

IBM

*Personal Computer
Hardware Reference
Library*

Hardware Maintenance and Service

Volume 1

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*Personal Computer
Hardware Reference
Library*

Hardware Maintenance and Service

Volume 1

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FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

Warning: The equipment described herein has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to the computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. If peripherals not offered by IBM are used with the equipment, it is suggested to use shielded, grounded cables with in-line filters if necessary.

CAUTION

The product described herein is equipped with a grounded plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

Safety Inspection Guide

IBM Personal Computer AT

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on this product. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgement should be used to identify potential unsafe conditions not covered by this inspection guide.

If any unsafe conditions are present, a determination must be made on how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power: primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, a damaged CRT face or bulging capacitor can cause serious injury.
- Mechanical hazards, loose or missing hardware can cause serious injury.

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off and the power cord removed from the power receptacle.

We recommend all non-IBM devices and attachments be removed from the unit before you conduct the safety inspection.

Reference Literature

IBM Personal Computer AT *Guide to Operations*

IBM Personal Computer AT *Installation and Setup*

Any applicable safety publications.

1. Set the Power switch to Off and disconnect the power cord.
2. Check exterior covers for damage (loose, broken, or sharp edges).
3. Check the power cord for the following:
 - a) A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground as specified in the *Hardware Maintenance and Service* manual.
 - b) The cord set should be the appropriate molded type as specified in the *Hardware Maintenance and Service* manual.
 - c) Insulation must not be frayed or worn.

4. Remove the Back Panel from the System Unit.
5. Remove the 5 cover mounting screws from the rear panel, and remove the cover.
6. Check for any obvious non-IBM alterations. Use good judgement as to the safety of any non-IBM alterations.
7. Check inside the unit for any obvious unsafe conditions, such as: metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
8. Check for worn, frayed, or pinched cables.
9. Ensure the voltage specified on the voltage tag (back panel of the machine) matches the voltage of the power receptacle. If in doubt, the voltage should be verified.
10. Examine the power supply and verify the following:
 - a) On universal power supplies, ensure that the input voltage selection switch is set correctly.
 - b) Ensure non-removable fasteners in the power supply cover have not been removed or tampered with.
 - c) Ensure that the grommet is installed where the internal power cables come through the frame of the power supply.

11. Check for the following labels:

- a) **“Battery Warning: Do not dispose of battery unit in fire or water. See instruction for disposal in the battery installation instructions.”**
- b) **“Caution: Hazardous Area. Do Not Remove This Cover. Trained Service People Only. No Serviceable Components Inside.”**

12. Check the condition of the battery.

Notes:



Preface

This manual provides the information needed to isolate and repair failures of the IBM Personal Computer AT. Readers should have received training on the IBM Personal Computer AT and should be familiar with the Triplett Model 310 Multimeter¹ or equivalent.

This manual has seven sections and is divided into two volumes. Volume 1 includes Sections 1, 2, and 3. Volume 2 includes Sections 4, 5, 6, and 7.

"**SECTION 1, INTRODUCTION,**" provides a general description of the IBM Personal Computer AT.

"**SECTION 2, DIAGNOSTICS,**" has the diagnostic menu reference and explains the diagnostic aids.

"**SECTION 3, PROBLEM ISOLATION CHARTS,**" describes the step-by-step instructions that lead you to the failing field replaceable unit (FRU).

"**SECTION 4, LOCATIONS,**" shows the locations of the various components in the IBM Personal Computer AT.

"**SECTION 5, REMOVALS/REPLACEMENTS AND ADJUSTMENTS,**" contains the information needed to remove, replace, and adjust any of the FRUs in the IBM Personal Computer AT.

¹ Manufactured by the Triplett Corporation, Bluffton, Ohio 45817

"SECTION 6, SYSTEM SETUP, JUMPERS AND SWITCH SETTINGS," describes switch settings and jumper positions, and provides setup information for the IBM Personal Computer AT.

"SECTION 7, PARTS CATALOG," contains illustrations and part numbers of all the FRUs.

IBM Personal Computer AT operating instructions are in the *Guide to Operations* manual. Detailed hardware and interface information is in the *Technical Reference* manual.

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SECTION 1. INTRODUCTION

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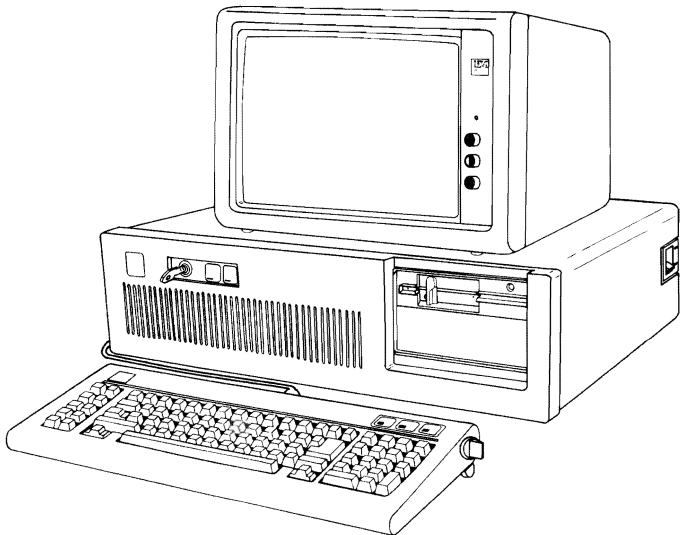


Introduction

The IBM Personal Computer AT is a tabletop computer that has a variety of options available to meet your present and future needs. It consists of the system unit and keyboard.

The system unit contains the 80286 Processor, High Capacity Diskette Drive, and expansion slots for option adapters. It also has the power supply, a minimum of 256Kb random access memory (RAM), a Fixed Disk and Diskette Drive Adapter, and a Key Lock for security. The power supply provides the necessary voltages for the system unit and keyboard.

The operator enters input to the system with an 84-key keyboard, which consists of a numeric keypad, 10 function keys, a typewriter-like area, and three status lights. It is connected to the system unit with a coiled cable. The keyboard cable and adjustable tilt angle allow the operator to move the keyboard to a comfortable operating position.



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Diagnostic Aids

This section describes three diagnostic aids that are used to isolate failures of the IBM Personal Computer AT:

- Power On Self Test (POST)
- Problem Isolation Charts (PICs)
- Advanced Diagnostic Tests.

You do not have to read this section each time service is required, but until you have a good understanding of the diagnostic aids, this section will serve as a useful reference.

Note: We recommend that you perform a system checkout using the Advanced Diagnostics diskette each time you service the computer or add an option to it.

Power On Self Test

Each time you set the system unit's Power switch to On, the power on self test (POST) executes. The POST takes from 13 to 90 seconds to complete, depending on the options installed.

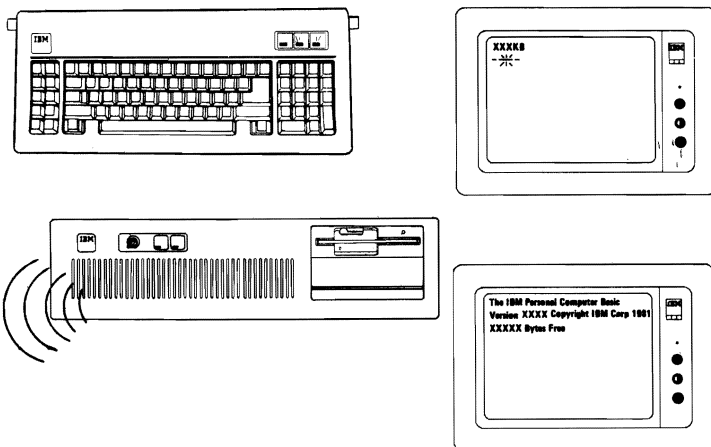
The POST checks the following:

- System board
- Memory expansion adapters
- Fixed Disk and Diskette Drive Adapter
- Primary display
- Keyboard
- Diskette drives
- Fixed disk drives.

To start the POST:

1. Turn all external devices On.
2. Turn the Brightness and Contrast knobs fully clockwise (IBM displays only).
3. Set the system unit's Power switch to On.
 - The keyboard status lights blink on, then off.
 - While the memory is being tested, the memory size appears in the top left corner of the screen and increases in 64Kb increments until the total system memory is tested.
 - The keyboard status lights again blink on, then off.
 - One short beep is heard when the POST is successfully completed.
 - The IBM Personal Computer BASIC screen appears (if a diskette or an operating system is not automatically loaded from a fixed disk drive).

Note: These responses indicate the POST ended successfully.



POST Errors

If the IBM Personal Computer AT fails to complete the POST, the following failure indications could occur:

- An incorrect audio response (no beep or more than one beep)
- A blank screen
- An error message.

Make a note of any error messages that appear.

When a failure occurs, make sure all cables are properly connected, and that all jumpers and switch settings are correct. See Section 6 for switch settings and jumper positions.

Listed below are some of the possible error messages that might appear during the POST:

- **601**
 - **XXXXXX XXXX 20X** (X could be any character)
 - **1701**
 - **040002 0004 20X**
-

If an error message appears on the screen and the next line displayed is:

(RESUME = "F1" KEY)

Press the F1 key. The system unit bypasses the error and attempts to complete the POST. The POST may or may not finish, depending on the error.

Problem Isolation Charts (PICs)

The PICs are a series of steps and screen menus that require you to answer questions and perform some actions. You will be able to determine which FRU is causing the failure by following the PICs and using the Advanced Diagnostics diskette.

1. You should always begin with the "Start" PIC in Section 3.
2. Depending on your failure indication, the "Start" PIC directs you to one of the PICs.
3. The PICs will guide you through a series of steps and the use of the Advanced Diagnostics diskette to identify the failing FRU.
4. Section 5 "Removals/Replacements and Adjustments" will guide you to complete the repair.
5. Repeat the diagnostic tests to verify that your system is operating correctly.

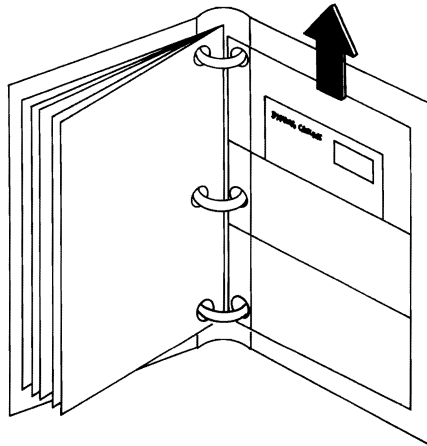
Advanced Diagnostic Tests

The advanced diagnostic tests are on the diskette that is at the back of this manual.

Note: You should make a copy of this diskette and put the original in a safe place.

Do the following to load the advanced diagnostic tests.

1. Insert the Advanced Diagnostics diskette into drive A.
2. Rotate the diskette drive lever down.
3. Set the system unit's Power switch to On.
4. The advanced diagnostic tests load after completion of the POST, and a menu appears on the screen.



Special Keys

Keys with special functions for the advanced diagnostic tests are:

Key	Use
F1	Forces the system unit to bypass an error and continue with POST.
F7	Moves the screen message to the left (color displays only).
F8	Moves the screen message to the right (color displays only).
Ctrl + P	Directs screen output to the printer.
Ctrl + N	Cancel output to the printer.
Ctrl + C	Stops diagnostic tests and returns to the installed devices menu.
Ctrl + S	Stops diagnostic tests. Press any key to continue.
Shift + PrtSc	Prints what is currently on the screen (useful when your display is unreadable).

Diagnostic Menus

The following pages show the main diagnostic menus and describe what each menu selection does.

Menu 1 - Battery Defective

This menu appears first if either of the following conditions exist:

- Battery is defective.
- A new battery was just installed.

**The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984**

PC/AT SETUP PROGRAM

**Have you completed running this
Setup program since connecting
the battery (Y/N).**

Type Y or N, then press "ENTER".

?_

- N -** Allows you to set the date, time, and options setup.
- Y -** Informs you that the battery failed by displaying 151 Error - Battery Defective.

Menu 2 - Select an Option

This menu appears first if the system's options are set up.

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 4 - SETUP**
- 9 - END DIAGNOSTICS**

SELECT THE ACTION DESIRED

?__

0 - SYSTEM CHECKOUT: Starts the system checkout procedure.

1 - FORMAT DISKETTE: Formats a diskette for diagnostic use only.

2 - COPY DISKETTE: Copies the Advanced Diagnostics diskette to another diskette.

3 - PREPARE SYSTEM FOR MOVING: Prepares the fixed disk drives when moving the system.

4 - SETUP: Allows you to check or set the time, date, or system options.

9 - END DIAGNOSTICS: Loads the program from the diskette in drive A.

Menu 3 - Installed Devices

This menu displays the options and devices installed in your system. The screen below is an example.

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - XXXXKB MEMORY
- 3 - KEYBOARD
- 4 - MONOCHROME & PRINTER ADAPTER
- 6 - X DISKETTE DRIVE(S)
AND ADAPTER
- 13 - GAME CONTROL ADAPTER
- 14 - MATRIX PRINTER
- 17 - X FIXED DISK DRIVE(S)
AND ADAPTER

IS THE LIST CORRECT (Y/N)
?_

Y - Continues with system diagnostics.

N - Allows you to add or delete items from the installed devices menu.

Note: If you enter **N**, the screen will display the installed devices list error, **199**. Disregard this error and continue to add or delete the options. After correcting the list, answer **Y** to continue. If you are unable to correct the list, you still must answer **Y** to continue.

Menu 4 - System Checkout

This menu allows you to: choose the number of times a test is run, use the error log, or end system checkout.

SYSTEM CHECKOUT

0 - RUN TESTS ONE TIME
1 - RUN TESTS MULTIPLE TIMES
2 - LOG UTILITIES
9 - END SYSTEM CHECKOUT

SELECT THE ACTION DESIRED
?_

0 - RUN TESTS ONE TIME: Runs the diagnostic tests once.

1 - RUN TESTS MULTIPLE TIMES: Runs the diagnostic tests as many times as you choose.

2 - LOG UTILITIES: Allows you to use the error log and time of day functions.

9 - END SYSTEM CHECKOUT: Returns to the select an option menu (Menu 2).

Menu 5 - Installed Devices Test

This menu allows you to choose specific devices to test, or to test all of the devices listed.

1 - SYSTEM BOARD
2 - XXXXKB MEMORY
3 - KEYBOARD
4 - MONOCHROME DISPLAY AND PRINTER ADAPTER
6 - X DISKETTE DRIVE(S) AND ADAPTER
13 - GAME CONTROL ADAPTER
14 - MATRIX PRINTER
17 - X FIXED DISK DRIVE(S) AND ADAPTER

SELECT OPTION NUMBER(S) TO TEST OR
PRESS "ENTER" TO SELECT ALL OPTIONS
?

The devices to be tested are selected by entering their corresponding numbers, separated by commas or spaces. To test all options, just press Enter.

1 - SYSTEM BOARD: Tests the major elements of the system board.

2 - XXXXKB MEMORY: Tests all random access memory (RAM) and verifies correct addressing.

3 - KEYBOARD: Tests all key positions, the keyboard cable, and the system reset function.

4 - MONOCHROME DISPLAY AND PRINTER ADAPTER: Tests the Monochrome Display and the Monochrome Display and Printer Adapter.

6 - X DISKETTE DRIVE(S) AND ADAPTER: Tests the diskette drives and the diskette drive portion of the Fixed Disk and Diskette Drive Adapter.

13 - GAME CONTROL ADAPTER: Tests the Game Control Adapter. Joysticks or paddles are required for this test.

14 - PRINTER: Tests the printer by printing a variety of character sets.

17 - X FIXED DISK DRIVE(S) AND ADAPTER: Tests the fixed disk drives and the fixed disk portion of the Fixed Disk and Diskette Drive Adapter.

Menu 6 - Log Utilities

This menu allows you access to the error log.

LOG UTILITIES

- 0 - START ERROR LOG
- 1 - STOP ERROR LOG
- 2 - DISPLAY LOG
- 3 - DISPLAY TIME OF DAY
- 9 - END LOG UTILITIES

SELECT THE ACTION DESIRED

?_

0 - START ERROR LOG: Starts a record of errors detected by diagnostic tests. You can choose to record the errors on a diskette or have them printed. If recording errors on a diskette, use a copy of the Advanced Diagnostics diskette that is not write protected.

Note: You cannot log errors to a diskette drive that is being tested. If you plan to test a diskette drive, you must log the errors to a diskette drive that is not being tested, or to a printer.

1 - STOP ERROR LOG: Stops recording errors detected by diagnostic tests.

2 - DISPLAY LOG: The errors that were logged to the diskette are displayed on the screen.

3 - DISPLAY TIME OF DAY: If no time was set, the time elapsed since the diagnostic program was loaded is displayed.

9 - END LOG UTILITIES: Returns you to the system checkout menu (Menu 4).

Menu 7 - IBM Monochrome Display and Printer Adapter

This menu allows you to test the IBM Monochrome Display and Printer Adapter.

IBM MONOCHROME DISPLAY AND PRINTER ADAPTER TEST

- 0 - DISPLAY ADAPTER TEST
- 1 - DISPLAY ATTRIBUTES
- 2 - CHARACTER SET
- 3 - 80 X 25 DISPLAY
- 4 - PRINTER ADAPTER TEST
- 9 - EXIT TO MAIN MENU
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION ___

0 - DISPLAY ADAPTER TEST: Tests the memory and correct addressing on the adapter.

1 - DISPLAY ATTRIBUTES: Tests the display attribute logic for intensity, reverse video, blinking, non display, and underline modes.

2 - CHARACTER SET: Tests character read only memory (ROM) by displaying all of the available characters.

3 - 80 X 25 DISPLAY: Fills the screen with a pattern of characters, in the 80-by-25 display mode.

4 - PRINTER ADAPTER TEST: Tests the Printer Adapter portion of the Monochrome Display and Printer Adapter.

9 - EXIT TO MAIN MENU: Returns to the system checkout menu (Menu 4).

10 - RUN ALL ABOVE TESTS: Performs tests 0 through 4.

11 - VIDEO TEST: Provides a test signal to allow voltage measurements at the video, intensity, and composite outputs.

12 - SYNC TEST: Provides a test signal to allow voltage measurements at the horizontal and vertical sync outputs.

Menu 8 - Color/Graphics Monitor Adapter

This menu allows you to test the Color/Graphics Display Adapter.

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 - DISPLAY ADAPTER TEST
- 1 - DISPLAY ATTRIBUTES
- 2 - CHARACTER SET
- 3 - 80 X 25 DISPLAY
- 4 - 40 X 25 DISPLAY
- 5 - 320 X 200 GRAPHICS
- 6 - 640 X 200 GRAPHICS
- 7 - LIGHT PEN TEST
- 8 - SCREEN PAGING
- 9 - EXIT TO MAIN MENU
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION
?

Note: You must have a color display attached to receive this menu.

0 - DISPLAY ADAPTER TEST: Tests the memory and correct addressing on the Color/Graphics Display Adapter.

1 - DISPLAY ATTRIBUTES: Tests the display attribute logic for intensity, reverse video, blinking, non display, and underline modes.

2 - CHARACTER SET: Tests character ROM by displaying all of the available characters.

3 - 80 X 25 DISPLAY: Fills the screen with a pattern of characters, in the 80-by-25 display mode.

4 - 40 X 25 DISPLAY: Fills the screen with a pattern of characters and an intensified white border in the 40-by-25 display mode.

5 - 320 X 200 GRAPHICS: Tests the 320-by-200 graphics mode and displays color set 0 and color set 1.

6 - 640 X 200 GRAPHICS: Tests the 640-by-200 graphics mode.

7 - LIGHT PEN TEST: Tests the light pen and the related circuitry on the Color/Graphics Adapter.

8 - SCREEN PAGING: Tests the addressing circuitry from the video controller chip to the Color/Graphics Adapter memory.

9 - EXIT TO MAIN MENU: Returns to the select an option menu (Menu 2).

10 - RUN ALL ABOVE TESTS: Performs tests 0 through 8.

11 - VIDEO TEST: Provides a test signal to allow voltage measurements at the video, intensity, and composite outputs.

12 - SYNC TEST: Provides a test signal to allow voltage measurements at the horizontal and vertical synchronization outputs.

Menu 9 - Diskette Drive and Adapter

This menu allows you to test the diskette drives and the diskette drive portion of the Fixed Disk and Diskette Drive Adapter.

TESTING - X DISKETTE DRIVE(S) AND ADAPTER DISKETTE DIAGNOSTIC MENU	

OPTION	DRIVE
1 - SEQUENTIAL ACCESS	ONE DRIVE
2 - RANDOM SEEK	ONE DRIVE
3 - VERIFY DISKETTE	ONE DRIVE
4 - SPEED TEST	ONE DRIVE
5 - DSKT CHANGE TEST	ONE DRIVE
9 - RETURN TO CONTROL PROGRAM	
FOR OPTION 9 TYPE "9" AND PRESS "ENTER" FOR OTHER OPTIONS	
TYPE THE OPTION NUMBER, DRIVE ID (1,A) AND PRESS "ENTER"	

1 - SEQUENTIAL ACCESS: Tests the basic diskette operations, including a sequential write, read, and comparison of data on all sectors of the diskette.

2 - RANDOM SEEK: Tests the basic diskette operations, including a series of 50 random seeks, each seek being followed by a write, read, and comparison of data.

3 - VERIFY DISKETTE: Verifies data accessing and each sector.

4 - SPEED TEST: Measures the time required for one revolution of the diskette.

5 - DSKT CHANGE TEST: Tests the diskette change signal as you remove and insert a diskette. (The diskette change test is a feature of the High Capacity Diskette Drive only.)

9 - RETURN TO CONTROL PROGRAM: Returns to the system checkout menu (Menu 4).

Menu 10 - Fixed Disk Drive and Adapter

This menu allows you to test the fixed disk drives and the fixed disk portion of the Fixed Disk and Diskette Drive Adapter.

FIXED-DISK DIAGNOSTIC MENU

- 1 - WRITE, READ, COMPARE (TEST CYLINDER)
- 2 - SEEK TEST
- 3 - HEAD SELECT
- 4 - ERROR DETECTION AND CORRECTION
- 5 - RUN ALL TESTS
- 6 - READ VERIFY
- 7 - FORMAT MENU
- 9 - RETURN TO CONTROL PROGRAM

FOR OPTION 9
TYPE "9" AND PRESS "ENTER"
FOR OTHER OPTIONS

TYPE THE OPTION NUMBER,
DRIVE ID (1,C) AND PRESS "ENTER"

1 - WRITE, READ, COMPARE (TEST CYLINDER): Tests the fixed disk drive portion of the Fixed Disk and Diskette Drive Adapter, and the fixed-disk drives' read and write operations.

2 - SEEK TEST: Sequentially moves the fixed-disk's heads inward one cylinder at a time until the last cylinder is reached; the heads are then reset to the first cylinder, and a random seek test is performed.

3 - HEAD SELECT: Data is written to the test cylinder by each fixed disk head; the data is then read and checked for any errors.

4 - ERROR DETECTION AND CORRECTION: Tests the fixed disk's error checking and correction circuits by reading data, altering the data, and writing the data at the test cylinder. A comparison test is made to detect any errors.

5 - RUN ALL TESTS: Runs tests 1, 2, 3, and 4.

6 - READ VERIFY: A read operation is performed on the entire fixed disk drive; any tracks that cannot be read are reported with existing defects.

7 - FORMAT MENU: Selects the format menu for the fixed disk drives.

9 - RETURN TO CONTROL PROGRAM: Returns to the select an option menu (Menu 2).

Menu 11 - Format the Fixed Disk Drive

This menu allows you to format the fixed disk drives.

Warning: All data on the selected fixed disk drive will be destroyed during a format operation or surface analysis.

FORMAT SELECTION MENU

- 1 - **CONDITIONAL FORMAT**
2 - **UNCONDITIONAL FORMAT**
3 - **SURFACE ANALYSIS**
4 - **CHANGE INTERLEAVE**
9 - **RETURN TO FIXED DISK MENU**

FOR OPTION 9
TYPE "9" AND PRESS "ENTER"
FOR OTHER OPTIONS

TYPE THE OPTION NUMBER,
DRIVE ID (1,C) AND PRESS "ENTER"

1 - CONDITIONAL FORMAT: The fixed disk drive is scanned for any defective sectors, then formatted (except for any known defective sectors).

2 - UNCONDITIONAL FORMAT: The fixed disk drive is formatted, except for any manufacturing defective sectors.

3 - SURFACE ANALYSIS: Scans the fixed disk drive by writing, reading, and comparing a unique data pattern to detect any defective tracks.

4 - CHANGE INTERLEAVE: The fixed disk drive interleave selection establishes the logical to physical sector relationship. Valid interleave values are 2 to 1 through 8 to 1.

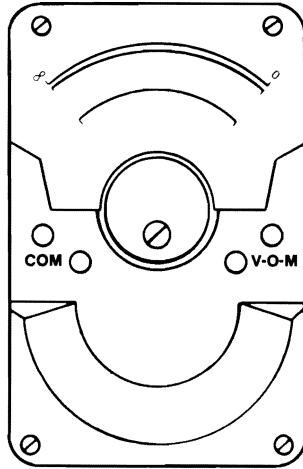
Warning: Changing the fixed disk drive interleave can result in a drastic change in system performance.

9 - RETURN TO FIXED DISK MENU: Returns to the fixed disk diagnostic menu (Menu 10).

Special Tools

The following special tools are required to service the IBM Personal Computer AT:

- A multimeter



- A tweezer-like type of module puller.



Notes:



Handwritten mark

SECTION 3. PROBLEM ISOLATION CHARTS

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Alternate Serial/Parallel Adapter - Parallel Port	3-1000-1
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Start

This is the entry point for all PIC's. The PICs will help you determine which field replaceable unit (FRU) is causing any of the following conditions.

- An error code
- An audio Error during POST
- A problem related to one device
- An undetermined problem.

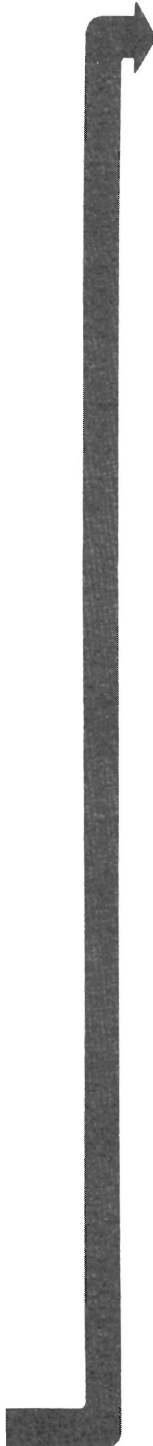
To use the PICs you must have the following minimum components:

- System unit
- Keyboard
- Display
- One diskette drive
- The Advanced Diagnostics diskette.

Note: All Voltages shown in the PICs are positive unless otherwise shown.

CONTINUE 

Start 3-1



Refer to Section 6, "System Setup, Jumpers and Switch Settings," and:

1. Ensure that the system unit's power cord is connected to a functioning, properly-grounded outlet.
2. Remove any diskettes from the diskette drives.
3. Check all switch settings.
4. Check all jumper positions.
5. Verify the options are correctly set by running the "Setup" program.

