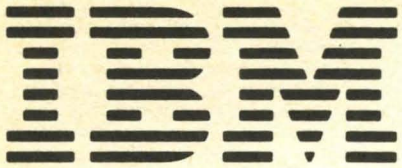

SY31-0571-2

IBM 5250 Information Display System
IBM 5251 Display Station
Models 1 and 11
Maintenance Analysis Procedures

MAINTENANCE ANALYSIS PROCEDURES

SY31-0571-2

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IBM 5251 Display Station
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MAINTENANCE ANALYSIS PROCEDURES

PREFACE

These Maintenance Analysis Procedures (MAPs) are to be used for servicing the IBM 5251 Models 1 and 11 Display Stations. Customer Engineers using these MAPs are assumed to have completed the course on the 5250 Display Stations.

It is important that you start your call with the *Start of Call MAP*, which leads to a repair action.

Definitions of terms and abbreviations that are not common, but are used in the MAPs, are in the *Glossary of Terms and Abbreviations* section of the *Maintenance Information Manual*, SY31-0461.

Note: MAP pages 0002-3, -9, -44, -47, -49, -51, -52, -54, and -57 have DANGER notices. If desired, translate these notices and write your own words on the blank lines provided on these pages.

Related Publications

Related information can be found in the following manuals:

- *IBM 5250 Display System Reference Card*, GX21-9249
- *IBM 5250 Information Display System Installation Manual—Physical Planning*, GA21-9277
- *IBM 5251 Models 1 and 11 Display Station and IBM 5252 Dual Display Station Operator's Guide*, GA21-9248
- *IBM 5251 Models 1 and 11 Display Station Maintenance Information Manual*, SY31-0461
- *IBM 5252 Dual Display Station Maintenance Information Manual*, SY31-0492
- *IBM 5252 Display Station Setup Procedures*, GA21-9288
- *IBM 5256 Printer Operator's Guide*, GA21-9260
- *IBM 5256 Printer Maintenance Information Manual*, SY31-0462
- *IBM 5256 Printer Maintenance Analysis Procedures*, SY31-0572

Third Edition (July 1979)

This is a major revision of, and obsoletes, SY31-0571-1. Because the changes and additions are extensive, this publication should be reveiwed in its entirety. Changes are periodically made to the information herein; changes will be reported in technical newsletters or in new editions of this publication.

Use this publication only for the purposes stated in the *Preface*.

This publication could contain errors. Use the Reader's Comment Form at the back of this publication to make comments about this publication. If the form has been removed, address your comments to IBM Corporation, Publications, Department 245, Rochester, Minnesota 55901. IBM may use and distribute any of the information you supply in any way it believes appropriate without incurring any obligation whatever. You may, of course, continue to use the information you supply.

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The 5251 Models 1 and 11 have the following specific DANGERs:

- Line voltage is present at the power supply and the display assembly.

- High voltage can be present at the cathode-ray tube.

- The cathode-ray tube could implode if it is hit or dropped.

- The green wire in the display assembly is not at ground voltage.

CE SAFETY PRACTICES

All Customer Engineers are expected to take every safety precaution possible and observe the following safety practices while maintaining IBM equipment

1. You should not work alone under hazardous conditions or around equipment with dangerous voltage. Always advise your manager if you MUST work alone.
2. Remove all power, ac and dc, when removing or assembling major components, working in immediate areas of power supplies, performing mechanical inspection of power supplies, or installing changes in machine circuitry.
3. After turning off wall box power switch, lock it in the Off position or tag it with a "Do Not Operate" tag, Form 229-1266. Pull power supply cord whenever possible.
4. When it is absolutely necessary to work on equipment having exposed operating mechanical parts or exposed live electrical circuitry anywhere in the machine, observe the following precautions
   a. Another person familiar with power off controls must be in immediate vicinity.
   b. Do not wear rings, wrist watches, chains, bracelets, or metal cuff links.
   c. Use only insulated pliers and screwdrivers.
   d. Keep one hand in pocket.
   e. When using test instruments, be certain that controls are set correctly and that insulated probes of proper capacity are used.
   f. Avoid contacting ground potential (metal floor strips, machine frames, etc.). Use suitable rubber mats, purchased locally if necessary.
5. Wear safety glasses when:
   a. Using a hammer to drive pins, riveting, staking, etc.
   b. Power or hand drilling, reaming, grinding, etc.
   c. Using spring hooks, attaching springs.
   d. Soldering, wire cutting, removing steel bands.
   e. Cleaning parts with solvents, sprays, cleaners, chemicals, etc.
   f. Performing any other work that may be hazardous to your eyes. REMEMBER – THEY ARE YOUR EYES.
6. Follow special safety instructions when performing specialized tasks, such as handling cathode ray tubes and extremely high voltages. These instructions are outlined in CEMs and the safety portion of the maintenance manuals.
7. Do not use solvents, chemicals, greases, or oils that have not been approved by IBM.
8. Avoid using tools or test equipment that have not been approved by IBM.
9. Replace worn or broken tools and test equipment.
10. Lift by standing or pushing up with stronger leg muscles – this takes strain off back muscles. Do not lift any equipment or parts weighing over 60 pounds
11. After maintenance, restore all safety devices, such as guards, shields, signs, and grounding wires.
12. Each Customer Engineer is responsible to be certain that no action on his part renders products unsafe or exposes customer personnel to hazards
13. Place removed machine covers in a safe out-of-the-way place where no one can trip over them
14. Ensure that all machine covers are in place before returning machine to customer
15. Always place CE tool kit away from walk areas where no one can trip over it, for example, under desk or table
16. Avoid touching moving mechanical parts when lubricating, checking for play, etc
17. When using stroboscope, do not touch ANYTHING – it may be moving
18. Avoid wearing loose clothing that may be caught in machinery. Shirt sleeves must be left buttoned or rolled above the elbow
19. Ties must be tucked in shirt or have a tie clasp (preferably nonconductive) approximately 3 inches from end. Tie chains are not recommended.
20. Before starting equipment, make certain fellow CEs and customer personnel are not in a hazardous position
21. Maintain good housekeeping in area of machine while performing and after completing maintenance

Knowing safety rules is not enough.
An unsafe act will inevitably lead to an accident.
Use good judgment - eliminate unsafe acts.

ARTIFICIAL RESPIRATION

General Considerations

1. Start Immediately – Seconds Count
   Do not move victim unless absolutely necessary to remove from danger. Do not wait or look for help or stop to loosen clothing, warm the victim, or apply stimulants.
2. Check Mouth for Obstructions
   Remove foreign objects. Pull tongue forward.
3. Loosen Clothing – Keep Victim Warm
   Take care of these items after victim is breathing by himself or when help is available.
4. Remain in Position
   After victim revives, be ready to resume respiration if necessary.
5. Call a Doctor
   Have someone summon medical aid.
6. Don't Give Up
   Continue without interruption until victim is breathing without help or is certainly dead.

Rescue Breathing for Adults

1. Place victim on his back immediately.
2. Clear throat of water, food, or foreign matter.
3. Tilt head back to open air passage.
4. Lift jaw up to keep tongue out of air passage.
5. Pinch nostrils to prevent air leakage when you blow.
6. Blow until you see chest rise.
7. Remove your lips and allow lungs to empty.
8. Listen for snoring and gurglings – signs of throat obstruction.
9. Repeat mouth to mouth breathing 10-20 times a minute. Continue rescue breathing until victim breathes for himself.

Thumb and finger positions

Final mouth-to-mouth position

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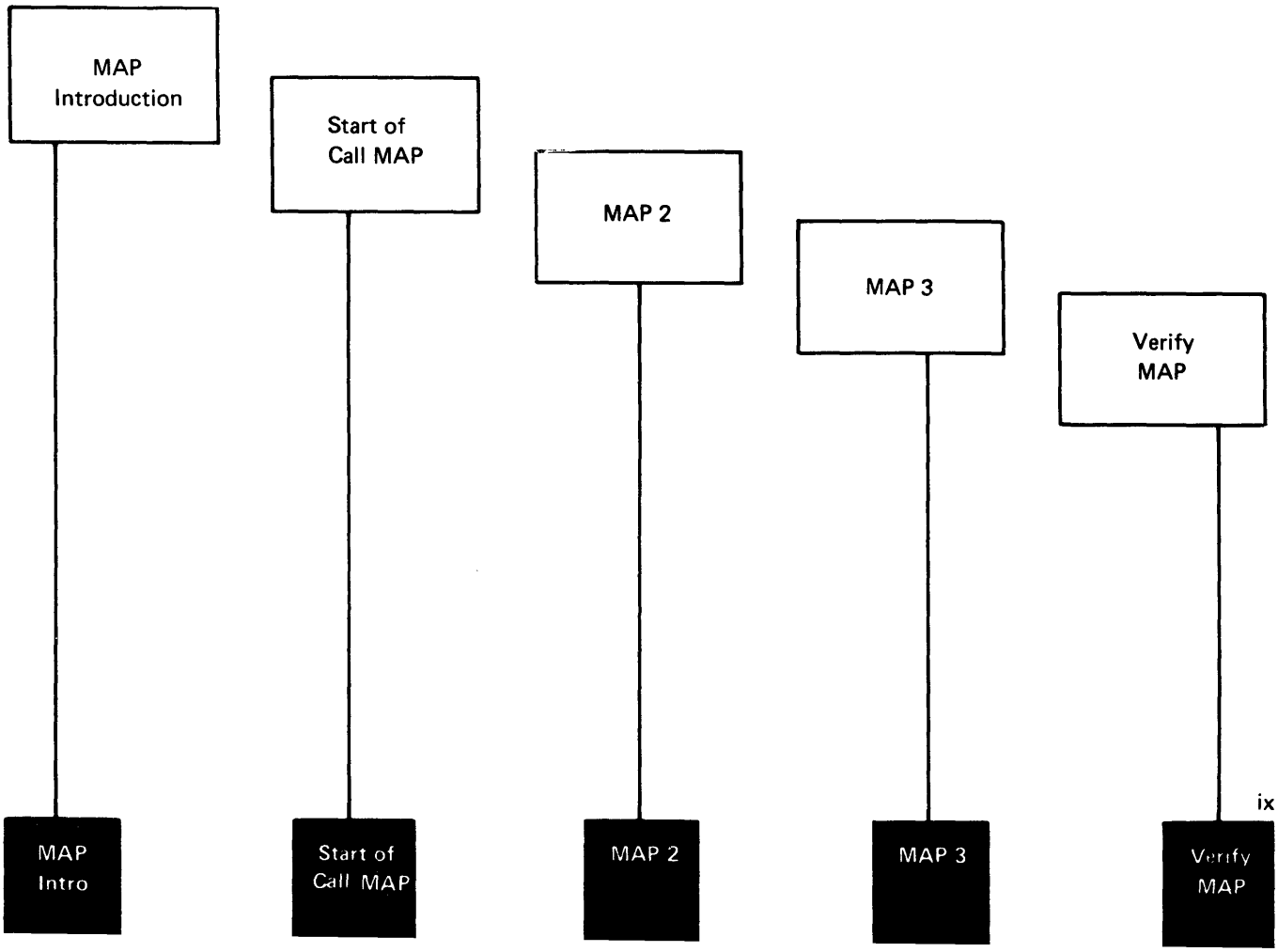
CONTENTS

