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**Systems**

**IBM 3250 Graphics  
Display System  
Problem Determination Guide**

(RPOs SU0090, SU0091, 7J0005, 7J0014)

**IBM**

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## Preface

This guide provides problem identification procedures for users of the IBM 3250 Graphics Display System with the data communications facilities provided by RPQs SU0090, SU0091, 7J0005, and 7J0014. The objective of the guide is to allow the user to determine whether the problem lies with one of the system units or with some other part of the system.

### Second Edition, (September 1979)

This major revision obsoletes GA33-3052-0. The only technical change made in this revision is the expansion of Problem Determination Procedure A, and is indicated by a vertical line to the left of the change. RPO 7J0014 allows more than one IBM 3255 Display Control to share a modem; Procedure A has been revised to aid problem determination when one modem is shared by more than one 3255 Display Control.

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## Introduction Section 1.

### How to Use this Guide

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

1. Problem determination procedures that take you from a 3251 problem through a series of steps to either a solution or 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.

The procedures consist of a series of logical steps. Each step ends with a question. Depending upon 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 good.*

To use this guide, select the procedure for the problem you have:

- 3251  $\overline{OK}$  indicator not on — Procedure A.
- No displayed image — Procedure B.
- Distorted image — Procedure C.
- Wrong image — Procedure D.
- Frozen image (that is, you cannot change the image by using either of the keyboards or the light pen) — Procedure E.

For keyboard and light pen problems, perform the relevant functional check:

Alphanumeric keyboard — Procedure F

Program function keyboard — Procedure G

Light Pen — Procedure H

### Power On Procedures

- *IBM 3251 Display Station:* Switch power on by pressing 1 on the power on/off switch.
- *IBM 3255 Display Control:*
  - a. At the modem, set the power on/off switch to ON.
  - b. At the 3255, switch power on by pressing 1 on the power on/off switch. Open the front door of the 3255 and observe the OPER indicator on the control panel; switching power on starts the 3255 self-check tests, if the tests end without detecting an error the OPER indicator lights.
- *IBM 3258 Control Unit:*
  - a. At the modem, set the power on/off switch to ON.
  - b. At the 3258:
    - Switch power on by pressing 1 on the power on/off switch.
    - Open the front door of the 3258 and set the ONLINE/OFFLINE switch, on the operator panel, to ONLINE. Observe the indicator above the ONLINE/OFFLINE switch; after a short period, the indicator should light to confirm that the 3258 is online to the host system.

### Power Off Procedures

- *IBM 3251 Display Station:* Switch power off by pressing 0 on the power on/off switch.
- *IBM 3255 Display Control:*
  - a. At the modem, set the power on/off switch to OFF.
  - b. At the 3255, switch power off by pressing 0 on the power on/off switch.
- *IBM 3258 Control Unit:*
  - a. At the 3258:
    - Open the front door and set the ONLINE/OFFLINE switch, on the operator panel, to OFFLINE.
    - Wait for the indicator below the ONLINE/OFFLINE switch to light.
    - Switch power off by pressing 0 on the power on/off switch.
  - b. At the modem, set the power on/off switch to off.

## Cleaning the Display Screen

**Caution:** The external surface of the screen has an anti-glare coating. Do not use acid solutions or abrasive products to clean the screen.

Switch power off at the 3251 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.

## Section 2. Problem Determination Procedures

### Procedure A. OK Indicator Not On

*Symptom:* The OK indicator at a 3251 is not lit.

Switch off the 3251 (by setting the power on/off switch to 0), wait for approximately 30 seconds and then switch on the 3251.

Is the  $\overline{OK}$  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 to your IBM representative that you have a 3251 problem.

Check:

1. Is the 3251 connected to a power source?
2. Is the 3251 switched on (that is, the power on/off switch set to 1)?
3. Is power available at the power source?

If no fault is found, report to your IBM representative that you have a 3251 problem.

**Note:** Answer YES to this question if the failing 3251 does not share a 3255 with a second 3251.

1. Switch power on at the second 3251.
2. Check that the three rear connector panel indicators are on.
3. Observe the  $\overline{OK}$  indicator.

At the second 3251, is the  $\overline{OK}$  indicator off?

YES NO

Report to your IBM representative that you have a 3251 problem. (If possible, retry the application using the second 3251 and, if necessary, restart problem determination.)