Note: If you cannot load the "Setup" program continue on the following page.

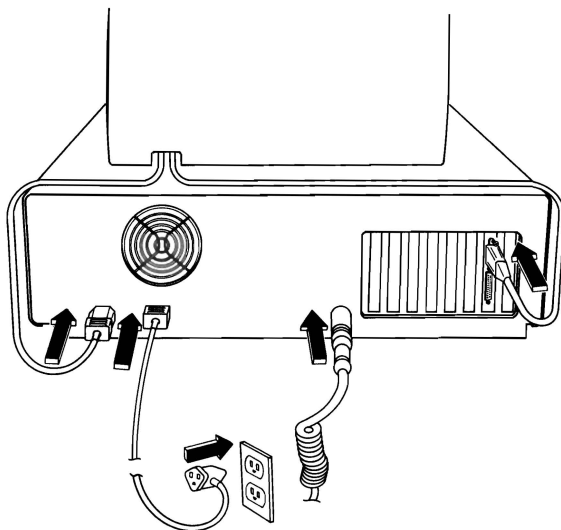
6. Verify the 115/230 Vac selector switch is set for the voltage available at the outlet.
-

**ARE THE SWITCH SETTINGS, JUMPERS,
OPTIONS, AND VOLTAGE SETUP CORRECT?**

NO Correct the 115/230 Vac selector switch setting, all switch settings and jumper settings. Ensure the system options are correctly set. Then continue with the next page.

YES 


1. Set the system unit's Power switch to Off.
 2. Remove all non-IBM devices, the Prototype Adapter, and any modified options (options that have been modified for special use), except the display.
 3. Turn the Brightness and Contrast controls fully clockwise (IBM displays only).
 4. Ensure that all connectors are installed securely and in their proper locations.
-



**ARE ALL CONNECTORS INSTALLED SECURELY
AND IN THEIR PROPER LOCATIONS?**

NO Install the connectors securely in their proper locations, then continue with the next page.

YES



Set the system unit's Power switch to On. If you receive an error code, go to the PIC that corresponds to the beginning digit of the error code. For example, if you receive error code:

1XX

go to PIC 100 on page 3-100-1. If you receive error code:

12XX

go to PIC 1200 on page 3-1200-1.

Note: X can be any number. If ALL X's are 0, the device tested successfully.

Exceptions to this are:

Error Code		Page
ROM ERROR	→ ROM Error Table	Start 3-5
XXXXXX XXXX 20X	→ Memory	3-200-1
XX30X	→ Keyboard	3-300-1
PARITY CHECK	→ Memory	3-200-1

For an audio error or an undetermined problem, go to the Undetermined Problem PIC on page Start 3-6.

If you receive an error code that does not have a corresponding PIC in this manual:

- You have an IBM device that has its own *Hardware Maintenance and Service* manual,
- or
- You have a device that is not supported by IBM diagnostic tests.

Go to the appropriate PIC.

ROM Error Table

In the figure below, find the ROM error code you received and take the corrective action.

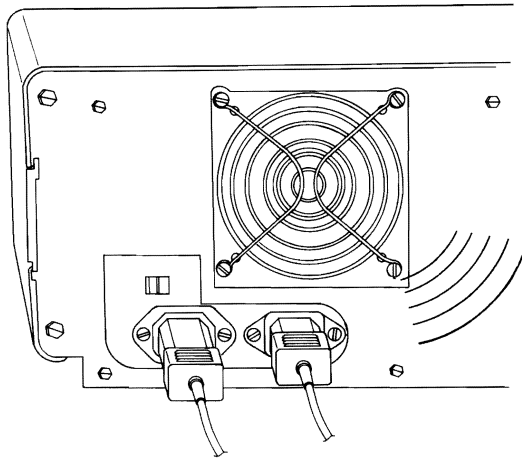
Error Code	Corrective Action
ROM Error	Replace the system board
IO ROM CC0000	Go to page 3-3000-1
IO ROM XXXXXX	Replace the IO adapter *
* Begin on page 3-020-13 and find the failing adapter.	

Undetermined Problem

Ensure the system unit's power cord is connected to a functioning, properly grounded outlet.

1. Remove any diskettes from the diskette drives.
2. Set the system unit's Power switch to On.
3. Determine if the power-supply fan is operating by feeling if there is exhaust from the power-supply vent, as shown below.

Note: If the system unit is working correctly, except that the power-supply fan is not operating, replace the power supply (see Section 5).



IS THE POWER-SUPPLY FAN OPERATING?

NO Check the system unit's power cord for continuity. If the power cord is bad, replace it. If the power cord is good, go to page 3-020-1

YES 

When the IBM Personal Computer AT power is switched on, the normal responses are:

1. The keyboard status lights blink on, then off.
2. The memory size is displayed in the top left corner of the screen and increases in 64K increments until all memory is tested.
3. The keyboard status lights again blink on, then off.
4. One short beep is heard at the end of the **POST**.
5. The IBM Personal Computer **BASIC** screen appears, unless an operating system is loaded from a diskette drive or fixed disk drive.

When power is applied to a failing system, one or more of the following may occur:

- The display screen remains blank.
- An audio response is incorrect.
- An error message appears.

If an error message appears along with an incorrect audio response, disregard the audio response and troubleshoot the problem indicated by the error message.

CONTINUE 

Find your problem or error message in the following figure and go to the page indicated. Note: The X's represent any alphanumeric characters displayed.

Error Indication	PIC Title	Page
A Blank Display and No Beep	Power	3-020-1
A Blinking Cursor and No Beep	Power	3-020-1
Continuous Beep	Power	3-020-1
Repeating Short Beeps	Power	3-020-1
Incorrect Memory Size Displayed	Memory	3-200-1
1 Long and 1 Short Beep	System Board	Note 1
1 Long and 2 Short Beeps	Display	Note 2
Incorrect Display	Display	Note 2
Short Beeps and a Blank or Incorrect Display	Display	Note 2
1 Long and 3 Short Beeps	Enhanced Graphics Adapter	3-2400-1

Notes:

1. Replace the system board.
2. **a).** If the Enhanced Graphics Adapter is the only display adapter installed in your system, go to 3-2400-1.
b). If the Enhanced Graphics Adapter and another display adapter are installed in your system, start with 3-2400-1. If no failure is found, continue with the PIC for the second display adapter.
c). For all other Display configurations, go to the PIC for the failing display.

CONTINUE 

Error Indication	PIC Title	Page
1XX	System Board	3-100-1
Parity Check	Memory	3-200-1
30X or XX30X	Keyboard	3-300-1
601	Diskette	3-600-1
XXXXXX XXXX 20X	Memory	3-200-1
Keyboard Not Functional	Keyboard	3-300-1
Keyboard Status Lights Not Functional	Keyboard	3-300-1
17XX	Fixed Disk Drive	3-1700-1

DO YOU HAVE ONE OF THE PROBLEMS LISTED?

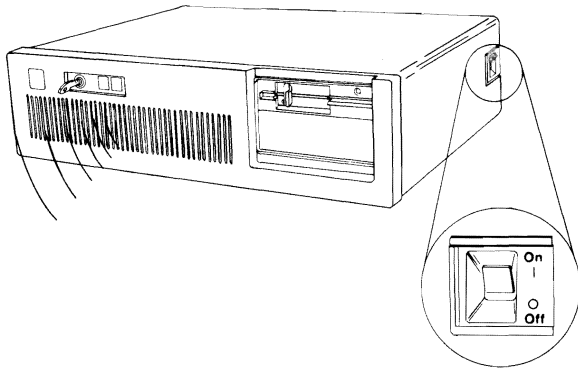
YES Go to the appropriate page.

NO 

Notes:



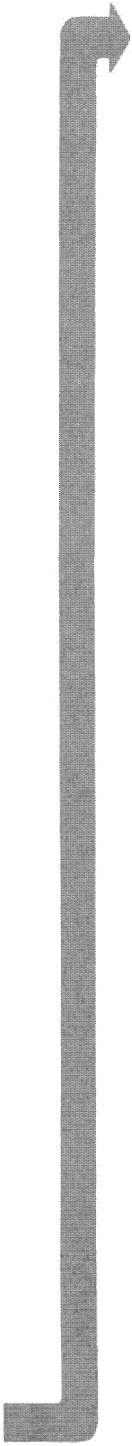
1. Set the system unit's Power switch to Off.
 2. Remove the system unit's cover (see Section 5).
 3. Make a list of all installed options and drives.
 4. Insert the Advanced Diagnostics diskette into drive A.
 5. Switch power On to all attached devices. This includes any displays, printers, or any other external devices attached to the system.
 6. Turn the Brightness and Contrast controls fully clockwise (IBM displays only).
 7. Set the system unit's Power switch to On.
-



IS ONE SHORT BEEP HEARD AT THE END OF THE POST?

NO If you received an error code, make a note of it and go to page Start 3-4. If you did not receive an error code, go to page 3-020-1.

YES 



Your screen should match the one below.

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED

?__

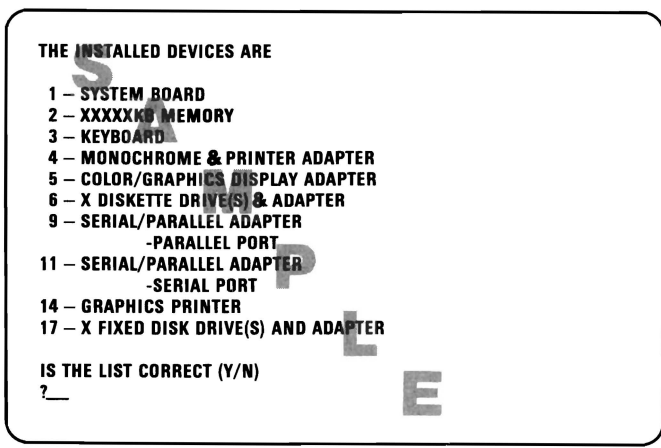
DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-600-1.

YES 

1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.

Your screen should be similar to the one below.



IS YOUR SCREEN SIMILAR TO THE ONE ABOVE?

YES Go to page Start 3-14.

NO 

You may have a failing Math Coprocessor.

**DO YOU HAVE A MATH COPROCESSOR
INSTALLED IN YOUR SYSTEM UNIT?**

NO Go to page 3-300-1.

YES 

1. Set the system unit's Power switch to Off.
2. Remove the Math Coprocessor from the system board (see Section 5).
3. Set the system unit's Power switch to On.
4. When Menu 2 - SELECT AN OPTION appears, press **0 (SYSTEM CHECKOUT)** then **Enter**

Your screen should be similar to the one below.

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - XXXXX-BYTE MEMORY
- 3 - KEYBOARD
- 4 - MONOCHROME & PRINTER ADAPTER
- 5 - COLOR/GRAPHICS DISPLAY ADAPTER
- 6 - X DISKETTE DRIVE(S) & ADAPTER
- 9 - SERIAL/PARALLEL ADAPTER
-PARALLEL PORT
- 11 - SERIAL/PARALLEL ADAPTER
-SERIAL PORT
- 17 - X FIXED DISK DRIVE(S) AND ADAPTER


IS THE LIST CORRECT (Y/N)

?_

IS YOUR SCREEN SIMILAR TO THE ONE ABOVE?

NO Go to page 3-300-1.

YES Replace the Math Coprocessor. If this does not correct your problem, replace the system board (see Section 5).



Press **Y** or **N** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering yes.

Note: If you cannot add devices to correct the list go to the **PIC** that applies to the device you cannot add.

If you cannot correct the list, you still must answer **Yes** before you can continue.

Your screen should match the one below.

SYSTEM CHECKOUT

- 0 – RUN TESTS ONE TIME**
- 1 – RUN TESTS MULTIPLE TIMES**
- 2 – LOG UTILITIES**
- 9 – END SYSTEM CHECKOUT**

SELECT THE ACTION DESIRED

?_

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-300-1.

YES 

1. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.
 2. Select the device that you suspect has a failure and press **Enter**, or press **Enter** to test all options.
 3. Follow the instructions on your screen to run the tests.
-

1 - SYSTEM BOARD
2 - XXXKB MEMORY
3 - KEYBOARD
4 - MONOCHROME DISPLAY AND PRINTER ADAPTER
6 - X DISKETTE DRIVE(S) AND ADAPTER
13 - GAME CONTROL ADAPTER
14 - MATRIX PRINTER
17 - X FIXED DISK DRIVE(S) AND ADAPTER

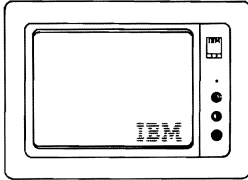
SELECT OPTION NUMBER(S) TO TEST OR
PRESS "ENTER" TO SELECT ALL OPTIONS
?

DID YOU RECEIVE AN ERROR CODE?

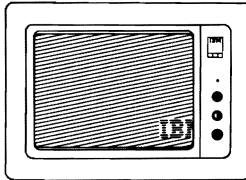
YES Make a note of the error code and go to page
Start 3-4.

NO 

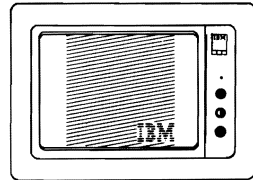
You may have observed one of the following errors on your primary display while running the system checkout test.



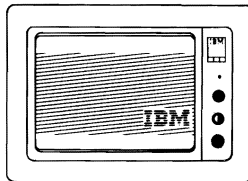
Too Dim



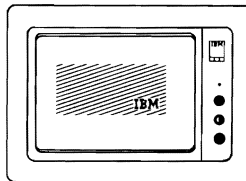
Too Wide



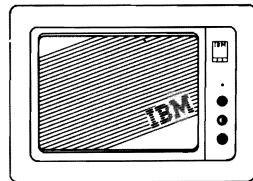
Too Narrow



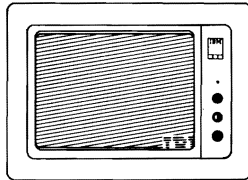
Too Short



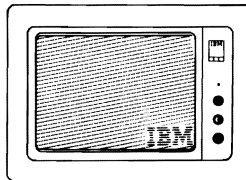
Too Small



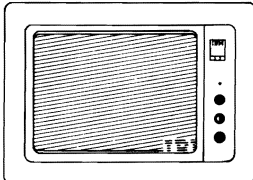
Tilted



Changes Size When Brightness Control Turned



Out of Focus



Characters Shifted Left or Right or Up and Down Off the Display Area

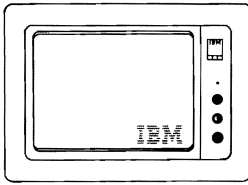
DID YOU OBSERVE AN ERROR ON YOUR PRIMARY DISPLAY?

YES Make a note of the error indication and go to page Start 3-8.

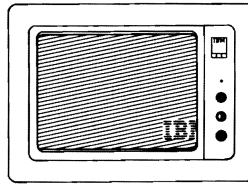
NO 

If you do not have a secondary display installed in your system, continue on the next page.

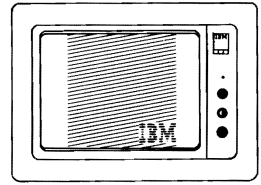
You may have observed one of the following errors on your secondary display while running the system checkout test.



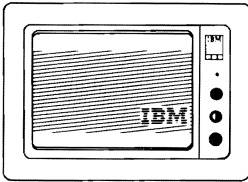
Too Dim



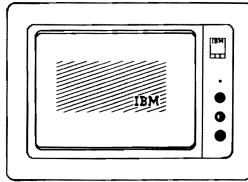
Too Wide



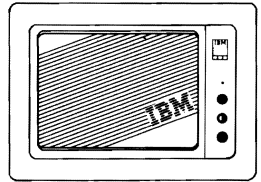
Too Narrow



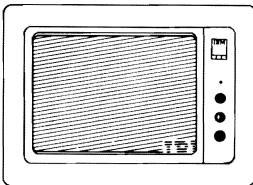
Too Short



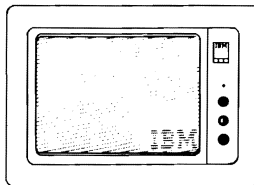
Too Small



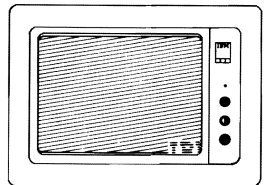
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus

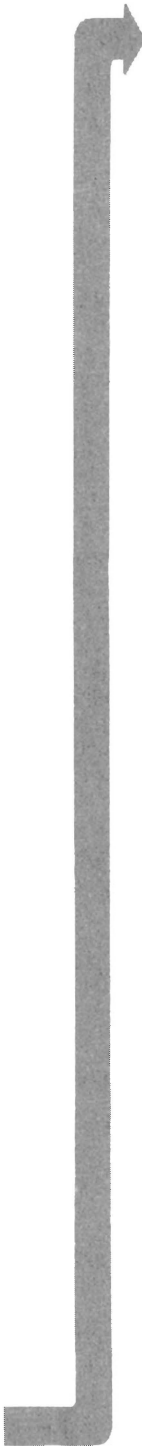


**Characters Shifted Left
or Right or Up and
Down Off the Display
Area**

DID YOU OBSERVE AN ERROR ON YOUR SECONDARY DISPLAY?

YES Make a note of the error indication and go to page Start 3-8.

NO



You may have received an error indication or error message while running the diagnostic tests.

DID THE TESTS RUN SUCCESSFULLY?

NO Make a note of the error indication and go to page Start 3-8.

Note: If a diagnostic test stops and you cannot continue, an error condition exists. Go to the PIC that pertains to the device being tested.

YES You have successfully completed the advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

Intermittent Problem

You have entered this PIC because you have completed the advanced diagnostic tests without finding an error or you suspect an intermittent problem. The following steps will help you diagnose a failure in your system and record the error message in the Error log.

Creating the Error Log

1. Insert the Advanced Diagnostics diskette into drive A.
2. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
3. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
4. Press **Y** or **N (IS LIST CORRECT (Y/N)?)** then **Enter**.
5. Press **2 (LOG UTILITIES)** then **Enter**.
6. Press **0 (START ERROR LOG)** then **Enter**.

CONTINUE 



7. Press **0** (**LOG TO DISKETTE, OR PRINTER (0/1)?**) then **Enter**.

Note: The following appears only if you log to diskette.

8. Press **A** or **B** (**ENTER THE DRIVE ID FOR ERROR LOG?**) then **Enter**.

Note: You cannot log errors to a diskette drive that is being tested. If you plan to test a diskette drive, you must log the errors to a diskette drive that is not being tested, or to a printer. If recording errors on a diskette, use a copy of the Advanced Diagnostics diskette that is not write protected.

9. Press **9** (**END LOG UTILITIES**) then **Enter**.

*But logs are incomplete -
in case of memory error, only notes
failure, not diagnostic error code.*

CONTINUE 

Starting the Test

1. Press **1 (RUN TESTS MULTIPLE TIMES)** then **Enter**.
2. Select the device you suspect has a failure then press **Enter**.
3. Press **N (WAIT EACH TIME AN ERROR OCCURS (Y/N)?)** then **Enter**.
4. Follow any instructions on your screen and select all available tests.

CONTINUE



End the Test and Display the Error Log

1. Press and hold the **Ctrl** key then press the **Break** key.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
3. Press **Y** or **N** (**IS LIST CORRECT (Y/N)?**) then **Enter**.
4. Press **2** (**LOG UTILITIES**) then **Enter**.
5. Press **2** (**DISPLAY LOG**) then **Enter**.
6. Press **A** or **B** (**ENTER THE DRIVE ID FOR ERROR LOG?**) then **Enter**.
7. If no errors occurred, the Log Utilities menu appears. If errors are displayed, go to page Start 3-4 and find your error code, then go to the appropriate PIC.

Power

You have entered this PIC because you were unable to complete the POST, you have been directed here from another PIC, or you suspect a power problem.

1. Set the system unit's Power switch to Off.
 2. Unplug the system unit's power cord from the outlet.
 3. Verify that the 115/230 Vac selector switch is set for the voltage available at the outlet.
 4. Disconnect all cables and external devices, except the display, from the system unit.
 5. Plug the system unit's power cord into the outlet.
 6. Set the system unit's Power switch to On.
-

POWER

DID THE FAILING SYMPTOM REMAIN?

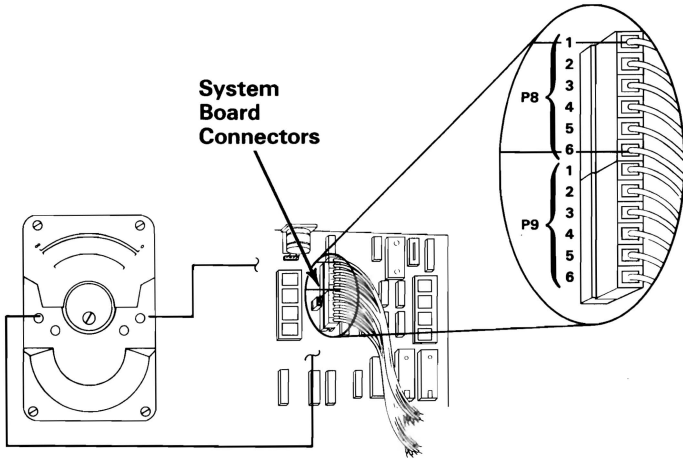
CAUTION

Set the system unit's Power switch to Off, before connecting any device.

NO Connect the external devices to the system unit, one at a time, until the failing symptom returns. Repair or replace the device causing the failure.

YES 

1. Set the system unit's Power switch to Off.
 2. Remove the system unit's cover (see Section 5).
 3. Set your meter to the 12 Vdc scale. Connect the common lead to pin 5 and the voltage lead to pin 1 on the system board's power connector P8.
 4. Set the system unit's Power switch to On.
 5. Check for a voltage of 2.4 to 5.2 Vdc.
-



**DO YOU HAVE 2.4 TO 5.2 VDC BETWEEN PIN 1
AND PIN 5?**

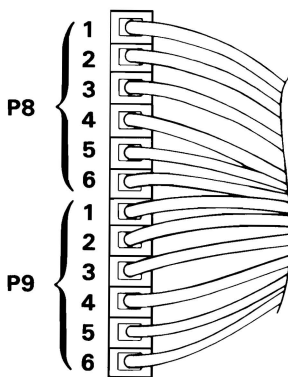
NO Go to page 3-020-9.

YES 

Check the rest of the power supply voltages at the system board:

1. Set your meter to the 12 Vdc scale.
2. Refer to the figure below and check the system board's power connectors for the correct voltages.

Voltage Connectors			
Min Vdc	Max Vdc	- Lead	+ Lead
+4.8	+5.2	P8-5	P9-4
+4.5	+5.4	P9-3	P8-6
+11.5	+12.6	P9-1	P8-3
+10.8	+12.9	P8-4	P9-2



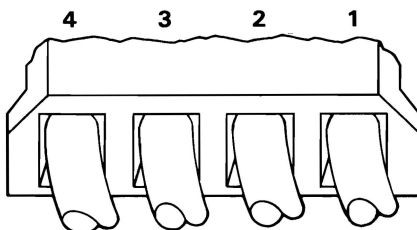
**ARE THE SYSTEM-BOARD
POWER-CONNECTOR VOLTAGES CORRECT?**

NO Replace the power supply (see Section 5).

YES 

1. Set the system unit's Power switch to Off.
2. Ensure the power connector of the top diskette drive is connected.
3. Set the system unit's Power switch to On.
4. Refer to the figure below and check the power connector of the top diskette drive for the correct voltages.

Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+4.8	+5.2	2	4
+11.5	+12.6	3	1



ARE THE VOLTAGES CORRECT?

NO Replace the power supply (see Section 5).

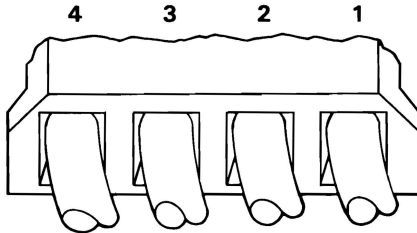
YES

If your system has only one diskette drive, continue on the next page.

1. Set the system unit's Power switch to Off.
2. Ensure the power connector of the bottom diskette drive is connected.
3. Set the system unit's Power switch to On.
4. Refer to the figure below and check the power connector of the bottom diskette drive for the correct voltages.

POWER

Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+4.8	+5.2	2	4
+11.5	+12.6	3	1



ARE THE VOLTAGES CORRECT?

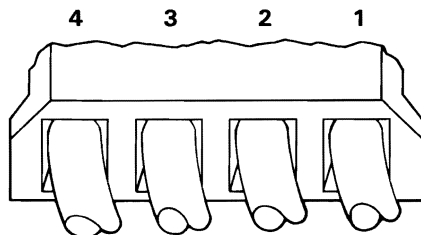
NO Replace the power supply (see Section 5).

YES 

If your system has no fixed disk drives, go to page 3-020-8.

1. Set the system unit's Power switch to Off.
2. Ensure the power connector of the left fixed disk drive is connected.
3. Set the system unit's Power switch to On.
4. Refer to the figure below and check the power connector of the left fixed disk drive for the correct voltages.

Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+4.8	+5.2	2	4
+11.5	+12.6	3	1



ARE THE VOLTAGES CORRECT?

NO Replace the power supply (see Section 5).

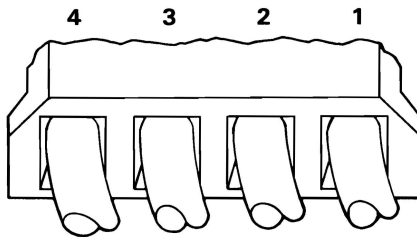
YES

If your system has only one fixed disk drive, continue on the next page.

1. Set the system unit's Power switch to Off.
2. Ensure the power cable of the right fixed disk drive is connected.
3. Set the system unit's Power switch to On.
4. Refer to the figure below and check the power connector of the right fixed disk drive for the correct voltages.

POWER

Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+4.8	+5.2	2	4
+11.5	+12.6	3	1



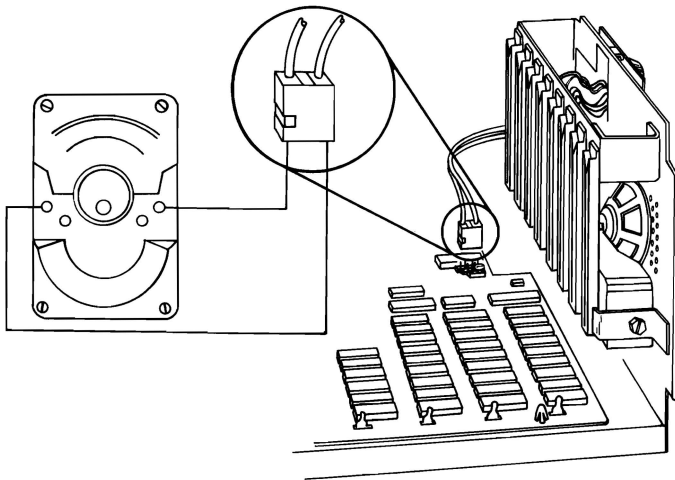
ARE THE VOLTAGES CORRECT?

NO Replace the power supply (see Section 5).

