bottom line?
Y N

127
Is there an 8 in position 15 of the bottom line?
Y N

128
Is there a 4 in position 15 of the bottom line?
Y N

129
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).

130
Does the machine have a BASIC-APL switch (see MIM 205)?
Y N

131
(See appendix B, the general logic probe, in the 5110 MIM).
-Probe H6-B04 (+APL switch).
(See MIM 248,249, display and control panel cable).

Is the DOWN light on?
Y N

132
Bad E4 (APL ROS) card.

133
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

134
(See appendix B, the general logic probe, in the 5110 MIM).
-Probe H6-B04 (+APL switch).
(See MIM 248,249, display and control panel cable).

Is the UP light on?
Y N

B B
E F

135
Is the BASIC-APL switch set to BASIC?
Y N

136
(See MIM 248,249, display and control panel cable).
Bad BASIC-APL switch.

137
Note: when the BASIC-APL switch is switched, RESTART must be pressed to initialize the 5110 with the new language.

Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

138
Bad E4 (APL ROS) card.

139
Does the machine have a BASIC-APL switch (see MIM 205)?
Y N

140
(See appendix B, the general logic probe, in the 5110 MIM).
-Probe H6-B04 (+APL switch).
(See MIM 248,249, display and control panel cable).

Is the UP light on?
Y N

141
Bad F2 (Common and language ROS) card.

142
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

143
-Probe H6-B04 (+APL switch).
(See appendix B, the general logic probe, in the 5110 MIM).
(See MIM 248,249, display and control panel cable).

Is the DOWN light on?
Y N

144
Is the BASIC-APL switch set to APL?
Y N

145
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad BASIC-APL switch.

146
Note: when the BASIC-APL switch is switched, RESTART must be pressed to initialize the 5110 with the new language.

Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

147
Is the BASIC-APL switch set to APL?
Y N

148
Bad F2 (Common and language ROS) card.

149
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad BASIC-APL switch.

150
-Remove the E4 card.
-Press RESTART. Wait 25 seconds.

Is the machine at halt P with 02 in positions 14 and 15 of the bottom line?
Y N

151
Bad E4 (APL ROS) card.

152
-Reinstall the E4 card.

Bad F2 (Common and language ROS) card.
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

153
Is there a card in M4 or N2 or N4 (read/write storage cards)?
Y N

154
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad M2 (read/write storage) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

155
-Power down.
-Remove the read/write storage cards in this order: M2, M4, N2, and N4.
-Install the last card removed into the M2 card location.
No more than 25 seconds after power up, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the display.

(Step 155 continues)

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(Step 155 continued)

-Power up.

Do all three events shown above occur in sequence after Power Up?

Y N

156
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

157
The card that was in M2 is bad.

158
Bad F2 (Common and language ROS) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad E4 (APL ROS) card.

159
Is there a card in E4?

Y N

160
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad F2 (Common and language ROS) card.

161
-Remove the E4 (APL)card.
-Press RESTART. Wait 25 seconds.

Is ROS 40 error code still displayed?

Y N

BHBJ

162
Bad E4 (APL ROS) card.
Bad F2 (Common and language ROS) card.

163
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad F2 (Common and language ROS) card.

164
Bad K4 (ROS feature) card (see MAP 050 for jumpering).

165
Halt Q is bringup complete.

Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

166
Is there a card in B2?

Y N

167
(Entry Point P)

-Remove the A2, D2, and K2 cards if installed.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

(Step 167 continues)

(Step 167 continued)
-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

168
-Install the A2, D2, and K2 cards again.
-Press RESTART. Wait 25 seconds.

Go to Page 1, Step 003, Entry Point M.

169
One of the cards is bad.

-Install the A2, D2, and K2 cards again.
-Press RESTART. Wait 25 seconds.

Is the machine at halt A, C, E, H, J or K? (See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)
Y N

170
Determine if the POR reset line is bad.

-Probe H2-B03 (-POR reset).

Is the DOWN light on?
Y N

171
The MAP cannot isolate the failure to additional symptoms. Use the machine halt code as your symptom.
Go to Step 173, Entry Point L.

172
Use the probe as a failure indicator. A bad condition is indicated by the DOWN light.
Go to Step 173, Entry Point L.

B
L

B B
K L
1
4

173

(Entry Point L)

One of the cards might be defective. Use the symptom from the previous step. Isolate the failure to the A2, D2, or K2 card by removing each card one at a time, pressing RESTART and waiting 25 seconds each time. Observe the 5110 display. When LOAD0 or CLEAR WS appears, the failure is in the last card removed. Replace the bad card.

174
-Power down.
-Remove the B2 card.

No more than 25 seconds after power up, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the display.

-Power up.

Do all three events shown above occur in sequence after Power Up?
Y N

175
-Power down.
-Install the B2 card.
-Power up. Wait 25 seconds.
Go to Page 14, Step 167, Entry Point P.

176
Bad B2 (BSCA 1) card.

177

-Disconnect the cable at the 5110 I/O interface port (see MIM 271).

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

178

Go to Page 1, Step 002, Entry Point J.

179

One of the devices is suspect.

-Connect all of the devices to the 5110 I/O interface port.
-Press RESTART. Wait 25 seconds.

Is the machine at halt A, C, E, H, J OR Q? (See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)

Y N

180

Determine if the POR reset line is bad.

-Probe H2-B03 (-POR reset).

Is the DOWN light on?

Y N

B B B
M N P

181

The map cannot isolate the failure to additional symptoms. Use the machine halt as your symptom.

Go to Step 183, Entry Point K.

182

Use the probe as a failure indicator. A bad condition is indicated by a DOWN light.

Go to Step 183, Entry Point K.

183

(Entry Point K)

The maximum number of I/O devices that can be attached to the 5110 is three. If a 5103 is attached, it must be the last I/O device in the string of I/O devices, because it terminates all the I/O signal lines. If a 5103 is not attached, the last I/O device must have a cable terminator attached. If a 5106 is attached, it must be the first I/O device attached to the 5110.
A 5106 can only be attached if the 5110 has an internal tape unit.

Is a 5106 attached to the 5110?

Y N

184

Are there two 5114's attached to the 5110?

Y N

185

Is there one 5114 attached to the 5110?

Y N

186

Bad printer B1A2 (adapter) card (see MAP 050 for jumpering).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

187

Is a 5103 attached to the 5114?

Y N

188

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

Bad A2 (I/O cable driver) card and cable assembly in 5110.

Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).

Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

Bad cable terminator.

189

-Disconnect the 5114 from the 5110.

-Connect the 5103 to the 5110.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

190

Bad printer B1A2 (adapter) card (see MAP 050 for jumpering).

Bad A2 (I/O cable driver) card and cable assembly in 5110.

Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

BT

191

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).

Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

192

(Entry Point I)

The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Diconnect 5114-1 from the 5110 I/O interface port.

-Connect 5114-2 to the 5110.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

193

Is a 5103 attached?

Y N

194

-Disconnect 5114-2 from the 5110.
-Connect 5114-1 to the 5110.
-Connect the cable terminator to 5114-1.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

195

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad cable terminator.

196

-Remove the C1 cards from 5114-1 and 5114-2.
-Install the card from 5114-2 into 5114-1.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

197

The bad C1 card is now in 5114-1.

BX

198

The trouble is in 5114-2.

Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

199

-Disconnect 5114-2 from the 5110.
-Connect the 5103 to the 5110.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

200

Bad printer B1A2 (adapter) card (see MAP 050 for jumpering).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

201

The trouble is in 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

202

-Remove the C1 cards from 5114-1 and 5114-2.

-Install the card from 5114-1 into 5114-2.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

203

The bad C1 card is now in 5114-2.

204

The trouble is in 5114-1.

Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).

Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

205

Is a 5114 attached to the 5106?

Y N

206

Is a 5103 attached?

Y N

20 BY BB CA

207

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).

Bad A2 (I/O cable driver) card and cable assembly in 5110.

Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).

Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

208

-Remove the tape control cards from the internal tape unit and from the 5106.

-Install the card from the internal tape unit into the 5106.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

209

-Swap the tape control cards back to their original locations.

-Disconnect the 5106 from the 5110 I/O interface port.

-Connect the 5103 to the 5110.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

(Step 209 continues)

(Step 209 continued)
-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

210
Bad printer B1A2 (adapter) card (see MAP 050 for jumpering).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

211
Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

212
The tape control card you removed from the 5106 is bad.

213
-Remove the tape control cards from the internal tape unit and the 5106.
-Install the card from the internal tape unit into the 5106.
No more than 25 seconds after RESTART is pressed, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

21 CC

214
-Swap the tape control cards back to their original locations.
-Disconnect the 5106 from the 5110 I/O interface port.
-Connect the 5114 to the 5110.
No more than 25 seconds after RESTART is pressed, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

215
Is a 5103 attached?
Y N

216
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad cable terminator.

217

-Disconnect the 5114 from the 5110 I/O interface port.

-Connect the 5103 to the 5110.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

218

Bad printer B1A2 (adapter) card (see MAP 050 for jumpering).

Bad A2 (I/O cable driver) card and cable assembly in 5110.

Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

219

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).

Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

220

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).

Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).

Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

221

The tape control card you removed from the 5106 is bad.

222
(Entry Point G)

Is there a card in K4?
Y N

223
(Entry Point Q)

Now determine if read/write storage is functioning.

Are there cards installed in M4, or N2, or N4 (read/write storage)?
Y N

224
Bad M2 (read/write storage) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.

225
-Power down.
-Remove the cards in M4, N2, and N4 if installed.
No more than 25 seconds after power up, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the display.

-Power up.
(Step 225 continues)

2 3 C G

(Step 225 continued)

Do all three events shown above occur in sequence after Power Up?
Y N

226
-Power down.
-Rmove M2.
-Istall he ard hat as n M4 into the M2 location.
No more than 25 seconds after power up, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the display.

-Power up.

Do all three events shown above occur in sequence after Power Up?
Y N

227
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.

228
The card that was in M2 is bad.

2 3 C H

229

One of the read/write storage cards you removed is suspect. Install the cards one at a time, powering down before each replacement and powering up after each card is installed. Use the preceeding step to determine which card is bad.

If machine still fails:
Bad J2 (processor) card (see MAP 050 for jumpering).

230

-Remove the K4 card.
-Press RESTART. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?

Y N

231

Go to Page 22, Step 223, Entry Point Q.

232

Bad K4 (ROS feature) card (see MAP 050 for jumpering).

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ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0300	A	1	001
0310	A	1	001
0600	A	1	001
0810	A	1	001
0830	A	1	001
0850	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
5	046	0400	A
19	220	0400	A
26	292	0500	A

001
(Entry Point A)

Is the PROCESS CHECK light on?
Y N

002
Can you create the PROCESS CHECK?
Y N

003
The MAPs depend on having the PROCESS CHECK on the machine or being able to create the PROCESS CHECK. Gather and record all available information pertaining to the PROCESS CHECK. Advise the customer that if the PROCESS CHECK appears again,to leave the machine in the failing condition until you arrive.

004
Is the PROCESS CHECK intermittent?
Y N

2A 2B 2C

005
Create the PROCESS CHECK.

Did the PROCESS CHECK come on as a result of pressing RESTART or powering on the 5110?
Y N

006
We will assume that the PROCESS CHECK comes on as a result of running a job.
Go to Step 010, Entry Point H.

007
We will use the RESTART condition to create the PROCESS CHECK.
Go to Step 010, Entry Point H.

008
Create the PROCESS CHECK.
Go to the INTERMITTENT FAILURE CHART in the 5110 SERVICE AIDS.

009
Is the PROCESS CHECK intermittent?
Y N

010
(Entry Point H)

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Switch the RUN switch under the covers to RUN.

Is the display blank or dark?
Y N

011
Are there any devices attached to the 5110 I/O interface port (see MIM 271)?
Y N

012
(Entry Point M)

Is there a card in A2 or B2 or D2 or K2 or K4 (see MIM 209)?
Y N

013
(Entry Point D)

Machine check is caused by an RDR error, a DA error, a KBD error, a BUS IN error or a BUS OUT error. The RDR and BUS IN errors can be probed on the J2 card. The KBD error can be probed on the H2 card. The DA and BUS OUT errors can be probed only at the device.
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Probe H2-U13 (+KBD parity check).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

014
-Probe J2-U09 (-BUS IN check).

Is the DOWN light on?
Y N

015
-Probe J2-S08 (-RDR Check).

Is the DOWN light on or pulsing?
Y N

016
-Probe H2-M02 (+DA check).

Is the UP light on?
Y N

017
-Probe H2-P07 (+BUS OUT check).

Is the UP light on?
Y N

018
-Probe F2-U13 (+DA check) and F2-U11 (+BUS OUT check).

Is the DOWN light on for both probe points?
Y N

019
-Probe F2-U13.

Is the UP light on?
Y N

020
-Probe F2-U11.

Is the UP light on?
Y N

021
Bad F2 (Common and language ROS) card.

022
(Entry Point P)

-Probe the bus out lines below. Record the results.

H2-G05	1	H2-J09	0
H2-G09	5	H2-J10	3
H2-G10	4	H2-M04	P
H2-G12	7	H2-B13	6
H2-J05	2		

Are both lights off for any of the probe points?
Y N

5 4 4 4
P Q R S T

023
The bus out line probe points in the preceeding step are to be used as the probe points in the next several steps.

Are an even number (or none) of the probe points DOWN?
Y N

024
-Switch the RUN switch under the covers to NOT RUN.
-Remove the F2 card.

Did any of the probe points change?
Y N

025
-Reinstall the F2 card.
-Remove the G2 card.

Did any of the probe points change?
Y N

026
-Reinstall the G2 card.
-Switch the RUN switch under the covers to RUN.

Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

027
Bad G2 (display) card (see MAP 050 for jumpering).

028
-Switch the RUN switch under the covers to RUN.

Bad F2 (Common and language ROS) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

4 U

029
-Remove the G2 card.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

030
Bad G2 (display) card (see MAP 050 for jumpering).

031
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.
Bad H2 (base I/O) card.

032
-Switch the RUN switch under the covers to RUN.

Bad H2 (base I/O) card.

033
Go to Page 14, Step 160, Entry Point G.

034
-Probe G2-M09 (+DA check) and G2-M05 (+bus out check).

Is the DOWN light on for both probe points?
Y N

035
-Probe G2-M09.

Is the UP light on?
Y N

036
-Probe G2-M05.

Is the UP light on?
Y N

V W X Y

037
Bad F2 (Common and language ROS) card.

038
Go to Page 3, Step 022, Entry Point P.

039
Go to Page 14, Step 160, Entry Point G.

040
-Probe L2-D05 (-POR switch).

Is the DOWN light on?
Y N

041
-Probe H2-G06 (-machine check).

Is the DOWN light on?
Y N

042
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

043
-Remove the F2 card.
-Press RESTART. Wait 25 seconds.
-Probe H2-G06.

Is the DOWN light on?
Y N

044
Bad F2 (Common and language ROS) card.

045
-Install the F2 card.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

046
Go To Map 0400, Entry Point A.

047
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

048
-Remove the F2, L2, and G2 cards.
-Probe L2-D05.

Is the DOWN light on?
Y N

049
One of the cards removed is suspect. Reinstall F2, L2, and G2 one at a time. The card which causes the probe DOWN light to turn on is bad.

050
Bad RESTART switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

051
(Entry Point E)

-Power down.
-Remove read/write storage cards M2, M4, N2, and N4, if installed.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Power up. Wait 25 seconds.

Does R7L0 contain FFFF?
Y N

052
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.

053
One of the cards removed is suspect. Reinstall them one at a time (M2 first, then M4, N2, and N4), powering down before and powering up after each card,to isolate the bad card.

If a failure still exists;
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.

054
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

055
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

056
Are both the PROCESS CHECK light and the IN PROCESS light on while the RESTART switch is pressed?
Y N

057
Bad IN PROCESS light.
Bad RESTART switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

058
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the machine at halt H?
(See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)
Y N

059
Did the machine pass halt A? (If you do not know, take the N column).
Y N

060
-Remove the G2 card.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

061
Bad G2 (display) card (see MAP 050 for jumpering).

062
-Install the G2 card.
-Press RESTART. Wait 25 seconds.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Does R7L0 contain FFFF?
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
Y N

063
Go to Page 5, Step 051, Entry Point E.

064
Are there any cards in M4, N2, or N4?
Y N

065
Bad M2 (read/write storage) card.
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

066
-Power down.
-Remove the read/write storage cards from M4, N2, and N4 if installed.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

067
-Power down.
-Remove the M2 card.
-Install one of the other read/write storage cards into the M2 location.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

068
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

069
The card that was in M2 is bad.

070
One of the read/write storage card removed is bad.
Reinstall them one at a time (M4 first, then N2, N4), powering down before and powering up after each card is replaced. The card that causes a PROCESS CHECK, is bad.

