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Systems

IBM 3250 Graphics Display System: Problem Determination and User's Guide

IBM

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Preface

The organization of the book is shown in Chapter 1. Further information on the 3250 system is given in *An Introduction to the IBM 3250 Graphics Display System,* GA33-3035, and *IBM 3250 Graphics Display System: Component Description,* GA33-3037.

Second Edition April 1983

The second edition introduces a major revision to the Problem Determination Guide to incorporate changes brought about by the introduction of the IBM 3255 Display Control Unit Model 2, and a restructuring of the contents of the publication to improve ease of use. This publication obsoletes GA33-3110-0.

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Chapter 1. Introduction

Using this Guide

Note: This guide is applicable to IBM 3250 Graphics Display Systems with an IBM 3251 Display Station Model 1, an IBM 3255 Display Control Unit Model 1 or Model 2, and an IBM 3258 Channel Control Unit.

Chapter 1 presents an overview of the Guide, and also details the procedures for powering-up and powering-down the units of an IBM 3250 Graphics Display System.

Chapter 2 contains the problem determination procedures for the IBM 3251 Display Station Model 1, the IBM 3255 Display Control Unit Models 1 and 2, and the IBM 3258 Channel Control Unit.

The procedures described in this guide are arranged in two groups:

1. Problem determination procedures that take you from a problem experienced with an IBM 3251 Display Station through a series of steps to either a solution or to a functional check.
2. Functional checks that determine if a component of the 3250 system is causing a problem for the user of a 3251.

A procedure consists of a series of logical steps. Each step ends with a question. Depending on the answer, you go down either a YES path, or a NO path, to another step or to a solution.

Note: This guide assumes that the problem is experienced on a system that was previously good, and that the application program is also good.

To use this guide, select the procedure in the appropriate chapter:

- Procedure A. Display Problems
- Procedure B. Alphanumeric Keyboard Problems
- Procedure C. Program Function Keyboard Problems
- Procedure D. Light Pen Problems
- Procedure E. Cursor Control Tablet Problems (Systems with RPQs 7J0070, 7J0072, and 7J0073)
- Procedure F. Plotter Problems (Systems with RPQs 7J0071 and 7J0072).

In addition there is a section (Procedure G) for problems with an IBM 3258 Channel Control Unit.

Switching Power On and Off

Power-Up Procedures

- **IBM 3251 Display Station Model 1.** Switch power on by pressing | on the power on/off switch (see Figure 1-1).
- **IBM 3255 Display Control Unit Models 1 and 2.** Switch power on by pressing | on the power on/off switch (see Figure 1-1). Open the front door of the 3255 and observe the OPER indicator on the test panel. Switching power on starts the 3255 self-checks. If the tests end without detecting an error, the OPER indicator goes on.

