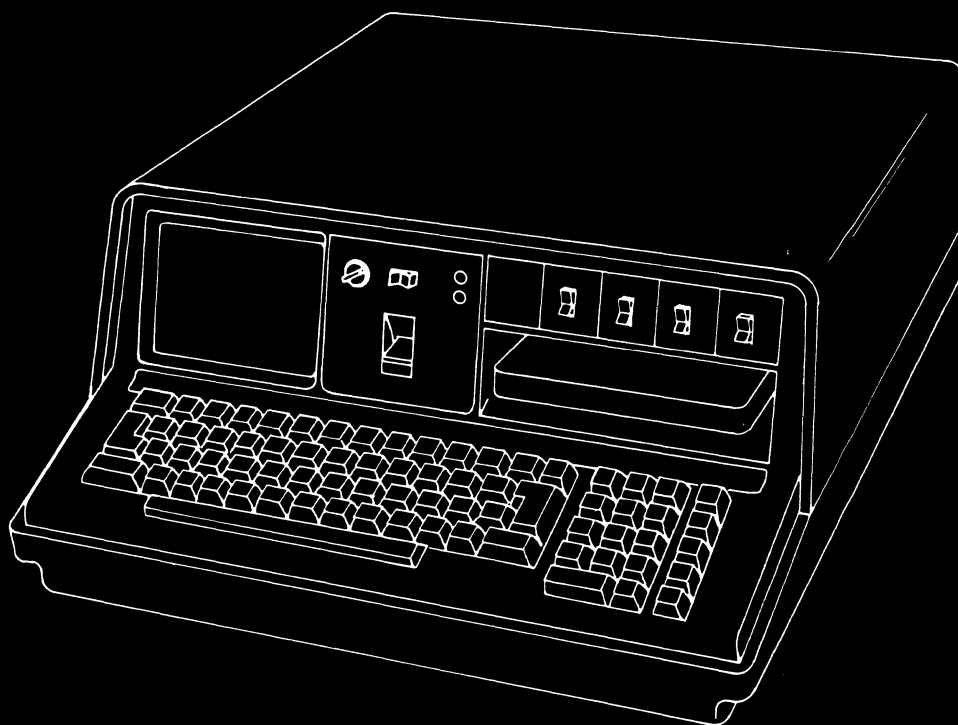


IBM

IBM 5100 Maintenance Analysis Procedures

5100



*IBM 5100
Portable Computer
Maintenance Analysis Procedures*

Second Edition (March 1976)

Changes are continually made to the specifications herein. This manual is under EC control and will be updated with each engineering change applied to the machine this manual accompanies.

Do not use this manual to service other machines as they can have features not included in this manual, or they can be at a different EC level.

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<p>PN 1608314 EC 829670</p>

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Logic Card Part Numbers

Part Name	Location	PN	Card EC	Date	Description
I/O cable driver assembly	A2	1608491	829518		—
Expansion feature	B2	1606996 ¹ 1607004 ²	829487 829506		—
APL ROS 3	C2	1607114	829537		—
BASIC ROS	C4	1606960	828835		—
APL ROS 1	D2	1606990	828934		—
APL ROS 2	D4	1606986	828883		—
ROS adapter	E2	1607132	829623		—
Base I/O	F2	1606964 ⁴ 1607000 ⁴ 1606998 ⁴ 1607122 ⁴	828846 829489 829488 829558		Relocated parts on the card
Controller	G2	656990 ⁵ 1607118 ⁵	828800 829547		—
I/O and diagnostic	H2	1607112 ⁶ 1607126 ⁶	829535 829571		—
APL supervisor	H4	1607110	829531		—
Display	J2	656942 1607120	825550 829554		Relocated parts on the card
R/W storage	K2-N4	8235549 ³ 8238327 ³	553353 553802		—
Board, A1	—	1608552	829494		—
Tape control	—	8527645	825629		—
Auxiliary tape adapter	—	1606988 ⁴ 1607134 ⁴	828912 829653		—
5103 printer adapter	—	1607002	829492		80 cps 5103
5103 printer adapter	—	1607124	829560		120 cps 5103

¹ Part 1606996 has Communications Adapter and Serial I/O Adapter Logic.

² Part 1607004 has Communications Adapter Logic only.

³ Part 8235549 and Part 8238327 are logically the same and can be intermixed on the same 5100 system.

⁴ These logic cards are interchangeable, within the given location.

⁵ For replacement purposes, use Part 1607118.

⁶ Use 1607126 when a 120 cps 5103 printer is attached.

The IBM 5100 Portable Computer Maintenance Library consists of MAPs (maintenance analysis procedures), a maintenance information manual, and parts catalog.

The MAPs and the maintenance information manual are unique maintenance documents and are, therefore, covered in this description.

The MAPs are EC controlled and will be updated as necessary to provide you with the latest information possible to diagnose 5100 Portable Computer problems. The maintenance information manual will be updated simultaneously with the MAPs using TNs and revisions. It is important that the MAPs and maintenance information be at compatible levels.

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 5100 Portable Computer that requires adjustment or replacement.

Two types of MAPs are used in the IBM 5100 Portable Computer 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 is MDI (maintenance and diagnostics integrated) and is located on the diagnostic tape cartridge. These MAPs are shown on the display screen. Paging through these MAPs is accomplished automatically when you respond to the questions on the display.

MAP ORGANIZATION

Start MAP

This is the starting point for each service call. From here you will be guided to the failing FRU (field replaceable unit) in the 5100 Portable Computer or to other MAPs that further identify the problem.

Bring Up and Process Check MAPs

The start MAP sends you to the bring up or process check MAPs when the 5100 Portable Computer fails to become READY or when the PROCESS CHECK light is on. Control unit failures are generally found by these MAPs.

IBM 5100 Portable Computer Device MAPs

These MAPs find failures in the 5100 Portable Computer basic devices. When a failure occurs in the keyboard, display, tape, or power supply, the start MAP sends you directly to that device MAP to find the failing FRU.

When multiple symptoms are present and the PROCESS CHECK light is one of them, always give priority to the PROCESS CHECK light.

IBM 5103 Printer Device MAPs

These MAPs provide instructions on how to load the MDI for the printer. The start MAP directs you to this MAP.

IBM 5106 Auxiliary Tape Unit Device MAPs

These MAPs provide instructions on how to load the MDI for the auxiliary tape unit. The start MAP directs you here.

MDI MAPs

MDI MAPs are read from the display screen. These MAPs can be used only when the 5100 Portable Computer basic functions are operational. The 5100 features (printer, communications adapter/serial I/O adapter, and auxiliary tape) and the tape write function use this MAP technique. A description of MDI and how to use it is found in the *Diagnostic Aids* section.

Machine Checkout

The start MAP directs you to the machine checkout MAP to further define 5100 Portable Computer failures. Once the failure is isolated, you are directed to other MAPs to locate the failing FRU.

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.

MAP EXAMPLES

KEYBOARD MAP 0600 *MAP name and number—referenced from start MAP.*

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

PAGE 1 OF 8

ENTRY POINTS				EXIT POINTS			
FROM ENTER THIS MAP				EXIT THIS MAP TO			
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER	PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
0200	A	1	001	8	081	0420	A
0300	A	1	001	2	006	0700	A
0845	A	1	001				
0900	A	1	001				

001 _____ *Step number*
(Entry Point A)

Can you make the machine fail?
Y N _____ *Y—yes N—no*

002 _____ *Entry point—indicates a possible starting point in this MAP.*
(Entry Point B)

Keyboard intermittent failures procedure.

Perform the following actions, one on each
call until the problem is corrected:

1. Clean the keyboard PC board
(refer to 251)
Reseat the keyboard cable at both ends.

Date / / _____ *Date—indicates the last date you performed this step.*

2. Replace the keyboard PC board
(refer to 251)
Date / /

3. Replace the all keys assembly
(refer to 251)
Date / /

4. Replace the F2 (base I/O) card
Date / /

003
Is the PROCESS CHECK light on?

Y N

8 2 _____ *Off page referencing—identifies the page and trace where this MAP leg continues.*
C D

On page referencing—indicates the trace and page where this MAP leg came from.

D
2

KEYBOARD MAP

PAGE 2 OF 8

004

- Calibrate the CE meter (refer to 270).
- For the probe points (refer to 204).
- Measure +8.5 vdc and +5.0 vdc at the keyboard PC board with reference to gnd on the A1 board.

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

Are both voltages in tolerance (+7.8 vdc to +9.3 vdc) and (+4.6 vdc to +5.5 vdc)?

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

Y N

005

- Measure +8.5 vdc and +5.0 vdc at the A1 board. (refer to 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.

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

007

Go to Page 5, Step 037, Entry Point C.

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

008

- Press the Q key then the P key.

Did anything (P, Q, *, ?, invalid key, etc) appear on the display?

Y N

009

- Probe F2-S05 (-keyboard lockout). (refer to the appendix, the general logic probe).

Instruction—establishes conditions for answering the next question.

Is the UP light on?

Y N

010

- Defective keyboard pc board (refer to 251).
- Check/replace keyboard cable (refer to 255).

Action—possible fixes for the failure. Replace, repair, or adjust in the order given.

Date—date of MAP release

Part number—MAP part number

Engineering change number—previous level

Engineering change number—current level

MAP page number

07JUL75

PN 1608391

EC 828851

PEC

MAP 0600-2

4 3
E F

START MAP 0200

MAP 0200-1

PAGE 1 OF 4

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0300	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	018	0300	B
3	014	0400	A
3	013	0400	D
3	016	0400	D
4	024	0420	A
4	019	0420	A
4	021	0420	A
4	022	0500	A
3	011	0500	A
4	020	0500	A
3	018	0500	A
3	018	0510	A
3	018	0600	A
3	018	0810	A
3	018	0830	A
3	018	0850	A
3	018	0900	A

001

MAP 0200, Entry point A is on page 2.

(CONTINUED, NEXT COL)

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MAP 0200-1

0200

0200

START MAP

PAGE 2 OF 4

(CONTINUED)

(Entry Point A)

-Record customer supplied information including error codes, if any.

Note: when the map leads to a defective card, measure the voltages at the location before replacing the card. If any voltages are found to be out of tolerance go to map 0700 , entry point A (refer to 271).

-Place the 5100 in its service position (refer to 212).

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

-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 on (refer to 200).

Is the problem associated with an installed RPQ feature?

Y N

002

Is the PROCESS CHECK light on?

Y N

003

Do you think the problem is too intermittent for effective use of the MAPs?

Y N

004

-Power up. Wait 30 seconds.

Or press RESTART .

Is the 5 inch display dark for all positions of the BRIGHTNESS control?

Y N

4 4 4 4 2
A B C D E

E
2

MAP 0200-2

005

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

006

Defective H2 (I/O and diag) card.

Defective PROCESS CHECK light.

Defective IN PROCESS light.

Defective RESTART switch.

Check/replace display and control panel cable (refer to 210, 241).

007

-Release the RESTART switch. Wait 10 seconds.

Is the PROCESS CHECK light on?

Y N

008

The 5 inch display raster is grossly distorted if it is absent, is rolling, has a black rather than a white background, is greatly reduced in size, is tilted, not centered, or departs significantly from a rectangular shape (as viewed in the DISPLAY REGISTERS switch position).

Is the 5 inch display raster grossly distorted?

Y N

009

-Press RESTART. wait 10 seconds.

Did either LOAD 0 or CLEAR WS (with no misspelling) appear on one and only one line of the 5 inch display?

Y N

4 4 3 3
F G H J

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MAP 0200-2

J
2

START MAP

PAGE 3 OF 4

010

-Switch the RUN switch under the covers to not run.

(refer to 200).

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Refer to 248, hex registers display.

Do all 1024 positions contain legible, well-formed, non-blank characters?

Y N

011

-Switch the DISPLAY REGISTERS switch to NORMAL.

-Switch the RUN switch under the covers to run.

Go to MAP 0500, Entry Point A.

012

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 or F.)

Y N

013

-Switch the RUN switch under the covers to run.

Go to MAP 0400, Entry Point D.

014

-Switch the DISPLAY REGISTERS switch to NORMAL.

-Switch the RUN switch under the covers to run.

Go to MAP 0400, Entry Point A.

H
2

MAP 0200-3

015

Are the top 13 lines of the display entirely blank?

Y N

016

Go to MAP 0400, Entry Point D.

017

Is the PROCESS CHECK light on?

Y N

018

-Use the customer information recorded earlier and the customer error chart to determine the probable failure area.

Exit to the appropriate MAP :

-Internal Tape Unit

Go to MAP 0300, Entry Point B.

-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.

-5103 Printer

Go to MAP 0810, Entry Point A.

-Communications/Serial I/O

Go to MAP 0830, Entry Point A.

-5106 Auxiliary Tape Unit

(CONTINUED, NEXT COL)

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MAP 0200-3

4
K

0200

C D F G K
2 2 2 2 3

START MAP

PAGE 4 OF 4

(CONTINUED)

Go to MAP 0850, Entry Point A.

-Otherwise go to the machine
check out MAP

Go to MAP 0900, Entry Point A.

019

Go to MAP 0420, Entry Point A.

020

Go to MAP 0500, Entry Point A.

021

Go to MAP 0420, Entry Point A.

022

Go to MAP 0500, Entry Point A.

023

Refer to the Intermittent Troubleshooting Guide
in the Diagnostic Aids section of the 5100 MIM.

A B
2 2

MAP 0200-4

024

Go to MAP 0420, Entry Point A.

025

Go to the RPQ Features Reference Section (MAP
0950).

TAPE READ MAP

MAP 0300-1

PAGE 1 OF 45

ENTRY POINTS

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

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	022	0200	A
2	010	0420	A
3	014	0420	A
45	509	0420	A
45	507	0600	A
42	477	0700	A
37	413	0700	A
38	423	0700	A
38	429	0700	A
28	280	0700	A
12	111	0700	A
2	009	0900	A
3	013	0900	A
3	016	0900	A
9	082	0900	A
44	505	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

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MAP 0300-1

4
5 4 2
A B C

0300

C
1

TAPE READ MAP

PAGE 2 OF 45

003

The characters DCP2 are displayed when the tape read diagnostic is done.

Are the characters DCP2 displayed?

Y N

004

The instruction PRESS EXECUTE,R,OR L might be displayed near the bottom of 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

3 3 3 3 2
D E F G HH
2

MAP 0300-2

007

(Entry Point B)

- If there is a cartridge in the tape drive, remove it.
- Press RESTART and wait 10 seconds.

Use the keys in the numeric key section of the keyboard (refer to 250 for the location of the numeric key section).

-Hold CMD and press HOLD .

-Hold CMD and press - (minus)

You have now loaded DCP1 (diagnostic control program 1. Refer to section 3, diagnostic aids).

If the DCP1 program load is ok, the characters DCP1 are displayed.

Are the characters DCP1 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.

3
J

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MAP 0300-2

0300

J
2

TAPE READ MAP

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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).

You have now put the DCP1 program in diagnostic mode.

If the diagnostic mode load is ok, the characters DIAG DCP1 are displayed (refer to section 3, diagnostic aids).

Are the characters DIAG DCP1 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.

015

Use the keys in the numeric key section.

- Press C
- Hold CMD and press 1
- Press EXECUTE

You have loaded and are running the tape read diagnostic (refer to section 3, diagnostic aids).

- Follow the instructions displayed to run the diagnostic. If the PROCESS CHECK light comes on or the characters DCP2 are displayed:

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

D E F G
2 2 2 2

MAP 0300-3

016

Go to MAP 0900, Entry Point A.

017

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

018

An error instruction is displayed in the following format:

GOTO MAP 0300 ERROR XXX.

Is your answer to the displayed question an error instruction?

Y N

019

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.

020

Go to Page 4, Step 024, Entry Point G.

021

Are you diagnosing an internal tape drive problem?

Y N

022

Go to MAP 0200, Entry Point A.

023

Run the tape write diagnostic program by following the instructions displayed.

0300

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MAP 0300-3

B
1

TAPE READ MAP

PAGE 4 OF 45

024

(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

025

Error 002?

Y N

026

Error 003?

Y N

027

Error 004?

Y N

028

Error 005?

Y N

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

Q
4

MAP 0300-4

029

Error 006?

Y N

030

Error 007?

Y N

031

Error 008?

Y N

032

Error 009?

Y N

033

Error 010?

Y N

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

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MAP 0300-4

0300

W
4

TAPE READ MAP

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034

Error 011?

Y N

035

Error 012?

Y N

036

Error 013?

Y N

037

Error 014?

Y N

038

Error 901?

Y N

4 4 4 4 4 5
3 3 3 A 2 A
X Y Z A B C

A
C
5

MAP 0300-5

039

Error 903?

Y N

040

Error 906?

Y N

041

Error 907?

Y N

042

Error 909?

Y N

043

Error 912?

Y N

4 4 4 4 4 6
2 2 1 1 0 A
A A A A A
D E F G H J

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MAP 0300-5

0300

A
J
5

TAPE READ MAP

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044

Error 915?

Y N

045

Error 918?

Y N

046

Error 921?

Y N

047

Error 924?

Y N

048

Error 927?

Y N

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

A
Q
6

MAP 0300-6

049

Error 930?

Y N

050

Error 933?

Y N

051

Error 936?

Y N

052

Error 937?

Y N

053

Error 938?

Y N

3 3 3 3 2 7
A 2 1 0 9 A
R S T U V W

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PEC 828851

MAP 0300-6

0300

A
W
6

TAPE READ MAP

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054

Error 939?

Y N

055

Error 940?

Y N

056

Error 943?

Y N

057

Error 946?

Y N

058

Error 947?

Y N

2 2 2 2 2 7
9 5 5 4 4
A A A B B B
X Y Z A B C

B
C
7

MAP 0300-7

059

Error 948?

Y N

060

Error 949?

Y N

061

Error 950?

Y N

062

Error 951?

Y N

063

Error 952?

Y N

2 2 2 1 1
3 2 2 9 7 8
B B B B B B
D E F G H J

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MAP 0300-7

0300

B
J
7

TAPE READ MAP

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064

Error 953?

Y N

065

Error 954?

Y N

066

Error 957?

Y N

067

Error 958?

Y N

068

Error 960?

Y N

1 1 1 1 1 8
6 6 5 4 4
B B B B B B
K L M N P Q

B
O
8

MAP 0300-8

069

Error 963?

Y N

070

Error 966?

Y N

071

Error 970?

Y N

072

Error 973?

Y N

073

Error 982?

Y N

1 1 1 1 1 9
4 3 3 2 2
B B B B B B
R S T U V W

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MAP 0300-8

0300

B
W
8

TAPE READ MAP

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074

Error 983?

Y N

075

Error 985?

Y N

076

Error 986?

Y N

077

Error 987?

Y N

078

Error 988?

Y N

1 1 1 1 1 9
2 B B B C C C
B Y Z A B C
X

C
C
9

MAP 0300-9

079

Error 989?

Y N

080

Error 994?

Y N

081

Error 995?

Y N

082

Incorrect error number.

Go to MAP 0900, Entry Point A.

083

ERROR 995--WRAP ERROR .

No wrap of data through tape control card.

Defective F2 (base I/O) card.

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

084

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) (refer to 227).

-Press EXECUTE

Is ERROR 995 displayed on the display?

Y N

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

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MAP 0300-9

0300

C
D
9
C
E
9
C
F
9

TAPE READ MAP

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085

NOTE: REMOVE JUMPER.

Defective tape control card (refer to 202).

Defective read/write head (refer to 202).

Dirty tape head.

Service check/adjust the cartridge stop blocks (refer to 224).

Check/replace the tape internal cable (refer to 202).

086

NOTE: REMOVE JUMPER.

Defective F2 (base I/O) card.

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

087

ERROR 989--READ DATA ERROR .

No sync byte detected on tape channel 0 (format track) or on tape channel 1 (data track).

(refer to the appendix, the general logic probe).

-Probe F2-J06 (-read data).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

088

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

Are both lights on?

