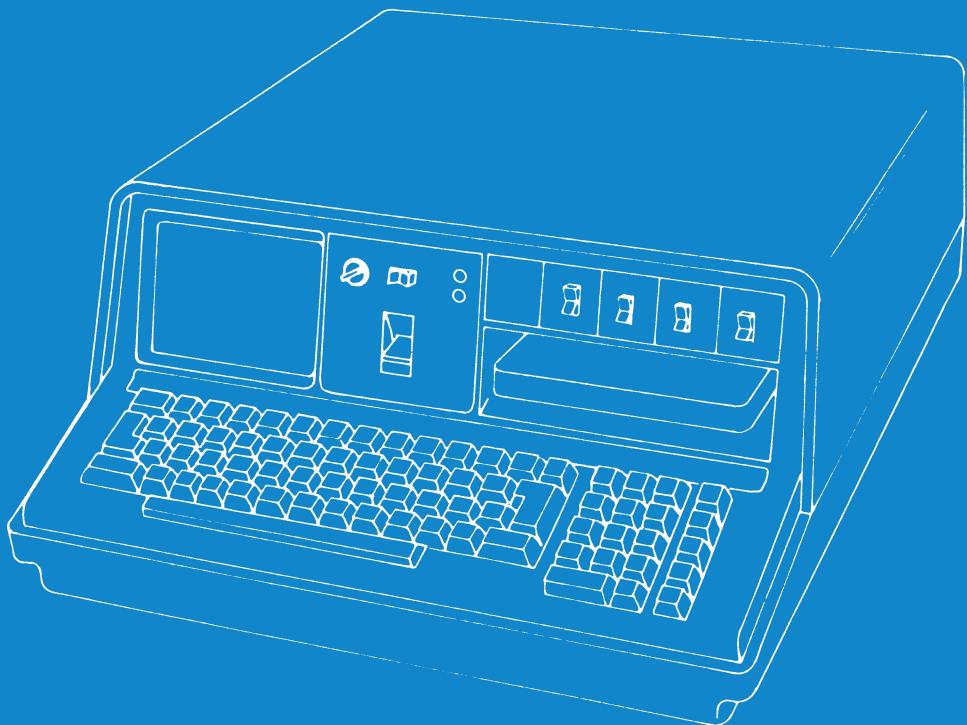


IBM

5110

**IBM 5110 System
Maintenance Analysis Procedures**



*IBM 5110 System
Maintenance Analysis Procedures*

Second Edition (April 1978)

This is a major revision of, and obsoletes, SY31-0553-0. This publication should be reviewed in its entirety.

Changes are periodically made to the information herein; before using this publication in connection with the operation of IBM systems, be sure you have the latest edition and any technical newsletters.

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

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050

0100

0200

0210

0300

0310

0400

0420

0500

0510

0600

0700

0810

0831
0835
0830

0850

0880

0900

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 4334732
Common and Language ROS	F2	A1X	4360434 4360498
		B1X	4334714 4334722 4334750
		C1X	4334712 4334724 4334752
		A2X	4334716 4334726 4334754
		B2X	4334766 ¹ 4834718 4834728
		C2X	4834756 4834768 ¹ 4834720 4834730
		X1X	4834758 4834770 ¹ 4834764 ¹
Display	G2		4360476 4360450
		(Katakana feature)	4834708
Base I/O	H2	X1X X2X	4360496 4834700
Controller	J2		1607136
Parallel I/O	K2		4360430
Feature ROS	K4		4360494 4834776

¹The Katakana feature requires one of these cards to be included.

Card Name	Location	Model	Part Number
Executable ROS	L2	AXX or CXX A1X or C1X	4834784 ¹ 4834734 4834742 4360478
		B1X	4834736 4360480
		A2X or C2X	4834786 ¹ 4834738 4360482
		B2X	4834740 4360484 4834788 ¹
Read/Write	M2-N4		8238223
Print adapter	5103		1607142 ² 1607154 1607152
		(Katakana feature)	4834706
Tape adapter	5106		1607134 ² 1607144 1607146
Tape control	5106 or Internal tape		8527645
Diskette adapter	5114		4834710 4360470 ³
Diskette control	5114		8528195
VFO	5114		1607217 ⁴
BSCA 2	A4		4834792 ² 4834780
BSCA 1	B2		1607176 ⁵

¹The Katakana feature requires one of these cards to be installed.

²Do no replace with same part number.

³VFO card is incorporated in this card.

⁴Not used with diskette adapter card 4360470.

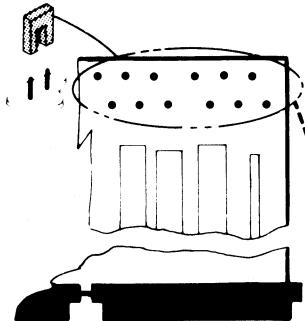
⁵The Microprocessor module on this card is P/N 5615702.

Card Name	Location	Model	Part Number
Comm. Facility	C2		
EIA	Used with external modems	5864363 5864660	
DDSA	Used with digital network	8527032	
38LS	U.S. switched network with Auto Answer	1756001	
38LS	U.S. Non-switched network with SNBU	1756003	
38LS	U.S. Non-switched network without SNBU	1756005	
38LS	World Trade Non-switched network	1756011	

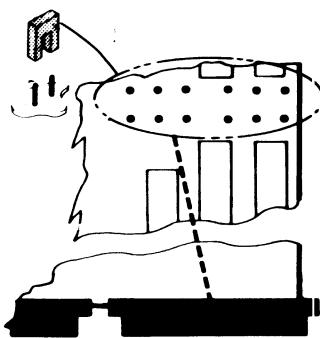
MAP 050-4

LOGIC CARD JUMPERS

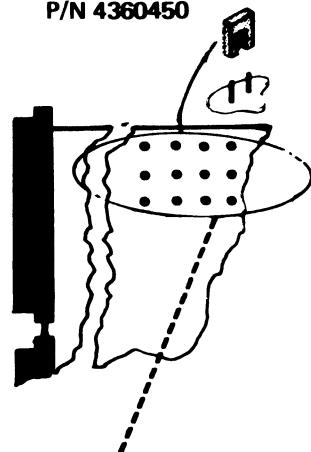
Printer Adapter Card



Display Card
P/N 4360476



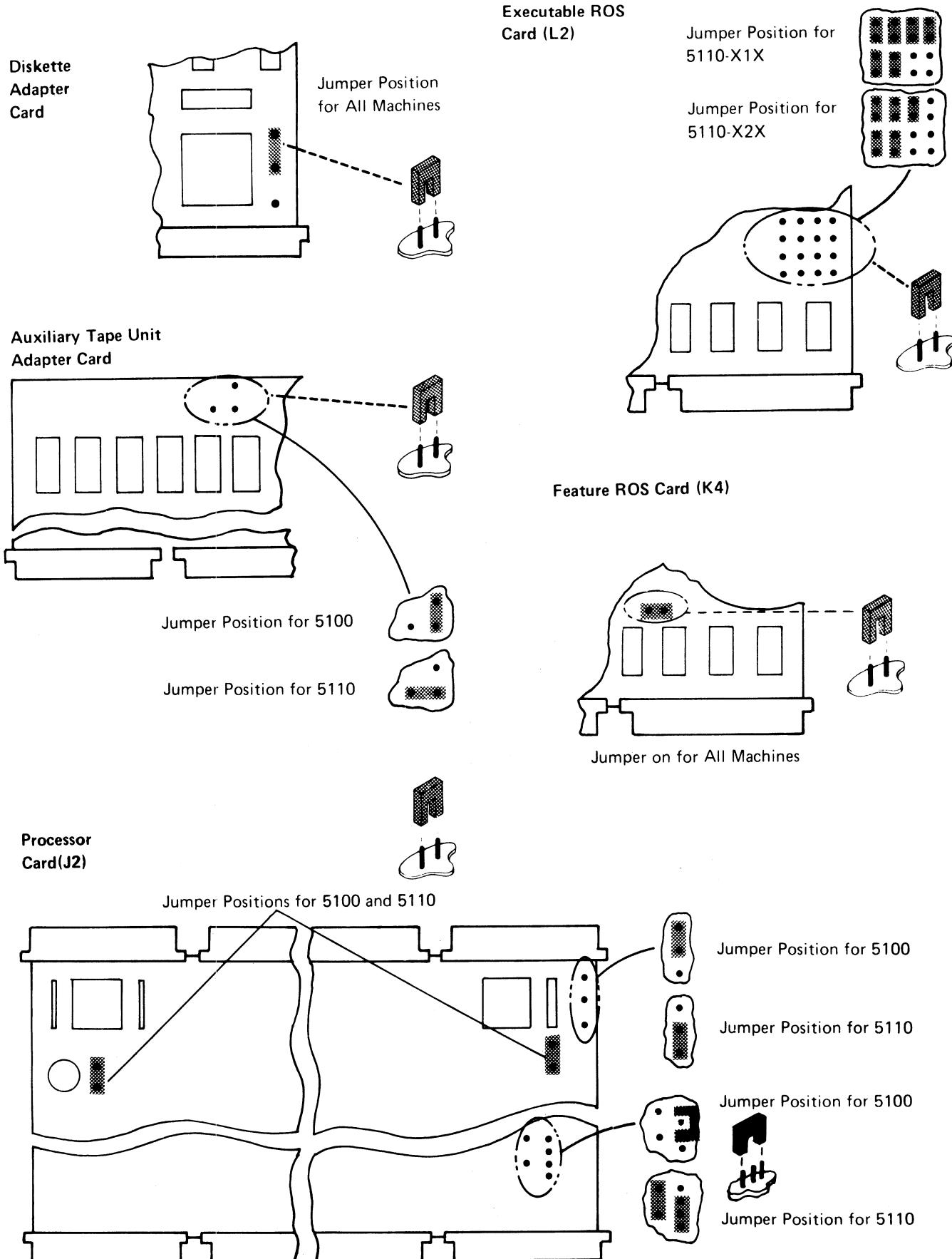
Display Card
P/N 4360450



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

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.