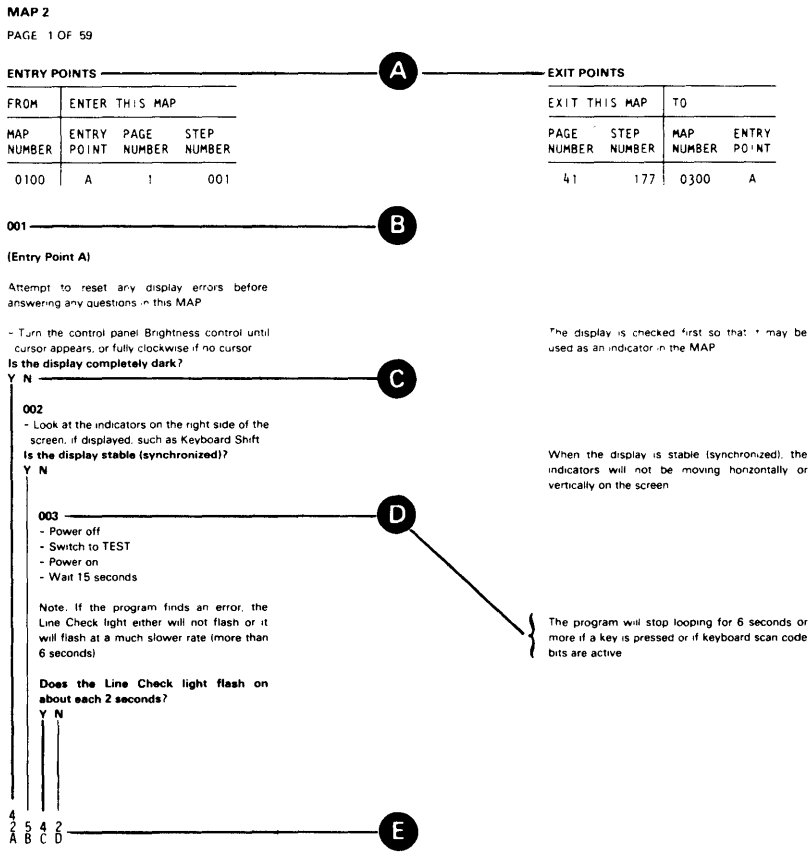


MAP FORMAT

The MAPs ask questions about symptoms; questions concerning the most important symptoms are asked first. These questions isolate the possible causes of machine failures and point you to the part of the display station that needs adjustment or replacement.

The MAPs guide you through the service call, using step-by-step procedures that have you follow a path when you respond to questions or when you leave or enter a page.

MAP Example



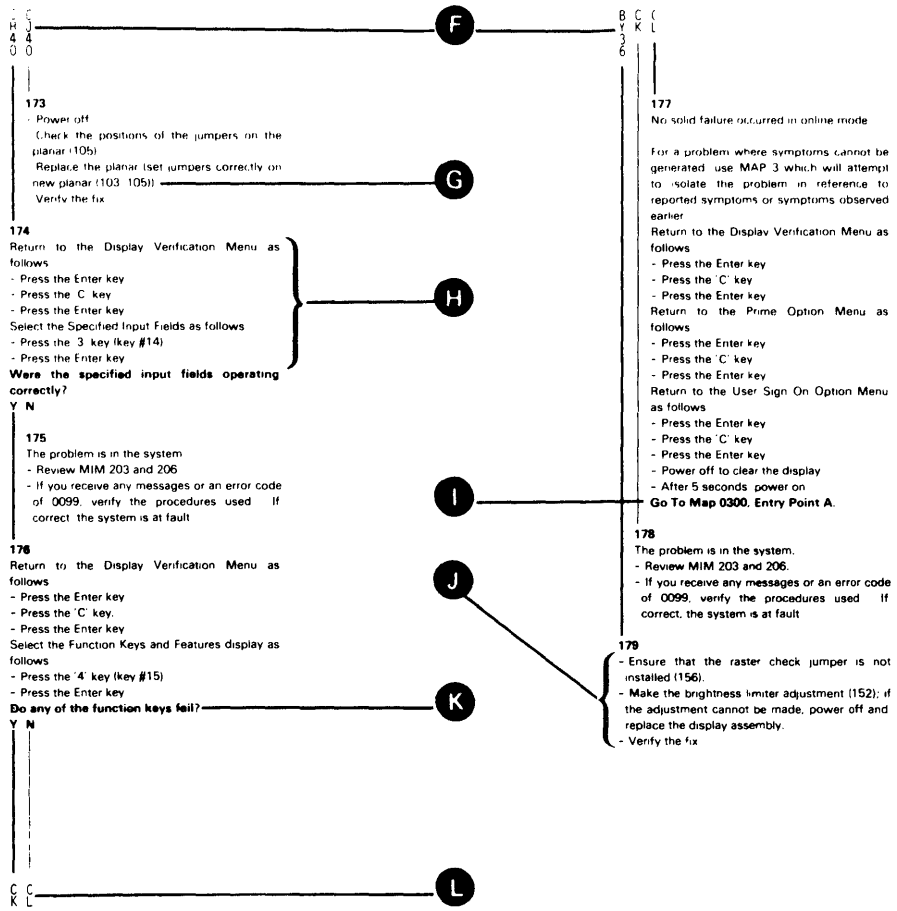
A The *Entry Points* and *Exit Points* tables list all entry and exit points to and from this MAP.

B Step number

C Y = yes; N = no

D Statements that provide additional information about a step.

E Off-page references identify the page and trace where a MAP leg continues.



F Off-page references identify the page and trace where a MAP leg came from.

G Reference numbers refer to a location graphic, a maintenance procedure, a chart, or other pertinent information in the MIM.

H Instructions establish conditions that help you answer the next question.

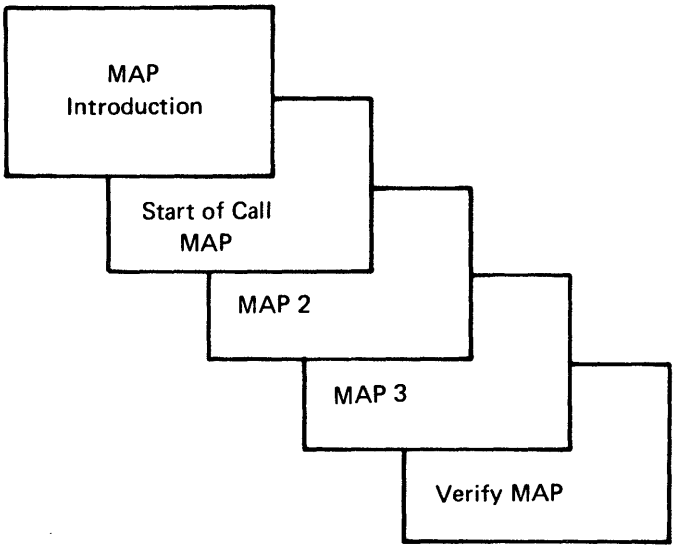
I Exit instructions indicate the MAP and entry point that you should go to.

J Commands state the possible fixes for the failure. Follow the commands in the order in which they are presented.

K Questions are to be answered either yes or no. Continue from your answer to the next question or instruction.

L On-page references identify the trace on the same page where this MAP leg continues.

5251 MAPs



Start of Call MAP

The Start of Call MAP is the starting point for each service call. This MAP contains a symptom index, which is a list of single symptoms that are grouped by major units. These single symptoms lead directly to a repair action in the MIM. If the symptom you encounter is not in the symptom index, you are led to MAP 2.

MAP 2

MAP 2 uses several symptoms to lead to a repair action. This MAP uses one symptom at a time. The most important and least complex symptom is used first.

MAP 3

MAP 3 diagnoses the problem in the same way that MAP 2 diagnoses the problem; MAP 3, however, uses fewer symptoms. As a result, MAP 3 only gives you a general idea of what is wrong; it does not isolate the failing FRU as precisely as MAP 2.

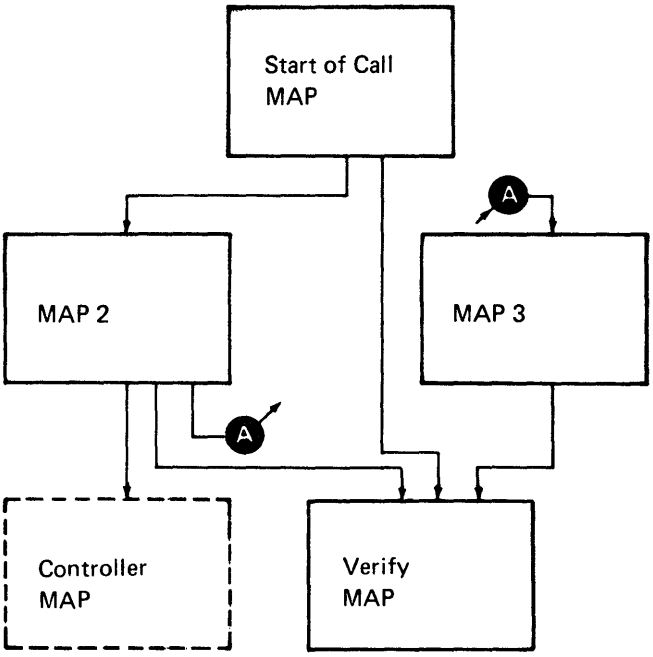
MAP 3 relies on either the symptom reports from the customer or the symptoms of intermittent failures (failures that were present but might not be present now).

Verify MAP

The Verify MAP is used after a repair action has been made; it ensures that the display station operates correctly.

MAP FLOW

The following chart shows the normal path to follow to isolate a failure:



Note: The Controller MAP is located in the controller documentation.

USING THE MAPs

When using the MAPs, you must:

READ CAREFULLY. The MAPs can aid you in finding the failure only if you follow instructions and answer questions accurately.

FOLLOW THE SEQUENCE. Always do the procedure one step at a time.