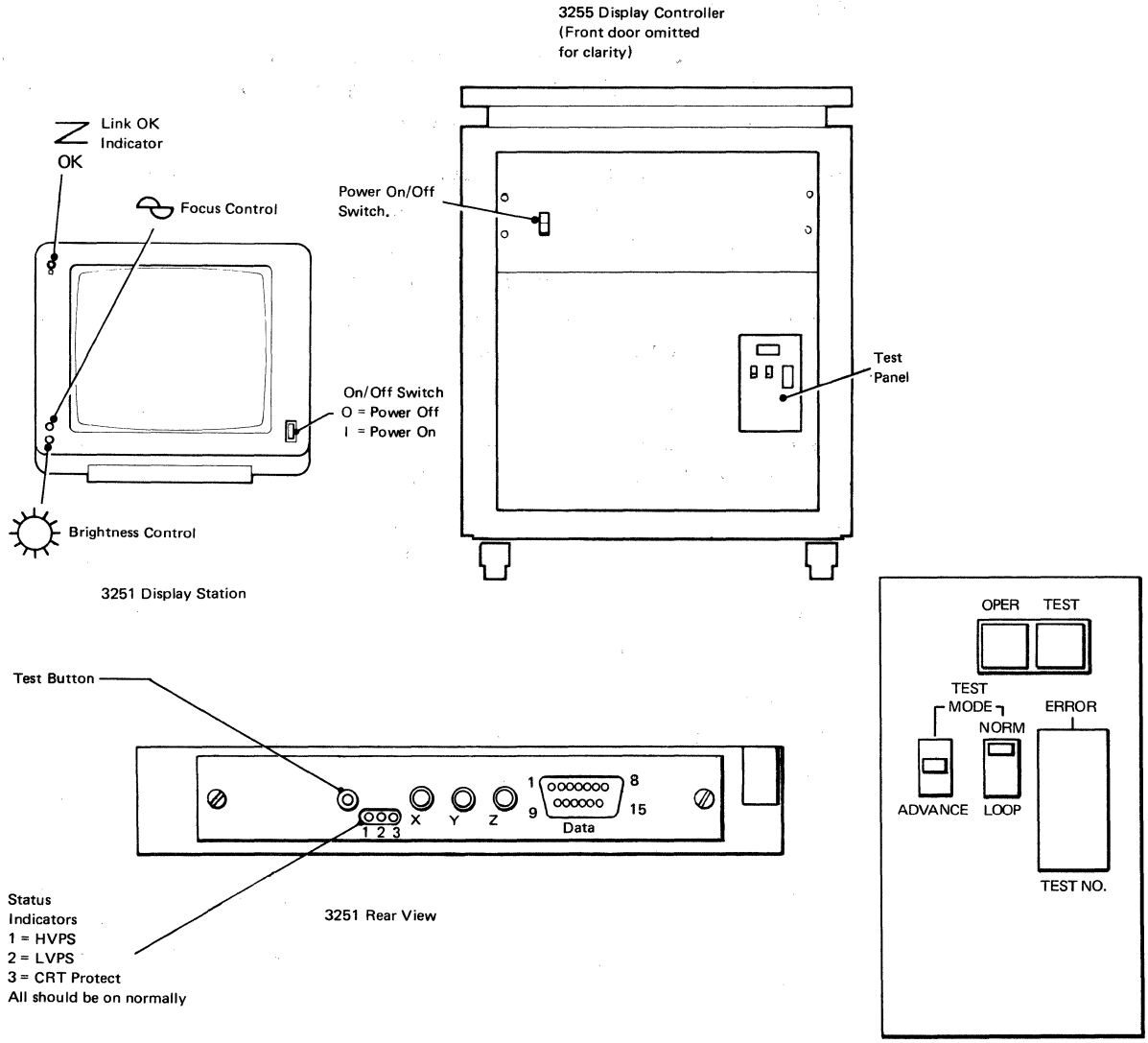


Figure 1-1. 3251 and 3255 Switches

- **IBM 3258 Channel Control Unit.**
  1. Switch power on by pressing | on the power on/off switch (see Figure 1-2).
  2. Open the front door of the 3258 and set the ONLINE/OFFLINE switch, on the operator panel, to ONLINE.
  3. Observe the indicator above the ONLINE/OFFLINE switch. After a short interval, the indicator should light to confirm that the 3258 is online to the host system.
  4. Close the front door.