071
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

072
Is there a card in N4?
Y N

073
IS there a card in N2?
Y N

074
Is there a card in M4?
Y N

075
Is the recorded RFL0 between or including 0000 and 3FFF?
Y N

076
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).

077
Bad M2 (read/write storage) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

078
Is the recorded RFL0 between or including 0000 and 3FFF?
Y N

079
Is the recorded RFL0 between or including 4000 and 7FFF?
Y N

080
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

081
-Power down.
-Exchange M2 with M4.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

082
Is the machine at halt H?
Y N

083
Bad read/write storage card is now at M2.

084
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between or including 0000 and 3FFF?
Y N

085
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

086
Bad read/write storage card is now at M2.

087
The trouble probably was a bad card connection.

088
-Power down.
-Exchange M2 with M4.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

089
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between or including 0000 and 3FFF?
Y N

090
Bad read/write storage card is now at M4.

091
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

092
The trouble probably was a bad card connection.

093
Is the recorded RFL0 between or including 0000 and 3FFF?
Y N

094

Is the recorded RFL0 between or including 4000 and 7FFF?

Y N

095

Is the recorded RFL0 between or including 8000 and BFFF?

Y N

096

Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

097

-Power down.
-Exchange M4 with N2.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?

Y N

098

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between or including 4000 and 7FFF?

Y N

AAAA
QRST

AAAA
QRST

099

Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

100

Bad read/write storage card is now at M4.

101

The trouble probably was a bad card connection.

102

-Power down.
-Exchange M2 with M4.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?

Y N

103

Is the machine at halt H?

Y N

104

Bad read/write storage card is now at M2.

105

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is RFL0 between or including 0000 and 3FFF?

Y N

106
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

107
Bad read/write storage card is now at M2.

108
The trouble probably was a bad card connection.

109
-Power down.
-Exchange M2 with M4.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

110

Is the machine at halt H?
Y N

111
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

AA XY

112
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is RFL0 equal to a value from 4000 to 7FFF?
Y N

113
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

114
Bad read/write storage card is now at M4.

115
The trouble probably was a bad card connection.

116
Is the recorded RFL0 between or including 0000 and 3FFF?
Y N

117
Is the recorded RFL0 between or including 4000 and 7FFF?
Y N

118

Is the recorded RFL0 between or including 8000 and BFFF?
Y N

119
-Power down.
-Exchange N4 with M4.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

120
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between or including 4000 and 7FFF?
Y N

121
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

122
Bad read/write storage card is now at M4.

123
The trouble probably was a bad cable connection.

124
-Power down.
-Exchange M4 with N2.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

125
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is the RFL0 between or including 4000 and 7FFF?
Y N

126
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

127
Bad read/write storage card is now at M4.

128
The trouble probably was a bad card connection.

129
-Power down.
-Exchange N2 with M4.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

130
Is the machine at halt H?
Y N

131
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

132
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between or including 8000 and BFFF?
Y N

133
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

B B
D E

134
Bad read/write storage card is now in N2.

135
The trouble probably was a bad card connection.

136
-Power down.
-Exchange M2 with N2.
-Power up. Wait 25 seconds.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

137

Is the machine at halt H?
Y N

138
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

139
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between or including 8000 and BFFF?
Y N

140
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

141
Bad read/write storage card is now in N2.

142
The trouble probably was a bad card connection.

143
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record the read/write storage size.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).

Does read/write storage size= 3FFF?
Y N

144
Does read/write storage size= 7FFF?
Y N

145
Does read/write storage size= BFFF?
Y N

146
Go to Page 5, Step 051, Entry Point E.

147
Is there a card in N4?
Y N

148
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

149
Bad N4 (read/write storage) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

150
Is there a card in N2?
Y N

151
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

152
Bad N2 (read/write storage) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

153
Is there a card in M4?
Y N

154

Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

155

Bad M4 (read/write storage) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).

156

If the machine failed during the bring up test, the halts should be visible on the display.
(See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)

Is the machine at halt A?
Y N

157
Is the machine at halt F?
Y N

158
-Switch the RUN switch under the covers to NOT RUN.
(See MIM 201).
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is R0L0 less than 005E?
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
Y N

159
Is R0L0 between or including 0430 and 04BC?
Y N

160
(Entry Point G)

-Switch the RUN switch under the covers to RUN.
-Probe the device address lines and record those that are UP.

H2-B07 X1	H2-D07 X0
H2-B09 Y0	H2-D09 X2
H2-B10 Y2	H2-D10 Y1
H2-D02 X3	H2-D11 Y3

Are exactly two of the lines UP?
Y N

161
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

162
-Remove the G2 card.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

163
Bad G2 (display) card (see MAP 050 for jumpering).

164
Were B07 and B09 the two lines UP?
Y N

165
Were D07 and D10 the two lines UP?
Y N

166
Were D02 and B10 the two lines up?
Y N

167
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.

168
Bad tape control card (see MIM 203).

169
Bad F2 (Common and language ROS) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

170
(Entry Point C)

Did the error occur while keying?
Y N

171
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

172
-Press RESTART. Wait 25 seconds.
-Probe H2-U13 (+KBD parity check).
-Press the 9 key on the alphameric keyboard.

Is the UP light on?
Y N

16BBY

BZ

173
-Probe H2-U13 (+KBD parity check).
-Press the Z key.

Is the UP light on?
Y N

174
-Probe H2-U13 (+KBD parity check).
-Press the W key.

Is the UP light on?
Y N

175
-Probe H2-U13 (+KBD parity check).
-Hold the shift key and press the Z key.

Is the UP light on?
Y N

176
-Probe H2-U13 (+KBD parity check).
-Press all the keys until the UP light comes on.
-Using the key codes chart find the hex value for the failing key (see MIM 250). The keycode is represented by bits at an UP level. The keyboard generates a DOWN level parity bit if the unused bits of the keycode, (down level bits), are even.
-Press and hold the failing key and probe the KEYBOARD DATA BUS (note: DOWN is a 1, UP is a 0).

H2-J11 2	H2-M12 1
H2-M08 5	H2-P02 3
H2-M09 0	H2-P05 4
H2-M10 P	H2-U02 6
H2-M11 7	

Is the data on the bus correct?
Y N

16666 16CCC ABCDE

177
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

178
Bad H2 (base I/O) card.

179
-Press and hold the shift and the Z keys.
-Probe H2-M11 (-keyboard data bit 7).

Is the DOWN light on?
Y N

180
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

181
Bad H2 (base I/O) card.

182
-Probe H2-M10 (-keyboard P bit).
-Press and hold the W key.

Is the UP light on?
Y N

183
-Probe H2-M10.
-Disconnect the keyboard cable at Z4.

Is the UP light on?
Y N

184
Bad H2 (base I/O) card.

185
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

186
Bad H2 (base I/O) card.

187
-Press and hold the Z key.
-Probe the keyboard data bus:

H2-J11 2	H2-M12 1
H2-M08 5	H2-P02 3
H2-M09 0	H2-P05 4
H2-M10 P	H2-U02 6
H2-M11 7	

Are bits 4 and 7 UP and all the rest DOWN?
Y N

188
Bad H2 (base I/O) card.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

189
Bad H2 (base I/O) card.

190
-Press and hold the 9 key on the alphameric keyboard.
-Probe the keyboard data bus:

H2-J11 2	H2-M12 1
H2-M08 5	H2-P02 3
H2-M09 0	H2-P05 4
H2-M10 P	H2-U02 6
H2-M11 7	

Are all bits 0-7 UP and the P bit DOWN?
Y N

191
Are any bits neither UP nor DOWN?
Y N

192
Any bit 0 through 7 DOWN?
Y N

PROCESS CHECK MAP

193
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

194
-Remove the Z4 (keyboard) cable.
-Probe the keyboard data bus again:

H2-J11 2	H2-M12 1
H2-M08 5	H2-P02 3
H2-M09 0	H2-P05 4
H2-M10 P	H2-U02 6
H2-M11 7	

Are any bits DOWN?
Y N

195
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

196
-Connect the Z4 (keyboard) cable.

Bad H2 (base I/O) card.

197
Bad H2 (base I/O) card.

198
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

199
-Switch the RUN switch under the covers to RUN.

Does R7L0 contain FFFF?
Y N

200
Go to Page 14, Step 160, Entry Point G.

201
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

202
-Switch the RUN switch under the covers to RUN.

Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

203
Halt F is the device address test.

Is there a 1 on the second line from the top?
Y N

204
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

205
Bad F2 (Common and language ROS) card.
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

206
Halt A is the BUS IN bit test.

-Probe the BUS IN (0-7,P) lines:

H2-G11 5	H2-P12 0
H2-M07 4	H2-P13 6
H2-M05 3	H2-S10 P
H2-P09 2	H2-U05 1
H2-P10 7	

(Step 206 continues)

(Step 206 continued)

Are any lines DOWN?
Y N

207
Bad J2 (processor) card (see MAP 050 for jumpering).

208
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.

209
Go to Page 15, Step 170, Entry Point C.

210
Is there a card in B2?
Y N

211
(Entry Point N)

-Remove the A2, D2, K2,and K4 cards, if installed (see MIM 209).
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

212
Reinstall the cards one at a time, pressing RESTART and trying to run the job after each card. The card that causes the PROCESS CHECK light to come on is bad.

213
-Reinstall the A2, D2, K2, and K4 cards.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.
Go to Page 2, Step 013, Entry Point D.

214
-Power down.
-Remove the B2 card.
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Power up. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

215
Bad B2 (BSCA 1) card.

216
-Power down.
-Install the B2 card.
-Power up. Wait 25 seconds.
Go to Step 211, Entry Point N.

217
The maximum number of I/O devices that can be attached to the 5110, is three. If a 5103 is attached, it must be the last I/O device in the string of I/O devices, because it terminates all the I/O signal lines. If a 5103 is not attached, the last I/O device must have a cable terminator installed. If a 5106 is attached it must be the first I/O device.
A 5106 can only be attached if the 5110 has an internal tape drive.

-Disconnect the I/O cable at the 5110 I/O interface port (see MIM 271).
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

218

-Reconnect the I/O cable to the 5110 I/O interface port.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

219
Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

220
Go To Map 0400, Entry Point A.

221
The problem is repaired.

222
Is a 5103 installed?
Y N

223
Is a 5106 installed?
Y N

224
(Entry Point B)

Are there 2 5114's installed?
Y N

225
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad cable terminator.

226
The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect 5114-2 from the 5110.
-Attach the cable terminator to 5114-1.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

227
The trouble is in 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

If the problem still exists;
-Check/replace cables A1D1,A1D2, and A1D3 in 5114-1 (see Map 0210 and MIM 280).

228
The trouble is in 5114-1

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad cable terminator.

229
Is there a 5114 installed?
Y N

230

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).
Bad cable terminator.

231

Does the PROCESS CHECK light come on as a result of powering on or pressing RESTART?

Y N

232

Does the PROCESS CHECK occur when using the 5106?

Y N

233

-Disconnect the 5106 from the 5110.
-Connect the 5114 that was connected to the 5106, to the 5110.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

234

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

235

Go to Page 19, Step 224, Entry Point B.

236

-Disconnect the 5114 from the 5106.
-Attach the cable terminator to the 5106.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

237

Were there 2 5114's installed?

Y N

238

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

239

The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect the cable terminator from the 5106.
-Connect 5114-1 to the 5106.
-Connect the cable terminator to 5114-1.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

240
The trouble is in 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

241
The trouble is in 5114-1.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

242
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).
Bad cable terminator.

243
-Disconnect the 5106 from the 5110.
-Connect the 5114 to the 5110.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

DB DC

244
Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

245
Are there 2 5114's?
Y N

246
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad cable terminator.

247
The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect 5114-1 from the 5110.
-Connect 5114-2 to the 5110.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

248

The trouble is in 5114-1.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

249

The trouble is in 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad cable terminator.

250

Is a 5106 installed?

Y N

251

Is a 5114 installed?

Y N

252

Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

253

Are there 2 5114'S installed?

Y N

254

Does the PROCESS CHECK light come on as a result of powering on or pressing RESTART?

Y N

255

(Entry Point F)

-Disconnect the 5114 from the 5110.
-Connect the 5103 to the 5110.
-Press RESTART. Wait 25 seconds.
-Press and hold the CMD key.
-Press the Print Display key.
-Release the keys.
The printer should print the information that is displayed on the display.

Is the PROCESS CHECK light on?

Y N

256

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

257

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

258
(Entry Point J)

-Disconnect the 5114 from the 5110.
-Connect the 5103 to the 5110.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

259
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

260
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

261
Does the PROCESS CHECK come on as a result of powering on or pressing RESTART?
Y N

262
The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect 5114-2 from 5114-1.
-Connect the 5103 to 5114-1.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?
Y N

D D D
K L M

263
The trouble is in 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

264
Go to Page 22, Step 255, Entry Point F.

265
The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect 5114-1 from the 5110.
-Connect 5114-2 to the 5110.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

266
The trouble is in 5114-1.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

267
-Disconnect 5114-2 from the 5110.
-Connect the 5103 to the 5110.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

268

The trouble is in 5114-2.

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

269

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

270

Does the PROCESS CHECK light come on as a result of powering on or pressing RESTART?

Y N

271

Is a 5114 installed?

Y N

272

Are you using the 5106 when the PROCESS CHECK occurs?

Y N

273

-Disconnect the 5106 from the 5110.
-Connect the 5103 to the 5110.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

274

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

275

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

276

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

277

Are you using the 5106 when the PROCESS CHECK occurs?

Y N

278

-Disconnect the 5106 from the 5110.
-Connect the 5114 to the 5110.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

279

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

280

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

281

-Disconnect the 5114 from the 5106.
-Connect the 5103 to the 5106.
-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

DDX DDY

282

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

283

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

284

Is a 5114 installed?

Y N

285

-Disconnect the 5106 from the 5110.
-Connect the 5103 to the 5110.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?

Y N

286

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

287

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

288

-Disconnect the 5106 from the 5110.
-Connect the 5114 to the 5110.
-Press RESTART. Wait 25 seconds.

Is the PROCESS CHECK light on?

Y N

289

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Bad tape control card (see MIM 203).
Check/replace the tape unit cable (see MAP 0210 and MIM 230,231).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

290

Go to Page 23, Step 258, Entry Point J.

291

Go to Page 2, Step 012, Entry Point M.

292

-Switch the DISPLAY REGISTERS switch to NORMAL.

Go To Map 0500, Entry Point A.

293

Go to the FREELANCE TROUBLESHOOTING GUIDE in the DIAGNOSTIC AIDS section of the MIM.

PAGE 1 OF 19

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0420	A	1	001
0450	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	004	0700	A
3	016	0700	A
17	163	0700	A
16	148	0700	A

001
(Entry Point A)

-Press the top, then the bottom of the REVERSE DISPLAY switch.

Does the background of the 5110 display change from dark to light?
Y N

002
-Press the bottom of the REVERSE DISPLAY switch.
-Probe G2-M03 (-reverse display).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

003
-Calibrate the multimeter (see MIM 270).
-Measure the following voltages with reference to J6-C02 (gnd) :

+12 Vdc J6E04
+8.5 Vdc G2J11
+5 Vdc G2D03
-5 Vdc F2M06
(Step 003 continues)

(Step 003 continued)

Are the voltages in tolerance (11.0 to 13.2 Vdc, 7.9 to 9.35 Vdc, and 4.6 to 5.5 Vdc)?
Y N

004
Go To Map 0700, Entry Point A.

005
-Probe G2-M03 (-reverse display).

Is the DOWN light on?
Y N

006
Bad G2 (display) card (see MAP 050 for jumpering).
Bad REVERSE DISPLAY switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

007
-Remove the G2 (display) card.
-Probe G2-M03 (-reverse display).

Is the DOWN light on?
Y N

008
Bad G2 (display) card (see MAP 050 for jumpering).

009
-Reinstall the G2 (display) card.

Bad REVERSE DISPLAY switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

B
1

010
-Press the top of the REVERSE DISPLAY switch.
-Probe G2-M03 (-reverse display).

Is the DOWN light on?
Y N

011
Bad REVERSE DISPLAY switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

012
-Press the bottom of the REVERSE DISPLAY switch.
-Adjust the BRIGHTNESS control to the center of its range.

Is the 5110 display completely dark?
Y N

013
(Entry Point H)

-Attach a jumper from G2-P02 (-I/O display off) to D08 (gnd).

Is there video (any black image) within the raster area of the 5110 display?
Y N

014
Is the raster a stable white background of the correct size and shape?
Y N

015
-Remove the jumper from G2-P02.
-Calibrate the multimeter (see MIM 270).
-Measure +12 Vdc from J6-E04 (+12 Vdc) to J6-C02 (gnd).
(See MIM 248 display Z3 socket locations).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

016
Go To Map 0700, Entry Point A.

017
-Probe G2-J02 (-external vertical sync).

Are both lights on and steady?
Y N

018
-Disconnect the cable from Z3.
-Probe G2-J02.

Are both lights on and steady?
Y N

019
-Connect the Z3 (display and control panel) cable.