YES

Check the speaker circuit:

1. Set the system unit's Power switch to Off.
2. Set your meter to the Ohms X 1 scale.
3. Disconnect the speaker cable from the system board (see Section 5).
4. Refer to the figure below and check the continuity of the speaker.

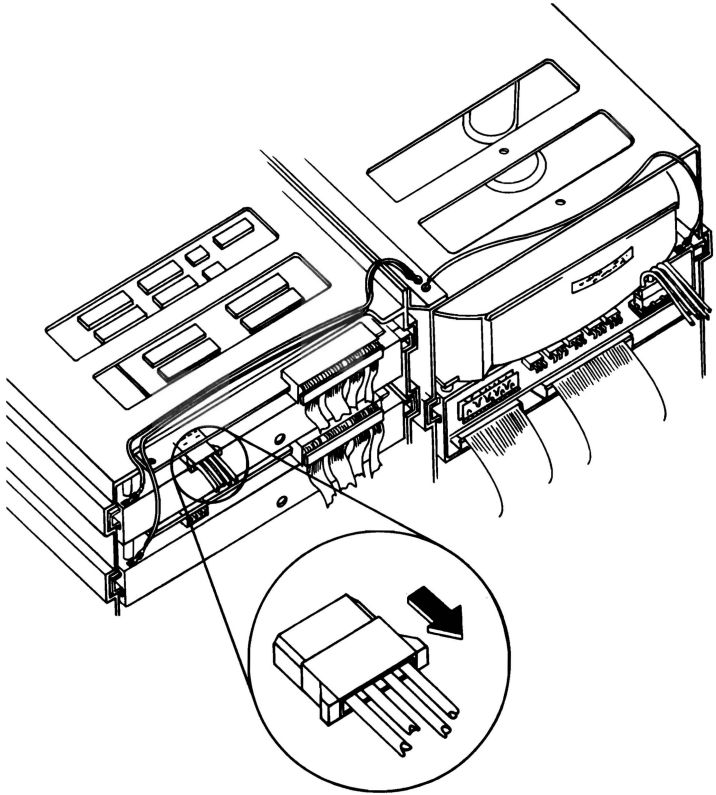


DOES THE THE SPEAKER HAVE CONTINUITY?

NO Replace the speaker (see Section 5).

YES 

1. Set the system unit's Power switch to Off.
 2. Disconnect the power cable from the top diskette drive.
 3. Set the system unit's Power switch to On.
-



POWER

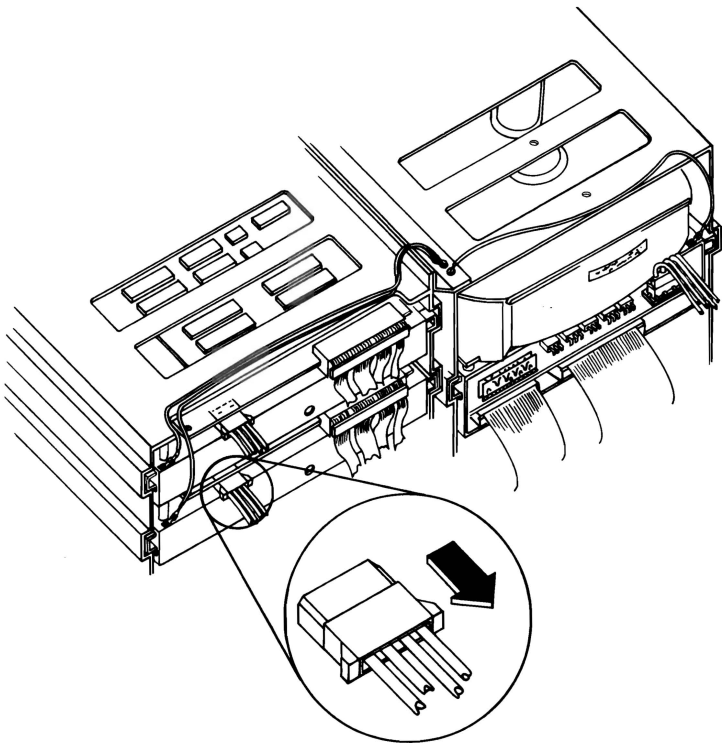
DID THE FAILING SYMPTOM REMAIN?

NO Replace the top diskette drive (see Section 5).

YES 

If your system has only one diskette drive, continue on the next page.

1. Set the system unit's Power switch to Off.
 2. Connect the top diskette drive's power cable.
 3. Disconnect the power cable from the bottom diskette drive.
 4. Set the system unit's Power switch to On.
-



DID THE FAILING SYMPTOM REMAIN?

NO Replace the bottom diskette drive (see Section 5).

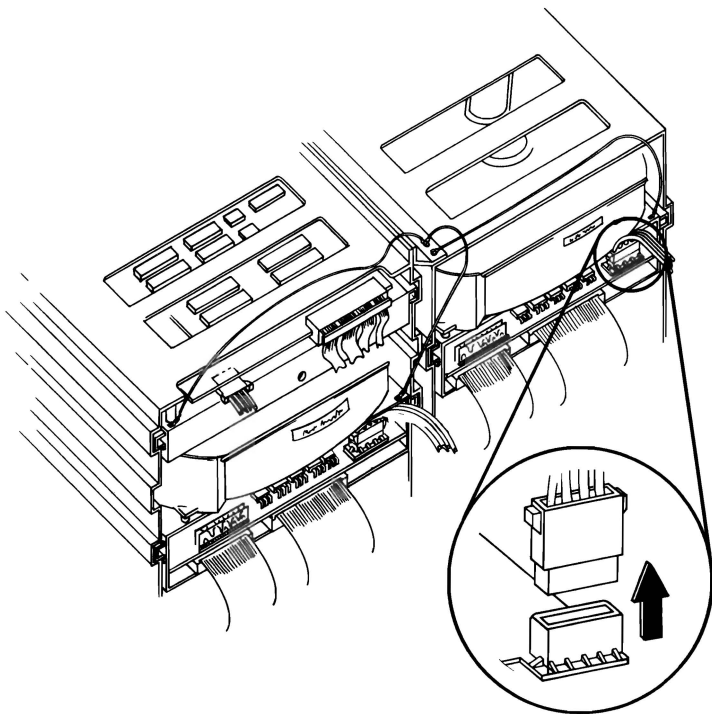
YES 

If your system has no fixed disk drive, go to page 3-020-13.

1. Set the system unit's Power switch to Off.

Note: If your system has two diskette drives, connect the bottom diskette drive's power cable.

2. Disconnect the power cable from the left fixed disk drive.
3. Set the system unit's Power switch to On.



POWER

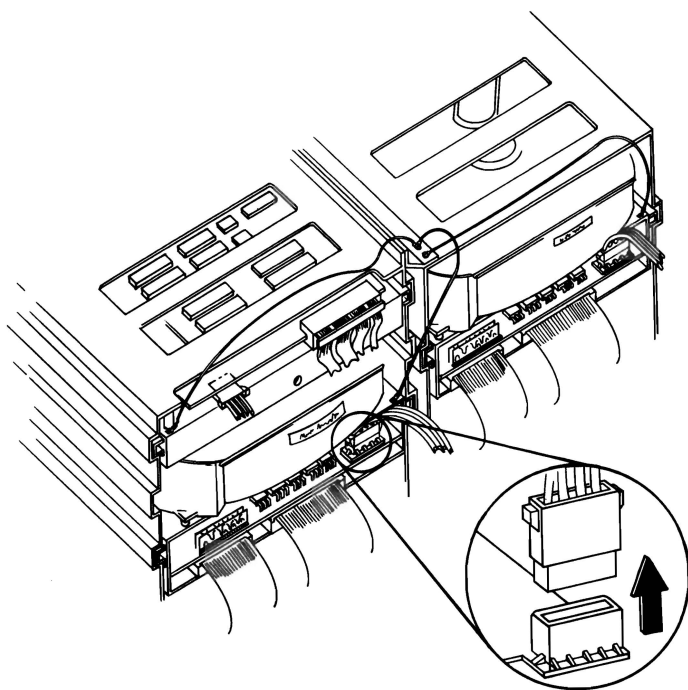
DID THE FAILING SYMPTOM REMAIN?

NO Replace the left fixed disk drive (see Section 5).

YES 

If your system has only one fixed disk drive, continue on the next page.


1. Set the system unit's Power switch to Off.
2. Disconnect the power cable from the right fixed disk drive.
3. Connect the left fixed disk drive's power cable.
4. Set the system unit's Power switch to On.



DID THE FAILING SYMPTOM REMAIN?

NO Replace the right fixed disk drive (see Section 5).

YES 



You may have a failing adapter. Do the following steps.

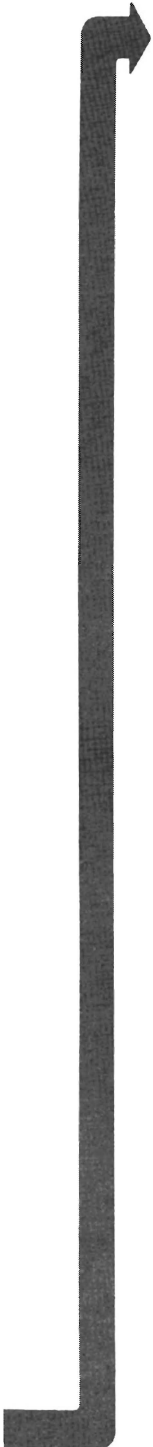
1. Set the system unit's Power switch to Off.
 2. Remove one option adapter from the system board (see Section 5). Do not remove the Fixed Disk and Diskette Drive Adapter or the primary display's adapter.
 3. Set the system unit's Power switch to On.
 4. Repeat the above steps until you find the failing adapter or all option adapters (except the Fixed Disk and Diskette Drive and primary display's adapter) have been removed.
-

POWER

DID THE FAILING SYMPTOM REMAIN?

NO Replace the last adapter removed. If this does not correct your problem, replace the system board (see Section 5).

YES 

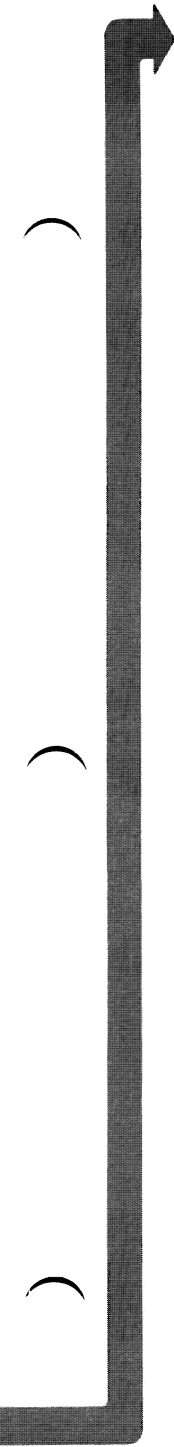


You may have a failing Math Coprocessor.

**IS A MATH COPROCESSOR INSTALLED IN YOUR
SYSTEM UNIT?**

NO Go to page 3-020-16.

YES 

- 
1. Set the system unit's Power switch to Off.
 2. Remove the Math Coprocessor from the system board (see Section 5).
 3. Set the system unit's Power switch to On.
-


POWER

DID THE FAILING SYMPTOM REMAIN?

NO Replace the Math Coprocessor. If this does not correct your problem, replace the system board (see Section 5).

YES



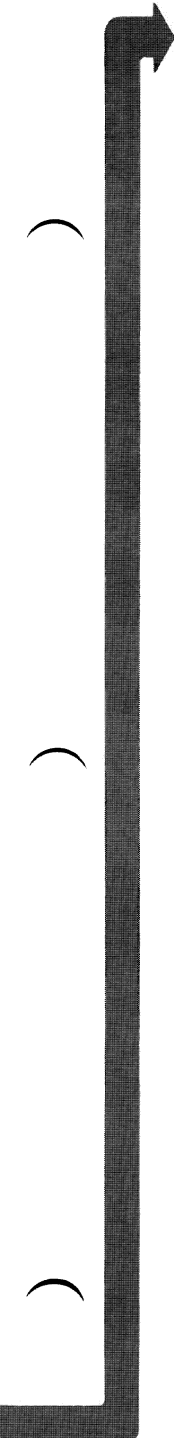
- 
1. Set the system unit's Power switch to Off.
 2. Remove the Fixed Disk and Diskette Drive Adapter from the system board (see Section 5).
 3. Set the system unit's Power switch to On.

Removal of the Fixed Disk and Diskette Drive Adapter results in a 601 error code (disregard this error).

DID THE FAILING SYMPTOM REMAIN?

NO Replace the Fixed Disk and Diskette Drive Adapter. If this does not correct your problem, replace the system board (see Section 5).

YES 

- 
1. Set the system unit's Power switch to Off.
 2. Remove the primary display's adapter from the system board (see Section 5).
 3. Set the system unit's Power switch to On.

Removal of the primary display's adapter results in one long and two short beeps during the POST.

POWER

DID YOU RECEIVE ONE LONG AND TWO SHORT BEEPS?

- YES** Replace the primary display's adapter. If this does not correct your problem, replace the system board (see Section 5).
- NO** Replace the system board. If this does not correct your problem, replace the power supply (see Section 5).

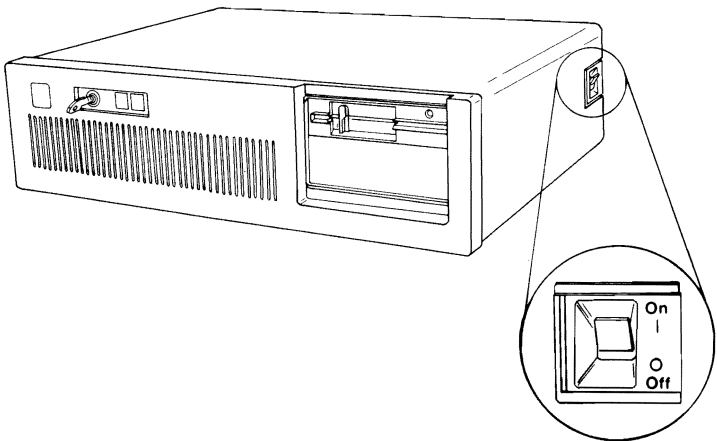
Notes:



System Board

You have entered this PIC because you were unable to complete the POST, or you received a 1XX error message.

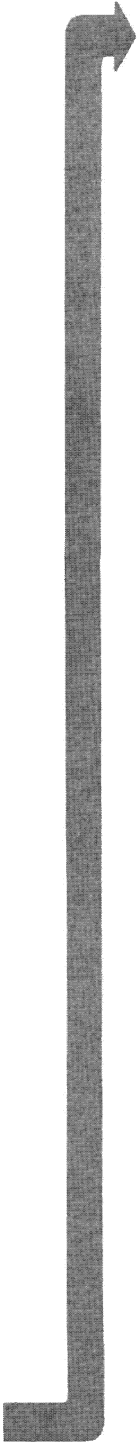
1. Set the system unit's Power switch to Off.
2. Wait 5 seconds.
3. Set the system unit's Power switch to On.



**DID YOU RECEIVE A 1XX ERROR MESSAGE
DURING THE POST?**

YES Go to page 3-100-5.

NO 

- 
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.
 4. Your screen should match the one below.
-

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
(C) Copyright IBM Corp.
1981, 1982, 1983, 1984

SELECT AN OPTION


- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

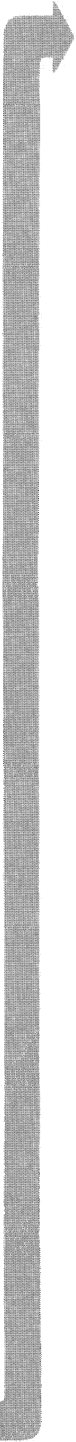
NO Go to page 3-020-1.

YES 

- 
1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering **Yes**. If you cannot correct the list, you still must answer **Yes** before you can continue.
 4. Press **1** (**RUN TESTS MULTIPLE TIMES**) then **Enter**.
 5. Press **1** (**SYSTEM BOARD**) then **Enter**.
 6. Select the number of times to run the test, then press **Enter**, or press **Enter** to run tests continuously.
 7. Press **Y** (**WAIT EACH TIME AN ERROR OCCURS(Y/N)?**) then **Enter**.

SYSTEM BOARD

CONTINUE 



8. Press **Y** (**DO YOU WANT TO TEST YOUR SYSTEM CLOCK (Y/N)?**) then **Enter**.

The screen below shows the system-board test result. A 100 message indicates a successful test.

TESTING – SYSTEM BOARD

100 SYSTEM BOARD

DID YOU RECEIVE A 1XX ERROR MESSAGE?

YES Replace the system board (see Section 5).

Note: A 199 error message means you answered **No** in the installed-devices menu. Do not replace the system board. Instead go to page Start 3-1 and verify the installed devices.

NO You have successfully completed the system board advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

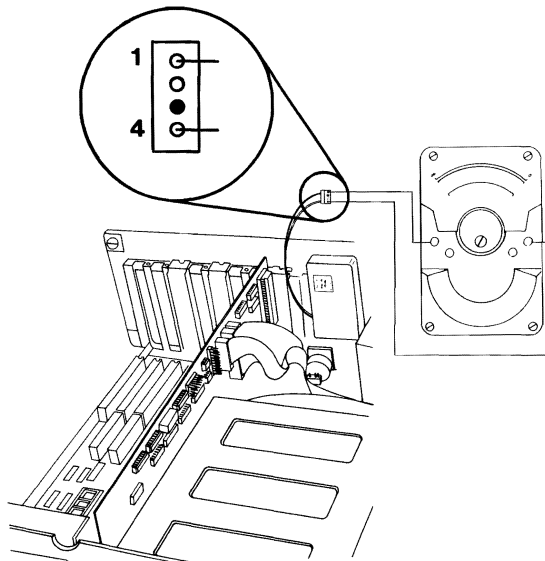
In the figure below, find the error code you received during the POST and go to the page specified.

Error Code	Indication or Repair Action	Go to Page
101	Interrupt Failure	3-020-13
102	Replace System Board	5-1
103	Replace System Board	5-1
104	Replace System Board	5-1
105	System Unit Failure	3-100-7
106	Replace System Board	5-1
107	Interrupt Failure	3-020-13
108	Replace System Board	5-1
109	Replace System Board	5-1
121	Replace System Board	5-1
151	Battery Defective or New Battery Installed	3-100-6
152	Replace System Board	5-1
161	Battery Defective or New Battery Installed	3-100-6
162	System Options Error -- (Run Setup)	6-1
163	Date and Time Not Set	6-1
164	Memory Size Error	6-1
199	Option Setup Error	Start 3-1

SYSTEM BOARD

Note: A **161 Battery Defective/New Battery Installed** message appears on the first POST after a battery installation, or replacement. If you just installed a new battery refer to Section 6 and set the system options.

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover (see Section 5).
3. Disconnect the battery connector.
4. Set your meter to the 12 Vdc scale. Connect the common lead to pin 1 and the voltage lead to pin 4 on the battery connector. Check for a voltage of 6.0 Vdc minimum.

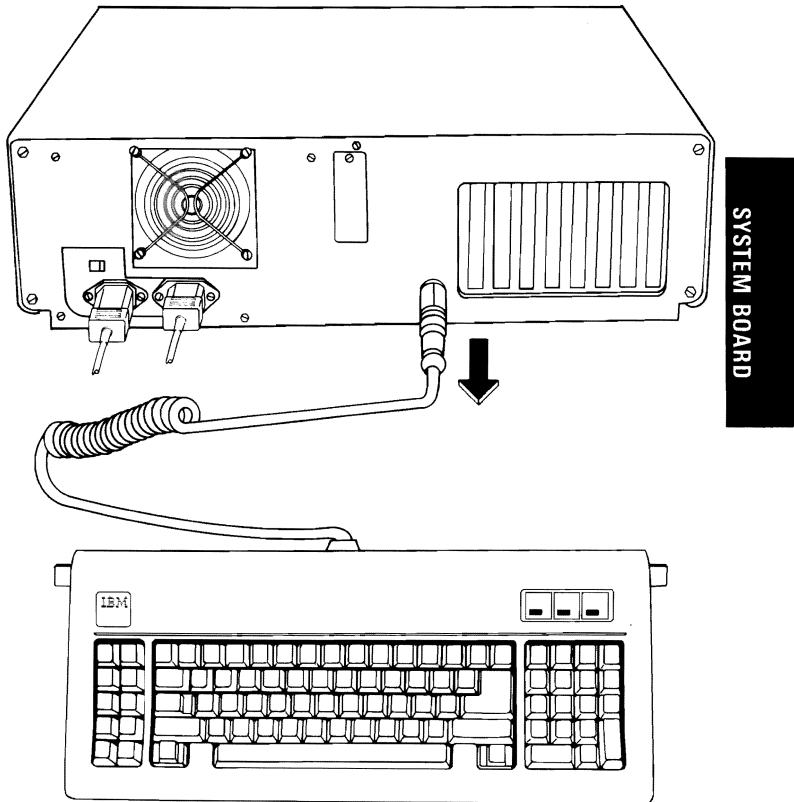


IS THE VOLTAGE AT LEAST 6.0 VDC?

NO Replace the battery (see Section 5). Then go to Section 6 and set the system options.

YES Replace the system board (see Section 5).

1. Set the system unit's Power switch to Off.
 2. Disconnect the keyboard cable from the system unit.
 3. Set the system unit's Power switch to On.
-



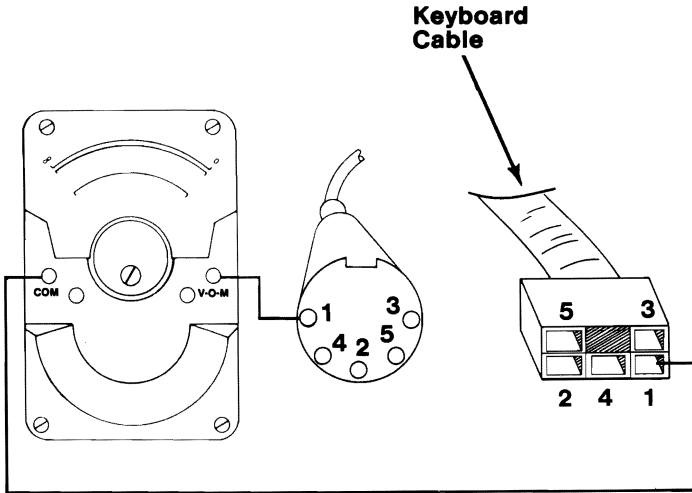
DID YOU RECEIVE A 105 SYSTEM BOARD ERROR?

YES Replace the system board (see Section 5).

NO 

1. Set the system unit's Power switch to Off.
2. Disconnect the keyboard cable from the keyboard (see Section 5).
3. Refer to the figure below, and check the keyboard cable for continuity.

Note: Check the continuity of wires 1, 2, 4, and 5 (wire 3 is not used).



IS THE KEYBOARD CABLE GOOD?

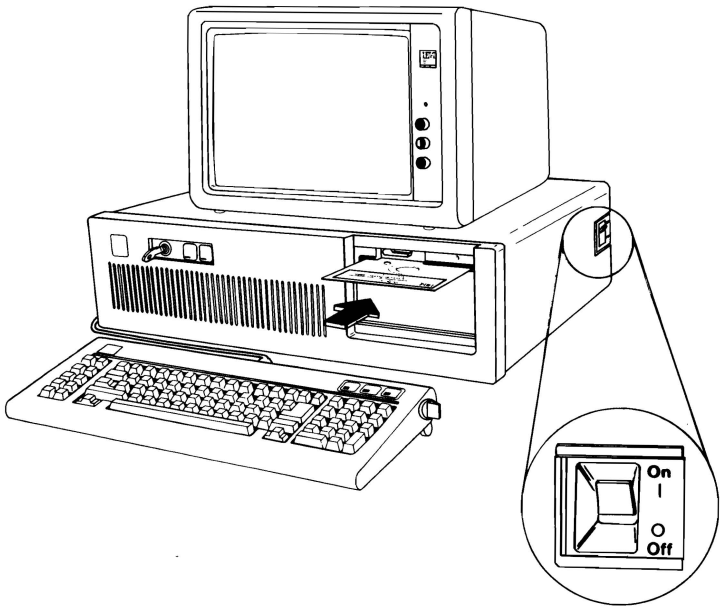
NO Replace the keyboard cable (see Section 5).

YES Replace the keyboard assembly (see Section 5).

Memory


You have entered this PIC because you were unable to complete the POST, the memory size displayed was incorrect, there was a memory parity check, or you have an error message indicating a memory failure.

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power switch to On.



MEMORY

CONTINUE



You may receive an error code similar to the one in the example below. If you do, make a note of the 10-character error code indicated by the arrow in the figure below.

XXXXX KB OK

XXXXXX XXXX ←

**DID YOU RECEIVE AN ERROR MESSAGE
SIMILAR TO THE ONE ABOVE?**

Note: If you also received a 164-Memory Size Error, go to Section 6 and do the "Setup" program. Verify the memory size is correctly set before you continue.

YES Make a note of the error code and go to page 3-200-7 .

NO 

You may have a parity-check message.


**PARITY CHECK X
XXXXX**

MEMORY

IS YOUR SCREEN SIMILAR TO THE ONE ABOVE?

YES Go to page 3-200-22.

NO 



Your screen should match the one below.

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp.
1981, 1982, 1983, 1984, 1985

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

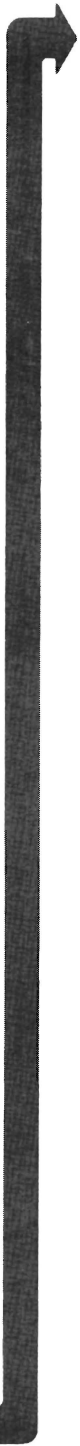
SELECT THE ACTION DESIRED

?_

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

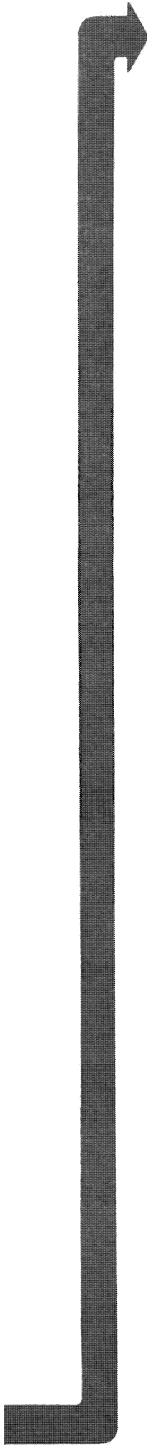
YES 

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering **Yes**. If you cannot correct the list, you still must answer **Yes**, before you can continue.
 4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 5. Press **2 (XXXXKB MEMORY)** then **Enter**.

MEMORY

CONTINUE





Note: You may receive an error message similar to the one in the example below. If you do, make a note of the 10-character error code indicated by the arrow in the example.

TESTING – XXXXKB MEMORY

**THIS TEST MAY TAKE UP TO 3 MINUTES
PLEASE STAND BY**

XXXX FAILURE

XXXXXX XXXX ←
XX:XX:XX

**DID YOU RECEIVE AN ERROR MESSAGE
SIMILAR TO THE ONE ABOVE?**

NO Go to page 3-200-21.