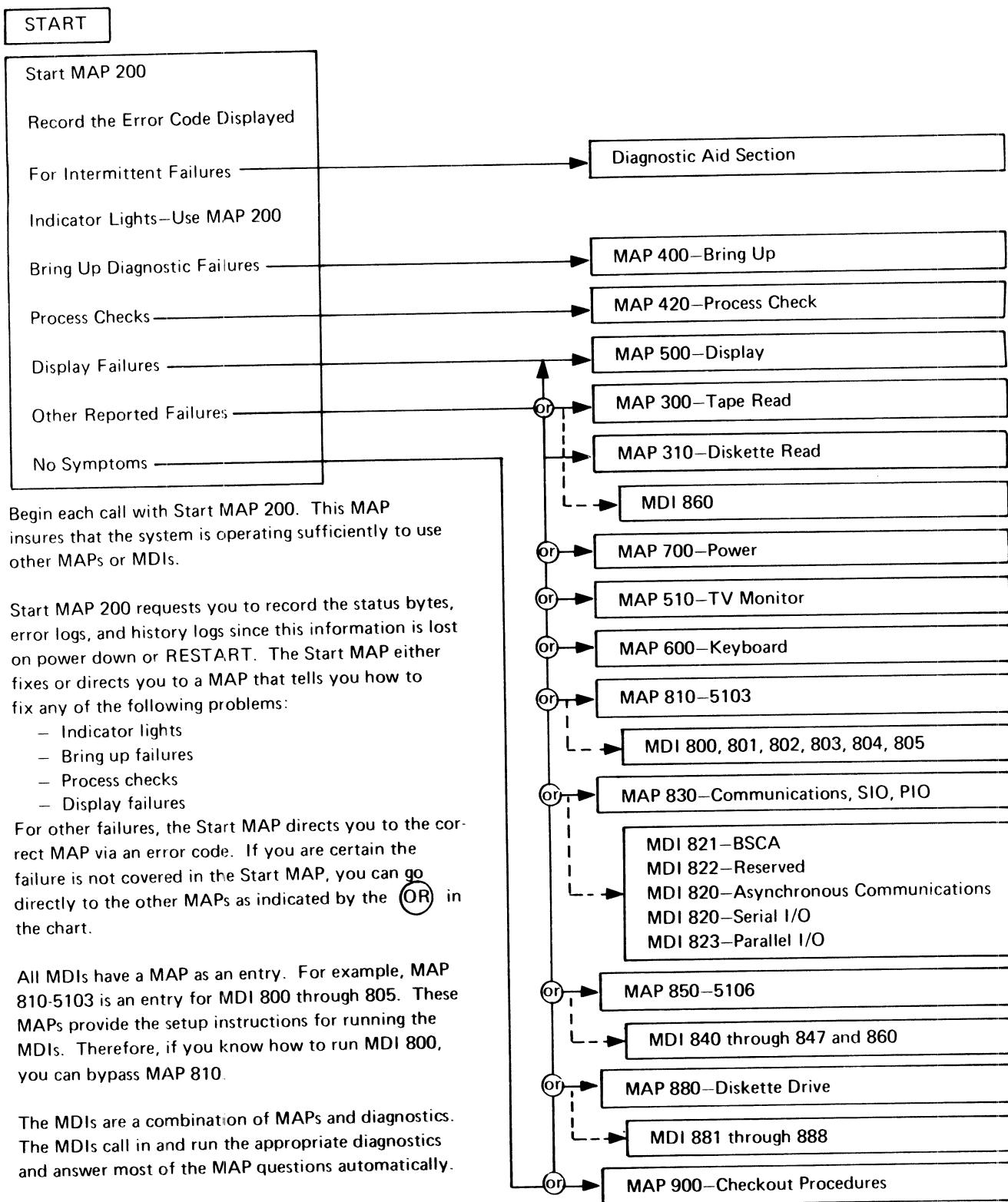
USING THE IBM 5110 SYSTEM MAPS

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



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

PAGE 1 OF 75

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

(Entry Point A) Step number
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.

2 2 2
A B C

MAP EXAMPLE (continued)A B C
1 1 1.**PROCESS CHECK MAP**

PAGE 2 OF 75

005

Create the PROCESS CHECK.

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.

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 _____

Instruction—establishes conditions for answering the next question.

Go to the INTERMITTENT FAILURE CHART in the 5110 SERVICE AIDS.

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.

This page left blank intentionally.

START MAP 0200

MAP 0200-1

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

0200

START MAP

PAGE 2 OF 5

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

MAP 0200-2

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

01MAY78

EC 835541 PEC 835458

4 4 4 3
E F G H

MAP 0200-2

H
2

START MAP

PAGE 3 OF 5

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 LOAD 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.

K L

MAP 0200-3

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 Alphanumeric 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

01MAY78

EC 835541 PEC 835458

MAP 0200-3

4 J K L

4 4 4
M N P

0200

START MAPE F G J M N
2 2 2 3 3 3

MAP 0200-4

PAGE 4 OF 5

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.**

01MAY78

EC 835541 PEC 835458

MAP 0200-4

A B C
2 2 2

START MAP

MAP 0200-5

PAGE 5 OF 5

0200

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.

01MAY78

EC 835541 PEC 835458

MAP 0200-5

This page intentionally left blank.

CABLE CHECKOUT MAP 0210

MAP 0210-1

PAGE 1 OF 2

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

0210

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

A B C
1 1 1

CABLE CHECKOUT MAP

MAP 0210-2

PAGE 2 OF 2

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.

01MAY78

EC 835541 PEC 835458

MAP 0210-2

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
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

C
T

TAPE READ MAP

MAP 0300-2

PAGE 2 OF 45

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)

3 3 3 3
D E F G

(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.

01MAY78

EC 835541 PEC 835458

MAP 0300-2

3
H

G H
2 2

TAPE READ MAP

PAGE 3 OF 45

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 (ROS control) 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.

D E F
2 2 2

MAP 0300-3

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.

01MAY78

EC 835541 PEC 835458

MAP 0300-3

B J
1 3

TAPE READ MAP

PAGE 4 OF 45

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

MAP 0300-4

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

01MAY78

EC 835541 PEC 835458

MAP 0300-4

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

W
4

TAPE READ MAP

PAGE 5 OF 45

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

A
C

MAP 0300-5

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

0300

4 4 4 4 4
2 2 2 2 2
X Y Z A B C

4 4 4 4 3
2 2 0 0 9 6
A A A A A A
D E F G H J

01MAY78

EC 835541 PEC 835458

MAP 0300-5

A
J
5

TAPE READ MAP

PAGE 6 OF 45

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

A
Q

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

3 3 3 3 3
9 6 5 4 3
A A A A A
K L M N P Q

3 3 3 2 2
2 2 0 9 9
A A A A A
R S T U V W

MAP 0300-6

01MAY78

EC 835541

PEC 835458

MAP 0300-6

A
W
6

TAPE READ MAP

PAGE 7 OF 45

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

B
C

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

MAP 0300-7

2 2 2 2 2
8 5 5 4 4
A A A B B B
X Y Z A B C

2 2 2 1 1 1
3 2 2 1 8 6 8
B B B B B B
D E F G H J

01MAY78

EC 835541

PEC 835458

MAP 0300-7

0300

B
J
7

TAPE READ MAP

B
Q

MAP 0300-8

PAGE 8 OF 45

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

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

1 1 1 1 1
6 5 5 4 4
B B B B B
K L M N P Q

1 1 1 1 1
3 3 2 2 2 9
B B B B B
R S T U V W

01MAY78

EC 835541

PEC 835458

MAP 0300-8

B
W
8

TAPE READ MAP

PAGE 9 OF 45

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

C

MAP 0300-9

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 1 1
1 1 1 1 1
B B B C C
X Y Z A B C

1 1 1
0 0 0
C C C
D E F

01MAY78

EC 835541 PEC 835458

MAP 0300-9

0300

C C C
D E F
9 9 9

TAPE READ MAP

PAGE 10 OF 45

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
G H J K

C C C
G H J K

MAP 0300-10

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.

I I
I I
C C
L M

01MAY78

EC 835541 PEC 835458

MAP 0300-10

C C C C
A B L M
9 9 1 1
0 0

TAPE READ MAP

PAGE 11 OF 45

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).

B B B
X Y Z
9 9 9

MAP 0300-11

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

1 1 1
2 2 2
C C C
N P Q

01MAY78

EC 835541 PEC 835458

MAP 0300-11

0300

B C C C
V N P O
8 1 1 1
1 1 1

TAPE READ MAP

PAGE 12 OF 45

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).

B B
T U
8 8

MAP 0300-12

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

01MAY78

1 1
3 3
C C
R S

EC 835541 PEC 835458

MAP 0300-12

B C C
S R S
8 1 1
2 2

TAPE READ MAP

PAGE 13 OF 45

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.

B C C
R T U
8

MAP 0300-13

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.

C C
T U

01MAY78

EC 835541 PEC 835458

MAP 0300-13

0300

B
P
8

TAPE READ MAP

PAGE 14 OF 45

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

B C C
N V W
8

MAP 0300-14

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).

01MAY78

EC 835541 PEC 835458

1
5
C
X

MAP 0300-14

B C
M X
8 1
4

TAPE READ MAP

PAGE 15 OF 45

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).

TAPE READ MAP

B C C
L Y Z
8

MAP 0300-15

155

Remove jumper.

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

156

-Try the test again (press F 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

01MAY78

EC 835541 PEC 835458

A B C
D D D
6 6 6
C C
Y Z

C C
Y Z

MAP 0300-15

0300

B D D D
K A B C
8 1 1 1
5 5 5

TAPE READ MAP

PAGE 16 OF 45

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).

B
H
7

MAP 0300-16

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).

1 1
7 7
D D
D E

01MAY78

EC 835541 PEC 835458

MAP 0300-16

D
E
I
6

TAPE READ MAP

PAGE 17 OF 45

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

D D D
D F G H

MAP 0300-17

6

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

01MAY78

EC 835541 PEC 835458

MAP 0300-17

0300

D D D
J K L
1 1 1
7 7 7

TAPE READ MAP

PAGE 18 OF 45

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.

D
M

B D
G M
7

MAP 0300-18

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

2 2 2 1
1 0 0 9
D D D D
N P Q R

01MAY78

EC 835541 PEC 835458

MAP 0300-18

D
R
1
8

TAPE READ MAP

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 the AC 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

2
0
D D D D
S T U V

D D D
T U V

MAP 0300-19

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).

01MAY78

EC 835541 PEC 835458

MAP 0300-19

0300

D
S
1
9

TAPE READ MAP

PAGE 20 OF 45

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

D D D
W X Y

D D D D D
P Q W X Y
1 8 8

MAP 0300-20

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.

2
1
D
Z

01MAY78

EC 835541 PEC 835458

MAP 0300-20

D
Z
2
0

TAPE READ MAP

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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.

B D E
F N A
7 1 8

MAP 0300-21

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

2 2
2 2
E E
B C

01MAY78

EC 835541 PEC 835458

MAP 0300-21

0300

E
A

B E E
E B C
7 2 2
1 1

TAPE READ MAP

PAGE 22 OF 45

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

E E
D E

E E
D E

MAP 0300-22

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).

2
3
F

01MAY78

EC 835541 PEC 835458

MAP 0300-22

B
D
7
2
2

TAPE READ MAP

PAGE 23 OF 45

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

MAP 0300-23

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).