Bad G2 (display) card (see MAP 050 for jumpering).

020
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

021
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad display assmbly (see MIM 204), also see MIM 247 before replacing the display assmbly.

022
-Remove the jumper from G2-P02.
-Press the top of the REVERSE DISPLAY switch.

Is the background of the 5110 display now black instead of white?
Y N

023
Bad G2 (display) card (see MAP 050 for jumpering).

024
-Press the bottom of the REVERSE DISPLAY switch.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is there video (any black image) on the display screen?
Y N

025
-Probe G2-B03 (-I/O display off).

Is only the DOWN light on?
Y N

026
-Probe G2-B12 (-machine video)

Are both lights on and steady?
Y N

027
-Disconnect the cable from Z3 (see MIM 209)
-Probe G2-B12.

Are both lights on and steady?
Y N

028
-Reconnect the Z3 cable.

Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

029
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

030
-Probe the following pins:

G2-J05 (+C2)
G2-P04 (+C4)

Are both lights on for all probe points?
Y N

031
-Remove the G2 card.
-Probe G2-J05 and G2-P04 again.

Are both lights on for all probe points?
Y N

032
Bad F2 (Common and language ROS) card.
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

033
Bad G2 (display) card (see MAP 050 for jumpering).

034
-Observe the 5110 display.
-Press the top of the REVERSE DISPLAY switch.
-Adjust the BRIGHTNESS control from one limit to the other.

Is there any video (any white image) on the display screen?
Y N

035
Is there a card installed in K2 (Parallel I/O)?
Y N

036
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

037
-Remove the K2 card.
-Adjust the BRIGHTNESS control from on limit to the other.

Is there any video on the display screen?
Y N

038
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

039
Bad K2 (Parallel I/O) card.

040
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad BRIGHTNESS control

041
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

042
-Switch the RUN switch under the covers to NOT RUN.
-Observe the 5110 display.
-Switch the DISPLAY REGISTERS switch to NORMAL then back to DISPLAY REGISTERS .

Is the video different in DISPLAY REGISTERS than in NORMAL? (The answer is Y if the machine is operating properly).
Y N

043
-Switch the RUN switch under the covers to RUN.
-Probe G2-B06 (-display reg).

With the switch in DISPLAY REGISTERS the DOWN light should be on. In NORMAL, the UP light should be on.

Are the probe indications correct?
Y N

1
1
Q R S

R S

044
-Remove the G2 (display) card.
-Probe G2-B06.

With the switch in DISPLAY REGISTERS the DOWN light should be on. In NORMAL, both lights should be off.

Are the probe indications correct?
Y N

045
-Reinstall the G2 (display) card.

Bad J2 (processor) card (see MAP 050 for jumpering).
Bad DISPLAY REGISTERS switch (see MIM 249).
Check/replace Z3 (display and control panel) cable (see MIM 248,249).

046
Bad G2 (display) card (see MAP 050 for jumpering).

047
Are there any I/O devices attached to the 5110 I/O interface port (see MIM 271)?
Y N

048
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad F2 (Common and language ROS) card.

6
T

049

-Remove the cable from the 5110 I/O interface port. (see MIM 271)

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

050

-Remove the A2 (I/O cable driver) card and cable.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

051

Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad F2 (Common and language ROS) card.

U V

U V

052

Bad A2 (I/O cable driver) card and cable assembly.

053

(Entry Point G)

The maximum number of I/O devices that can be attached to the 5110 is three. If a 5103 is installed, it has to be the last I/O device in the string of devices, because it terminates all the I/O signal lines. If a 5103 is not installed, the last I/O device must have a cable terminator installed. If a 5106 is installed, it has to be the first I/O device in the string of devices.

Was there a 5103 in the string of devices you disconnected from the 5110 I/O interface port?

Y N

054

Was there a 5106 in the string of devices?

Y N

055

Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

056

-Connect the 5106 to the 5110 I/O interface port.
-Attach the cable terminator to the 5106.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

057
Was there a 5114 installed?
Y N

058
The trouble is fixed.

059
Were there two 5114's installed?
Y N

060
-Disconnect the cable terminator from the 5106.
-Connect the 5114 to the 5106.
-Attach the cable terminator to the 5114.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

(Step 060 continues)

(Step 060 continued)

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

061
The trouble is fixed.

062
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

063
The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Connect 5114-1 to the 5106.
-Attach the cable terminator to 5114-1.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

064

-Connect 5114-2 to 5114-1.
-Attach the cable terminator to 5114-2.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

065
The trouble is fixed.

066
The trouble is in 5114-2

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

067
The trouble is in 5114-1

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

068
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).
Bad cable terminator.

069
-Connect the 5103 to the 5110.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

070
Bad A2 (I/O cable driver) card and cable assembly in 5110.
Bad 5103 B1A2 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5103 I/O interface cable (see MAP 0210 and MIM 280).

071
Was there a 5114 in the string of devices?
Y N

072
Was there a 5106 in the string of devices?
Y N

073
The trouble is fixed.

074

-Disconnect the 5103 from the 5110.
-Connect the 5106 to the 5110.
-Connect the 5103 to the 5106.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

075
Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

076
The trouble is fixed.

077
Were there two 5114's in the string?
Y N

1OAE AF

078

-Disconnect the 5103 from the 5110.
-Connect the 5114 to the 5110.
-Connect the 5103 to the 5114.
No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

079
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

080
Was a 5106 installed?
Y N

081
The trouble is fixed.

1OAG

082

-Disconnect the 5114 from the 5110.
-Connect the 5106 to the 5110.
-Connect the 5114 to the 5106.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

083

Bad 5106 C1 (adapter) card (see MAP 050 for jumpering).
Check/replace the 5106 internal cables B1 and B2 (see MAP 0210 and MIM 280).
Check/replace the 5106 I/O interface cable (see MAP 0210 and MIM 280).

084

The trouble is fixed.

085

The first 5114 in the string of I/O devices attached to the 5110 will be called 5114-1. The second 5114 will be called 5114-2.

-Disconnect the 5103 from the 5110.
-Connect 5114-2 to the 5110.
-Connect the 5103 to 5114-2.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only

(Step 085 continues)

(Step 085 continued)
one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

086

-Disconnect 5114-2 from the 5110.
-Connect 5114-1 to the 5110.
-Connect 5114-2 to 5114-1.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?
Y N

087

The trouble is in 5114-1

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

088

The trouble is fixed.

DISPLAY MAP

089
The trouble is in 5114-2

Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).
Check/replace the 5114 internal cables D1 and D3 (see 280 and MAP 0210).
Check/replace the 5114 I/O interface cable (see 280 and MAP 0210).

090
Is the display tilted?
Y N

091
-Probe G2-P04 (+C4).

Are both lights on and steady?
Y N

092
-Probe G2-P04.

Are both lights off?
Y N

093
-Remove the F2 (ROS control) card.
-Probe G2-P04.

Are both lights on and steady?
Y N

094
-Reinstall F2.
-Remove the G2 (display) card.
-Probe G2-P04.

Are both lights on and steady?
Y N

095
-Install G2
-Remove the D2 (ASYNC COM-Serial I/O) card
-Probe G2-P04

Are both lights on and steady?
Y N

096
-Install D2
-Remove the A2 (I/O cable driver) card
-Probe G2-P04

Are both lights on and steady?
Y N

097
Reinstall the A2 card.
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

098
Bad A2 (I/O cable driver) card and cable assembly.

099
Bad D2 (Async Comm-Serial I/O) card.

100
Bad G2 (display) card (see MAP 050 for jumpering).

101
Bad F2 (Common and language ROS) card.

102
Bad H2 (base I/O) card.

103

-Switch the L32-64-R32 switch to all three positions and observe the display.

Does the video change correctly as the switch is operated?

Y N

104

Bad G2 (display) card (see MAP 050 for jumpering).
Bad display L32-64-R32 switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

105

-Switch the RUN switch under the covers to RUN.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Does the failure appear as long vertical lines (exceeding several characters in length), on the display?

Y N

106

-Switch the RUN switch under the covers to NOT RUN.

Is the video on the display stable?

Y N

107

-Switch the RUN switch under the covers to RUN.
-Probe K6-A02 (-external vertical sync). (See MIM 248 display Z3 socket locations).

Are both lights on and steady?

Y N

16AAAA QRST

108

-Disconnect the cable from Z3.
-Probe K6-A02.

Are both lights on and steady?

Y N

109

-Connect the Z3 (display and control panel) cable.

Bad G2 (display) card (see MAP 050 for jumpering).

110

Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

111

Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

112

-Switch the RUN switch under the covers to RUN.
-Switch the DISPLAY REGISTERS switch to NORMAL.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

113
Is there a card in A2 or B2 or D2 or K2?
Y N

114
(Entry Point I)

Is there a card in M4 or N2 or N4?
Y N

115
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad M2 (read/write storage) card.

116
-Power down.
-Remove M4,N2, and N4 if installed.
-Power up. Wait 25 seconds.
No more than 25 seconds after power up, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the display.

-Power up.

Do all three events shown above occur in sequence after Power Up?
Y N

117
-Power down.
-Swap M2 with M4.
-Power up. Wait 25 seconds.
No more than 25 seconds after power up, the following events should occur:
1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the display.

-Power up.

Do all three events shown above occur in sequence after Power Up?
Y N

118
Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

119
The read/write storage card that was in M2 is bad.

120
One of the read write storage cards removed is bad. Power down. Install the cards one at a time, (M4 first, then N2, N4), to find the bad card. Power up after each card is installed. Use the preceeding step to determine which card is bad.

121

-Remove the cards from A2,B2,D2, and K2 if installed.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

122

Go to Page 13, Step 114, Entry Point I.

123

-Install B2,D2, and K2 if removed.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

124

One of the cards you just installed is bad. Remove them one at a time, pressing RESTART after each card is replaced. The card that causes the display to NOT fail is bad.

AZ

125

Is there a cable connected to the 5110 I/O interface port?

Y N

126

Bad A2 (I/O cable driver) card and cable assembly.

127

-Install the A2 card.

-Remove the I/O interface cable from the 5110 I/O interface port.

No more than 25 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH appears on the top line of the 5110 display.
2. ABCDEFGHJKLMNP appears on the top line.
3. The top line is cleared and either LOAD0 or CLEAR WS appears once on one and only one line of the 5110 display.

-Press RESTART.

Do all three events shown above occur in sequence after RESTART is pressed?

Y N

128

Bad A2 (I/O cable driver) card and cable assembly.

129

Go to Page 6, Step 053, Entry Point G.

130

Is there a flashing cursor displayed only on the line below CLEAR WS or LOAD0 once and only once?

Y N

131
Are there any read/write storage cards in M4, N2, or N4?
Y N

132
Bad M2 (read/write storage) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

133
-Power down.
-Remove the storage cards M4, N2, and N4 if installed.
-Power up. Wait 25 seconds.

Is there a flashing cursor displayed only on the line below CLEAR WS or LOAD0 once and only once?
Y N

134
-Power down.
-Remove the read/write storage card in M2.
-Install one of the other read/write storage cards into the M2 location.
-Power up. Wait 25 seconds.

Is there a flashing cursor displayed only on the line below CLEAR WS or LOAD0, once and only once?
Y N

135
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

B B
C D

136
The card that was in M2 is bad

137
One of the cards removed is bad. Reinstall them one at a time (M4 first, then N2, N4) to find the bad card.

138
-Enter the following characters in order:
4455@@@

Is 4455@@@ followed by a flashing cursor, displayed on the line below CLEAR WS or LOAD0 once and only once?
Y N

139
Are there any read/write storage cards in M4, N2, or N4?
Y N

140
Bad M2 (read/write storage) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

141
-Power down.
-Remove the storage cards M4, N2, and N4 .
-Power up. Wait 25 seconds.
-Enter the following characters in order.
4455@@@

Is 4455@@@ followed by a flashing cursor, displayed on the line below CLEAR WS or LOAD0 once and only once?
Y N

142
-Power down.
-Remove the read/write storage card in M2.
-Install one of the other read/write storage card into the M2 card location.
-Power up. Wait 25 seconds.
-Enter the following characters in order, 4455@@@

Is 4455@@@ followed by a flashing cursor, displayed on the line below CLEAR WS or LOAD0 once and only once?
Y N

143
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

144
The card that was in M2 is bad

145
One of the cards removed is bad. Reinstall them one at a time (M4 first, then N2, N4) to find the bad card.

146
Bad M2 (read/write storage) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

147
-Calibrate the multimeter (see MIM 270).
-Measure +8.5 Vdc at board location C1-C13 .

Is the voltage in tolerance (+7.8 Vdc to +9.3 Vdc)?
Y N

148
Go To Map 0700, Entry Point A.

149
-Measure G2-J11 (+8.5 Vdc) to G2-D08 (gnd).

Is the voltage in tolerance (+7.8 Vdc to +9.3 Vdc)?
Y N

150
The circuit is open between the power supply connector Y1 (A1 board location C1-C13) and G2-J11 .

151
Bad G2 (display) card (see MAP 050 for jumpering).

152
See 247 (Display Raster Adjustments)

153
-Probe G2-J05 (+C2 PWRD).

Are both lights on and steady?
Y N

154
Is the DOWN light on?
Y N

155
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

156
-Remove the F2 card.

Are both lights on and steady?
Y N

157
-Reinstall F2.

Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

158
Bad F2 (Common and language ROS) card.

159
Bad G2 (display) card (see MAP 050 for jumpering).

160
(Entry Point B)

******* CAUTION *******
High voltage is present.

Check closely --- is the machine CRT filament glowing (observe through the glass at the socket end of the CRT)?
Y N

161
-Calibrate the multimeter (see MIM 270).
-Measure +12 Vdc from J6-E04 to J6-C02 (gnd).
(See MIM 248 display Z3 socket locations).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

162
-Disconnect the cable from Z3.
(see MIM 209).

Is the voltage in tolerance (+11.0 Vdc to +13.2 Vdc)?
Y N

163
-Connect the Z3 (display and control panel) cable.

Go To Map 0700, Entry Point A.

164
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

165
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

166
-Probe G2-P07 (+C5).

Are both lights on and steady?
Y N

167
(Entry Point C)

-Remove the F2 card.
-Probe G2-P07.

Are both lights on and steady?
Y N

168
-Reinstall the F2 card.
-Remove the G2 (display) card.
-Probe G2-P07.

Are both lights on and steady?
Y N

169
-Reinstall the G2 card.

Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

170
Bad G2 (display) card (see MAP 050 for jumpering).

171
Bad F2 (Common and language ROS) card.

172
-Probe G2-B09 (+external horizontal drive).

Are both lights on and steady?
Y N

173
Is there a card in A2?
Y N

174
(Entry Point D)

-Disconnect the cable from Z3.
-Probe G2-B09.

Are both lights on and steady?
Y N

175
-Connect the Z3 (display and control panel) cable.

Is there a card in D2?
Y N

176
Bad G2 (display) card (see MAP 050 for jumpering).

177
-Remove the D2 (ASYNC COM-Serial I/O) card.
-Probe G2-B09

Are both lights on and steady?
Y N

178
Bad G2 (display) card (see MAP 050 for jumpering).

179
Bad D2 (Async Comm-Serial I/O) card.

180
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

181
-Remove the A2 (I/O cable driver) card.
-Probe G2-B09.

Are both lights on and steady?
Y N

182
-Reinstall the A2 (I/O cable driver) card.
-Press RESTART. Wait 25 seconds.

Go to Step 174, Entry Point D.

183
-Reinstall the A2 (I/O cable driver) card.
-Remove all I/O devices attached to the 5110 I/O interface port (see MIM 271).
-Press RESTART. Wait 25 seconds.
-Probe G2-B09.

Are both lights on and steady?
Y N

184
Bad A2 (I/O cable driver) card and cable assembly.

185
Go to Page 6, Step 053, Entry Point G.

186
-Probe G2-B12 (-machine video).

Are both lights on and steady?
Y N

187
-Disconnect the cable from Z3.
-Probe G2-B12.

Are both lights on and steady?
Y N

188
-Connect the Z3 (display and control panel) cable.

Bad G2 (display) card (see MAP 050 for jumpering).
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

189
Bad BRIGHTNESS control.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

B
W

190
-Probe H6-E04 (-machine video).
(See MIM 248 display Z3 socket locations).

Are both lights on and steady?
Y N

191
Bad BRIGHTNESS control.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

192
Bad display assembly (see MIM 204).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad BRIGHTNESS control

193
Go to Page 2, Step 013, Entry Point H.

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TV MONITOR MAP 0510

PAGE 1 OF 2

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001

001
(Entry Point A)

-Turn up the BRIGHTNESS control on the TV monitor.

Is there a full raster on the TV monitor?
Y N

002
Bad TV monitor or its ac input voltage.

003
-Turn the BRIGHTNESS control down until the white background just disappears.

Is there any video on the TV monitor?
Y N

004
-Attach a jumper from G2-B12 (-machine video) to G2-B13 (+monitor video).