YES 

When a memory error message is displayed, the failing address is in the form of a 10-character alphanumeric code.

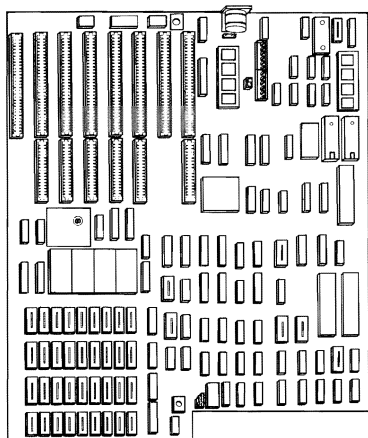
Refer to the figure below and find the first two characters of your error code then go to the page indicated.

First Two Characters of Error Code	Problem Area	Go to Page
00, 01, 02, 03 04, 05, 06, 07	System Board	3-200-8
08 or 09	128Kb Memory Adapter	3-200-13
10, 11, 12, 13 14, 15, 16, 17 18, 19, 1A, 1B 1C, 1D, 1E, 1F 20, 21, 22, 23 24, 25, 26, 27 28, 29, 2A, 2B 2C, 2D, 2E, 2F 30, 31, 32, 33 34, 35, 36, 37	512Kb Memory Adapter	3-200-15

MEMORY

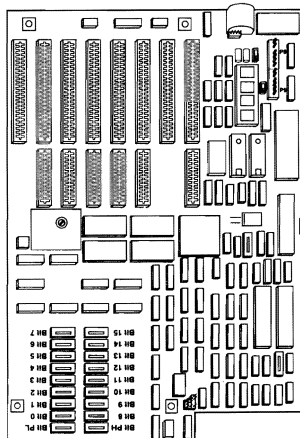
If you are unable to find your error code in the figure above, go to page 3-200-29.

Refer to the figure below and determine the type of system board in the system unit you are servicing.



Front

Type 1



Front

Type 2

ARE YOU SERVICING A TYPE 2 SYSTEM BOARD?

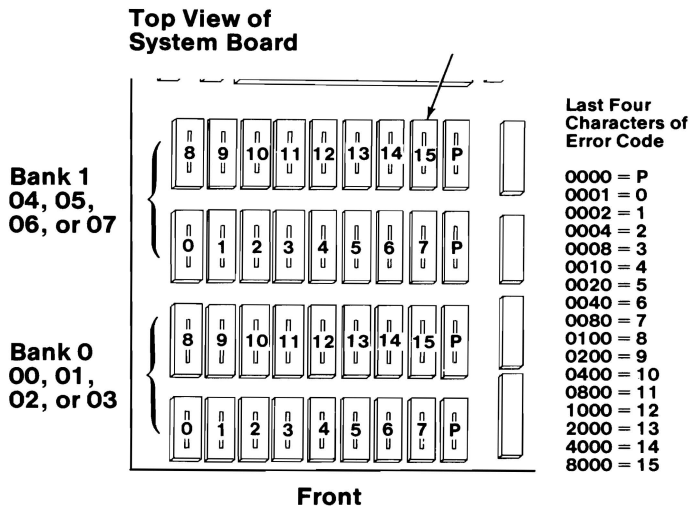
YES Go to page 3-200-11.

NO 

A 10-character error code that begins with 00, 01, 02, 03, 04, 05, 06, or 07, indicates a system board memory failure.

The first two characters of your error code indicate which bank has the failing memory module. The last four characters indicate the failing module of the bank. For example, error code 040002 8000 corresponds to the failing module indicated by the arrow in the figure below.

Refer to the figure below and find the failing module for your error code.



MEMORY

DID YOU FIND THE FAILING MODULE?

NO Go to page 3-200-18.

YES

- 
1. Replace the failing 128K memory module on the system board (see Section 5).

Note: Replace both Parity (P) modules in the failing bank if the last four characters of your error code are 0000.

2. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE AN ERROR CODE?

YES Go to page 3-200-18.

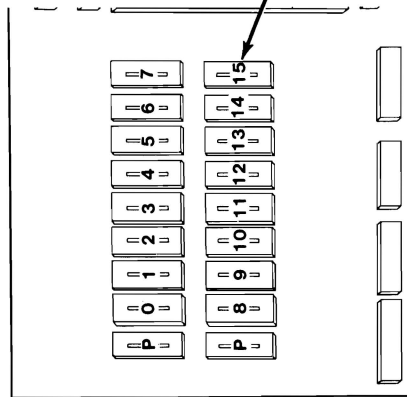
NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

A 10-character error code that begins with 00, 01, 02, 03, 04, 05, 06, or 07 indicates a system board memory failure.

The last four characters of the error code indicate the failing module. For example, for error code 040002 8000, the 8000 corresponds to the failing module indicated by the arrow in the figure below.

Refer to the following figure and find the failing module for your error code.

Top View of System Board



Front

Last Four Characters of Error Code

- 0000 = P
- 0001 = 0
- 0002 = 1
- 0004 = 2
- 0008 = 3
- 0010 = 4
- 0020 = 5
- 0040 = 6
- 0080 = 7
- 0100 = 8
- 0200 = 9
- 0400 = 10
- 0800 = 11
- 1000 = 12
- 2000 = 13
- 4000 = 14
- 8000 = 15

MEMORY

DID YOU FIND THE FAILING MODULE?

NO Go to page 3-200-18.

YES



- 
1. Replace the failing 256K memory module on the system board (see Section 5).

Note: Replace both Parity (P) modules in the failing bank if the last four characters of your error code are 0000.

2. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE AN ERROR CODE?

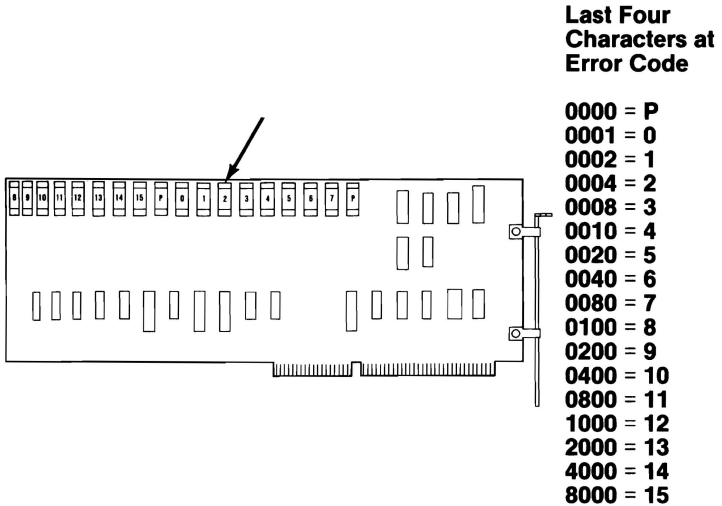
YES Go to page 3-200-18.

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

A 10-character error code that begins with 08 or 09 indicates a 128Kb Memory Expansion Adapter failure. The last four characters of your error code indicate the failing module of the bank. For example, error code 080002 0004 corresponds to the failing module indicated by the arrow in the figure below.

Find the 128Kb Memory Expansion Adapter (it is the only memory expansion adapter with no switches).

Refer to the figure below and find the failing module for your error code.

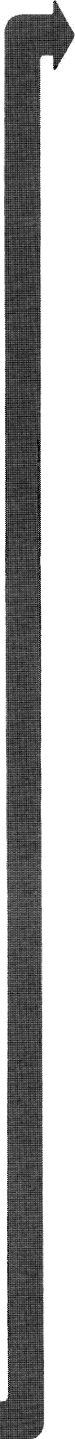


DID YOU FIND THE FAILING MODULE?

NO Go to page 3-200-18.

YES



- 
1. Replace the failing 64K memory module on the 128Kb Memory Expansion Adapter (see Section 5).

Note: Replace both Parity (P) modules if the last four characters of your error code are 0000.

2. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE AN ERROR CODE?

YES Go to page 3-200-18.

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

Refer to the figure below and find the first two characters of your error code (make a note of the failing bank, 0 or 1).

Compare the switch settings shown for those characters with those of all 512Kb memory expansion adapters in your system. The failing adapter is the one with switch settings that match those in the figure below.

First Two Characters of Error Code	Bank	Memory Expansion Adapter Switch Settings							
		1	2	3	4	5	6	7	8
10, 11, 12, 13 14, 15, 16, 17	0	On	On	On	Off	On	On	On	On
	1	On	On	On	Off	On	Off	On	Off
18, 19, 1A, 1B 1C, 1D, 1E, 1F	0	On	On	On	Off	Off	On	On	On
	1	On	On	On	Off	Off	Off	On	Off
20, 21, 22, 23 24, 25, 26, 27	0	On	On	Off	On	On	On	On	On
	1	On	On	Off	On	On	Off	On	Off
28, 29, 2A, 2B 2C, 2D, 2E, 2F	0	On	On	Off	On	Off	On	On	On
	1	On	On	Off	On	Off	Off	On	Off
30, 31, 32, 33 34, 35, 36, 37	0	On	On	Off	Off	On	On	On	On
	1	On	On	Off	Off	On	Off	On	Off

MEMORY

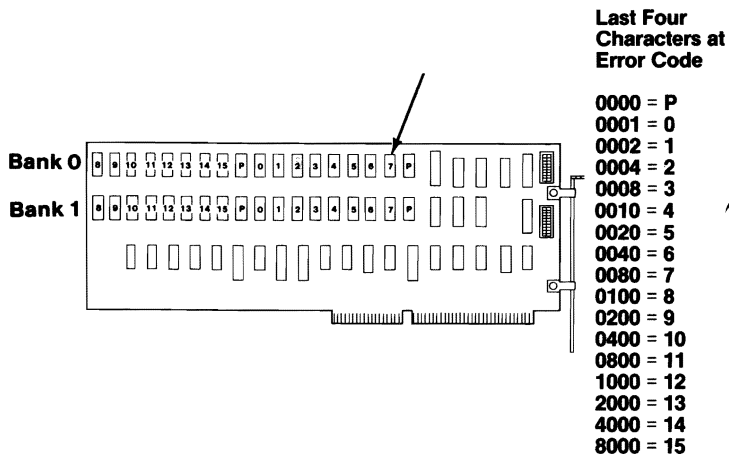
DOES YOUR SYSTEM HAVE A 512KB MEMORY EXPANSION ADAPTER WITH SWITCH SETTINGS THAT MATCH THOSE ABOVE?

NO Go to Section 6 and compare your switch settings with those in the switch-setting figures. Make the necessary corrections, then go to page 3-200-1 and repeat the diagnostic tests.

YES 

The first two characters of your error code indicate which bank has the failing memory module. The last four characters indicate the failing module of the bank. For example, error code 100002 0080 corresponds to the failing module indicated by the arrow in the figure below.


Refer to the figure below and find the failing module for your error code.



DID YOU FIND THE FAILING MODULE?

NO Go to page 3-200-18.

YES

- 
1. Replace the failing 128K memory module on the memory expansion adapter (see Section 5).

Note: Replace both Parity (P) modules if the last four characters of your error code are 0000.

2. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE AN ERROR CODE?

YES Go to page 3-200-18.

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.


1. Refer to the figure below and find the first two characters of your error code and replace the FRU indicated (see Section 5).
 2. Repeat the diagnostic test that failed.
-

First Two Characters of Error Code	Replace
00, 01, 02, 03 04, 05, 06, 07	System Board
08 or 09	128Kb Memory Expansion Adapter
10, 11, 12, 13 14, 15, 16, 17	512Kb Memory Expansion Adapter 1
18, 19, 1A, 1B 1C, 1D, 1E, 1F	512Kb Memory Expansion Adapter 2
20, 21, 22, 23 24, 25, 26, 27	512Kb Memory Expansion Adapter 3
28, 29, 2A, 2B 2C, 2D, 2E, 2F	512Kb Memory Expansion Adapter 4
30, 31, 32, 33 34, 35, 36, 37	512Kb Memory Expansion Adapter 5

DID YOU RECEIVE AN ERROR CODE?

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

YES 



If a 128Kb Memory Expansion Adapter is installed in your system, continue on the next page.

1. Refer to the figure below and find the last four characters of your error code and replace the FRU indicated.
 2. Repeat the diagnostic test that failed.
-

Last Four Characters of Error Code	Replace
0000, 0040, 0080, 00C0 0100, 01C0, 0200, 0240	System Board
0280, 02C0, 0300, 0340 0380, 03C0, 0400, 0440	512Kb Memory Expansion Adapter 1
0480, 04C0, 0500, 0540 0580, 05C0, 0600, 0640	512Kb Memory Expansion Adapter 2
0680, 06C0, 0700, 0740 0780, 07C0, 0800, 0840	512Kb Memory Expansion Adapter 3
0880, 08C0, 0900, 0940 0980, 09C0, 0A00, 0A40	512Kb Memory Expansion Adapter 4
0A80, 0AC0, 0B00, 0B40 0B80, 0BC0, 0C00, 0C40	512Kb Memory Expansion Adapter 5

MEMORY

DID YOU RECEIVE AN ERROR CODE?

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

YES Go to page 3-200-31.

You should be on this page if a 128Kb Memory Expansion Adapter is installed in your system.

1. Refer to the figure below and find the last four characters of your error code, and replace the FRU indicated.
 2. Repeat the memory diagnostic test that failed.
-

Last Four Characters of Error Code	Replace
0000, 0040, 0080, 00C0 0100, 01C0, 0200, 0240	System Board
0280 02C0	128Kb Memory Expansion Adapter
0300, 0340, 0380, 03C0 0400, 0440, 0480, 04C0	512Kb Memory Expansion Adapter 1
0500, 0540, 0580, 05C0 0600, 0640, 0680, 06C0	512Kb Memory Expansion Adapter 2
0700, 0740, 0780, 07C0 0800, 0840, 0880, 08C0	512Kb Memory Expansion Adapter 3
0900, 0940, 0980, 09C0 0A00, 0A40, 0A80, 0AC0	512Kb Memory Expansion Adapter 4
0B00, 0B40, 0B80, 0BC0 0C00, 0C40, 0C80, 0CC0	512Kb Memory Expansion Adapter 5

DID YOU RECEIVE AN ERROR CODE?

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

YES Go to page 3-200-31.

You should be on this page if the memory test ended without returning a 10-character error message.

You may have a parity-check message (see the example below).


**PARITY CHECK X
XXXXX**

MEMORY

DO YOU HAVE A PARITY CHECK ERROR MESSAGE?

NO Your system memory is now functioning correctly. If you suspect an intermittent problem, go to page 3-010-1.

YES 



After a parity check error, the memory is scanned to see if a failing address can be identified. If identified, the address is displayed as a five-character alphanumeric code under the parity check message. If the failing address cannot be identified, five question marks are displayed under the parity check message.

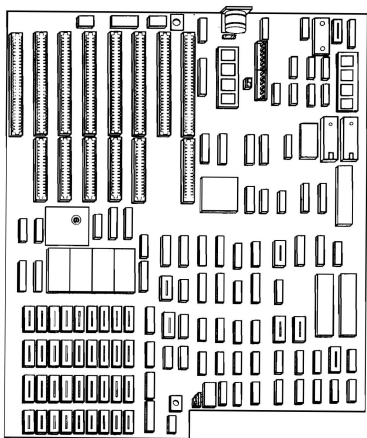
**PARITY CHECK X
XXXXX**

DO YOU HAVE A PARITY CHECK ERROR CODE?

NO Go to page 3-200-27.

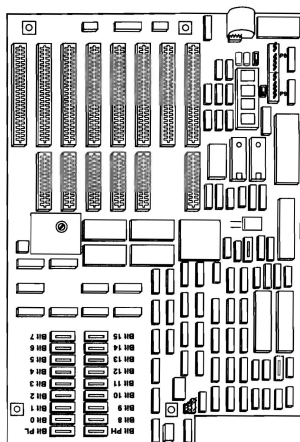
YES 

Refer to the figure below and determine the type of system board in the system unit you are servicing.



Front

Type 1



Front


Type 2

MEMORY

ARE YOU SERVICING A TYPE 2 SYSTEM BOARD?

YES Go to page 3-200-26.

NO 



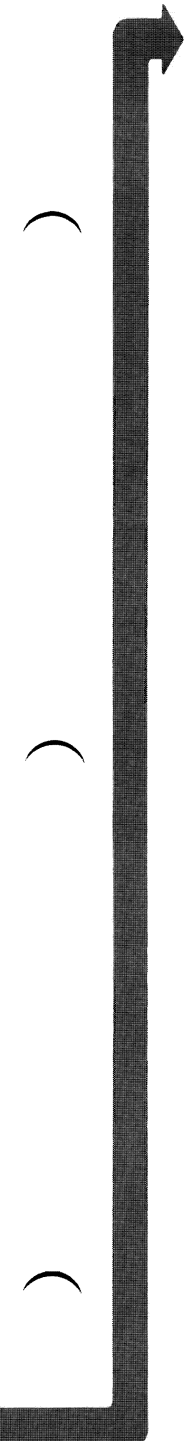
The first character of a parity check error code identifies the failing bank. For example, error code 40000 indicates bank 1 of the system board is failing.

First Character of Parity Error	Failing Memory Bank
0, 1, 2, or 3	System Board Bank 0
4, 5, 6, or 7	System Board Bank 1

IS THE FIRST CHARACTER OF THE PARITY CHECK ERROR CODE 0, 1, 2, 3, 4, 5, 6, OR 7?

YES Replace the 18 128K memory modules in the failing bank. If the same parity check error code occurs, replace the system board (see Section 5).

NO 



You should be on this page if the first character of the parity check error code is 8 or 9.

**IS THE FIRST CHARACTER OF THE PARITY
CHECK ERROR 8 OR 9?**

YES Replace the 18 64K memory modules of the 128KB Memory Expansion Adapter. If the same error code occurs, replace the adapter (see Section 5).

NO Go to page 3-200-27

The first character of a parity check error code identifies the where the failing component is located.

IS THE FIRST CHARACTER OF THE PARITY CHECK ERROR CODE 0, 1, 2, 3, 4, 5, 6, OR 7?

YES Replace the 18 256K memory modules on the system board. If the same parity check error occurs, replace the system board (see Section 5).

NO 



Parity Checks

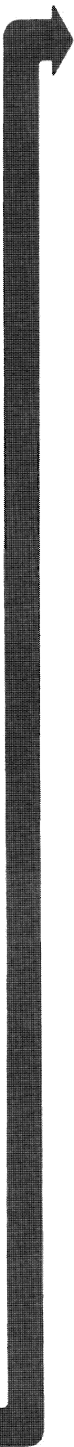
Parity Check 1 indicates a system board parity error. Parity Check 2 indicates a memory expansion adapter parity error. To isolate a parity failure:

1. Set the system unit's Power switch to Off.
 2. Remove all installed memory expansion adapters.
 3. Set the system unit's Power switch to On.
 4. Go to Section 6 and do the "Setup" program. (Ensure the memory size is correctly set.)
 5. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE A PARITY CHECK ERROR?

YES Replace all memory modules on the system board. If the same parity check error code occurs, replace the system board (see Section 5).

NO 



If the system unit has no memory expansion adapters, go to page 3-200-31.

1. Set the system unit's Power switch to Off.
2. Install one memory expansion adapter.

Note: If you have a 128Kb Memory Expansion Adapter install it first.

3. Set the system unit's power switch to On.
 4. Go to Section 6 and do the "Setup" program. (Ensure the memory size is correctly set.)
 5. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE A PARITY CHECK ERROR?

YES Replace all memory modules on the last adapter installed. If the same parity check error code occurs, replace the memory expansion adapter (see Section 5).

NO Repeat the above steps until all memory expansion adapters are installed (begin with adapter 1), then go to page 3-200-31.


Memory Errors

1. Set the system unit's Power switch to Off.
 2. Remove all installed memory expansion adapters.
 3. Set the system unit's Power switch to On.
 4. Go to Section 6 and do the "Setup" program.
(Ensure the memory size is correctly set.)
 5. Repeat the memory diagnostic tests.
-

DID YOU RECEIVE A MEMORY ERROR MESSAGE?

YES Go to page 3-200-6 and continue. If you cannot find a failing module replace the system board (see Section 5).

NO 



If the system unit has no memory expansion adapters, continue on the next page.

1. Set the system unit's Power switch to Off.
2. Install one memory expansion adapter.

Note: If you have a 128Kb adapter install it first.

3. Set the system unit's Power switch to On.
 4. Go to Section 6 and do the "Setup" program. (Ensure the memory size is correctly set.)
 5. Repeat the diagnostic test that failed.
-

DID YOU RECEIVE A MEMORY ERROR MESSAGE?

YES Replace all memory modules on the last memory expansion adapter installed. If the same error code occurs, replace the memory expansion adapter (see Section 5).

NO Repeat the above steps until all memory expansion adapters are installed (begin with adapter 1), then go to page 3-200-31.

You have completed the memory's advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

If you have gone through the PICs without solving your problem, the following steps should help you find additional audio or visual symptoms.

1. Check the system for loose or damaged memory modules and memory expansion adapters.
2. Select **LOG UTILITIES** in the System Checkout menu, start an error log, and select **RUN TESTS MULTIPLE TIMES**. This will allow you to operate the system thoroughly and identify the failing symptom. When you have identified the symptom, go to page 3-200-1.

If you have followed these procedures and still have an unsolved problem, request technical assistance.

Notes:

Keyboard

You have entered this PIC because you received a 3XX error code, you have been directed here from another PIC, or you suspect a keyboard problem. If the keyboard has obvious broken parts, replace them (see Section 5), then continue.

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power switch to On.

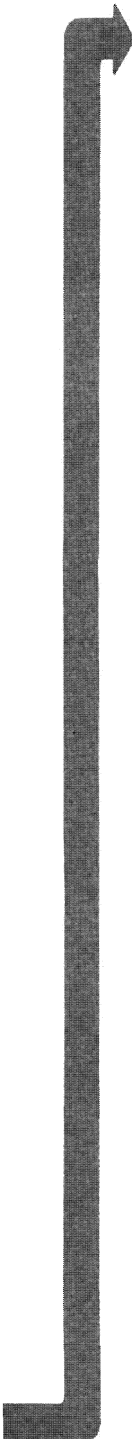
XXXXXX KB OK

302—System Unit Keylock is Locked
—Unlock System Unit Keylock
(RESUME = "F1"KEY)

DID YOU RECEIVE A 302 ERROR CODE DURING THE POST?

YES Unlock the system unit Key Lock. Press the F1 key to resume the POST, if the system unit Key Lock is unlocked go to page 3-300-9.

NO 



You may have received a 3XX error code. Look for your error code in the figure below.

Error Code	Page
301	3-300-11
XX301	3-300-12
303	3-300-10
304	3-300-10

DID YOU FIND YOUR ERROR CODE ABOVE?

YES Go to the page indicated.

NO 

Your screen should match the one below.

**The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
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SELECT AN OPTION

- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 4 – SETUP**
- 9 – END DIAGNOSTICS**



**SELECT THE ACTION DESIRED
?**

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES 

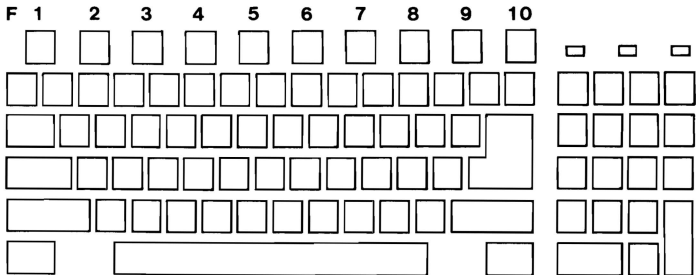
KEYBOARD

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes, before you can continue.
 4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 5. Press **3 (KEYBOARD)** then **Enter**.
- 

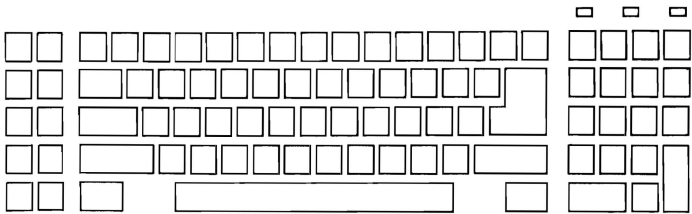
CONTINUE



Depending on the width setting (40 or 80 column) of your display your screen will match one of the two below.



**PRESS EACH KEY, HOLD FOR TYPEMATIC TEST
IF OK PRESS "Y THEN ENTER"
IF NOT OK PRESS "N THEN ENTER"**




**PRESS EACH KEY, HOLD FOR TYPEMATIC TEST
IF OK PRESS "Y THEN ENTER"
IF NOT OK PRESS "N THEN ENTER"**

**DOES YOUR SCREEN MATCH EITHER ONE
ABOVE?**

NO Replace the keyboard assembly (see Section 5).

YES 



Follow the instructions on your screen and perform the keyboard tests.

Note: Observe the keyboard's status indicator lights as you press the Caps Lock, Num Lock, and Scroll Lock keys.

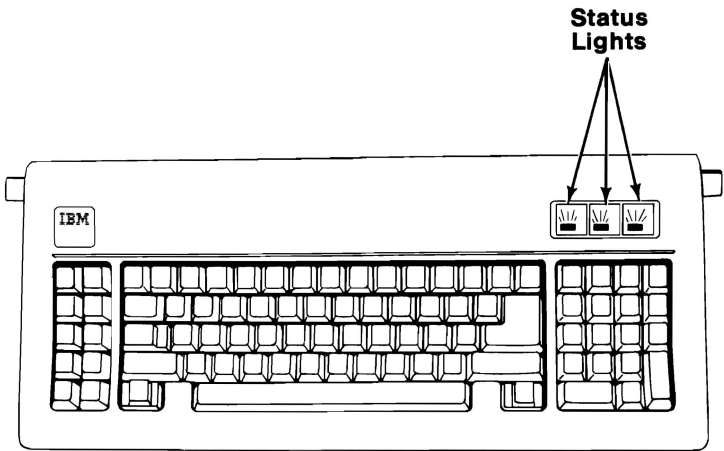
**PRESS EACH KEY, HOLD FOR TYPOMATIC TEST
IF OK PRESS "Y THEN ENTER"
IF NOT OK PRESS "N THEN ENTER"**

DID YOU RECEIVE A 3XX ERROR MESSAGE?

NO You have successfully completed the keyboard's advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 

A 3XX error code indicates a status light or keyboard assembly problem.

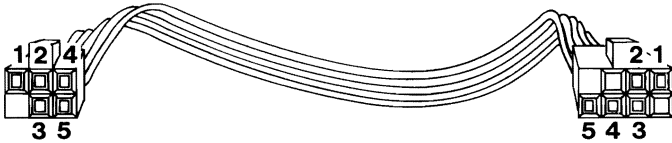


DID YOU OBSERVE A KEYBOARD STATUS LIGHT PROBLEM?

NO Replace the keyboard assembly (see Section 5).