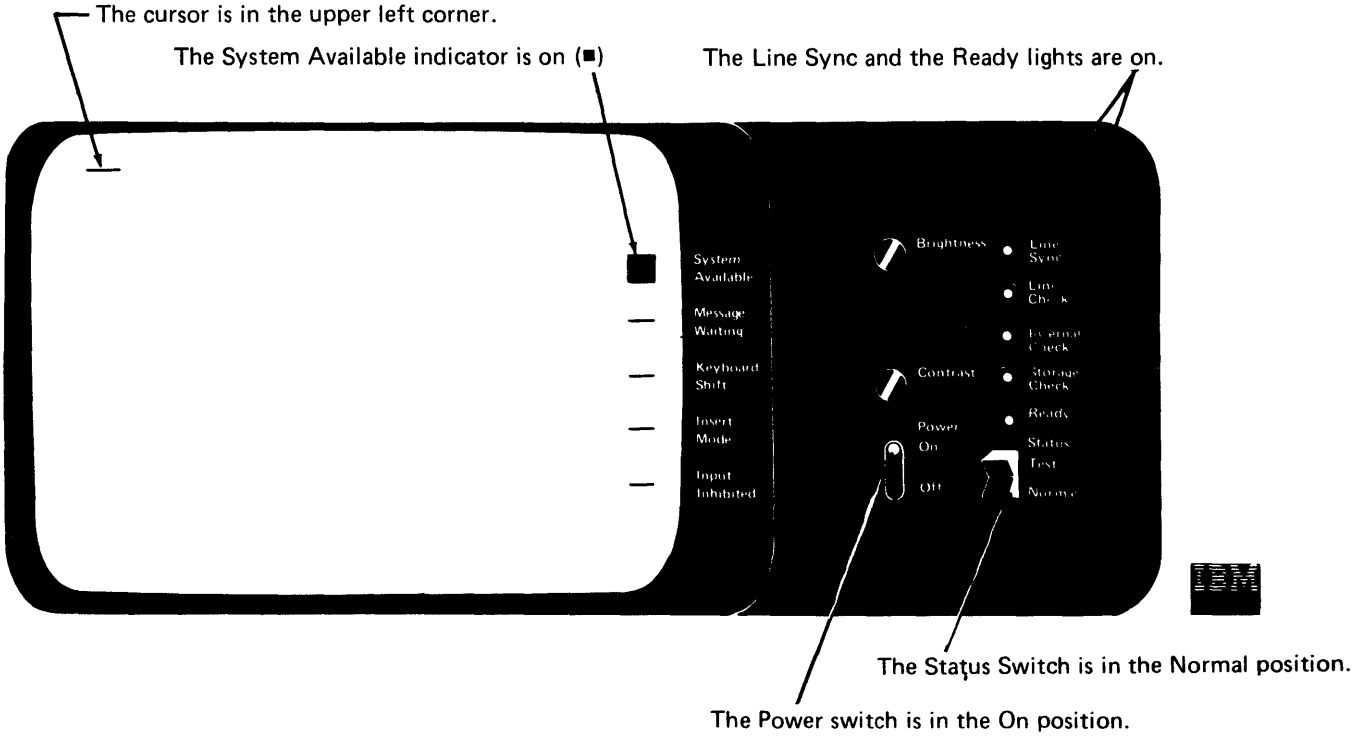
READ THE COMMENTS. Some steps have additional information that pertains to them. This information, which is located to the right of the step, describes why questions or actions are needed to determine the correct failing part.

FOLLOW THE INSTRUCTIONS. Instructions must be carried out exactly and in the order given. Questions rely on conditions prepared by the instructions immediately before the questions.

NORMAL CONDITIONS AFTER POWER ON

The following illustration shows the normal conditions of the display station after power on.

Note: When a key is pressed, the clicker operates, and the characters are displayed.




MAP
0100


MAP
0200


MAP
0300


MAP
0400

IBM 5251-1/11 DISPLAY STATION

START OF CALL MAP

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	003	0200	A
4	009	0200	A
4	011	0200	A
4	015	0200	A
4	018	0200	A

001

Start of Call

DISPLAY STATION COVER REMOVAL (108)
KEYBOARD COVER REMOVAL (109)

(Entry Point A)

SYMPTOM INDEX

Symptom	Comments	Repair Action
DISPLAY		
Characters missing only in the corners		MIM 154, 155
Display changes size	Display is stable	Replace the display assembly (151)
Display lines missing	Some lines are correctly displayed	Replace the planar (103, 105)
Lines not straight	Display is stable	Replace the display assembly (151)

(Step 001 continues)

(Step 001 continued)

Out of focus	Display is stable Ensure brightness control is not fully clockwise	Replace the display assembly (151)
Only a horizontal line is displayed	Line may be solid or broken	Replace the display assembly (151)
Only a vertical line is displayed	Line may be solid or broken	Replace the display assembly (151)
Partial characters	The same character fails in any display location	Replace the planar (103, 105)
K E Y L O C K		
Machine operates with keylock set	Machine still operates	MIM 114
P O W E R S U P P L Y		
Blank Display	Dead keyboard and Ready Light on	If the -5 vdc is low or missing, replace the power supply (181). If not, Go To Map 0200, Entry Point A
Blank Display	ONLY Internal Check Light and Ready Light on	
Cursor in D	ONLY Ready Light on	
Cursor in D	Ready Light on and System Available	
Noisy power supply fan	Runs ok but noisy	Replace the power supply fan (187)
O T H E R		
Always in TEST status	The diagnostic continues to loop about each 2 seconds after power on in NORMAL status. The System Available indicator is off	MIM 111

(Step 001 continues)

(Step 001 continued)

High frequency noise	High frequency source (16 KHZ) is in the display assembly	Baffles are available, contact sales rep. for RPQ

Note: The above indications are NOT covered in MAP 2.

Did you find the indication in the Symptom Index?

Y N

002

Is the Magnetic Stripe Reader (119) or Light Pen (125) feature installed?

Y N

003

Go To Map 0200, Entry Point A.

004

Note: If not known, answer no.

Does the symptom indicate a Magnetic Stripe Reader failure?

Y N

005

Note: If not known, answer NO.

Does the symptom indicate a Light Pen failure?

Y N

006

Is the Magnetic Stripe Reader feature installed (119)?

Y N

5 5 5 4 4
A B C D E

007
- Power off.
- Remove the Light Pen feature (125).
- Power on.

Does the symptom still occur?
Y N

008
- Power off.
- Replace the Light Pen feature.
- Use MIM 121 to isolate the failure.

009
- Power off.
- Replace the Light Pen feature.

Go To Map 0200, Entry Point A.

010
- Power off.
- Remove the Magnetic Stripe Reader feature card from the planar (119).
- Power on.
- Press some of the data character keys (gray keys).

Do all the keys pressed display the correct characters?
Y N

011
- Power off.
- Put the Magnetic Stripe Reader feature card back on the planar (119).

Go To Map 0200, Entry Point A.

012
Does the symptom still occur?
Y N

F G

013
- Power off.
- Put the Magnetic Stripe Reader feature card back on the planar (119).
- Remove the Light Pen feature, if installed (125).
- Use MIM 115 to isolate the failure.

014
- Power off.
- Put the Magnetic Stripe Reader Feature Card back on the planar (119).

Is the Light Pen feature installed?
Y N

015

Go To Map 0200, Entry Point A.

016
- Power off.
- Remove the Light Pen feature (125).
- Power on.

Does the symptom still occur?
Y N

017
- Power off.
- Replace the Light Pen feature (125).
- Use MIM 121 to isolate the failure.

018
- Power off.
- Replace the Light Pen feature (125).

Go To Map 0200, Entry Point A.

019
- Power off.
- Remove the Magnetic Stripe Reader feature card from the planar, if installed (119).
- Power on.
- Key in three lines of the same upper case character.
- Place the Light Pen tip on a character on the CRT.

Is the Line Sync Light flashing on and off?
Y N

020
Is a 0036 error displayed?
Y N

021
- Use MIM 120 to isolate the failure.

022
- Press the reset key.
- Press the Field Exit key.
- Place the Light Pen tip on the first character on the first line and slowly move the Light Pen to the end of the line, then down to the third line, then back to the left side of the display.

Note: The cursor may jitter 1 to 4 positions to each side of the tip depending on the brightness setting.

Does the cursor closely follow the Light Pen movement?
Y N

023
- Use MIM 122 to isolate the failure.

024
- Gently push the Light Pen tip against the CRT to operate the switch.

Is a 0037 error displayed?
Y N

H J K

A B H J K
3 3

025
- Use MIM 123 to isolate the failure.

026
No failure was found with this feature.

027
- Use MIM 121 to isolate the failure.

028
- Remove the Light Pen feature, if installed (125).
- Pass a test card through the Magnetic Stripe Reader.

Is any data displayed?
Y N

029
- Press some of the data character keys (gray keys).

Do all the keys pressed display the correct characters?
Y N

030
- Use MIM 117 to isolate the failure.

031
- Check the proper positions of the jumpers on the Magnetic Stripe Reader card (118).
- Use MIM 115 to isolate the failure.

032
- Check the proper positions of the jumpers on the Magnetic Stripe Reader card (118).
- Use MIM 116 to isolate the failure.

033
- Perform the referenced repair action.
- Verify the fix.

This page is intentionally left blank.

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
41	177	0300	A

001

(Entry Point A)

Attempt to reset any display errors before answering any questions in this MAP.

- Turn the control panel Brightness control until cursor appears, or fully clockwise if no cursor.

The display is checked first so that it may be used as an indicator in the MAP.

Is the display completely dark?

Y N

002

- Look at the indicators on the right side of the display, if displayed, such as Keyboard Shift.

Is the display stable (synchronized)?

Y N

When the display is stable (synchronized), the indicators will not be moving horizontally or vertically on the display.

003

- Power off.
- Switch to TEST.
- Power on.
- Wait 15 seconds.

Note: If the program finds an error, the Line Check light either will not flash or it will flash at a much slower rate (more than 6 seconds).

The program will stop looping for 6 seconds or more if a key is pressed or if keyboard scan code bits are active.

Does the Line Check light flash on about each 2 seconds?

Y N

4
2 5 4 2
A B C D

004
- Power off.
- Switch to NORMAL.
- Power on.

Does the Internal Check light remain on?
Y N

The Internal Check light on indicates that a parity error occurred in the planar.

005
Does the Line Check light remain on?
Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

006
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

007
- Power off.
- Reseat the display signal/planar power cable at the power supply (180) and planar connector G (103).
- Power on.

Does the problem still occur?
Y N

008
The display signal/planar power cable was loose.
- Verify the fix.

** Probable failing line(s):
-5 Vdc

009

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180):

Pin	Voltage	Vdc Limits
-5	-5	-4.6 to -5.4

Is the voltage inside the limits?

Y N

010
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

011
- Ground the voltmeter on frame ground (180).
- Measure the voltage on the planar (103):

Pin	Voltage	Vdc Limits
1-G-B06	-5	-4.6 to -5.4

Is the voltage inside the limits?

Y N

012
- Power off.
- Repair or replace the display signal/planar power cable (102).
- Verify the fix.

013
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

014
The '-power on reset' line is grounded.
- Use MIM 141 to isolate the failure.
- Verify the fix.

015
- Power off.
- Switch to NORMAL.
- Power on.
- Unlock the keylock if installed.

Is the complete display moving up or down?
Y N

This checks for a vertical synchronization problem.
Look at the indicators on the right side of the display, such as Keyboard Shift, if displayed.

016
- Power off.
- Reseat the display signal/planar power cable at the display and at planar connector G (157).
- Power on.

Does the problem still occur?
Y N

017
The display signal/planar power cable was loose.
- Verify the fix.

** Probable failing line(s):
Horizontal Sync (157)

018
- Use MIM 157 to trace the 'horizontal sync' line for opens or grounds to isolate the failure.
- Verify the fix.

019
- Power off.
- Switch to NORMAL.
- Reseat the display signal/planar power cable at the display and at planar connector G (157).
- Power on.

Does the problem still occur?
Y N

020
The display signal/planar power cable was loose.
- Verify the fix.

021
- Use MIM 157 to trace the 'vertical sync' line for opens or grounds to isolate the failure.
- Verify the fix.