At the 3255 that controls the failing 3251, observe the indicators on the control panel.

Are any indicators on?

YES NO

Check:

1. Is the 3255 connected to a power source?
2. Is the 3255 switched on?
3. Is power available at the power source?

If no fault is found, report to your IBM representative that you have a 3255 problem.

Continued on next page



**Note:** Answer yes to this question if the modem for the 3255 controlling the failing 3251 does not handle data for the other 3255 s.

Switch power on at all 3255 s and attached 3251 s that use the same modem as the 3255 controlling the failing 3251.

Is the OK indicator off at all 3251s in the configuration?

YES NO

Report to your IBM representative that you have a 3255 problem.

Go to the 3255 that is connected directly to the modem (this may be the 3255 that controls the failing 3251). At the 3255:

1. Press and release the OPER button.
2. Wait for the 3255 self-check tests to end execution (approximately 30 seconds).

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed)?

YES NO

Report to your IBM representative that you have a 3255 problem.

Check the state of the OK indicator at a 3251 controlled by the 'ready' 3255.

Is the OK indicator off?

YES NO

If the configuration has more than one 3255, make each 3255 ready.

If any 3255 is not ready or if any OK indicators are not on, report to your IBM representative that you have a 3255 problem. Retry the application at a 3251 that indicates OK and is controlled by a ready 3255.

At the modem used by the 3255, check:

1. Is the modem connected to a power source?
2. Is the modem switched ON?
3. Is power available at the power source?
4. If there is a DATA/TEST switch, is it set to DATA?
5. If there is a LINE/LOOP switch, is it set to LINE?

Check the state of the OK indicator at a 3251 controlled by the 'ready' 3255.

Is the OK indicator off?

YES NO

Retry the application. If necessary, restart problem determination.

Ask the operator responsible for the 3258 to check that the 3258 is ONLINE (that is; the online indicator, above the ONLINE/OFFLINE switch, is on).

Is the 3258 ONLINE?

YES NO

Ask the 3258 operator to carry out the 3258 power-on procedure and, if the 3258 does not indicate ONLINE, the 3258 Functional Check described in Procedure J.

In conjunction with the operator responsible for the 3258, perform the Data Communication Line Functional Check described in Procedure K.

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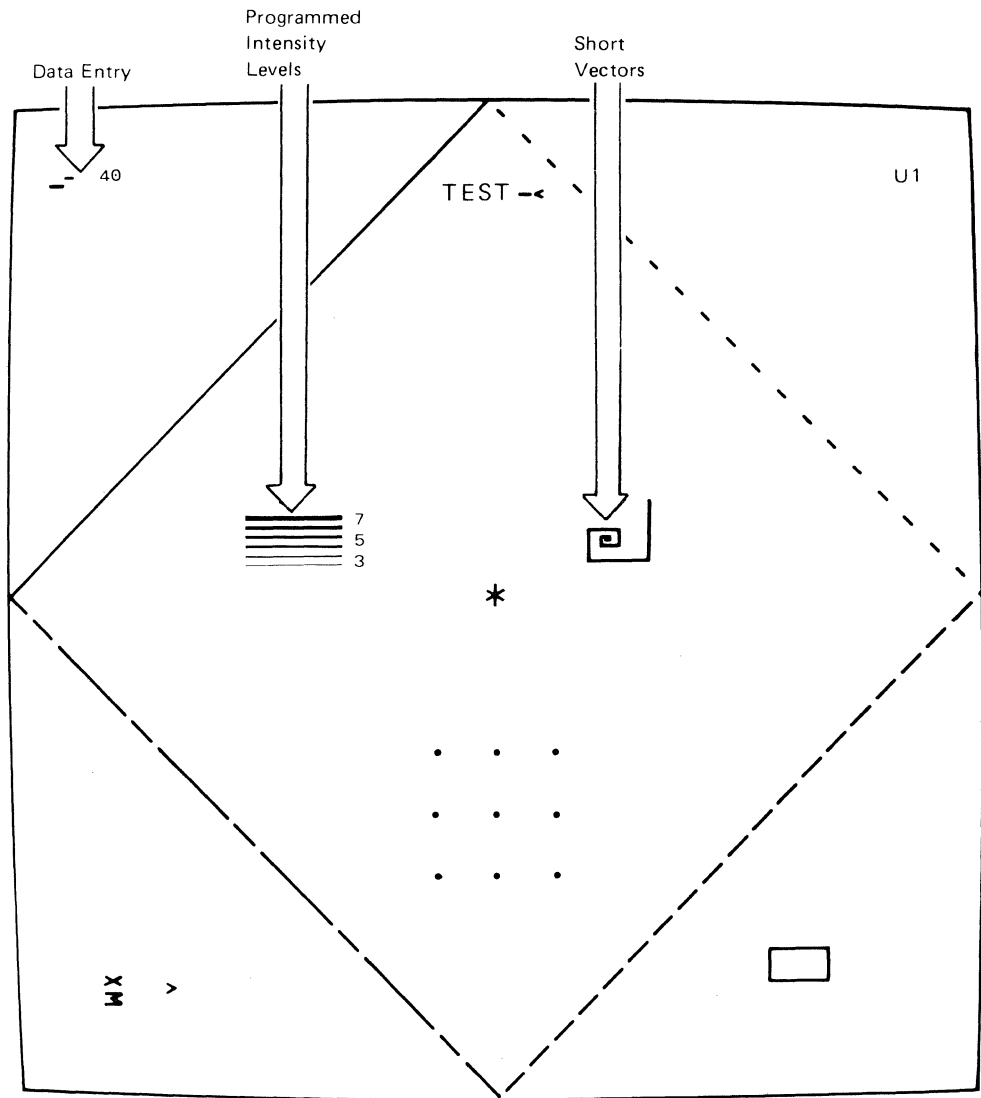