This forces a video signal to the TV monitor.

Is there any video on the TV monitor?
Y N

005

Is the 5110 display dark?
Y N

2 2
A B C D

C D

006
-Disconnect the TV monitor from the monitor cable
-Probe the center conductor on the monitor cable connector.

Are both lights on and steady?
Y N

007
-Remove the monitor cable from the 5110.
-Probe the center conductor of the 5110 monitor cable connector.

Are both lights on and steady?
Y N

008
-Remove the jumper

Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

009
-Remove the jumper

Check/replace machine TV monitor cable (see MIM 249).

010
-Remove the jumper.

Bad TV monitor.

011
-Disconnect the TV monitor from the machine.

Is the 5110 display dark?
Y N

2 2
E F

012
-Remove the jumper.

Bad TV monitor.

013
-Remove the jumper.

Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace machine TV monitor cable (see MIM 249).

014
Bad G2 (display) card (see MAP 050 for jumpering).

015
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace machine TV monitor cable (see MIM 249).
Bad TV monitor.

PAGE 1 OF 7

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0300	A	1	001
0845	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
7	077	0420	A
2	006	0700	A

001
(Entry Point A)

Can you make the machine fail?
Y N

002
(Entry Point B)

Go to the FREELANCE TROUBLESHOOTING GUIDE in the Diagnostic Aids section of the 5110 MIM.

003
Make the machine fail.

Is the PROCESS CHECK light on?
Y N

004
- Calibrate the multimeter (see MIM 270).
- For the probe points see MIM 206 and 255.
- Measure +8.5 Vdc and +5.0 Vdc at the keyboard PC board with referance to N2D08 (gnd) on the A1 board.

Are both voltages in tolerance (+7.8 Vdc to +9.3 Vdc and +4.6 Vdc to +5.5 Vdc)?
Y N

7 2 2
A B C

005
-Measure +8.5 Vdc and +5.0 Vdc at the A1 board (see MIM 255).

Are both voltages in tolerance (+7.8 Vdc to +9.3 Vdc and +4.6 Vdc to +5.5 Vdc)?
Y N

006
Go To Map 0700, Entry Point A.

007
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

008
-Press the Q key then the P key.

Did anything (P, Q, *, ?, invalid key, etc) appear on the display?
Y N

009
-Probe H2-U12 on the A1 board (-keyboard strobe).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the DOWN light on?
Y N

010
-Probe H2-U12 on the A1 board (-keyboard strobe).
-Press and hold the P key.

Is the DOWN light on?
Y N

011
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

012
-Release the P key.
-Probe H2-U06 on the A1 board (-interr req 3).

Is the DOWN light on?
Y N

013
-Probe H2-U06 on the A1 board.
-Observe the DOWN light while sequentially pressing keys.

Does the DOWN light come on?
Y N

014
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

015
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad CMD key module (see mim 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

016
-Disconnect the keyboard cable at Z4.
-Probe H2-U06 (-interrupt req 3).

Is the DOWN light on?
Y N

017
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

018
-Connect the keyboard cable at Z4.

Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

019
-Remove the keyboard cable at Z4.
(see MIM 209).
-Probe H2-U12 on the A1 board (-keyboard strobe).

Is the UP light on?
Y N

020
-Connect the keyboard cable at Z4.

Bad H2 (base I/O) card.

021
-Connect the keyboard cable at Z4.

Bad ATTN or HOLD key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

022
Did QP appear on the display?
Y N

023
Did a ? appear on the display?
Y N

024
Did only one character display?
Y N

025
-Press and hold the K key.
-Press RESTART. Wait 25 seconds.
(See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)

Is the machine at halt H?
Y N

026
-Release the K key.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

027
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

028
Bad ATTN or HOLD key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

029
-Release the K key.

Do positions 5 and 6 of the second line from the top of the display, contain F3 ?
Y N

030
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

031
Bad CMD key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

032
(Entry Point C)

You are checking for keys failing to generate a strobe.

-Probe H2-U12 (-keyboard strobe).
(See appendix B, the general logic probe, in the 5110 MIM).
-Press the failing key.

Is the DOWN light on when the key is pressed?
Y N

033
Bad key module (see MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

034
Using the keyboard data chart (see MIM 250):

-Probe the keyboard data bus.

H2-J11 2	H2-M12 1
H2-M08 5	H2-P02 3
H2-M09 0	H2-P05 4
H2-M10 P	H2-U02 6
H2-M11 7	

The keycode is represented by bits at an UP level. The keyboard generates a DOWN level parity bit if the unused bits of the keycode (DOWN level) are even.

Is the data correct for the key pressed?
Y N

035
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

036
The correct data is coming from the keyboard.

Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad G2 (display) card (see MAP 050 for jumpering).
Bad L2 (exec ROS) card (see MAP 050 for jumpering).

037
-Press and hold the X key.
-Press RESTART.
-When the machine halts at halt H, release the X key.

Do positions 5 and 6 of the second line from the top of the display contain C9 ?
Y N

038
Do positions 5 and 6 of the second line from the top of display contain C8 ?
Y N

039
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

040
Bad left shift key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

041
Bad right shift key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

042
-Press and hold the P key.

Does the P key perform the repeat function (the P key should not preform the repeat function)?
Y N

043
Do both shift keys function?
Y N

044
Do both shift keys fail?
Y N

045
Bad shift key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

046
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

047
-Press and hold the CMD key.
-Press and hold the A key.
-Press RESTART. Wait 25 seconds.
-Release the CMD and the A keys.

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

048
Is the machine at halt H?
(See BRINGUP HALTS in the Diagnostic Aids section of the MIM.)
Y N

7 7
N P Q R

049
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

050
Do positions 5 and 6 of the second line from the top of the display contain 03 ?
Y N

051
Bad CMD key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

052
-Press RESTART. Wait 25 seconds.
-Press and hold the space bar.

Does the repeat function work?
Y N

053
-Press and hold the SPACE bar.
-Probe H2-B04 (+typamatic).

Is the UP light on?
Y N

054
-Probe H2-U12 (-keyboard strobe).
-Press the space bar.

Is the DOWN light on when the key is pressed?
Y N

055
Bad key module (see MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

6 6 6
S T U

056
-Remove the keyboard cable at Z4.
-Probe H2-B04 (+typamatic).

Is the DOWN light on?
Y N

057
Bad H2 (base I/O) card.

058
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

059
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

060
-Press all the keys one by one.
-Test the ATTN key by pressing the backspace key until a character flashes, then press the ATTN key. The flashing character should disappear.

Does any key fail to function?
Y N

061
-Press ATTN
-Press HOLD.
-Hold the shift key down and press the (peroid) key on the numeric keyboard.
This ensures that the 5110 is in EBCDIC character mode.

Now check out the ability of the machine to do a character set selection.

Does the 5110 have the KATAKANA feature installed?
Y N

062
-Press the $ key several times.
-Press the HOLD key.
-Hold the shift key down and press the 8 key on the numeric keyboard.

Did the $ characters on the display change to ¥ (yen)?
Y N

063
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

064
-Press the HOLD key.
-Hold the shift key down and press the (peroid) key on the numeric keyboard.

Go to Page 1, Step 002, Entry Point B.

065
-Release the shift and press the $ key several times.
-Press the HOLD key.
-Hold the shift key down and press the 0 key on the numeric keyboard.

Did the $ character change on the display to ¥ (yen)?
Y N

066
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

067
-Press the HOLD key.
-Hold the shift key down and press the . (peroid) key on the numeric keyboard.

Go to Page 1, Step 002, Entry Point B.

068
Go to Page 4, Step 032, Entry Point C.

069
-Press the A key.

Is an A displayed?
Y N

070
Bad key module (see MIM 253).

071
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

072
-Probe H2-B04 (+typamatic).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

073
-Press and hold the A key
-Probe H2-U12 (-keyboard strobe).

Are both lights on and steady?
Y N

A A
Z A B

074
Bad H2 (base I/O) card.

075
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

076
Bad H2 (base I/O) card.

077
Go To Map 0420, Entry Point A.

This page intentionally left blank.

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0300	A	1	001
0310	A	1	001
0500	A	1	001
0600	A	1	001
0840	A	1	001
0841	A	1	001
0843	A	1	001
0846	A	1	001

001
(Entry Point A)

Is the customers power OK?
Y N

002
Is the 5110 or any of the I/O devices causing the bad customer power (take the Y leg if unknown)?
Y N

003
Customer power problem

004
Unplug the 5110 and all the I/O devices from the customer power.
Have the customer reset their circuit breaker or replace their fuse.

Does the customers circuit breakers trip or their fuses still blow?
Y N

005
Plug in the 5110 and I/O devices one at a time to the customers power.

Does the 5110 or any of the I/O devices cause the customers circuit breakers to trip or their fuses to blow?
Y N

006
Suspect customer power problem.

007
The device that caused the customers circuit breaker to trip or fuse to blow is bad.

See the AC power diagram for the failing device:

5110 (see 5110 MIM 273)
5106 (see 5110 MIM 284)
5103 (see 5103 MIM 384)
5114 (see 5114 MIM 182)

008
Customer power problem

009
Is the power supply fan running (see MIM 202 and 273)?
Y N

010
Is fuse F1 blown?
(See MIM 207 and 273).
Y N

011
Is the line cord plugged in?
(See MIM 273).
Y N

012
Plug the line cord in.

013
-Power down.

Check for:
1. Open line cord (see MIM 273).
2. Open power switch (see MIM 273).
3. Open ac power filters (see MIM 273).
4. Open in ac power box (see MIM 273).
5. Open fan lead J2 (see MIM273).
6. Open fan motor winding (see MIM 273).

014
-Power down.
-Replace fuse F1.
-Power up. Wait 25 seconds.

Does fuse F1 blow after replacing?
Y N

015
Bad fuse F1

016
-Power down.
-Replace fuse F1
-Disconnect the ac power cables at J1, J2, and J3 (see MIM 273).
-Power up. Wait 25 seconds.

Does fuse F1 blow now?
Y N

017
-Power down.
-Connect the ac power cable at J2 (see MIM 273).
-Power up. Wait 25 seconds.

Does fuse F1 blow now?
Y N

3 3
G H J

J

018
-Power down.
-Connect the ac power cable at J3 (see MIM 273).
-Power up. Wait 25 seconds.

Does fuse F1 blow now?
Y N

019
-Power down.
-Connect the ac power cable at J1 (see MIM 273).
-Power up. Wait 25 seconds.

Does fuse F1 blow now?
Y N

020
Trouble was probaly a bad cable connection at J1 or J2 or J3.

021
-Power down.
-Replace the fuse F1.
-Disconnect the dc power cable at A1Y1 (see MIM 272).
-Power up. Wait 25 seconds.

Does fuse F1 blow now?
Y N

022
-Measure the UNLOADED voltages at the dc power cable (see MIM 272).

Are all the voltages in tolerance?
Y N

3 3 3 3
K L M N

023
Check/replace A1Y1 (DC Power) cable (see MIM 272).
Bad power supply.
****
* CAUTION *
****
see MIM 271, power supply removal and replacement.

024
Go to Page 4, Step 038, Entry Point B.

025
Bad power supply.
Check/replace A1Y1 (DC Power) cable (see MIM 272).
****
* CAUTION *
****
see MIM 271, power supply removal and replacement.

026
Bad tape motor assembly (see MIM 203).
Bad tape fan assmbly.

027
Bad fan assembly.

028
Check for a short or loose connection in the ac power box (see MIM 273).

029
-Calibrate the multimeter (see MIM 270).
-Measure the following loaded voltages at the A1 board to C1-A13 (gnd):
-Record the pin location of any voltages that are out of tolerance (see MIM 272).

+5 Vdc A1-D13
+8.5 Vdc C1-C11
+12 Vdc C1-D13
-12 Vdc C1-E13
-5 Vdc C1-E11

Are all voltages in tolerance?
Y N

030
-Power down.
-Disconnect the cable at the I/O interface port if installed (see MIM 283).
-Disconnect the dc power cable at Y1 (see MIM 272).
-Power up.
-Measure the UNLOADED voltages at the dc power cable (see MIM 272).

Are all voltages in tolerance?
Y N

031
Is there any voltage present?
Y N

032
-Power down.
-Exchange the power supply connector J1 with the fan connector, J2. (See MIM 273).
-Power up. Wait 25 seconds.

Is the fan running now?
Y N

033
Swap cables J1 and J2 back to their original positions.
Check/replace the cables in the ac power box (see MIM 273).

034
Are the voltages present now?
Y N

035
Swap cables J1 and J2 back to their original positions.
Check/replace A1Y1 (DC Power) cable (see MIM 272).
Bad power supply.
****
* CAUTION *
****
see MIM 271, power supply removal and replacement.

036
Swap cables J1 and J2 back to their orignal positions.
A cable was unseated or had an open connection. Inspect for loose connections.

037
Check/replace A1Y1 (DC Power) cable (see MIM 272).
Bad power supply.
****
* CAUTION *
****
see MIM 271, power supply removal and replacement.

038
(Entry Point B)

-Power down.
-Connect the dc cable back into socket Y1.
-Power up.
-Measure the following LOADED voltages to C1-A13 (gnd) for the next several steps (see MIM 272).
+5 Vdc A1-D13
+8.5 Vdc C1-C11
+12 Vdc C1-D13
-12 Vdc C1-E13
-5 Vdc C1-E11

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

039
Go to Page 5, Step 047, Entry Point D.

040
-Power down.
-Remove all the cards from the board.
-Replace fuse F1 if needed.
(see MIM 209).
-Power up. Wait 25 seconds.

Does fuse F1 blow or does power drop or is the voltage out of tolerance now?
Y N

041
Bad card.
Power down and power up as you reinstall the cards one at a time until the defective card is found.

042
-Power down.
-Replace fuse F1 if needed.
-Disconnect all the cables to the A1 board except the dc power cable at Y1 (see MIM 209).
-Power up. Wait 25 seconds.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

043
-Connect the Z4 (keyboard) cable.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

044
-Connect the Z2 (tape) cable.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

045
-Connect the Z3 (display and control panel) cable.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

046
-Connect the Z1 (ASYNC COM-Serial I/O) cable.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

6V 6W 6X 6Y 6Z AA

AA

047
(Entry Point D)

-Connect the I/O interface cable to the 5110.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

048
The problem was corrected by reseating the cables. Inspect both ends of the cables for loose foreign conductors (foil or wire ends for example).

049
-Disconnect all the I/O interface cables from each other and from the 5110 I/O interface port.
-Connect the I/O devices one at a time to the Ranger I/O interface port.
-Measure all the voltages again for each device you attach.

The device which causes a voltage to be out of tolerance, or blows a fuse, is the bad device.
-Remove all the cards from that device.
-Power up. Wait 25 seconds.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

050
One of the cards removed is defective. Reinstall them one at a time until the measured voltage goes out of tolerance. The last card reinstalled is defective.

051
Bad external I/O device or cable. Check especially for short circuits (see MAP 0210).

052
-Power down.
-Disconnect the communication cable at the data set and/or the serial I/O cable from the serial I/O device.
-Power up.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

053
Bad data set or serial I/O device.

054
Short circuit in the communication cable or serial I/O cable.

055
-Power down.
-Disconnect the cable connector on the 5110 display.
-Power up.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

056
Bad display assembly (see MIM 204).
****
* CAUTION *
****
High voltage is present.

057
-Check for a short circuit in the control panel switches.
(See MIM 248,249, display and control panel cable).

058
Check for a short circuit in the tape unit.
Bad tape control card (see MIM 203).
Short circuit in the internal tape cable.

059
-Power down.
-Disconnect keyboard cable at the keyboard.
(See MIM 206).
-Power up.

Does the fuse F1 blow or are any of the measured voltages out of tolerance?
Y N

060
Short circuit in the keyboard PC board.
(See MIM 251).

061
Bad keyboard cable.
(See MIM 206).

062
Bad A1 board.

063
The power supply is working properly.

Are you missing a voltage at a specific device?
Y N

064
Bad A1 board.

065
Trace the circuit from that device to the power supply (see MIM 274 and LOGIC diagram 480).

PAGE 1 OF 4

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	008	0420	A

001
(Entry Point A)

This is the entry MAP for the 5103.

Information on the use of the CE probe can be found in Appendix B of the 5110 MIM.

Is the PROCESS CHECK light on?
Y N

002

Does the 5110 have an internal tape drive (see MIM 201)?
Y N

003

Is a second 5114 installed on the system?
Y N

004
NOTE: a problem in the 5114 I/O interface cable, the 5114 adapter card, or 5114 cables D1 or D3 can also cause a problem in the printer.
Go to Page 3, Step 010, Entry Point C.

2A 2B 2C

005
Disconnect the second 5114. Connect the 5103 to the first 5114.

NOTE: a problem in the 5114 I/O interface cable, the 5114 adapter card, or 5114 cables D1 or D3 can also cause a problem in the printer.
Go to Page 3, Step 010, Entry Point C.