Y N

089

Is the UP light on?

Y N

1
O
C
G
1
O
C
H
1
O
C
J
1
O
C
KC
G
0
C
H
1
0
C
J
1
0
C
K
1
0

MAP 0300-10

090

Defective F2 (base I/O) card.

Check/replace the tape drive cable (refer to 202).

091

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

Is the DOWN light on?

Y N

092

Defective tape control card (refer to 202).

093

Check/replace the tape drive cable (refer to 202).

094

Defective tape control card (refer to 202).

Defective F2 (base I/O) card.

Check/replace the tape drive cable (refer to 202).

Defective read/write head (refer to 202).

Dirty tape head.

Service check/adjust the cartridge stop blocks (refer to 224).

Check/replace the tape internal cable (refer to 202).

095

-If there is a cartridge in the tape drive, remove it.

-Remove tape control card (refer to 202).

Is the DOWN light on?

Y N

1
1
C
L
1
1
C
M

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MAP 0300-10

0300

C C
L M
O O

TAPE READ MAP

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B B C C
Y Z A B
9 9 9 9

MAP 0300-11

0300

096

Is the UP light on?

Y N

097

Defective F2 (base I/O) card.

098

Defective tape control card (refer to 202).

099

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

100

Is the UP light on?

Y N

101

Defective F2 (base I/O) card.

102

Check/replace the tape drive cable (refer to 202).

103

Defective F2 (base I/O) card.

104

ERROR 988--READ DATA ERROR .

No sync byte detected on tape channel 1 (data track).

Defective tape control card (refer to 202).

Defective read/write head (refer to 202).

Dirty tape head.

Service check/adjust the cartridge stop blocks (refer to 224).

105

ERROR 987--READ DATA ERROR .

No sync byte detected on tape channel 0 (format track).

Defective tape control card (refer to 202).

Defective read/write head (refer to 202).

Dirty tape head.

Service check/adjust the cartridge stop blocks (refer to 224).

106

ERROR 986--READ DATA ERROR .

No interrupt detected on tape channel 1 (data track).

Defective tape control card (refer to 202).

Defective read/write head (refer to 202).

Check/replace the tape internal cable (refer to 202).

107

ERROR 985--READ DATA ERROR .

No interrupt detected on tape channel 0 (format track).

Defective tape control card (refer to 202).

Defective read/write head (refer to 202).

Check/replace the tape internal cable (refer to 202).

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MAP 0300-11

B
X
9

TAPE READ MAP

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108

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

- Calibrate the CE meter (refer to 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

109

- 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

110

- 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

111

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

Go to MAP 0700, Entry Point A.

112

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

113

Check/replace the tape drive cable (refer to 202).

114

Defective tape control card (refer to 202).

B
U
8

MAP 0300-12

115

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

- Defective F2 (base I/O) card.
- Defective tape control card (refer to 202).
- Defective tape LED-PTX assembly (refer to 202).
- Check/replace the tape drive cable (refer to 202).
- Check/replace the tape internal cable (refer to 202).

116

ERROR 973--STATUS ERROR .
Tape might be moving too slowly.

- Service check/adjust the motor pulley (refer to 226).
- Service check/adjust the cartridge stop blocks (refer to 224).
- Inspect the jackshaft housing and the spindle for binds (refer to 202).
- Service check/adjust the magnet gaps (refer to 222).
- Defective tape motor assembly (refer to 202).
- Defective diagnostic tape cartridge.
- Defective spindle-select arm assembly (refer to 202).
- Defective jackshaft housing assembly (refer to 202).

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MAP 0300-12

0300

B B
S T
8 8

TAPE READ MAP

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117

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

118

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

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

119

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

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

120

ERROR 966--STATUS ERROR .

BOT Status cannot be cleared (status bit 7 was 0, should have been 1).

-If you are not sure of the answer to the next question, answer it N.

Is the tape moving too slow?

Y N

1 1
3 3
C C
N PC C
N P
1 1
3 3

MAP 0300-13

121

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

Is ERROR 973 now displayed on the display?

Y N

122

Defective F2 (base I/O) card.

123

- Service check/adjust the motor pulley (refer to 226).
- Service check/adjust the cartridge stop blocks (refer to 224).
- Inspect the jackshaft housing and the spindle for binds (refer to 202).
- Service check/adjust the magnet gaps (refer to 222).
- Defective tape motor assembly (refer to 202).
- Defective diagnostic tape cartridge.
- Defective spindle-select arm assembly (refer to 202).
- Defective jackshaft housing assembly (refer to 202).

124

Tape might be moving too slowly.

- Service check/adjust the motor pulley (refer to 226).
- Service check/adjust the cartridge stop blocks (refer to 224).
- Inspect the jackshaft housing and the spindle for binds (refer to 202).
- Service check/adjust the magnet gaps (refer to 222).
- Defective tape motor assembly (refer to 202).
- Defective diagnostic tape cartridge.
- Defective spindle-select arm assembly (refer to 202).
- Defective jackshaft housing assembly (refer to 202).

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MAP 0300-13

0300

TAPE READ MAP

MAP 0300-14

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B B
P R
8 8

125

ERROR 963--STATUS ERROR .

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

Service check/adjust the cartridge stop blocks (refer to 224).

Defective tape LED-PTX assembly (refer to 202).

Defective tape control card (refer to 202).

Defective diagnostic tape cartridge.

126

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) (refer to 227).

-Retry the test (press R on the keyboard).

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

Is ERROR 960 still displayed?

Y N

127

NOTE: REMOVE JUMPER.

Defective tape LED-PTX assembly (refer to 202).

Check/replace the tape internal cable (refer to 202).

128

(refer to the appendix, the general logic probe).

-Probe tape control card pin SO4 (-BOT) .

Is the DOWN light on?

Y N

1 1
4 4
C C
Q R

B C C
N O R
8 1 1
4 4

129

NOTE: REMOVE JUMPER.

Defective tape control card (refer to 202).

130

-Probe F2-U10 (-BOT) .

Is the DOWN light on?

Y N

131

NOTE: REMOVE JUMPER.

Check/replace the tape drive cable (refer to 202).

132

NOTE: REMOVE JUMPER.

Defective F2 (base I/O) card.

133

ERROR 958--STATUS ERROR .

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

-If you are not sure of the answer to the next question, answer it N.

Is the tape moving too slow?

Y N

134

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

Is ERROR 973 now displayed?

Y N

135

Defective F2 (base I/O) card.

1 1
5 5
C C
S T

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MAP 0300-14

0300

C
S
1
4C
T
1
4

TAPE READ MAP

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136

Service check/adjust the motor pulley (refer to 226).

Service check/adjust the cartridge stop blocks (refer to 224).

Inspect the jackshaft housing and the spindle for binds (refer to 202).

Service check/adjust the magnet gaps (refer to 222).

Defective tape motor assembly (refer to 202).

Defective diagnostic tape cartridge.

Defective spindle-select arm assembly (refer to 202).

Defective jackshaft housing assembly (refer to 202).

137

Tape might be moving too slowly.

Service check/adjust the motor pulley (refer to 226).

Service check/adjust the cartridge stop blocks (refer to 224).

Inspect the jackshaft housing and the spindle for binds (refer to 202).

Service check/adjust the magnet gaps (refer to 222).

Defective tape motor assembly (refer to 202).

Defective diagnostic tape cartridge.

Defective spindle-select arm assembly (refer to 202).

Defective jackshaft housing assembly (refer to 202).

B
M
8

MAP 0300-15

138

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 B08 (gnd) to tape control card pin B10 (+ EOT PTX collector) (refer to 227).

(refer to the appendix, the general logic probe).

-Probe F2-J02 (-EOT) .

Is the DOWN light on?

Y N

139

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

Is the DOWN light on?

Y N

140

NOTE: REMOVE JUMPER.

Defective tape control card (refer to 202).

141

NOTE: REMOVE JUMPER.

Check/replace the tape drive cable (refer to 202).

142

-Retry the test (press R on the keyboard).

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

Y N

143

NOTE: REMOVE JUMPER.

Defective tape LED-PTX assembly (refer to 202).

Check/replace the tape internal cable (refer to 202).

1
6
C
U

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MAP 0300-15

0300

B
L
8

C
U
1
5

TAPE READ MAP

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144

NOTE: REMOVE JUMPER.

Defective F2 (base I/O) card.

145

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 are not sure of the answer to the next question, answer it N.

Is the tape moving too slow?

Y N

146

Did the tape run off either reel?

Y N

147

-Retry the test (press R on the keyboard).

Wait for another error to be displayed on the display.

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

148

Service check/adjust the cartridge stop blocks (refer to 224).

Defective tape LED-PTX assembly (refer to 202).

Check/replace the tape internal cable (refer to 202).

Defective diagnostic tape cartridge.

B
K
8

C
V
1
6

MAP 0300-16

149

Tape might be moving too slowly.

Service check/adjust the motor pulley (refer to 226).

Service check/adjust the cartridge stop blocks (refer to 224).

Inspect the jackshaft housing and the spindle for binds (refer to 202).

Service check/adjust the magnet gaps (refer to 222).

Defective tape motor assembly (refer to 202).

Defective diagnostic tape cartridge.

Defective spindle-select arm assembly (refer to 202).

Defective jackshaft housing assembly (refer to 202).

150

ERROR 953--COMMAND ERROR .

Unwanted tape motion.

There might be foreign material in the select magnet gaps (refer to 202).

Defective brake arm or brake arm spring (refer to 202).

Service check/adjust the magnet gaps (refer to 222).

Service check/adjust the jackshaft housing (refer to 223).

0300

1
6
C
V

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EC 829670

PEC 828851

MAP 0300-16

B
H
7

TAPE READ MAP

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151

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

152

-If there is a cartridge in the tape drive, remove it.

-While looking into the front of the tape drive push the spindle (refer to 202) 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

153

There might be foreign material in the select magnet gaps (refer to 202).

Service check/adjust the jackshaft housing (refer to 223).

Service check/adjust the magnet gaps (refer to 222).

Defective spindle-select arm assembly (refer to 202).

1 1
8 7
C C
W XC
X
1
7

MAP 0300-17

154

-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) (refer to 227).

Did the tape move clockwise (reverse)?

Y N

155

-Calibrate the CE meter (refer to 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

156

Go to Page 37, Step 409, Entry Point C.

157

-If there is a cartridge in the tape drive, remove it.

-Remove tape control card (refer to 202).

-Measure the resistance between tape control card pin D12 and D13.

Is the resistance 25 to 40 ohms?

Y N

158

Defective select magnet (reverse) (refer to 202).

Check/replace the tape internal cable (refer to 202).

1 1
8 8
C C
Y Z

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EC 829670 PEC 828851

MAP 0300-17

0300

C C C
W Y Z
1 1 1
7 7 7

TAPE READ MAP

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159

There might be foreign material in the select magnet gaps (refer to 202).

Service check/adjust the jackshaft housing (refer to 223).

Service check/adjust the magnet gaps (refer to 222).

Defective spindle-select arm assembly (refer to 202).

160

Defective tape control card (refer to 202).

161

(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

162

-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

163

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.

-Retry the test (press R on the keyboard).

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

1 1
8 8
D D
A B

D D
A B
1 1
8 8

MAP 0300-18

164

There might be foreign material in the select magnet gaps (refer to 202).

165

(refer to the appendix, the general logic probe).

-Probe tape control card pin U04 (-forward) (refer to 227).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

166

Defective tape control card (refer to 202).

167

-Remove the F2 (base I/O) card from the board.

Is the DOWN light on?

Y N

168

Is the UP light on?

Y N

169

Defective tape control card (refer to 202).

170

Defective F2 (base I/O) card.

171

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

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PEC 828851

MAP 0300-18

0300

172

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

173

-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

174

-If there is a cartridge in the tape drive, remove it.
-Look into the front of the tape drive , watch for spindle (refer to 202) rotation after pressing R and then C on the keyboard.

Does the spindle rotate?

Y N

175

-While looking into the front of the tape drive push the spindle (refer to 202) 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

2 2 2 2 1
2 1 1 0 9
D D D D D
C D E F G

176

-Open the covers and see if the motor is running.

Is the motor running?

Y N

177

-Power down.
-Unplug AC cable.
-Disconnect the power supply ac power connector J1 at the ac power box (refer to 207).
-Disconnect the tape motor ac power connector J3 at the ac power box (refer to 207).
-Connect the tape motor ac power connector to where the power supply ac power connector was.
-Plug in AC cable.
-Power up. Wait 30 seconds.

Does the tape motor run now?

Y N

178

-Power down.
-Unplug AC cable.
-Replace ac power connectors in their proper locations (tape motor connector at J3 and ac power supply connector at J1 ; refer to 207).
Defective tape motor assembly (refer to 202).

179

-Power down.
-Unplug AC cable.
- Replace ac power connectors in their proper locations (tape motor connector at J3 and ac power supply connector at J1 ; refer to 207).
Test/replace ac wiring(refer to 273).

2
0
D
H

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MAP 0300-19

D D
F H
1 1
9 9

TAPE READ MAP

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180

Is the jackshaft rotating (refer to 202)?

Y N

181

Inspect the jackshaft for frozen bearings.
Defective belt (refer to 202).
Service check/adjust the motor pulley
(refer to 226).
Defective jackshaft housing assembly (refer
to 202).

182

There might be foreign material in the select
magnet gaps (refer to 202).
Service check/adjust the jackshaft housing
(refer to 223).
Service check/adjust the magnet gaps (refer
to 222).
Defective jackshaft housing assembly (refer to
202).
Defective spindle-select arm assembly (refer
to 202).

183

-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) (refer to 227).

Did the tape move counterclockwise
(forward)?

Y N

2 2
0 0
D D
J KD D
J K
2 2
0 0

MAP 0300-20

184

-Calibrate the CE meter (refer to 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

185

Go to Page 37, Step 409, Entry Point C.

186

-If there is a cartridge in the tape drive,
remove it.
-Remove tape control card (refer to 202).
-Measure the resistance between tape control
card pin B12 and B13 .

Is the resistance 25 to 40 ohms?

Y N

187

Defective select magnet (forward) (refer to
202).
Check/replace the tape internal cable (refer
to 202).

188

There might be foreign material in the select
magnet gaps (refer to 202).
Service check/adjust the jackshaft housing
(refer to 223).
Service check/adjust the magnet gaps (refer
to 222).
Defective spindle-select arm assembly (refer
to 202).

189

Defective tape control card (refer to 202).

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MAP 0300-20

0300

D D
D E
1 1
9 9

TAPE READ MAP

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190

Service check/adjust the cartridge stop blocks (refer to 224).

Service check/adjust the locking wheels (refer to 225).

Defective spindle-select arm assembly (refer to 202).

Defective diagnostic tape cartridge.

191

-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

192

Defective brake arm or brake arm spring (refer to 202).

Defective F2 (base I/O) card.

193

-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

194

-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

2 2 2
1 1 1
D D D
L M N

D D D
L M N
2 2 2
1 1 1

MAP 0300-21

195

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.

-Retry the test (press R on the keyboard).

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

196

Service check/adjust the motor pulley (refer to 226).

Inspect the jackshaft and spindle for binds (refer to 202).

There might be foreign material in the select magnet gaps (refer to 202).

Defective tape motor assembly (refer to 202).

Defective spindle-select arm assembly (refer to 202).

Defective jackshaft housing assembly (refer to 202).

Defective diagnostic tape cartridge.

197

(refer to the appendix, the general logic probe).

-Probe tape control card pin U04 (-forward)

Is the UP light on?

Y N

198

Defective tape control card (refer to 202).

199

-Probe F2-J04 (-forward).

Is the UP light on?

Y N

200

Check/replace the tape drive cable (refer to 202).

2
2
D
P

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MAP 0300-21

0300

B
E
7
D
C
1
D
P
2
1
9

TAPE READ MAP

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201

Defective F2 (base I/O) card.

202

There might be foreign material in the select magnet gaps (refer to 202).

Defective brake arm or brake arm spring (refer to 202).

Service check/adjust the magnet gaps (refer to 222).

Service check/adjust the jackshaft housing (refer to 223).

203

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

204

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 (refer to 229).

-Replace the cartridge in the tape drive.

-Retry the test (press R on the keyboard).

205

-Thread the tape back on the reel (refer to 230).

-Replace the cartridge in the tape drive.

-Retry the test (press R on the keyboard).

B
E
7

MAP 0300-22

206

(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. Refer to 202).

-While manually pressing the file protect switch:

-Retry the test (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

207

The file protect switch operates electrically.

Service check/adjust the switch assembly (refer to 221).

Service check/adjust the cartridge stop blocks (refer to 224).

Defective tape switch assembly (refer to 202).

Defective diagnostic tape cartridge.

208

The problem is an electrical problem not an adjustment problem.

-Replace the cartridge in the tape drive.

(refer to the appendix, the general logic probe).

-Probe tape control card pin D07 (+file protect) (refer to 227).

Is the DOWN light on?

Y N

2 2
3 3
D D
Q R

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MAP 0300-22

0300

TAPE READ MAP

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MAP 0300-23

D D
Q R
2 2
2 2

B
D
7

0300

209

Defective tape switch assembly (refer to 202).
Check/replace the tape internal cable (refer to 202).

210

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

Is the DOWN light on?

Y N

211

Defective tape control card (refer to 202).

212

-Probe F2-P04 (+file protect).

Is the DOWN light on?

Y N

213

Check/replace the tape drive cable (refer to 202).

214

Defective F2 (base I/O) card.

215

(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 (refer to 202).

-While manually pressing the cartridge in place switch:

-Retry the test (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

216

The cartridge in place switch operates electrically.

Service check/adjust the switch assembly (refer to 221).

Service check/adjust the cartridge stop blocks (refer to 224).

Defective tape switch assembly (refer to 202).

Defective diagnostic tape cartridge.

217

The problem is an electrical problem not an adjustment problem.

-Replace the cartridge in the tape drive.

(refer to the appendix, the general logic probe).

-Probe tape control card B08 (gnd) (refer to 227).

Is the DOWN light on?

Y N

218

Defective tape control card (refer to 202).

2
4
D
S

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MAP 0300-23

D
S
2
3

TAPE READ MAP

PAGE 24 OF 45

219

-Probe tape control card pin B07 (-cartridge in place).

Is the DOWN light on?

Y N

220

Defective tape switch assembly (refer to 202).
Check/replace the tape internal cable (refer to 202).

221

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

Is the DOWN light on?

Y N

222

Defective tape control card (refer to 202).

223

-Probe F2-M03 (-cartridge in place).

Is the DOWN light on?

Y N

224

Check/replace the tape drive cable (refer to 202).

225

Defective F2 (base I/O) card.

B B
A B
7 7

MAP 0300-24

226

ERROR 947--WRAP ERROR.

No data detected for wrap through the tape control card.

Defective tape control card (refer to 202).

Defective F2 (base I/O) card.

Check/replace the tape drive cable (refer to 202).

227

ERROR 946--WRAP ERROR.

Missing interrupt for wrap through tape head.

(refer to the appendix, the general logic probe).

-Probe tape control card pin U09 (-channel select).

Is the DOWN light on?

Y N

228

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

-Probe tape control card pin U09 (-channel select).

Are both lights on?

Y N

229**Is the UP light on?**

Y N

230

Defective F2 (base I/O) card.

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

2 2 2
5 5 5
D D D
T U V

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MAP 0300-24

D D D
T U V
2 2 2
4 4 4

TAPE READ MAP

PAGE 25 OF 45

231

- Probe F2-G13 (-channel select).
- Leave the probe on the pin.

Is the UP light on?

Y N

232

- Check/replace the tape drive cable (refer to 202).

233

- Defective F2 (base I/O) card.

234

- Defective tape control card (refer to 202).
- Defective read/write head (refer to 202).

235

- Remove the F2 (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

236

Is the UP light on?

Y N

237

- Defective tape control card (refer to 202).

238

- Defective F2 (base I/O) card.