YES 

1. Remove the keyboard's internal cable (see Section 5).
 2. Refer to the figure below and check the cable for continuity.
-

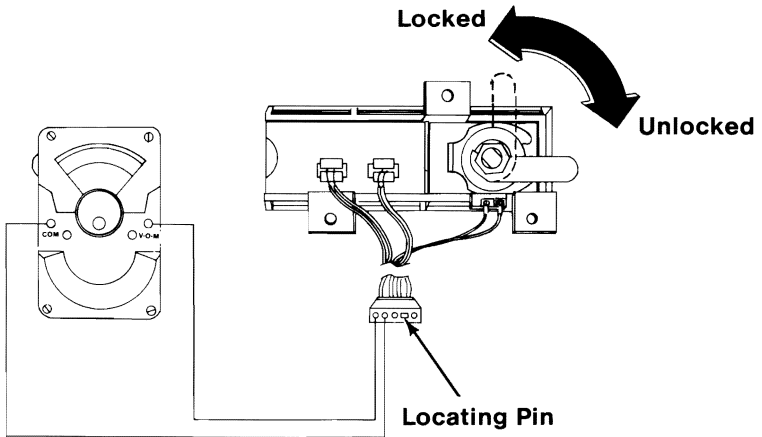


IS THE INTERNAL CABLE GOOD?

- NO** Replace the keyboard's internal cable (see Section 5).
- YES** Replace the keyboard LED card. If this does not correct your problem, replace the keyboard assembly (see Section 5).

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover (see Section 5).
3. Disconnect the Control Panel cable from the system board (see Section 5).
4. Set your meter to the Ohms X 1 scale.
5. Check the Control Panel's switch, as shown below.

-
- Key Lock Locked = Continuity (0 Ohms)
 - Key Lock Unlocked = No Continuity (Infinity)

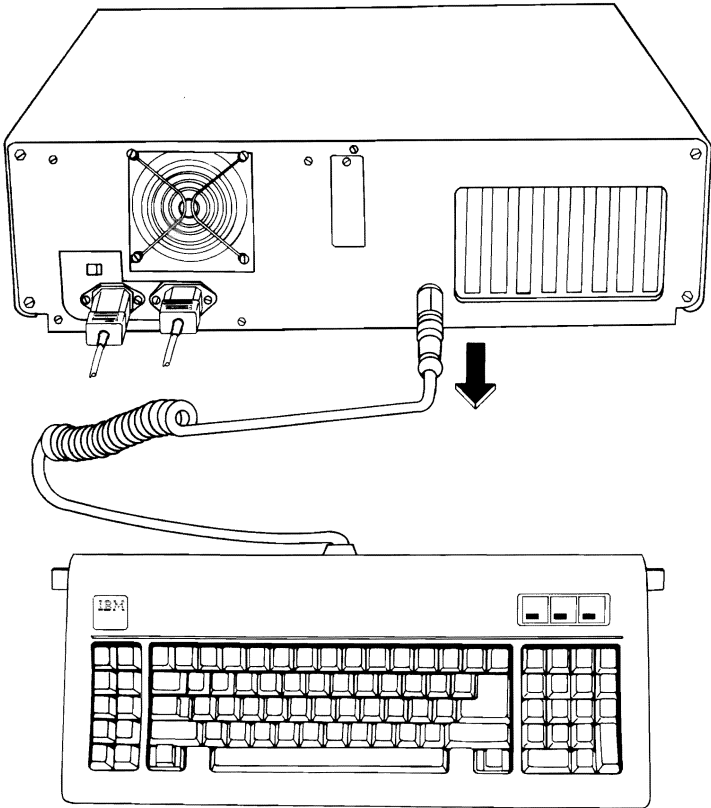


DOES THE CONTROL PANEL SWITCH MEET BOTH CONDITIONS SHOWN IN THE FIGURE ABOVE?

NO Replace the Control Panel (see Section 5).

YES Replace the system board (see Section 5).

1. Set the system unit's Power switch to Off.
 2. Disconnect the keyboard cable from the system unit.
 3. Set the system unit's Power switch to On.
-



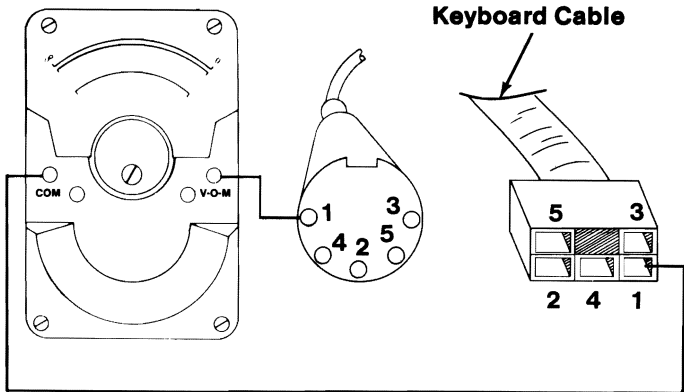
DID YOU RECEIVE A 303 OR 304 KEYBOARD ERROR?

YES Replace the system board (see Section 5).

NO 

1. Set the system unit's Power switch to Off.
2. Disconnect the keyboard cable from the keyboard (see Section 5).
3. Refer to the figure below and check the keyboard cable for continuity.

Note: Check the continuity of wires 1, 2, 4, and 5 (wire 3 is not used).



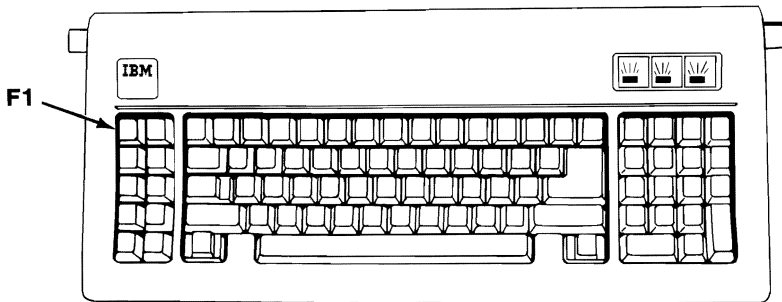
IS THE KEYBOARD CABLE GOOD?

NO Replace the keyboard cable (see Section 5).

YES Replace the keyboard assembly (see Section 5).

An XX301 keyboard error code indicates a key stuck during the POST.

Press the F1 key.



DOES PRESSING THE F1 KEY RESUME THE POST?

NO Replace the keyboard assembly (see Section 5).

YES Go to page 3-300-3.

Display (Monochrome)

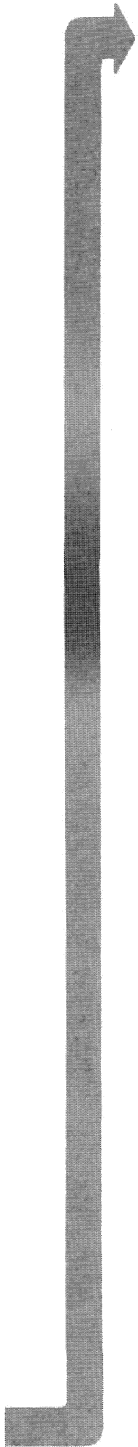
You have entered this PIC because you were unable to complete the POST, you suspect a Monochrome Display problem, or you received a 4XX error message.

1. Set the system unit's Power switch to Off.
 2. Disconnect the IBM Monochrome Display's signal cable from the system unit.
 3. Insert the Advanced Diagnostics diskette into drive A.
 4. Set the system unit's Power switch to On.
 5. Notice the audio responses during the POST.
-

WAS THE AUDIO RESPONSE ONE LONG AND TWO SHORT BEEPS?

YES Replace the IBM Monochrome Display and Printer Adapter. If this does not correct the problem, replace the system board (see Section 5).

NO 

- 
1. Set the system unit's Power switch to Off.
 2. Connect the monochrome display's signal cable to the system unit.
 3. Set the system unit's Power switch to On.
 4. Set the Brightness and Contrast controls fully clockwise.

Your screen should match the following.

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ADVANCED DIAGNOSTICS
Version X.XX
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SELECT AN OPTION

- 0 – SYSTEM CHECKOUT
- 1 – FORMAT DISKETTE
- 2 – COPY DISKETTE
- 3 – PREPARE SYSTEM FOR MOVING
- 4 – SETUP
- 9 – END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

IS THE IMAGE ON THE SCREEN STEADY AND READABLE?

NO Go to page 3-400-14.

YES 

The display may function correctly except the cursor may be missing or out of position.

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
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SELECT AN OPTION

- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED

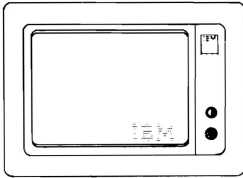
? - * -

IS THE CURSOR VISIBLE AND IN THE CORRECT POSITION ON YOUR SCREEN?

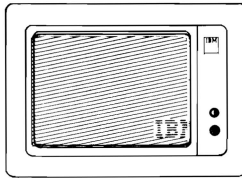
NO Replace the Monochrome Display and Printer Adapter. If this does not correct the problem, replace the system board (see Section 5).

YES 

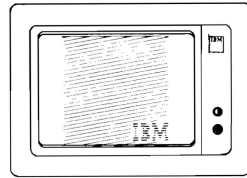
Your image may be distorted or the characters may be the wrong size, as shown below.



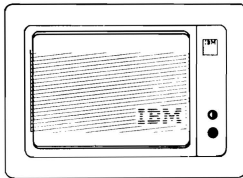
Too Dim



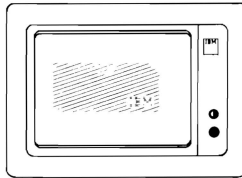
Too Wide



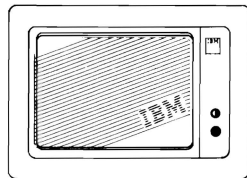
Too Narrow



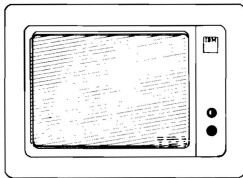
Too Short



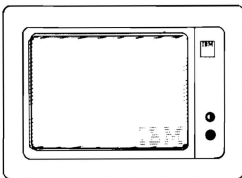
Too Small



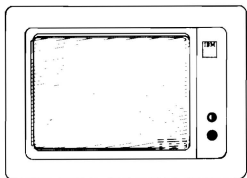
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus



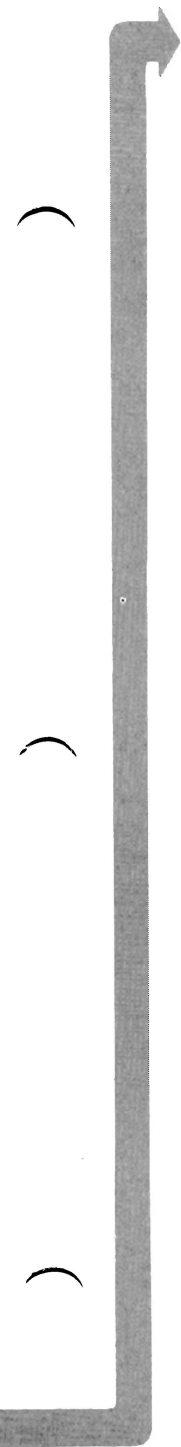
**Characters Shifted Left
or Right or Up and
Down Off the Display
Area**

**DOES YOUR IMAGE MATCH ANY OF THE
EXAMPLES ABOVE?**

YES Replace the Monochrome Display (see
Section 5).


NO



- 
1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes, before you can continue.
 4. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.

CONTINUE



- 
1. Press **4 (MONOCHROME & PRINTER ADAPTER)** then **Enter**.
 2. Press **10 (RUN ALL ABOVE TESTS)** then **Enter**.
-

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY
THIS LINE IS INTENSIFIED
THIS LINE IS IN REVERSE VIDEO

THIS LINE IS BLINKING
THIS LINE IS UNDERLINED

IS THE SCREEN CORRECT (Y/N)?

DID YOU RECEIVE A 401 ERROR MESSAGE?

YES Replace the Monochrome Display and Printer Adapter. If this does not correct the problem, replace the system board (see Section 5).

NO 

Adjust the Brightness and Contrast controls until the intensified line is brighter than the other lines.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY
THIS LINE IS INTENSIFIED
THIS LINE IS IN REVERSE VIDEO


THIS LINE IS BLINKING
THIS LINE IS UNDERLINED

IS THE SCREEN CORRECT (Y/N)?

**WERE YOU ABLE TO ADJUST THE INTENSIFIED
LINE BRIGHTER THAN THE OTHERS?**

NO Go to page 3-400-14.

YES 



Each line on your screen should match the description of that line.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY

THIS LINE IS INTENSIFIED

THIS LINE IS IN REVERSE VIDEO

THIS LINE IS BLINKING

THIS LINE IS UNDERLINED

IS THE SCREEN CORRECT (Y/N)?

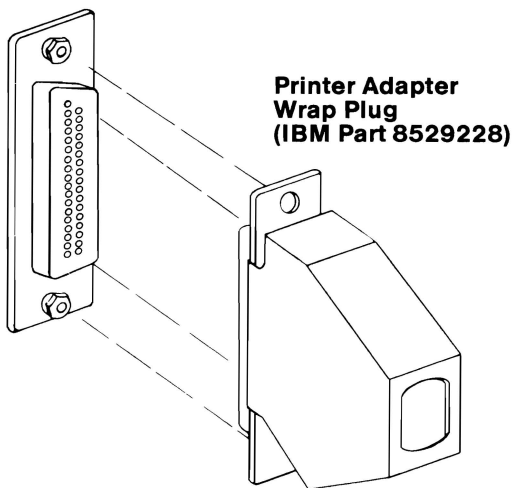
**DO THE LINES ON YOUR SCREEN MATCH
THEIR DESCRIPTIONS?**

NO Replace the Monochrome Display and Printer Adapter. If this does not correct the problem, replace the system board (see Section 5).


YES 

1. Disconnect the printer cable if it's attached to the Monochrome Display and Printer Adapter.
 2. Install the printer adapter's wrap plug as shown in the figure below.
-

IBM Monochrome Display and Printer Adapter



CONTINUE



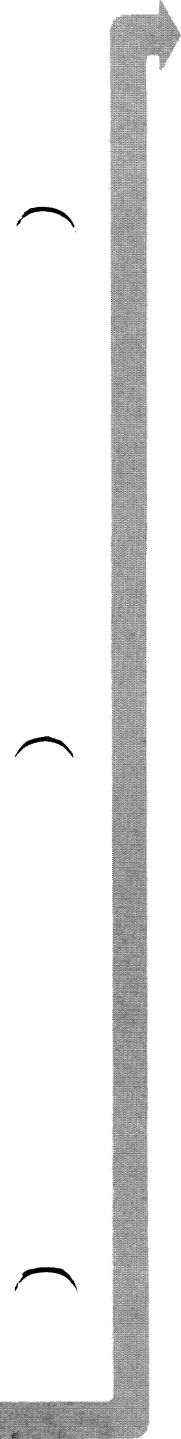
Note: If you perform the following test without installing the wrap plug, you will receive an invalid error message.

Press **Y** then **Enter**.

PRINTER ADAPTER TEST

INSTALL THE WRAP PLUG AND PRESS "ENTER"

CONTINUE 



Press **Enter** to begin the test.

An error message similar to the one below may appear on your screen.

0:01:00

ERROR – MONOCHROME & PRINTER ADAPTER TEST 432

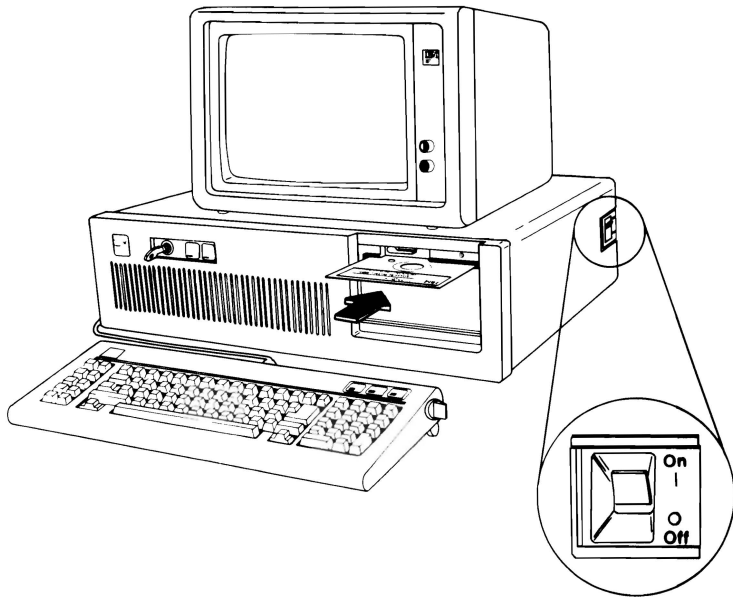
PRESS ENTER TO CONTINUE

**DID YOU RECEIVE AN ERROR MESSAGE
SIMILAR TO THE ONE ABOVE?**

- YES** Replace the Monochrome Display and Printer Adapter. If this does not correct the problem replace the system board (see Section 5).
- NO** You have successfully completed the Monochrome Display and Printer Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

The following pages help you diagnose a problem in your IBM Monochrome Display through the use of audio responses.

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power switch to On.



CONTINUE 

Follow the steps below. Listen for the "beep" each time you press **Enter**.


Note: Use the numbers on the top row of the keyboard; do not use the numeric keypad.

Steps	Test Selected	Audio Response
1. Press 0	Run diagnostic tests.	None
2. Press Enter		1 Beep
Note: Skip Steps 3 and 4 if you have only one display adapter in your system.		
3. Press Y or N	Is a monitor attached to every display adapter?	None
4. Press Enter		1 Beep
5. Press Y	Is the installed-devices list correct?	None
6. Press Enter		1 Beep
7. Press 0	Run tests one time.	None
8. Press Enter		1 Beep
9. Press 4	Select Monochrome Display and Printer Adapter test.	None
10. Press Enter		2 Beeps

DID YOU RECEIVE THE CORRECT AUDIO RESPONSES?

NO You may have a power supply or connector problem. Check the connectors and go to page 3-020-1.

YES 



Your screen should match the one below.

**IBM MONOCHROME DISPLAY AND
PRINTER ADAPTER TEST**

- 0 – DISPLAY ADAPTER TEST**
- 1 – DISPLAY ATTRIBUTES**
- 2 – CHARACTER SET**
- 3 – 80 X 25 DISPLAY**
- 4 – PRINTER ADAPTER TEST**
- 9 – EXIT TO MAIN MENU**
- 10 – RUN ALL ABOVE TESTS**
- 11 – VIDEO TEST**
- 12 – SYNC TEST**

SELECT THE NUMBER OF THE DESIRED ACTION

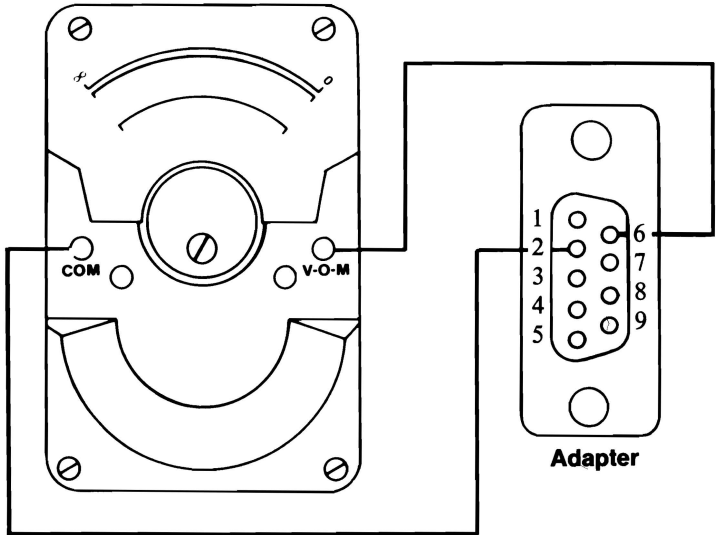
**ARE ALL CHARACTERS ON YOUR SCREEN
CORRECT AND READABLE?**

NO Replace the Monochrome Display and Printer Adapter (see Section 5).

Note: If the above screen did not appear or the display is completely blank, continue on the next page.

YES 

1. Type **11**, then press **Enter**.
 2. Disconnect the Monochrome Display's signal cable.
 3. Set your meter to the 12 Vdc scale.
 4. Measure the voltage between pins 2 and 7 on the adapter for 2.4 to 3.8 Vdc.
 5. Measure the voltage between pins 2 and 6 on the adapter for 2.4 to 3.8 Vdc.
-

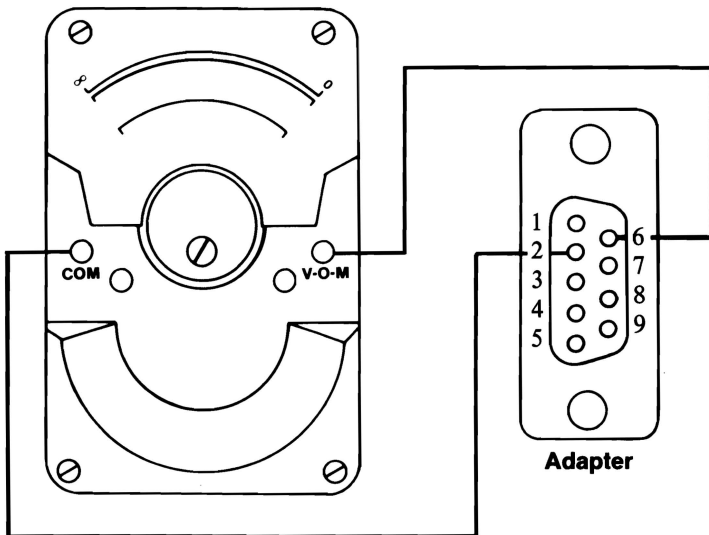


ARE THE VOLTAGES CORRECT?

NO Replace the Monochrome Display and Printer Adapter (see Section 5).

YES 

1. Press Enter.
2. Measure the voltage between pins 2 and 7 on the adapter for 0 to 0.5 Vdc.
3. Measure the voltage between pins 2 and 6 on the adapter for 0 to 0.5 Vdc.

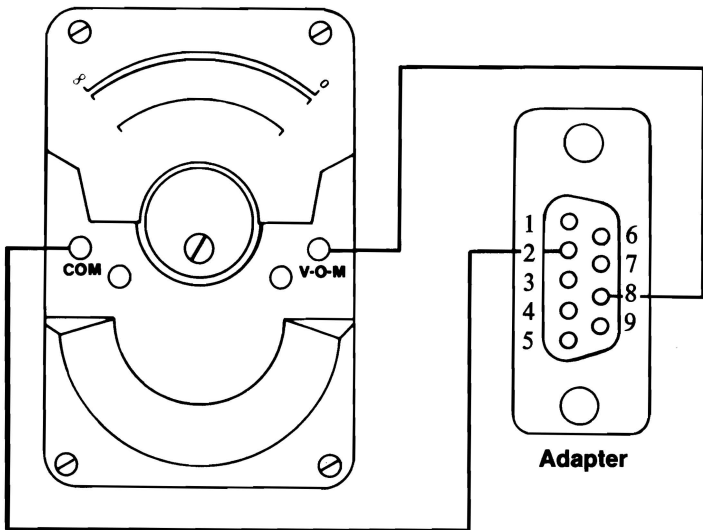


ARE THE VOLTAGES CORRECT?

NO Replace the Monochrome Display and Printer Adapter (see Section 5).

YES 

1. Press **Enter**, and wait for two beeps.
 2. Measure the voltage between pins 2 and 8 on the adapter for 0.4 to 1.1 Vdc.
 3. Measure the voltage between pins 2 and 9 on the adapter for 3.0 to 4.2 Vdc.
-

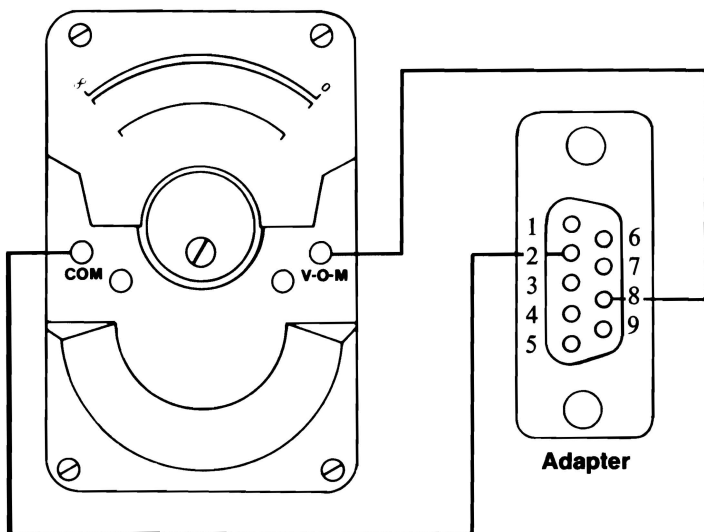


ARE THE VOLTAGES CORRECT?

NO Replace the Monochrome Display and Printer Adapter (see Section 5).

YES 

1. Type **12**, then press **Enter**.
 2. Measure the voltage between pins 2 and 8 on the adapter for 1.5 to 2.5 Vdc.
 3. Measure the voltage between pins 2 and 9 on the adapter for 1.8 to 2.6 Vdc.
-



ARE THE VOLTAGES CORRECT?

NO Replace the Monochrome Display and Printer Adapter (see Section 5).

YES Replace the monochrome display (see Section 5).

Display (Color Graphics)

You have entered this PIC because you were unable to complete the POST, you suspect a color/graphics problem, or you received a color/graphics error message.

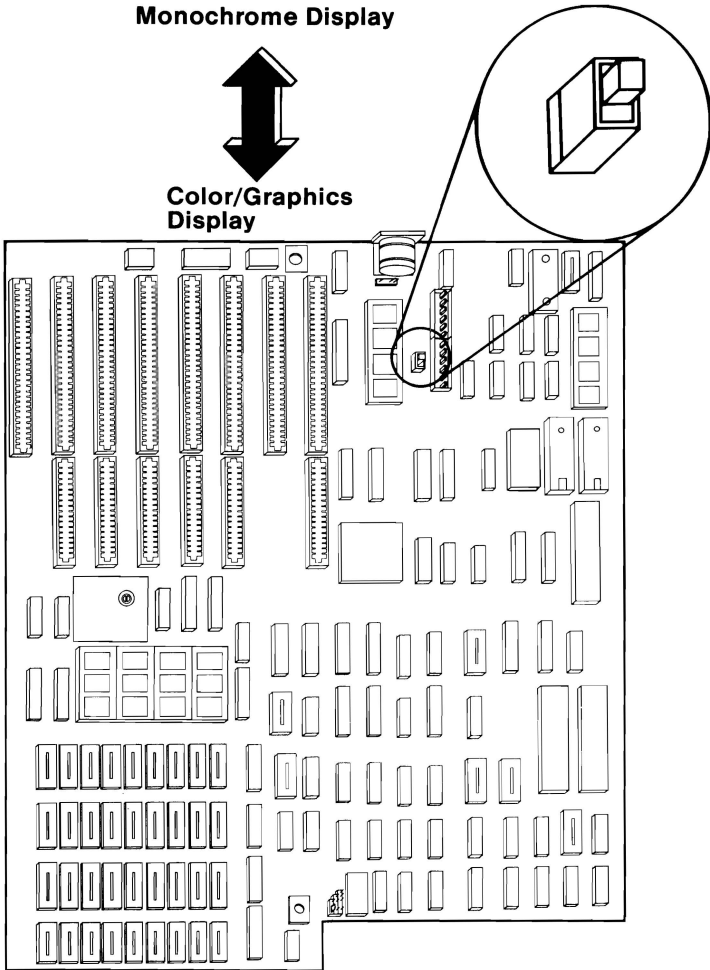
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.
 4. If your display has a separate Power switch, set it to On.
 5. Turn the Brightness and Contrast controls fully clockwise (IBM displays only).
 6. Note any audio responses during the POST.
-

WAS THE AUDIO RESPONSE ONE LONG AND TWO SHORT BEEPS?