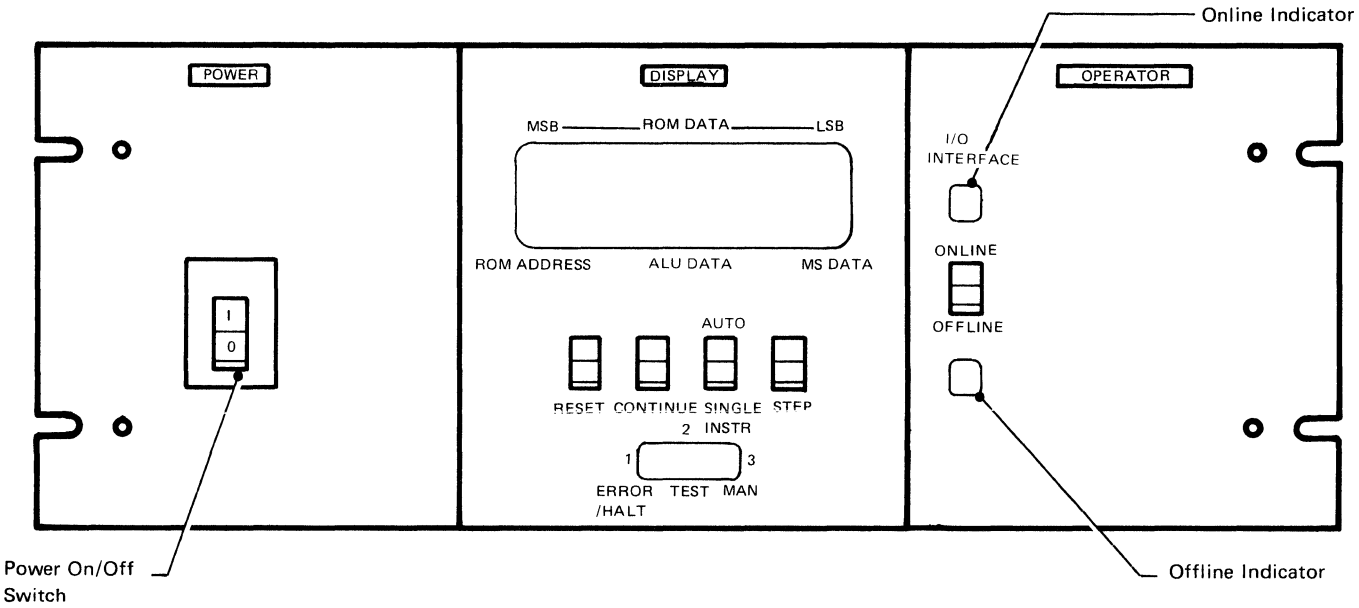


Figure 1-2. 3258 Panel

Power-Down Procedures

- *IBM 3251 Display Station Model 1.* Switch power off by pressing O on the power on/off switch.
- *IBM 3255 Display Control Unit Models 1 and 2.* Switch power off by pressing O on the power on/off switch.
- *IBM 3258 Channel Control Unit:*
  1. Open the front door of the 3258 and set the ONLINE/OFFLINE switch to OFFLINE.
  2. Wait for the Offline indicator, below the ONLINE/OFFLINE switch, to light.
  3. Switch power off by pressing O on the power on/off switch.
  4. Close the front door.

Cleaning the Display Screen

Warning: The external surface of the screen has an antireflective coating. Do not use acid solutions or abrasive products to clean the screen.

Switch power off at the 3251 (see above) before cleaning the screen. Clean the screen with a soft cloth and one of the following:

- Water only
- Water and detergent, followed by a water-dampened cloth
- Ammonia-based glass cleaner.

After cleaning, wipe the screen dry with a soft, clean, cloth.

Chapter 2. Problem Determination Procedures

This chapter details the problem determination procedures for a 3250 system.

Select the appropriate procedure from:

- Procedure A. Display Problems
- Procedure B. Alphanumeric Keyboard Problems
- Procedure C. Program Function Keyboard Problems
- Procedure D. Light Pen Problems
- Procedure E. Cursor Control Tablet Problems (Systems with RPQs 7J0070, 7J0072, and 7J0073)
- Procedure F. Plotter Problems (Systems with RPQs 7J0071 and 7J0072)
- Procedure G. 3258 Problems.

Chapter 1 describes how to read the procedures and how to switch power on and off.

Procedure A. Display Problems

If the 3251 Display Station does not display an image, follow this procedure.
Note: Turn the Brightness control fully clockwise. Switch off the 3251 and, after approximately 30 seconds, switch power on again.
Is the screen blank?
YES NO
| Retry the application.

Is the Link OK indicator (see Figure 1-1) on?
YES NO
| Go to "Step A. Link OK Indicator Is Not On."

Press the test button (button O) on the rear connector panel of the 3251. Does a large circle appear on the 3251?
YES NO
| Report a 3251 problem to your IBM Representative.