006
If there is a 5106 and/or 5114(s) attached, disconnect the 5106 and the 5114(s). Connect the 5103 directly to the 5110.
Go to Page 3, Step 010, Entry Point C.

007
Is the printer MDI loaded?
Y N

008
Go To Map 0420, Entry Point A.

009
This procedure will reset the process check and let you continue with the printer MDI at the map number and step number on the display.

-Record the map number and step number now displayed.
-Press and release the RESTART switch. Wait 25 seconds.
Use the keys on the numeric section of the keyboard:
-Hold CMD and press HOLD
-Hold CMD and press - (minus)
-For BASIC , hold CMD and press * (multiply)
-For APL , hold CMD and press x (multiply)
-Press C
-Press 1
-Press EXECUTE
Follow the instructions on the display until DSP MENU appears. Then enter the rightmost three digits of the map no. recorded earlier.
-Press O (alphabetic)
-Press EXECUTE
(Step 009 continues)

(Step 009 continued)
-Wait for MDI OPTIONS to be displayed.
-Advance the cursor to STEP NO.
-Enter the three-digit step no. recorded earlier.
-Press EXECUTE

The printer MDI is now continuing at the step where the PROCESS CHECK light occured before. Follow the instructions on the display.

010
(Entry Point C)

-If a PROCESS CHECK occurs after doing the following, GO TO MAP 420, Entry Point A.

-Press RESTART. WAIT 25 seconds.
Use the keys on the numeric keyboard.
-Press HOLD
-Hold CMD and press - (minus)
-For BASIC, hold CMD and press *(multiply)
-For APL, hold CMD and press x (multiply)
-Press C
-Press 1
-Press EXECUTE

Do the words TAPE READ DIAGNOSTIC or DISKETTE READ DIAGNOSTIC appear on the top line of the display?
Y N

011
Bad F2 (Common and language ROS) card.

012
-Follow the instructions on the display until DSP MENU appears. THEN:

-Enter 800
-Press EXECUTE

The printer MDI should now load and run.
If a PROCESS CHECK occurs, Go To Map 0420, Entry Point A.
Follow the instructions on the display.
Return to this step if the MDI directs you to return to MAP 0810.

Did the MDI run to completion?
Y N

013
Follow the instructions on the display.

D

014
Did you disconnect a 5106 and/or a 5114(s) from the 5110 to run this MDI?
Y N

015
(Entry Point B)

-Press RESTART. Wait 25 seconds.

Did the customer complain of trouble with PRINT/PLOT?
Y N

016
No trouble found.

017
-Remove the 5103 tractor assembly.
-Install 1 part paper.
-Set the paper release lever to the rear of the machine (see 5103 MIM 301).
-Set the copy control dial to 1 (see 5103 MIM 301).
-Insert the PRINT/PLOT tape cartridge or diskette that IBM supplied to the customer.

For APL, enter:
)LINK 1
-Press EXECUTE

For BASIC, enter:
LINK 1
-Press EXECUTE

The answers to the questions on the display are as follows:
1 or 2 Press EXECUTE
1 Press EXECUTE
2 Press EXECUTE
2 Press EXECUTE

When LOAD0 or CLEAR WS is displayed, enter the following information:

For APL, enter
(Step 017 continues)

01JAN79

EC 836600 PEC 835541

4
E

(Step 017 continued)
)LOAD 4
-Press EXECUTE.
-Enter)RUN
-Press EXECUTE.

For BASIC, enter
LOAD 5
-Press EXECUTE
-Enter RUN
-Press EXECUTE.

Are the dots within the tolerance lines?
Y N

018
Check the platen pressure roll adjustment (see 5103 MIM 323).
Check for loose or broken parts in the paper path.
Bad forms feed stepper motor.
Bad A1B1 (motor driver) card (see 5103 MIM 303).
Bad A1A1 (sense amplifier)
Check the platen gear backlash.
Check the forms feed stepper motor/emitter timing (see 5103 MIM 332).

019
Are the verticle lines the correct length and density?
Y N

020
Check the forms feed stepper motor/emitter timing (see 5103 MIM 332). This is a very critical adjustment for Print/plot. It may be necessary to fine adjust the emitter so that the Print/plot graph verticle lines are the same length and height.
Bad A1A1 (sense amplifier) card (see 5103 MIM 303).

021
PRINT/PLOT mechanical functions check out OK

E
3

022
-Reconnect the 5106 or the 5114 to the 5110 one at a time.
-Connect the 5103 to the 5106 or to the 5114.
-Rerun the printer MDI 0800.

DO NOT FOLLOW THE PRINTER MDI IF AN ERROR OCCURS.

Did MDI 0800 run to completion?
Y N

023
The problem is in the 5106 if attached, or in the 5114. Go to MAP 0850 if you have a 5106 attached or go to MAP 0880 if you have a 5114. If the above procedure does not find the problem, suspect the I/O interface cables in either the 5106 or in the 5114 (see MAP 0210 and MIM 213) and cables D1 and D3 in the 5114, or cables B1 and B2 in the 5106 (see MAP 0210 and MIM 280), or the adaptor cards (C1) in the 5106 or the 5114(s).

024
Go to Page 3, Step 015, Entry Point B.

COMMUNICATIONS,SERIAL I/O, AND PARALLEL I/O MAP 0830

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	009	0300	A
4	031	0420	A
2	012	0420	A
2	010	0420	A

001
(Entry Point A)

This is the entry MAP for the asynchronous communications (async comm), binary synchronous communications (BSC), serial I/O, and parallel I/O adapters. Load these MDIs from the communications diagnostic cartridge if the 5110 has an internal tape drive, otherwise use the diagnostic diskette. If the PROCESS CHECK light is on, the MDI cannot be loaded.

Is the PROCESS CHECK light on?
Y N

002
Is the problem 99XX error codes when the user loads the BSC feature microcode?
Y N

003
Do you want to test the BSC feature?
Y N

4 3 3 2
A B C D

0831 0838 0830

004
(Entry Point B)

Use the keys on the numeric section of the keyboard:

-Press HOLD
-Hold CMD and press - (minus)
-For BASIC, hold CMD and press * (multiply)
-For APL,hold CMD and press X (multiply)
-Press C
-Press 1
-Press EXECUTE

Did the PROCESS CHECK light come on?
Y N

005
Do the words TAPE READ DIAGNOSTIC or DISKETTE READ DIAGNOSTIC appear on the top line of the display?
Y N

006
Bad F2 (Common and language ROS) card.

007
You have loaded and are running the read diagnostic program (see section 4, diagnostic aids). Follow the instructions on the display. Return to this point for further instructions when the DSP MENU is displayed.

Is the DSP MENU on the display?
Y N

008
Is the PROCESS CHECK light on?
Y N

009
Go To Map 0300, Entry Point A.

010
Go To Map 0420, Entry Point A.

E F

E F

011
-Enter the desired MDI number.
-Press EXECUTE.

The MDI should load and run. If a PROCESS CHECK occurs while the MDI is running go to MAP 0420, otherwise follow the instructions on the display.
When completed, return to BASIC/APL mode by pressing RESTART.

012
Go To Map 0420, Entry Point A.

013

The BSCA diagnostics require some information about the communication facility card. Indicate on the following list which communication facility is installed so you can accurately answer the questions asked by the diagnostic. On the first CE call (assume the first CE call if none of the following communication facilities has been indicated), unplug the C2 card and refer to the BSC MIM to determine which communication facility card is installed and how it is personalized.

NOTE- BSC problems after the A1 board has been replaced may be caused by wrong nets on the new A1 board. See the A1 Board Requirements in the BSC MIM.

( ) EIA

( ) DDSA - (U.S. only) - 2400 bps

( ) DDSA - (U.S. only) - 4800 bps

( ) 38LS - switched -

transmit level = _____db

Equalizer switch _____ set ON (Only World Trade except Canada)

( ) 38LS - nonswitched -

( )2 wire ( )4 wire

( )30 ms CTS delay, 0 ms echo clamp

( )80 ms CTS delay, 50 ms echo clamp

( )230 ms CTS delay, 150 ms echo clamp

( )SNBU transmit level = _____db

( )Transmit level (Only World Trade except Canada) = _____ db

Equalizer switch _____ set ON (Only

(Step 013 continues)

(Step 013 continued)
World Trade except Canada)

NOTE - If this is the first CE call on the BSCA feature, verify that the CTS delay and the echo clamp are compatable with the remote station(s). If help is needed to determine compatability, contact the local BODS.
Also verify that the transmit level is correct (see MAP 0831) then return here to continue.
Go to Page 2, Step 004, Entry Point B.

014
Was the error code 9900?
Y N

015
Was the error code 9921 , 9940 or 9941?
Y N

016
Was the error code 9931 or 9932?
Y N

017
Was the error code 9933, 9970, 9971, 9972, 9974, 9975, 9976, 9977, 9981, 9982 or 9999?
Y N

018
Was the error code 9983?
Y N

0831 0838 0830

019
Was the error code 9987 or 9998?
Y N

020
Was the error code 9986?
Y N

021
Bad B2 (BSCA 1) card.

022
Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

023
-Unplug the BSCA external cable from the 5110.
-Reload the BSC microcode.

Does error 9987 or 9998 occur while reloading the BSC microcode?
Y N

024
Connect the BSCA external cable to the 5110, then run MDI 0821 (see step 004). If MDI 821 runs OK (no errors), then suspect a problem at the remote station.

025
Bad C2 (EIA,DDSA,38LS) card.
Bad A4 (BSCA 2) card.
See the BSC MIM for jumpering and switch setting instructions.

026
Bad A4 (BSCA 2) card.

027
Bad A4 (BSCA 2) card.
Bad B2 (BSCA 1) card.

028
Bad B2 (BSCA 1) card.
Bad BSCA microprocessor module (located on the B2 card).
When replacing the module, position it so the notch in the narrow end is pointed towards the cylinder shaped module.

029
Bad B2 (BSCA 1) card.
Bad H2 (base I/O) card.

030
BSC program problem. Suspect the BSC cartridge or diskette.

031
Go To Map 0420, Entry Point A.

Transmit and Receive Level Checkout MAP

001
(Entry Point A)

Use this MAP to check the modem transmit or receive level or to set the transmit level for an IBM modem.

Is the local station on a switched telephone network or does it have Switched Network Back Up (SNBU) installed?
Y N

002
Go to Page 4, Step 020, Entry Point B.

003
This is the transmit level procedure for a switched network.
- Connect the DB meter to the DT (DATA TIP) and DR (DATA RING) terminals at the coupler.
- Set the DB meter to the bridge position.
- Load the Communications Diagnostic Cartridge or the 5110 Diagnostic Diskette. Select the BSCA Test Patterns by entering 898 when the DSP MENU is displayed. DO NOT enter O to select the option menu at this time.
- Follow the instructions on the display. Select STEP mode and select step 8 to transmit continuous SYN characters. Answer Y for business machine clocking if the local station has a 38LS installed. Answer the other questions based on the local station configuration.

Does this station have Auto Answer?
Y N

004
- Dial the local modem telephone from a nearby telephone. Answer the modem telephone and put it DATA mode.

Go to Page 2, Step 006, Entry Point F.

A

005
- Dial the local modem telephone from a nearby telephone. After you hear the ring, the 3 second answer tone and some SYN characters, cradle the telephone handset.

Go to Page 2, Step 006, Entry Point F.

006
(Entry Point F)

When the terminal begins to transmit, does the DB meter indicate the value marked on the coupler within a tolerance of one db for at least 10 seconds?
Y N

007
- Set the modem transmit level to the db level specified on the coupler. If the db value is not specified, have the customer notify the telephone company. (NOTE- Some couplers have an automatic transmit level setting feature. If this type of coupler is installed, ask the customer what db level it requires.)
See the BSC MIM for the procedure to set the transmit level for a 38LS integrated modem. For IBM external modems, use the maintenance information provided with the external modem.

Does the DB meter indicate the correct level now?
Y N

008
- Disconnect the meter leads from the DT and DR terminals.
- Disconnect the DT and DR leads from the coupler that go to the modem.
- Set the db meter switch to the 600 position.
- Connect the DB meter to the white (DT) and black (DR) wires just disconnected.

Does the DB meter indicate the correct value now?
Y N

B C D E

B C D E

009
Modem problem. Reconnect the white wire to DT and the black wire to DR at the coupler.

If using an OEM modem, have the customer notify the responsible person.

If using an IBM external modem, use the maintenance information provided with that modem.

Bad C2 (38LS) card.

010
Coupler problem. Reconnect the white wire to DT and the black wire to DR at the coupler.

Have the customer notify the responsible person.

011
The transmit level is correct.

Do you want to check the receive level?
Y N

012
The test is complete. If you tested SNBU and want to test the nonswitched transmit/receive levels, go to Step 020 Entry Point B.

013
Go to Page 3, Step 017, Entry Point C.

014
The transmit level is correct.

Do you want to check the receive level?
Y N

3 3
F G

015
The test is complete. If you tested SNBU and want to test the nonswitched transmit/receive levels, go to Step 020, Entry Point B.

016
Go to Step 017, Entry Point C.

017
(Entry Point C)

This is the receive level procedure for a switched network.
- Set the DB meter range for -30 db.
- Have the remote station transmit a pattern.

Is the receive level correct? (U.S. should be between -21.5 and -27.2 db. In World Trade, consult the local PTT representative.)
Y N

018
Telephone network problem.
Have the customer notify the responsible person.

019
The receive level is OK.
Test complete. If you tested SNBU and want to test the nonswitched transmit/receive levels, go to Step 020, Entry Point B.

020
(Entry Point B)

This is the transmit level procedure for a nonswitched network.
The transmit level for U.S. and Canadian nonswitched networks is 0 db. For World Trade countries (except Canada), consult the local PTT representative for the correct transmit level.

- Set the DB meter to the bridge position.
- Take the cover off the 4 prong connector to the telephone line. Connect the DB meter to the R and GN terminals inside the plug.
- Load the communications diagnostic cartridge or the 5110 diagnostic diskette. Select the BSCA test patterns by entering 898 when the DSP MENU is displayed. DO NOT enter O to select the option menu at this time.
- Follow the instructions on the display. Select step mode and select step 008 to transmit continuous SYN characters. NOTE: If the local station is on a multipoint network, go to Entry Point E.

Is the transmit level correct?
Y N

021
Is the local station using a World Trade (except Canada) 38LS?
Y N

022
Is the local station using a U.S./Canada 38LS?
Y N

5 H 5 J 5 K L

023
(Entry Point E)

- Set the transmit level to the correct level. See the BSC MIM for 38LS switch settings.

If using an IBM external modem, use the maintenance information provided with that modem.
If using an OEM modem, have the customer notify the responsible person.

Does the DB meter indicate the correct level now?
Y N

024
- Unplug the external cable from the nonswitched telephone line.
- Set the DB meter to the 600 position.

Does the DB meter indicate the correct db level now?
Y N

025
modem problem.

If using an OEM modem, have the customer notify the responsible person.

If using an IBM external modem, use the maintenance information provided with that modem.

Bad C2 (38LS) card.

026
Telephone network problem.
Have the customer notify the responsible person.

5 M

027
The transmit level is OK.

Do you want to check the receive level?
Y N

028
Test complete. If SNBU is installed and you want to test its transmit/receive levels, go to Step 003.

029
Go to Step 035, Entry Point D.

030
Bad C2 (38LS) card.

031
Go to Page 4, Step 023, Entry Point E.

032
The transmit level is OK.

Do you want to check the receive level?
Y N

033
Test complete. If SNBU is installed and you want to test its transmit/receive levels, go to Step 003.

034
Go to Step 035, Entry Point D.

035
(Entry Point D)

This is the receive level procedure for a nonswitched network.
- Set the DB meter to the bridge position.
- Connect the DB meter leads to the R and GN terminals in the 4 prong plug for a 2 wire network. For a 4 wire network, connect the leads to the Y and BK terminals.
- Have the remote station transmit a pattern.

Is the receive level correct? (U.S. should be between -15 and -17 db. In World Trade, consult the local PTT representative)
Y N

036
Have the remote station verify that their transmit level is correct.

Telephone network problem.
Have the customer notify the responsible person.

037
Is the 5110 on a 4 wire nonswitched network?
Y N

038
The receive level test is OK. If SNBU is installed and you want to test its transmit/receive levels, go to Step 003.

039
To check the internal and external cables, connect the DB meter to C2G09 and C2J13 (See logic diagram 455).

Is the receive level correct?
Y N

0831 0838 0830

040

Bad external cable.
Bad internal cable.
See logic diagram 455.

041

Receive level test is OK. If SNBU is installed and you want to test its transmit/receive levels, go to step 003.
If receive problems still occur, replace the C2 (38LS) card.

001

Use this MAP to isolate problems to the local 38LS integrated modem or local CBS type coupler by using a nearby telephone.