239

- Defective tape control card (refer to 202).
- Check/replace the tape drive cable (refer to 202).

A A
Y Z
7 7

MAP 0300-25

240

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

(refer to the appendix, the general logic probe).

- Probe tape control card pin S05 (-diagnostic mode) (refer to 227).

Is the UP light on?

Y N

241

- Defective tape control card (refer to 202).

242

- Probe F2-G04 (-diagnostic mode).

Is the UP light on?

Y N

243

- Check/replace the tape drive cable (refer to 202).

244

- Defective F2 (base I/O) card.

245

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

(refer to the appendix, the general logic probe).

- Probe tape control card pin U02 (+tape clock) (refer to 227).

Are both lights on?

Y N

2 2
6 6
D D
W X

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MAP 0300-25

0300

D
X
2
5

TAPE READ MAP

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246

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

Is the DOWN light on?

Y N

247

-Probe F2-S09 (+tape clock).

-Leave the probe on the pin.

Is the UP light on?

Y N

248

Check/replace the tape drive cable (refer to 202).

249

Defective F2 (base I/O) card.

250

-Remove the F2 (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

251

Is the UP light on?

Y N

252

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

253

Defective F2 (base I/O) card.

254

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

D
W
2
5

MAP 0300-26

255

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

Is the DOWN light on?

Y N

256

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

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

Are both lights on?

Y N

257

Is the UP light on?

Y N

258

Defective F2 (base I/O) card.

Defective tape control card (refer to 202).

Check/replace the tape drive cable (refer to 202).

259

-Probe F2-G03 (-write enable).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

260

Defective F2 (base I/O) card.

261

Check/replace the tape drive cable (refer to 202).

2 2
9 7
D D
Y Z

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PEC 828851

MAP 0300-26

0300

D
Z
2
6

TAPE READ MAP

PAGE 27 OF 45

262

-Probe F2-G08 (-read clock).

Are both lights on?

Y N

263

-Probe F2-G08 (-read clock).

Is the DOWN light on?

Y N

264

-Probe F2-G08 (-read clock).
-Leave the probe on the pin.

Is the UP light on?

Y N

265

Defective F2 (base I/O) card.

266

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

Is the DOWN light on?

Y N

267

Defective F2 (base I/O) card.
Defective tape control card (refer to 202).
Check/replace the tape drive cable (refer to 202).

268

Check/replace the tape drive cable (refer to 202).

2
8
E
A
2
7
E
BE
B
2
7

MAP 0300-27

269

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-Probe F2-G08 (-read clock).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

270

Is the UP light on?

Y N

271

Defective F2 (base I/O) card.
Check/replace the tape drive cable (refer to 202).

272

Defective tape control card (refer to 202).

273

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

274

Check/replace the tape drive cable (refer to 202).

275

Defective F2 (base I/O) card.

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MAP 0300-27

0300

E
A
2
7

TAPE READ MAP

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276

- Calibrate the CE meter (refer to 270).
- Measure -12 vdc between tape control card pin U08 (gnd) and tape control card pin S13 (-12 vdc) (refer to 227).

Is the voltage in tolerance (-11.0 vdc to -13.2 vdc)?

Y N

277

- If there is a cartridge in the tape drive, remove it.
- Remove tape control card (refer to 202).
- 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

278

- Install the tape control card (refer to 202).
- 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

279

- 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

280

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

Go to MAP 0700, Entry Point A.

2
C
2
D
2
E
2
F

MAP 0300-28

E
C
2
8
E
D
2
8
E
E
2
8
E
F
2
8

281

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

282

- Check/replace the tape drive cable (refer to 202).

283

- Defective tape control card (refer to 202).

284

- If there is a cartridge in the tape drive, remove it.
 - Remove tape control card (refer to 202).
- 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) (refer to 227).

Is there continuity between the pins?

Y N

285

- Defective tape control card (refer to 202).
- Check/replace the tape internal cable (refer to 202).

286

- Defective tape control card (refer to 202).
- Defective F2 (base I/O) card.
- Check/replace the tape drive cable (refer to 202).
- Defective read/write head (refer to 202).
- Check/replace the tape internal cable (refer to 202).

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MAP 0300-28

A D
X Y
7 2
6 6

TAPE READ MAP

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287

- Remove the F2 (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

288

Is the UP light on?

Y N

289

Defective tape control card (refer to 202).
Check/replace the tape drive cable (refer to 202).

290

Defective F2 (base I/O) card.

291

Defective tape control card (refer to 202).
Check/replace the tape drive cable (refer to 202).

292

ERROR 939--INTERRUPT ERROR .
Incorrect interrupt response.

(refer to the appendix, the general logic probe).

- Probe tape control card pin S05 (-diagnostic mode) (refer to 227).

Is the DOWN light on?

Y N

293

Defective tape control card (refer to 202).
Defective F2 (base I/O) card.

296

A E
V G
6 2
9 9

MAP 0300-29

294

- Remove the F2 (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

295

Is the UP light on?

Y N

296

Defective tape control card (refer to 202).

297

Defective F2 (base I/O) card.

298

Defective tape control card (refer to 202).
Check/replace the tape drive cable (refer to 202).

299

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

(refer to the appendix, the general logic probe).

- Probe F2-P11 (-select magnet active)

Is the UP light on?

Y N

300

Defective F2 (base I/O) card.

303

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MAP 0300-29

0300

0300

E
H
2
9

TAPE READ MAP

PAGE 30 OF 45

301

-Probe tape control card pin U12 (-select magnet active) (refer to 227).

Is the UP light on?

Y N

302

Check/replace the tape drive cable (refer to 202).

303

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

Is the UP light on?

Y N

304

Defective tape control card (refer to 202).

305

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

Is the UP light on?

Y N

306

Defective tape control card (refer to 202).

307

-Probe F2-M13 (-run).

Is the UP light on?

Y N

308

Check/replace the tape drive cable (refer to 202).

309

Defective F2 (base I/O) card.

A
U
6

MAP 0300-30

310

ERROR 937--STATUS ERROR .

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

(refer to the appendix, the general logic probe).

-Probe F2-P11 (-select magnet active)

Is the UP light on?

Y N

311

Defective F2 (base I/O) card.

312

-Probe tape control card pin U12 (-select magnet active) (refer to 227).

Is the UP light on?

Y N

313

Check/replace the tape drive cable (refer to 202).

314

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

Is the UP light on?

Y N

315

Defective tape control card (refer to 202).

316

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

Is the UP light on?

Y N

317

Defective tape control card (refer to 202).

3
1
E
J

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EC 829670

PEC 828851

MAP 0300-30

A
T
6

E
J
3
0

TAPE READ MAP

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318

-Probe F2-M13 (-run).

Is the UP light on?

Y N

319

Check/replace the tape drive cable (refer to 202).

320

Defective F2 (base I/O) card.

321

ERROR 936--STATUS ERROR .

Select magnet active status was active, should not have been active(status bit 2 was 1, should have been 0).

(refer to the appendix, the general logic probe).

-Probe F2-P11 (-select magnet active)

Is the DOWN light on?

Y N

322

Defective F2 (base I/O) card.

323

-Probe tape control card pin U05 (-run) (refer to 227).

Is the DOWN light on?

Y N

324

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

Is the UP light on?

Y N

325

Defective tape control card (refer to 202).

3
2
E
K

3
1
E
L

E
L
3
1

MAP 0300-31

326

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

Is the UP light on?

Y N

327

Defective tape control card (refer to 202).

Defective select magnet (forward) (refer to 202).

Check/replace the tape internal cable (refer to 202).

328

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

Is the UP light on?

Y N

329

Defective tape control card (refer to 202).

330

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

Is the UP light on?

Y N

331

Defective tape control card (refer to 202).

Defective select magnet (reverse) (refer to 202).

Check/replace the tape internal cable (refer to 202).

332

-If there is a cartridge in the tape drive, remove it.

-Remove tape control card (refer to 202).

-Probe F2-P11 (-select magnet active).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

3
2
E
M

3
1
E
N

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EC 829670

PEC 828851

MAP 0300-31

0300

0300

TAPE READ MAP

PAGE 32 OF 45

E K 3
M 3
N 3
1 1 1

333

Is the UP light on?

Y N

334

Defective F2 (base I/O) card.

335

Defective tape control card (refer to 202).

336

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

337

Check/replace the tape drive cable (refer to 202).

338

Defective F2 (base I/O) card.

339

-Remove the F2 (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

340

Is the UP light on?

Y N

341

Defective tape control card (refer to 202).

3 3
2 2
P E
Q

MAP 0300-32

A S 6
E P 3
O 3
2 2

342

Defective F2 (base I/O) card.

343

Defective tape control card (refer to 202).
Check/replace the tape drive cable (refer to 202).

344

ERROR 933--STATUS ERROR .

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

(refer to the appendix, the general logic probe).

-Probe F2-U09 (-erase inactive).

Is the DOWN light on?

Y N

345

Defective F2 (base I/O) card.

346

-Probe tape control card pin U11 (-channel 1 erase) (refer to 227).

Is the UP light on?

Y N

347

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-Probe F2-U09 (-erase inactive).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

3 3 3
3 3 3
R S T

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MAP 0300-32

ERR
332
222

TAPE READ MAP

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348

Is the UP light on?

Y N

349

Defective F2 (base I/O) card.

350

Defective tape control card (refer to 202).

351

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

352

Check/replace the tape drive cable (refer to 202).

353

Defective F2 (base I/O) card.

354

-Probe F2-S08 (-channel 1 erase).

Is the UP light on?

Y N

355

Check/replace the tape drive cable (refer to 202).

356

Defective F2 (base I/O) card.

ARR
6

MAP 0300-33

357

ERROR 930--STATUS ERROR .

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

(refer to the appendix, the general logic probe).
-Probe F2-U09 (-erase inactive).

Is the DOWN light on?

Y N

358

Defective F2 (base I/O) card.

359

-Probe tape control card pin U10 (-channel 0 erase) (refer to 227).

Is the UP light on?

Y N

360

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-Probe F2-U09 (-erase inactive).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

361

Is the UP light on?

Y N

362

Defective F2 (base I/O) card.

363

Defective tape control card (refer to 202).

33
44
EU
V

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MAP 0300-33

0300

0300

A
P
6
E
U
3
3
E
V
3
3

TAPE READ MAP

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364

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

365

Check/replace the tape drive cable (refer to 202).

366

Defective F2 (base I/O) card.

367

-Probe F2-J07 (-channel 0 erase).

Is the UP light on?

Y N

368

Check/replace the tape drive cable (refer to 202).

369

Defective F2 (base I/O) card.

370

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).

(refer to the appendix, the general logic probe).

-Probe F2-U09 (-erase inactive)

Is the UP light on?

Y N

371

Defective F2 (base I/O) card.

3
4
E
W

E
W
3
4

MAP 0300-34

372

-Probe tape control card pin S03 (-erase inactive) (refer to 227).

Is the UP light on?

Y N

373

Check/replace the tape drive cable (refer to 202).

374

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

Is the DOWN light on for either pin?

Y N

375

Defective tape control card (refer to 202).

Check/replace the tape internal cable (refer to 202).

376

-Remove the F2 (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 pin?

Y N

377

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

Is the UP light on for both probe points?

Y N

378

Defective tape control card (refer to 202).

379

Defective F2 (base I/O) card.

3
5
E
X

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MAP 0300-34

A
N
6
E
X
3
4

TAPE READ MAP

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380

Defective tape control card (refer to 202).
Check/replace the tape drive cable (refer to 202).

381

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

(refer to the appendix, the general logic probe).
-Probe F2-J02 (-end of tape).

Is the DOWN light on?

Y N

382

Defective F2 (base I/O) card.

383

-Calibrate the CE meter (refer to 270).
-Measure greater than +1 vdc between tape control card pin B10 (+ EOT PTX collector) and tape control card pin U08 (gnd) (refer to 227).

Is the voltage greater than 1 vdc?

Y N

384

Defective tape control card (refer to 202).
Defective tape LED-PTX assembly (refer to 202).
Check/replace the tape internal cable (refer to 202).

385

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-Probe F2-J02 (-end of tape).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

3
5
E
Y
3
5
E
Z

A
M
6
E
Y
3
5
E
Z
3
5

MAP 0300-35

386

Is the UP light on?

Y N

387

Defective F2 (base I/O) card.

388

Defective tape control card (refer to 202).

389

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

390

Check/replace the tape drive cable (refer to 202).

391

Defective F2 (base I/O) card.

392

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

(refer to the appendix, the general logic probe).
-Probe F2-U10 (-beginning of tape).

Is the DOWN light on?

Y N

393

Defective F2 (base I/O) card.

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MAP 0300-35

3
6
F
A

0300

F
A
3
5

TAPE READ MAP

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394

-Calibrate the CE meter (refer to 270).

-Measure greater than 1 vdc between tape control card pin D10 (+ BOT PTX collector) and tape control card pin U08 (gnd) (refer to 227).

Is the voltage greater than 1 vdc?

Y N

395

Defective tape control card (refer to 202).

Defective tape LED-PTX assembly (refer to 202).

Check/replace the tape internal cable (refer to 202).

396

-If there is a cartridge in the tape drive, remove it.

-Remove tape control card (refer to 202).

-Probe F2-U10 (-beginning of tape).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

397

Is the UP light on?

Y N

398

Defective F2 (base I/O) card.

399

Defective tape control card (refer to 202).

400

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

3
6
F
B3
6
F
CA
L
6F
B
3
6F
C
3
6

MAP 0300-36

401

Check/replace the tape drive cable (refer to 202).

402

Defective F2 (base I/O) card.

403

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) .

(refer to the appendix, the general logic probe).

-Probe F2-J13 (- LED and erase ok).

Is the UP light on?

Y N

404

Defective F2 (base I/O) card.

405

-Probe tape control card pin S07 (- LED and erase ok) (refer to 227).

Is the UP light on?

Y N

406

Check/replace the tape drive cable (refer to 202).

3
7
F
D

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MAP 0300-36

TAPE READ MAP

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MAP 0300-37

F
D
3
6

407

- Calibrate the CE meter (refer to 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

408

- 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

409

(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

410

- If there is a cartridge in the tape drive, remove it.
- Remove tape control card (refer to 202).
- 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

F
F
F
F
3
3
3
3
7
7
7
7

411

- Install the tape control card (refer to 202).
- 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

412

- 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

413

- +12 vdc is not in tolerance.

Go to MAP 0700, Entry Point A.

414

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

415

- Check/replace the tape drive cable (refer to 202).

416

- Defective tape control card (refer to 202).

417

- Defective tape control card (refer to 202).

418

- Defective tape LED-PTX assembly (refer to 202).
- Check/replace the tape internal cable (refer to 202).

3 3 3 3 3
8 7 7 7 7
F F F F F
E F G H J

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EC 829670 PEC 828851

MAP 0300-37

0300

F
E
3
7

TAPE READ MAP

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419

-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

420

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-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

421

-Install the tape control card (refer to 202).
-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

422

-Measure +5 vdc between G2-U03 (+5 vdc) and N2-P08 (gnd).

Is the voltage in tolerance (+4.6 vdc to +5.5 vdc)?

Y N

423

+5 vdc is not in tolerance

Go to MAP 0700, Entry Point A.

424

Repair the open connection between G2-U03 and E6-A04

3 3 3
8 8 8
F F F
K L MF F F
K L M
3 3 3
8 8 8

MAP 0300-38

425

Check/replace the tape drive cable (refer to 202).

426

Defective tape control card (refer to 202).

427

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

Is the ground voltage in tolerance (0.0 vdc to 0.3 vdc)?

Y N

428

-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

429

Ground voltage is not in tolerance.

Go to MAP 0700, Entry Point A.

430

Go to Page 38, Step 431, Entry Point D.

431

(Entry Point D)

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-Test for continuity from tape control card pin U08 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

3 3
9 9
F F
N P

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MAP 0300-38

TAPE READ MAP

PAGE 39 OF 45

F N
3 3
8 8

432

- Install the tape control card (refer to 202).
- Test for continuity from F6-A02 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

433

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.

434

Check/replace the tape drive cable (refer to 202).

435

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

Is there continuity between the pins?

Y N

436

- Install the tape control card (refer to 202).
- Test for continuity from F6-A04 (gnd) to N2-P08 (gnd).

Is there continuity between the pins?

Y N

437

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

Is there continuity between the pins?

Y N

3 3 3 3
9 9 9 9
F F F F
Q R S T

MAP 0300-39

A F F F F
K O R S T
6 3 3 3 3
9 9 9 9 9

438

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.

439

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

440

Check/replace the tape drive cable (refer to 202).

441

Defective tape control card (refer to 202).

442

ERROR 915--STATUS ERROR .

File protect status should be active (status bit 6 was 0, should have been 1).

(refer to the appendix, the general logic probe).

-Probe F2-P04 (+file protect).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

443

Defective F2 (base I/O) card.

444

-If there is a cartridge in the tape drive, remove it.

-Remove tape control card (refer to 202).

Is the UP light on?

Y N

4 4
0 0
F F
U V

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EC 829670

PEC 828851

MAP 0300-39

0300

0300

A
H
5
F
U
3
9
F
V
3
9

TAPE READ MAP

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445

-Disconnect the tape drive cable from the board (refer to 228).

Is the UP light on?

Y N

446

Defective F2 (base I/O) card.

447

Check/replace the tape drive cable (refer to 202).

448

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

Is there continuity between the pins?

Y N

449

Defective tape control card (refer to 202).

450

Defective tape switch assembly (refer to 202).
Check/replace the tape internal cable (refer to 202).

451

ERROR 912--STATUS ERROR.

Cartridge in place status should not be found (bit 3 should be 0).

(refer to the appendix, the general logic probe).

-Probe F2-M03 (-cartridge in place).

-Leave the probe on the pin.

Is the DOWN light on?

Y N

4
O
F
W
4
O
F
X

F
W
4
0
F
X
4
0

MAP 0300-40

452

Defective F2 (base I/O) card.

453

-If there is a cartridge in the tape drive, remove it.

-Remove tape control card (refer to 202).

Is the UP light on?

Y N

454

-Disconnect the tape drive cable from the board (refer to 228).

Is the UP light on?

Y N

455

Defective F2 (base I/O) card.

456

Check/replace the tape drive cable (refer to 202).

457

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

Is there continuity between the pins?

Y N

458

Defective tape control card (refer to 202).

459

Defective tape switch assembly (refer to 202).

Check/replace the tape internal cable (refer to 202).

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MAP 0300-40

A
F
5

TAPE READ MAP

PAGE 41 OF 45

460

ERROR 909--WRAP ERROR .
Error occurred during a test of the F2 (base I/O) card, no wrap of data.

Defective F2 (base I/O) card.

461

ERROR 907--INTERRUPT ERROR .
Incorrect interrupt response.

(refer to the appendix, the general logic probe).
-Probe F2-G08 (-read clock).

Are both lights on?

Y N

462

-Probe F2-G08 (-read clock).

Is the DOWN light on?

Y N

463

-Probe F2-P07 (-int req 2).

Is the DOWN light on?

Y N

464

Defective F2 (base I/O) card.
Defective tape control card (refer to 202).

465

Defective G2 (controller) card.

4
2
F
Y

F
Z
4
1

MAP 0300-41

466

-If there is a cartridge in the tape drive, remove it.
-Remove tape control card (refer to 202).
-Probe F2-G08 (-read clock).
-Leave the probe on the pin.

Is the DOWN light on?

Y N

467

Is the UP light on?

Y N

468

Defective F2 (base I/O) card.

469

Defective tape control card (refer to 202).

470

-Disconnect the tape drive cable from the board (refer to 228).

Is the DOWN light on?

Y N

471

Check/replace the tape drive cable (refer to 202).

472

Defective F2 (base I/O) card.

0300

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MAP 0300-41

F
Y
4
T

TAPE READ MAP

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473

- Calibrate the CE meter (refer to 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

474

- If there is a cartridge in the tape drive, remove it.
- Remove tape control card (refer to 202).
- 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

475

- Install the tape control card (refer to 202).
- 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

476

- 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

477

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

Go to MAP 0700, Entry Point A.