022
- Inspect the display for one of the following problems (158):

1. Display not centered.
2. Tilted display.
3. Display size not correct.
4. Characters missing only in the corners.

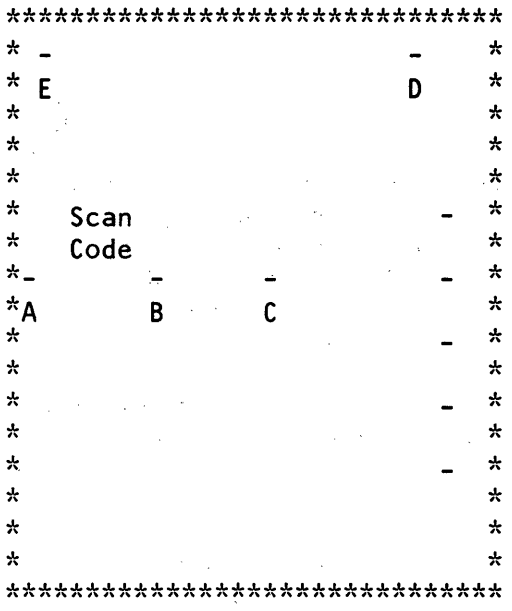
Did you find the problem in the above list (158)?
Y N

** Probable failing line(s):
Vertical Sync (157)

023

- Power off.
- Switch to NORMAL.
- After 5 seconds, power on.
- Unlock the keylock if installed.

The figure shows the positions of the cursor during the power-on sequence:



- Turn the control panel Brightness control until cursor appears, or fully clockwise if no cursor.

Does the cursor remain in position E (position 2, line 1)?

Y N

Cursor Position	Description
None	The controller test or the display failed.
A	The system cable control test failed.
B	(NORMAL) The I/O test failed. (TEST) 1. A key was pressed. 2. Bits were on in the I/O registers that should not be on.
C	Main planar diagnostic has completed. (Ready light on)
D	The display station is waiting for a poll from the controller. (Line Sync and System Available must be on before the cursor may be moved to position E.)
E	The display station has responded to the controller.

The cursor in position E indicates that two-way communication with the controller is completed.

024

Does the cursor remain in position D ?

Y N

The internal diagnostic completed and the display station failed to communicate with the controller.

2 1
1 5 7
L M N

025

Does the cursor remain in position C ?

Y N

The internal diagnostic completed but read-only storage failed.

026

Does the cursor remain in position B ?

Y N

The internal diagnostic stopped because of an I/O failure.

027

Does the cursor remain in position A?

Y N

The internal diagnostic stopped because of a cable adapter failure.

028

Does the System Available indicator remain on?

Y N

System Available on indicates that the station address matches.

029

Does the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

1 1 1 1
5 3 1 0 8 8
P Q R S T U

030

- Observe the System Available indicator for 15 seconds.

Does the indicator turn on and then off?

Y N

031

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

032

This station may have the same address as another station on the system cable.

- Find the other station on the cable that is failing and correct the address problem.

Note: It may be necessary to go to the controller to locate other stations on the system cable.

- Verify the fix.

Scan Code	Keyboard ID	Station Address
xxxxxxxx	xxxxxxxx	xxxxx567

Station Address can be seen only in TEST (210).

033

Does the Storage Check light remain on?

Y N

034

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180, 182):

Pin	Voltage	Vdc Limits
+5	+5	4.7 to 5.5

Is the voltage inside the limits?

Y N

035

- Measure the line AC voltage at the line filter side of the Power switch (110).

Is the voltage inside the limits (184)?

Y N

036

- Measure the AC voltage at the customer power outlet (184).

Is the line voltage inside the limits (184)?

Y N

037

- Inform the customer of a power outlet problem.

1 1 1
0 0 0
X Y Z

038
- Power off.
- Disconnect the line cord from the power outlet.
- Repair or replace the line cord/line filter (185).
- Verify the fix.

039
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

040
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

041
The '-power on reset' line is grounded.
- Use MIM 141 to isolate the failure.
- Verify the fix.

042
Is any character repeating on the display without a key pressed?

This indicates a stuck key.

Y N

043
- Turn the Brightness control clockwise.

Is a single cursor displayed?

Y N

044
- Power off.
- Disconnect the keylock cable from the planar (114).
- Power on.

Does the problem still occur?

Y N

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

045

The keylock cable or switch is failing.

- Use MIM 114 to isolate the failure.
- Connect the keylock cable at the planar.
- Verify the fix.

046

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Connect the keylock cable at the planar.
- Verify the fix.

047

- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.

- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Verify the fix.

048

- Power off.
- Clean or replace the failing key module and the pad PC board (132, 133).
- Verifv the fix.

049

Is the Cable Thru feature installed?

Y N

12AE 12AF

050
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

051
Are the Address switches set to '111' (binary) MIM Sec. 5?
Y N

Address '111' (binary) (all three Address switches up) cannot be used.

052
- Power off.
- Record the setting of the Address switches.
- Set the Address switches to '000'.
- Switch to TEST.
- Power on.

This checks for a ground that causes an address of '111' (binary) in an address line.

Does the cursor remain in position A ?
Y N

053
- Use MIM 111 to trace the failing address line.
- Set the Address switches to the correct address.

Note: Address '111' (binary) cannot be used.

- Switch to NORMAL.
- Verify the fix.

054

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Set the Address switches to the correct address.

Note: Address '111' (binary) cannot be used.

- Switch to NORMAL.
- Verify the fix.

055

- Power off.
- Set the Address switches to the correct address.

Note: Address '111' (binary) cannot be used.

- Verify the fix.

056

- Power off.
- Switch to TEST.
- Power on.
- Wait 15 seconds.

Note: If the program finds an error, the Line Check light either will not flash or it will flash at a much slower rate (more than 6 seconds).

The program will stop looping for 6 seconds or more if a key is pressed or if keyboard scan code bits are active.

Does the Line Check light flash on about each 2 seconds?

Y N

057
- Press a key.

Note: Use more than one key to ensure that you have not selected a failing key.

Does any key cause the keyboard identification field to be displayed (142, 210)?

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If any keyboard identification is displayed, the strobes (138) are operational.

Y N

058
The 'data strobe' line may be down.
- Use MIM 138 to check the 'data strobe' line.
- Switch to NORMAL.
- Verify the fix.

059
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Switch to NORMAL.
- Verify the fix.

060
- Press a key.

Note: Use more than one key to ensure that you have not selected a failing key.

Does any key cause the keyboard identification field to be displayed (142, 210)?

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If any keyboard identification is displayed, the strobes (138) are operational.

Y N

061
- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.
- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Switch to NORMAL.
- Verify the fix.

062
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Switch to NORMAL.
- Verify the fix.

063
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

064

Does the Line Check light remain on?

Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

2 1
0 6
A A
N P

065

- Power off.
- Switch to TEST.
- Power on.

Is the displayed station address correct for this station (210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	xxxxxxxx	xxxxx567

A display station without Cable Thru feature installed should display '000' in the address field.

066

Is the Cable Thru feature installed?

Y N

067

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

068
- Power off.
- Record the setting of the Address switches (100).
- Switch to TEST.
- Power on.
- Change an Address switch only during the time the diagnostic program is stopped (the program may be stopped by holding down any data key).

Note: The displayed address should change to the new switch setting after the program loops.

- Repeat the procedure for all 3 Address switches.

Note: Address '111' (binary) is not valid. It will cause the cursor to remain in position A.

It will be necessary to power off and then power on to reset any errors during this procedure.

Does the displayed station address change when each Address switch is changed?
Y N

069
- Power off.
- Set the Address switches to the correct address.

Note: Address '111' (binary) cannot be used.

- Switch to NORMAL.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?
Y N

070
The control panel cable was loose.
- Verify the fix.

** Probable failing line(s):
Station Address (111)

1 1
8 8
A A
S T

071
- Use MIM 111 to trace the failing address line.
- Verify the fix.

072
- Power off.
- Set the Address switches to the correct address.

Note: Address '111' (binary) cannot be used.

- Switch to NORMAL.
- Verify the fix.

073
- Power off.
- Switch to NORMAL.
- Power on.

Is the system cable connected (100)?

Y N

074
- Power off.
- Connect the system cable.
- Verify the fix.

075

Is the internal system cable connected on the planar (171) or to a Protector Card (103, 104)?

Y N

076
- Power off.
- Connect the internal system cable on the planar (171) or a Protector Card (103, 104).
- Verify the fix.

AU

077
- Power off.

Note: Any station connected to socket '2' (Cable Thru feature installed) will be interrupted during the following procedure (100).

- Disconnect the system cable (100).
- Check the internal system cable including the connectors (171) for ground, open, or shorts.
- Check the Lightning Protector card on the planar, if installed (103, 173).

Is the internal system cable (and the Protector Card) OK?

Y N

078
- Repair or replace the internal system cable (171) or replace the Lightning Protector Card (104).
- Reconnect the system cable (100).
- Verify that the Terminator switch is set correctly (171).
- Verify the fix.

079

- Reconnect the system cable (100).
- Verify that the Terminator switch is set correctly (171).
- Power on.

The station is not communicating with the controller.

1. The system might not be configured for this station.

2. The system cable might have one of the following conditions:
   A. grounded.
   B. open.
   C. connector not installed correctly (polarity reversed).

3. A Terminator switch might be set to '1' on a work station between this station and the controller.

4. The Station Protector must be checked, if installed (173).

It will be necessary to find out which stations are connected to this system cable and which stations are responding to the controller.

- Go to the controller to analyze the network problem.

Was the network ok?

Y N

080

- Correct the network problem.
- Inform customer of any system cable problem.

Optional Resistance Check

The continuity of the system cable may be checked with the controller power off as follows:

- Disconnect the system cable at the display station.

- Measure the resistance at the end of the system cable.

The resistance from signal wire to the shield should be about 55 to 130 ohms (55 + 5 ohms per 100 meters of cable) or (55 + 15 per 1000 feet of cable).

The resistance between signal wires should be about 110 to 210 ohms (110 + 7 ohms per 100 meters of cable) or (110 + 20 per 1000 feet of cable).

Note: Any station on the same system cable between this station and the controller must have its Terminator switch set in position 2.

081

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

082

- Find the last station on the system cable (system cable connected to socket '1' only) (100).

The cable terminator can be connected as follows:

1. The Terminator switch is set to position '1' on the last station (171), (Cable Thru feature installed); OR,

2. Two jumpers are installed on the planar (105), (position 9), (Cable Thru feature not installed).

Is the cable terminator connected in the last work station?

Y N

083

- Connect the terminator in the last work station.
- Verify the fix.

084

- Go to the controller for a network problem.

The Terminator switch is set in position '1' when the station is the last work station on the cable. The switch connects a 55 ohm terminator for the system cable.

The switch is set to position '2' when the station is not the last work station on the cable. In position '2' the terminator resistors are disconnected.

085

- Press all top row data character keys (gray keys) one at a time while holding down the (left) Upper Shift key.
- Press ALL data character keys (gray keys) one at a time in lower shift.

Do ALL the keys pressed display the correct characters in both upper and lower shift?

Y N

This procedure tests each data key, shift function, and data path through the controller from the keyboard to the display.

086

Does only one key fail?

Y N

If only one or two keys fail, the data path is probably OK.

087

- While observing the display, press and hold each top row data character key (gray keys) one key at a time.
- Look for the keyed character to repeat on the display.

Do ALL the keys fail to repeat on the display (typamatic)?

Y N

If the typamatic function is operating correctly, a character will repeatedly appear on the display for each key pressed and held down.

088

- Power off.
- Switch to TEST.
- Power on.
- Press a key.

Note: Use more than one key to ensure that you have not selected a failing key.

Is the displayed keyboard identification correct for this keyboard after a key is pressed (142, 210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

The keyboard identification shows the controller which translate table to use for this keyboard.