0300

Is the DOWN light on?

Y N

232

Bad tape control card (see MIM 203).

233

- Probe tape control card pin B07 (-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

2 2
4 4
E E
H J

01MAY78

EC 835541 PEC 835458

MAP 0300-23

E
G

B B E E
A B H J
7 7 2 2
3 3

TAPE READ MAP

PAGE 24 OF 45

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).

E E E
K L M

MAP 0300-24

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).

E E E
K L M

01MAY78

EC 835541 PEC 835458

MAP 0300-24

A A
Y Z
7 7

TAPE READ MAP

PAGE 25 OF 45

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
EE
N P

E
P

MAP 0300-25

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).

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EC 835541 PEC 835458

MAP 0300-25

0300

E
N
2
5

TAPE READ MAP

269

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-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 E
Q R S

E
S

MAP 0300-26

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

01MAY78

EC 835541 PEC 835458

MAP 0300-26

E E E
R T U
2 2 2
6 6 6

TAPE READ MAP

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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
E E
V W

E
W

MAP 0300-27

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).

01MAY78

EC 835541 PEC 835458

MAP 0300-27

0300

E E
0 V
2 2
6 7

TAPE READ MAP

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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

E E
X Y

A E E
X X Y
7

MAP 0300-28

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

2 2
9 9
E F
Z A

01MAY78

EC 835541 PEC 835458

MAP 0300-28

A E F
V Z A
6 2 2
8 8

TAPE READ MAP

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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).

F
B

A F
U B
6

MAP 0300-29

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

3 3
0 0
F F
C D

01MAY78

EC 835541 PEC 835458

MAP 0300-29

0300

F F
C D
2 2
9 9

TAPE READ MAP

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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.

A
T
6

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).

3 3
1 1
F F
E F

01MAY78

EC 835541 PEC 835458

MAP 0300-30

F
F
3
0

TAPE READ MAP

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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).

F
E
G
3
0

MAP 0300-31

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).

F
G

01MAY78

EC 835541 PEC 835458

MAP 0300-31

0300

A
S
6

TAPE READ MAP

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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

A F F
R H J
6

MAP 0300-32

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.

3
F K

01MAY78

EC 835541 PEC 835458

MAP 0300-32

F
K
3
2

TAPE READ MAP

PAGE 33 OF 45

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.

A
P
L
6

MAP 0300-33

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).

3
4
F
M

01MAY78

EC 835541 PEC 835458

MAP 0300-33

0300

F
M
3

TAPE READ MAP

PAGE 34 OF 45

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).

A
N
6

MAP 0300-34

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-J02 (-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.

01MAY78

3 3
5 5
F F
N P

EC 835541 PEC 835458

MAP 0300-34

A F F
M N P
6 3 3
4 4

TAPE READ MAP

PAGE 35 OF 45

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

F F
Q R

MAP 0300-35

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.

01MAY78

EC 835541 PEC 835458

MAP 0300-35

0300

A
L
6

TAPE READ MAP

PAGE 36 OF 45

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 F
S T

F
T

MAP 0300-36

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

01MAY78

EC 835541 PEC 835458

MAP 0300-36

F	F	F	F	F	F	F
S	U	V	W	X	Y	
3	3	3	3	3	3	
6	6	6	6	6	6	

TAPE READ MAP

PAGE 37 OF 45

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

3
8
F
Z

G
A

MAP 0300-37

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).

01MAY78

EC 835541 PEC 835458

MAP 0300-37

0300

F
Z
3
7

441

TAPE READ MAP

PAGE 38 OF 45

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

G G G
B C D

G G G
B C D

MAP 0300-38

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 .

01MAY78

EC 835541 PEC 835458

3 3
9 9
G G
E F

MAP 0300-38

A G G
K E F
6 3 3
8 8

TAPE READ MAP

PAGE 39 OF 45

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).

A G
H G
5

MAP 0300-39

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

4 4
0 0
G G
H J

01MAY78

EC 835541 PEC 835458

MAP 0300-39

G

0300

A G G
G H J
5 3 3
9 9

TAPE READ MAP

PAGE 40 OF 45

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.

A
F
5

MAP 0300-40

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).

4 4 4
1 1 1
G G G
K L M

01MAY78

EC 835541 PEC 835458

MAP 0300-40

G G
L M
4 4
0 0

TAPE READ MAP

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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.

G K
4 0

MAP 0300-41

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 tolerance.

Go To Map 0700, Entry Point A.

01MAY78

4 4 4 4
2 2 2 2
G G G G
N P Q R

EC 835541 PEC 835458

MAP 0300-41

0300

A A G G G G
D E N P O R
5 5 4 4 4 4

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- 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.

V X Y Z A A
4 5 5 5 A B
5 5

MAP 0300-42

- 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.

01MAY78

EC 835541 PEC 835458

MAP 0300-42

S T U
4 4 4

TAPE READ MAP

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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

P R G G
4 4 S T

MAP 0300-43

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.

01MAY78

EC 835541 PEC 835458

MAP 0300-43

0300

N
4

TAPE READ MAP

L M G
4 4 U

MAP 0300-44

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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 BO5 (+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 BO5 (+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).

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.

A K
1 4

TAPE READ MAP

MAP 0300-45

PAGE 45 OF 45

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.

0300

01MAY78

EC 835541 PEC 835458

MAP 0300-45

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DISKETTE READ MAP

MAP 0310-1

PAGE 1 OF 26

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			
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	010	0420	A
2	006	0420	A
22	241	0700	A
13	123	0700	A
2	005	0900	A
3	009	0900	A
26	293	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 (see 5114 MIM 182).

(Step 002 continues)

DISKETTE READ MAP

MAP 0310-2

PAGE 2 OF 26

(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.

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MAP 0310-2

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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).

0310

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)

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MAP 0310-3

DISKETTE READ MAP

MAP 0310-4

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(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 (ROS control) 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

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MAP 0310-4

F
4

DISKETTE READ MAP

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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 A1C1G13 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.

E
4

G

MAP 0310-5

023

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

024

-Insert the CE diagnostic diskette (with the label 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).

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MAP 0310-5

0310

G

D
4

DISKETTE READ MAP

N

MAP 0310-6

PAGE 6 OF 26

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

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

2 2 2 2 2
6 5 0 0 0
H J K L M N

2 1 1 1 1
0 9 9 9 9
P Q R S T U

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EC 8355458 PEC 835458

MAP 0310-6

U
6

DISKETTE READ MAP

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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

A
A

MAP 0310-7

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

1 1 1 1 1 1
9 9 7 7 7 A
V W X Y Z A

1 1 1 1 1 1 1
5 5 5 3 2 8
A A A A A A
B C D E F G
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MAP 0310-7

0310

A
G
7

DISKETTE READ MAP

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 13, Step 129,

Entry Point C.

057

-Press L

-Probe A1C1-U07 (+Select head 1) on the 5114.

Is the UP light ON?

Y N

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.

A A
J K

MAP 0310-8

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 CE diagnostic diskette.

Bad drive control card.

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

A
M
8

DISKETTE READ MAP

PAGE 9 OF 26

065

- 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

066

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

Is the voltage OK?

Y N

067

- Check fuse 2.

Is fuse 2 OK?

Y N

068

- Replace the fuse.

Does the fuse blow again?

Y N

069

- Bad fuse 2.

070

Is there a second diskette drive installed?

Y N

A
A
R
S

MAP 0310-9

071

(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

072

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

073

- Bad drive control card.
- Check/replace the D4 cable in 5114 (see MAP 0210).
- Bad AC or DC power supply (see 5114 MIM 181 and 182).

074

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

Does the fuse blow again?

Y N

075

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

Did the fuse blow again?

Y N

076

- Bad 5114 A1 board.

077

Go to Step 071, Entry Point M.

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MAP 0310-9

1 1 1
0 0 0
A A A A A
N P Q R S

1
0
A
T

0310

A A A A
N P O T
9 9 9 9

DISKETTE READ MAP

PAGE 10 OF 26

078

Go to Page 9, Step 071,
Entry Point M.

079

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

Is the voltage OK?

Y N

080

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

081

Bad A1 board in 5114.

082

Bad connection from the +24 Vdc to the Taper
Pin Block (see 5114 MIM 176).

Bad resistor, capacitor or connection (see
5114 MIM 176,130).

Bad drive control card.

083

-Turn off the 5114.

-Measure the resistance of the head load
solenoid (see 5114 MIM 176).

Is the resistance approximately 140 ohms?

Y N

084

Bad head load solenoid.

Check the wires and connectors from the
diskette drive control card to the Terminal Pin
Block (see 5114 MIM 176).

085

Check the wires and connectors from the
diskette drive control card to the Terminal Pin
Block (see 5114 MIM 176).

Bad drive control card.

Check/replace the D4 cable in 5114 (see MAP
0210).

A
L
8

MAP 0310-10

086

-Check the head load springs and head load
mechanism.

Does everything look OK mechanically?

Y N

087

Repair or replace the defective components.

088

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

Y N

089

Adjust the rods.

090

-Press L
-On the 5114, Probe:

A1D4-B07 (+File Data).

(Ground on A1D4-D08).

Are both lights on and steady?

Y N

091

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.

092

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

Are both lights on and steady?

Y N

093

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

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MAP 0310-10

A
U
I
0

DISKETTE READ MAP

PAGE 11 OF 26

094

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

Are both lights on and steady?

Y N

095

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

096

-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

097

(Entry Point N)

-Look for obvious mechanical problems.

Are there any obvious problems?

Y N

098

Is the drive band OK?

Y N

099

Repair or replace the failing components.

A A
W X

MAP 0310-11

100

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

Does the assembly move easily?

Y N

101

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).

102

-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

103

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

104

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

105

Repair or replace the defective components.

1
2
A A A
V W X

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MAP 0310-11

0310

A A A
F H V
7 8 1

DISKETTE READ MAP

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106

- Check the mounting screws on the stepper motor.

Are they tight?

Y N

107

Tighten the screws.

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

108

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

Is the service check OK?

Y N

109

Repair, replace or adjust the failing components.

110

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.

111

Go to Page 11, Step 097, Entry Point N.

112

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

Are the heads loading?

Y N

1
3
A A
Y Z

A
Z

MAP 0310-12

113

- Probe A1D4-B10 (+HD Engage) on the 5114.

Is the down light on and the up light pulsing?

Y N

114

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

Check/replace the D4 cable in 5114 (see MAP 0210).

115

- 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

116

- Measure +24 Vdc on A1A4-D10, (gnd on D08) on the 5114.

Is the voltage OK?

Y N

117

- Check fuse 2.

Is the fuse OK?

Y N

118

- Replace the fuse.

Does the fuse blow again?