478

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

A A A G G G
B D E A B C
5 5 5 4 4 4
2 2 2

MAP 0300-42

479

- Check/replace the tape drive cable (refer to 202).

480

- Defective tape control card (refer to 202).

481

- Defective tape control card (refer to 202).

482

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

Defective F2 (base I/O) card.

483

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

Defective F2 (base I/O) card.

484

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

Defective F2 (base I/O) card.

4 4 4
2 2 2
G G G
A B C

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EC 829670 PEC 828851

MAP 0300-42

0300

U V X Y Z A TAPE READ MAP
4 4 5 5 5 A
5

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485

ERROR 014-- SYSTEM ERROR .
Device not selected.

Defective F2 (base I/O) card.

486

ERROR 013-- SYSTEM ERROR .
Device not attached.

Defective F2 (base I/O) card.

487

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

Rewind the diagnostic tape. It might not
be positioned correctly.
Defective diagnostic tape cartridge.

488

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

Rewind the diagnostic tape. It might not be
positioned correctly.
Defective diagnostic tape cartridge.

489

ERROR 010-- SYSTEM ERROR .
End of file.

Rewind the diagnostic tape. It might not be
positioned correctly.
Defective diagnostic tape cartridge.

490

ERROR 009--SYSTEM ERROR .
End of data.

Defective diagnostic tape cartridge.

P R S T
4 4 4 4

MAP 0300-43

491

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

Defective diagnostic tape cartridge.

Dirty tape head.

Service check/adjust the cartridge stop
blocks (refer to 224).

Defective tape control card (refer to
202).

492

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

Defective diagnostic tape cartridge.

Dirty tape head.

Service check/adjust the cartridge stop
blocks (refer to 224).

Defective tape control card (refer to 202).

493

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

Go to Page 22, Step 206, Entry Point F.

494

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

Go to Page 23, Step 215, Entry Point E.

0300

N
4

TAPE READ MAP

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495

ERROR 004-- SYSTEM ERROR .

Timeout

- If there is a cartridge in the tape drive, remove it.
- Remove tape control card (refer to 202).
- Measure the resistance between tape control card pin BO4 (+channel 0 coil) and BO5 (+channel 0 center tap) (refer to 227).

Is the resistance between 6 ohms and 15 ohms?

Y N

496

- Defective read/write head (refer to 202).
- Check/replace the tape internal cable (refer to 202).

497

- 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

498

- Defective read/write head (refer to 202).
- Check/replace the tape internal cable (refer to 202).

499

- Measure the resistance between tape control card pin DO4 (+channel 1 coil) and DO5 (+channel 1 center tap).

Is the resistance between 6 ohms and 15 ohms?

Y N

500

- Defective read/write head (refer to 202).
- Check/replace the tape internal cable (refer to 202).

L M G
4 4 D
4 4

MAP 0300-44

501

- Measure the resistance between tape control card pin DO6 (-channel 1 coil) and DO5 (+channel 1 center tap).

Is the resistance between 6 ohms and 15 ohms?

Y N

502

- Defective read/write head (refer to 202).
- Check/replace the tape internal cable (refer to 202).

503

- Rewind the diagnostic tape. It might not be positioned correctly.
- Defective diagnostic tape cartridge.
- Dirty tape head.
- Defective read/write head (refer to 202).
- Defective tape control card (refer to 202).
- Check/replace the tape internal cable (refer to 202).

504

ERROR 003-- SYSTEM ERROR .

Machine error.

- Defective F2 (base I/O) card.
- Defective tape control card (refer to 202).
- Check/replace the tape drive cable (refer to 202).

505

ERROR 002-- SYSTEM ERROR .

Command error. Incorrect command detected:

Go to MAP 0900, Entry Point A.

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MAP 0300-44

0300

4
4
G
D

A K
1 4

TAPE READ MAP

MAP 0300-45

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506

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

Did you press ATTN key during tape I/O ?

Y N

507

Go to MAP 0600, Entry Point A.

508

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

509

Go to MAP 0420, Entry Point A.

0300

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MAP 0300-45



BRING UP MAP 0400

PAGE 1 OF 15

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0200	D	1	010
0420	A	1	001
0500	A	1	001
0900	A	1	001

001
(Entry Point A)
-Switch the L32-64-R32 switch to 64.
(refer to 249, checkpoints).

Is the machine at checkpoint K?
Y N

002

Is the machine at checkpoint J?
Y N

003

Is the machine at checkpoint I?
Y N

004

Is the machine at checkpoint H?
Y N

005

Is the machine at checkpoint G?
Y N

1 1
5 4 9 6 5 1
A B C D E F

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MAP 0400-1

F
1

006

Is the machine at checkpoint D?
Y N

007

Is the machine at checkpoint B?
Y N

008

Is the machine at checkpoint A?
Y N

009

Is there a card in H4 (APL supervisor)?
Y N

010

(Entry Point D)
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
Refer to 248, hex registers display.

Is there an AAAA in R3L0?
Y N

4 4 4 4 3 2
G H J K L M

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EC 829523 PEC 828851
MAP 0400-1

0400

M
1

BRING UP MAP

PAGE 2 OF 15

011

- Ensure that the RUN switch under the covers is to RUN.
- Switch the DISPLAY REGISTERS switch to NORMAL.
- Probe H6-C02 (-run switch and not IPL).
(refer to 241 display Z3 socket locations).
(refer to the appendix, the general logic probe).

Is the UP light on?

Y N

012

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

Is the DOWN light on?

Y N

013

- Ensure that the L32-64-R32 switch is set to 64.
- Probe J6-DO4 (-right 32 sw).
Refer to 241, 210).

Is the DOWN light on?

Y N

014

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
- Switch the RUN switch under the covers to not run.

Is R0L0 0002?

Y N

015

- Switch the DISPLAY REGISTERS switch to NORMAL.
- Switch the RUN switch under the covers to run.
- Probe F2-B03 .(-por).

Is the DOWN light on?

Y N

S T
2 2

MAP 0400-2

016

(Entry Point I)

- Power down.
- Remove the storage cards L2, L4, M2, M4, N2, and N4.
- Power up. Wait 30 seconds.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

017

- Defective K2 (read/write storage) card.
- Defective K4 (read/write storage) card.
- Defective J2 (display) card.
- Defective F2 (base I/O) card.
- Defective G2 (controller) card.
- Defective H2 (I/O and diag) card.

018

One of the the cards removed is defective. Reinstall them two at a time (L first, then M, N) to isolate to a pair. Then replace one of the pair to find the defective card.

019

- Probe F2-B03.

Remove the following cards in order until the DOWN light goes off. The last card removed is defective.

A2, B2, E2, F2.

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MAP 0400-2

3 3 3 3 2 2
N P Q R S T

0400

Q R
2 2

BRING UP MAP

PAGE 3 OF 15

020

-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 G2-S10	2 G2-U10
1 G2-U13	3 G2-S13.

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

Y N

021

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

Y N

022

Defective G2 (controller) card.

023

-Switch the DISPLAY REGISTERS switch to NORMAL.

Go to Page 2, Step 016, Entry Point I.

024

-Switch the DISPLAY REGISTERS switch to NORMAL.

Go to Page 2, Step 016, Entry Point I.

025

Defective display L32-64-R32 switch.
Check/replace display and control panel cable (refer to 210, 241).

L N P
1 2 2

MAP 0400-3

026

-Remove the J2 (display) card.
-Probe H6-E02.

Is the DOWN light on?

Y N

027

Defective J2 (display) card.

028

-Reinstall the J2 (display) card.

Defective DISPLAY REGISTERS switch. Refer to 210).
Check/replace display and control panel cable.
(refer to 210, 241).

029

(refer to 200).
Defective RUN switch.
Check/replace display and control panel cable.
(refer to 210, 241).

030

-Power down.
-Remove the read/write storage cards from L2, L4, M2, M4, N2 and N4.
-Power up. Wait 30 seconds.

Did either LOAD 0 or CLEAR WS (with no misspelling) appear on one and only one line of the 5 inch display?

Y N

031

Defective K2 (read/write storage) card.
Defective K4 (read/write storage) card.
Defective J2 (display) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

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EC 829523 PEC 828851

MAP 0400-3

4
U

0400

J K U
1 1 3

BRING UP MAP

PAGE 4 OF 15

032

One of the read/write storage cards removed is defective. Reinstall them two at a time (L first, then M, and N) to isolate to a pair. Then replace one of the pair to find the defective card.

033

- Remove the H4 (APL supervisor) card.
- Press RESTART. wait 10 seconds.

Do you get exactly the same failure?

Y N

034

Defective H4 (APL supervisor) card.

035

- Reinstall the H4 (APL supervisor) card.

Go to Page 1, Step 010, Entry Point D.

036

Bus in test for all bits up.

-Probe all the bus in bits listed below:

5 F2-G11	0 F2-P12
4 F2-M02	6 F2-P13
3 F2-M05	P F2-S10
2 F2-P09	1 F2-U05.
7 F2-P10	

Are all bus in bits UP?

Y N

037

Probe the bus in bit that is DOWN.
Remove the following cards until the DOWN light goes off:
A2, B2, E2, F2, G2 And H2.
Then replace that card.

G H V
1 1 4

MAP 0400-4

038

- Defective G2 (controller) card.
- Defective F2 (base I/O) card.

039

The op code test failed.

- Defective G2 (controller) card.
- Defective F2 (base I/O) card.

040

Interrupt test.

Is there a 1 in position 1 of line 3 of the display?

Y N

041

Is there a 2 in position 1 of line 3 of the display?

Y N

042

Is there a 3 in position 1 of line 3 of the display?

Y N

043

- Defective G2 (controller) card.

044

- Defective F2 (base I/O) card.
- Defective G2 (controller) card.

045

Is there a card in A2 or B2?

Y N

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EC 829523 PEC 828851

MAP 0400-4

4
V5 5 5
W X Y

0400

X Y
4 4

BRING UP MAP

PAGE 5 OF 15

046

Defective G2 (controller) card.
Defective F2 (base I/O) card.

047

Is there a card in B2?

Y N

048

(Entry Point E)

-Remove the A2 card.
-Press RESTART. wait 10 seconds.

Do you get exactly the same failure?

Y N

049

Defective A2 (I/O cable driver) card and
cable assembly.

Defective printer B1A2 (adapter) card.

Check/replace the I/O signal/power cable
from auxiliary tape drive adapter A1B1,
A1B2, (signal) and A1A4 (pwr) to base
machine.

Check/replace I/O signal/power cable
from printer adapter B1B2, B1B3 (signal)
and B1A1 (pwr) to the 5100.

Defective I/O cable terminator in auxiliary
tape.

Check/replace I/O cables.

050

-Reinstall the A2 card.

Defective G2 (controller) card.

Defective F2 (base I/O) card.

E W Z
1 4 5

MAP 0400-5

051

-Remove the B2 (expansion feature) card.
-Press RESTART. wait 10 seconds.

Do you get exactly the same failure?

Y N

052

Defective B2 (expansion feature) card.

053

-Reinstall the B2 (expansion feature) card.

Go to Page 5, Step 048, Entry Point E.

054

-Remove the B2 (expansion feature) card.
-Press RESTART. wait 10 seconds.

Do you get exactly the same failure?

Y N

055

Defective B2 (expansion feature) card.

056

Defective G2 (controller) card.

Defective F2 (base I/O) card.

057

Is there a 3 in position 1 of line 3 of the
display?

Y N

058

Defective G2 (controller) card.

Defective H2 (I/O and diag) card.

5
Z

6
A

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EC 829523 PEC 828851

MAP 0400-5

0400

D
1
A
5

BRING UP MAP

PAGE 6 OF 15

059

-Use the hex code displayed in positions 3 and 4 of line 3 to determine the defective key (refer to 250).

Defective key module (refer to 252).

Defective keyboard PC board (refer to 251).

Check/replace keyboard cable (refer to 255).

060

Is there a card in H4 (APL supervisor)?

Y N

061

(Entry Point C)

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Refer to 248, hex registers display.

-Record RFL0.

-Switch the DISPLAY REGISTERS switch to NORMAL.

Is there a card in M2?

Y N

062

Is there a card in L2?

Y N

063

Defective K2 (read/write storage) card.

Defective K4 (read/write storage) card.

Defective J2 (display) card.

Defective G2 (controller) card.

Defective H2 (I/O and diag) card.

9 7 6
A A A
B C D

A
D
6

MAP 0400-6

064

Is RFL0 recorded 2 steps back between 0000 and 3FFF inclusive?

Y N

065

Is the recorded RFL0 between 4000 and 7FFF inclusive?

Y N

066

Defective G2 (controller) card.

Defective H2 (I/O and diag) card.

067

-Power down.

-Exchange K4 and L4.

-Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

068

Defective read/write storage card is now at K4.

069

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is RFL0 between 4000 and 7FFF inclusive?

Y N

070

Defective read/write storage card is now at K4.

071

Defective read/write storage card is now at L2.

7
A
E

09DEC75 PN 1608387

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MAP 0400-6

0400

A
E
6

BRING UP MAP

PAGE 7 OF 15

072

- Power down.
- Exchange the pair of cards in K with the pair of cards in L.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

073

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective H2 (I/O and diag) card.

074

- Power down.
- Exchange K4 and L4.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

075

- Defective read/write storage card is now at K4.

076

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is RFL0 between 0000 and 3FFF inclusive?

Y N

077

- Defective read/write storage card is now at L2.

078

- Defective read/write storage card is now at K4.

A
C
6

MAP 0400-7

079

Is the recorded RFL0 between 0000 and 3FFF inclusive?

Y N

080

Is the recorded RFL0 between 4000 and BFFF inclusive?

Y N

081

- Power down.
- Exchange the pair of cards in N with the pair of cards in L.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

082

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.
- Defective H2 (I/O and diag) card.

083

(Entry Point H)

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
- Record RFL0.
- Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between 4000 and BFFF inclusive?

Y N

084

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective H2 (I/O and diag) card.

9 8 8
A A A
F G H

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MAP 0400-7

0400

A
H
7

BRING UP MAP

PAGE 8 OF 15

085

Is RFL0 between 4000 and 7FFF inclusive?

Y N

086

- Power down.
- Exchange L4 and M2.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

087

- Defective H2 (I/O and diag) card.
- Defective J2 (display) card.
- Defective G2 (controller) card.

088

(Entry Point J)

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
- Record RFL0.
- Switch the DISPLAY REGISTERS switch to NORMAL.

Is RFL0 between 4000 and 7FFF inclusive?

Y N

089

Is RFL0 between 8000 and BFFF inclusive?

Y N

090

- Defective H2 (I/O and diag) card.
- Defective J2 (display) card.
- Defective G2 (controller) card.

091

Defective read/write storage card is now at M4.

8 8
A A
J KA A A
G J K
7 8 8

MAP 0400-8

092

Defective read/write storage card is now at L4.

093

- Power down.
- Exchange L2 and M4.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

094

- Defective H2 (I/O and diag) card.
- Defective J2 (display) card.
- Defective G2 (controller) card.

095

Go to Page 8, Step 088, Entry Point J.

096

- Power down.
- Exchange the pair of cards in L with the pair of cards in M.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

097

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.
- Defective H2 (I/O and diag) card.

098

Go to Page 7, Step 083, Entry Point H.

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EC 829523 PEC 828851
MAP 0400-8

0400

C A A
1 B F
6 6 7

BRING UP MAP

PAGE 9 OF 15

099

- Power down.
- Exchange the pair of cards in K with the pair of cards in M.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

100

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.
- Defective H2 (I/O and diag) card.

101

Go to Page 7, Step 083, Entry Point H.

102

- Remove the H4 (APL supervisor) card.
- Press RESTART. wait 10 seconds.

Do you get exactly the same failure?

Y N

103

- Defective H4 (APL supervisor) card.

104

- Reinstall the H4 (APL supervisor) card.

Go to Page 6, Step 061, Entry Point C.

105

The ROS content test failed.

- Record line 2 of the display.

Is there 18 in positions 1 & 2 of line 2?

Y N

1 4 9
A A
L M

A M
9 9

MAP 0400-9

106

Is there anything in positions 5 & 6 of line 2?

Y N

107

(refer to 210, display and control panel cable).
(refer to the appendix, the general logic probe).

- Probe H6-B04 (+ APL switch).

Note: when the BASIC-APL switch is switched, RESTART must be pressed to bring up the new language.

Is the UP light on?

Y N

108

Is there a 1 in position 1 of line 2?

Y N

109

Note: when the BASIC-APL switch is switched, RESTART must be pressed to bring up the new language.

- Defective F2 (base I/O) card.
- Defective G2 (controller) card.

110

- Probe the basic select lines:
E2-B13 (-select 1)
E2-D04 (-select 2).

Is one line UP and the other line DOWN?

Y N

1 1 1 1
2 0 0 0
A A A A
N P Q R

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MAP 0400-9

0400

A
O
9

BRING UP MAP

PAGE 10 OF 15

111

Are both lines UP?

Y N

112

-Remove the C4 (BASIC ROS) card.

Now are E2-B13 and E2-D04 both DOWN?

Y N

113

Defective C4 (BASIC ROS) card.

114

Defective E2 (ROS adapter) card.

115

Defective E2 (ROS adapter) card.

116

Do positions 1 & 2 of line 2 contain 11, 12, 13, or 14?

Y N

117

Do positions 1 & 2 of line 2 contain 10 or 15?

Y N

118

Defective E2 (ROS adapter) card.

119

Defective E2 (ROS adapter) card.

Defective C4 (BASIC ROS) card.

1
O
A
S

A
P
9

MAP 0400-10

120

Defective C4 (BASIC ROS) card.

121

Is there a 2 in position 1 of line 2?

Y N

122

Note: when the BASIC-APL switch is switched, RESTART must be pressed to bring up the new language.

Defective F2 (base I/O) card.

Defective G2 (controller) card.

123

-Probe the APL select lines:

E2-B09 (-select APL)

E2-B10 (-select APL)

E2-D02 (-select APL) .

Are 2 lines UP and one line DOWN?

Y N

124

Are all 3 lines UP?

Y N

125

-Remove C2, D2 and D4 (APL ROS) cards.

Now are 2 lines UP and one DOWN?

Y N

126

Defective E2 (ROS adapter) card.

1
A
T
1
A
U
1
A
V

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PEC 828851

MAP 0400-10

0400

A A
U V
1 1
0 0

BRING UP MAP

PAGE 11 OF 15

127

One of C2, D2 and D4 is defective. Reinstall them one at a time. The card that causes more than one of the (-select APL) lines to be DOWN is defective.

128

The following questions all refer to positions 1 & 2 of line 2.

Is 20 displayed?

Y N

129

Is 21, 22, 23, or 24 displayed?

Y N

130

Is 25 displayed?

Y N

131

Is 26, 27, 28, or 29 displayed?

Y N

132

Is 2A displayed?

Y N

133

Defective C2 (APL ROS 3) card.

134

Defective E2 (ROS adapter) card.
Defective C2 (APL ROS 3) card.

135

Defective D4 (APL ROS 2) card.

136

Defective E2 (ROS adapter) card.
Defective D4 (APL ROS 2) card.

1 1
1 1
A A
W X

A A A
T W X
1 1 1
0 1 1

MAP 0400-11

137

Defective D2 (APL ROS 1) card.

138

Defective E2 (ROS adapter) card.
Defective D2 (APL ROS 1) card.

139

Is B09 the line that is DOWN?

Y N

140

Is B10 the line that is DOWN?

Y N

141

Do positions 1 & 2 of line 2 contain 2A, 2B, 2C, 2D, 2E, or 2F?

Y N

142

Defective E2 (ROS adapter) card.

143

Defective C2 (APL ROS 3) card.

144

Do positions 1 & 2 of line 2 contain 25, 26, 27, 28, or 29?