NO Go to page 3-500-4.

YES 

Ensure that the system board video switch setting is correct for your primary display.



IS THE SYSTEM BOARD VIDEO SWITCH SET CORRECTLY?

NO Correct the video switch position. Go to page 3-500-1 and repeat the diagnostics test.

YES 

1. Set the system unit's Power switch to Off.
 2. Remove the system unit's cover (see Section 5).
 3. Examine your system and determine how many display adapters are installed.
-

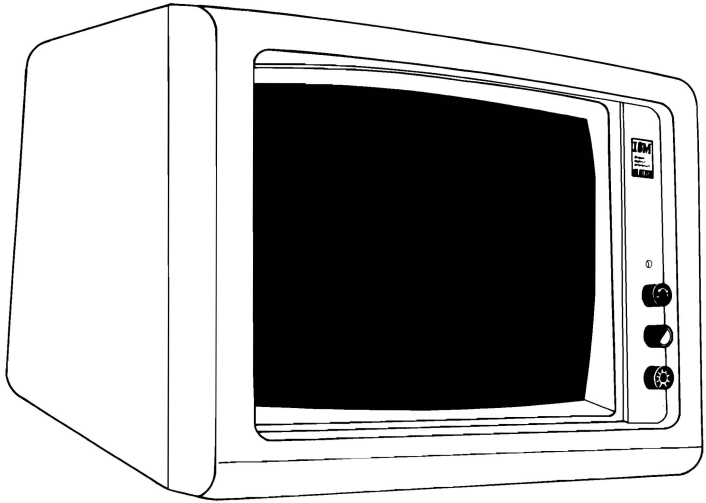
DOES YOUR SYSTEM HAVE TWO DISPLAY ADAPTERS INSTALLED?

- NO** Replace the Color/Graphics Monitor Adapter. If this does not correct your problem, replace the system board (see Section 5).
- YES** Replace the primary display's adapter. If this does not correct your problem, replace the system board (see Section 5).

1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
3. Press **Y** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes, before you can continue.
4. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.
5. Press **5** (**COLOR/GRAPHICS MONITOR ADAPTER**) then **Enter**.

CONTINUE 

Select **10 (RUN ALL TESTS)** then press **Enter**.



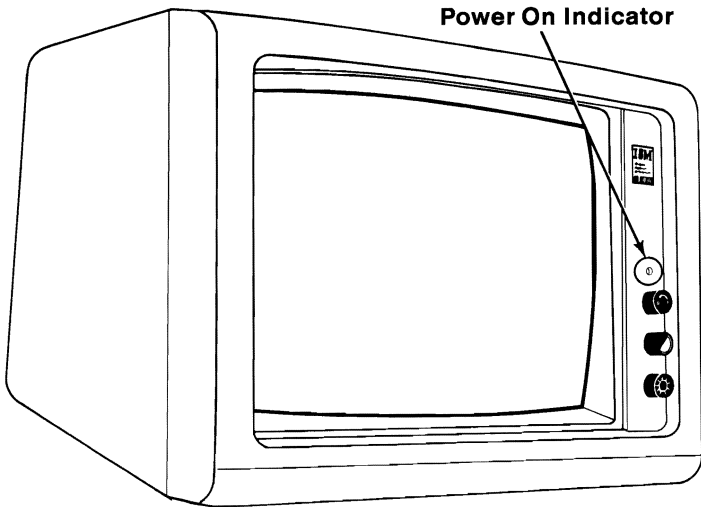
IS THE SCREEN DARK (NO ILLUMINATION)?

NO Go to page 3-500-9.

YES 

If you do not have an IBM Color Display, go to page 3-500-25.

Check the Power-On indicator on your IBM Color Display.

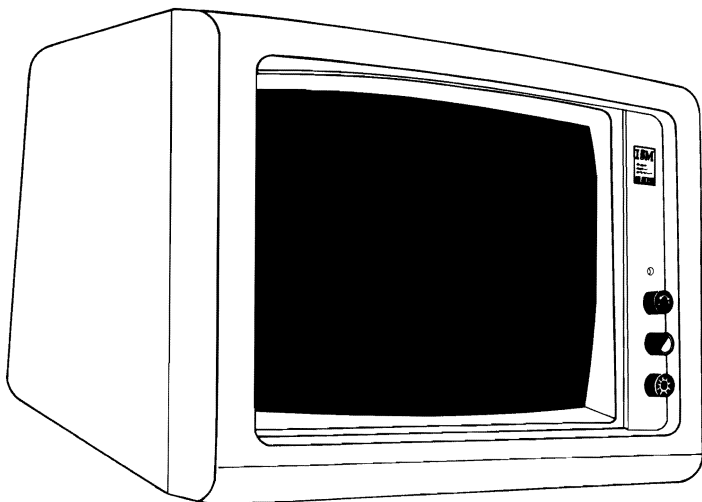


IS THE POWER-ON INDICATOR GLOWING?

NO Go to page 3-500-8.

YES 

1. Set the system unit's Power switch to Off.
 2. Set the Color Display's Power switch to Off.
 3. Disconnect the IBM Color Display's signal cable from the Color/Graphics Monitor Adapter.
 4. Set the Color Display's Power switch to On.
-

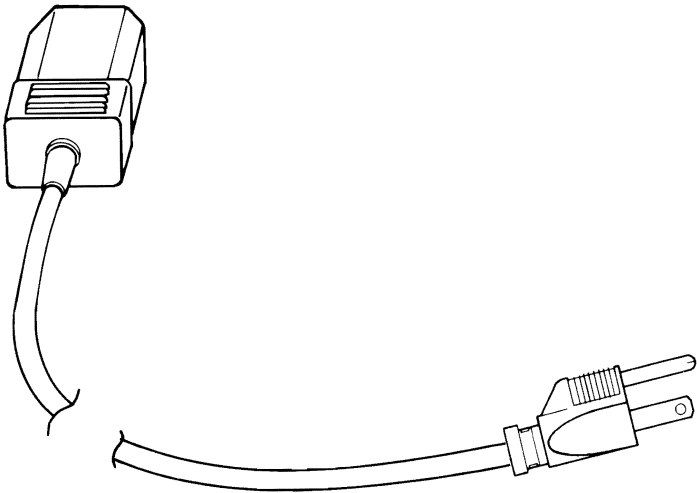


IS THE SCREEN STILL DARK (NO ILLUMINATION)?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES Replace the Color Display (see Section 5).

1. Set the color display's Power switch to Off.
 2. Unplug the display's power cord from the outlet.
 3. Disconnect the display's power cord from the display.
 4. Set your meter to the Ohms X 1 scale.
 5. Check the display's power cord for continuity.
-



IS THE POWER CORD GOOD?

NO Replace the power cord.

YES Replace the Color Display (see Section 5).

Your screen should match the one below.

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 – DISPLAY ADAPTER TEST
- 1 – DISPLAY ATTRIBUTES
- 2 – CHARACTER SET
- 3 – 80X25 DISPLAY
- 4 – 40X25 DISPLAY
- 5 – 320X200 GRAPHICS
- 6 – 640X200 GRAPHICS
- 7 – LIGHT PEN TEST
- 8 – SCREEN PAGING
- 9 – EXIT TO MAIN MENU
- 10 – RUN ALL ABOVE TESTS
- 11 – VIDEO TEST
- 12 – SYNC TEST

SELECT THE NUMBER OF THE DESIRED ACTION

IS YOUR IMAGE STEADY AND READABLE?

- NO** If you have an IBM Color Display, go to Section 5 and perform the vertical-hold adjustment. Then begin this page again. If you have already made this adjustment and still do not have a steady and readable image, go to page 3-500-25. If you do not have an IBM Color Display, go to page 3-500-25.

YES 

The display may function correctly except the cursor may be missing or in the wrong position.

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 – DISPLAY ADAPTER TEST**
- 1 – DISPLAY ATTRIBUTES**
- 2 – CHARACTER SET**
- 3 – 80X25 DISPLAY**
- 4 – 40X25 DISPLAY**
- 5 – 320X200 GRAPHICS**
- 6 – 640X200 GRAPHICS**
- 7 – LIGHT PEN TEST**
- 8 – SCREEN PAGING**
- 9 – EXIT TO MAIN MENU**
- 10 – RUN ALL ABOVE TESTS**
- 11 – VIDEO TEST**
- 12 – SYNC TEST**

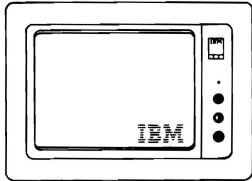
SELECT THE NUMBER OF THE DESIRED ACTION __

IS THE CURSOR VISIBLE AND IN THE CORRECT POSITION ON YOUR SCREEN?

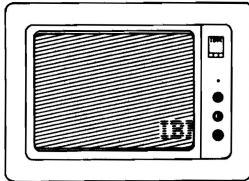
NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES 

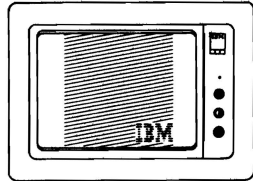
Your image may be distorted or the characters may be the wrong size, as shown below. If the characters on your screen are the wrong size, go to Section 5 and perform the vertical-size adjustment, then return to this page.



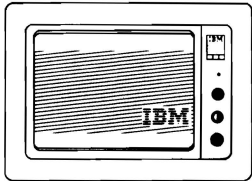
Too Dim



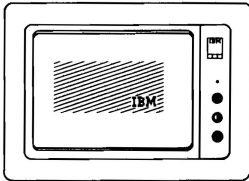
Too Wide



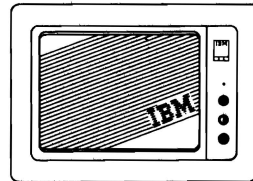
Too Narrow



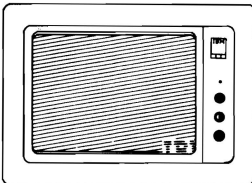
Too Short



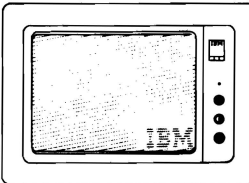
Too Small



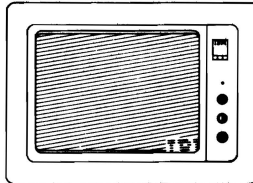
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus



**Characters Shifted Left
or Right or Up and
Down Off the Display
Area**

**DOES YOUR IMAGE MATCH ANY OF THE
EXAMPLES ABOVE?**

YES Replace the Color Display (see Section 5).

NO 



Select **10 (RUN ALL ABOVE TESTS)** then press **Enter**.

The appearance of each line on your screen should match the description stated in the line.

DISPLAY ATTRIBUTES
THIS LINE IS AT NORMAL INTENSITY
THIS LINE IS INTENSIFIED
THIS LINE IS IN REVERSE VIDEO
THIS LINE IS BLINKING

 **BLUE**
 **GREEN**
 **CYAN**
 **RED**
 **MAGENTA**
 **YELLOW**
 **WHITE**

IS THE SCREEN CORRECT (Y/N)? 

DID YOU RECEIVE A 501 ERROR MESSAGE?

YES Replace the Color/Graphics Monitor Adapter
(see Section 5).

NO 

If you have an IBM Color Display or another direct-drive color display, continue on the next page.

A composite color display may be limited to two color shades, with the darker shade on top.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY

THIS LINE IS INTENSIFIED

THIS LINE IS IN REVERSE VIDEO

THIS LINE IS BLINKING

 **BLUE**

 **GREEN**

 **CYAN**

 **RED**

 **MAGENTA**

 **YELLOW**

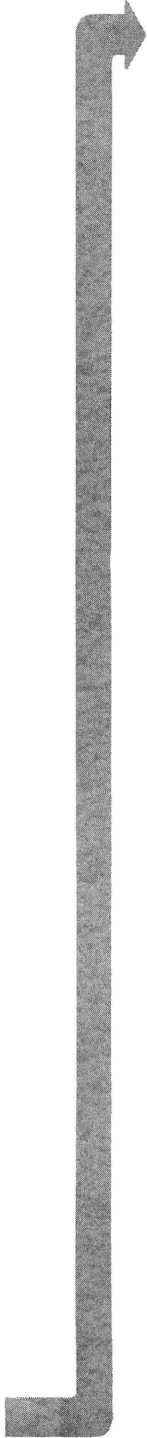
 **WHITE**

IS THE SCREEN CORRECT (Y/N)? 

ARE ALL THE COLORS PRESENT AND THE CORRECT SHADE ON YOUR SCREEN?

NO If you have a composite display, go to Section 5 and perform the variable capacitor adjustment, then return to this page. If you have already performed this adjustment, go to page 3-500-25.

YES 



Direct-drive displays may not support the intensified line. If you do not have an IBM Color Display, go to the next page.

Adjust the Brightness and Contrast controls until the intensified line is brighter than the other lines.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY

THIS LINE IS INTENSIFIED

THIS LINE IS IN REVERSE VIDEO

THIS LINE IS BLINKING

 **BLUE**

 **GREEN**

 **CYAN**

 **RED**

 **MAGENTA**

 **YELLOW**

 **WHITE**

IS THE SCREEN CORRECT (Y/N)?  **--**

**WERE YOU ABLE TO ADJUST FOR AN
INTENSIFIED LINE?**

NO Go to page 3-500-25.

YES 

On composite displays, the colors appear in two shades with the darker shade on top. Direct-drive displays may not support the intensified line.

The appearance of each line on your screen should match the description stated in the line.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY

THIS LINE IS INTENSIFIED

THIS LINE IS IN REVERSE VIDEO

THIS LINE IS BLINKING

 **BLUE**

 **GREEN**

 **CYAN**

 **RED**

 **MAGENTA**

 **YELLOW**

 **WHITE**

IS THE SCREEN CORRECT (Y/N)? 

DO ALL THE LINES MATCH THEIR DESCRIPTIONS?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES 

Press **Y** then **Enter**.

Your screen should match the one below.

CHARACTER SET

! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _
` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~
¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾
À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

IS THE SCREEN CORRECT? (Y/N)

ARE ALL THE CHARACTERS PRESENT AND CORRECT ON YOUR DISPLAY? (NO EXTRA DOTS IN CHARACTER BOXES OR MISSING DOTS.)

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

Press Y then Enter

Your screen should match the one below.

40X25 DISPLAY

```
!"#$%&'()*+,-./0123456789:;<=>
!"#$%&'()*+,-./0123456789:;<=>?
!"#$%&'()*+,-./0123456789:;<=>?@
!"#$%&'()*+,-./0123456789:;<=>?@A
!"#$%&'()*+,-./0123456789:;<=>?@AE
!"#$%&'()*+,-./0123456789:;<=>?@ABC
!"#$%&'()*+,-./0123456789:;<=>?@ABCD
!"#$%&'()*+,-./0123456789:;<=>?@ABCDE
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEF
```

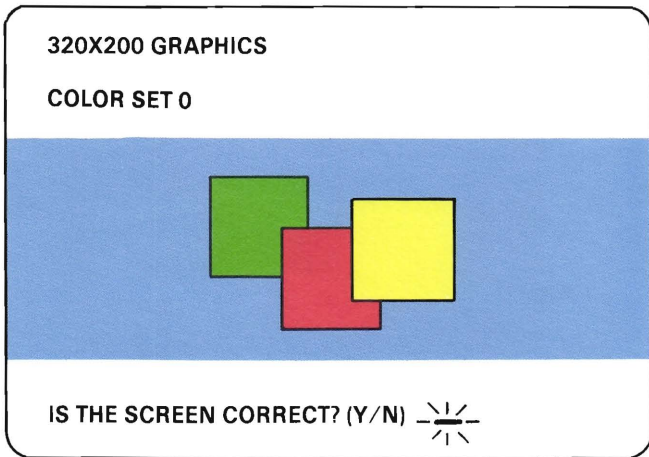
IS THE SCREEN CORRECT? (Y/N) 

**IS THE BORDER WHITE AND ARE THE
CHARACTERS PRESENT AND COMPLETE?**

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

YES 

Press **Y** then **Enter**. Your screen should match the one below. The background should be dark cyan. The boxes, from left to right, should be intensified green, intensified red, and intensified yellow. The characters are displayed in intensified yellow.

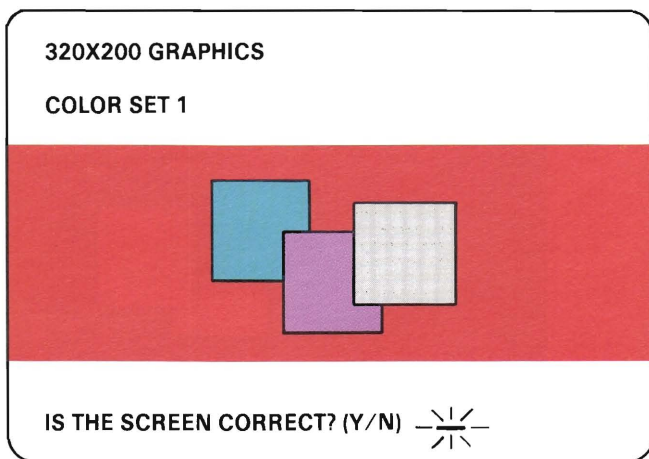


DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES 

Press **Y** then **Enter**. Your screen should match the one below. The background should be intensified red. The boxes, from left to right, should be dark cyan, dark magenta, and non-intensified white (light gray). The characters are displayed in dark magenta.

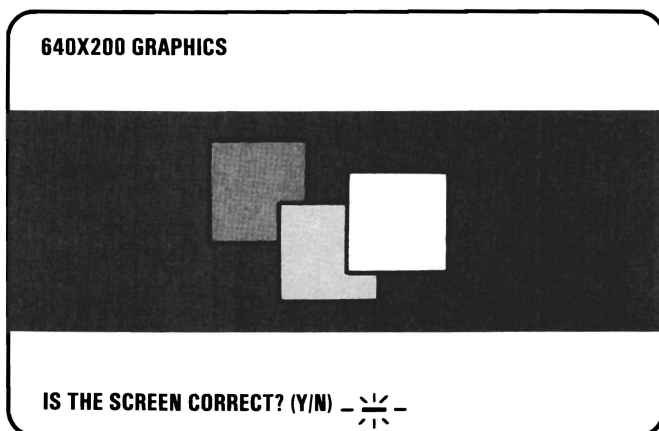


DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES 

Press **Y** then **Enter**. Your screen should match the one below. The background should be black. The boxes, from left to right, should be gray, gray, and white. The characters are displayed in white.



DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES 



Press **Y** then **Enter**.

If you do not have a light pen attached to your Color/Graphics Monitor Adapter, go to page 3-500-24 Step 1.

Note: The light-pen test is timed. If you wait longer than 60 seconds to respond, or are not careful where you place the tip of the pen before pushing it, you may receive an error message.

Place the tip of the light pen in the center of the block and press the pen toward the screen, as shown in the following figure. The displayed block will be replaced by an asterisk (*). Repeat this procedure for each new block that appears. When the test is complete, video page 0 is displayed.

CONTINUE 

Press **N** then **Enter** to start the test.

LIGHT PEN TEST

**PRESS LIGHT PEN AT CENTER
OF DISPLAYED BLOCK**

*

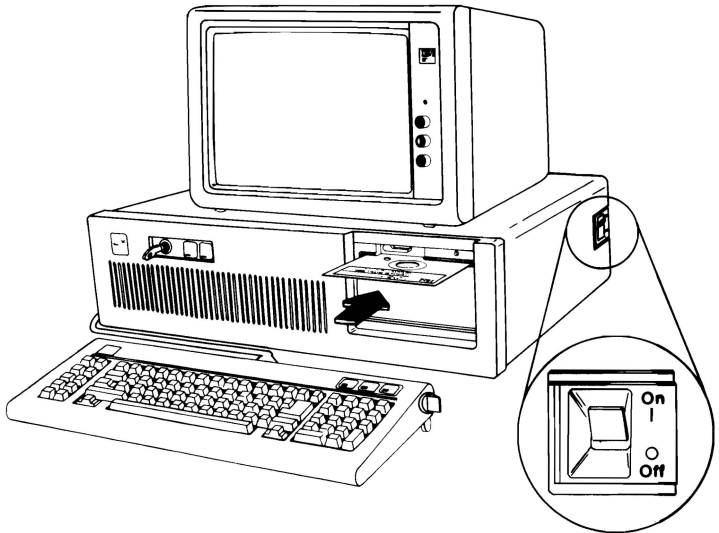
**WERE YOU ABLE TO COMPLETE THE
LIGHT-PEN TEST (SCREEN DISPLAYS VIDEO
PAGE 0)?**

NO Replace the light pen.


YES 

The following pages help you diagnose a problem in your Color Display through the use of audio responses.

1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the color display's Power switch to On.
 4. Set the system unit's Power switch to On.
-



CONTINUE 



Follow the steps below. Listen for the "beep" each time you press **Enter**.

Note: Use the numbers on the top row of the keyboard; do not use the numeric keypad.

Steps	Test Selected	Audio Response
1. Press 0	Run diagnostic tests.	None
2. Press Enter		1 Beep
Note: Skip Steps 3 and 4 if you have only one display adapter in your system.		
3. Press Y or N	Is a monitor attached to every display adapter?	None
4. Press Enter		1 Beep
5. Press Y	Is the installed-devices list correct?	None
6. Press Enter		1 Beep
7. Press 0	Run tests one time.	None
8. Press Enter		1 Beep
9. Press 5	Select Color/Graphics Monitor Adapter tests.	None
10. Press Enter		2 Beeps

DID YOU RECEIVE THE CORRECT AUDIO RESPONSES?

NO You may have a power supply or connector problem. Check the connectors; if the connections are good, go to page 3-020-1.

YES 

Your screen should match the one below.

COLOR/GRAPHICS MONITOR ADAPTER TEST

- 0 - DISPLAY ADAPTER TEST
- 1 - DISPLAY ATTRIBUTES
- 2 - CHARACTER SET
- 3 - 80X25 DISPLAY
- 4 - 40X25 DISPLAY
- 5 - 320X200 GRAPHICS
- 6 - 640X200 GRAPHICS
- 7 - LIGHT PEN TEST
- 8 - SCREEN PAGING
- 9 - EXIT TO MAIN MENU
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

SELECT THE NUMBER OF THE DESIRED ACTION —

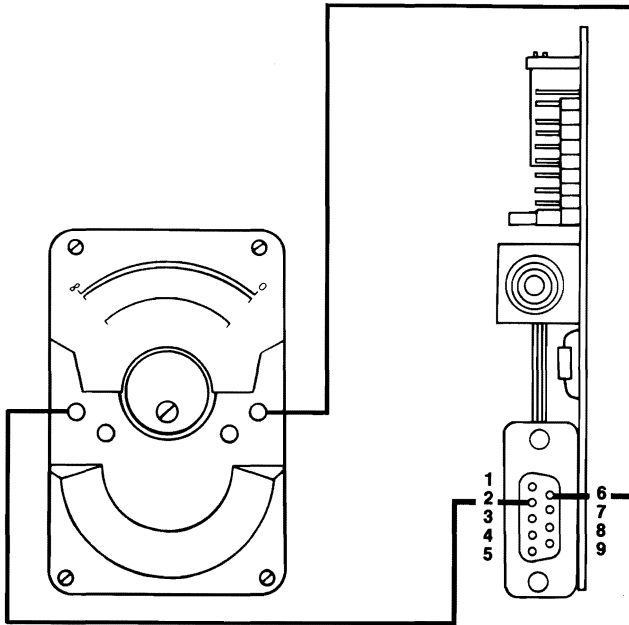
**ARE ALL CHARACTERS ON YOUR SCREEN
CORRECT AND READABLE?**

NO Replace the Color/Graphics Monitor Adapter
(see Section 5).

Note: If the above screen did not appear
or the display is completely blank, continue
on the next page.

YES 

1. Disconnect the Color Display's signal cable.
2. Type **11**, then press **Enter**.
3. Set your meter to the 12 Vdc scale.
4. Measure the voltage between pin 2 (ground) and pins 3, 4, 5, and 6 (signal) on the 9-pin signal connector of the Color/Graphics Monitor Adapter. The voltage should be between 2.4 and 5.5 Vdc.
5. Measure the voltage between the outer edge and the center conductor of the phono-jack. The voltage should be between 1.0 and 2.4 Vdc.

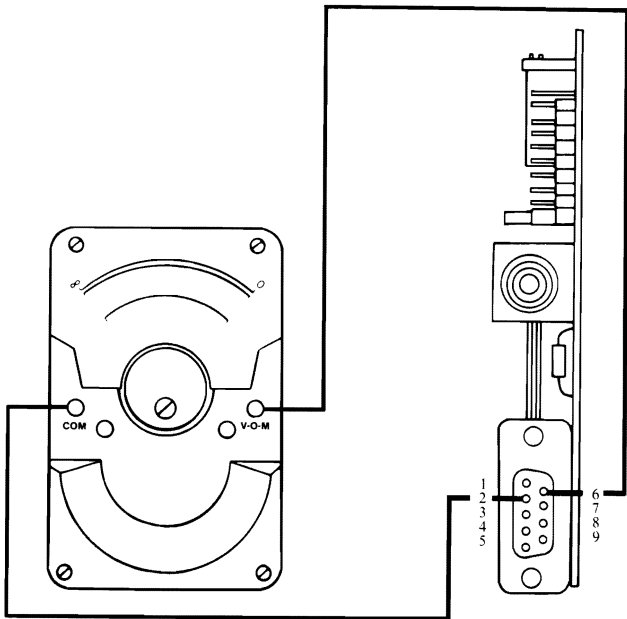


ARE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES 

1. Press **Enter**.
2. Measure the voltage between pin 2 (ground) and pins 3, 4, 5, and 6 (signal) on the 9-pin signal connector of the Color/Graphics Monitor Adapter. The voltage should be between 0.0 and 0.5 Vdc.
3. Measure the voltage between the outer edge and the center conductor of the phono jack. The voltage should be between 0.0 and 0.9 Vdc.