Figure 1. Display Test Pattern

## Procedure B. No Displayed Image

*Symptom:* There is no image displayed on the screen of a 3251.

Turn the Brightness control fully clockwise.

Switch off the 3251 (by setting the power on/off switch to 0), wait for approximately 30 seconds and then switch on the 3251.

Is the screen blank?

YES NO

Retry the application.

Is the 3251  $\overline{OK}$  indicator on?

YES NO

Go to Procedure A ( $\overline{OK}$  Indicator Not On).

Observe the indicators located on the 3251 rear connector panel.

Are all three indicators on?

YES NO

Report to your IBM representative that you have a 3251 problem.

Press and release the 3251 test button (button 0 at the left-hand end of the 3251 rear connector panel).

Is a circle displayed on the screen?

YES NO

Report to your IBM representative that you have a 3251 problem.

1. Press and release the 3251 test button to make the 3251 ready.
2. At the 3255 that controls the failing 3251, observe the indicators on the control panel.

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed)?

YES NO

At the 3255:

1. Press and release the OPER button.

2. Wait for the 3255 self-check tests to end execution (approximately 30 seconds).

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed)?

YES NO

Report to your IBM representative that you have a 3255 problem.

Retry the application. If necessary, restart problem determination.

At the 3255, press and release the TEST button.

At the 3251, is the test pattern displayed (see Figure 1)?

YES NO

Report to your IBM representative that you have a 3255 problem.

Continued on next page

At the 3255:

1. Press and release the OPER button.
2. Wait for the 3255 self-check tests to end execution (approximately 30 seconds).

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed)?

YES NO

| Report to your IBM representative that you have a 3255 problem.

Retry the application. If the problem is not fixed, suspect a failure at the host system or the application program. If the host system and application program are good, run 3250 OLTs (online tests) or an equivalent test to identify the cause of the problem.

## Procedure C. Distorted Image

*Symptom:* The displayed image, or a component of the image, is distorted.

Press and release the 3251 test button (Button 0 at the left-hand end of the 3251 rear connector panel).

Is an undistorted circle displayed at the 3251?

YES NO

| Report to your IBM representative that you have a 3251 problem.

Press and release the 3251 test button to make the 3251 ready. Report to your IBM representative that you have a 3255 problem.



## Procedure D. Wrong Image

*Symptom:* The displayed image is not the correct image for the selected application.

Is the 3251  $\overline{OK}$  indicator on?

YES NO

Go to Procedure A ( $\overline{OK}$  Indicator Not On).

Is the displayed image an application image?

YES NO

Is the displayed image a circle?

YES NO

At the 3255:

1. Set the NORM/LOOP switch to NORM.
2. Press and release the OPER button.
3. Wait for the 3255 self-check tests to end execution (approximately 30 seconds).

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed)?

YES NO

Report to your IBM representative that you have a 3255 problem.