Y N

145

Defective E2 (ROS adapter) card.

146

Defective D4 (APL ROS 2) card.

1
2
A
Y

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MAP 0400-11

0400

BRING UP MAP

PAGE 12 OF 15

A
N
9

147

Do positions 1 & 2 of line 2 contain 20 or 21?

Y N

148

Do positions 1 & 2 of line 2 contain 22, 23, or 24?

Y N

149

Defective E2 (ROS adapter) card.

150

Defective D2 (APL ROS 1) card.

151

Defective E2 (ROS adapter) card.
Defective D2 (APL ROS 1) card.

152

Is there a 1 in position 1 of line 2?

Y N

153

Is there a 2 in position 1 of line 2?

Y N

154

Defective H2 (I/O and diag) card.
Defective G2 (controller) card.

1 1
3 2
A B
Z A

MAP 0400-12

B
A
1
2

155

(refer to 205).

Does the machine have a BASIC-APL switch?

Y N

156

(refer to 210, display and control panel cable).
(refer to the appendix, the general logic probe).

-Probe H6-B04 (+ APL switch).

Is the DOWN light on?

Y N

157

Go to Page 13, Step 163, Entry Point F.

158

Defective F2 (base I/O) card.
Defective H2 (I/O and diag) card.

159

(refer to 210, display and control panel cable).
(refer to the appendix, the general logic probe).

-Probe H6-B04 (+ APL switch).

Is the UP light on?

Y N

160

Is the BASIC-APL switch set to BASIC?

Y N

161

(refer to 210, display and control panel cable).
Defective BASIC-APL switch.

1 1
3 3
B B
B C

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EC 829523 PEC 828851

MAP 0400-12

0400

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

BRING UP MAP

PAGE 13 OF 15

162

Note: when the BASIC-APL switch is switched, RESTART must be pressed to bring up the new language.

Defective F2 (base I/O) card.
Defective H2 (I/O and diag) card.

163

(Entry Point F)

Is there a 0 , 1 , 2 , 3 , or 4 in position 2 of line 2?

Y N

164

Is there a 5 , 6 , 7 , 8 , or 9 in position 2 of line 2?

Y N

165

Defective C2 (APL ROS 3) card.
Defective E2 (ROS adapter) card.

166

Defective D4 (APL ROS 2) card.
Defective E2 (ROS adapter) card.

167

Defective D2 (APL ROS 1) card.
Defective E2 (ROS adapter) card.

168

(refer to 205).

Does the machine have a BASIC-APL switch?

Y N

1 1
3 3
B B
D E

B B
D E
1 1
3 3

MAP 0400-13

169

(refer to 210, display and control panel cable).
(refer to the appendix, the general logic probe).

-Probe H6-B04 (+ APL switch).

Is the UP light on?

Y N

170

Go to Page 14, Step 176, Entry Point B.

171

Defective F2 (base I/O) card.
Defective H2 (I/O and diag) card.

172

(refer to 210, display and control panel cable).
(refer to the appendix, the general logic probe).

-Probe H6-B04 (+ APL switch).

Is the DOWN light on?

Y N

173

Is the BASIC-APL switch set to APL?

Y N

174

(refer to 210, display and control panel cable).

Defective BASIC-APL switch.

1 1
4 4
B B
F G

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MAP 0400-13

0400

A B B
L F G
9 1 1
3 3 3

BRING UP MAP

PAGE 14 OF 15

175

Note: when the BASIC-APL switch is switched, RESTART must be pressed to bring up the new language.

Defective F2 (base I/O) card.

Defective H2 (I/O and diag) card.

176

(Entry Point B)

Is there a 6, 7, or 8 in position 2 of line 2?

Y N

177

Defective C4 (BASIC ROS) card.

Defective E2 (ROS adapter) card.

178

Defective E2 (ROS adapter) card.

179

-Remove the following cards: A2 (I/O cable driver), B2 (expansion feature), D2, D4, C2 (APL ROS 1, 2, 3), and C4 (BASIC ROS).

-Press RESTART. wait 10 seconds.

Is the machine at checkpoint I with 18 in positions 1 & 2 of line 2?

Y N

180

One of the cards removed is suspect. Reinstall them one at a time, pressing RESTART and waiting 10 seconds each time until a card causes a halt at checkpoint I with 18 in positions 1 & 2 of line 2. Record the last card reinstalled.

Is the last card that was reinstalled either A2 or B2?

Y N

1 1 1
4 4 4
B B B
H J KB B B B
H J K
1 1 1
4 4 4

MAP 0400-14

181

The last card that was reinstalled is defective or
Defective E2 (ROS adapter) card.

182

The last card that was reinstalled is defective.

183

-Reinstall A2, B2, C2, C4, D2, and D4 which were removed earlier.

Defective E2 (ROS adapter) card.

Defective F2 (base I/O) card.

Defective G2 (controller) card.

184

Is there a card in A2 or B2?

Y N

185

Defective E2 (ROS adapter) card.

186

Is there a card in A2?

Y N

1 1
5 5
B B
L M

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MAP 0400-14

B B
L M
1 1
4 4

BRING UP MAP

PAGE 15 OF 15

187

(Entry Point G)

-Remove the B2 (expansion feature) card.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

188

-Reinstall the B2 (expansion feature) card.

Defective E2 (ROS adapter) card.
Defective F2 (base I/O) card.

189

Defective B2 (expansion feature) card.

190

-Remove the A2 (I/O cable driver) card.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

1 1
5 5
B B
N P

A B B
1 N P
1 1
5 5

MAP 0400-15

191

-Reinstall the A2 (I/O cable driver) card.

Is there a card in B2?

Y N

192

Defective E2 (ROS adapter) card.

193

Go to Page 15, Step 187, Entry Point G.

194

Defective A2 (I/O cable driver) card and cable assembly.

195

Defective H2 (I/O and diag) card.

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MAP 0400-15

6400

PROCESS CHECK MAP 0420

MAP 0420-1

PAGE 1 OF 17

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

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	021	0400	A
17	205	0500	A

001

(Entry Point A)

-Switch the RUN switch under the covers to not run.

(refer to 200).

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Refer to 248, hex registers display.

IS THE DISPLAY BLANK OR DARK?

Y N

002

-Switch the RUN switch under the covers to run.

-Switch the DISPLAY REGISTERS switch to NORMAL.

-PROBE 'G2-U09' (-BUS IN CHECK).

Is the DOWN light on?

Y N

003

-PROBE 'G2-S08' (-RDR Check).

Is the DOWN light on or pulsing?

Y N

1 1
7 2 6 2
A B C D

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MAP 0420-1

0420

D

PROCESS CHECK MAP

PAGE 2 OF 17

004

-Probe F2-B13 (+DA check).

Is the UP light on?

Y N

005

-Probe F2-D13 (+bus out check).

Is the UP light on?

Y N

006

-Probe E2-D10 (+ DA check) and E2-B11
(+bus out check).

Are both probe points DOWN?

Y N

007

-Probe E2-D10.

Is the UP light on?

Y N

008

-Probe E2-B11.

Is the UP light on?

Y N

009

Defective E2 (ROS adapter) card.

010

Go to Page 4, Step 036,
Entry Point F.

011

Go to Page 5, Step 047,
Entry Point E.6 6
E F G

G

MAP 0420-2

012

-Probe B2-M02 (+bus out parity check) and
B2-J13 (+device address check).Is only the DOWN light on for both probe
points?

Y N

013

-Probe B2-J13.

Is the UP light on?

Y N

014

-Probe B2-M02.

Is the UP light on?

Y N

015

(Entry Point D)

-Probe H2-B10 (- POR switch).

Is the DOWN light on?

Y N

016

-Probe F2-G06 (-machine check).

Is the DOWN light on?

Y N

017

Defective H2 (I/O and diag) card.
Check/replace display and control
panel cable (refer to 210, 241).6 5 4 4 3
H J K L M

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MAP 0420-2

0420

M
2

PROCESS CHECK MAP

PAGE 3 OF 17

018

- Switch the RUN switch under the covers to not run.
- Remove the A2 (I/O cable driver) card if there is one.
- Probe F2-G06.

Is the DOWN light on?

Y N

019

- Switch the RUN switch under the covers to run.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

020

Is the PROCESS CHECK light on?

Y N

021

Go To Map 0400, Entry Point A.

022

- Switch the RUN switch under the covers to not run.

Go to Page 4, Step 030, Entry Point J.

023

- Reinstall the A2 card.

Is the printer the only auxiliary I/O device installed?

Y N

4 4
N P Q

Q

MAP 0420-3

024

Is the auxiliary tape the only auxiliary I/O device installed?

Y N

025

- Power down the printer.
- Remove the auxiliary tape I/O cable from the machine.
- Remove the printer I/O cable from the auxiliary tape and install it into the machine instead.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

026

- Defective A2 (I/O cable driver) card and cable assembly.
- Defective 5103 B1A2 (adapter) card.
- Check/replace I/O signal/power cable from 5103 adapter B1B2 , B1B3 (signal) and B1A1 (pwr) to the 5100.

027

- Defective auxiliary tape control card.
- Defective auxiliary tape C1 (adapter) card.
- Defective tape motor assembly (refer to 202).
- Check/replace the I/O cables (refer to 208 and 580).
- (refer to 304 of the printer MLM) .

4
R

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MAP 0420-3

0420

N P R
3 3 3

PROCESS CHECK MAP

K L
2 2

MAP 0420-4

PAGE 4 OF 17

028

Defective A2 (I/O cable driver) card and cable assembly.
Defective I/O cable terminator in the auxiliary tape.
Check/replace I/O cables (refer to 208 and 580).

029

Defective A2 (I/O cable driver) card and cable assembly.
Defective 5103 B1A2 (adapter) card.
Check/replace I/O cables.

030

(Entry Point J)

-Remove the B2 (expansion feature) card if there is one.

-Probe F2-G06.

Is the DOWN light on?

Y N

031

-Reinstall A2.

Defective B2 (expansion feature) card.

032

-Probe F2-G06 and remove the following cards one at a time until the DOWN light goes off.

E2 (ROS Adapter) card.

F2 (base I/O) card.

G2 (controller) card.

H2 (I/O And diag) card.

The last card removed is defective.

-Reinstall the other cards that were removed.

-Switch the RUN switch under the covers to run.

033

-Remove the H2 (I/O and diag) card.
-Probe H2-B10.

Is the DOWN light on?

Y N

034

Defective H2 (I/O and diag) card.

035

Defective RESTART switch.
Check/replace display and control panel cable (refer to 210, 241).

036

(Entry Point F)

-Probe the bus out lines below. Record the results.

F2-G05 F2-J09

F2-G09 F2-J10

F2-G10 F2-M04

F2-G12 F2-M07.

F2-J05

Are both lights off for any of the probe points?

Y N

037

For the next several steps all of the bus out lines above are the probe points.

Are an odd number of the probe points DOWN?

Y N

5 5 5
S T U

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MAP 0420-4

0420

U
4

PROCESS CHECK MAP

MAP 0420-5

PAGE 5 OF 17

038

(Entry Point B)

- Switch the RUN switch under the covers to not run.
- Remove the B2 (expansion feature) card if there is one.

Did any of the probe points change?

Y N

039

- Remove the A2 (I/O cable driver) if there is one.

Did any of the probe points change?

Y N

040

- Remove the E2 (ROS adapter) card.

Did any of the probe points change?

Y N

041

- Reinstall A2, B2, and E2 .

Defective F2 (base I/O) card.

042

- Reinstall A2 and B2 .

Defective E2 (ROS adapter) card.

043

- Reinstall B2 .

Defective A2 (I/O cable driver) card and cable assembly.

044

Defective B2 (expansion feature) card.

J S T
2 4 4

045

- Defective H2 (I/O and diag) card.
- Defective E2 (ROS adapter) card.
- Defective F2 (base I/O) card.
- And if installed
- Defective A2 (I/O cable driver) card and cable assembly.
- Defective B2 (expansion feature) card.

046

Defective F2 (base I/O) card.

047

(Entry Point E)

- Probe the device address lines below and record the results.

X-LINES	Y-LINES
F2-B07	F2-B09
F2-D02	F2-B10
F2-D07	F2-D10
F2-D09	F2-D11.

Are both lights off for any of the probe points?

Y N

048

Are one X line and one Y line UP and all the others DOWN?

Y N

049

Determine probe points for the next several steps by reading down the left to the first true statement.

Two or more Y lines are UP --probe points are any two Y lines that are UP.
Refer to the list 2 steps back.

Two or more X lines are UP --probe points are any two X lines that are UP.
Refer to the list 2 steps back.

All the Y lines are DOWN --probe points (Step 049 continues)

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MAP 0420-5

6 6
V W

0420

F H V W
2 2 5 5

PROCESS CHECK MAP

C E X Y
1 2

MAP 0420-6

PAGE 6 OF 17

(Step 049 continued)
are all the Y lines.
Refer to the list 2 steps back.

All the X lines are DOWN --probe
points are all the X lines.
Refer to the list 2 steps back.

Go to Page 5, Step 038,
Entry Point B.

050

Defective E2 (ROS adapter) card.
Defective F2 (base I/O) card.
And if installed
Defective A2 (I/O cable driver) card and
cable assembly.
Defective B2 (expansion feature) card.

051

Defective F2 (base I/O) card.

052

Go to Page 2, Step 015, Entry Point D.

053

-Remove the H4 (APL supervisor) card if it is
installed.

Within 10 seconds after RESTART is pressed,
the following events should occur:

1. ABCDEFGH Appears on the top line of the 5
inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or
ABCDEFGHIJK (if in APL) appears on the
display.

Do all three events listed above occur in
sequence after RESTART is pressed?

Y N

X Y

054

-Reinstall the H4 (APL supervisor) card.
-Power down.
-Remove read/write storage cards K2,
K4, L2, L4, M2, M4, N2, and N4.
-Power up. Wait 30 seconds.

Does R3L0 contain AAAA?

Y N

055

Defective G2 (controller) card.
Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective H2 (I/O and diag) card.

056

One of the cards removed is defective.
Reinstall them two at a time (K first,
then L, M and N) to isolate to a pair.
Then replace one of the pair to isolate
the defective card.

057

Defective H4 (APL supervisor) card.

058

Defective G2 (controller) card.
Defective F2 (base I/O) card.

059

Within 10 seconds after RESTART is pressed,
the following events should occur:

1. ABCDEFGH Appears on the top line of the 5
inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or
CLEAR WS appears on the display.

Do all three events listed above occur in
sequence after RESTART is pressed?

Y N

1 7
1 A
Z A

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MAP 0420-6

A
A
6

PROCESS CHECK MAP

PAGE 7 OF 17

060

Are both the PROCESS CHECK light and the IN PROCESS light on while the RESTART switch is pressed?

Y N

061

Defective IN PROCESS light.
Defective RESTART switch.
Check/replace display and control panel cable (refer to 210, 241).

062

Is there a card in H4 (APL supervisor)?

Y N

063

(Entry Point C)

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
-Record RFL0.
Refer to 248, hex registers display.
-Switch the DISPLAY REGISTERS switch to NORMAL.
(refer to 249, checkpoints).

Is the machine at checkpoint H?

Y N

064

Did the machine pass checkpoint A ? If you are not sure, take the NO leg.

Y N

065

-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Does R3L0 contain AAAA?

Y N

1
1 8 8
A A A A A
B C D E FA A
E F

MAP 0420-7

066

-Power down.
-Remove read/write storage cards K2, K4, L2, L4, M2, M4, N2, and N4.
-Power up. Wait 30 seconds.

Does R3L0 contain AAAA?

Y N

067

Defective G2 (controller) card.
Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective H2 (I/O and diag) card.

068

One of the cards removed is defective.
Reinstall them two at a time (K first, then L, M and N) to isolate to a pair. Then replace one of the pair to isolate the defective card.

069

(Entry Point I)

-Power down.
-Remove the read/write storage cards from L2, L4, M2, M4, N2, N4.
-Power up. Wait 30 seconds.

Did either LOAD 0 or CLEAR WS (with no misspelling) appear on one and only one line of the 5 inch display?

Y N

070

Defective K2 (read/write storage) card.
Defective K4 (read/write storage) card.
Defective J2 (display) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

071

One of the read/write storage cards removed is defective.
Reinstall them two at a time (L first, then M, N) to isolate the defective pair. Then replace one of the pair to find the defective card.

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MAP 0420-7

0420

A A
C D
7 7

PROCESS CHECK MAP

PAGE 8 OF 17

072

Defective H2 (I/O and diag) card.
Defective G2 (controller) card.

073

Is there a card in M2?

Y N

074

Is there a card in L2?

Y N

075

Defective K2 (read/write storage) card.
Defective K4 (read/write storage) card.
Defective J2 (display) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

076

Is RFL0 recorded 3 steps above between
0000 and 3FFF inclusive?

Y N

077

Is the recorded RFL0 between 4000 and
7FFF inclusive?

Y N

078

Defective G2 (controller) card.
Defective H2 (I/O and diag) card.
Defective F2 (base I/O) card.

079

-Power down.
-Exchange K4 and L2.
-Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

9 9
A A A A
G H J K

A A
J K

MAP 0420-8

080

Defective read/write storage card is now at
K4.

081

-Switch the DISPLAY REGISTERS switch to
DISPLAY REGISTERS.

Is RFL0 between 4000 and 7FFF inclusive?

Y N

082

Defective read/write storage card is now at
K4.

083

-Power down.
-Exchange the pair of cards in K with the pair of
cards in L.
-Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

084

Defective read/write storage card is now at
K4.

085

-Switch the DISPLAY REGISTERS switch to
DISPLAY REGISTERS.
-Record RFL0.
-Switch the DISPLAY REGISTERS switch to
NORMAL.

Is RFL0 between 4000 and 7FFF inclusive?

Y N

086

Defective read/write storage card is now at
K4.

087

Defective H2 (I/O and diag) card.
Defective G2 (controller) card.
Defective F2 (base I/O) card.

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MAP 0420-8

0420

A
H
8

PROCESS CHECK MAP

PAGE 9 OF 17

088

- Power down.
- Exchange the pair of cards in K with the pair of cards in L.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

089

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.
- Defective H2 (I/O and diag) card.

090

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is RFL0 between 4000 and 7FFF inclusive?

Y N

091

- Defective H2 (I/O and diag) card.
- Defective J2 (display) card.
- Defective F2 (base I/O) card.
- Defective G2 (controller) card.

092

- Power down.
- Exchange K4 and L4.
- Power up. Wait 30 seconds.
- Switch the DISPLAY REGISTERS switch to NORMAL.

Is the machine at checkpoint H?

Y N

093

- Defective read/write storage card is now at K4.

A
L

A
G
L
8

MAP 0420-9

094

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is RFL0 between 0000 and 3FFF inclusive?

Y N

095

- Defective read/write storage card is now at L2.

096

- Defective read/write storage card is now at K4.

097

Is the recorded RFL0 between 0000 and 3FFF inclusive?

Y N

098

Is the recorded RFL0 between 4000 and BFFF inclusive?

Y N

099

- Power down.
- Exchange the pair of cards in N with the pair of cards in L.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

100

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.
- Defective H2 (I/O and diag) card.

1 1 1
1 0 0
A A A
M N P

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MAP 0420-9

0420

A
P
9

PROCESS CHECK MAP

PAGE 10 OF 17

101

(Entry Point H)

-Switch the DISPLAY REGISTERS switch to
DISPLAY REGISTERS.

-Record RFL0.

Is RFL0 between 4000 and BFFF inclusive?

Y N

102

Go to Page 7, Step 069, Entry Point I.

103

Is RFL0 between 4000 and 7FFF inclusive?

Y N

104

-Power down.

-Exchange L4 and M2.

-Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

105

Defective H2 (I/O and diag) card.

Defective J2 (display) card.

Defective G2 (controller) card.

Defective F2 (base I/O) card.

106

(Entry Point K)

-Switch the DISPLAY REGISTERS switch to
DISPLAY REGISTERS.