Y N

119

Bad fuse.

1 1 1 1
3 3 3 3
B B B B
A B C D

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EC 835541 PEC 835458

MAP 0310-12

B B B B
A B C D
1 1 1 1
2 2 2 2

DISKETTE READ MAP

PAGE 13 OF 26

120

- 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

121

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

122

Bad power supply (see 5114 MIM 181 and 182).

123

Go To Map 0700, Entry Point A.

124

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).

125

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

Is the service check OK?

Y N

126

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

127

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

A A
E Y
7 1
2

MAP 0310-13

128

No failure found.

129

(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

130

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.

131

- 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

132

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

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1
4
B
E

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MAP 0310-13

0310

B
E
1
3

DISKETTE READ MAP

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133

- 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

134

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

135

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

Is the service check OK?

Y N

136

Failure found.

137

- 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

138

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

Is the service check OK?

Y N

B B B
F G H

MAP 0310-14

139

Repair or replace the failing components.

140

- Check the idler assembly for binds or broken parts.

Are there any binds or broken parts?

Y N

141

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

Are the rods seated properly?

Y N

142

Adjust the rods.

143

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

Does the drive still fail?

Y N

144

Bad drive control card.

145

Check/replace the B4 cable in 5114 (see MAP 0210).

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

146

Repair/replace the failing components.

147

Adjust and tighten the stepper pulley (see 5114 MIM 151).

Bad stepper motor.

Bad CE diagnostic diskette.

01MAY78

EC 835541 PEC 835458

MAP 0310-14

B B B
F G H

A A A
B C D
7 7 7

DISKETTE READ MAP

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148

Go to Step 150, Entry Point D.

149

Go to Step 150, Entry Point D.

150

(Entry Point D)

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

Is the drive motor turning?

Y N

151

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

Does the motor turn freely?

Y N

152

Bad motor.

153

Check the AC distribution in 5114 (see 5114 MIM 182).

154

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

Y N

155

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

156

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

Y N

B B
J K

B B
J K

MAP 0310-15

157

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

158

Is the diskette turning?

Y N

159

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

Does the diskette turn?

Y N

160

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

Does the drive hub turn?

Y N

161

Replace the drive assembly.

162

- 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

163

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

164

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

Is the latch functioning properly?

Y N

1 1 1 1
7 6 6 6
B B B B
L M N P

01MAY78

EC 835541 PEC 835458

MAP 0310-15

0310

B B B
M N P
1 1 1
5 5 5

DISKETTE READ MAP

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165

Replace the bad components.

166

Replace the drive assembly.

167

-Turn on the IPO switch.

Does the diskette turn?

Y N

168

Check for a loose pulley or a bind in the spindle assembly.

Replace the drive assembly if no failures are found.

169

(Entry Point F)

On the drive control card, Probe:

TPB-9 (+Index)

TPA-13 (gnd)

(See 5114 MIM 173)

Is the down light on and the up light pulsing?

Y N

170

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

Is the PTX/LED alignment OK?

Y N

171

Bad PTX/LED.

B B
Q R

MAP 0310-16

172

Perform the LED output service check for the failing drive (see 5114 MIM 162).

Is the LED service check OK?

Y N

173

Bad LED.

Bad drive control card.

174

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

Is the output correct?

Y N

175

Bad PTX assembly (see 5114 MIM 165).

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.

176

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.

177

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

Is the line pulsing?

Y N

178

Check/replace the D4 cable in 5114 (see MAP 0210).

Bad drive control card.

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MAP 0310-16

B B
Q R

1
7
B
S

Z B B
7 L S

DISKETTE READ MAP

5 6

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179

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

Is the line pulsing?

Y N

180

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

181

-Perform the diskette speed service check (see 5114 MIM 160).

Is the service check OK?

Y N

182

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).

183

Reload the diagnostic.

184

Go to Page 16, Step 169, Entry Point F.

185

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.

X Y
7 7

MAP 0310-17

186

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).

187

On the 5114 measure:

+5 Vdc on A1A4-D04.

-5 Vdc on A1A4-B10.

gnd on A1C1U08.

(See 5114 MIM 183)

Are the voltages OK?

Y N

188

-Check fuse 1, (+5 Vdc).
(See 5114 MIM 181).

Is the fuse OK?

Y N

189

(Entry Point G)

-Replace the blown fuse.

Does the fuse blow again?

Y N

190

Bad fuse.

191

-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

01MAY78

1 1 1 1
8 8 8 8
B B B B
T U V W

EC 835541 PEC 835458

MAP 0310-17

0310

B B
V W
1 1
7 7

DISKETTE READ MAP

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192

-Plug in Drive 1 (A1D4).

Did the fuse blow?

Y N

193

Did you disconnect a cable from A1B4?

Y N

194

No failure found.
(See 5114 MIM 181 and 182).

195

-Plug in Drive 2 (A1B4).

Did the fuse blow?

Y N

196

No failure found.
(See 5114 MIM 181 and 182).

197

Check/replace the B4 cable in 5114 (see
MAP 0210).

Bad drive control card.

198

Check/replace the D4 cable in 5114 (see MAP
0210).

Bad drive control card.

199

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 5114 MIM 181 and
182).

B B
T U
1 1
7 7

MAP 0310-18

200

-Check fuse 3 (-5 Vdc).
(see 5114 MIM 181)

Is fuse 3 OK?

Y N

201

Go to Page 17, Step 189, Entry Point G.

202

Check the +5 Vdc and -5 Vdc again. If they
are not OK, replace the DC power supply (see
181 and 182 in the 5114 MIM).

203

-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

204

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

Are both lights on and steady?

Y N

205

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).

1 1
9 9
B B
X Y

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MAP 0310-18

V 7 W 7 B 8 B 8
X 1 Y 1
8 8

DISKETTE READ MAP

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206

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.

207

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 (ROS control) 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).

208

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

209

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).

O 6 R 6 S 6 T 6

MAP 0310-19

210

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).

211

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

212

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).

213

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).

0310

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MAP 0310-19

L M P
6 6 6

DISKETTE READ MAP

PAGE 20 OF 26

214

- 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).

215

- 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).

216

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

Is the UP light on?

Y N

217

- 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).

218

Is a diskette in the drive?

Y N

B C
Z A

K B C
6 Z A

MAP 0310-20

219

- 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

220

Replace the failing components.

221

- 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).

222

Remove the DISKETTE and retry the diagnostic.

223

- Perform the LED service check (see 5114 MIM 162 and 174).

Is the service check OK?

Y N

224

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

Is the voltage OK?

Y N

2 2 2
5 4 1
C C C
B C D

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MAP 0310-20

C
D
2
0

DISKETTE READ MAP

PAGE 21 OF 26

225

-Check fuse 1 (see 5114 MIM 181 and 183).

Is fuse 1 OK?

Y N

226

-Replace fuse 1.

Does the fuse blow again?

Y N

227

Bad fuse.

228

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

Does the fuse blow again?

Y N

229

Check/replace the D4 cable in 5114 (see MAP 0210).

Bad diskette drive control card.

Bad LED/PTX assembly.

230

-Disconnect the cable from A1B4 to the drive.

Does the fuse blow again?

Y N

231

Check/replace the B4 cable in 5114 (see MAP 0210).

Bad diskette drive control card.

Bad LED/PTX assembly.

232

Is there a 5103 attached?

Y N

C C C
E F G

C C C
E F G

MAP 0310-21

233

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 5114 MIM 181).

234

(Entry Point K)

-Disconnect the 5103 from the 5114.

-Insert a new fuse.

Does the fuse blow again?

Y N

235

Suspect a short or open in the DC voltage distribution in the 5103 (see the 5103 MIM).

Check the I/O cables.

236

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 5114 MIM 181).

Bad cable from A1A2 to the I/O port

237

-Measure +5 Vdc on A1A4B02 on the 5114.

Is the voltage OK?

Y N

238

Is a 5103 attached?

Y N

2 2 2
3 3 2
C C C
H J K

01MAY78

EC 835541 PEC 835458

MAP 0310-21

0310

C
K
2
1

DISKETTE READ MAP

PAGE 22 OF 26

239
(Entry Point H)

Is the drive motor turning?

Y N

240

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

Are the voltages OK?

Y N

241

Go To Map 0700, Entry Point A.

242

Is the relay inside of the AC box picked?

Y N

243

Bad relay R1.

Bad cable to the relay (see 181 and 182 in the 5114 MIM).

244

Missing AC voltages (see 5114 MIM 181 and 182).

245

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

Is the voltage OK?

Y N

246

-Check fuse 2.

Is the fuse OK?

Y N

2 2
3 3
C C
L M N

C
N

MAP 0310-22

247

(Entry Point L)

-Replace the fuse.

Does the fuse blow again?

Y N

248

Bad fuse.

249

-Disconnect the cable from A1A4.

-Replace the fuse.

Does the fuse blow again?

Y N

250

-Unplug the cables at A1D4 and A1B4 if present.

-Replug the A1A4 cable.

Does the fuse blow?

Y N

251

-Replug the cable at A1D4.

Does the fuse blow?

Y N

252

-Replug the cable at A1B4.

Does the fuse blow?

Y N

253

The trouble is fixed.

2 2 2 2
3 3 3 3
C C C C
P Q R S

01MAY78

EC 835541 PEC 835458

MAP 0310-22

C C C C
M P Q R S
2 2 2 2 2
2 2 2 2 2

DISKETTE READ MAP

PAGE 23 OF 26

254

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 5114 MIM 176).

255

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 5114 MIM 176).

256

Bad A1A4 cable.
Bad 5114 A1 board.

257

Bad AC/DC power supply (See 5114 MIM 181 and 182).
Bad cable A1A4 (See 5114 MIM 181).

258

-Check fuse 4.

Is fuse 4 OK?

Y N

259

Go to Page 22, Step 247, Entry Point L.

260

Bad AC/DC power supply (See 5114 MIM 181 and 182).
Bad cable A1A4 (See MAP 0210 and 5114 MIM 181).

C C C
H J L
2 2 2
1 1 2

MAP 0310-23

261

Bad cable A1A4 (See MAP 0210 and 5114 MIM 181).
Bad AC/DC power supply (See 5114 MIM 181 and 182).
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).

262

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

Is the voltage OK?

Y N

263

Go to Page 22, Step 249, Entry Point H.

264

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

265

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

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MAP 0310-23

0310

C
C
2
0

DISKETTE READ MAP

PAGE 24 OF 26

266

(Entry Point J)

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

267

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

Are the fuses OK?

Y N

268

Replace the blown fuse.

Does the fuse blow again?

Y N

269

Bad fuse.

270

-Disconnect the cables A1D4 and A1B4.

-Replace the blown fuse.

Does the fuse blow again?