- Verify that the connections from the modem to the coupler are correct (see color code chart).
- Make DATA TERMINAL READY (DTR) inactive by pressing the RESTART key.
- Select the 15 VDC range on the CE meter.
- The MAP will state which CE meter lead to probe the signal to be measured. At that time, connect the other lead to SG (SIGNAL GROUND) if probing at the coupler or to C2D08 if probing on the C2 (38LS) card.
- Lift the modem telephone handset from the cradle. DO NOT lift the exclusion key.
- Listen for the dial tone.

Do you hear the dial tone?
Y N

002
- Lift the exclusion key.

Do you hear the dial tone now?
Y N

003
Telephone problem.
Go to Page 4, Step 034, Entry Point A.

004
- Dial a nearby telephone.

Can calls be completed like an ordinary telephone?
Y N

005
Telephone problem.
Go to Page 4, Step 034, Entry Point A.

*** COLOR CODE CHART ***

Switch Hook (SH) = Red
Signal Ground (SG) = Grey
Data Modem Ready (DA) = Yellow
Coupler Cut Through (CCT) = Brown
Off Hook (OH) = Blue
Ring Indicate (RI) = Violet
Data Tip (DT) = White
Data Ring (DR) = Black

NOTE - The inactive level of all the above coupler connections except DT and DR are - EIA levels (-3 to -25 VDC) when measured to SG.

006

- The modem telephone tests OK as an ordinary telephone .

To test the Auto Answer function, make DTR active by:

1. Load the communications diagnostic cartridge or 5110 diagnostic diskette.
2. Enter 898 to select the BSCA Test Patterns when the DSP MENU is displayed. DO NOT enter 0 to select the option menu at this time.
3. Select STEP mode and step 8 to transmit continuous SYN characters.
4. Select Y for the Business Machine option. Answer the other questions based on the local station configuration.

- Dial the local modem telephone from a nearby telephone.
- Listen for a high pitched tone (answer tone) that lasts for approximately 3 seconds.

Do you hear the answer tone?

Y N

007

Cradle the handset on the nearby telephone.

Go to Page 5, Step 043, Entry Point B.

008

Do you hear the data (SYN characters) after the answer tone?

Y N

009

Do you hear the dial tone approximately 20 seconds after the answer tone stops?

Y N

010

Bad C2 (38LS) card.

See the BSC MIM for jumpering and switch setting instructions.

011

Line disconnected.

Suspect the test pattern stopped or a wrong procedure. Restart this MAP.

Suspect the C2 (38LS) card.

012

The Auto Answer function tested OK. Check for disconnect operating correctly by:

1. Lift the handset on the local modem telephone. This should disconnect the line and display a N on the reply line of the MDI display.
2. Listen at the telephone that originated the call for the data transmission to stop.
3. Listen for dial tone approximately 20 seconds after the data stopped.

Do you hear the dial tone?

Y N

013

- Cradle the modem telephone handset.
- Probe the SH (Red) terminal at the coupler with the - meter lead.

Is SH at a - EIA level (-3 to -25 VDC)?

Y N

014

Telephone problem.

Have the customer notify the responsible person.

015

- Lift the modem telephone handset from the cradle.

Does SH go to a + EIA level (+3 to +25 VDC)?

Y N

016

Telephone problem.

Have the customer notify the responsible person.

017
- Probe C2G10 (SWITCH HOOK) with the + meter lead.

Is SWITCH HOOK at a + EIA level (+3 to +25 VDC)?
Y N

018
Cable problem.
See logic diagram 455.

019
Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

020
- The disconnect function tested OK.

Do you want to test the manual answer function?
Y N

021
The CBS type coupler tested OK.

022
Does the local station have an external modem?
Y N

023
- Have someone dial the local modem telephone from a nearby telephone.
- After the modem telephone rings, lift the handset and lift the exclusion key.

Can you talk with the other person?
Y N

024
telephone problem.
Have the customer notify the responsible person.

025
- Make Data Terminal Ready (DTR) active by using MDI 898 step 008 to transmit continuous SYN characters.
- Put the modem telephone handset back in the cradle.

Does the nearby telephone hear approximately 3 seconds of answer tone followed by continuous SYN characters?
Y N

026
Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

027
The manual answer function tested OK.

028
- Put the external modem in talk mode.
- Have someone dial the local modem telephone from a nearby telephone.
- After the modem telephone rings, lift the handset from the cradle.
- Lift the exclusion key.

Can you talk with the other person?
Y N

029
Telephone problem.
Have the customer notify the responsible person.

030

- Put the modem in DATA mode.
- Make Data Terminal Ready (DTR) active by using MDI 898 step 008 to transmit continuous SYN characters.
- Put the modem telephone handset back in the cradle.

Does the nearby telephone hear approximately 3 seconds of answer tone and the continuous SYN characters?

Y N

031

Modem problem.

If using an OEM modem, have the customer notify the responsible person.

If using an IBM external modem, use the maintenance information provided with that modem.

032

The manual answer function tested OK.

033

Exclusion key is not wired properly in the telephone set.

Have the customer notify the responsible person.

034

(Entry Point A)

- Cradle the modem telephone handset.
- Probe the SH (Red) terminal at the coupler with the - meter lead.

Is SH at a - EIA level (-3 to -25 VDC)?

Y N

035

- Probe the SH (Red) terminal at the coupler with the + meter lead.

Is SH at a + EIA level (+3 to +25 VDC)?

Y N

036

Coupler power is bad.

Have the customer notify the responsible person.

037

- Lift the modem telephone handset from the cradle.

Does SH go to a - EIA level (-3 to -25 VDC)?

Y N

038

Coupler or cradle switch problem.

Have the customer notify the responsible person.

039

Cradle switch wired backwards in the telephone set.

Have the customer notify the responsible person.

040

- Lift the modem telephone handset from the cradle.

Does SH go to a + EIA level (+3 to +25 VDC)?

Y N

041

Cradle switch not wired to coupler.

Have the customer notify the responsible person.

042

Telephone problem.

Have the customer notify the responsible person.

043

(Entry Point B)

Does the CBS type coupler have a test switch?

Y N

044

Go to Step 047, Entry Point C.

045

Is the test switch set to the operate mode (non-test) position?

Y N

046

Set the switch to the operate mode position, then restart this MAP.

047

(Entry Point C)

Is the modem telephone handset cradled?

Y N

048

Cradle the handset and restart.

049

Did the telephone ring only once?

Y N

050

- Make DTR inactive by pressing the ATTN key once.
- Dial the modem telephone from a nearby telephone.

Does the modem telephone ring?

Y N

051

Telephone problem.

Have the customer notify the responsible person.

052
- Let the modem telephone ring for this step.
- Probe the RI (Violet) terminal at the coupler with the + meter lead.

Does RI (RING INDICATE) pulse with each ring?
Y N

053
Coupler problem.
Have the customer notify the responsible person.

054
- Make DTR active by pressing ATTN key once to display the option menu, then run step 8.
- Probe the OH (Blue) terminal at the coupler with the + meter lead.

Is OH (OFF HOOK) at a + EIA level (+3 to +25VDC)?
Y N

055
- Probe C2G13 (RING INDICATE) with the + meter lead. Connect the - meter lead to a D08 (logic ground) pin.

Is RING INDICATE at a + EIA level (+3 to +25 VDC) when the telephone rings?
Y N

056
Cable problem.
See logic diagram 455. Check the SG (SIGNAL GROUND) wire also.

N P

N P

057
- Probe C2G03 (OFF HOOK) with the + meter lead. DSR must be active (step 008 of MDI 898 running).

IS OFF HOOK at a + EIA level (+3 to +25 VDC)?
Y N

058
Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

059
Cable problem.
See logic diagram 455. Check the SG (SIGNAL GROUND) wire also.

060
Did ringing stop when DTR was made active?
Y N

061
Coupler problem.
Have the customer notify the responsible person.

062
(Entry Point D)

- If a N is on the decision line of the MDI display, restart step 008 and redial the modem telephone.
- Probe the DA (Yellow) terminal at the coupler with the + meter lead.

Is DA (DATA MODEM READY) at a + EIA level (+3 to +25 VDC)?
Y N

063
- Probe C2J02 (DATA MODEM READY) with the + meter lead.

Is DATA MODEM READY at a + EIA level (+3 to +25 VDC)?
Y N

064
Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

065
Cable problem.
See logic diagram 455.

066
- Probe the CCT (Brown) terminal at the coupler with the + meter lead.

Is COUPLER CUT THROUGH at a + EIA level (+3 to +25 VDC)?
Y N

067
Coupler problem.
Have the customer notify the responsible person.

068
- Probe C2J09 (COUPLER CUT THROUGH) with the + meter lead.

Is CCT at a + EIA level (+3 to +25 VDC)?
Y N

069
Cable problem.
See logic diagram 455.

070
- Check for continuity of the DT and DR signal wires. See logic diagram 445. (This can also be done by checking for a signal with the db meter at the DT and DR terminals at the coupler.)

Does the cable test OK?
Y N

071
Bad cable.

072
Bad coupler.
Have the customer notify the responsible person.

073
Go to Page 6, Step 062, Entry Point D.

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Manual Call to a Manual Answer Station using a CDT Type Coupler

001
Use this MAP to isolate connection problems when the local station has a CDT (no auto answer function) type coupler by using a nearby telephone.

- Be sure the Test switch (if provided) on the CDT type coupler is in the normal operating position.
- Lift the modem handset from cradle.

Do you hear the dial tone?
Y N

002
Exclusion key problem in the modem telephone.
Have the customer notify the responsible person.

003
- Cradle the modem telephone handset, then have someone call the local modem telephone from a nearby telephone.

Does the modem telephone ring?
Y N

004
Telephone problem.
Have the customer notify the responsible person.

005
- Lift the handset on the modem telephone.

Can you talk with the person on the nearby telephone?
Y N

006
Telephone problem.
Have the customer notify the responsible person.

A

007
(Entry Point A)

- Load MDI 890 from the communications diagnostic cartridge or the 5110 diagnostic diskette. Enter 898 to select the BSC test patterns. DO NOT enter O to select the option menu at this time. Select step 008 to transmit continuous SYN characters.
- Lift the Exclusion key. This puts modem telephone in data mode.
- DO NOT cradle the handset.

Does the nearby telephone hear the continuous SYN characters?
Y N

008
- Use the ear plug with the CE meter and DB adapter to listen to the continuous SYN characters (connect meter leads DT (DATA TIP) and DR (DATA RING) terminals at the coupler).

Do you hear the SYN characters?
Y N

009
Is a N displayed on the reply line of the MDI display?
Y N

010
Modem problem.

If using an OEM modem, have the customer notify the responsible person.

If using an IBM external modem, use the maintenance information provided with that modem.

011
The routine to transmit the continuous SYN characters is not running.
Go to Step 007, Entry Point A.

01JAN79
EC 836600 PEC 835541

2 2
B C

012

Coupler problem.

Have the customer notify the responsible person.

013

Test completed satisfactory. Cradle both telephone handsets.

DIGITAL NETWORK REMOTE WRAP TEST PROCEDURE

001
Use this MAP to test the digital network with a remote DDSA station.

- Before using this MAP, MDI 821 must run without errors. The remote stations' diagnostics must run without errors also.
- If the Disable Double Loopback (DDL) jumper is installed on the remote DDSA communication facility card, have the remote service person remove it (see BSC MIM for the location of the jumper).
- NOTE- For normal operation DDL must be jumpered on all tributary stations on a multipoint network. Otherwise wrap tests run by any tributary station will seriously degrade the operation of the rest of network.
- Have the remote station loop a local wrap test.
- Load MDI 890 from the communications diagnostic cartridge or the 5110 diagnostic diskette.
- Select BSCA MDI 896.
- Run BSC35 of MDI 896 while the remote station is in local wrap mode. The test will be wrapped back to the local DDSA from the remote DDSA communication facility.

Test run OK? (no errors displayed by MDI 896)
Y N

002
Verify that the local and remote stations are set up correctly to run the test. If they are set up correctly, the problem is in the digital telephone network.
Have the customer notify the responsible person.

003
Does the remote station have a remote wrap test?
Y N

004
Test complete.

A

A MAP 0834-1

005
- Remove the DDL jumper from the DDSA card at the local station and run BSC34 of MDI 896.
- Have the remote station run the remote test.

Test run OK?
Y N

006
Verify that the local and remote stations are set up correctly to run the test. If the set up is correct, the problem is in the digital telephone network.
Have the customer notify the responsible person.

007
The local and remote BSCA and the digital network tested OK.
Replace the DDL jumper if it was removed.

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BSC Network and BSCA

Intermittent Problem MAP

001
Use this MAP as a guide to resolve BSC network problems and BSCA intermittent problems.

- Have the customer maintain a record of the symptoms and error codes. See the BSC MIM for a description of the error codes.
- Have the customer maintain a record of the error log and error history. See the BSC Users Guide to print the error log and error history.
- Verify that the configuration record(s) is correct. See the BSC Users Guide to display the configuration record(s).
- Verify that the features, modems and strapping options (echo clamp, clear to send delay, transmit speed) are compatable with the remote station(s).
- Run the 5110 System Test to verify that another problem on the 5110 is not causing the BSC problem.

Does the 5110 System Test run OK?
Y N

002
Correct any problem indicated by the System Test.

003
- Loop MDI 821 for 10 minutes by setting up a path starting with step 005. The path stop number depends upon which communication facility card is installed. See the 5110 MIM for details to set up a path.

Does MDI 821 loop without any errors?
Y N

004
Correct any problems indicated by MDI 821.

A

005
- If the local station is on a nonswitched telephone network and has the Switched Network Backup (SNBU) feature on the *modem, switch to* SNBU.

Is the local station operating on a switched network or SNBU?
Y N

006
This section of the MAP is for a nonswitched (leased) telephone network.

Is the local station using an external modem?
Y N

007
- Use logic diagram 455 to check continuity of the external cable.

Does the external cable test OK?
Y N

008
Repair or replace the external cable.

009
(Entry Point F)

- Use MAP 0831 to check the transmit and receive levels.

Are the transmit and receive levels correct?
Y N

010
Use MAP 0831 to fix the problem.

011

Are the BSC On Line/RFT tests available on this nonswitched network?

Y N

012
(Entry Point E)

- Use the accoustic coupler feature of a 1200 TDAT or TRAP to communicate with a remote station that has BSC On Line/RFT test capability. See the BSCA MIM for 1200 TDAT and TRAP procedures. NOTE- Before using the TRAP on a 38LS integrated modem, ask the local BODS for assistance.

Does the test run OK?

Y N

013
- Try testing with another remote station.

Does this test run OK?

Y N

014
- Use the TRAP to record a failure. See the BSCA MIM for the TRAP procedure. NOTE- Before using the TRAP on a 38LS integrated modem, ask the local BODS for assistance.

Does the TRAP printout indicate the problem?

Y N

015
Ask your manager for assistance.

016
Correct the problem.

E F G

017
The local station tests OK on a switched telephone network. Suspect the nonswitched telephone network, the remote station, customers' program or procedure.

018
Suspect the telephone network or the customers program or procedure.

019
- Prepare the 5110 to run the BSC/RFT On Line test. See the BSC MIM for instructions.

Does the On Line test run OK?

Y N

020

Is the local station on a multipoint network?

Y N

021
Go to Step 012, Entry Point E.

022
Is this the only station on the multipoint network that fails?

Y N

023
Have the host (primary) station localize the problem.

024
Go to Step 012, Entry Point E.

025
Suspect the customers' program or procedure.

026
Is it an IBM external modem?
Y N

027
Go to Page 1, Step 009, Entry Point F.

028
- Use the modem maintenance information to run the modem diagnostic tests.

Do the modem tests run OK?
Y N

029
Repair the modem using the maintenance information provided with the modem.

030
Go to Page 1, Step 009, Entry Point F.

031
(Entry Point C)

- Use MAP 0831 to check the transmit and receive levels.

Are the transmit and receive levels OK?
Y N

032
Use MAP 0831 to fix the problem.

033

Is the local station using a CBS (Auto Answer) type coupler?
Y N

034
Is the local station using a CDT type coupler?
Y N

H J K

035
- Use MAP 836,837 and 838 to test the World Trade line plate.

Does the line plate test OK?
Y N

036
Use MAP 836,837 and 838 to fix the problem.

037
Go to Step 043, Entry Point B.

038
- Use MAP 0833 to test the CDT type coupler.

Does the CDT type coupler test OK?
Y N

039
Use MAP 0833 to fix the problem.

040
Go to Step 043, Entry Point B.

041
- Use MAP 0832 to test the CBS type coupler.

Does the CBS type coupler test OK?
Y N

042
Use MAP 0832 to correct the problem.

043
(Entry Point B)

- Prepare the 5110 to run the BSC On Line/RFT tests. See the BSC MIM for instructions.

Does the BSC On Line/RFT test run OK?
Y N

044
- Dial another remote station and run the test again.