-Record RFL0.

Is RFL0 between 4000 and 7FFF inclusive?

Y N

107

Is RFL0 between 8000 and BFFF
inclusive?

Y N

A
Q
R
S
TA
N
Q
R
S
T

MAP 0420-10

108

Defective H2 (I/O and diag) card.

Defective J2 (display) card.

Defective G2 (controller) card.

Defective F2 (base I/O) card.

109

Defective read/write storage card is
now at M4.

110

Defective read/write storage card is now at
L4.

111

-Power down.

-Exchange L2 and M4.

-Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

112

Defective H2 (I/O and diag) card.

Defective J2 (display) card.

Defective G2 (controller) card.

Defective F2 (base I/O) card.

113

Go to Step 106, Entry Point K.

114

-Power down.

-Exchange the pair of cards in L with the pair of
cards in M.

-Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

115

Defective J2 (display) card.

Defective G2 (controller) card.

Defective F2 (base I/O) card.

Defective H2 (I/O and diag) card.

T
A
U

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MAP 0420-10

0420

Z
6
A
B
7
A
M
9
A
U
1
O

PROCESS CHECK MAP

PAGE 11 OF 17

116

Go to Page 10, Step 101,
Entry Point H.

117

- Power down.
- Exchange the pair of cards in K with the pair of cards in M.
- Power up. Wait 30 seconds.

Is the machine at checkpoint H?

Y N

118

- Defective J2 (display) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.
- Defective H2 (I/O and diag) card.

119

Go to Page 10, Step 101, Entry Point H.

120

- Remove the H4 (APL supervisor) card.
- Press RESTART. wait 10 seconds.

Do you get exactly the same failure?

Y N

121

- Defective H4 (APL supervisor) card.

122

- Reinstall the H4 (APL supervisor) card.

Go to Page 7, Step 063, Entry Point C.

123

- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
- Refer to 248, hex registers display.
- Record read/write storage size.

Does read/write storage size= 3FFF?

Y N

1
2
A
V
A
W

A
W

MAP 0420-11

124

Does read/write storage size= 7FFF?

Y N

125

Does read/write storage size= BFFF?

Y N

126

- Defective H2 (I/O and diag) card.
- Defective H4 (APL supervisor) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.

127

Is there a card in N2?

Y N

128

- Defective H2 (I/O and diag) card.
- Defective H4 (APL supervisor) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.

129

- Defective N2 (read/write storage) card.
- Defective N4 (read/write storage) card.
- Defective H2 (I/O and diag) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.

130

Is there a card in M2?

Y N

131

- Defective H2 (I/O and diag) card.
- Defective H4 (APL supervisor) card.
- Defective G2 (controller) card.
- Defective F2 (base I/O) card.

1
2
A
X

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MAP 0420-11

0420

B A A
1 1 1

PROCESS CHECK MAP

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132

Defective M2 (read/write storage) card.
Defective M4 (read/write storage) card.
Defective H2 (I/O and diag) card.
Defective G2 (controller) card.
Defective F2 (base I/O) card.

133

Is there a card in L2?

Y N

134

Defective H2 (I/O and diag) card.
Defective H4 (APL supervisor) card.
Defective G2 (controller) card.
Defective F2 (base I/O) card.

135

Defective L2 (read/write storage) card.
Defective L4 (read/write storage) card.
Defective H2 (I/O and diag) card.
Defective G2 (controller) card.
Defective F2 (base I/O) card.

136

(refer to 249, checkpoints).

Is the machine at checkpoint A?

Y N

137

Is the machine at checkpoint E?

Y N

138

-Switch the RUN switch under the covers to not run.
(refer to 200).
-Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
Refer to 248, hex registers display.

Is R0L0 less than 005E?

Y N

1 1 1
7 6 5
A A B B
Y Z A B

B B

MAP 0420-12

139

Is R0L0 in the range 0430 to 04BC?

Y N

140

(Entry Point G)

-Switch the RUN switch under the covers to run.
-Probe the device address lines and record those that are UP.

X1 F2-B07 X0 F2-D07
Y0 F2-B09 X2 F2-D09
Y2 F2-B10 Y1 F2-D10
X3 F2-D02 Y3 F2-D11.

Are exactly two of the lines UP?

Y N

141

Defective F2 (base I/O) card.
Defective G2 (controller) card.

142

Are B07 and B09 the two lines UP?

Y N

143

Are B07 and D10 or D02 and B10 the lines UP?

Y N

144

Are B09 and D09 the two lines UP?

Y N

145

Are D07 and D10 the two lines UP?

Y N

1 1 1 1 1 1
5 3 3 3 3 3
B B B B B B
C D E F G H

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MAP 0420-12

0420

B B B B B
D E F G H
1 1 1 1 1
2 2 2 2 2

PROCESS CHECK MAP

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146

Defective G2 (controller) card.
Defective F2 (base I/O) card.

147

Defective E2 (ROS adapter) card.
Defective G2 (controller) card.
Defective F2 (base I/O) card.

148

Defective B2 (expansion feature) card.
Defective G2 (controller) card.
Defective F2 (base I/O) card.

149

Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective A2 (I/O cable driver) card and cable assembly.
Defective auxiliary tape control card.
Defective auxiliary tape C1 (adapter) card.
Defective 5103 B1A2 (adapter) card.
Check/replace the I/O signal/power cable from auxiliary tape drive adapter A1B1, A1B2, (signal) and A1A4 (pwr) to base machine.
Check/replace I/O signal/power cable from printer adapter B1B2, B1B3 (signal) and B1A1 (pwr) to the 5100.
Defective I/O cable terminator in auxiliary tape.
Check/replace I/O cables.

150

Did the error occur while keying?

Y N

151

Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable (refer to 255).

B
J

MAP 0420-13

152

The keyboard generates odd parity which is passed to bus in.
(refer to 255).

-Press RESTART. wait 10 seconds.
-Press the 9 key on the amphameric keyboard.
-Probe G2-U09 (-bus in check).

Is the DOWN light on?

Y N

153

-Press the Z key.
-Probe G2-U09 (-bus in check).

Is the DOWN light on?

Y N

154

-Press the W key.
-Probe G2-U09 (-bus in check).

Is the DOWN light on?

Y N

155

-Press the 6 key on the alphameric keyboard.
-Probe G2-U09 (-bus in check).

Is the DOWN light on?

Y N

156

-Hold the shift key and press the Z key.
-Probe G2-U09 (-bus in check).

Is the DOWN light on?

Y N

B
J

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

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MAP 0420-13

0420

B
P
1
3

PROCESS CHECK MAP

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157

-Press all keys until one gives a bus in check.
-Using the key codes chart find the hex value for the failing key (refer to 250).
-Press and hold the failing key and probe the KEYBOARD DATA BUS (note: DOWN is a 1, UP is a 0).

5 F2-J11	6 F2-M12
2 F2-M08	4 F2-P02
7 F2-M09	3 F2-P05
P F2-M10	1 F2-U02.
0 F2-M11	

Is the data on the bus correct?

Y N

158

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

159

Defective F2 (base I/O) card.

160

-Press and hold the shift and the Z keys.
-Probe F2-M11 (-keyboard data bit 0).

Is the DOWN light on?

Y N

161

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

162

Defective F2 (base I/O) card.

B
M
1
3

MAP 0420-14

163

-Press and hold the 6 key on the alphameric keyboard.
-Probe F2-P05 (-keyboard data bit 3).

Is the DOWN light on?

Y N

164

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

165

Defective F2 (base I/O) card.

166

-Probe F2-M10 (-keyboard P bit).
-Press and hold the W key.

Is the UP light on?

Y N

167

-Probe F2-M10
-Disconnect the keyboard cable at Z4.

Is the UP light on?

Y N

168

Defective F2 (base I/O) card.

169

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

170

Defective F2 (base I/O) card.

0420

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MAP 0420-14

B B
K L
1 1
3 3

PROCESS CHECK MAP

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171

- Press and hold the Z key.
- Probe the keyboard data bus
- 5 F2-J11 6 F2-M12
- 2 F2-M08 4 F2-P02
- 7 F2-M09 3 F2-P05
- P F2-M10 1 F2-U02.
- 0 F2-M11

Are bits 0 and 3 UP and all the rest DOWN?

Y N

172

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

173

Defective F2 (base I/O) card.

174

- Press and hold the 9 key on the alphameric keyboard.
- Probe the keyboard data bus
- 5 F2-J11 6 F2-M12
- 2 F2-M08 4 F2-P02
- 7 F2-M09 3 F2-P05
- P F2-M10 1 F2-U02.
- 0 F2-M11

Are all bits 0-7 UP and the P bit DOWN?

Y N

175

Any bit 0-7 DOWN?

Y N

176

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

B B
R S

B B B B
A C R S
1 1
2 2

MAP 0420-15

177

- Remove the Z4 (keyboard) cable.
- Probe the keyboard data bus again
- 5 F2-J11 6 F2-M12
- 2 F2-M08 4 F2-P02
- 7 F2-M09 3 F2-P05
- P F2-M10 1 F2-U02.
- 0 F2-M11

Are any bits DOWN?

Y N

178

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

179

-Connect the Z4 (keyboard) cable.

Defective F2 (base I/O) card.

180

Defective F2 (base I/O) card.
Defective G2 (controller) card.

181

-Switch the RUN switch under the covers to run.

Does R3L0 contain AAAA?

Y N

182

Go to Page 12, Step 140, Entry Point G.

183

Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

184

-Switch the RUN switch under the covers to run.

Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

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MAP 0420-15

0420

A
Z
T
2

PROCESS CHECK MAP

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185

Is there a 5 or an E on line 2?

Y N

186

Is there an 8 on line 2?

Y N

187

Is there a 1 on line 2?

Y N

188

Defective F2 (base I/O) card.
Defective G2 (controller) card.

189

Defective E2 (ROS adapter) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.

190

Defective B2 (expansion feature) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.

191

-Remove the A2 (I/O cable driver) card if one is installed.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

192

Defective F2 (base I/O) card.
Defective G2 (controller) card.

B
TB
T

MAP 0420-16

193

- Reinstall A2 .
- Disconnect the I/O cables to the auxiliary tape and the printer.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

194

Defective A2 (I/O cable driver) card and cable assembly.

195

-Connect the printer ,if there is one, directly into the machine.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

196

Defective A2 (I/O cable driver) card and cable assembly.
Defective 5103 B1A2 (adapter) card.
Check/replace I/O cables.

1
7
B
U

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PEC 829523

MAP 0420-16

0420

A B
Y U
1 1
2 6

PROCESS CHECK MAP

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197

Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective A2 (I/O cable driver) card and cable assembly.
Defective auxiliary tape control card.
Defective auxiliary tape C1 (adapter) card.
CHECK/REPLACE THE 'I/O' CABLES.

198

-Probe the bus in (0-7,p) lines
5 F2-G11 0 F2-P12
4 F2-M02 6 F2-P13
3 F2-M05 P F2-S10
2 F2-P09 1 F2-U05.
7 F2-P10

Are any lines DOWN?

Y N

199

Defective G2 (controller) card.

200

-Power down the printer.
-Disconnect the auxiliary I/O cable to the printer and the auxiliary tape drive.
-Probe the bus in line that is DOWN.

Is the DOWN light on?

Y N

201

Defective 5103 B1A2 (adapter) card.
Check/replace I/O cables.
Defective auxiliary tape control card.
Defective auxiliary tape C1 (adapter) card.

B
V

A B
1 V

MAP 0420-17

202

-Connect the auxiliary I/O cable to the printer and the auxiliary tape drive.
-Power up the printer.
-Remove the A2 (I/O cable driver) card.
-Remove the B2 (expansion feature) card.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

203

-Reinstall the A2 and B2 cards.

Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective E2 (ROS adapter) card.

204

Reinstall the A2 and B2 cards one at a time. Press RESTART each time. The card that causes the PROCESS CHECK light to come on is defective.

205

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

Go To Map 0500, Entry Point A.

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MAP 0420-17

0420

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0420	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
6	061	0400	A
1	003	0700	A
2	015	0700	A
8	088	0700	A
7	072	0700	A

001

(Entry Point A)

Note: brightness, focus, height, width, tilt, positioning, and linearity problems may be corrected by an adjustment (refer to 240).

- Press the bottom of the REVERSE DISPLAY switch.
- Probe J2-M03 (-reverse display).
(refer to the appendix, the general logic probe).

Is the UP light on?

Y N

002

- Calibrate the CE meter (refer to 270).
- Measure the following voltages with reference to J6-C02 (gnd):

+12 vdc J6-E04
+8.5 vdc J2-J11
+5 vdc J2-D03
(refer to 272).

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

003

Go to MAP 0700, Entry Point A.

A B
1 1

DISPLAY MAP

PAGE 2 OF 10

004

-Probe J2-M03 (-reverse display).

Is the DOWN light on?

Y N

005

Defective J2 (display) card.

Defective REVERSE DISPLAY switch.

Check/replace display and control panel cable (refer to 210, 241).

006

-Remove the J2 (display) card.

-Probe J2-M03 (-reverse display).

Is the DOWN light on?

Y N

007

Defective J2 (display) card.

008

-Reinstall the J2 (display) card.

Defective REVERSE DISPLAY switch.

Check/replace display and control panel cable (refer to 210, 241).

009

-Press the top of the REVERSE DISPLAY switch.

-Probe J2-M03 (-reverse display).

Is the DOWN light on?

Y N

010

Defective REVERSE DISPLAY switch.

Check/replace display and control panel cable (refer to 210, 241).

C
2

MAP 0500-2

011

-Press the bottom of the REVERSE DISPLAY switch.

-Adjust the BRIGHTNESS control to the center of its range.

Is the 5 inch display completely dark?

Y N

012

-Attach a jumper from J2-P02 (- I/O display off) to D08 (gnd).

Is there video (any black image) within the raster area of the 5 inch display?

Y N

013

(refer to 240, display raster).

Is the raster a stable white background of the correct size and shape?

Y N

014

-Remove the jumper from J2-P02.

-Calibrate the CE meter (refer to 270).

-Measure +12 vdc from J6-E04 (+12 vdc) to J6-C02 (gnd).
(refer to 241 display Z3 socket locations).

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

Y N

015

Go to MAP 0700, Entry Point A.

016

-Probe J2-J02 (-external vertical sync).

Are both lights on?

Y N

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EC 829670 PEC 828851

MAP 0500-2

0500

2
C8 8 3 3 3
D E F G H

F G H
2 2 2

DISPLAY MAP

PAGE 3 OF 10

017

- Disconnect the cable from Z3.
- Probe J2-J02.

Are both lights on?

Y N

018

- Connect the Z3 (display and control panel) cable.

Defective J2 (display) card.

019

Defective display assembly.
Check/replace display and control panel cable (refer to 210, 241).

020

Defective J2 (display) card.
Defective display assembly.
Check/replace display and control panel cable (refer to 210, 241).

021

- Remove the jumper from J2-P02.
- Press the top of the REVERSE DISPLAY switch.

Is the background of the 5 inch display now black instead of white?

Y N

022

Defective J2 (display) card.

J
3

MAP 0500-3

023

- Press the bottom of the REVERSE DISPLAY switch.
- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Is there video (any black image) within the raster area of the display screen?

Y N

024

- Probe J2-P02 (- I/O display off).

Is only the DOWN light on?

Y N

025

- Probe J2-B12 (-machine video)

Are both lights on?

Y N

026

- Disconnect the cable from Z3.
- Probe J2-B12.

Are both lights on?

Y N

027

Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.

028

Defective display assembly.
Check/replace display and control panel cable (refer to 210, 241).

029

- Probe the following pins:
J2-J05 (+C2), J2-P04 (+C4).

Are both lights on for all probe points?

Y N

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MAP 0500-3

3
J

4 4 4 4
K L M N

0500

M N
3 3

DISPLAY MAP

PAGE 4 OF 10

030

- Remove the J2 card.
- Probe J2-J05 and J2-P04 again.

Are both lights on for all probe points?

Y N

031

- Remove the A2 card.
- Probe J2-J05 and J2-P04 again.

Are both lights on for all probe points?

Y N

032

- Defective F2 (base I/O) card.
- Defective G2 (controller) card.

033

- Defective A2 (I/O cable driver) card and cable assembly.

034

- Defective J2 (display) card.

035

- Remove the A2 (I/O cable driver) card.

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

4 4
P QK L P Q
3 3 4 4

MAP 0500-4

036

- Reinstall A2.

- Defective F2 (base I/O) card.
- Defective G2 (controller) card.
- Defective J2 (display) card.
- Defective display assembly.
- Check/replace display and control panel cable (refer to 210, 241).

037

- Defective A2 (I/O cable driver) card and cable assembly.

038

- Defective J2 (display) card.
- Defective F2 (base I/O) card.
- Defective G2 (controller) card.

039

- Switch the RUN switch under the covers to not run.
- Observe the 5 inch display.
- Switch the DISPLAY REGISTERS switch to NORMAL then back to DISPLAY REGISTERS.

Is the video different in DISPLAY REGISTERS than in NORMAL ?

Y N

040

- Switch the RUN switch under the covers to run.
- Probe J2-B06 (-hex)

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

5 5 5
R S T

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MAP 0500-4

0500

R S T
4 4 4

DISPLAY MAP

U V W
5 5 5

MAP 0500-5

PAGE 5 OF 10

041

- Remove the J2 (display) card.
- Probe J2-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

042

- Reinstall the J2 (display) card.

Defective DISPLAY REGISTERS switch.
Refer to 210).
Check/replace display and control panel cable.
(refer to 210, 241).

043

Defective J2 (display) card.

044

Defective J2 (display) card.

045

- Probe J2-P04 (+C4).

Are both lights on?

Y N

046

- Probe J2-PO4.

Are both lights off?

Y N

5 5 5
U V W

047

- Remove the A2 (I/O cable driver) card if one is installed.
- Probe J2-PO4.

Are both lights on?

Y N

048

- Reinstall A2.

Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective J2 (display) card.

049

Defective A2 (I/O cable driver) card and cable assembly.

050

Defective F2 (base I/O) card.

051

- 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

052

Defective J2 (display) card.
Defective display L32-64-R32 switch.
Check/replace display and control panel cable (refer to 210, 241).

6
X

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EC 829670 PEC 828851
MAP 0500-5

0500

X
5

DISPLAY MAP

PAGE 6 OF 10

053

- Switch the RUN switch under the covers to run.
- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.

Does the failure appear as vertical lines on the display?

Y N

054

- Switch the RUN switch under the covers to not run.

Is the video on the display stable?

Y N

055

- Switch the RUN switch under the covers to run.
- Probe K6-A02 (-external vertical sync). (refer to 241 display Z3 socket locations).

Are both lights on?

Y N

056

- Disconnect the cable from Z3.
- Probe K6-A02.

Are both lights on?

Y N

057

- Connect the Z3 (display and control panel) cable.

Defective J2 (display) card.

058

- Defective display assembly.
- Check/replace display and control panel cable (refer to 210, 241).

Z A
6 A
6

MAP 0500-6

059

- Defective display assembly.
- Check/replace display and control panel cable (refer to 210, 241).

060

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

Within 10 seconds after RESTART is pressed, the following events should occur:

1. ABCDEFGH Appears on the top line of the 5 inch display.
2. ABCDEFGHI Appears on the top line.
3. The top line is blanked and either LOAD 0 or CLEAR WS appears on the display.

Do all three events listed above occur in sequence after RESTART is pressed?

Y N

061

Go to MAP 0400, Entry Point A.

062

Is there a flashing cursor displayed on the line below CLEAR WS or LOAD 0 and nowhere else?

Y N

063

- Power down.
- Remove the storage cards L2, L4, M2, M4, N2, and N4.
- Power up. Wait 30 seconds.

Is there a flashing cursor displayed on the line below CLEAR WS or LOAD 0 and nowhere else?