Retry the application. If necessary, restart problem determination.

Press and release the 3251 test button (button 0 at the left-hand end of the 3251 rear connector panel).

Does the displayed image change?

YES NO

Report to your IBM representative that you have a 3251 problem.

Retry the application. If necessary, restart problem determination.

Check the status of the host system and application program by contacting either other 3251 users or the host system operator. Is the host system application program good?

YES NO

Retry the application when the program is restored.

The cause of the problem is probably a failure when you last used either a keyboard or the light pen.

Perform a functional check of the device (keyboard or light pen) that you used immediately before the wrong display appeared:

Alphanumeric Keyboard – perform Procedure F.

Program Function Keyboard – perform Procedure G.

Light Pen – perform Procedure H.

**Note:** If these checks do not identify the cause of the problem, run 3250 OLTs (online tests) or an equivalent test.





## Procedure E. Frozen Image

*Symptom:* The displayed application image cannot be modified by the 3251 user; the keyboards and the light pen are inoperative.

Is the 3251  $\overline{OK}$  indicator on?

YES NO

Go to Procedure A ( $\overline{OK}$  Indicator Not On).

At the 3255 that controls the failing 3251, observe the indicators on the control panel.

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed)?

YES NO

1. Press and release the OPER button.

2. Wait for the 3255 self-check tests to end execution (approximately 30 seconds).

Is the 3255 ready (OPER indicator on, ERROR indicator off, TEST NO 20 displayed) ?

YES NO

Report to your IBM representative that you have a 3255 problem.

Retry the application. If necessary, restart problem determination.

Check the status of the host system and application program by contacting either other 3251 users or the host system operator. Is the host system application program good?

YES NO

Retry the application when the program is restored.

The cause of the problem is probably a failure when you last used either a keyboard or the light pen.

Perform a functional check of the device (keyboard or light pen) that you used immediately before the image froze:

Alphanumeric Keyboard – perform Procedure F.

Program Function Keyboard – perform Procedure G.

Light Pen – perform Procedure H.

**Note:** *If these checks do not identify the cause of the problem, run 3250 OLTs (online tests) or an equivalent test.*



## Section 3. Functional Checks

### Procedure F. Alphanumeric Keyboard Test

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

The keyboard test accepts input from the alphanumeric keyboard and displays the entered character, plus a two-digit character code, in a reserved field of the test pattern.

To test the alphanumeric keyboard:

1. Select the test pattern:
  - Switch power on at the 3251 and 3255.
  - Open the front door of the 3255 and press the TEST button on the control panel.
2. Observe the data entry field in the top left-hand corner of the test pattern and test the alphanumeric keyboard:
  - *JUMP Key:* Press the JUMP key twice, checking that code 06 is displayed and that the cursor jumps to the TEST field and returns to the data entry field. (See Note.)
  - *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 with the character).
  - *Function Keys:* Press the function keys, not including the JUMP key, in turn and observe that the correct code is displayed.

<i>Function Key</i>	<i>Code</i>
Null	00
Click	01
Reset	0A
(Space bar)	40
Cont	03
End	04
Cancel	05
→ (Advance)	07
← (Backspace)	08
Overstrike	16

**Note:** *Pressing JUMP once and then pressing a character key may initiate a diagnostic test. To return to the test pattern, press the TEST button at the 3255.*

If any keys give a wrong character or code, report to your IBM representative that you have an alphanumeric keyboard problem.

To return the 3251 to the operating condition, go to the 3255 control panel and press the OPER button.



## Procedure G. Program Function Keyboard Test

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

The keyboard test accepts input from the program function keyboard and displays the number, 00 through 31, of the pressed key in a reserved field of the test pattern. To test the program function keyboard:

1. Select the test pattern:
  - Switch power on at the 3251 and 3255.
  - Open the front door of the 3255 and press the TEST button on the control panel.
2. Press each program function key in turn. When a key is pressed, it should light and stay lit until the next key is pressed. In addition to lighting the key, the program displays PF followed by the key number in the data entry field of the test pattern. If any keys fail to light or the wrong key number is displayed, report to your IBM representative that you have a program function keyboard problem.

To return the 3251 to the operating condition, go to the 3255 control panel and press the OPER button.