Press button O again to return the 3251 to the operating condition.
Go to "Step B. Display the Test Pattern."

Step A. Link OK Indicator Is Not On

Switch off the 3251 (by setting the power on/off switch to O). Wait for approximately 30 seconds, then switch on the 3251. Is the Link OK indicator off?
YES NO
| Retry the application.

Observe the indicators located on the 3251 rear connector panel. Are all three indicators on?
YES NO
| Are all three indicators off?
| YES NO
| | Report a 3251 problem to your IBM Representative.
|
| 1. Check that the 3251 is connected to a power source.
| 2. Check that the 3251 is switched on.
| 3. Ask a qualified electrician to check that power is available at the power source.
|
| If no fault is found, report a 3251 problem to your IBM Representative.

Go to step D. Check that the 3255 is ready.

Step B. Display the Test Pattern

Note: This step will stop operations at all 3251s controlled by this 3255.

Open the front door of the 3255 and press the OPER button on the test panel (see Figure 1-1). Wait for approximately 30 seconds.

On the test panel, is TEST NO. 20 displayed with the OPER indicator on and the ERROR indicator off?

YES NO

Report a 3255 problem to your IBM Representative.

Press the TEST button on the test panel. Is the IBM test pattern (see Figure 2-1) displayed on the 3251?

YES NO

Report a 3255 problem to your IBM Representative.

Adjust the brightness and focus if necessary. Is the test pattern the same as that in Figure 2-1?

YES NO

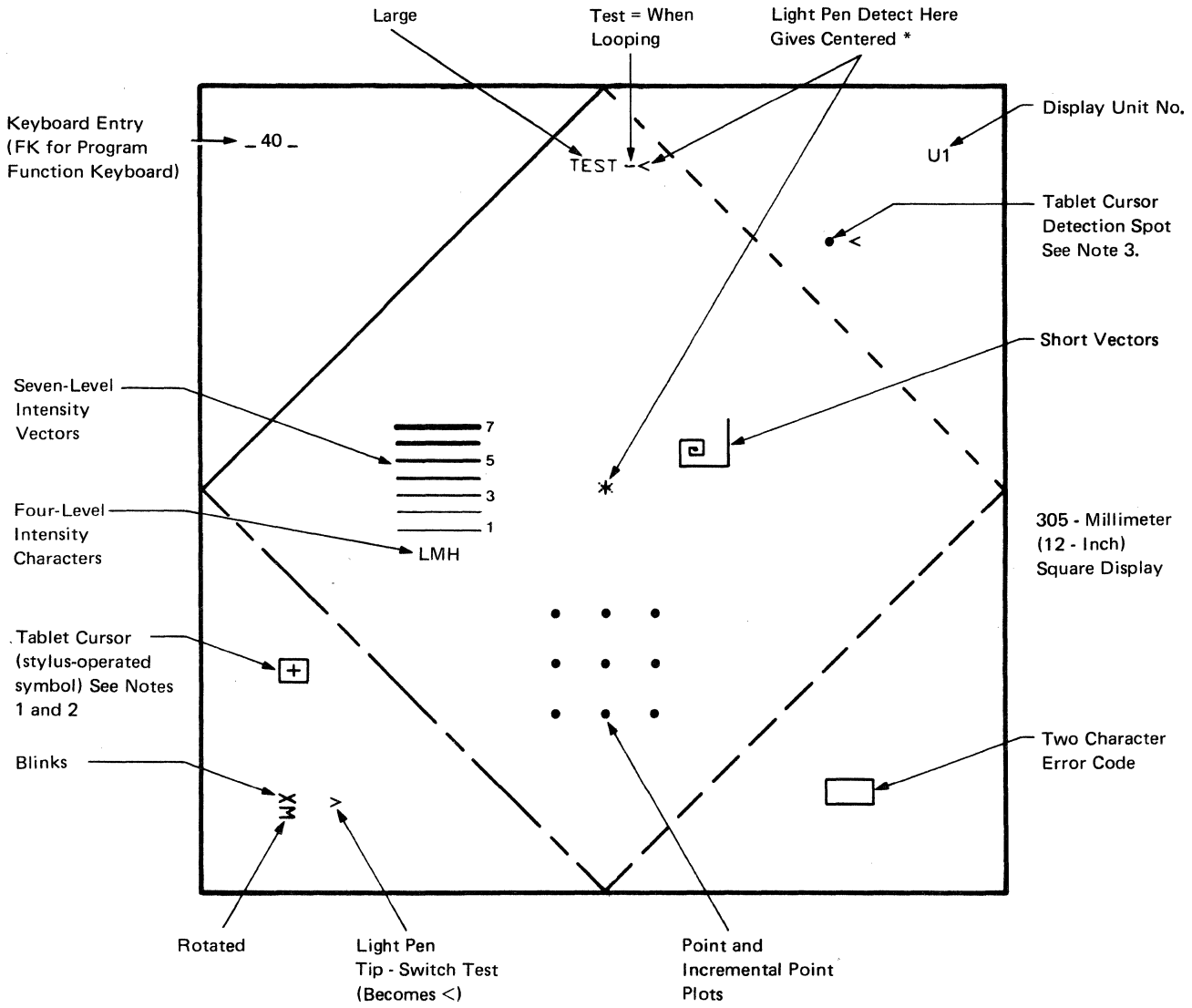
Report a 3255 or 3251 problem to your IBM Representative.