Y N

271

Bad drive control card.

Bad A1D4 or A1B4 cable to the drive control card.

272

Is a 5103 attached?

Y N

C C C C
T U V W

MAP 0310-24

273

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

Bad cable from the power supply to A1A4.

Bad DC power supply.

274

Go to Page 21, Step 234, Entry Point K.

275

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).

276

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

Is the service check OK?

Y N

277

Bad PTX.

Bad drive control card.

278

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

Is the alignment OK?

Y N

279

Adjust the alignment.

Bad LED or PTX assembly.

2
5
C
X

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EC 835541 PEC 835458

MAP 0310-24

C C C C
T U V W

C
X
2
4**DISKETTE READ MAP**

PAGE 25 OF 26

280

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****281**

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.

282

-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**

C
C
Y
Z

J	C	C	C
6	B	Y	Z
2	2	0	
0			

MAP 0310-25**283**

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.

284

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.

285**Go to Page 24, Step 266, Entry Point J.****286****Have you been here before?****Y N****287**

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.

288

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.

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MAP 0310-25

0310

A B H
1 2 6

DISKETTE READ MAP

MAP 0310-26

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289

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.

290

Are the heads loaded all the time?

Y N

291

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).

292

Bad drive control card.
Check for shorts on the Taper Pin Block (see 5114 MIM 130).

293

The 5114 MDI cannot be loaded.

Go To Map 420, Entry Point A.

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MAP 0310-26

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

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C D

MAP 0400-1

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

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EC 835541 PEC 835458

MAP 0400-1

0400

K
1

BRING UP MAP

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

R

MAP 0400-2

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 ROLO 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 ROLO 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

01MAY78

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4 4 3 3 3
S T U V W

MAP 0400-2

W
2

BRING UP MAP

PAGE 3 OF 23

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 appears 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.

U
2
V
2

MAP 0400-3

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.

01MAY78

4
X

EC 835541 PEC 835458

MAP 0400-3

0400

S T X
2 2 3

BRING UP MAP

PAGE 4 OF 23

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).

P O
2 2

MAP 0400-4

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).

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MAP 0400-4

5 5 5
Y Z A

Y Z A
4 4 A
4

BRING UP MAP

PAGE 5 OF 23

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 preceding step to determine which card is bad.

M N
2 2

MAP 0400-5

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.

0400

01MAY78

EC 835541 PEC 835458

MAP 0400-5

J L
1 2

BRING UP MAP

PAGE 6 OF 23

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).

9 8 7
A A A A
B C D E

A
E

MAP 0400-6

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.

01MAY78

7
A
F

EC 835541 PEC 835458

MAP 0400-6

A A
D F
6 6

BRING UP MAP

PAGE 7 OF 23

064

- 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

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

A A A
H J K

MAP 0400-7

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 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

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 RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
 - Switch the DISPLAY REGISTERS switch to NORMAL.
- (Step 074 continues)

A
G
7

BRING UP MAP

PAGE 8 OF 23

(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).

A
A
C
L
6

MAP 0400-8

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

01MAY78

9 9 9 9 9
A A A A A
M N P Q R

EC 835541 PEC 835458

MAP 0400-8

A
L

A A A
P Q R
8 8 8

BRING UP MAP

PAGE 9 OF 23

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 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

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.

H A A A
1 B M N
6 8 8

MAP 0400-9

093

-Power down.
-Swap M4 and N2.
-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

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 (ROS control) card.

01MAY78

EC 835541 PEC 835458

MAP 0400-9

0400

F G
1 1

BRING UP MAP

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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
S T U V W X

A X

MAP 0400-10

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 (ROS control) card.

1 1 1
A A B
Y Z A

01MAY78

EC 835541 PEC 835458

MAP 0400-10

A B
Z A
1 1
0 0

BRING UP MAP

PAGE 11 OF 23

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 (ROS control) card.

115

Bad E4 (APL ROS) card.

116

Bad F2 (ROS control) card.

117

Bad E4 (APL ROS) card.

118

Bad H2 (base I/O) card.

Bad F2 (ROS control) card.

Bad L2 (exec ROS) card (see MAP 050 for jumpering).

Bad G2 (display) card (see MAP 050 for jumpering).

A A
W Y
1 1
0 0

MAP 0400-11

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 (ROS control) card.
Bad J2 (processor) card (see MAP 050 for jumpering).
Bad H2 (base I/O) card.

123

Bad F2 (ROS control) card.

124

Bad E4 (APL ROS) card.

Bad F2 (ROS control) card.

125

Bad F2 (ROS control) 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

01MAY78

1 1 1
3 2 2
B B B
B C D

EC 835541 PEC 835458

MAP 0400-11

0400

B
D
1
1

BRING UP MAP

PAGE 12 OF 23

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

B B B
C E F

MAP 0400-12

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 (ROS control) card.

142

Bad H2 (base I/O) card.

Bad L2 (exec ROS) card (see MAP 050 for jumpering).

01MAY78

EC 835541 PEC 835458

MAP 0400-12

1
3
B
G

BRING UP MAP

PAGE 13 OF 23

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 (ROS control) card.

149

Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

Bad BASIC-APL switch.

A B
V B
1 1
0 1**MAP 0400-13****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 (ROS control) 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)

01MAY78

EC 835541 PEC 835458

MAP 0400-13

A
A
T
U
1
1
0
0

BRING UP MAP

PAGE 14 OF 23

(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 (ROS control) 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 (ROS control) card.

161

-Remove the E4 (APL)card.
-Press RESTART. Wait 25 seconds.

Is ROS 40 error code still displayed?

Y N

B B
H J

B E A B B
1 1 S H J
| | | | |
| | | | |

MAP 0400-14

162

Bad E4 (APL ROS) card.
Bad F2 (ROS control) 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 (ROS control) 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.

-Press RESTART.

(Step 167 continues)

01MAY78

EC 835541 PEC 835458

MAP 0400-14

1
5
B
K

BRING UP MAP

PAGE 15 OF 23

(Step 167 continued)

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 B
K L
1
4

173

MAP 0400-15

(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

Go to Page 14, Step 167, Entry Point P.

176

Bad B2 (BSCA 1) card.

0400

01MAY78

EC 835541 PEC 835458

MAP 0400-15

B
L

A
1

BRING UP MAP

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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

B B B
M N P

MAP 0400-16

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).

1 1 1
9 7 7
B B B
Q R S

01MAY78

EC 835541 PEC 835458

MAP 0400-16

B
S
T
6

BRING UP MAP

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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).

B
T

B
B
R
T
1
6

MAP 0400-17

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.

-Disconnect 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

1 1 1
9 8 8
B B B
U V W

01MAY78

EC 835541 PEC 835458

MAP 0400-17

0400

B
W
1
7

BRING UP MAP

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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.

B
B
V
X
1
7

MAP 0400-18

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).

01MAY78

EC 835541 PEC 835458

MAP 0400-18

B
X

B B
Q U T
6 7

BRING UP MAP

PAGE 19 OF 23

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

2
0
B B C
Y Z A

B C
Z A

MAP 0400-19

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)

01MAY78

2
0
C
B

EC 835541 PEC 835458

MAP 0400-19

0400

B C
Y B
1 1
9 9

BRING UP MAP

PAGE 20 OF 23

(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

2 T
C C
D

C
D

MAP 0400-20

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.

01MAY78

EC 835541 PEC 835458

2 2
1 1
C C
E F

MAP 0400-20

C
C
F
2
0

BRING UP MAP

PAGE 21 OF 23

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).

C
C
2
0

MAP 0400-21

221

The tape control card you removed from the 5106 is bad.

0400

01MAY78

EC 835541 PEC 835458

MAP 0400-21

BRING UP MAP

MAP 0400-22

PAGE 22 OF 23

(Step 225 continued)

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 (ROS control) 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)

Do all three events shown above occur in sequence after Power Up?

Y N

226

- Power down.
 - Remove M2.
 - Install the card that was in 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 (ROS control) card.

228

The card that was in M2 is bad.

C
C
G
H
2
2

BRING UP MAP

MAP 0400-23

PAGE 23 OF 23

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 preceding 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).

0400

01MAY78

EC 835541 PEC 835458

MAP 0400-23

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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			
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

0420

A B C
1 1 1

PROCESS CHECK MAP

G

MAP 0420-2

PAGE 2 OF 26

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

2 2 1
6 6 8
D E F G

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

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MAP 0420-2

1 1 1
8 8 4 6 6 3
H J K L M N

N
2

PROCESS CHECK MAP

T

MAP 0420-3

PAGE 3 OF 26

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 (ROS control) 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 preceding 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 (ROS control) card.

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

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0 R S U
3 3 3 3

PROCESS CHECK MAP

PAGE 4 OF 26

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 (ROS control) 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

MAP 0420-4

037

Bad F2 (ROS control) 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 (ROS control) card.

01MAY78

5
5
Z

EC 835541 PEC 835458

MAP 0420-4

V W X Y

Z A
4 A
4

PROCESS CHECK MAP

PAGE 5 OF 26

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).

P
3

MAP 0420-5

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 (ROS control) 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 (ROS control) card.

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MAP 0420-5

0420

L M
2 2

PROCESS CHECK MAP

PAGE 6 OF 26

A
E

MAP 0420-6

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).

060

-Remove the G2 card.
-Press RESTART. Wait 25 seconds.

055

-Press RESTART. Wait 25 seconds.
-Perform the failing job, if possible.

Is the PROCESS CHECK light on?

Y N

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 RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
-Switch the DISPLAY REGISTERS switch to NORMAL.

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.

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

1 7 7
3 7 7
A A A A
B C D E

7 7
A A
F G

01MAY78

EC 835541 PEC 835458

MAP 0420-6

A A A A
C D F G
6 6 6 6

PROCESS CHECK MAP

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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, to find the bad card.

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

1 0 8
A A A
H J K

A
K

MAP 0420-7

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).

01MAY78

8 8
A A
L M

EC 835541 PEC 835458

MAP 0420-7

0420

A
M
7

PROCESS CHECK MAP

PAGE 8 OF 26

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.

A
J
7
A
7

MAP 0420-8

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

1
0
A
N
P
9

01MAY78

EC 835541 PEC 835458

MAP 0420-8

A
P
8

PROCESS CHECK MAP

PAGE 9 OF 26

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

A A A
Q R S T

MAP 0420-9

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

01MAY78

EC 835541 PEC 835458

MAP 0420-9

A A A A
Q R S T

1 1 1
0 0 0
A A A
U V W

0420

A A A A
N U V W
8 9 9 9

PROCESS CHECK MAP

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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).