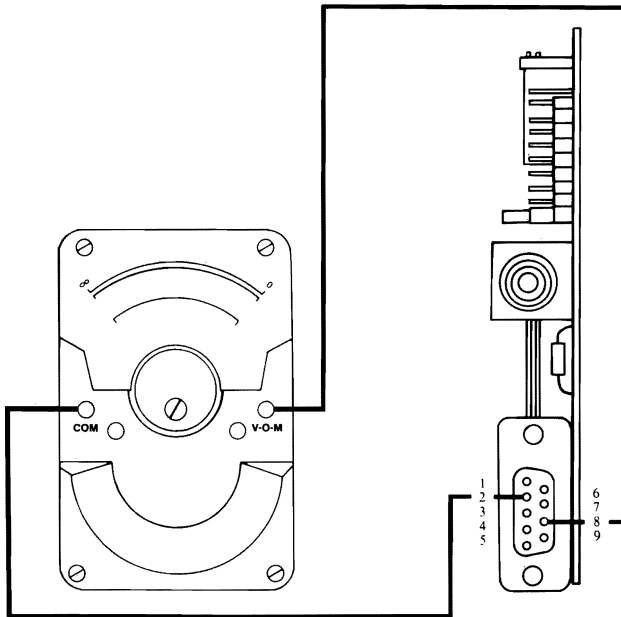


ARE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

1. Press **9**, and listen for two beeps.
2. Measure the voltage between pin 2 and pin 8 on the 9 pin signal connector of the Color/Graphics Monitor Adapter. The voltage should be between 0.0 and 0.7 Vdc.
3. Measure the voltage between pin 2 and pin 9. The voltage should be between 0.0 and 0.3 Vdc.
4. Measure the voltage between the outer edge and the center conductor of the phono jack. The voltage should be between 0.4 and 1.5 Vdc.

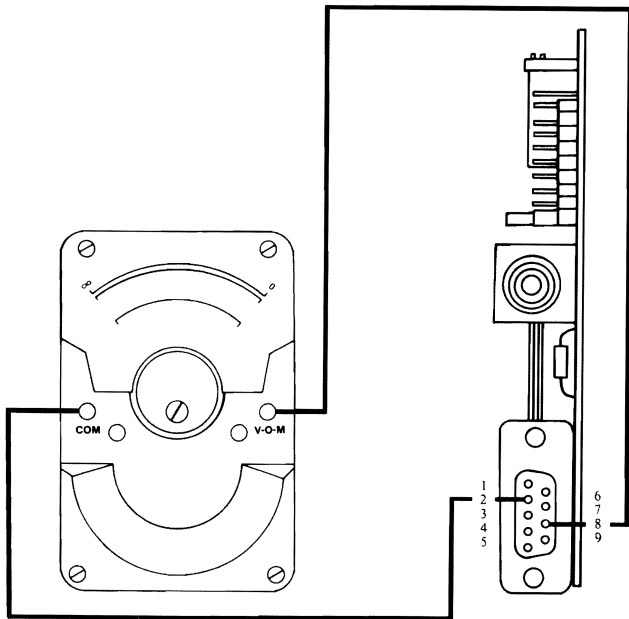


ARE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES

1. Select **12** then press **Enter**.
2. Measure the voltage between pin 2 and pin 8 on the 9 pin signal connector of the Color/Graphics Monitor Adapter. The voltage should be between 0.8 and 1.5 Vdc.
3. Measure the voltage between pin 2 and pin 9. The voltage should be between 0.3 and 1.0 Vdc.
4. Measure the voltage between the outer edge and the center conductor of the phono jack. The voltage should be between 0.2 and 0.6 Vdc.



ARE THE VOLTAGES CORRECT?

NO Replace the Color/Graphics Monitor Adapter (see Section 5).

YES Replace the Color Display (see Section 5).

Notes:

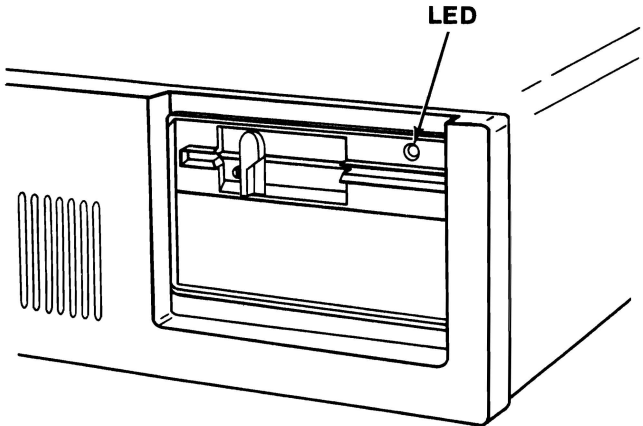


Diskette Drive

You have entered this PIC because you received a 6XX error code, you have been directed here from another PIC, or you suspect a diskette drive or Fixed Disk and Diskette Drive Adapter problem.

1. Set the system unit's Power switch to Off.
2. Insert your Advanced Diagnostics diskette into drive A (ensure the diskette is free of damage and correctly installed).
3. Set the system unit's Power switch to On.
4. Observe the light-emitting diode (LED) on drive A.

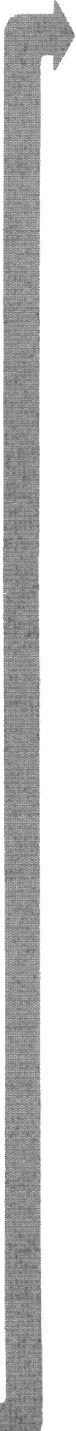
DISKETTE



DID THE LED ON DRIVE A LIGHT BEFORE THE BEEP SOUNDS AT THE END OF THE POST?

NO Go to page 3-600-8.

YES 



Your screen should match the one below.

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Version X.XX
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SELECT AN OPTION


- 0 – SYSTEM CHECKOUT
- 1 – FORMAT DISKETTE
- 2 – COPY DISKETTE
- 3 – PREPARE SYSTEM FOR MOVING
- 4 – SETUP
- 9 – END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-600-8.

YES 

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. if the list is incorrect, follow the instructions on the screen to correct the list before answering **Yes**.
 4. Press **1 (RUN TESTS MULTIPLE TIMES)** then **Enter**.
 5. Press **6 (DISKETTE DRIVE(S) AND ADAPTER)** then **Enter**.
 6. Press **1 (ENTER NUMBER OF TIMES TO RUN TESTS)** then **Enter**.

DISKETTE

CONTINUE



Press **Y** (**WAIT EACH TIME AN ERROR OCCURS (Y/N)?**) then **Enter**.

Follow the instructions on your screen and press **Enter** when ready to continue.

* You may not receive these lines.

X:XX:XX
6XX
80210200090006 *
0301020005 *

DID YOU RECEIVE AN ERROR CODE SIMILAR TO THE ONE ABOVE?

YES Go to page 3-600-7.

NO 

The diskette drives and adapter multiple tests have finished without an error. Continue with Step 1 to do the individual diagnostic tests.

1. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
2. Press **6 (DISKETTE DRIVE(S) AND ADAPTER)** then **Enter**.
3. Perform each test once to ensure the diskette drives and adapter are functioning correctly.

* You may not receive these lines.

```
X:XX:XX
6XX
80210200090006 *
0301020005 *
```

DID YOU RECEIVE AN ERROR CODE SIMILAR TO THE ONE ABOVE?

NO You have successfully completed the diskette drive advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 

The fourth character of message line 3 indicates which diskette drive is failing. If the character is 0, the failure is with drive A. If the character is 1, the failure is with drive B.

* You may not receive these lines.

X:XX:XX
6XX
80200400090006 *
0300040007 *

**IF MESSAGE LINE 3 IS PRESENT RECORD THE
FOURTH CHARACTER.**

CONTINUE

1. Repeat the test using another formatted diskette in the failing drive. If the error occurs again, continue with Step 2. If no errors occur, repeat all tests to ensure your diskette drive is operating correctly.
2. Find your error code in the figure below and take the action specified.

Error Code	Action
601	Go to page 3-600-8 *
602	Incorrect Diskette Installed
603	Incorrect Diskette Installed
606	Go to page 3-600-8
607	Go to page 3-600-8
608	Replace Advanced Diagnostics Diskette
611	Go to page 3-600-8 **
612	Go to page 3-600-8
613	Go to page 3-600-8
614	Replace Advanced Diagnostics Diskette
621	Go to page 3-600-8
622	Go to page 3-600-8
623	Go to page 3-600-8
624	Go to page 3-600-8
625	Go to page 3-600-8
626	Go to page 3-600-8
627	Go to page 3-600-8
628	Go to page 3-600-8

* If a 601 error message is preceded by any other 6XX error message, troubleshoot the first error.

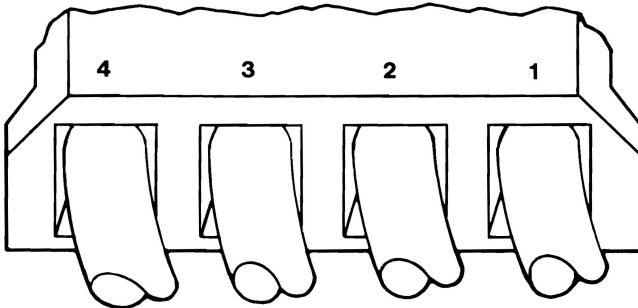
** Check the diskette drive's motor speed adjustment before continuing on 3-600-8 (see Section 5).

Also get this if drive door open ...

1. Remove the system unit's cover (see Section 5).
2. Set the system unit's Power switch to On.
3. Check the voltages at the diskette drive's power connector, as shown below.

Note: If the system unit has two diskette drives, check the voltages at both power connectors.

Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



ARE THE VOLTAGES CORRECT?

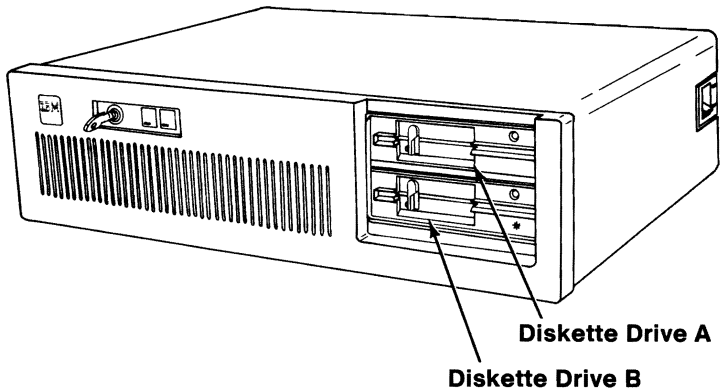
NO Go to page 3-020-1.

YES



See the figure below.

DISKETTE



**ARE TWO DISKETTE DRIVES INSTALLED IN
YOUR SYSTEM?**

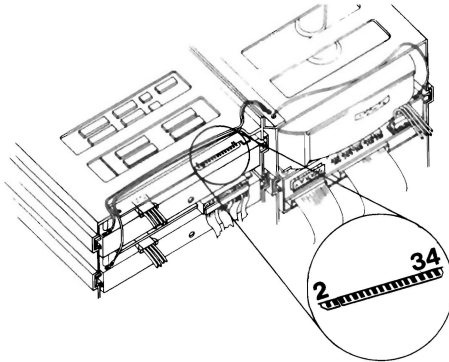
YES Go to page 3-600-18.

NO 

1. Set the system unit's Power switch to Off.
2. Remove the signal cable from the circuit board on diskette drive A.
3. Set the system unit's Power switch to On.
4. Check the voltages at the drive A circuit board as shown below. Ensure the terminating resistor is installed on diskette drive A (see Section 6).
5. The voltages should be 2.0 to 5.5 Vdc.

Note: When measuring voltages specified in this PIC, use the system unit's frame as ground.

Drive A Circuit Board
12
16
18
20
22
24
32



ARE THE VOLTAGES CORRECT?

NO Replace the diskette drive (see Section 5).

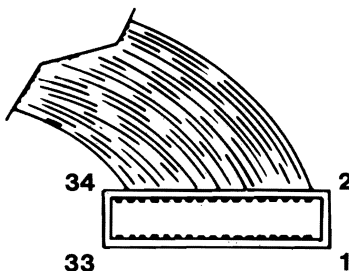
YES

Refer to the figure below and check the voltages at the signal cable (diskette-drive end) with the cable disconnected from diskette drive A.

The voltages should be 2.0 to 5.5 Vdc.

DISKETTE

Signal Cable Pin Numbers
8
26
28
30
34



ARE THE VOLTAGES CORRECT?

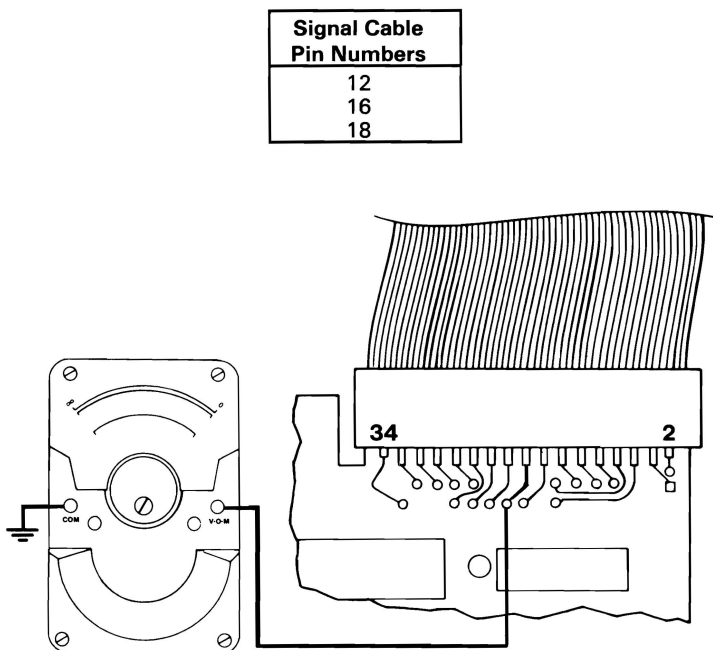
NO Go to page 3-600-17.

YES 

1. Set the system unit's Power switch to Off.
2. Connect the signal cable to diskette drive A.

The voltages at the pins shown below should shift from approximately 5 Vdc to approximately 0 Vdc during the POST (be sure to run the POST for each voltage check).

Note: Approximately 5 Vdc includes a range of 2.0 to 5.5 Vdc, and approximately 0 Vdc includes a range of 0 to 0.8 Vdc.



DID ALL VOLTAGES SHIFT?

NO Go to page 3-600-17.

YES 

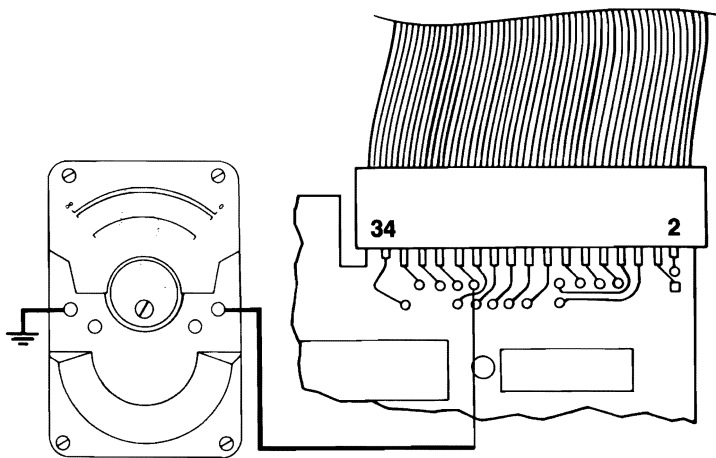
The voltages at the pins shown below should shift from approximately 5 Vdc to approximately 0 Vdc during the POST (be sure to run the POST for each voltage check).

Notes:

1. Your Advanced Diagnostics diskette must be write protected.
2. Approximately 5 Vdc includes a range of 2.0 to 5.5 Vdc, and approximately 0 Vdc includes a range of 0 to 0.8 Vdc.

DISKETTE

Signal Cable Pin Numbers
26
28



DID BOTH VOLTAGES SHIFT?

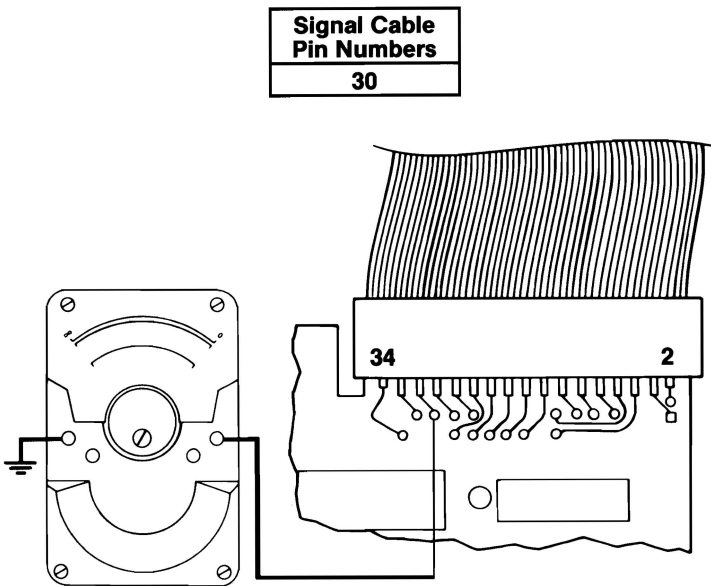
NO Replace the Diskette drive (see Section 5).

YES 

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power Switch to On.

The voltage at the pin shown below should be approximately 5.0 Vdc, and decrease approximately 0.3 Vdc when the diskette drive's LED is on.

Note: Approximately 5 Vdc includes a range of 2.0 to 5.5 Vdc.

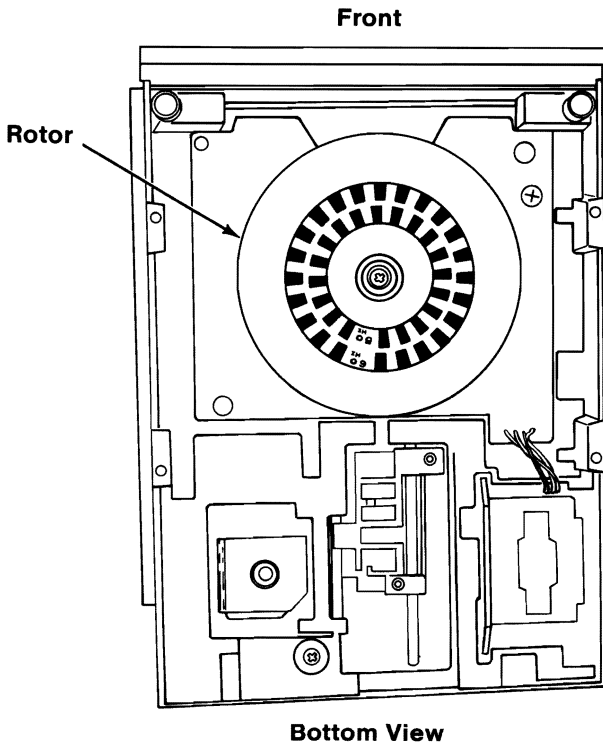


**DID THE VOLTAGE DECREASE
APPROXIMATELY 0.3 VDC?**

NO Replace the diskette drive (see Section 5).

YES 

1. Set the system unit's Power switch to Off.
2. Remove the diskette drive's mounting screws and clips (see Section 5).
3. Slide the diskette drive 50-75 mm (2-3 inches) toward the front.
4. Observe the drive-motor rotor during the POST and see if it rotates (the drive-motor rotor is on the underside of the diskette drive).



DID THE ROTOR ROTATE DURING THE POST?

NO Replace the diskette drive (see Section 5).

YES 

Your screen should match the one below.

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SELECT AN OPTION

- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED

?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

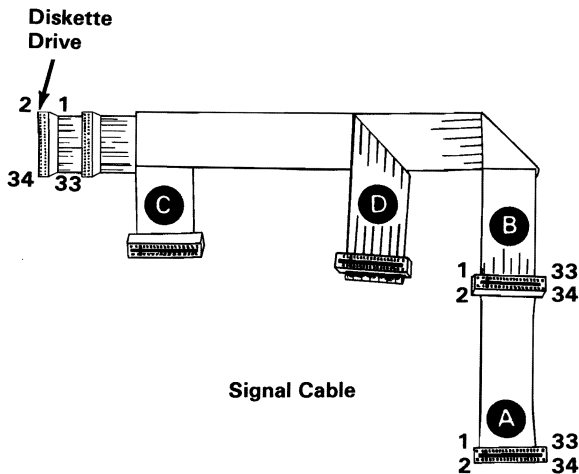
YES You have completed the diskette drive advanced diagnostic tests. If you suspect an intermittent problem go to page 3-010-1.

Note: If the diskette drive is functioning properly and its LED does not light, replace the diskette drive (see Section 5).

NO 

1. Set the system unit's Power switch to Off.
2. Check the diskette drive's signal cable for continuity. The line numbers at one end of the cable match the line numbers at the other end, except for those listed below (check all lines for continuity).

Diskette Drive A Signal Cable Connector			Diskette Drive B Signal Cable Connector		
Pin Numbering			Pin Numbering		
Drive End	Adapter End		Drive End	Adapter End	
10	16		10	10	
11	15		11	11	
12	14		12	12	
14	12		14	14	
15	11		15	15	
16	10		16	16	



DID ALL LINES HAVE CONTINUITY?

NO Replace the signal cable (see Section 5).

YES Replace the Fixed Disk and Diskette Drive Adapter. If this does not correct your problem, replace the system board (see Section 5).

The following steps are to help isolate a problem by exchanging the positions of diskette drives A and B.

1. Set the system unit's Power switch to Off.
2. Remove both diskette drive A and B (see Section 5).
3. Exchange the positions of the diskette drives (insert the top drive (A) in the bottom position, and the bottom drive (B) in the top position).
4. Install both diskette drives (see Section 5).

Note: Ensure the terminating resistor and the end of the signal cable are installed on diskette drive A (the top diskette drive; see Section 6).

5. Repeat the diagnostic tests.
-

DID THE FAILURE FOLLOW THE DRIVE?

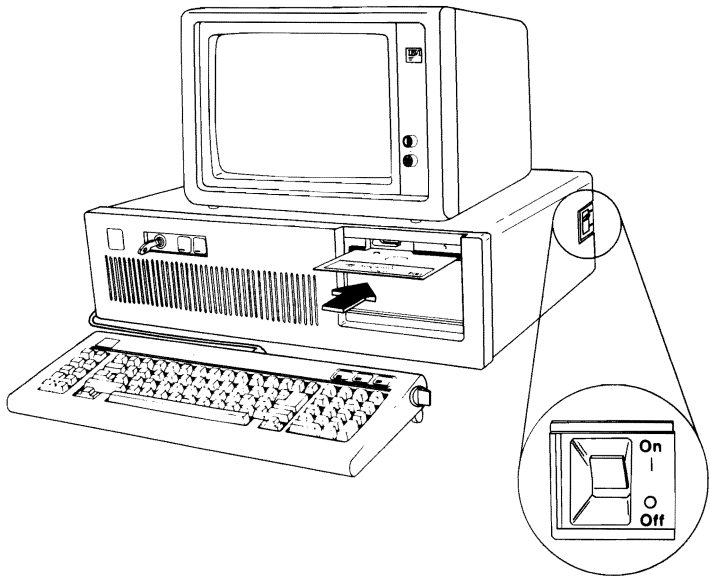
NO Go to page 3-600-17.

YES Replace the failing diskette drive (see Section 5).

Math Coprocessor

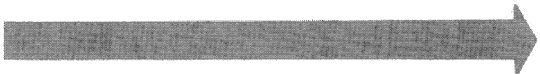
You have entered this PIC because you have a 7XX error code or suspect a Math Coprocessor problem.

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power switch to On.



COPROCESSOR

CONTINUE



3-700-1

Your screen should match the one below.

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SELECT AN OPTION

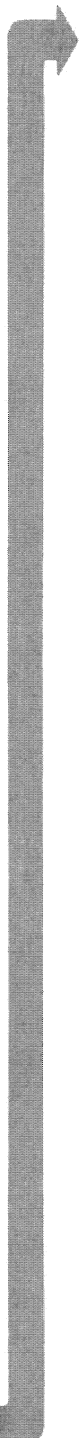
- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 4 – SETUP**
- 9 – END DIAGNOSTICS**

**SELECT THE ACTION DESIRED
?**

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES 

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 4. Press **1 (RUN TESTS MULTIPLE TIMES)** then **Enter**.

CONTINUE 



Press **7 (MATH COPROCESSOR)**, then **Enter**.

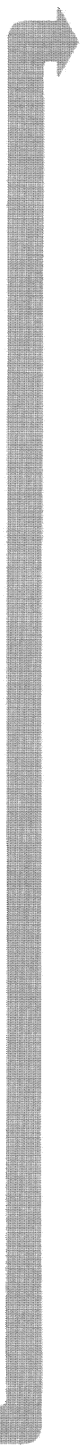
The message below should appear for ten seconds or less.

TESTING MATH COPROCESSOR

**WAS THE MESSAGE ABOVE DISPLAYED FOR
TEN SECONDS OR LESS?**

NO Replace the Math Coprocessor. If this does not correct the problem, replace the system board (see Section 5).

YES 



You may receive an error message similar to the one below.

ERROR MATH COPROCESSOR 701

COPROCESSOR

DID YOU RECEIVE AN ERROR MESSAGE?

- YES** Replace the Math Coprocessor. If this does not correct the problem replace the system board (see Section 5).
- NO** You have successfully completed the Math Coprocessor diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

Notes:



Serial/Parallel Adapter - Parallel Port

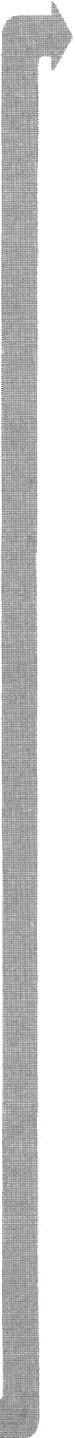
You have entered this PIC because you received a 9XX error message, or you suspect a Serial/Parallel Adapter - Parallel Port problem.

Turn to Section 6 and ensure the following conditions exist:

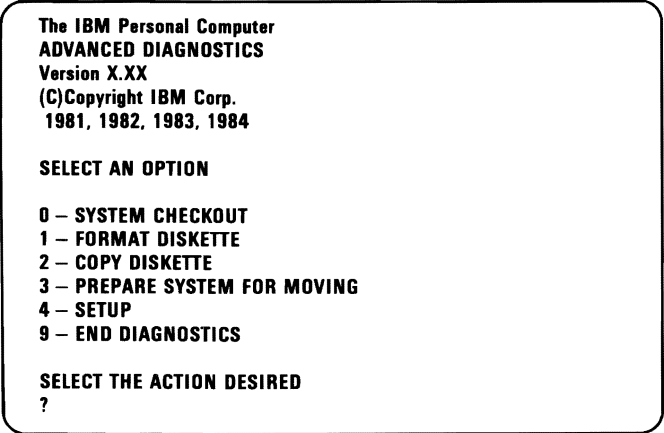
1. The primary Serial/Parallel Adapter - Parallel Port is set for "Primary Parallel Port" operation.
2. If a second Serial/Parallel Adapter is installed, it is set for "Alternate Parallel Port" operation.

CONTINUE



- 
1. Set the system unit's Power switch to Off.
 2. Disconnect the printer cable if it's attached to the Serial/Parallel Adapter.
 3. Insert the Advanced Diagnostics diskette into drive A.
 4. Set the system unit's Power switch to On.

Your screen should match the one below.