3A X 3A Y 2A Z 2B A 2B B

089
- Power off.
- Switch to NORMAL.
- Reseat the keyboard cable at:
  1. The access panel.
  2. Socket B on the planar (103).
  3. Keyboard logic PC board.
- Power on.

Does the problem still occur?

Y N

090
One of the keyboard cables was loose.
- Verify the fix.

091
- Power off.
- Switch to TEST.
- Power on.
- Press a key.

Does the displayed keyboard identification match the identification set in the jumpers (142, 210)?

Y N

092
- Use MIM 136 to trace the failing keyboard identification line to isolate the failure.
- Switch to NORMAL.
- Verify the fix.

** Probable failing line(s):
Keyboard Identification (136)

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If the keyboard identification is wrong, the controller will use the wrong key code translate table.
The keyboard identification is displayed in the field near the center of the display.
This tests the identification lines from the keyboard to the display.

093
- Power off.
- Install the keyboard identification jumpers correctly (142).
- Switch to NORMAL.
- Verify the fix.

094
- Press the following keys and look for scan codes.

Note: If you delay more than 10 seconds between keys, you will have to press them twice.

- Press and hold the 'G' key.
- Look for scan code 00010101 .

- Press the letter 'O' key.
- Look for scan code 00101001.

- Press and hold down the (left) keyboard Shift key (position 62) MIM 143.
- Look for scan code 01010111.

- Release the (left) keyboard Shift key.
- Look for scan code 11010111.

- Press the Cursor Left key (position 9) MIM 143.
- Look for scan code 01110010.

Were the above scan codes displayed correctly?

Y N

095

During the following procedure all the scan code bits should alternate between 1 and 0.
- Run your hand over all the keys including the Shift key.
- Note the scan code bit that fails to change.

Does EACH of the displayed scan code bits change?

Y N

2 2 2
4 4 4
B B B
D E F

Scan Code	Keyboard ID	Station Address
01234567	xxxxxxxx	xxxxxxxx

This procedure tests the data path from the keyboard to the display by turning all scan code bits on and off.

Scan Code Test	Bits 01234567
G	00010101
O	00101001
Shift (down)	01010111
Shift (release)	11010111
Cursor Left	01110010

A grounded scan code line will display a '1'.
An open scan code line will display a '0'.

096

- Power off.
- Switch to NORMAL.
- Reseat the keyboard cable at:
  1. The access panel.
  2. Socket B on the planar (103).
  3. Keyboard logic PC board.
- Power on.

Does the problem still occur?

Y N

097

One of the keyboard cables was loose.

- Verify the fix.

098

- Use MIM 137 to trace the failing scan code line to isolate the failure.
- Verify the fix.

099

- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.

- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Switch to NORMAL.
- Verify the fix.

100

The problem is in the system.

- Review MIM 203 and 206.
- If you receive any messages or an error code of 0099, verify the procedures used. If correct, the system is at fault.
- Switch to NORMAL.

** Probable failing line(s):
Keyboard Scan Code (137)

A grounded scan code line will display a '1'.
An open scan code line will display a '0'.

101

- Power off.
- Switch to TEST.
- Power on.

Is scan code 11111111 displayed (210)?

Y N

102

- Press the following keys and look for scan codes.

Note: If you delay more than 10 seconds between keys, you will have to press them twice.

- Press and hold the 'G' key.
- Look for scan code 00010101 .

- Press the letter 'O' key.
- Look for scan code 00101001.

- Press and hold down the (left) keyboard Shift key (position 62) MIM 143.
- Look for scan code 01010111.

- Release the (left) keyboard Shift key.
- Look for scan code 11010111.

- Press the Cursor Left key (position 9) MIM 143.
- Look for scan code 01110010.

Were the above scan codes displayed correctly?

Y N

Scan Code	Keyboard ID	Station Address
01234567	xxxxxxxx	xxxxxxxx

When the keyboard is disconnected or the 'cable check' line is open, all 1's are forced in the I/O register.
The cable check is used to indicate if the keyboard is connected.

This procedure tests the data path from the keyboard to the display by turning all scan code bits on and off.

Scan Code Test	Bits 01234567
G	00010101
O	00101001
Shift (down)	01010111
Shift (release)	11010111
Cursor Left	01110010

103

Is the displayed station address correct for this station (210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	xxxxxxxx	xxxxx567

A display station without Cable Thru feature installed should display '000' in the address field.

104

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Switch to NORMAL.
- Verify the fix.

105

Note: If the program finds an error, the Line Check light either will not flash or it will flash at a much slower rate (more than 6 seconds).

The program will stop looping for 6 seconds or more if a key is pressed or if keyboard scan code bits are active.

Does the Line Check light flash on about each 2 seconds?

Y N

106

- Power off.
- Switch to NORMAL.
- Power on.
- Press several data character keys one at a time.

Does any key cause the cursor to move?

Y N

107

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

108
- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.
- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Verify the fix.

109
- Press a key.

Note: Use more than one key to ensure that you have not selected a failing key.

Does any key cause the keyboard identification field to be displayed (142, 210)?

Y N

110
- Power off.
- Switch to NORMAL.
- Reseat the keyboard cable at:
  1. The access panel.
  2. Socket B on the planar (103).
  3. Keyboard logic PC board.
- Power on.

Does the problem still occur?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If any keyboard identification is displayed, the strobes (138) are operational.

111
One of the keyboard cables was loose.
- Verify the fix.

** Probable failing line(s):
-5 Vdc (138)
+5 Vdc (138)
Data Strobe (138)
Delay Strobe (138)

112
- Power off.
- Switch to TEST.
- Power on.
- Press a key.

Does the displayed keyboard identification match the identification set in the jumpers (142, 210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If the keyboard identification is wrong, the controller will use the wrong key code translate table.
This tests the identification lines from the keyboard to the display.

113
One of the following lines is failing:
-5 Vdc.
+5 Vdc.
Data strobe.
Delay strobe.
Ground.

- Use MIM 138 to isolate the failure.
- Switch to NORMAL.
- Verify the fix.

114

- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.

- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Switch to NORMAL.
- Verify the fix.

115

- Press a key.

Does the displayed keyboard identification match the identification set in the jumpers (142, 210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If the keyboard identification is wrong, the controller will use the wrong key code translate table.

This tests the identification lines from the keyboard to the display.

116

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Switch to NORMAL.
- Verify the fix.

117
- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.
- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Switch to NORMAL.
- Verify the fix.

118
- Press a key.

Note: Use more than one key to ensure that you have not selected a failing key.

Is the displayed keyboard identification correct for this keyboard after a key is pressed (142, 210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

The keyboard identification shows the controller which translate table to use for this keyboard.

119
- Power off.
- Switch to NORMAL.
- Reseat the keyboard cable at:
  1. The access panel.
  2. Socket B on the planar (103).
  3. Keyboard logic PC board.
- Power on.

Does the problem still occur?

Y N

120

One of the keyboard cables was loose.
- Verify the fix.

** Probable failing line(s):
Keyboard Identification (136)

121
- Power off.
- Switch to TEST.
- Power on.
- Press a key.

Does the displayed keyboard identification match the identification set in the jumpers (142, 210)?

Y N

122
- Use MIM 136 to trace the failing keyboard identification line to isolate the failure.
- Switch to NORMAL.
- Verify the fix.

123
- Power off.
- Install the keyboard identification jumpers correctly (142).
- Switch to NORMAL.
- Verify the fix.

124
- Power off.
- Switch to NORMAL.
- Power on.
- Press several data character keys one at a time.

Does any key cause the cursor to move?

Y N

125
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

Scan Code	Keyboard ID	Station Address
xxxxxxxx	0123xxxx	xxxxxxxx

If the keyboard identification is wrong, the controller will use the wrong key code translate table.
This tests the identification lines from the keyboard to the display.

126

- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.

- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Verify the fix.

127

- Power off.
- Switch to NORMAL.
- Reseat the keyboard cable at:
  1. The access panel.
  2. Socket B on the planar (103).
  3. Keyboard logic PC board.
- Power on.

Does the problem still occur?

Y N

128

One of the keyboard cables was loose.

- Verify the fix.

** Probable failing line(s):
Keyboard Check (140)

129

- Use MIM 140 to trace the keyboard check lines for opens to isolate the failure.
- Verify the fix.

130

- Power off.
- Clean or replace the failing key module and the pad PC board (132, 133).
- Verify the fix.

131

- Power off.
- Switch to TEST.
- Power on.
- Press all the function keys (black keys) one at a time.

The scan code should change each time a different key is pressed.

Scan Code	Keyboard ID	Station Address
01234567	xxxxxxxx	xxxxxxxx

This procedure tests the function key modules; the data path was tested earlier (see 144 for scan code table).

Does the displayed scan code change each time a different key is pressed?

Y N

132

- Wait 15 seconds.

Note: If the program finds an error, the Line Check light either will not flash or it will flash at a much slower rate (more than 6 seconds).

The program will stop looping for 6 seconds or more if a key is pressed or if keyboard scan code bits are active.

Does the Line Check light flash on about each 2 seconds?

Y N

133

Is the displayed station address correct for this station (210)?

Y N

Scan Code	Keyboard ID	Station Address
xxxxxxxx	xxxxxxxx	xxxxx567

A display station without Cable Thru feature installed should display '000' in the address field.

3365V 3385W 3355X 3345Y

134
- Power off.
- Switch to NORMAL.
- Power on.
- Change the Brightness control setting.

The display should change gradually from dark to bright as the Brightness control is turned clockwise.

Does the Brightness change gradually?
Y N

135
- Power off.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?
Y N

136
The control panel cable was loose.
- Verify the fix.

** Probable failing line(s):
Cable Ground (111)

137
- Use MIM 111 to isolate the failure.
- Verify the fix.

138
- Power off.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?
Y N

139
The control panel cable was loose.
- Verify the fix.

** Probable failing line(s):
Status Switch (111)

140
- Use MIM 111 to trace the status switch lines.
- Verify the fix.

141
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Switch to NORMAL.
- Verify the fix.

142
- Power off.
- Switch to NORMAL.
- Power on.
- While observing the display, press and hold each top row data character key (gray keys) one key at a time.
- Look for the keyed character to repeat on the display.

Do ALL the keys fail to repeat on the display (typamatic)?

Y N

If the typamatic function is operating correctly, a character will repeatedly appear on the display for each key pressed and held down.

143
- Power off.
- Clean or replace the failing function key module or the pad PC board (133).
- Verify the fix.

144
- Power off.

The pad PC board connector or logic PC board is failing.

A pad PC board failure will usually cause a character to be repeated on the display or a single key to fail.
- Inspect and clean the pad PC board connector contacts on both top and bottom (130).
- Replace the logic PC board (131).
- Verify the fix.

145
- Power off.
- Switch to NORMAL.
- Power on.

Only the displayed characters or cursor should be visible. The trace lines (raster) should not be visible (156).

Is the raster visible?
Y N

146
- As you do the next procedure, observe the control panel lights.
- Power off.
- After 5 seconds, power on.

During the power-on sequence, are all the control panel lights on (about 1 second)?
Y N

All lights are turned on for about 1 second by the 'power on reset' line from the planar for a lamp test.

147
- Power off.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?
Y N

148
The control panel cable was loose.
- Verify the fix.

** Probable failing line(s):
Control Panel Light (111)

149
- Use MIM 111 to trace the failing line to isolate the failure.
- Verify the fix.

150
- Turn the Brightness control clockwise.