Y N

7 6 A
Y Z A7 7 7
A A A
B C D

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MAP 0500-6

0500

A A A
B C D
6 6 6

DISPLAY MAP

PAGE 7 OF 10

064

Defective K2 (read/write storage) card.
Defective K4 (read/write storage) card.
Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

065

One of the cards removed is defective.
Reinstall them two at a time (L first, then M, N) to isolate to a pair. Then replace one of the pair to find the defective card.

066

-Enter the following characters in order:
4455@@@

Is 4455@@@ followed by a flashing cursor displayed on the line below CLEAR WS or LOAD 0 and nowhere else?

Y N

067

-Power down.
-Remove the storage cards L2, L4, M2, M4, N2, and N4.
-Power up. Wait 30 seconds.
-Enter the following characters in order:
4455@@@

Is 4455@@@ followed by a flashing cursor displayed on the line below CLEAR WS or LOAD 0 and nowhere else?

Y N

068

One of the cards removed is defective.
Reinstall them two at a time (L first, then M, N) to isolate to a pair. Then replace one of the pair to find the defective card.

7 7
A A
E F

Y A A
6 E F
7 7

MAP 0500-7

069

Defective K2 (read/write storage) card.
Defective K4 (read/write storage) card.
Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

070

Defective K2 (read/write storage) card.
Defective K4 (read/write storage) card.
Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

071

-Measure +8.5 vdc at board location C1-C13.

Is the voltage in tolerance (+7.8 vdc to +9.3 vdc)?

Y N

072

Go to MAP 0700, Entry Point A.

073

-Measure J2-J11 (+8.5 vdc) to J2-D08 (gnd).

Is the voltage in tolerance (+7.8 vdc to +9.3 vdc)?

Y N

074

The circuit is open between the power supply connector Y1 (A1 board location C1-C13) and J2-J11.

075

Defective J2 (display) card.

E
2

DISPLAY MAP

PAGE 8 OF 10

076

-Probe J2-J05 (-C2 PWRD).

Are both lights on?

Y N

077

Is the DOWN light on?

Y N

078

Defective G2 (controller) card.
Defective F2 (base I/O) card.

079

-Remove the A2 (I/O cable driver) if it is installed.

Are both lights on?

Y N

080

-Remove the E2 (ROS adapter) card.

Are both lights on?

Y N

081

-Reinstall A2 and E2.

Defective J2 (display) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.

082

-Reinstall A2.

Defective E2 (ROS adapter) card.

083

Defective A2 (I/O cable driver) card and cable assembly.
Defective printer B1A2 (adapter) card.

084

Defective J2 (display) card.

D
2

MAP 0500-8

085

(Entry Point B)

Check closely --- is the machine CRT filament glowing (observe through the glass at the socket end of the CRT)?

Y N

086

-Calibrate the CE meter (refer to 270).
-Measure +12 vdc from J6-E04 to J6-C02 (gnd).
(refer to 241 display Z3 socket locations).

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

Y N

087

-Disconnect the cable from Z3.
(refer to 209.)

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

Y N

088

-Connect the Z3 (display and control panel) cable.

Go to MAP 0700, Entry Point A.

089

Defective display assembly.
Check/replace display and control panel cable (refer to 210, 241).

090

Defective display assembly.
Check/replace display and control panel cable (refer to 210, 241).

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MAP 0500-8

9
A
G

0500

A
G
8

DISPLAY MAP

PAGE 9 OF 10

091

-Probe J2-P07 (+C5).

Are both lights on?

Y N

092

(refer to 209.)

Is there a card in A2?

Y N

093

(Entry Point C)

-Remove the E2 (ROS adapter) card.

-Probe J2-P07.

Are both lights on?

Y N

094

-Reinstall the E2 (ROS adapter) card.

Defective G2 (controller) card.

Defective F2 (base I/O) card.

095

Defective E2 (ROS adapter) card.

096

-Remove the A2 (I/O cable driver) card.

-Probe J2-P07.

Are both lights on?

Y N

097

Reinstall the A2 (I/O cable driver) card.

Go to Page 9, Step 093, Entry Point C.

098

Defective A2 (I/O cable driver) card and cable assembly.

9
A
HA
H
9

MAP 0500-9

099

-Probe J2-B09 (+external horizontal drive).

Are both lights on?

Y N

100

(refer to 209.)

Is there a card in A2?

Y N

101

(Entry Point D)

-Disconnect the cable from Z3.

-Probe J2-B09.

Are both lights on?

Y N

102

-Connect the Z3 (display and control panel) cable.

Defective J2 (display) card.

103

Defective display assembly.

Check/replace display and control panel cable (refer to 210, 241).

104

-Remove the A2 (I/O cable driver) card.

-Probe J2-B09.

Are both lights on?

Y N

105

-Reinstall the A2 (I/O cable driver) card.

Go to Page 9, Step 101, Entry Point D.

106

Defective A2 (I/O cable driver) card and cable assembly.

1
O
A
J

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MAP 0500-9

0500

A
J
9

DISPLAY MAP

MAP 0500-10

PAGE 10 OF 10

107

-Probe J2-B12 (-machine video).

Are both lights on?

Y N

108

-Disconnect the cable from Z3.

-Probe J2-B12.

Are both lights on?

Y N

109

-Connect the Z3 (display and control panel)
cable.

Defective J2 (display) card.

110

Defective BRIGHTNESS control.

Check/replace display and control panel cable
(refer to 210, 241).

111

-Probe H6-E04 (-machine video).

(refer to 241 display Z3 socket locations).

Are both lights on?

Y N

112

Defective BRIGHTNESS control.

Check/replace display and control panel cable
(refer to 210, 241).

113

Defective display assembly.

Check/replace display and control panel cable
(refer to 210, 241).

0500

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PEC 828851

MAP 0500-10

TV MONITOR MAP 0510

PAGE 1 OF 2

ENTRY POINTS

FROM ENTER THIS MAP			
MAP	ENTRY	PAGE	STEP
NUMBER	POINT	NUMBER	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

Defective 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 J2-B13 (-machine video) to J2-J02 (+monitor video).

This forces a video signal to the TV monitor.

Is there any video on the TV monitor?

Y N

005

Is the 5 inch display dark?

Y N

B C D
1 1 1

MAP 0510-1

006

-Disconnect the TV monitor from the machine.
-Probe the center conductor on the xxxx TV monitor socket.

Are both lights on?

Y N

007

-Remove the jumper.

Defective J2 (display) card.
Check /replace machine TV monitor cable (refer to 210).

008

-Remove the jumper.

Defective TV monitor.

009

-Disconnect the TV monitor from the machine.

Is the 5 inch display dark?

Y N

010

-Remove the jumper.

Defective TV monitor.

011

-Remove the jumper.

Defective J2 (display) card.
Check /replace machine TV monitor cable (refer to 210).

012

Defective J2 (display) card.

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MAP 0510-1

2 1 1 1
A B C D

0510

A
1

TV MONITOR MAP

MAP 0510-2

PAGE 2 OF 2

013

Defective J2 (display) card.

Check/replace machine TV monitor cable (refer to 210).

Defective TV monitor.

0510

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EC 828851 PEC -----

MAP 0510-2

PAGE 1 OF 8

ENTRY POINTS

FROM ENTER THIS MAP			
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0300	A	1	001
0845	A	1	001
0900	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
8	081	0420	A
2	006	0700	A

001

(Entry Point A)

Can you make the machine fail?

Y N

$$\begin{matrix} 2 & 2 \\ A & B \end{matrix}$$

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MAP 0600-1

A B
1 1

KEYBOARD MAP

PAGE 2 OF 8

002

(Entry Point B)

Keyboard intermittent failures procedure.

Perform the following actions, one on each call until the problem is corrected:

1. Clean the keyboard PC board (refer to 251).
Reseat the keyboard cable at both ends.
Date / /

2. Replace the keyboard PC board (refer to 251).
Date / /

3. Replace the all keys assembly (refer to 251).
Date / /

4. Replace the F2 (base I/O) card.
Date / /

5. Replace the G2 (controller) card.
Date / /

6. Replace the H2 (I/O & diag) card.
Date / /

7. Replace the power supply.

* CAUTION *

Refer to 271, power supply removal and replacement.

Date / /

003

Is the PROCESS CHECK light on?

Y N

8 2
C DD
2

MAP 0600-2

004

-Calibrate the CE meter (refer to 270).

-For the probe points (refer to 204).

-Measure +8.5 vdc and +5.0 vdc at the keyboard PC board with reference to 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

005

-Measure +8.5 vdc and +5.0 vdc at the A1 board.
(refer to 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

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable (refer to 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 F2-S05 (-keyboard lockout).

(refer to the appendix, the general logic probe).

Is the UP light on?

Y N

4 3 3
E F G

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EC 828851 PEC -----
MAP 0600-2

0600

F G
2 2

KEYBOARD MAP

PAGE 3 OF 8

010

- Disconnect the keyboard cable at Z4.
- Probe F2-S05 (-keyboard lockout).

Is the DOWN light on?

Y N

011

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

012

- Connect the keyboard cable at Z4.

Defective F2 (base I/O) card.

013

- Probe F2-U12 (-keyboard strobe).

Is the DOWN light on?

Y N

014

- Press and hold the P key.
- Probe F2-U12 (-keyboard strobe).

Is the DOWN light on?

Y N

015

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

016

- Release the P key.
- Probe F2-U06 (-interrupt req 3).

Is the DOWN light on?

Y N

4 3 3
H J K

J K
3 3

MAP 0600-3

017

- Probe F2-U06 (-interrupt req 3).
- Observe the DOWN light while sequentially pressing keys.

Does the DOWN light come on?

Y N

018

Defective F2 (base I/O) card.

019

Bit 3 is the command bit, if it is on it may be causing the problem.

- Probe F2-P05 (-keyboard data bus 3) while pressing the P key.

Is the DOWN light on?

Y N

020

Defective G2 (controller) card.
Defective F2 (base I/O) card.

021

Defective CMD key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

022

- Disconnect the keyboard cable at Z4.
- Probe F2-U06 (-interrupt req 3).

Is the DOWN light on?

Y N

023

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

4
L

07JUL75 PN 1608391

EC 828851 PEC -----

MAP 0600-3

0600

E H L
2 3 3

KEYBOARD MAP

PAGE 4 OF 8

024

-Connect the keyboard cable at Z4.

Defective F2 (base I/O) card.
Defective G2 (controller) card.

025

-Remove the keyboard cable at Z4.
(refer to 209.)
-Probe F2-U12 (-keyboard strobe).

Is the UP light on?

Y N

026

-Connect the keyboard cable at Z4.

Defective F2 (base I/O) card.

027

-Connect the keyboard cable at Z4.

Defective ATTN or HOLD key module
(refer to 252).

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

028

Did QP appear on the display?

Y N

029

Did the uppercase character for the Q key
display?

Y N

6 5 4
M N P

P
4

MAP 0600-4

030

Did only one character display?

Y N

031

-Press and hold the K key.
-Press RESTART. wait 10 seconds.
(refer to 249, checkpoints).

Is the machine at checkpoint G?

Y N

032

-Release the K key.

Did either LOAD 0 or CLEAR WS (with
no misspelling) appear on one and only
one line of the 5 inch display?

Y N

033

Defective H2 (I/O and diag) card.

034

Defective ATTN or HOLD key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

035

-Release the K key.

Do positions 3 and 4 of line 3 on the
display contain 30?

Y N

036

Defective H2 (I/O and diag) card.

5 5
Q R

07JUL75 PN 1608391
EC 828851 PEC -----
MAP 0600-4

0600

Q R
4 4

KEYBOARD MAP

PAGE 5 OF 8

037

Defective CMD key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

038

(Entry Point C)

You are checking for keys failing to generate a strobe.

-Press the failing key.

-Probe F2-U12 (-keyboard strobe).

Is the DOWN light on?

Y N

039

Defective key module (refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

040

-Probe F2-P05 (-bit 3).

Is the DOWN light on?

Y N

041

Using the keyboard data chart
(refer to 250).

-Probe the keyboard data bus.

5 F2-J11	6 F2-M12
2 F2-M08	4 F2-P02
7 F2-M09	3 F2-P05
P F2-M10	1 F2-U02.
0 F2-M11	

Is the data correct for the key pressed?

Y N

5 5 5
S T U

N S T U
4 5 5 5

MAP 0600-5

042

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

043

The correct data is coming from the keyboard.

Defective F2 (base I/O) card.

Defective G2 (controller) card.

Defective J2 (display) card.

Defective H2 (I/O and diag) card.

044

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

045

-Press and hold the X key.

-Press RESTART .

-When the machine halts at checkpoint G,
release the X key.

Do positions 3 and 4 of line 3 of the display
contain 6C?

Y N

046

Do positions 3 and 4 of line 3 of the display
contain EC?

Y N

047

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

07JUL75 PN 1608391

EC 828851 PEC -----

MAP 0600-5

6 6
V W

0600

M V W
4 5 5

KEYBOARD MAP

PAGE 6 OF 8

048

Defective left shift key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

049

Defective right shift key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

050

Refer to section 4-keyboard, typamatic function.

-Press and hold the P key.

Does the P key perform the typamatic function?

Y N

051

Do both shift keys function?

Y N

052

Do both shift keys fail?

Y N

053

Defective shift key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

8 6 6
X Y Z

Y Z
6 6

MAP 0600-6

054

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

055

-Press and hold the CMD key. Then press and hold the A key.
-Press RESTART. wait 10 seconds.
-Release the CMD and the A keys.

Did either LOAD 0 or CLEAR WS (with no misspelling) appear on one and only one line of the 5 inch display?

Y N

056

(refer to 249, checkpoints).

Is the machine at checkpoint G?

Y N

057

Defective H2 (I/O and diag) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.

058

Do positions 3 and 4 of line 3 on the display contain 3F?

Y N

059

-Press RESTART. wait 10 seconds.
-Press and hold the CMD key.
-Press and hold the P key.
-Probe F2-P05 (-keyboard bit 3).

Is the DOWN light on?

Y N

7 7 7 7
A A A A
A B C D

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EC 828851 PEC -----

MAP 0600-6

0600

A A A
B C D
6 6 6

KEYBOARD MAP

PAGE 7 OF 8

060

Defective CMD key module
(refer to 252).
Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

061

Defective F2 (base I/O) card.
Defective G2 (controller) card.
Defective H2 (I/O and diag) card.

062

-Press RESTART. wait 10 seconds.
-Press and hold the space bar.

Does the typamatic function work?

Y N

063

-Press and hold the SPACE bar.
-Probe F2-U07 (+typamatic).

Is the UP light on?

Y N

064

-Remove the keyboard cable at Z4.
-Probe F2-U07 (+typamatic).

Is the DOWN light on?

Y N

065

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

066

Defective F2 (base I/O) card.

7 7
A A
E F

A A A
A E F
6 7 7

MAP 0600-7

067

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

068

-Press and hold the P key for about 5 seconds.

Does the P key perform the typamatic function?

Y N

069

-Press all the keys one by one.

Does any key fail to function?

Y N

070

Go to Page 2, Step 002, Entry Point B.

071

Go to Page 5, Step 038, Entry Point C.

072

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

073

-Press the A key.

Is an A displayed?

Y N

074

Defective key module (refer to 252).

8
A
G

07JUL75 PN 1608391
EC 828851 PEC -----
MAP 0600-7

0600

C X A
2 6 7

KEYBOARD MAP

MAP 0600-8

PAGE 8 OF 8

075

Defective H2 (I/O and diag) card.
Defective F2 (base I/O) card.
Defective G2 (controller) card.

076

-Probe F2-U07 (+typamatic).

Is the UP light on?

Y N

077

-Press and hold the A key
-Probe F2-U12 (-keyboard strobe).

Are both lights on?

Y N

078

Defective F2 (base I/O) card.

079

Defective keyboard PC board (refer to 251).
Check/replace keyboard cable
(refer to 255).

080

Defective F2 (base I/O) card.

081

Go to MAP 0420, Entry Point A.

0600

07JUL75 PN 1608391

EC 828851 PEC -----

MAP 0600-8

POWER MAP 0700

PAGE 1 OF 5

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0300	A	1	001
0500	A	1	001
0600	A	1	001
0820	A	1	001
0821	A	1	001
0840	A	1	001
0841	A	1	001
0843	A	1	001
0846	A	1	001

001

(Entry Point A)

(refer to 273).

Is the fan running?

Y N

002

(refer to 273).

Is fuse F1 blown?

Y N

003

(refer to 273).

Is the line cord plugged in?

Y N

004

-Plug the line cord in.

B C
1 1

MAP 0700-1

005

-Power down.

Check for an:

1. Open line cord.
2. Open power switch.
3. Open ac power filters.
4. Open in ac power box.
5. Open fan lead J2 or defective fan (refer to 273).

006

For each of the next several steps perform the following:

-Power down.

-Replace fuse F1.

-Perform the operation ,if any, listed in the step.

-Power up. Wait 30 seconds.

Does fuse F1 blow after replacing?

Y N

007

Defective fuse F1.

008

-Disconnect the dc power cable at Y1.

Does fuse F1 blow now?

Y N

009

Go to Page 3, Step 026, Entry Point B.

010

-Disconnect the power supply ac power plug J1 at the ac power box.
(refer to 273).

Does fuse F1 blow now?

Y N

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MAP 0700-1

2 1 1
A B C

2 2
D E

0700

D E
1 1

POWER MAP

PAGE 2 OF 5

011

Defective power supply.

* CAUTION *

Refer to 271, power supply removal and replacement.

012

-Disconnect the ac power plug J1 at the ac power box
(refer to 273).

Does fuse F1 blow now?

Y N

013

Defective tape motor assembly (refer to 202).

014

-Disconnect the fan ac plug J2 at the ac power box
(refer to 273).

Does fuse F1 blow now?

Y N

015

Defective fan assembly.

016

-Check for a short or loose connection in the ac power box
(refer to 273).

A
1

MAP 0700-2

017

-Calibrate the CE meter (refer to 270).

-Measure the following loaded voltages at the A1 board:

-Record the pin location of any voltages that are out of tolerance
(refer to 272).

+5 vdc A1-D13 .

+8.5 vdc C1-C11 .

+12 vdc C1-D13 .

-12 vdc C1-E13 .

Are all voltages within tolerance?

Y N

018

-Power down.

-Disconnect any auxiliary I/O cables
(refer to 281).

-Disconnect the dc power cable at Y1
(refer to 209.)

-Power up.

-Measure the unloaded voltages at the dc power cable
(refer to 272).

Are all voltages within tolerance?

Y N

019

Is there any voltage present?

Y N

020

-Power down.

-Exchange the power supply connector J1 with the fan connector, J2
(refer to 273).

-Power up. Wait 30 seconds.

Is the fan running now?

Y N

5 3 3 3 3
F G H J K

12DEC75 PN 1608392

EC 829523 PEC 828851

MAP 0700-2

0700

H J K
2 2 2

POWER MAP

PAGE 3 OF 5

021

Check/replace the cables in the ac power box.
(refer to 273).

022

Are the voltages present now?

Y N

023

Defective power supply.

* CAUTION *

Refer to 271, power supply removal and replacement.

024

A cable was unseated or had an open connection. Inspect for loose connections.

025

Defective power supply.

* CAUTION *

Refer to 271, power supply removal and replacement.

G
2

MAP 0700-3

026

(Entry Point B)

-Power down.

-Connect the dc cable back into socket Y1.

-Disconnect all the cables to the A1 board except the dc power cable.

-Power up.

-Measure one of the out of tolerance voltages recorded above for the next several steps.

Does fuse F1 blow or does power drop?

Y N

027

Is the measured voltage out of tolerance now?

Y N

028

-Connect the Z4 (keyboard) cable.

Is the measured voltage out of tolerance now?

Y N

029

-Connect the Z2 (tape) cable.

Is the measured voltage out of tolerance now?

Y N

030

-Connect the Z3 (display and control panel) cable.

Is the measured voltage out of tolerance now?