Press the OPER button to return the 3255 to the operating condition. Close the front door of the 3255. Is the same problem present when you select another application program?

YES NO

Report a possible problem in the earlier application program to the system operator.

Go to "Procedure G. 3258 Problems."



Notes:

1. The position of the tablet cursor is related to the position the tablet stylus.
2. The tablet cursor is displayed when RPQs 7J0070, 7J0072, and 7J0073 are installed. It may also be displayed without these RPQs being installed.
3. The tablet cursor detection spot is displayed when RPQs 7J0070, 7J0072, and 7J0073 are installed. It may also be displayed without these RPQs being installed.

Figure 2-1. Display Test Pattern

Step C. Check that the 3251 Is Ready

Is the 3251 connected to a power source and is the power on/off switch set to |?
YES NO
| Connect the 3251 to the power source and switch power on by setting the power on/off switch to |.

Are all three indicators on the rear connector panel of the 3251 on?
YES NO
| Are any of the indicators on?
| YES NO
| | Ask a qualified electrician to check (1) that power is available at the power source and (2), if applicable, that the power connector is serviceable. If no fault is found, report a suspected 3251 problem to your IBM Representative.
| Report a 3251 problem to your IBM Representative.

Turn the Brightness control fully clockwise. Press the test button (button O) on the rear connector panel of the 3251. Does a large circle appear on the 3251?
YES NO
| Report a 3251 problem to your IBM Representative.

Press button O again to return the 3251 to the operating condition. Go to "Step D. Check that the 3255 Is Ready."

Step D. Check that the 3255 Is Ready

Note: This step will stop operations at all 3251s controlled by this 3255.

Open the front door of the 3255 and look at the test panel. Is anything displayed by the TEST NO. indicators?

YES NO

- Is the 3255 connected to a power source and is the power on/off switch set to | ?

  YES NO

  - Connect the 3255 to the power source and switch power on by setting the switch to |.

  Ask a qualified electrician to check (1) that power is available at the power source and (2), if applicable, that the power connector is serviceable. If no fault is found, report a suspected 3255 problem to your IBM Representative.

Is the NORM/LOOP switch set to NORM?

YES NO

- Set the switch to NORM. Press the OPER button to return the 3255 to the operating condition, then close the front door. If the Link OK indicator is on at the 3251, resume operations; if not, start again at "Step A. Link OK Indicator Is Not On."

Press the OPER button on the test panel and wait 30 seconds (during which the TEST NO changes). Is 20 displayed as TEST NO., with the OPER indicator on, and the ERROR indicator off?

YES NO

- Report a 3255 problem to your IBM Representative.