Is a single cursor displayed?
Y N

4 3 3
1 7 7
B C C
Z A B

151
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

152
- Change the Brightness control setting.

Does the Brightness change gradually?

The display should change gradually from dark to bright as the Brightness control is turned clockwise.

Y N

153
- Power off.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?

Y N

154
The control panel cable was loose.
- Verify the fix.

** Probable failing line(s):
Brightness Control Ground
(111)

155
- Use MIM 111 to isolate the failure.
- Verify the fix.

156
- Power off.
- Switch to TEST.
- Power on.
- Wait 15 seconds.

Note: If the program finds an error, the Line Check light either will not flash or it will flash at a much slower rate (more than 6 seconds).

The program will stop looping for 6 seconds or more if a key is pressed or if keyboard scan code bits are active.

Does the Line Check light flash on about each 2 seconds?

Y N

157
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Switch to NORMAL.
- Verify the fix.

158

Note: Use more than one key to ensure that you have not selected a failing key.

You may have to delay up to 6 seconds before you hear the clicker the first time.

When a key is pressed, do you hear the keyboard clicker?
Y N

159
- Power off.
- Switch to NORMAL.
- Reseat the keyboard cable at:
  1. The access panel.
  2. Socket B on the planar (103).
  3. Keyboard logic PC board.
- Power on.

Does the problem still occur?
Y N

160
One of the keyboard cables was loose.
- Verify the fix.

** Probable failing line(s):
+8.5 Vdc (139)
-Clicker Activate (139)

161
- Use MIM 139 to trace the '+8.5 volt' and '-clicker activate' lines to isolate the failure.
- Verify the fix.

162

- Power off.
- Switch to NORMAL.
- Power on.

This section of the MAP will use MIM reference 206.

The following keys will display the User ID Option Menu:
(Use key location chart, MIM 143.)

- Hold down the upper Shift key and press System Request (key #1).
- Press the Enter key (key #80).

```
*****************************
* (The steps in this box are *
* for use if the display is  *
* used as a system console.) *
* - Press Load on the system.*
* - Enter User ID 'C'.       *
* - Enter Time '222222'.     *
* - Press the Enter key.     *
* - Press the Enter key      *
*   again.                   *
* - Key in 'OFF'.            *
* - Press the Enter key.     *
*****************************
```

The Sign-On Menu should now appear.

The following keys will display the Prime Option Menu:
(Use key location chart, MIM 143.)

- Press the Command (key #2).
- Press Test Request (key #24).

The Prime Option Menu should now be displayed (206).

Is the prime option menu displayed?

Y N

C C
F G

C C
F G

163

The problem is in the system.

- Review MIM 203 and 206.
- If you receive any messages or an error code of 0099, verify the procedures used. If correct, the system is at fault.

164

Select the Display Verification Menu by pressing the following keys:

- Press the '1' key (key #12).
- Press the Enter key (key #80).

Is the display verification menu displayed?

Y N

165

The problem is in the system.

- Review MIM 203 and 206.
- If you receive any messages or an error code of 0099, verify the procedures used. If correct, the system is at fault.

166

Select the Display Attributes by pressing the following keys:

- Press the '1' key (key #12).
- Press the Enter key (key #80).

Are all attributes operating correctly?

Y N

167

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

4 0 C H

168

The high intensity characters should change gradually from normal to bright as the Contrast control is turned clockwise.
- Change the Contrast control setting.

Note: It may be necessary to adjust the Brightness control to make the contrast visible.

Do the high intensity characters change gradually?

Y N

169
- Power off.
- Reseat the control panel cable at the planar board connector H (110).
- Power on.

Does the problem still occur?

Y N

170
The control panel cable was loose.
- Verify the fix.

171
- Use MIM 111 to isolate the failure.
- Verify the fix.

** Probable failing line(s):
+8.5 Vdc (111)
Contrast Control Ground (111)

172

Return to the Display Verification Menu as follows:
- Press the Enter key.
- Press the 'C' key.
- Press the Enter key.

Select the Displayable Characters table as follows:
- Press the '2' key (key #13).
- Press the Enter key.

Are the displayable characters displayed?

Y N

4 4
1 1
C C
J K

173
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

174
Return to the Display Verification Menu as follows:
- Press the Enter key.
- Press the 'C' key.
- Press the Enter key.

Select the Specified Input Fields as follows:
- Press the '3' key (key #14).
- Press the Enter key.

Were the specified input fields operating correctly?
Y N

175
The problem is in the system.
- Review MIM 203 and 206.
- If you receive any messages or an error code of 0099, verify the procedures used. If correct, the system is at fault.

176
Return to the Display Verification Menu as follows:
- Press the Enter key.
- Press the 'C' key.
- Press the Enter key.

Select the Function Keys and Features display as follows:
- Press the '4' key (key #15).
- Press the Enter key.

Do any of the function keys fail?
Y N

C C L M

B C C Z L M 3 6

177
No solid failure occurred in online mode.

For a problem where symptoms cannot be generated, use MAP 3 which will attempt to isolate the problem in reference to reported symptoms or symptoms observed earlier.
Return to the Display Verification Menu as follows:
- Press the Enter key.
- Press the 'C' key.
- Press the Enter key.

Return to the Prime Option Menu as follows:
- Press the Enter key.
- Press the 'C' key.
- Press the Enter key.

Return to the User Sign-On Option Menu as follows:
- Press the Enter key.
- Press the 'C' key.
- Press the Enter key.
- Power off to clear the display.
- After 5 seconds, power on.

Go To Map 0300, Entry Point A.

178
The problem is in the system.
- Review MIM 203 and 206.
- If you receive any messages or an error code of 0099, verify the procedures used. If correct, the system is at fault.

179
- Ensure that the raster check jumper is not installed (156).
- Make the brightness limiter adjustment (152); if the adjustment cannot be made, power off and replace the display assembly.
- Verify the fix.

180

- Make the adjustment for the symptom you have; if the adjustment cannot be made, power off and replace the display assembly (151).

1. Display not centered	(155)
2. Tilted display	(154)
3. Display size not correct	(154)
4. Characters missing in the corners	(154,155)

- Verify the fix.

181

- Power off.
- Switch to TEST.
- Unlock the keylock if installed.
- Power on.
- Wait 15 seconds.

Note: If the program finds an error, the Line Check light either will not flash or it will flash at a much slower rate (more than 6 seconds).

The program will stop looping for 6 seconds or more if a key is pressed or if keyboard scan code bits are active.

Does the Line Check light flash on about each 2 seconds?

Y N

182

- Power off.
- Switch to NORMAL.
- Power on.

Does the Ready light remain on?

Y N

Ready on indicates that the power-on diagnostic is complete and the cursor should be at least at position C.

5 5 4
5 0 3
C C C
N P Q

183

- As you do the next procedure, observe the control panel lights.
- Power off.
- After 5 seconds, power on.

During the power-on sequence, are all the control panel lights on (about 1 second)?

Y N

All lights are turned on for about 1 second by the 'power on reset' line from the planar for a lamp test.

184

Is the fan running?

Y N

185

- Power off.

Is the AC power supply fuse OK (180)?

Y N

186

- Replace the AC power supply fuse (180).
- Power on.
- If the fuse blows again, replace the power supply.
- Verify the fix.

187

- Power on.

Is the line cord plugged in?

Y N

188

- Power off.
- Plug in the line cord.
- Verify the fix.

189

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Measure the line AC voltage at the line filter side of the Power switch (110).

Is the voltage inside the limits (184)?

Y N

190

- Measure the AC voltage at the customer power outlet (184).

Is the line voltage inside the limits (184)?

Y N

191

- Inform the customer of a power outlet problem.

192

- Power off.
- Disconnect the line cord from the power outlet.
- Repair or replace the line cord/line filter (185).
- Verify the fix.

193

- Measure the AC voltage on the transformer side of the Power switch (110).

Is the voltage inside the limits (182)?

Y N

4 4
5 5
C C
U V

194
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the Power switch.
- Verify the fix.

195
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

196

Is the low voltage circuit breaker on (180)?

Y N

The circuit breaker is tripped by the '+5 Vdc' line and turns off the '-5 Vdc', '+5 Vdc', and the '+8.5 Vdc' lines.

197

- Set the low voltage circuit breaker (180).
- Power on.
- If the circuit breaker trips, do the following:

Note: Power off to disconnect or reconnect cables.

1. Disconnect the display AC power connector (150).
2. Disconnect the low voltage cable at the power supply (180).
3. Disconnect all cables on the planar.

- Set the circuit breaker.
- Power on.
- If the circuit breaker trips again, replace the power supply.
- If not, reconnect all disconnected cables one at a time in the following order:
  1. The cable at the power supply.
  2. The cable at the 'G' socket.
  3. All remaining cables one at a time.
- Set the circuit breaker and power on after each step and replace the cable or unit that causes the circuit breaker to trip.
- Reconnect the display AC power connector (150).
- Verify the fix.

198

- Power off.
- Reseat the display signal/planar power cable at the power supply (180) and planar connector G (103).
- Power on.

Does the problem still occur?

Y N

199

The display signal/planar power cable was loose.

- Verify the fix.

** Probable failing line(s):
+5 Vdc

200

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180, 182):

Pin	Voltage	Vdc Limits
+5	+5	4.7 to 5.5

Is the voltage inside the limits?

Y N

201
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

202
- Power off.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?

Y N

203
The control panel cable was loose.
- Verify the fix.

** Probable failing line(s):
+5 Vdc

204

- Ground the voltmeter on frame ground (180).
- Measure the voltage at the four pins on the planar (103):

Pin	Voltage	Vdc Limits
1-G-B02	+5	4.6 to 5.5
1-G-B03	+5	4.6 5.5
1-G-D02	+5	4.6 5.5
1-G-D03	+5	4.6 5.5

Is the voltage inside the limits?

Y N

205

- Power off.
- Repair or replace the display signal/planar power cable (102).
- Verify the fix.

206

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

207

Does the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

208

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

209

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180, 182):

Pin	Voltage	Vdc Limits
+5	+5	4.7 to 5.5

Is the voltage inside the limits?

Y **N**

210

- Measure the line AC voltage at the line filter side of the Power switch (110).

Is the voltage inside the limits (184)?

Y **N**

211

- Measure the AC voltage at the customer power outlet (184).

Is the line voltage inside the limits (184)?

Y **N**

212

- Inform the customer of a power outlet problem.

5 5 5
0 0 0
D D D
B C D

213
- Power off.
- Disconnect the line cord from the power outlet.
- Repair or replace the line cord/line filter (185).
- Verify the fix.

214
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

215
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

216

Does the Line Check light remain on?

Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

217

Does the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

218

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

_____
_____
_____
_____
_____

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180, 182):

Pin	Voltage	Vdc Limits
+5	+5	4.7 to 5.5

Is the voltage inside the limits?
Y N

219
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

220
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

221
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

222

Does the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

223

- Power off.
- Reseat the display signal/planar power cable at the power supply (180) and planar connector G (103).
- Power on.

Does the problem still occur?

Y N

224

The display signal/planar power cable was loose.

- Verify the fix.

** Probable failing line(s):
-5 Vdc

225

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

_____
_____
_____
_____
_____

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180):

Pin	Voltage	Vdc Limits
-5	-5	-4.6 to -5.4

Is the voltage inside the limits?