A A A
H X Y
7

MAP 0420-10

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

01MAY78

A A
X Y

1 1 1 1
2 2 1 1
A B B B
Z A B C

EC 835541 PEC 835458

MAP 0420-10

B
C
1
0

PROCESS CHECK MAP

PAGE 11 OF 26

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 RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
- Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFLO 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.

B
B
1
0

MAP 0420-11

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 RFLO.
(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).
- Switch the DISPLAY REGISTERS switch to NORMAL.

Is the RFLO 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.

0420

01MAY78

EC 835541 PEC 835458

MAP 0420-11

B
A
1
0

PROCESS CHECK MAP

PAGE 12 OF 26

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).

A B B
Z D E
1 0

MAP 0420-12

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

1 1 1
3 3 3
B B B
F G H

01MAY78

EC 835541 PEC 835458

MAP 0420-12

B
D
E

A B B B
B F G H
6 1 1 1
2 2 2

PROCESS CHECK MAP

PAGE 13 OF 26

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

B B B B
J K L M

B B B B
J K L M

MAP 0420-13

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

01MAY78

1 1
4 4
B B
N P

EC 835541 PEC 835458

MAP 0420-13

0420

K B B
2 N P
1 1
3 3

PROCESS CHECK MAP

PAGE 14 OF 26

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

1 1 1
7 7 7
B B B B
Q R S T

B
T

MAP 0420-14

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

01MAY78

1 1 1 1
7 5 5 5
B B B B
U V W X
EC 835541 PEC 835458
MAP 0420-14

B B B
V W X
1 1 1
4 4 4

PROCESS CHECK MAP

PAGE 15 OF 26

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 (ROS control) card.

168

Bad tape control card (see MIM 203).

169

- Bad F2 (ROS control) 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 alphanumeric keyboard.

Is the UP light on?

Y N

1
6
B
Y
Z

B
Z

MAP 0420-15

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

1 1 1 1 1
6 6 6 6 6
C C C C C
A B C D E

01MAY78

EC 835541 PEC 835458

MAP 0420-15

0420

C C C C
B C D E
5 5 5 5

PROCESS CHECK MAP

PAGE 16 OF 26

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).

B C C
Y A F
I
5 5

MAP 0420-16

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 alphanumeric
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

01MAY78

EC 835541 PEC 835458

C F

1 1 1 1
7 7 7 7
C C C C
G H J K

MAP 0420-16

B C C C C
U G H J K
1 1 1 1 1
4 6 6 6 6

PROCESS CHECK MAP

PAGE 17 OF 26

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.

B B B C
O R S L
1 1 1 |
4 4 4 |

MAP 0420-17

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 (ROS control) 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)

01MAY78

EC 835541 PEC 835458

MAP 0420-17

0420

C

L

H J
2 2

PROCESS CHECK MAP

F C
2 M

MAP 0420-18

PAGE 18 OF 26

(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 (ROS control) 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

01MAY78

2 1
6 9
C C
N P

EC 835541 PEC 835458

MAP 0420-18

C
M

C
P
1
8

PROCESS CHECK MAP

PAGE 19 OF 26

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.

C
R
S

MAP 0420-19

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

01MAY78

EC 835541 PEC 835458

MAP 0420-19

2
2
C
C
Q
R
S

0420

C C
T U
1 1
9 9

PROCESS CHECK MAP

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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).

2

C C C
V W X

C C
W X

MAP 0420-20

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

01MAY78

2 2 2
1 1 1
C C D
Y Z A

EC 835541 PEC 835458

MAP 0420-20

C C C D
V Y Z A
2 2 2 2
0 0 0 0

PROCESS CHECK MAP

PAGE 21 OF 26

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

D D
B C

D D
B C

MAP 0420-21

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

2 2
D D
D E

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MAP 0420-21

0420

C D D
Q D E
T 2 2
9 1 1

PROCESS CHECK MAP

PAGE 22 OF 26

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

2 2
4 3
D D D
F G H

D
H

MAP 0420-22

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).

2 3
3 D
J

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EC 835541 PEC 835458

MAP 0420-22

D D
G J
2 2
2 2

PROCESS CHECK MAP

PAGE 23 OF 26

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

D D D
K L M

MAP 0420-23

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

2 2
4 4
D D
K L P M

01MAY78

EC 835541 PEC 835458

MAP 0420-23

0420

D D D
F N P
2 2 2
2 3 3

PROCESS CHECK MAP

PAGE 24 OF 26

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

2
5
D D D D D
Q R S T U

D D D
R S T U

MAP 0420-24

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 MHM 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

2
5
D D
V W

01MAY78

EC 835541 PEC 835458

MAP 0420-24

D D
V W
2 2
4 4

PROCESS CHECK MAP

PAGE 25 OF 26

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

D D
X Y

D D D
O X Y
2 2 2
4 4 4

MAP 0420-25

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

2 2 2
6 6 6
D E E
Z A B

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EC 835541 PEC 835458

MAP 0420-25

0420

C D E E
N Z A B
1 2 2 2
8 5 5 5

PROCESS CHECK MAP

PAGE 26 OF 26

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.

D E
2 2

MAP 0420-26

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.

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MAP 0420-26

DISPLAY MAP 0500

MAP 0500-1

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			
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)

0500

DISPLAY MAP

PAGE 2 OF 19

(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**

MAP 0500-2

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

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MAP 0500-2

1 1
7 6 3 3
C D E F

F
2

DISPLAY MAP

PAGE 3 OF 19

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.

E
2

MAP 0500-3

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

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MAP 0500-3

0500

5 5 4 4 4
G H J K L

J 3 K 3 L 3

DISPLAY MAP

PAGE 4 OF 19

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 (ROS control) 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).

M

MAP 0500-4

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 one 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).

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MAP 0500-4

M

5 5
N P

G H N P
3 3 4 4

DISPLAY MAP

PAGE 5 OF 19

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
Q R S

R S

MAP 0500-5

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 (ROS control) card.

6
T

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MAP 0500-5

0500

T
5

DISPLAY MAP

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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 (ROS control) card.

U V

MAP 0500-6

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).

U V

01MAY78

EC 835541 PEC 835458

8 7
W X

MAP 0500-6

X
6

DISPLAY MAP

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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)

8
Y Z

Z

MAP 0500-7

(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

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8 8
A A
A B

EC 835541 PEC 835458

MAP 0500-7

0500

A A
A B
7 7

DISPLAY MAP

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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).

W Y
6 7

MAP 0500-8

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.

01MAY78

9 9
A A
C D

EC 835541 PEC 835458

MAP 0500-8

A A
C D
8 8

DISPLAY MAP

PAGE 9 OF 19

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

A
F

MAP 0500-9

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.

1
0
A
E
A
F

1
0
A
G

01MAY78

EC 835541 PEC 835458

MAP 0500-9

0500

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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 one line of the 5110 display.
- (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.

01MAY78

EC 835541 PEC 835458

MAP 0500-10

Q A
5 H
1
0

DISPLAY MAP

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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

A A A A
L M N P

MAP 0500-11

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 (ROS control) card.

102

Bad H2 (base I/O) card.

1 1
6 2
A A A A A A
J K L M N P

01MAY78

EC 835541 PEC 835458

MAP 0500-11

0500

A
K
T
1

DISPLAY MAP

PAGE 12 OF 19

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

1
6
A A A A
Q R S T

A A A
R S T

MAP 0500-12

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

1
6
A A A A
Q R S T

01MAY78

EC 835541 PEC 835458

MAP 0500-12

A
V
1
2

DISPLAY MAP

PAGE 13 OF 19

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

1
4
A A A
W X Y

A A
X Y

MAP 0500-13

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 preceding step to determine which card is bad.

0500

01MAY78

EC 835541 PEC 835458

MAP 0500-13

A
W
T
3

DISPLAY MAP

PAGE 14 OF 19

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.

A
Z

A
A
U
Z
1
2

MAP 0500-14

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

1 1
5 5
B B
A B

01MAY78

EC 835541 PEC 835458

MAP 0500-14

B
B
1
4

DISPLAY MAP

PAGE 15 OF 19

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

B B B
A C D
1 4

MAP 0500-15

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

1 1 1
6 6 6
B B B
E F G

01MAY78

EC 835541 PEC 835458

MAP 0500-15

0500

B B B
E F G
1 1 1
5 5 5

DISPLAY MAP

PAGE 16 OF 19

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).

D A A
2 J 0
1 1
1 2

MAP 0500-16

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.

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1 1
7 7
B B
H J

EC 835541 PEC 835458

MAP 0500-16

C B B
2 H J

DISPLAY MAP

6 6

PAGE 17 OF 19

156

-Remove the F2 (ROS CONTROL) 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 (ROS control) 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

B B B
K L M

B B B
K L M

MAP 0500-17

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 (ROS CONTROL) card.
-Probe G2-P07.

Are both lights on and steady?

Y N

1 1 1
8 8 8
B B B
N P Q

01MAY78

EC 835541 PEC 835458

MAP 0500-17

0500

B B B
N P O
1 1 T
7 7 7

DISPLAY MAP

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168

- Reinstall the F2 (ROS CONTROL) 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 (ROS control) 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

19
B B B B
R S T U

B B B
S T U

MAP 0500-18

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.

01MAY78

EC 835541 PEC 835458

MAP 0500-18

19
B V

B B
R V
I I
8 8

DISPLAY MAP

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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).

A B
1 W

MAP 0500-19

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.

B
W

0500

01 MAY78

EC 835541 PEC 835458

MAP 0500-19

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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

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2 2
A B C D

C D

MAP 0510-1

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

01MAY78

EC 835541 PEC 835458

MAP 0510-1

0510

A B E F
1 1 1 1

TV MONITOR MAP

MAP 0510-2

PAGE 2 OF 2

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.

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MAP 0510-2

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
0900	A	1	001

EXIT POINTS

EXIT THIS MAP			
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 reference 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

0600

B C
1 1

KEYBOARD MAP

PAGE 2 OF 7

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).

3 3
D E F

F

MAP 0600-2

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).

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MAP 0600-2

3
G

D E G
2 2 2

KEYBOARD MAP

PAGE 3 OF 7

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 OP appear on the display?

Y N

023

Did a ? appear on the display?

Y N

024

Did only one character display?

Y N

5 4 4
H J K L

L

MAP 0600-3

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).

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MAP 0600-3

0600

K
3

KEYBOARD MAP

PAGE 4 OF 7

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).

M

J
3

MAP 0600-4

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).

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MAP 0600-4

H
3

KEYBOARD MAP

PAGE 5 OF 7

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

Q R

MAP 0600-5

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 (+typematic).

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

01MAY78

EC 835541 PEC 835458

MAP 0600-5

0600

S T U
5 5 5

KEYBOARD MAP

PAGE 6 OF 7

056

- Remove the keyboard cable at Z4.
- Probe H2-B04 (+typematic).