## Procedure H. Light-Pen Test

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

The test pattern contains fields that test the programmable light-pen modes. When a field is selected with the light pen, the program responds by changing a component of the test pattern. To test the light pen:

1. Select the test pattern:
  - Switch power on at the 3251 and 3255
  - Open the front door of the 3255 and press the TEST button on the control panel.
2. 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.
3. 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.
4. Point the light pen at the word TEST in the pattern. The < following TEST should change to >.
5. Point the light pen at the < sign following the word TEST. An \* should appear in the center of the test pattern.
6. 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 and should be replaced. If the tests still fail with a new light pen, report to your IBM representative that the light pen function of the 3251 is failing.

To return the 3251 to the operating condition, go to the 3255 control panel and press the OPER button.



## Procedure J. IBM 3258 Functional Test

Open the front door of the 3258 and observe the control panel.

Are any indicators on?

YES NO

Check:

1. Is the 3258 connected to a power source?
2. Is the 3258 switched on (that is, the power on/off switch set to 1)?
3. Is power available at the power source?

Have you found the cause of the problem?

YES NO

Report to your IBM representative that you have a 3258 problem.

Rectify the problem and continue this functional check.

At the control panel:

1. Set the ONLINE/OFFLINE switch to OFFLINE.
2. Wait for the indicator below the ONLINE/OFFLINE switch to light and then, press and release the RESET switch.
3. Set the ONLINE/OFFLINE switch to ONLINE and observe the indicator above the switch. After a slight delay, the indicator should light to show that the 3258 is ready and ONLINE.

Is the 3258 ONLINE?

YES NO

Report to your IBM representative that you have a 3258 problem.

At the modem attached to the 3258, check:

1. Is the modem connected to a power source?
2. Is the modem POWER switch set to ON?
3. Is power available at the power source?
4. If a LINE/LOOP is fitted, is it set to LINE?
5. If a DATA/TEST switch is fitted, is it set to DATA?

The 3258 appears to be good. If the 3251 users have problems, perform the Data Communications Line Functional Check described in Procedure K.





## Procedure K. Data Communication Line Functional Check

Is an IBM 5979 Model L21 modem used?

YES NO

Test the modems and data communication line according to the procedure recommended by the supplier of the modem. If no fault is found and the 3251 users have problems, start problem determination at the 3251 or run 3250 OLTs (online tests), or an equivalent test, to determine the cause of the problem.

At the modem, attached to the 3258:

1. Switch power on.
2. Set the LAMP TEST/LINE/LOOP switch to LAMP TEST.

Are all indicators on at the modem?

YES NO

Are all indicators off?

YES NO

Report to your IBM representative that you have a modem problem.

Check:

1. Is the modem connected to a power source?
2. Is the modem switched ON?
3. Is power available at the power source?

Have you found the cause of the problem?

YES NO

Report to your IBM representative that you have a modem problem.

Rectify the problem and continue this functional check.

1. Set the LAMP TEST/LINE/LOOP switch to LOOP.
2. Set the DATA/TEST 1/TEST 2 switch to TEST 1 (the CTRL indicator will flash on and off when you switch to test).

Is the SIGNAL indicator on and does the CTRL indicator remain off, without flashing, for at least one minute?

YES NO

Report to your IBM representative that you have a modem problem.

Ask the operator responsible for the 3251 and 3255 to perform the modem checks, as described in the previous steps, at the modem used by the 3255.

Is the modem good (that is, SIGNAL on and CTRL off for at least one minute)?

YES NO

Report to your IBM representative that you have a modem problem at the 3255.

Working in conjunction with the operator at the 3255: At both modems, set the LAMP TEST/LINE/LOOP switch to LINE and the DATA/TEST 1/TEST 2 switch to TEST 1 (the CTRL indicators will flash on and off when you switch to TEST 1).

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At both modems, is the SIGNAL indicator on and does the CTRL indicator remain off, without flashing, for at least one minute?

YES NO

Suspect a line problem. Request that the line be tested by the authority responsible for the data communication line. If no fault is found, report to your IBM representative that you have a data communication problem.

At both modems, set the DATA/TEST 1/TEST 2 switch to DATA.

Is the SIGNAL indicator on at both modems?

YES NO

Report to your IBM representative that you have a 5979 problem.

The IBM 5979 modems and the data communication line appear to be good. If the 3251 users have problems, start problem determination at the 3251 or run 3250 OLTs (online tests), or an equivalent test, to determine the cause.

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Problem Determination Guide

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