Y N

5 5 5
3 3 3
D D D
H J K

226
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

227
- Ground the voltmeter on frame ground (180).
- Measure the voltage on the planar (103):

Pin	Voltage	Vdc Limits
1-G-B06	-5	-4.6 to -5.4

Is the voltage inside the limits?
Y N

228
- Power off.
- Repair or replace the display signal/planar power cable (102).
- Verify the fix.

229
- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

230
- Power off.
- Reseat the display signal/planar power cable at the power supply (180) and planar connector G (103).
- Power on.

Does the problem still occur?
Y N

231
The display signal/planar power cable was loose.
- Verify the fix.

** Probable failing line(s):
+8.5 Vdc

232

- Ground the voltmeter on frame ground (180).
- Measure the voltage at 1-H-B12 (brightness control) (111).

The voltage should change from 0 to +8.5 volts as the Brightness control is turned clockwise.

Is the voltage correct?

Y N

233

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Ground the voltmeter on frame ground (180).
- Measure the DC voltage at the power supply test point (180):

Pin	Voltage	Vdc Limits
+8.5	+8.5	7.7 to 9.4

Is the voltage inside the limits?

Y N

234

- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

235

- Ground the voltmeter on frame ground (180).
- Measure the voltage at the three pins on the planar (103):

Pin	Voltage	Vdc Limits
1-G-B09	+8.5	7.7 to 9.4
1-G-B10	+8.5	7.7 9.4
1-G-B11	+8.5	7.7 9.4

Is the voltage inside the limits?

Y N

236

- Power off.
- Repair or replace the display signal/planar power cable (102).
- Verify the fix.

237

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

238

The '-power on reset' line is grounded.

- Use MIM 141 to isolate the failure.
- Verify the fix.

239

Is the display CRT filament on (150)?

Y N

The filament being on verifies that part of the display is OK and that AC power is being received from the power supply.

240

- Power off.
- Reseat the display AC power connector (150).
- Switch to NORMAL.
- Power on.

Does the problem still occur?

Y N

241

The display power cable was loose.

- Verify the fix.

242

- Power off.

Is the display fuse OK (150)?

Y N

243

- Replace the display fuse (150).
- Power on.
- If the new fuse blows, replace the display unit (151).
- Verify the fix.

244
- Power on.

DANGER

If you are not careful, you could receive an electrical shock while performing the next procedures.

- Measure the AC voltage for the display at the display AC power connector (150):

Socket	Vac	Vac Limits
Display AC power connector	120	106 to 134

Is the voltage inside the limits?
Y N

245
- Power off.
- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
- Verify the fix.

246
- Use MIM 157 'Horizontal Sync'.
- Verify the fix.

247
- Power off.
- Reseat the display signal/planar power cable at the display and at planar connector G (157).
- Switch to NORMAL.
- Power on.

Does the problem still occur?
Y N

248

The display signal/planar power cable was loose.

- Verify the fix.

** Probable failing line(s):
Video (157)
Horizontal Sync (157)

249

- Ground the voltmeter on frame ground (180).
- Measure the voltage at 1-H-B12 (brightness control) (111).

The voltage should change from 0 to +8.5 volts as the Brightness control is turned clockwise.

Is the voltage correct?

Y N

250

- Power off.
- Reseat the control panel cable at the planar board connector H (103).
- Power on.

Does the problem still occur?

Y N

251

The control panel cable was loose.

- Verify the fix.

** Probable failing line(s):
+8.5 Vdc (111)

252

- Use MIM 111 to isolate the failure.
- Verify the fix.

253

Does the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

254

- Turn up the Brightness control (clockwise).
- Make the Brightness Limiter Adjustment (152).
- Use MIM 157 to trace both the '+video drive' and '+horizontal sync' lines for opens to isolate the failure.
- Verify the fix.

255

- Power off.
- Check the positions of the jumpers on the planar (105).
- Replace the planar; set jumpers correctly on new planar (103, 105).
- Verify the fix.

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ENTRY POINTS

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

001

(Entry Point A)

All problems must be started at Start of Call MAP.

This MAP has three sections:

1. MAP (using symptoms reported by the customer or observed earlier).

The fix statement lists the possible repair actions in a recommended sequence in reference to repair time, failure rate, and parts cost.

The MAP will isolate as far as possible with the information available.

If there is more than one repair action listed in the fix statement, perform one action per call and record the date.

If you get to a question you cannot answer, the repair actions on both the YES and the NO traces should be considered for this problem.

If you get lost in the MAP, go to MAP 3 Entry Point B.

2. Error log MAP (uses error log) (Entry Point C).

3. An index of probable causes listed by major symptom (Entry Point B).

Do you have a current error log (208)?

Y N

002

Was the display completely dark?

Y N

2 1
3 8 2
A B C

003

- Look at the indicators on the right side of the display, if displayed, such as Keyboard Shift.

When the display is stable (synchronized), the indicators do not move horizontally or vertically on the display.

Was the display stable (synchronized)?

Y N

004

Did the Line Check light remain on?

Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

005

Did the Ready light remain on?

Y N

The Ready light off indicates the planar diagnostic did not complete.

006

The power supply may have failed or has output ripple.

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
  Date / / .

007

The horizontal sync or vertical sync lines may have failed.

- Inspect the display signal/planar power cable for opens or grounds; pay special attention to the lines mentioned above (157).
- Repair or replace the cable if necessary.
  Date / / .

- Replace the display assembly (151).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

008

Did the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

009

The '-5 Vdc' line to the planar may have failed.

- Inspect the display signal/planar power cable for an open; pay special attention to the '-5 Vdc' line.

- Repair or replace the display signal/planar power cable if necessary (102).
  Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

010

The '-power on reset' line may have grounded.

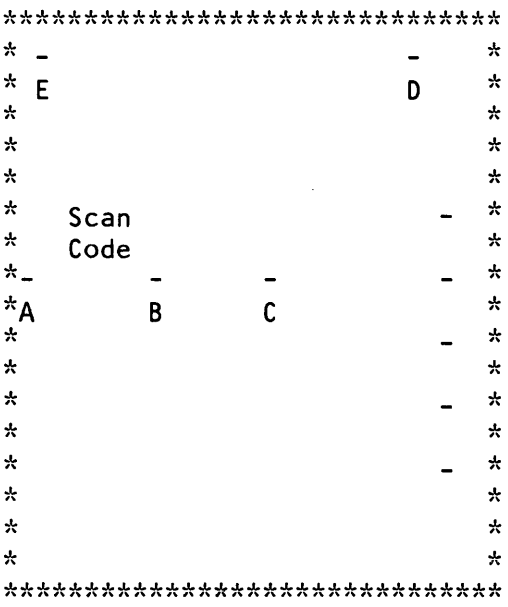
- Inspect the keyboard cables for grounds or opens; pay special attention to the '-power on reset' line (141).
- Repair or replace the failing cable if necessary.
  Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

011

The figure shows the positions of the cursor during the power-on sequence:



Cursor Position	Description
None	The controller test or the display failed.
A	The system cable control test failed.
B	(NORMAL) The I/O test failed. (TEST) 1. A key was pressed. 2. Bits were on in the I/O registers that should not be on.
C	Main planar diagnostic has completed. (Ready light on)
D	The display station is waiting for a poll from the controller. (Line Sync and System Available must be on before the cursor may be moved to position E.)
E	The display station has responded to the controller.

Did the cursor remain in position E (position 2, line 1)?

Y N

The cursor in position E indicates that two-way communication with the controller is completed.

012

Did the cursor remain in position D ?

Y N

The internal diagnostic completed and the display station failed to communicate with the controller.

1
0 9 5
F G H

013

Did the cursor remain in position C ?

Y N

The internal diagnostic completed but read-only storage failed.

014

Did the cursor remain in position B ?

Y N

The internal diagnostic stopped because of an I/O failure.

015

Did the cursor remain in position A ?

Y N

The internal diagnostic stopped because of a cable adapter failure.

016

Did ALL the keys fail to repeat on the display (typamatic)?

Y N

If there is a failure on the keyboard pad or logic PC board interface, the typamatic function will fail on this MAP path.

017

Was any character repeating on the display without a key pressed?

Y N

This indicates a stuck key.

018
The display may be failing internally.

- Replace the display assembly (151).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

019
A key may be sticking.
- Clean or replace the failing key module and pad PC board (132, 133).
  Date / / .

020
Did the Ready light remain on?
Y N

Ready on indicates that the power-on diagnostic is complete and the cursor should be at least at position C.

021
Did the Internal Check light remain on?
Y N

The Internal Check light on indicates that a parity error occurred in the planar.

022
The planar may be failing.

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

023
Low voltage may have caused the failure.
- Check the voltage at the customer outlet.
  Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

024
Did the Internal Check light remain on?
Y N

The Internal Check light on indicates that a parity error occurred in the planar.

025
The pad PC board connector or logic PC board may be failing.

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).

Date / / .

026
The '-power on reset' line may have grounded.

- Inspect the keyboard cables for grounds or opens; pay special attention to the '-power on reset' line (141).
- Repair or replace the failing cable, if necessary.

Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).

Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

Date / / .

027
Did the Line Check light remain on?
Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

028

The Address switches, if installed, may have been set or shorted to address '111' (binary).

- Check the Address switch lines for grounds MIM 111.
- Repair or replace the cable/switch, if necessary.

  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

  Date / / .

029

The planar may have failed.

- Replace the planar; set jumpers correctly on new planar (103, 105).

  Date / / .

030

Did the Line Sync light remain on?

Y N

Line Sync on indicates that the controller is transmitting data on the system cable.

031

The 'data strobe' line may have failed.

- Inspect the keyboard cables for grounds; pay special attention to the 'data strobe' line.
- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).

  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

  Date / / .

032

The planar may have failed.

- Replace the planar; set jumpers correctly on new planar (103, 105).

  Date / / .

033
The planar may have failed.

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

034
Did the Line Sync light remain on?
Y N

Line Sync on indicates that the controller is transmitting data on the system cable.

035
The communications link to the controller may have failed.
- Inspect the external system cable connector.
- Inspect, repair, or replace the internal system cable between the planar and the external system cable connector (171).
- Go to the controller for a network problem.
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

036
Did the Line Check light remain on?
Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

037
An Address switch, if installed, may have been set wrong or failed.
- Check the Address switch lines for a ground or open MIM 111.
- Repair or replace the cable/switch, if necessary.
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

038

The system cable might not be terminated correctly.

- Check to ensure that the cable is terminated correctly at the last work station.
- Go to the controller for a network problem.

Date / / .

039

Did ALL the keys pressed display the correct characters in both upper and lower shift?

Y N

Pressing all the keys tests each key and the data path through the controller from the keyboard to the display.

040

Did only one key fail?

Y N

If only one or two keys fail, the data path is probably OK.

041

Did ALL the keys fail to repeat on the display (typamatic)?

Y N

If there is a failure on the keyboard pad or logic PC board interface, the typamatic function will fail on this MAP path.

1 1 1 1
3 3 1 1
U V W X

042

A scan code line could have failed.

A keyboard ID:

1. Line failed.
2. Was not jumpered correctly.
3. Was not interpreted correctly by the controller.

- Inspect the keyboard cables for grounds and opens; pay special attention to the 'ID' and 'scan code' lines MIM 136, 137.

- Repair or replace the keyboard cable.
  Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

043

Was the keyboard dead (inoperative)?