Press the TEST button on the test panel. Is the IBM test pattern (see Figure 2-1) displayed at the 3251?

YES NO

- Report a 3255 problem to your IBM Representative.

Press the OPER button to return the 3255 to the operating condition, then close the front door. There does not appear to be anything wrong with the 3255 or the 3251. The problem may be in the 3258 or the serial link; go to "Procedure G. 3258 Problems."

Procedure B. Alphanumeric Keyboard Problems

Note: This procedure will stop operations at all 3251s controlled by this 3255.

Go to the 3255 that controls the 3251.

Open the front door of the 3255 and press the OPER button on the test panel (see Figure 1-1). Wait for approximately 30 seconds.

On the test panel, is TEST NO 20 displayed with the OPER indicator on and the ERROR indicator off?

YES NO

Report a 3255 problem to your IBM Representative.

Press the TEST button on the test panel. Return to the 3251 and, if necessary, adjust the brightness and focus. Is the IBM test pattern (see Figure 2-1) displayed on the 3251?

YES NO

Report a 3255 problem to your IBM Representative.

Check the alphanumeric keyboard as follows:

1. **Character Keys:** Press each character key in turn and observe the data entry field in the top left-hand corner of the test pattern. Check that, when you press a key, the key clicks and the correct character is displayed. (A two-digit code is displayed also with the character.)
2. **JUMP Key:** Press the key twice, checking that code 06 is displayed and that the cursor jumps to the test field and returns to the data entry field.
3. **Function Keys:** After checking the JUMP key, press each of the other function keys and observe that the correct code is displayed, as shown in the following table:

Function	Key	Code
Null	00	--
Click	01	--
Reset	0A	--
(Spacebar)	--	40
Cont	03	--
End	04	--
Cancel	05	--
-> (Advance)	--	07
<-- (Backspace)	--	08
Overstrike	--	16

If any keys give a wrong character or code, suspect a problem with the alphanumeric keyboard and report it to your IBM Representative.

To return the 3251 to the operating condition, go to the 3255 test panel and press the OPER button, then close the front door of the 3255.

Procedure C. Program Function Keyboard Problems

Note: This procedure will stop operations at all devices controlled by this 3255.

Go to the 3255 that controls the 3251.

Open the front door of the 3255 and press the OPER button on the test panel (see Figure 1-1). Wait for approximately 30 seconds.

On the test panel, is TEST NO 20 displayed with the OPER indicator on and the ERROR indicator off?

YES NO

| Report a 3255 problem to your IBM Representative.

Press the TEST button on the test panel. Return to the 3251 and, if necessary, adjust the brightness and focus. Is the IBM test pattern (see Figure 2-1) displayed on the 3251?

YES NO

| Report a 3255 problem to your IBM Representative.

Press each program function key in turn. When a key is pressed, it should light and stay lit until the next key is pressed. (The data entry field of the test pattern should contain FK and the number of the last key pressed.)

If any key fails to light or the wrong key number is displayed, suspect a problem with the program function keyboard and report it to your IBM Representative.

To return the 3251 to the operating condition, go to the 3255 test panel and press the OPER button, then close the front door of the 3255.

Procedure D. Light Pen Problems

Note: This procedure will stop operations at all 3251s controlled by this 3255.

Go to the 3255 that controls the 3251.

Open the front door of the 3255 and press the OPER button on the test panel (see Figure 1-1). Wait for approximately 30 seconds.

On the test panel, is TEST NO 20 displayed with the OPER indicator on and the ERROR indicator off?

YES NO

Report a 3255 problem to your IBM Representative.

Press the TEST button on the test panel. Return to the 3251 and, if necessary, adjust the brightness and focus. Is the IBM test pattern (see Figure 2-1) displayed on the 3251?

YES NO

Report a 3255 problem to your IBM Representative.