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

7
V W X

W X

MAP 0600-6

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).

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7
Y
MAP 0600-6

N P V Y
5 5 6 6

KEYBOARD MAP

PAGE 7 OF 7

067

- Press the HOLD key.
- Hold the shift key down and press the . (period) 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 (+typematic).
(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

Z A A
Z A B

A Z A A
1 A B

MAP 0600-7

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.

0600

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EC 835541 PEC 835458

MAP 0600-7

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5110 POWER MAP 0700

PAGE 1 OF 6

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

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

A B C

MAP 0700-1**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

010Is fuse F1 blown?
(See MIM 207 and 273).

Y N

011Is the line cord plugged in?
(See MIM 273).

Y N

012

Plug the line cord in.

01MAY78

EC 835541 PEC 835458

3 2 2
D E F

MAP 0700-1

E F
T 1

5110 POWER MAP

PAGE 2 OF 6

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 MIM 273).
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

MAP 0700-2

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

01MAY78

EC 835541 PEC 835458

MAP 0700-2

PAGE 3 OF 6

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).

D
1**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

01MAY78

EC 835541 PEC 835458

6 4 4 4 4
P Q R S T

MAP 0700-3

R S T
3 3 3

5110 POWER MAP

0
3

MAP 0700-4

PAGE 4 OF 6

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 original 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.

01MAY78

EC 835541 PEC 835458

MAP 0700-4

U
4

5110 POWER MAP

PAGE 5 OF 6

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

6 6 6 6 6 A
V W X Y Z A

A
A

MAP 0700-5

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).

0700

01MAY78

EC 835541 PEC 835458

MAP 0700-5

X Y Z
5 5 5

5110 POWER MAP

PAGE 6 OF 6

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.

P V W
3 5 5

MAP 0700-6

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 208)

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).

07 MAY 78

EC 838541 PEC 8385486

MAP 0700-6

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			
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

002Does 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.

0810

A B C
1 1 1

PRINTER MAP

MAP 0810-2

PAGE 2 OF 4

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 occurred before. Follow the instructions on the display.

01MAY78

EC 835541 PEC 835458

MAP 0810-2

PRINTER MAP

PAGE 3 OF 4

**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 (ROS control) 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

MAP 0810-3

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)

01MAY78

EC 835541 PEC 835458

MAP 0810-3

0810

PRINTER MAPE
3

MAP 0810-4

PAGE 4 OF 4

(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

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.**

01MAY78

EC 835541 PEC 835458

MAP 0810-4

**COMMUNICATIONS, SERIAL I/O,
AND PARALLEL I/O MAP 0830**

MAP 0830-1

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	009	0300	A
4	029	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 microcode?

Y N

003

Do you want to test the BSC feature?

Y N

D
1

**COMMUNICATIONS,
SIO AND PIO MAP**
PAGE 2 OF 4

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

E F

MAP 0830-2

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.

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 (ROS control) 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.

01MAY78

EC 835541 PEC 835458

MAP 0830-2

E F

C
1

**COMMUNICATIONS,
SIO AND PIO MAP**

PAGE 3 OF 4

B
1

MAP 0830-3

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.

- () EIA
- () DDSA - (U.S. only) - 2400 bps
- () DDSA - (U.S. only) - 4800 bps
- () 38LS - switched -
transmit level = _____ db
- () 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 (World Trade and Canada only) = _____ db

NOTE - If this is the first CE call on the BSCA feature, verify that the CTS delay and the echo clamp are compatible with the remote station(s). If help is needed to determine compatibility, contact the local BODS.

Also verify that the transmit level is correct (see MAP 0831).

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 0830 0830

01MAY78

EC 835541 PEC 835458

MAP 0830-3

4 4 4 4 4 4
G H J K L M

H J K L M
3 3 3 3 3

**COMMUNICATIONS,
SIO AND PIO MAP**

PAGE 4 OF 4

A G
1 3

MAP 0830-4

019

Was the error code 9987 or 9998?

Y N

028

BSC program problem. Suspect the BSC cartridge or diskette.

020

Was the error code 9986?

Y N

029

Go To Map 0420, Entry Point A.

021

Bad B2 (BSCA 1) card.

022

Bad C2 (38LS) card.

See the BSC MIM for jumpering and switch setting instructions.

023

Bad C2 (EIA,DDSA,38LS) card.

Bad A4 (BSCA 2) card.

See the BSC MIM for jumpering and switch setting instructions.

024

Bad A4 (BSCA 2) card.

025

Bad A4 (BSCA 2) card.

Bad B2 (BSCA 1) card.

026

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.

027

Bad B2 (BSCA 1) card.

Bad H2 (base I/O) card.

01MAY78

EC 835541 PEC 835458

MAP 0830-4

Checkout MAP

PAGE 1 OF 5

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?

Y N

002
Go to Page 3, Step 020, Entry Point B.

003

- 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 an integrated modem. 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 Step 006, Entry Point F.

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 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. 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

0831
0835
0830

A B C D
1 1 1 1

Transmit / Receive Level

MAP 0831-2

Checkout Map

PAGE 2 OF 5

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.

013

Go to Step 017, Entry Point C.

014

The transmit level is correct.

Do you want to check the receive level?

Y N

015

The test is complete.

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 PPT representative.)

Y N

018

Telephone network problem.

Have the customer notify the responsible person.

019

The receive level is OK.

Test complete.

01MAY78

EC 835541 PEC -----

MAP 0831-2

Transmit / Receive Level
Checkout Map
PAGE 3 OF 5

F

MAP 0831-3

020
(Entry Point B)

The transmit level for U.S. and Canadian nonswitched networks is 0 db except for Canadian National and Canadian Pacific Telecommunication networks which are -10 db. For World Trade countries, 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 38LS or a 38LS in Canada set for -10 db?

Y N

022

Bad C2 (38LS) card.

023

- Set the transmit level to the correct level. See the BSC MIM for 38LS switch settings and the procedure.
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

(Entry Point E)

- 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.

0831
0835
0830

Checkout Map

PAGE 4 OF 5

027

The transmit level is OK.

Do you want to check the receive level?

Y N

028

Test complete.

029**Go to Step 033, Entry Point D.****030**

The transmit level is OK.

Do you want to check the receive level?

Y N

031

Test complete.

032**Go to Step 033, Entry Point D.****033****(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

034

Have the remote station verify that their transmit level is correct.

Telephone network problem.

Have the customer notify the responsible person.

035**Is the 5110 on a 4 wire nonswitched network?**

Y N

036

The receive level test is OK.

037

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

038

Bad external cable.

Bad internal cable.

See logic diagram 455.

01MAY78

EC 835541 PEC -----

H
4

Transmit / Receive Level

MAP 0831-5

Checkout Map

PAGE 5 OF 5

039

Receive level test is OK. If receive problems still occur, replace the C2 (38LS) card.

0831
0835
0830

01MAY78

EC 835541 PEC -----

MAP 0831-5

This page intentionally left blank.

MAP for 38LS Integrated Modem

PAGE 1 OF 7

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.

***** 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.

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.

0831 0835 0830

B
1

**Local CBS coupler MAP
for 38LS**
PAGE 2 OF 7

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 O 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.

C D

MAP 0832-2

011

Line disconnected.

Suspect the test pattern stopped or a wrong procedure...restart.

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.

01MAY78

EC 835541 PEC -----

C D

**3 3
E F**

MAP 0832-2

E F
2 2

**Local CBS coupler MAP
for 38LS**
PAGE 3 OF 7

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.

G H

MAP 0832-3

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 \$YN 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.

0831 0835 0830

G H

4
J

01MAY78

EC 835541 PEC -----

MAP 0832-3

A J
1 3

**Local CBS coupler MAP
for 38LS**

MAP 0832-4

PAGE 4 OF 7

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.

01MAY78

EC 835541 PEC -----

MAP 0832-4

K
4

**Local CBS coupler MAP
for 38LS**

MAP 0832-5

PAGE 5 OF 7

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)

Are switches set to operate mode on the CBS type coupler?

Y N

044

Set switches properly then restart.

045

Is the modem telephone handset cradled?

Y N

046

Cradle the handset and restart.

047

Did the telephone ring only once?

Y N

048

- Make DTR inactive by pressing the ATTN key once.
- Dial the modem telephone from a nearby telephone.

Does the modem telephone ring?

Y N

049

Telephone problem.
Have the customer notify the responsible person.

050

- 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

7 6 6
L M N

01MAY78

EC 835541 PEC -----

MAP 0832-5

0831
0835
0830

M N
5 5

**Local CBS coupler MAP
for 38LS**
PAGE 6 OF 7

051

Coupler problem.
Have the customer notify the responsible person.

052

- 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

053

- 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

054

Cable problem.
See logic diagram 455. Check the SG (SIGNAL GROUND) wire also.

055

- 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

056

Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

P Q

MAP 0832-6

057

Cable problem.
See logic diagram 455. Check the SG (SIGNAL GROUND) wire also.

058

Did ringing stop when DTR was made active?

Y N

059

Coupler problem.
Have the customer notify the responsible person.

060

(Entry Point C)

- 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

061

- Probe C2J02 (DATA MODEM READY) with the + meter lead.

Is DATA MODEM READY at a + EIA level (+3 to +25 VDC)?

Y N

062

Bad C2 (38LS) card.
See the BSC MIM for jumpering and switch setting instructions.

063

Cable problem.
See logic diagram 455.

01MAY78

EC 835541 PEC -----

MAP 0832-6

P Q

7 R

L R
5 6

**Local CBS coupler MAP
for 38LS**

MAP 0832-7

PAGE 7 OF 7

064

- 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

065

Coupler problem.

Have the customer notify the responsible person.

066

- Probe C2J09 (COUPLER CUT THROUGH) with the + meter lead.

Is CCT at a + EIA level (+3 to +25 VDC)?

Y N

067

Cable problem.

See logic diagram 455.

068

- 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

069

Bad cable.

070

Bad coupler.

Have the customer notify the responsible person.

071

Go to Page 6, Step 060, Entry Point C.

0831
-
0835
0830

01MAY78

EC 835541 PEC -----

MAP 0832-7

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Manual Call to a Manual Answer**Station using a CDT Type Coupler**

PAGE 1 OF 2

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 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

MAP 0833-1

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.

0831 0835 0830

B C
1 1

**Manual Call to a
Manual Answer Station**

MAP 0833-2

PAGE 2 OF 2

012

Coupler problem.

Have the customer notify the responsible person.

013

Test completed satisfactory. Cradle both telephone handsets.

01MAY78

EC 835541 PEC -----

MAP 0833-2

DIGITAL NETWORK REMOTE

WRAP TEST PROCEDURE

PAGE 1 OF 1

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

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.