Y N

1 1 2 2 Y Z

044

A keyboard check line may have failed.
A keyboard ID:

1. Line failed.
2. Was not jumpered correctly.
3. Was not interpreted correctly by the controller.

- Inspect the keyboard cables for grounds and opens; pay special attention to the 'ID' and 'cable check' lines MIM 136, 140.

- Repair or replace the keyboard cable.
  Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

045

The '-5 Vdc', '+5 Vdc', 'data strobe', or 'delay strobe' line may have failed.

- Inspect the keyboard cables for grounds and opens; pay special attention to the lines mentioned above.

- Repair or replace the keyboard cable.
  Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

046
A key may be sticking.
- Clean or replace the failing key module and pad PC board (132, 133).
  Date / / .

047
Did ALL the keys fail to repeat on the display (typamatic)?
Y N

If there is a failure on the keyboard pad or logic PC board interface, the typamatic function will fail on this MAP path.

048
Did the Ready light remain on?
Y N

Ready on indicates that the power-on diagnostic is complete and the cursor should be at least at position C.

049
The 'Ready LED' line may have failed.
- Inspect the control panel cable for opens and grounds; pay special attention to the 'Ready LED' line MIM 111.
- Repair or replace the control panel cable if necessary.
  Date / / .

- Replace the LED MIM 111.
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

050
Did the Line Sync light remain on?
Y N

Line Sync on indicates that the controller is transmitting data on the system cable.

1 1 1
8 4 4
A A A
A B C

051

The 'Line Sync LED' line may have failed.

- Inspect the control panel cable for opens and grounds; pay special attention to the 'Line Sync LED' line MIM 111.
- Repair or replace the control panel cable if necessary.
  Date / / .

- Replace the LED MIM 111.
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

052

The clicker circuit is tested.

When a key was pressed, did you hear the keyboard clicker?

Y N

053

The '+8.5 Vdc' or 'clicker activate' line may have failed.

- Inspect the keyboard cables for opens and grounds; pay special attention to lines mentioned above MIM 111.

- Repair or replace the keyboard cable.
  Date / / .

- Replace the clicker coil.
  Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

054

(Entry Point B)

The following chart lists the probable causes for common symptoms.

Major Symptom	Minor Symptom	Probable Cause
	KEYING FUNCTION	
Characters not correct	Single character	Key module Pad PC board Planar
	More than one character	Logic PC board Keyboard cables Voltages Planar
Characters repeat	Single key	Key module Pad PC board Logic PC board
	More than one key	Pad PC board Logic PC board Voltages
Clicker fails	More than one key	Keyboard cable Clicker +8.5 volts low
Binding key	Single key	Key module Dust shield
	More than one key	Dust shield Key modules
Spacebar		Key module Spacebar linkage Dust shield

(Step 054 continues)

(Step 054 continued)

SYSTEM FUNCTION		
Line Sync not on	Parity error	System cable
	No parity error	Planar Controller
	Other units similar	System poll
Line check	Station only	Planar Power supply
	Station and controller	Cable terminator Power supply Planar
System not available	No parity errors Line Sync on	Address switches
Internal check		External noise Line filter Power supply Display assembly

DISPLAY FUNCTION		
Jumping display	Single line	External magnetic noise
	More than one line	Strong external magnetic field Planar Voltages Display assembly
Partial characters	Same character independent of display location	Planar Display assembly
Brightness changes	More than 5 minutes after power on	Display assembly Brightness control Cable (111) Planar

(Step 054 continues)

(Step 054 continued)

Contrast changes (high intensity)		Contrast control (111) Cable interposer Planar Display assembly
Spots or lines on the display		Display assembly External noise Planar
Loss of display for a short period	Arcing noise from display area No noise in display	Display assembly Loose display cable Planar Display assembly
Horizontal lines		Brightness limiter Display assembly
Image size changes		Display assembly
Vertical roll		Display cable Connector (157) Display assembly
Horizontal skew		Display cable Connector (157) Display assembly Planar
*	OTHER SYMPTOMS	*
Circuit breaker trips		Power line disturbance, Reset circuit breaker
Power supply fuse blows		Power line disturbance Replace fuse
Symptoms not described		Voltage/power supply Planar External noise

Go To Verify Map 0400, Entry Point A.

055

Typamatic function and some keys fail.

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).

Date / / .

056

Did the Ready light remain on?

Y N

Ready on indicates that the power-on diagnostic is complete and the cursor should be at least at position C.

057

Did the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

058

Did the Line Sync light remain on?

Y N

Line Sync on indicates that the controller is transmitting data on the system cable.

059

Did the Line Check light remain on?

Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

2 2 1 1 1
0 0 9 9 9
A A A A A
E F G H J

060

The AC power or the '+5 Vdc' line to the planar may have failed.

- Inspect the display signal/planar power cable; pay special attention to the '+5 Vdc' line.
- Replace the cable, if necessary.
  Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
  Date / / .

- Replace the AC Power switch.
  Date / / .

- Replace the AC line filter.
  Date / / .

- Replace the AC line cord.
  Date / / .

- Replace the display assembly (151).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

061

The planar diagnostic may have failed.

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

062

The planar diagnostic may have failed.

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

063

Low voltage may have caused the failure.

-Check the customer outlet.

Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).

Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

Date / / .

064

Did the Line Check light remain on?

Y N

The Line Check light on indicates that the cable adapter received data (from the system cable) that was out of parity.

065

Did the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

066

Did the Ready light remain on?

Y N

The Ready light off indicates the planar diagnostic did not complete.

067

Power supply ripple may have caused the failure.

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).

Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

Date / / .

068

The Brightness control, display AC power, or display drive may have failed.

- Inspect and reseat the display AC power connector.
- Inspect the control panel cable; pay special attention to the '+8.5 Vdc' line and the 'brightness control' line MIM 111.
- Inspect the Brightness control MIM 111.
- Replace the cable or brightness control if necessary.
- Inspect the display signal/planar power cable; pay special attention to the 'video drive' and the 'horizontal sync' lines MIM 157.
- Replace the cable, if necessary.
  Date / / .

- Replace the display assembly (151).
  Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).
  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

069

The planar diagnostic may have failed.

- Replace the planar; set jumpers correctly on new planar (103, 105).
  Date / / .

070

Did the Internal Check light remain on?

Y N

The Internal Check light on indicates that a parity error occurred in the planar.

071

The '-5 Vdc' line may have failed.

- Inspect the display signal/planar power cable; pay special attention to the '-5 Vdc' line.
- Replace the cable, if necessary.

  Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).

  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

  Date / / .

072

The '+8.5 Vdc' or '- Power on Reset' line may have failed.

- Inspect the display signal/planar power cable; pay special attention to the '+8.5 Vdc' line.
- Replace the cable, if necessary.
- Inspect the keyboard signal cables; pay special attention to the '-power on reset' line MIM 140.
- Replace the cable, if necessary.

  Date / / .

- Inspect and clean the pad PC board connector contacts on both sides (130).
- Replace the keyboard logic PC board (131).

  Date / / .

- Disconnect the line cord from the power outlet.
- Replace the power supply (181).

  Date / / .

- Replace the planar; set jumpers correctly on new planar (103, 105).

  Date / / .

073
(Entry Point C)

- Find the last error code from the error log in column 1 of the chart below.
- (The latest error code can be determined by noting the date in the error log.)
- Find the other error code if there is one in column 4.
- Column 5 lists the probable causes.

See MIM 208 error history table for sense information for the error codes.

1	2	3	4	5
Last Error Code	Name	Error Description	Other Error Code	Probable Cause
0100	No response	This error is reported when a display station is in use and no response to a poll occurs.		System cable Planar
0101	Transmit operation check	This error is reported by a controller during a poll or command being executed by the controller.		Controller
0103	Receive parity error	This error is reported by the controller when a frame is received and parity is bad in response to a poll command.	0104	Controller Planar System cable
0104	Line parity check	This error is sent in the poll response status from the display station.	0103	Planar Controller System cable

(Step 073 continues)

(Step 073 continued)

		A line parity check must be reset with a poll command and the reset bit on.		
0106	Receive length check	The wrong number of bytes was received by the controller as a result of a poll or command.		Planar
0107	Wrong station responded	Incorrect station address returned in responses to a poll	0103 0104	Planar System cable System Cable
0108	Power on	The condition is determined in the exception status sent by the display station. It is reported as an error only if the station was in use.		Planar
0109	Activate command failure	Busy bit was not on after an activate command had been sent		System Cable
0111	Scan code not valid	The 7-bit code sent in the keyboard response frame does not translate to a character or function.	0103 0104	Keyboard System cable System cable
0120	Command not valid	This indicates that the poll command sent to the display is not a valid command or the device identification is wrong.	0103 0104	Planar System cable System cable
0121	Register value not valid	This indicates that the address counter value is not inside the user accessible limits.	0103 0104	Planar System cable System cable
0122	Storage or	This condition occurs		Planar

(Step 073 continues)

(Step 073 continued)

	input queue overrun	when more than 16 commands and associated data frames have been sent, or when an attempt is made to store data beyond the limit of user accessible storage.		Controller
0123	Null or attribute	Null or attribute not found or address counter points to attribute.		System application program Planar
0124	Activate not valid	This condition indicates a wrong or not valid activate command was sent to the display station.	0103 0104	Controller Planar System cable System cable
0125	Undefined exception status	Controller determined undefined status returned by station		Power Planar System Cable
0149	Undefined error status	Incorrect status returned	0125 0103 0104	Planar Power System Cable
0181	Mag Stripe Rdr. Error	No device status available		MSR MSR Card Planar
0182	Device type Error	Unsupported device type responded to poll	0103	Planar System Cable
0183	Wrong size display	Image size ID incorrect		Jumpers on Planar
0184	Incorrect keyboard ID	Keyboard ID received incorrect		Keyboard ID controller
0185	Keyboard ID mismatch	Controller and station do not match keyboard ID		Controller keyboard

(Step 073 continues)

(Step 073 continued)

0189	Inv. OS status	No device status available	0181 0181	LP MSR LP
0190	Even/Odd change in status	Status sent to the controller has not changed in 200 milliseconds after the work station has received a poll command with a positive response and a not busy response.		Planar
0191	Busy	The controller has found that the busy bit has been on for a time longer than 400 milliseconds.		Planar

MSR - Magnetic Stripe Reader
LP - Light Pen

IBM 5251-1/11 DISPLAY STATION

Verify MAP

ENTRY POINTS

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

001

(Entry Point A)

- Attempt to repeat the original error.
- Verify that no new errors have occurred.
- Power off.
- Switch to NORMAL.
- After 5 seconds, power on.

Is the cursor in position E (position 2, line 1)?
Y N

002
Is the controller available?
Y N

003
Is the cursor in position D (upper right)?
Y N

004
Go to MAP 0100, Entry Point A (Start of Call) and use the symptom you have now.

005
End of call.

006
Go to MAP 0100, Entry Point A (Start of Call) and use the symptom you have now.

A

007
- Run the on-line test (display attributes test (206)).

Does the display attributes test pass?
Y N

008
Go to MAP 0100, Entry Point A (Start of Call) and use the symptom you have now.

009
- If necessary, run the customer application.
- If not necessary, answer yes to the following question.

Does the customer application function correctly now?
Y N

010
- If necessary, check the customer application.

Go to MAP 0100, Entry Point A (Start of Call) and use the symptom you have now.

011
End of call.

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