Check the light pen as follows:

1. **Tip Switch:** Observe the > sign near the bottom left-hand corner of the test pattern while you press and release the tip of the light pen. Pressing the tip should change the > to <; releasing the switch should restore the > sign.
2. **Light Pen Detect:**
   a. Use the light pen to select each of the numbered intensity levels in the left center of the test pattern. When levels 5, 6, and 7 are selected, a < sign should appear alongside the level. Levels below 5 should not respond when selected.
   b. Point the light pen at the word TEST in the pattern. The < sign following TEST should change to >.
      Note: 3255 Model 2. When Single Element Intensification (SEI) has been enabled, pointing the light pen at the word TEST should brighten each character at which the pen is pointed to intensity level 7.
   c. Point the light pen at the < sign following the word TEST. An * sign should appear in the center of the test pattern.
   d. Point the light pen at the spiral of short vectors in the right center of the screen. The vectors following the vector selected should disappear. (In this test, other components of the test pattern also disappear.)

If any of the light pen tests fail, check that the light pen is properly connected at the front of the 3251. If this does not help, change the light pen for a spare, or one from another 3251. Repeat the tests. If the tests do not fail now, the first light pen was faulty. Report the problem to your IBM Representative.

To return the 3251 to the operating condition, go to the 3255 test panel and press the OPER button, then close the front door of the 3255.

Procedure E. Cursor Control Tablet Problems (Systems with RPQs 7J0070, 7J0072, and 7J0073)

Note: This procedure will stop operations at all 3251s controlled by this 3255.

Go to the 3255 that controls those 3251s with cursor control tablets.

Open the front door of the 3255 and press the OPER button on the test panel (see Figure 1-1). Wait for approximately 30 seconds.

On the test panel, is TEST NO 20 displayed with the OPER indicator on and the ERROR indicator off?

YES NO

Close the front door, then report a 3255 problem to your IBM Representative.

Press the TEST button on the test panel. Return to the 3251 and, if necessary, adjust the Brightness and Focus controls. Is the IBM test pattern (see Figure 2-1) displayed on the 3251?

YES NO

Close the front door of the 3255, then report a 3255 problem to your IBM Representative.

Look through the rear door of the 3255 for four red indicators (a group of three indicators, and a single indicator in a lower position). Is the indicator in the lower position on?

YES NO

Switch power off at the 3255. Remove the output connector from the rear of one cursor control tablet. Switch power on at the 3255. Is the lower indicator still off?

YES NO

There is a problem with the cursor control tablet. Report the problem to the Representative for the tablet.

Switch power off at the 3255. Remove the connectors from the other cursor control tablets. Switch power on again. With all the connectors removed, is the lower indicator still off?

YES NO

Determine which cursor control tablet has caused the problem by connecting them, one at a time, until the lower indicator goes off. Report the problem to the Representative for the tablet.

Report the problem to your IBM Representative.

Check all the cursor control tablets as follows:

1. **Stylus:** Press the tip of the stylus against the surface of the cursor control tablet firmly enough to operate the tip switch. Check that a + sign appears in the tablet cursor on the test pattern.
2. **Tablet Cursor:** Move the stylus about the surface of the cursor control tablet. Check that the tablet cursor on the test pattern follows the movement of the stylus.

3. Use the stylus to move the tablet cursor over the detection spot (upper, right-hand, on the test pattern). Check that a < sign appears to the right of the detection spot.

Do all the cursor control tablets work satisfactorily?
YES NO
| Is there more than one cursor control tablet attached to your 3255?
| YES NO
| | The problem may be in the non-IBM tablet or it may be in the IBM equipment. If a spare cursor control tablet is available and can be connected, you may be able to determine whether the fault is in the tablet or the IBM equipment. Failing this, report the problem to your IBM Representative.
| |
| Does one or more of the cursor control tablets work satisfactorily?
| YES NO
| | Report the problem to your IBM Representative.
| |
| Connect a failing cursor control tablet in place of a working tablet. Does this tablet now work?
| YES NO
| | Check that your cursor control tablet is correctly connected and set up. If in doubt, call the Representative for the tablet.
| |
| Report the problem to your IBM Representative.
|
Return the 3251 to the operating condition by pressing the OPER button on the 3255 test panel and closing the front door.