Did the test run OK?
Y N

045
Is the local station using a 38LS integrated modem?
Y N

046
Is it an IBM external modem?
Y N

047
Go to Step 050,
Entry Point G.

048
- Use the maintenance information for the modem to run a test on the modem.

Does the modem test run OK?
Y N

049
Use the maintenance information provided with the modem to repair the modem.

050
(Entry Point G)

- Use the 1200 TDAT or TRAP procedure to bypass the modem. See the BSC MIM for the 1200 TDAT or TRAP procedure.
- Prepare the 5110 to run the BSC On Line/RFT test.

Does the the On Line test run OK with the modem bypassed?
Y N

N P Q R

N P Q R

051
- Verify that the TDAT or TRAP procedure is correct. If the procedure is correct, try testing with another remote station.

Does the On Line/RFT test run OK?
Y N

052
- Use the TRAP to record a failure.

Does the TRAP printout indicate the problem?
Y N

053
Ask your manager for assistance.

054
Correct the problem.

055
Suspect the first remote station or that redialing corrected the problem.

056
OEM modem or telephone network problem.
Have the customer notify the responsible person.

057
Ask the local BODS for assistance.

058
Suspect the first remote station or that redialing corrected the problem.

059

The local station tests OK. Suspect the telephone network, remote station or customer procedure. For intermittent problems, consider vibrating the 5110 to detect loose connections, check the AC and DC voltages, heat and cool the 5110 to aggravate the problem. Use the error history listings that the customer printed to help isolate the cause of the problem. See appendix E in the BSC Users Manual for the meaning and possible cause of the error codes in the BSC history table.

For more information, see the 5110 MIM.

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Automatic Answer MAP for 38LS with World Trade Line Box

001

- Be sure that MDI 821 runs OK before using this MAP.
- Remove the 5110 top cover.
- Press RESTART on the 5110.

Is there a telephone set associated with the data station?

Y N

002

(Entry Point A)

- Connect a jumper from C2B02 (-Data Terminal Ready) to C2D08.
- Dial the data station from a nearby telephone set.

The jumper allows the 5110 to go to data mode after three good ring trains are detected.

Is the busy tone present?

Y N

003

- Ringback tone can be heard in the nearby handset. Data station answers after the third ring pulse train.

Is the 3.5s answering tone (2100 Hz) present?

Y N

004

- Measure the DC voltage between C2J02 and C2J08.

C2J02 is connected to a Transfer Relay point in the line box. When the 5110 is in data mode, C2J02 is -3.5VDC; otherwise, C2J02 is open.

Is C2J02 at -3.5VDC after three ring pulse trains?

Y N

005

- Ensure that C2B02 is jumpered to C2D08.
- Redial the data station from a nearby telephone set.
- Check with a voltmeter (5V ac), C2G10 (Current Detection 1) and C2G13 (Current Detection 2).

C2G10 and C2G13 signal levels:
Without ring current
Off: about 1V ac.

With ring current
On: voltage increases by 0.3V to 1V ac.

Current Detection 1 signal level can be different from Current Detection 2.

Are both signals pulsing with the ring signal?
Y N

006

- Measure ac voltage at the telephone line.

DANGER

Signal measured can be higher than 150V ac.

DC current up to 48V is present. The voltmeter must indicate a signal oscillating between 48V and 78V, and a gap of about 30V ac between silent and ring periods.
Do not ground one of the telephone wires.

Are there ac pulses (ringing current) higher than 30V ac?
Y N

007
Ask the customer to call the PTT representative.

008
(Entry Point B)
Check with an ohmmeter the telephone cable(s) from the line box to the wall-mounted connector. See logic diagram 470.

Possibility of a short circuit in the connection.

Is the cable(s) OK?
Y N

009
Bad telephone cable(s).

010
Bad line box assembly P/N 4836775

011
Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

012
Bad C2 (38LS) card.

The 38LS should raise Transfer Relay when Current Detection 1 and Current Detection 2 rise (together three times), and when the 5110 is in data mode.

013
Bad line box assembly P/N 4836775

014
- Check for the presence of the 2100 Hz between C2D08 and C2D05.

Use an intercom or a dbmeter.

Is 2100 Hz present during 3.5 seconds?
Y N

015
Bad C2 (38LS) card.

The 38LS should send a 2100 Hz tone during 3.5s, when answering a call automatically.

016
Bad line box assembly P/N 4836775

017
Does the answering tone stop after 3.5 seconds?
Y N

018
Bad C2 (38LS) card.

019
Auto-answer function is OK. Check other functions as appropriate.
Remove the jumper from C2B02 to C2D08.

020
- Power off the 5110.
- Keep the jumper on C2B02 to C2D08.
- Redial the data station.

Is the busy tone present?
Y N

021
- Power on the 5110.
- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

022
Bad line box assembly P/N 4836775

023
- Probe C2G10 (Current Detection 1) and C2G13 (Current Detection 2).

C2G10 and C2G13 signal levels:
On: -3V
Off: +1V

Are both signals off?
Y N

024
Bad line box assembly P/N 4836775

025
- Disconnect the 5110 from the telephone line (at the wall-mounted connector level).
- Remove the jumper from C2B02 to C2D08.
- Press RESTART on the 5110.
- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

026
Bad line box assembly P/N 4836775

027
Bad C2 (38LS) card.

028

- Disconnect the 5110 from the telephone line (at the wall-mounted connector level).
- Retry the call.

Ringback tone should be present.

Is the busy tone present?

Y N

029

Go to Page 2, Step 008, Entry Point B.

030

Ask the customer to call the PTT representative.

031

- Use MAP 838 to check the manual answer operation, then return to this point.

Is the manual answer operation OK?

Y N

032

Use MAP 838 to repair.

033

Go to Page 1, Step 002, Entry Point A.

This page intentionally left blank.

001
- Be sure MDI 821 runs OK before using this MAP.
- Remove 5110 top cover.
- Press RESTART on the 5110.
- Lift the handset of the associated telephone set.

Is the dial tone present?
Y N

002
- Power off the 5110; retry the call.

Is the dial tone present?
Y N

003
Is the 5110 connected to the telephone line with a jack?
Y N

004
- Disconnect the 5110 from the telephone line and connect the telephone set directly to the line (at the wall- mounted connector level).

(Entry Point A)
- Dial a nearby telephone set.

Is the conversation OK?
Y N

005
Ask the customer to call the PTT representative.

Dial tone present, called telephone rings and communication is established.

2A 2B 2C 2D

006
(Entry Point B)
- Check with an ohmmeter the telephone cable(s) from the line box to the wall-mounted connector. See logic diagram 470.

Possibility of a short circuit in the connection.

Is the cable(s) OK?
Y N

007
Bad cable(s).

008
Bad line box assembly P/N 4836775

009
- Unplug the jack.

Go to Page 1, Step 004, Entry Point A.

010
- Power on the 5110.
- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

011
Bad line box assembly P/N 4836775

012
Bad C2 (38LS) card.

013
- Dial a nearby telephone set.

Dial tone present, called telephone rings and communication is established.

Is the conversation OK?
Y N

014
Ask the customer to call the the PTT representative.

015

- Keep the handset off hook.
- Connect a jumper from C2B02 (-Data Terminal Ready) to C2D08.

No more tone; silent handset.

Is the associated telephone set disconnected from the line?

Y N

016

- Probe C2G10 (Current Detection 1) and C2G13 (Current Detection 2).

C2G10 and C2G13 signal levels:
On: -3V
Off: +1V

Is one of these signals on?

Y N

017

Go to Page 2, Step 006, Entry Point B.

018

- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?

Y N

019

Bad C2 (38LS) card.

Transfer Relay should be on when the 5110 is in data mode and the handset lifted.

020

Bad line box assembly P/N 4836775
Remove the jumper from C2B02 to C2D08.

021

- Remove the jumper from C2B02 to C2D08.
- Press RESTART on the 5110.

Is the conversation with the nearby telephone set OK again?

Y N

022

Bad line box assembly P/N 4836775

023

The local telephone line is OK.

- Ask the customer to make a data transmission to a remote data station.

Is the data transmission OK?

Y N

024

Loop MDI 821 in path mode to test the BSCA again. See the 5110 MIM for details to set up a path. If MDI 821 runs OK, suspect the line box assembly.

025

Manual call function is OK. Check other functions as appropriate.

Busy tone in the nearby handset, and/or dial tone in the associated handset.

Manual Answer MAP for 38LS with World Trade Line Box

001
- Be sure MDI 821 runs OK before using this MAP.
- Remove the 5110 top cover.
- Press RESTART on the 5110.
- Dial the data station from a nearby telephone set.

Is the busy tone present?
Y N

002

Wait for at least 3 rings.

Is the associated telephone set ringing?
Y N

003

In the nearby handset: modem answering tone or data can be heard.

Is the modem connected to the line?
Y N

004
- Lift the handset of the associated telephone set.

Is the dial tone present?
Y N

005
Go to Page 5, Step 030, Entry Point B.

006
Ask the customer to call the PTT representative.

007
- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

008
Bad line box assembly P/N 4836775

0831 0838 0830

3 2 2
A B C

009
Bad C2 (38LS) card.

Transfer Relay should be off when the 5110 is not in data mode.

010
- Answer the call.

Is the conversation OK?
Y N

011
Ask the customer to call the PTT representative.

012
- Keep the handset off hook.
- Connect a jumper from C2B02 (-Data Terminal Ready) to C2D08.

No more tone; silent handset.

Is the associated telephone set disconnected from the line?
Y N

013
- Probe C2G10 (Current Detection 1) and C2G13 (Current Detection 2).

C2G10 and C2G13 signal levels:
On: -3V
Off: +1V

Is one of these signals on?
Y N

014
Go to Page 5, Step 030, Entry Point B.

015
- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

016
Bad C2 (38LS) card.

Transfer Relay should be on when the 5110 is in data mode and the handset lifted.

017
Bad line box assembly P/N 4836775
Remove the jumper from C2B02 to C2D08.

018
- Remove the jumper from C2B02 to C2D08.
- Press RESTART on the 5110.

Is the conversation with the nearby telephone set OK again?
Y N

019
Bad line box assembly P/N 4836775

Busy tone in the nearby handset, and/or dial tone in the associated handset.

020
The local telephone line is OK.
- Ask the customer to prepare the 5110 for a data transmission.
- Ask the remote station to dial the local data station.
- Answer the call manually.
- Make a data transmission .

Is the data transmission OK?
Y N

021
Loop MDI 821 in path mode to test the BSCA again. See the 5110 MIM for details to set up a path. If MDI 821 runs OK, suspect the line box assembly.

022
The manual answer function is OK. Check other functions as appropriate.

023
- Power off the 5110; retry the call.

Is the busy tone still present?
Y N

4 4
F G

0831
0838
0830

024
- Power on the 5110.
- Probe C2G03 (Transfer Relay).

C2G03 signal levels:
On: -2.7V
Off: -4.5V

Is the signal on?
Y N

025
Bad line box assembly P/N 4836775

026
Bad C2 (38LS) card.

Transfer Relay should be off when the 5110 is not in data mode.

027
Is the data station connected to the telephone line with a jack?
Y N

028
- Disconnect the data station from the telephone line and connect the associated telephone set directly to the telephone line (at the wall-mounted connector level).

No busy tone, called telephone set rings, communication is established.

(Entry Point A)
- Dial the data station from a nearby telephone set.

Is the conversation OK?
Y N

029
Ask the customer to call the PTT representative.

Manual Answer MAP for World Trade 38LS

030
(Entry Point B)
- Check with an ohmmeter the telephone cable(s) from the line box to the wall-mounted connector. See logic diagram 470.

Is the cable(s) OK?
Y N

031
Bad cable(s).

032
Bad line box assembly P/N 4836775

033
- Unplug the jack.

Go to Page 4, Step 028, Entry Point A.

Possibility of a short circuit in the connection.

0831
0838
0830

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ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0861	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	009	0420	A
2	008	0420	A

001
(Entry Point A)

This is the entry MAP for the 5106.

Information on the use of the CE probe can be found in Appendix B of the 5110 MIM.
If the PROCESS CHECK light is on, the 5106 MDI cannot be loaded.

Is the PROCESS CHECK light on?
Y N

002
Use the keys on the numeric section of the keyboard:

-Press HOLD
-Hold CMD and press -(minus)
-For BASIC, hold CMD and press * (multiply)
-For APL, hold CMD and press x (multiply)
-Press C
-Press 1
-Press EXECUTE

Did the PROCESS CHECK light come on?
Y N

003
Do the words TAPE READ DIAGNOSTIC appear on the top line of the display?
Y N

2A 2B 2C 2D

004
Bad F2 (Common and language ROS) card.

005
Follow the instructions on the display until DSP MENU appears. Then:

-Enter 840
-Press EXECUTE

The 5106 MDI should now load and run. If the PROCESS CHECK light comes on GO TO MAP 0420, ENTRY POINT A.

Follow the instructions on the display. When completed, return to this step.

-Press RESTART
-Do the test for the 5106 near the end of the Select Magnet Service Check (see MIM 221).

Is the tape motion rhythmic?
Y N

006
Do the Tape Select Magnet Servie Check (see MIM 221).

007
The 5106 tape select magnets are operating properly

008
Go To Map 0420, Entry Point A.

009
Go To Map 0420, Entry Point A.

5114 MAP

PAGE 1 OF 3

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	015	420	A
3	019	420	A

001
(Entry Point A)

This is the entry map for 5114.
If a PROCESS CHECK occurs while using the MDI, reload the MDI. If the PROCESS CHECK persists, go to MAP 420, entry point A.

Before using the MDI, make sure the diskette is not damaged, and the problem occurs on more than one diskette.

After any adjustment or part replacement, the machine must be tested. If the problem has not been corrected, reseat the cards and cables. Load the diagnostic again.

Check for the following possible defects;

Foreign material in the diskette or diskette drive
Belt off or damaged
Broken cover/pivots or missing or loose screws
Motor or pulleys not turning
Loose pulleys
Accessing band broken or damaged
Loose guide rods
Loose cables or cards
Fan not turning (see 5114 MIM 182).

Is the PROCESS CHECK light on?

Y N

3 2
A B

002

Is the diskette difficult to insert or remove from the drive?

Y N

003

-Disconnect all of the I/O devices from the 5110 I/O interface port.
-Connect the failing 5114 to the 5110.
-Connect the cable terminator to the 5114.
NOTE: If a cable terminator is not available, use the 5103 as the terminating device.

-Press RESTART. Wait 25 seconds.
Use the keys on the numeric keyboard:
-Press HOLD
-Hold CMD and press -(minus)
-For BASIC, hold CMD and press *(multiply)
-For APL, hold CMD and press X(multiply)
-Press C
-Press 1
-Press EXECUTE

Follow the instructions on the display until the DSP MENU appears and then;

-Enter 881
-Press EXECUTE

The 5114 MDI should now load and run.

Is the PROCESS CHECK light on?

Y N

004

-Follow the instructions on the display.

Did the MDI run to completion?

Y N

3 3
C D E F

E F

005

Follow the instructions on the display.
NOTE: If the 5103 is the terminating device, the 5103 I/O interface cables and the 5103 adapter card can also cause problems in the 5114.

006

Are there two diskette drives in the 5114?

Y N

007

(Entry Point C)

Did you disconnect a 5106 and/or a second 5114?

Y N

008

Suspect the 5103 if attached when the failure occured. The parts in the 5103 to suspect are the printer I/O cable and the printer adapter card.

009

-Connect the 5106 and/or the second 5114 to the I/O interface port one at a time, in the same position they were before you disconnected them.
-Press RESTART. Wait 25 seconds.
-Rerun MDI 881 on the same drive.

DO NOT FOLLOW THE INSTRUCTIONS ON THE DISPLAY IF AN ERROR CONDITION OCCURS.

Did the MDI run to completion?

Y N

3 3 3
G H J

010
The trouble is in the 5106 or the second 5114. Suspect the I/O interface cables in either the 5106 or the second 5114 (see MAP 0210 and MIM 280) and the cables D1 and D3 in the second 5114 or the cables B1 and B2 in the 5106, or the adaptor cards in the 5106 and the second 5114. Go to MAP 0850 for the 5106 or rerun MDI 881 for the second 5114.

011
No trouble found.
Suspect the 5103 if attached when the failure occured. The parts to suspect in the 5103 are the 5103 I/O interface cable and the 5103 adaptor card.

012
Run the MDI on the other diskette drive:

-Press ATTN twice
The DSP MENU should appear.
-Enter 881
-Press EXECUTE

Did the MDI run to completion?
Y N

013
Follow the instructions on the display.
NOTE: If the 5103 is the terminating device, the 5103 I/O interface cables and the 5103 adapter card can also cause problems in the 5114.

014
Go to Page 2, Step 007, Entry Point C.

015
Go To Map 420, Entry Point A.

016
Are the heads loaded all the time?
Y N

017
Check the head load bail return spring and bail stop screw (see 5114 MIM 130).
Preform the head load service check (see 5114 MIM 130).
Bad drive control card.
Bad 5114 C1 (adapter) card (see MAP 050 before replacing this card).