Y N

5 5 5 4 4 4
L M N P Q R

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EC 829523 PEC 828851

MAP 0700-3

0700

R
3

POWER MAP

PAGE 4 OF 5

031

-Connect the Z1 (communications adapter/serial I/O adapter) cable.

Is the measured voltage out of tolerance now?

Y N

032

-Connect the I/O cables.

Is the measured voltage out of tolerance now?

Y N

033

The problem was corrected by reseating the cables. Inspect both ends of the cables for loose foreign conductors (foil or wire ends for example).

034

-Power down.
-Remove all the cards from the auxiliary devices.
-Power up. Wait 30 seconds.

Is the measured voltage out of tolerance now?

Y N

035

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.

036

Defective external I/O device or cable. Check especially for short circuits.

P Q S
3 3 4

MAP 0700-4

037

-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.

Is the measured voltage out of tolerance now?

Y N

038

Defective data set or serial I/O device.

039

Short circuit in the communication cable or serial I/O cable.

040

-Power down.
-Disconnect the cable connector on the 5 inch display.
-Power up.

Is the measured voltage out of tolerance now?

Y N

041

Defective display assembly.

042

-Check for a short circuit on the control panel switches
(refer to 210, display and control panel cable).

043

Check for a short circuit in the tape unit.
Defective tape control card (refer to 202).
Short circuit in the tape cable
(refer to 420).

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MAP 0700-4

0700

4
S

L M N
3 3 3

POWER MAP

PAGE 5 OF 5

044

- Power down.
- Disconnect keyboard cable at the keyboard (refer to 204).
- Power up.

Is the measured voltage out of tolerance now?

Y N

045

Short circuit in the keyboard PC board. (refer to 251).

046

Defective keyboard cable (refer to 204).

047

Go to Page 5, Step 048, Entry Point C.

048

(Entry Point C)

- Power down.
- Remove all the cards from the board. (refer to 209.)
- Power up. Wait 30 seconds.

Does fuse F1 blow or does power drop or is the voltage out of tolerance now?

Y N

049

Defective card.
Power down and power up as you reinstall the cards one at a time until the defective card is found.

050

Defective A1 board.

F
2

MAP 0700-5

051

The power supply is working properly.

Are you missing a voltage at a specific device?

Y N

052

Defective A1 board.

053

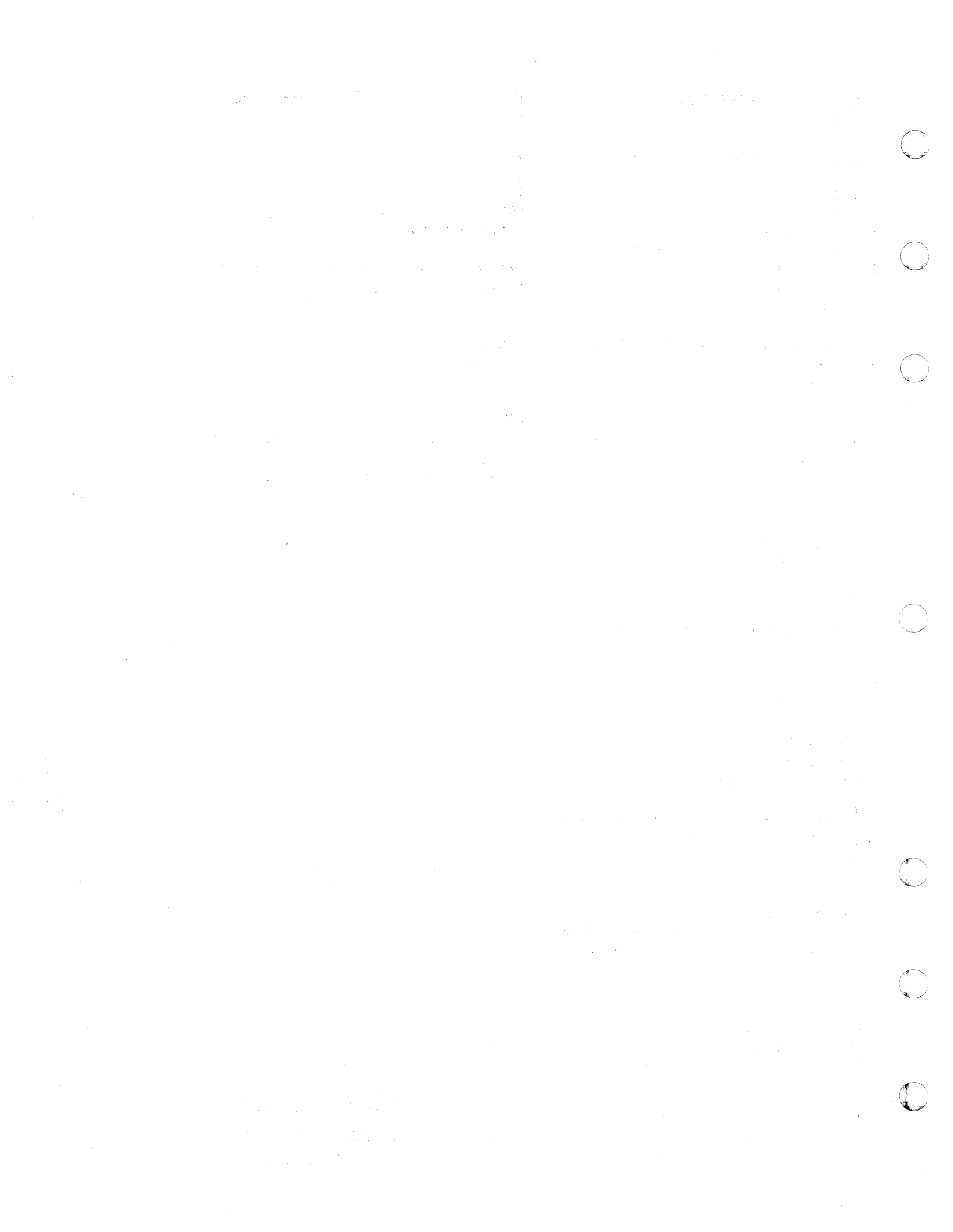
-Trace the circuit from that device to the power supply (refer to section 5, power supply voltages).

0700

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EC 829523 PEC 828851

MAP 0700-5



5103 PRINTER MAP

MAP 0810-1

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		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	004	0420	A

001

(Entry Point A)

This is the entry MAP for the 5103 printer.

Is the PROCESS CHECK light on?

Y N

002

Note: if there is an auxiliary tape attached, disconnect the auxiliary tape and disconnect the printer. Connect the printer directly to the 5100. The PROCESS CHECK light might turn on. Press RESTART . Wait 10 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
- Hold CMD and press 1
- Press EXECUTE

Follow the instructions on the display until DCP2 MENU appears. Then:

- Enter 800
- Press EXECUTE

The 5103 printer MDI should now load and run. Follow the instructions on the display. When completed, return to the BASIC/APL mode by pressing RESTART .

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MAP 0810-1

A
1

5103 PRINTER MAP

PAGE 2 OF 2

003

Is the 5103 printer MDI loaded?

Y N

004

Go to MAP 0420, Entry Point A.

B
2

MAP 0810-2

005

This procedure will reset the process check and allow you to continue with the 5103 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 10 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

-Hold CMD and press 8

-Enter 0800

-Enter 0001

-Enter 0000

-Press EXECUTE . Wait for tape movement to stop.

-Enter BR0800

-Press EXECUTE

-Enter the rightmost three digits of the MAP number previously recorded.

-Press O (alpha)

-Press EXECUTE

-Wait for MDI OPTIONS to be displayed.

-Advance the cursor to STEP NO.

-Enter the three-digit step number previously recorded.

-Press EXECUTE

The 5103 printer MDI is now continuing at the step where the PROCESS CHECK light previously occurred. Follow the instructions on the display.

01MAR76 PN 1608393

EC 829580 PEC 828851

MAP 0810-2

2
B

0810

PAGE 1 OF 1

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
1	003	0420	A

001

(Entry Point A)

This is the entry MAP for the communications adapter/ serial I/O adapter. If the PROCESS CHECK light is on, the communications/serial I/O MDI cannot be loaded.

Is the PROCESS CHECK light on?

Y N

002

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
- Hold CMD and press 1
- Press EXECUTE

Follow the instructions on the display until DCP2 MENU appears. Then:

- Enter 820
- Press EXECUTE

The communications/serial I/O MDI should now load and run. Follow the instructions on the display. When completed, return to the BASIC/APL mode by pressing RESTART .

003

Go to MAP 0420, Entry Point A.

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PAGE 1 OF 1

ENTRY POINTS

FROM ENTER THIS MAP			
MAP	ENTRY	PAGE	STEP
NUMBER	POINT	NUMBER	NUMBER
0200	A	1	001
0860	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
-----		-----	
PAGE	STEP	MAP	ENTRY
NUMBER	NUMBER	NUMBER	POINT
-----		-----	
1	003	0420	A

001

(Entry Point A)

This is the entry MAP for the auxiliary tape drive.
If the PROCESS CHECK light is on, the auxiliary tape drive MDI cannot be loaded.

Is the PROCESS CHECK light on?

Y N

002

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
- Hold CMD and press 1
- Press EXECUTE

Follow the instructions on the display until DCP2 MENU appears. Then:

- Enter 840
- Press EXECUTE

The auxiliary tape drive MDI should now load and run. Follow the instructions on the display. When completed, return to the BASIC/APL mode by pressing RESTART .

003

Go to MAP 0420, Entry Point A.

MACHINE CHECKOUT MAP

MAP 0900-1

PAGE 1 OF 8

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0300	A	1	001
0845	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	004	0200	A
7	063	0300	A
2	010	0400	A
2	006	0420	A
8	075	0420	A
2	017	0420	A
5	050	0420	A
6	054	0420	A
6	058	0420	A
7	064	0420	A
2	005	0500	A
8	077	0500	A
4	038	0500	A
2	016	0600	A
3	026	0600	A
3	028	0600	A
3	030	0600	A
6	053	0600	A

001

(Entry Point A)

- Power down
- Power up.
- Remove the tape cartridge if it is in the tape drive.
- Set the BRIGHTNESS control to the center of its range.
- Switch the L32-64-R32 switch to 64.
- Press the bottom of the REVERSE DISPLAY switch.
- Switch the DISPLAY REGISTERS switch to NORMAL.

Did either LOAD 0 or CLEAR WS (with no misspelling) appear on one and only one line of the 5 inch display?

Y N

Y N

2 2
A B

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MAP 0900-1

0900

A B
1 1

MACHINE CHECKOUT

PAGE 2 OF 8

002

Is the PROCESS CHECK light on?

Y N

003

Is the 5-inch 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 machine CRT raster is grossly distorted if it is absent, is rolling, has a black rather than a white background, is greatly reduced in size, or departs significantly from a rectangular shape.

Is the machine CRT raster grossly distorted?

Y N

008

Is the IN PROCESS light on?

Y N

009

Are the top 13 lines of the display entirely blank?

Y N

010

Go to MAP 0400, Entry Point A.

E
2

MAP 0900-2

011

-Press and hold the RESTART switch.

Are both the PROCESS CHECK and IN PROCESS lights on?

Y N

012

Defective PROCESS CHECK light.

Defective IN PROCESS light.

Defective RESTART switch.

Check /replace display and control panel cable (refer to 210, 241).

013

-Release the RESTART switch. Wait 10 seconds.

Is the PROCESS CHECK light on?

Y N

014

-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 (refer to 250 and keyboard theory section 4).

Do the keys function correctly?

Y N

015

Is the PROCESS CHECK light on?

Y N

016

Go to MAP 0600, Entry Point A.

017

Go to MAP 0420, Entry Point A.

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MAP 0900-2

8 8 2
C D E

8 3
F G

0900

018

-Press and hold the SPACE bar.

Does the repeat function work correctly?

Y N

019

(refer to the appendix, the general logic probe).

-Press and hold the SPACE bar.

-Probe F2-U07 (+typamatic).

Is the UP light on?

Y N

020

-Remove the keyboard cable at Z4.

-Probe F2-U07 (+typamatic).

Is the DOWN light on?

Y N

021

Defective keyboard PC board (refer to 251).

Check/replace keyboard cable (refer to 255).

022

Defective F2 (base I/O) card.

023

Defective key module (refer to 252).

Defective keyboard PC board (refer to 251).

Check/replace keyboard cable (refer to 255).

Defective J2 (display) card.

024

-Press and hold the P key.

Does the P key perform the typamatic function?

Y N

025

-Press the backspace key to place the cursor under a character.

-Press ATTN

Did the character at the cursor location and the remaining characters on that line disappear?

Y N

026

Defective ATTN key.

Go to MAP 0600, Entry Point A.

027

-Press EXECUTE

The word ERROR should appear on the display with other characters.

Is the word ERROR on the display?

Y N

028

Defective EXECUTE key.

Go to MAP 0600, Entry Point A.

029

-Press HOLD

The cursor/character should stop flashing.

Did the flashing stop?

Y N

030

Defective HOLD key.

Go to MAP 0600, Entry Point A.

K
3

MACHINE CHECKOUT

PAGE 4 OF 8

031

Does the machine have a BASIC/APL switch
(refer to 205)?

Y N

032

Go to Page 4, Step 035, Entry Point B.

033

-Check the BASIC/APL switch (refer to 244).

Does the BASIC/APL switch function
correctly?

Y N

034

Defective BASIC/APL switch.

Defective F2 (base I/O) card.

Check/replace display and control panel cable
(refer to 210, 241).

035

(Entry Point B)

-Press RESTART

-Check the REVERSE DISPLAY switch (refer to
245).

Does the REVERSE DISPLAY switch function
correctly?

Y N

036

Defective REVERSE DISPLAY switch.

Defective F2 (base I/O) card.

Defective J2 (display) card.

Check/replace display and control panel cable
(refer to 210, 241).

L
4

MAP 0900-4

037

-Check the DISPLAY REGISTERS switch (refer to
243).

Does the DISPLAY REGISTERS switch
function correctly?

Y N

038

Defective DISPLAY REGISTERS switch.

Defective F2 (base I/O) card.

Defective J2 (display) card.

Check/replace display and control panel cable
(refer to 210, 241).

Go to MAP 0500, Entry Point A.

039

-Switch the DISPLAY REGISTERS switch to
NORMAL.

-Check the L32-64-R32 switch (refer to 242).

Does the L32-64-R32 switch function
correctly?

Y N

040

Defective L32-64-R32 switch.

Defective F2 (base I/O) card.

Defective J2 (display) card.

Check/replace display and control panel cable
(refer to 210, 241).

28SEP76

PN 1608396

EC 829670

PEC 829523

MAP 0900-4

4
L5
M

0900

M
4

MACHINE CHECKOUT

PAGE 5 OF 8

041

- Switch the L32-64-R32 switch to 64.
- Use the 5100 model number to identify the read/write storage size:
Model A1, B1, C1 = 16K .
Model A2, B2, C2 = 32K .
Model A3, B3, C3 = 48K .
Model A4, B4, C4 = 64K .
- Check the read/write storage size in the 5100.
- Switch the DISPLAY REGISTERS switch to DISPLAY REGISTERS.
- Refer to 248, hex registers display.

Is the read/write storage size correct?

Y N

042

Is the read/write storage size 3FFF ?

Y N

043

Is the read/write storage size 7FFF ?

Y N

044

- Defective N2 (read/write storage) card.
- Defective N4 (read/write storage) card.
- Defective G2 (controller) card.

045

- Defective M2 (read/write storage) card.
- Defective M4 (read/write storage) card.
- Defective G2 (controller) card.

046

- Defective L2 (read/write storage) card.
- Defective L4 (read/write storage) card.
- Defective G2 (controller) card.

5
NN
5

MAP 0900-5

047

- Switch the DISPLAY REGISTERS switch to NORMAL.
- Perform a calculation as follows (refer to section 6, language support):
- For APL, enter:
B ← 9 EXECUTE
C ← 3 EXECUTE
A ← B × C EXECUTE
A EXECUTE
- For BASIC, enter:
B=9 EXECUTE
C=3 EXECUTE
A=B*C EXECUTE

Is the answer 27?

Y N

048

Is the PROCESS CHECK light on?

Y N

049

- Defective H2 (I/O and diag) card.
- Defective H4 (APL supervisor) card.
- Defective E2 (ROS adapter) card.
- Defective D2 (APL ROS 1) card.
- Defective D4 (APL ROS 2) card.
- Defective C2 (APL ROS 3) card.
- Defective C4 (BASIC ROS) card.

050

Go to MAP 0420, Entry Point A.

6
P

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MAP 0900-5

0900

P
5

MACHINE CHECKOUT

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051

Use the keys on the numeric key section of the keyboard (refer to 250).

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

When DCP1 loads, the characters DCP1 should appear on the display. (you have loaded DCP1, diagnostic control program 1. Refer to section 3, diagnostic aids).

Does the DCP1 program load?

Y N

052

Is the PROCESS CHECK light on?

Y N

053

Defective CMD key.

Go to MAP 0600, Entry Point A.

054

Go to MAP 0420, Entry Point A.

055

Put the DCP1 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 DCP1 should appear on the display (refer to section 3, diagnostic aids).

Do the characters DIAG DCP1 appear on the display?

Y N

6 6
Q RQ R
6 6

MAP 0900-6

056

Is the PROCESS CHECK light on?

Y N

057

- Defective H2 (I/O and diag) card.
- Defective H4 (APL supervisor) card.
- Defective E2 (ROS adapter) card.
- Defective D2 (APL ROS 1) card.
- Defective D4 (APL ROS 2) card.
- Defective C2 (APL ROS 3) card.
- Defective C4 (BASIC ROS) card.

058

Go to MAP 0420, Entry Point A.

059

Use the keys on the numeric key section of the keyboard:

- Press C
- Hold CMD and press 1
- Press EXECUTE

You have loaded and are running the tape read diagnostic program (refer to section 3, diagnostic aids). Follow the instructions on the display. Return to this point for further instructions when DCP2 MENU is displayed.

Is DCP2 MENU on the display?

Y N

060

Is the PROCESS CHECK light on?

Y N

7 7 7
S T U

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MAP 0900-6

0900

S T U
6 6 6

MACHINE CHECKOUT

H V
3 7

MAP 0900-7

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061

Did the tape read diagnostic program load?

Y N

062

Defective E2 (ROS adapter) card.
Defective F2 (base I/O) card.

063

Go to MAP 0300, Entry Point A.

064

Go to MAP 0420, Entry Point A.

065

-Press 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. Refer to section 3, diagnostic aids).

Did MDI 860 run correctly?

Y N

066

Perform the actions requested by the routines.

067

-Press ATTN twice.

The DCP2 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 (refer to section 3, diagnostic aids).

-PRINTER	800
-COMMUNICATIONS/SERIAL I/O	820
-AUXILIARY TAPE	840

Do the routines run correctly?

Y N

068

Perform the actions requested by the routines.

069

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

070

(refer to the appendix, the general logic probe).
-Probe F2-U07 (+typamatic).

Is the UP light on?

Y N

071

-Press and hold the A key
-Probe F2-U12 (-keyboard strobe).

Are both lights on?

Y N

072

Defective F2 (base I/O) card.

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MAP 0900-7

7
V8 8
W X

0900

C D F W X
2 2 2 7 7

MACHINE CHECKOUT

MAP 0900-8

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073

Defective keyboard PC board (refer to 251).

Check/replace keyboard cable (refer to 255).

074

Defective F2 (base I/O) card.

075

Go to MAP 0420, Entry Point A.

076

Defective IN PROCESS light.

Check/replace display and control panel cable (refer to 210, 241).

077

Go to MAP 0500, Entry Point A.

0900

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MAP 0900-8

RPO Features Reference Section

This section is to provide a place to file instructions, wiring diagrams, and reference materials for any RPO features that are installed.

PN 2451333
EC 829670



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IBM 5100 Maintenance Analysis Procedures Printed in U.S.A.



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IBM World Trade Corporation
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PN 1608314
EC 829670