Procedure F. Plotter Problems (Systems with RPQs 7J0071 and 7J0072)

Note: This procedure will stop operations at all 3251s controlled by this 3255.

Go to the 3255 that controls the plotter.

Open the front door of the 3255 and press the OPER button on the test panel (see Figure 1-1). Wait for approximately 30 seconds.

At the test panel, is TEST NO 20 displayed with the OPER indicator on and the ERROR indicator off?

YES NO

Close the front door, then report a 3255 problem to your IBM Representative.

Are the 3251s attached to the 3255 working correctly?

YES NO

Go to "Procedure A. Display Problems."

Check that the cable plugged into the plotter connector is the correct one.

Note: The cable for a **cursor control tablet** has a short, black, ground wire attached to its connector plug.

Ask the system operator to check that the system software is addressing the plotter correctly.

If the plotter is correctly connected, and the software is addressing the plotter, call the Representative for the plotter.

Procedure G. 3258 Problems

Step A.

Is the 3250 system failing? ("3250 system" means the 3251 Display Stations attached via 3255 Display Controls to the one 3258 Control Unit.)
YES NO

- Is the problem present at other 3258s?
  YES NO
  - Go to Step B.

  Suspect a problem with the host system or the application program. If necessary, ask the system operator to run the online test system (OLTS) or an equivalent test.

  Does the testing identify a problem?
  YES NO
  - Check the host system and the application program. The problem does not appear to be caused by the 3250 system.

  Report the problem to your IBM Representative.

Go to Step B.

Step B.

Are other users attached to your 3258 reporting problems?
YES NO

- Have the 3251 and the 3255 been checked?
  YES NO
  - Go to "Step A. Link OK Indicator Is Not ON" in "Procedure A. Display Problems" and check the 3251 and 3255.

  Is the Link OK indicator (see Figure 1-1) on at your 3251?
  YES NO
  - 3255 to 3258 link cable problem (or a TP network or communications problem if RPQs SU0090, SU0091, 7J0005, and 7J0014 are installed). Ask your System Operator to have the cables, or the TP or communications networks checked.

  Check that the application program is running correctly and that there are no displayed messages concerning your 3251. If no problem is obvious, ask the system operator to run OLTS or an equivalent test.

  Does the testing identify a problem?
  YES NO
  - Check the host system and application program. The problem does not appear to be caused by the 3250 system.

  Report the problem to your IBM Representative.

Go to Step C.

Step C. Check that the 3258 Is Ready for Use

Open the front door of the 3258 and look at the panel. Are any indicators on?
YES NO
| Is the 3258 connected to a power source, and is the power on/off switch set to |?
| YES NO
| | Connect the 3258 to the power source and set the power on/off switch to |.
| Ask a qualified electrician to check (1) that power is available at the power source and (2) that the power connector is serviceable. If no fault is found, close the front door, then report a 3258 problem to your IBM Representative.

Is the ONLINE indicator on?
YES NO
| Set the ONLINE/OFFLINE switch to OFFLINE and then set it to ONLINE. Wait several minutes and see if the ONLINE indicator goes on. (The delay depends on the channel activity.)
|
| Is the ONLINE indicator on?
| YES NO
| | Report a 3258 problem to your IBM Representative.
| Retry the application. If the problem is still present, go to "Step A. Link OK Indicator Is Not On" in "Procedure A. Display Problems."

Go to Step D.

Step D.

Set the ONLINE/OFFLINE switch to OFFLINE. Wait for the OFFLINE indicator to light. (There will be a delay because of channel activity.) Switch to ONLINE and wait several minutes to see if the ONLINE indicator goes on.

Does the ONLINE indicator go on?
YES NO
| Close the front door, then report a 3258 problem to your IBM Representative.

Close the front door, then retry the application. Is the problem still present?
YES NO
| End of problem.

Ask the system operator to run OLTS or an equivalent test.

Does the testing identify a problem?
YES NO
| Check the application program. The problem does not appear to be caused by the 3250 system.

Report the problem to your IBM Representative.

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Problem Determination and User's Guide

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