018
Bad drive control card.
Check for shorts on the Taper Pin Block (see 5114 MIM 130).

019
Go To Map 420, Entry Point A.

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PAGE 1 OF 13

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0200	C	3	016
0200	D	8	079
0200	F	6	050
0300	A	1	001
0310	A	1	001
0845	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	004	0200	A
10	102	0300	A
12	119	0300	A
10	101	0310	A
2	012	0400	A
2	006	0420	A
5	045	0420	A
3	019	0420	A
7	072	0420	A
9	088	0420	A
9	092	0420	A
13	127	0420	A
10	103	0420	A
12	123	0420	A
2	005	0500	A
5	049	0500	A
6	057	0500	A
5	048	0500	A
3	018	0600	A
3	028	0600	A
4	030	0600	A
4	032	0600	A
9	087	0600	A

001
(Entry Point A)

-If there is an internal tape drive or a 5106, make sure that the tape cartridges are removed.
-Power down.
-Power up. Wait 25 seconds.
-Set the BRIGHTNESS control so that the characters are well defined.
-Switch the L32-64-R32 switch to 64.
-Press the bottom of the REVERSE DISPLAY switch.
-Switch the DISPLAY REGISTERS switch to NORMAL.

(Step 001 continues)

(Step 001 continued)

Did either LOAD0 or CLEAR WS (spelled correctly) appear only once on one and only one line of the 5110 display?
Y N

002
Is the PROCESS CHECK light on?
Y N

003
Is the 5110 display dark for all positions of the BRIGHTNESS control?
Y N

004
Go To Map 0200, Entry Point A.

005
Go To Map 0500, Entry Point A.

006
Go To Map 0420, Entry Point A.

007
The 5110 display raster is grossly distorted if it has a black rather than a white background, or is greatly reduced in size.

Is the 5110 display raster grossly distorted?
Y N

008
Is the 5110 display raster rolling?
Y N

009
Does the 5110 display raster contain wide horizontal bars similar to a TV set with the horizontal hold out of adjustment?
Y N

5 5 5
A B C D

D

010
Is the IN PROCESS light on?
Y N

011
Are the top 13 lines of the display entirely blank (there are 16 lines total for the display)?
Y N

012
Go To Map 0400, Entry Point A.

013
-Press and hold the RESTART switch.

Are both the PROCESS CHECK and IN PROCESS lights on?
Y N

014
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad PROCESS CHECK light.
Bad IN PROCESS light.
Bad RESTART switch.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

015
-Release the RESTART switch. Wait 25 seconds.

Is the PROCESS CHECK light on?
Y N

5 5 3
E F G

016
(Entry Point C)

-Press each key (except the HOLD, CMD, ATTN, EXECUTE keys and the space bar. Do not try the repeat function).
-Observe the display for proper characters or functions (see MIM 250 and keyboard theory section 3).

Do the keys function correctly?
Y N

017
Is the PROCESS CHECK light on?
Y N

018
Go To Map 0600, Entry Point A.

019
Go To Map 0420, Entry Point A.

020
-Press and hold the SPACE bar.

Does the repeat function work correctly?
Y N

021
-Press and hold the SPACE bar.
-Probe H2-B04 (+typamatic).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

022
-Remove the keyboard cable at Z4.
-Probe H2-B04 (+typamatic).

Is the DOWN light on?
Y N

H J K L

H J K L

023
Bad H2 (base I/O) card.

024
Bad SPACE key module.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

025
Bad key module
(See MIM 253).
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).
Bad G2 (display) card (see MAP 050 for jumpering).

026
-Press and hold the P key.

Does the P key perform the repeat function? (The answer is N if the machine is operating correctly).
Y N

027
-Release the P key.
-Press the backspace key until a character flashes.
-Press ATTN.

Did the character at the cursor location and the remaining characters after the cursor disappear?
Y N

028
Bad ATTN key.

Go To Map 0600, Entry Point A.

5 4
M N

029
-Press the P key twice.
-Press EXECUTE.

The word VALUE ERROR or ERROR 500 should appear on the display with other characters.

Are the words VALUE ERROR or ERROR 500 on the display?
Y N

030
Bad EXECUTE key.

Go To Map 0600, Entry Point A.

031
-Press HOLD.

The cursor/character should stop flashing or disappear.

Did the flashing stop or disappear?
Y N

032
Bad HOLD key.

Go To Map 0600, Entry Point A.

033
Now check out the ability of the machine to do a character set selection.

-Press ATTN
-Press HOLD
-Hold the shift key down and press the . (peroid) key on the numeric keyboard. (This ensures that the 5110 is in EBCDIC character mode.)

Does the 5110 have the KATAKANA feature installed?
Y N

P Q

P Q

034
-Release the shift key.
-Press the $ key several times.
-Press the HOLD key.
-Hold the shift key down and press the 8 key on the numeric keyboard.

Did the $ characters change to ¥ (yen)?
Y N

035
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

036
-Press the HOLD key.
-Hold the shift key down and press the (period) key on the numeric keyboard.

Go to Page 6, Step 050, Entry Point F.

037
-Release the shift key and press the $ key several times.
-Press the HOLD key.
-Hold the shift key down and press the 0 key on the numeric keyboard.

Did the $ character on the display change to ¥ (yen)?
Y N

038
Bad G2 (display) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

039
-Press the HOLD key.
-Hold the shift key down and press the . (peroid) key on the numeric keyboard.

Go to Page 6, Step 050, Entry Point F.

040
-Release the P key.
-Probe H2-B04 (+typamatic).
(See appendix B, the general logic probe, in the 5110 MIM).

Is the UP light on?
Y N

041
-Press and hold the A key
-Probe H2-U12 (-keyboard strobe).

Are both lights on and steady?
Y N

042
Bad H2 (base I/O) card.

043
Bad keyboard PC board (see MIM 251).
Check/replace Z4 (keyboard) cable (see Map 0210 and MIM 206,255).

044
Bad H2 (base I/O) card.

045
Go To Map 0420, Entry Point A.

046
Bad IN PROCESS light.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

047
Bad display assembly (see MIM 204).

048
The vertical frequency may be out of adjustment (see MIM 247).
****
* CAUTION *
****
High voltage is present.
If this adjustment has no effect;

Go To Map 0500, Entry Point A.

049
Go To Map 0500, Entry Point A.

050
(Entry Point F)

Does the machine have a BASIC/APL switch (see MIM 205)?
Y N

051
Go to Step 054, Entry Point B.

052
-Check the BASIC/APL switch (see MIM 246).

Does the BASIC/APL switch function correctly?
Y N

053
Bad BASIC/APL switch.
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

054
(Entry Point B)

-Press RESTART.
-Wait 25 seconds.
-Check the REVERSE DISPLAY switch (see MIM 242).

Does the REVERSE DISPLAY switch function correctly?
Y N

055
Bad REVERSE DISPLAY switch.
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

S

S MAP 0900-6

056
-Check the DISPLAY REGISTERS switch (see MIM 243).

Does the DISPLAY REGISTERS switch function correctly?
Y N

057
Bad DISPLAY REGISTERS switch.
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

If the machine still fails,
Go To Map 0500, Entry Point A.

058
Do you want to check out the RUN or the STEP switch?
Y N

059
(Entry Point E)

-Switch the DISPLAY REGISTERS switch to NORMAL.
-Switch the RUN switch under the covers to RUN.
-Check the L32-64-R32 switch (see MIM 244).

Does the L32-64-R32 switch function correctly?
Y N

060
Bad L32-64-R32 switch.
Bad H2 (base I/O) card.
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

061

-Switch the L32-64-R32 switch to 64.
Use the 5110 model number to identify the read/write storage size:

Model A11,B11,C11 = 16K
Model A12,B12,C12 = 32K
Model A13,B13,C13 = 48K
Model A14,B14,C14 = 64K
Model A21,B21,C21 = 16K
Model A22,B22,C22 = 32K
Model A23,B23,C23 = 48K
Model A24,B24,C24 = 64K

-Check the read/write storage size in the 5110.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).

Is the read/write storage size correct?
Y N

062
Is the read/write storage size 3FFF?
Y N

063
Is the read/write storage size 7FFF?
Y N

064
Is the read/write storage size BFFF?
Y N

065
Bad N2 (read/write storage) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

066
Bad N4 (read/write storage) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

V W X

067
Bad M4 (read/write storage) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

068
Bad M2 (read/write storage) card.
Bad J2 (processor) card (see MAP 050 for jumpering).

069
-Switch the DISPLAY REGISTERS switch to NORMAL.
-Perform a calculation as follows (see the APL or BASIC reference manual):

-For APL, enter:
```
B←9    EXECUTE
C←3    EXECUTE
A←BxC    EXECUTE
A  EXECUTE
```

-For BASIC, enter:
B=9 EXECUTE
C=3 EXECUTE
A=B*C EXECUTE

Is the answer 27?
Y N

070
Is the PROCESS CHECK light on?
Y N

071
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.
Bad E4 (APL ROS) card.

072
Go To Map 0420, Entry Point A.

073
-Observe the IN PROCESS light.
-Hold down the COMMAND key and press the 4 key on the alphameric keyboard.
-Release the keys.
-Press EXECUTE.

Does the IN PROCESS light turn on or flash?
Y N

074
Did the PROCESS CHECK light turn on or flash?
Y N

075
Bad G2 (display) card (see MAP 050 for jumpering).

076
The leads to the IN PROCESS and PROCESS CHECK lights are swapped. Use LOGIC 420 to help in metering out the leads.

077
Does the 5110 have the ALARM feature?
Y N

078
Go to Step 085, Entry Point G.

079
(Entry Point D)

Press ATTN.
-For APL, enter;
2 □CC 1
-Press EXECUTE

-For BASIC, enter;
10 WRITE FILE FLS,'S'
-Press EXECUTE.
-Enter RUN
-Press EXECUTE.
(Step 079 continues)

(Step 079 continued)

Does the audible alarm turn on?
Y N

080
-Probe J6-D02 (+alarm).

Is the UP light on?
Y N

081
Bad G2 (display) card (see MAP 050 for jumpering).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

082
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad audible alarm (see MIM 201).

083
-Press ATTN

Is the alarm off?
Y N

084
Bad G2 (display) card (see MAP 050 for jumpering).

085
(Entry Point G)

Use the keys on the numeric key section of the keyboard (see MIM 250).

-Hold CMD and press HOLD
-Hold CMD and press - (minus)

When DCP loads, the characters DCP should appear on the display. (You have loaded DCP , diagnostic control program . See MIM section 4, diagnostic aids).
(Step 085 continues)

(Step 085 continued)

Does the DCP program load?
Y N

086
Is the PROCESS CHECK light on?
Y N

087
Bad CMD key.

Go To Map 0600, Entry Point A.

088
Go To Map 0420, Entry Point A.

089
Put the DCP program in diagnostic mode by using the keys on the numeric key section of the keyboard:

-Hold CMD and press * (BASIC multiply key)
OR
-Hold CMD and press x (APL multiply key)

The characters DIAG DCP should appear on the display (see MIM section 4, diagnostic aids).

Do the characters DIAG DCP appear on the display?
Y N

090
Is the PROCESS CHECK light on?
Y N

091
Bad L2 (exec ROS) card (see MAP 050 for jumpering).
Bad F2 (Common and language ROS) card.
Bad E4 (APL ROS) card.

092
Go To Map 0420, Entry Point A.

Z

Z

093
-Press C
-Press 1
-Press EXECUTE

Did the PROCESS CHECK light come on?
Y N

094
TAPE READ DIAGNOSTIC should appear if the 5110 has an internal tape unit (see MIM 201).
DISKETTE READ DIAGNOSTIC should appear if the 5110 does NOT have an internal tape unit.

Do the words TAPE READ DIAGNOSTIC or DISKETTE READ DIAGNOSTIC appear on the top line of the display?
Y N

095
Bad F2 (Common and language ROS) card.

096
You have loaded and are running the tape or diskette read diagnostic program (see MIM section 4, diagnostic aids). Follow the instructions on the display. Return to this point for further instructions when DSP MENU is displayed.

Is DSP MENU on the display?
Y N

097
Is the PROCESS CHECK light on?
Y N

098
Did the tape or diskette read diagnostic program load?
Y N

099
Bad F2 (Common and language ROS) card.
Bad H2 (base I/O) card.

100
Does the 5110 have an internal tape drive (see MIM 201)?
Y N

101
Go To Map 0310, Entry Point A.

102
Go To Map 0300, Entry Point A.

103
Go To Map 0420, Entry Point A.

104
Does the 5110 have an internal tape drive (see MIM 201)?
Y N

105
-Enter 881
-Press EXECUTE

Follow the instructions on the display, then return to this point for further instructions when the MDI is completed. (You have loaded and are running the diskette diagnostic program. See section 4, diagnostic aids).

Did the MDI run to completion?
Y N

106
Perform the actions requested by the routine.

107

-Press ATTN twice.

The DSP menu should now be displayed. Select each routine one at a time until you have completed all the routines that are applicable to the features on your machine (see section 4, diagnostic aids).

```
-Printer MDI                      800
-Async comm-serial I/O MDI        820
-BSCA MDI                         821
-Parallel I/O MDI                 823
-Communications routine chart     890
```

Do the routines run correctly?

Y N

108

Preform the actions requested by the routines.

109

The machine checkout is complete. Remove the diagnostic diskette and press RESTART.

110

-Enter 860

-Press EXECUTE.

Follow the instructions on the display then return to this point for further instructions when the MDI is completed. (You have loaded and are running the tape write diagnostic program. See MIM section 4, DIAGNOSTIC AIDS).

Did MDI 860 run correctly?

Y N

111

Perform the actions requested by the routines.

112

Do you want to run the tape magnet select routine?

Y N

113

(Entry Point H)

Use the keys on the numeric keyboard
-Hold CMD and press HOLD
-Hold CMD and press - (minus)
-Hold CMD and press * (BASIC multiply key)
OR
-Hold CMD and press x (APL multiply key)
-Press C
-Press 0
-Press EXECUTE

The DSP MENU should now be displayed. Select each routine one at a time until you have completed all of the routines that are applicable to the features available on your machine (see section 4, diagnostic aids).

-PRINTER MDI	800
-AUXILIARY TAPE MDI	840
-TAPE WRITE MDI	860
-DISKETTE MDI	881

Is the PROCESS CHECK light on?

Y N

114

Do the routines run correctly?

Y N

115

Perform the actions requested by the routines.

116

Do you wish to check out the Async comm-serial I/O feature ,the BSCA feature, or the PARALLEL I/O feature?

Y N

1 3 A A A A J K L M

117

The machine checkout is complete. Remove the 5110 diagnostic tape cartridge and press RESTART.

118

-Remove the 5110 diagnostic tape cartridge.
-Press ATTN three times (until DIAG DCP appears).
-Press EXECUTE.
-Follow the instructions on the display but insert the communications diagnostic tape cartridge.

Is DSP MENU on the display?

Y N

119

Go To Map 0300, Entry Point A.

120

-Select the routines which apply to the features on your machine.

Do the routines run correctly?

Y N

121

Perform the actions requested by the routine.

122

The communications feature checkout is complete. Remove the communications diagnostic tape cartridge and press RESTART.

123

Go To Map 0420, Entry Point A.

124
-Press RESTART
-Do the test at the end of the Select Magnet Service Check (see MIM 221).

Is the tape motion rhythmic?
Y N

125
Do the FORWARD AND REVERSE SELECT MAGNETS SERVICE CHECK (see MIM 221).

126
-Remove the scratch tape.
-Insert the diagnostic tape.

Go to Page 12, Step 113, Entry Point H.

127
Go To Map 0420, Entry Point A.

128
-Switch the RUN switch under the covers to NOT RUN.
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Observe the display.

Is any of the information in the registers changing?
Y N

129
-Press the STEP switch.

Did R0L0 change?
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
Y N

A A A
N P Q

A A A
N P Q

130
-Probe H6A04 (+single instr switch comm).

Is the UP light on?
Y N

131
Bad H2 (base I/O) card.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

132
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad RUN switch (see MIM 201,249).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad STEP switch

133
Go to Page 6, Step 059, Entry Point E.

134
Bad RUN switch (see MIM 201,249).
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

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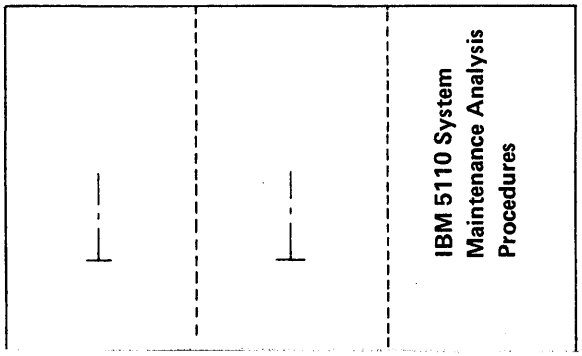

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