0831
0835
0830

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BSC Network and BSCA

Intermittent Problem MAP

PAGE 1 OF 4

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 compatible 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

MAP 0835-1

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.

0831
0835
0830

D
1

BSC Network and BSCA
Intermittent Problem MAP
PAGE 2 OF 4

011

Are the BSC On Line/RFT tests available on this nonswitched network?

Y N

012
(Entry Point E)

- Use the acoustic 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

MAP 0835-2

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.

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EC 835541 PEC -----

MAP 0835-2

E F G

B C
1 1

BSC Network and BSCA
Intermittent Problem MAP
PAGE 3 OF 4

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

035

Go to Step 041, Entry Point B.

H J

MAP 0835-3

036

- Use MAP 0833 to test the CDT type coupler.

Does the CDT type coupler test OK?

Y N

037

Use MAP 0833 to fix the problem.

038

Go to Step 041, Entry Point B.

039

- Use MAP 0832 to test the CBS type coupler.

Does the CBS type coupler test OK?

Y N

040

Use MAP 0832 to correct the problem.

041

(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

042

- Dial another remote station and run the test again.

Did the test run OK?

Y N

043

Is the local station using a 38LS integrated modem?

Y N

044

Is it an IBM external modem?

Y N

01MAY78

EC 835541 PEC -----

MAP 0835-3

0831
0835
0830

4 4 4 4 4
K L M N P

N P
3 3

BSC Network and BSCA
Intermittent Problem MAP
PAGE 4 OF 4

045

Go to Step 048, Entry Point G.

046

- Use the maintenance information for the modem to run a test on the modem.

Does the modem test run OK?

Y N

047

Use the maintenance information provided with the modem to repair the modem.

048

(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

049

- 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

050

- Use the TRAP to record a failure.

Does the TRAP printout indicate the problem?

Y N

051

Ask your manager for assistance.

K L M Q R S
3 3 3

MAP 0835-4

052

Correct the problem.

053

Suspect the first remote station or that redialing corrected the problem.

054

OEM modem or telephone network problem.
Have the customer notify the responsible person.

055

Ask the local BODS for assistance.

056

Suspect the first remote station or that redialing corrected the problem.

057

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.

Q R S

01MAY78

EC 835541 PEC -----

MAP 0835-4

AUXILIARY TAPE MAP

MAP 0850-1

PAGE 1 OF 2

ENTRY POINTS

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

EXIT POINTS

EXIT THIS MAP			
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

004

Bad F2 (ROS control) card.

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EC 835541 PEC 835458

MAP 0850-1

2 2 2
A B C

0850

A B C
1 1 1

AUXILIARY TAPE MAP

MAP 0850-2

PAGE 2 OF 2

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.

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EC 835541 PEC 835458

MAP 0850-2

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			
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



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MAP 0880-1

3 2
A B

0880

B

5114

5114 MAP

PAGE 2 OF 3

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
C

3
D

E F

MAP 0880-2

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 occurred. 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
G

3
H

3
J

01MAY78

EC 835541 PEC 835458

MAP 0880-2

D G H J
2 2 2 2

5114

5114 MAP

PAGE 3 OF 3

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 occurred. 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.

A C
1 2

MAP 0880-3

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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EC 835541 PEC 835458

MAP 0880-3

0880

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MACHINE CHECKOUT MAP

MAP 0900-1

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	077
0200	F	6	050
0300	A	1	001
0310	A	1	001

EXIT POINTS

EXIT THIS MAP			
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	004	0200	A
10	100	0300	A
12	117	0300	A
9	099	0310	A
2	012	0400	A
2	006	0420	A
5	045	0420	A
3	019	0420	A
7	072	0420	A
9	086	0420	A
9	090	0420	A
12	125	0420	A
10	101	0420	A
12	121	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	085	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)

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EC 835541 PEC 835458

MAP 0900-1

MACHINE CHECKOUT

PAGE 2 OF 13

(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

MAP 0900-2

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

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EC 835541 PEC 835458

5 5 3
E F G

MAP 0900-2

G
2

MACHINE CHECKOUT

PAGE 3 OF 13

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 (+typematic).
(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 (+typematic).

Is the DOWN light on?

Y N

H J K L

MAP 0900-3

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.

01MAY78

EC 835541 PEC 835458

MAP 0900-3

5 4
M N

0900

N
3

MACHINE CHECKOUT

PAGE 4 OF 13

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

MAP 0900-4

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 (peroid) 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).

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EC 835541 PEC 835458

MAP 0900-4

P Q

5 R

E F M R
2 2 3 4

MACHINE CHECKOUT

A B C
2 2 2

MAP 0900-5

PAGE 5 OF 13

039

- 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.**

040

- Release the P key.
- Probe H2-B04 (+typematic).
(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.

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EC 835541 PEC 835458

MAP 0900-5

MACHINE CHECKOUT

S

MAP 0900-6

PAGE 6 OF 13

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).**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).

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EC 835541 PEC 835458

MAP 0900-6

S

1
2
T
U
7

U
6

MACHINE CHECKOUT

PAGE 7 OF 13

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

MAP 0900-7

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 (ROS control) card.
Bad E4 (APL ROS) card.

072

Go To Map 0420, Entry Point A.

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8
Y

EC 835541 PEC 835458

MAP 0900-7

V W X

0900

Y
7

MACHINE CHECKOUT

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073

- Observe the IN PROCESS light.
- Hold down the COMMAND key and press the 4 key on the alphabetic keyboard.
- Release the keys.
- Press EXECUTE.

Does the IN PROCESS light turn on or flash?

Y N

074

Bad G2 (display) card (see MAP 050 for jumpering).

075

Does the 5110 have the ALARM feature?

Y N

076

Go to Step 083, Entry Point G.

077

(Entry Point D)

Press ATTN.

-For APL, enter;

2CC 1

-Press EXECUTE

-For BASIC, enter;

10 WRITE FILE FLS,'A'

-Press EXECUTE.

-Enter RUN

-Press EXECUTE.

Does the audible alarm turn on?

(The alarm stays on for APL).

Y N

078

- Probe J6-D02 (+alarm).
- Repeat the above instructions.

Is the UP light on?

Y N

Z A A
Z A B

Z A A
A A B

MAP 0900-8

079

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

080

Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).
Bad audible alarm (see MIM 201).

081

- Press ATTN

Is the alarm off?

Y N

082

Bad G2 (display) card (see MAP 050 for jumpering).

083

(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).

Does the DCP program load?

Y N

084

Is the PROCESS CHECK light on?

Y N

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9 9 9
A A A
C D E

EC 835541 PEC 835458

MAP 0900-8

A A A
C D E
8 8 8

MACHINE CHECKOUT

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085

Bad CMD key.

Go To Map 0600, Entry Point A.

086

Go To Map 0420, Entry Point A.

087

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

088

Is the PROCESS CHECK light on?

Y N

089

Bad L2 (exec ROS) card (see MAP 050 for jumpering).

Bad F2 (ROS control) card.

Bad E4 (APL ROS) card.

090

Go To Map 0420, Entry Point A.

091

-Press C

-Press 1

-Press EXECUTE

Did the PROCESS CHECK light come on?

Y N

1

2

A A

F G

A
G

MAP 0900-9

092

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

093

Bad F2 (ROS control) card.

094

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

095

Is the PROCESS CHECK light on?

Y N

096

Did the tape or diskette read diagnostic program load?

Y N

097

Bad F2 (ROS control) card.

Bad H2 (base I/O) card.

098

Does the 5110 have an internal tape drive (see MIM 201)?

Y N

099

Go To Map 0310, Entry Point A.

1 1 1
0 0 0
A A A
H J K

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EC 835541 PEC 835458

MAP 0900-9

A A A
H J K
9 9 9

MACHINE CHECKOUT

MAP 0900-10

PAGE 10 OF 13

100

Go To Map 0300, Entry Point A.

101

Go To Map 0420, Entry Point A.

102

Does the 5110 have an internal tape drive
(see MIM 201)?

Y N

103

-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

104

Perform the actions requested by the routine.

105

-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
- (Step 105 continues)

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MAP 0900-10

A
L
0

MACHINE CHECKOUT

PAGE 11 OF 13

(Step 105 continued)

Do the routines run correctly?

Y N

106

Preform the actions requested by the routines.

107

The machine checkout is complete. Remove the diagnostic diskette and press RESTART.

108

- 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

109

Perform the actions requested by the routines.

110

Do you want to run the tape magnet select routine?

Y N

1
2
A A
M N

A
N

MAP 0900-11

111

(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

112

Do the routines run correctly?

Y N

113

Perform the actions requested by the routines.

114

Do you wish to check out the Async comm-serial I/O feature ,the BSCA feature, or the PARALLEL I/O feature?

Y N

115

The machine checkout is complete. Remove the 5110 diagnostic tape cartridge and press RESTART.

1 1
2 2
A A
P Q

01MAY78

EC 835541 PEC 835458

MAP 0900-11

0900

A A A
M P O
1 1 1

MACHINE CHECKOUT

PAGE 12 OF 13

116

- 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

117

Go To Map 0300, Entry Point A.

118

- Select the routines which apply to the features on your machine.

Do the routines run correctly?

Y N

119

Perform the actions requested by the routine.

120

The communications feature checkout is complete. Remove the communications diagnostic tape cartridge and press RESTART.

121

Go To Map 0420, Entry Point A.

122

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

Is the tape motion rhythmic?

Y N

A A
R S

T A A A
6 F R S
9

MAP 0900-12

123

Do the FORWARD AND REVERSE SELECT MAGNETS SERVICE CHECK (see MIM 221).

124

- Remove the scratch tape.
- Insert the diagnostic tape.

Go to Page 11, Step 111, Entry Point H.

125

Go To Map 0420, Entry Point A.

126

- 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

127

- Press the STEP switch.

Did ROL0 change?

(See DISPLAY REGISTERS in the Diagnostic Aids section in the MIM).

Y N

128

- Probe H6A04 (+single instr switch comm).

Is the UP light on?

Y N

129

Bad H2 (base I/O) card.
Check/replace Z3 (display and control panel) cable (see MAP 0210 and MIM 248,249).

1 1 1
3 3 3
A A A
T U V

01MAY78

EC 835541 PEC 835458

MAP 0900-12

A A A
T U V
1 1 1
2 2 2

MACHINE CHECKOUT

MAP 0900-13

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130

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

131

Go to Page 6, Step 059, Entry Point E.

132

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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EC 835541 PEC 835458

MAP 0900-13

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International Business Machines Corporation

General Systems Division
4111 Northside Parkway N.W.
P.O. Box 2150
Atlanta, Georgia 30301
(U.S.A. only)

General Business Group/International
44 South Broadway
White Plains, New York 10601
U.S.A.
(International)