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SELECT AN OPTION


- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

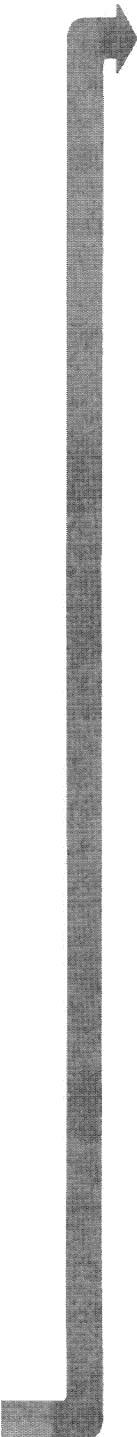
NO Go to page 3-020-1.

YES 

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 5. Press **9 (SERIAL/PARALLEL - PARALLEL PORT)** then **Enter**.

SERIAL/PARALLEL-PARALLEL PORT

CONTINUE 



Your screen should match the one below.

**TESTING – ALTERNATE SERIAL/PARALLEL ADAPTER
– PARALLEL PORT**

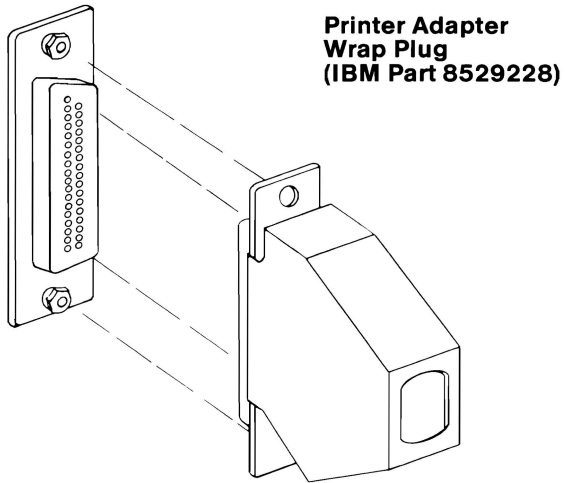
INSTALL THE WRAP PLUG AND PRESS “ENTER”

DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the Serial/Parallel Adapter (see Section 5).

NO 

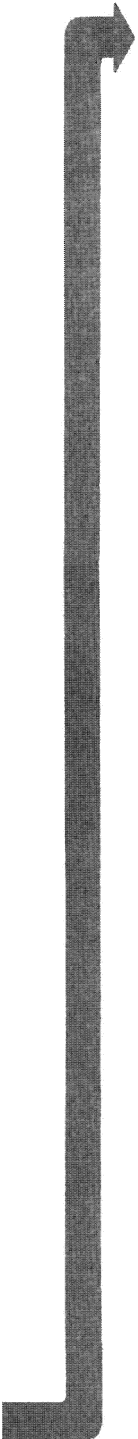
Install the wrap plug on the Serial/Parallel Adapter, as shown below.



SERIAL/PARALLEL-PARALLEL PORT

CONTINUE

3-900-5



Press **Enter** to begin the test.

ERROR – SERIAL/PARALLEL ADAPTER 901

PRESS ENTER TO CONTINUE

DID YOU RECEIVE AN ERROR MESSAGE?

- YES** Replace the Serial/Parallel Adapter (see Section 5).
- NO** You have successfully completed the Serial/Parallel Adapter - Parallel Port advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

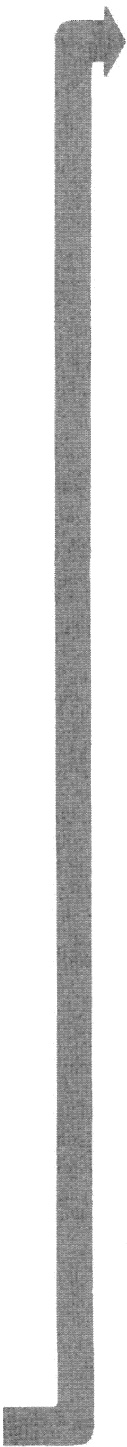
Alternate Serial/Parallel Adapter - Parallel Port

You have entered this PIC because you received a 10XX error message, or you suspect a problem with the alternate Serial/Parallel Adapter - Parallel Port.

Turn to Section 6 and ensure the following conditions exist:

1. The primary Serial/Parallel Adapter - Parallel Port is set for "Primary Parallel Port" operation.
2. The second Serial/Parallel Adapter - Parallel Port is set for "Alternate Parallel Port" operation.

CONTINUE 

- 
1. Set the system unit's Power switch to Off.
 2. Disconnect the printer cable if it's attached to the alternate Serial/Parallel Adapter.
 3. Insert the Advanced Diagnostics diskette into drive A.
 4. Set the system unit's Power switch to On.

Your screen should match the one below.

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SELECT AN OPTION

- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 4 – SETUP**
- 9 – END DIAGNOSTICS**

**SELECT THE ACTION DESIRED
?**


NO Go to page 3-020-1.

YES 

- 
1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes, before you can continue.
 4. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.
 5. Press **10** (**ALTERNATE SERIAL/PARALLEL ADAPTER - PARALLEL PORT**) then **Enter**.

CONTINUE





Your screen should match the one below.

**TESTING – ALTERNATE SERIAL/PARALLEL ADAPTER
– PARALLEL PORT**

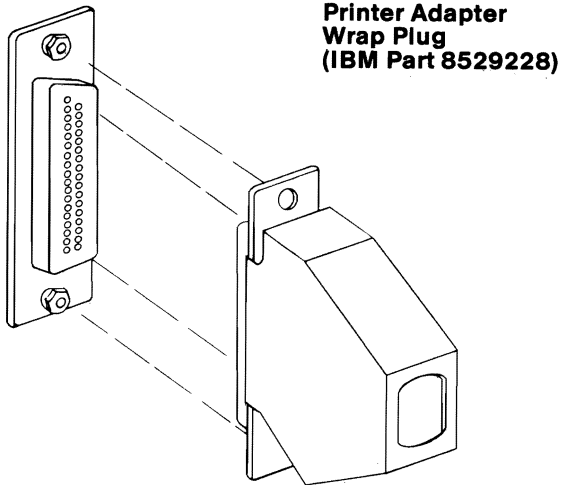
INSTALL THE WRAP PLUG AND PRESS "ENTER"

DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the alternate Serial/Parallel Adapter
(see Section 5).

NO 

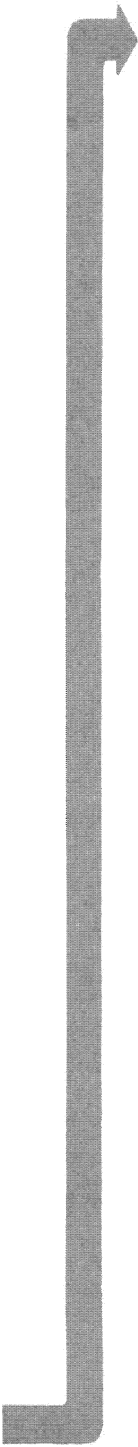
Install the wrap plug on the Serial/Parallel Adapter, as shown below.



CONTINUE 

3-1000-5

ALT SERIAL/PARALLEL-PARALLEL PORT



Press **Enter** to begin the test.

**ERROR – ALTERNATE SERIAL/PARALLEL ADAPTER
– PARALLEL PORT 1001**

PRESS ENTER TO CONTINUE

DID YOU RECEIVE AN ERROR MESSAGE?

- YES** Replace the alternate Serial/Parallel Adapter (see Section 5).
- NO** You have successfully completed the alternate Serial/Parallel Adapter - Parallel Port advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.


Serial/Parallel Adapter - Serial Port

You have entered this PIC because you received an 11XX error message, or you suspect a problem with the Serial/Parallel Adapter - Serial Port.

Turn to Section 6 and ensure the following conditions exist:

1. The primary Serial/Parallel Adapter - Serial Port is set for "Primary Serial Port" operation.
2. If a second Serial/Parallel Adapter is installed, it is set for "Alternate Serial Port" operation.

CONTINUE 

- 
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.

Your screen should match the one below.

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ADVANCED DIAGNOSTICS
Version X.XX
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SELECT AN OPTION

- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES 

1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
5. Select **11 (SERIAL/PARALLEL ADAPTER - SERIAL PORT)** then press **Enter**.

CONTINUE

Your screen should match the one below.

TESTING – SERIAL/PARALLEL ADAPTER – SERIAL PORT

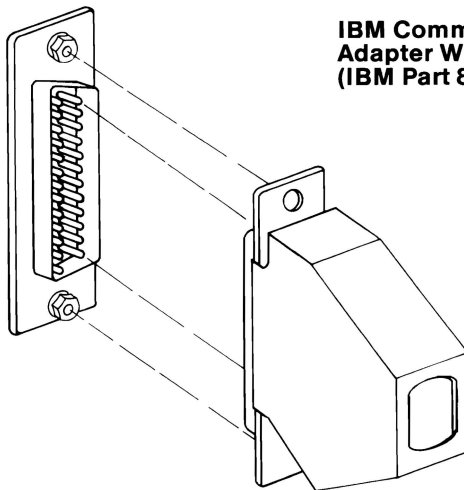
**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SERIAL PORT (Y/N)?**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-1100-7.

YES 

1. Press **Y (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?)** then **Enter**.
 2. Disconnect the communications cable from the modem.
 3. Connect the wrap plug to the communications cable.
 4. Press **Enter** to begin the test. This test may take up to 15 seconds.
-




**IBM Communications
Adapter Wrap Plug
(IBM Part 8529280)**

**DID YOU RECEIVE A MESSAGE TELLING YOU
TO INSTALL THE WRAP PLUG ON THE
ADAPTER?**

NO You have successfully completed the Serial/Parallel Adapter - Serial Port advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 

- 
1. Disconnect the wrap plug from the communications cable.
 2. Disconnect the communications cable from the Serial/Parallel Adapter.
 3. Connect the wrap plug to the adapter.
 4. Press **Enter** to begin the test. This test may take up to 15 seconds.

Your screen should match the one below.

TESTING – SERIAL/PARALLEL ADAPTER – SERIAL PORT

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SERIAL/PARALLEL ADAPTER (Y/N)? y**

**INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER?**

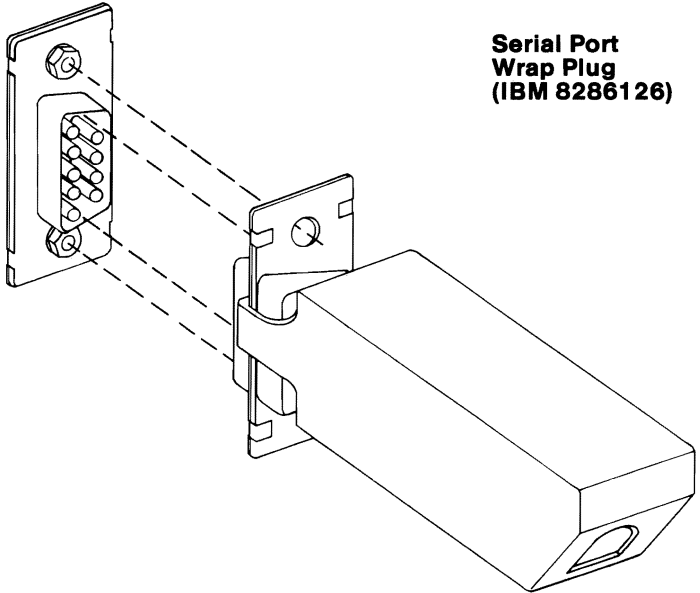
**INSTALL THE WRAP PLUG ON THE SERIAL PORT
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the Serial/Parallel Adapter (see Section 5).


NO Replace the Communications Adapter Cable (see section 5).

1. Press **N (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?)** then **Enter**.
 2. Connect the wrap plug to the Serial/Parallel Adapter, as shown below.
-



**Serial Port
Wrap Plug
(IBM 8286126)**

CONTINUE 



Press **Enter** to begin the test. This test may take up to 15 seconds.

Your screen should match the one below.

TESTING – SERIAL/PARALLEL ADAPTER – SERIAL PORT

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SERIAL/PARALLEL ADAPTER (Y/N)?**

**INSTALL THE WRAP PLUG ON THE SERIAL PORT
AND PRESS ENTER**

DID YOU RECEIVE AN ERROR MESSAGE?

NO You have successfully completed the Serial/Parallel Adapter - Serial Port advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES Replace the Serial/Parallel Adapter (see Section 5).

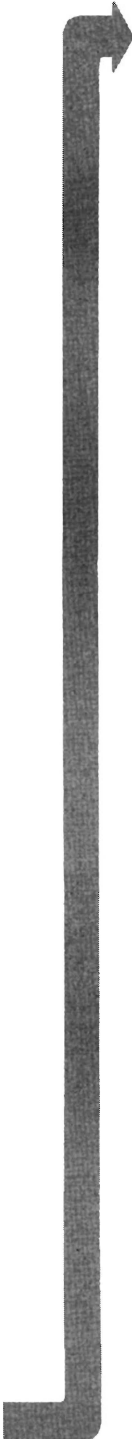
Alternate Serial/Parallel Adapter - Serial Port

You have entered this PIC because you received a 12XX error message, or you suspect a problem with the alternate Serial/Parallel Adapter - Serial Port.

Turn to Section 6 and ensure the following conditions exist:

1. The primary Serial/Parallel Adapter - Serial Port is set for "Primary Serial Port" operation.
2. The second Serial/Parallel Adapter is installed and set for "Alternate Serial Port" operation.

CONTINUE 

- 
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.

Your screen should match the one below.

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SELECT AN OPTION


- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

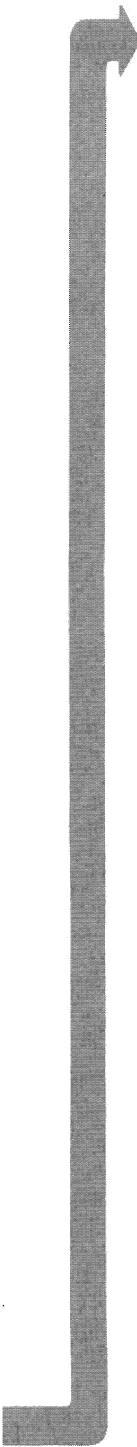
DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES 

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 5. Select **12 (ALT SERIAL/PARALLEL ADAPTER - SERIAL PORT)** then press **Enter**.

CONTINUE 



Your screen should match the one below.

**TESTING – ALT SERIAL/PARALLEL ADAPTER
– SERIAL PORT**

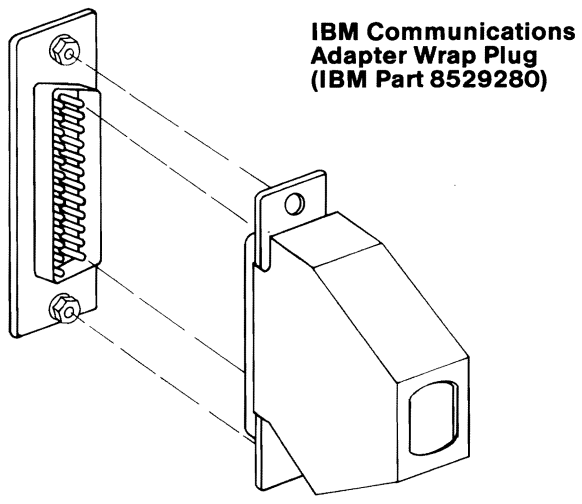
**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT SERIAL PORT (Y/N)?**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-1200-7.

YES 

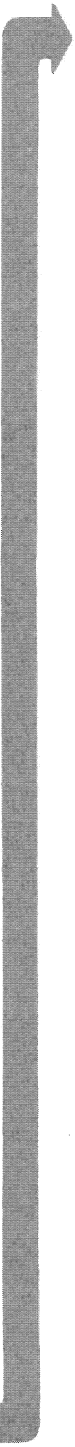
1. Press **Y** (**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?**) then **Enter**.
2. Disconnect the communications cable from the modem.
3. Connect the wrap plug to the communications cable, as shown below.
4. Press **Enter** to begin the test. This test may take up to 15 seconds.



DID YOU RECEIVE A MESSAGE TELLING YOU TO INSTALL THE WRAP PLUG ON THE ADAPTER?

NO You have successfully completed the alternate Serial/Parallel Adapter - Serial Port advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 

- 
1. Disconnect the wrap plug from the communications cable.
 2. Disconnect the communications cable from the alternate Serial/Parallel Adapter.
 3. Connect the wrap plug to the adapter.
 4. Press **Enter** to begin the test. This test may take up to 15 seconds.
-

**TESTING – ALT SERIAL/PARALLEL ADAPTER
– SERIAL PORT**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT SERIAL PORT (Y/N)?**

**INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER?**

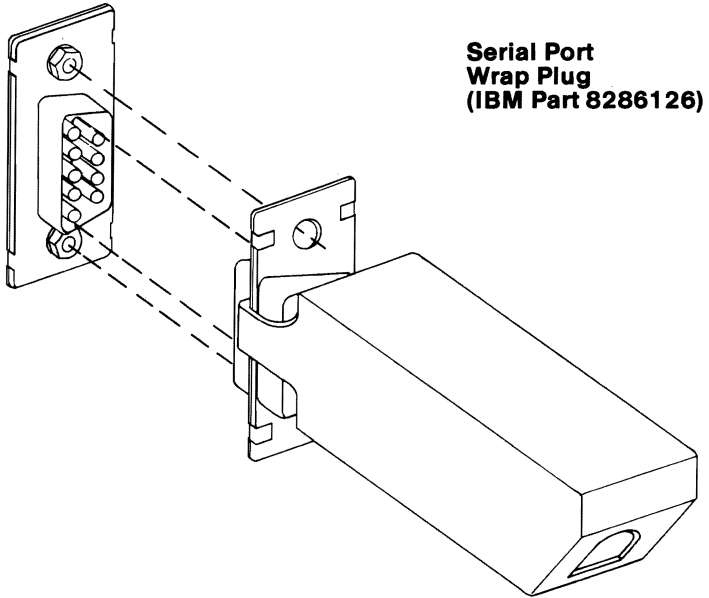
**INSTALL THE WRAP PLUG ON THE ALT SERIAL PORT
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the alternate Serial/Parallel Adapter (see Section 5).

NO Replace the Communications Adapter Cable.

1. Press **N** (**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?**) then **Enter**.
2. Connect the wrap plug to the alternate Serial/Parallel Adapter, as shown below.




ALT SERIAL/PARALLEL-SERIAL PORT

CONTINUE



3-1200-7



Press **Enter** to begin the test. This test may take up to 15 seconds.

TESTING – ALT SERIAL/PARALLEL ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT SERIAL PORT (Y/N)? n**

**INSTALL THE WRAP PLUG ON THE ALT SERIAL PORT
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

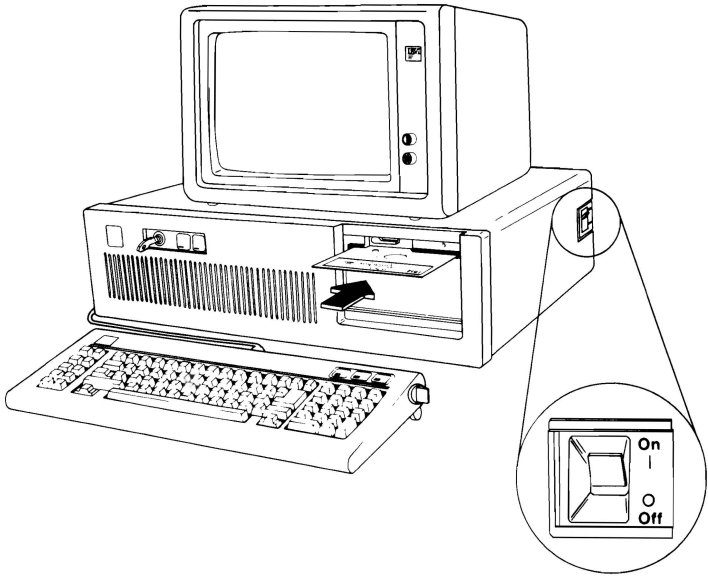
NO You have successfully completed the alternate Serial/Parallel Adapter - Serial Port advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES Replace the alternate Serial/Parallel Adapter (see Section 5).

Game Control Adapter

You have entered this PIC because you received a 13XX error message, or you suspect a problem with the Game Control Adapter.

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power switch to On.



GAME CONTROL

CONTINUE



3-1300-1

Your screen should match the one below.

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SELECT AN OPTION

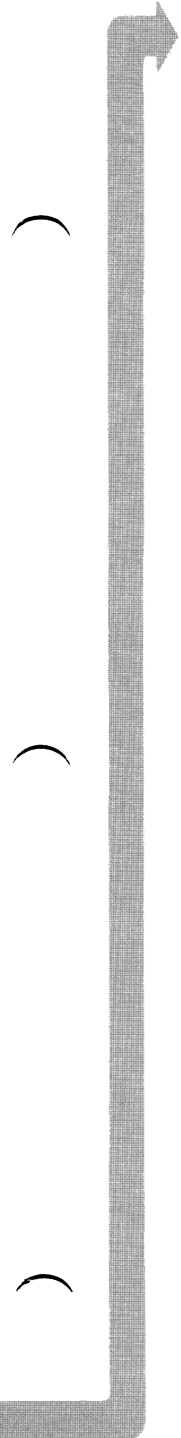
- 0 - SYSTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 4 - SETUP**
- 9 - END DIAGNOSTICS**

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

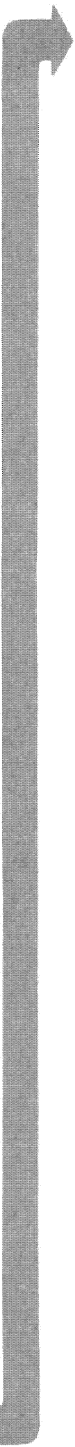
YES 

- 
1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 5. Select **13 (GAME CONTROL ADAPTER)** then press **Enter**.

GAME CONTROL

CONTINUE





Your screen should match the one below.

WHICH OF THE FOLLOWING IS ATTACHED:

1 = JOYSTICK

2 = PADDLE

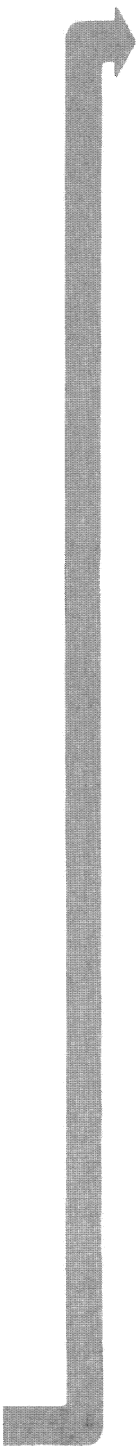
3 = NOTHING ATTACHED

?

**ARE THERE JOYSTICKS OR PADDLES
ATTACHED?**

NO Install joysticks or paddles and go to the next page. If you do not have joysticks or paddles, you cannot continue with the Game Control Adapter diagnostic tests.

YES 



Your screen should match the one below.

Follow the instructions on your screen and press **Y** or **N** when ready to continue.

**DID ALL BUTTONS SHOW PRESSED AND
RELEASED, AND DID ALL JOY STICKS
OR PADDLES MOVE IN EACH DIRECTION?
(Y/N)**

?

DID YOU RECEIVE AN ERROR MESSAGE?

YES - 1302
YES Replace the Game Control Adapter (see Section 5).

NO 

If one or more of the joystick or paddle images displayed on your screen appear in reverse video, check the connectors before continuing.

Move all installed paddles or joysticks in all directions. Ensure the letter inside the box on the screen moves in all directions.

BUTTON A RELEASED	BUTTON B RELEASED	BUTTON C RELEASED	BUTTON D RELEASED
* * * * *			* * * * *
* A	*		* B
*	*	*	*
*	*	*	*
*	*	*	*
* * * * *			* * * * *

**PRESS AND RELEASE ALL BUTTONS,
EXERCISE ALL JOY STICKS/PADDLES
AND PRESS ANY KEY WHEN DONE**

GAME CONTROL

WERE YOU ABLE TO COMPLETE THE TEST SATISFACTORILY?

NO If one joystick or paddle does not move and stays in reverse video, replace it. If one or more of the joysticks or paddles stays in reverse video but can move, replace the Game Control Adapter (see Section 5).

Note: If one or more joysticks or paddles goes into reverse video, adjust the fine tuning control and repeat the test.

YES 

Graphics Printer

You have entered this PIC because you have a 14XX error code or have identified a problem with your Graphics Printer. If the device attached is not a Graphics Printer refer to the manual for that device.

Error Description	Diagnostic Action
1400 Printer Entry	<p data-bbox="323 451 876 610">1. Set the printer Power switch to Off. Verify that the forms are properly inserted. Move the print head to the leftmost position. Set the printer Power switch to On.</p> <p data-bbox="366 646 876 704">Are the Power, Ready and Online lights on?</p> <p data-bbox="366 740 625 773">YES: Go to Step 2.</p> <p data-bbox="366 776 891 867">NO: Go to page 3-1400-34, "Control Panel," and do each step until you find the failing FRU.</p> <p data-bbox="323 902 674 935">2. Press the Online button.</p> <p data-bbox="366 971 738 1003">Does the Online light go out?</p> <p data-bbox="366 1039 625 1071">YES: Go to Step 3.</p> <p data-bbox="366 1075 876 1133">NO: Go to page 3-1400-34, "Control Panel."</p>

PRINTER

Error Description	Diagnostic Action
<p>1400 Printer Entry</p>	<p>3. Press the Line Feed and Form Feed buttons.</p> <p>Do the forms advance when you press each button?</p> <p>YES: Go to Step 4. NO: Do the forms advance when you press either button?</p> <p>YES: Go to page 3-1400-34, "Control Panel." NO: Go to page 3-1400-22, "Forms Do Not Advance," and do each step until you find the failing FRU.</p> <p>4. Remove all forms. Press the Online button.</p> <p>Does the alarm sound and the No Paper light go on?</p> <p>YES: Set the Power switch to Off. Reinsert the forms. Set the Power switch to On. Go to Step 5. NO: Go to page 3-1400-34, "Control Panel."</p>

Error Description	Diagnostic Action
1400 Printer Entry	<p>5. Load the Advanced Diagnostics program, if not already loaded.</p> <p>Is option 14 missing from the Installed Devices menu?</p> <p>YES: Go to Step 6. NO: Select option 14.</p> <p>Does the printer print?</p> <p>NO: Go to Step 6. YES: Compare the printout with the following samples.</p> <p>IBM Matrix Printer</p> <pre> ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 = : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ' a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 ; : < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ' a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ! " # \$ % & ' () * + , - . / ' 7 1 2 3 4 5 6 </pre>

PRINTER

Error Description	Diagnostic Action
<p>1400 Printer Entry</p>	<p>6. Set the Power switch on the printer and system unit to Off. Disconnect the Printer Cable from the printer and system unit. Do the Offline Diagnostic Test (see page 3-1400-42).</p> <p>Does the printer print?</p> <p>NO: Go to page 3-1400-18, "No Printing," and do each step until you find the failing FRU.</p> <p>YES: Compare the printout with the following samples.</p> <p>IBM Matrix Printer</p> <pre> mnopqrstuvwxyz_ abc_ klmnopqrstuvwxyz ()~ abcdefghijklmnopqrstuvwxyz ()~ abcdefghijklmnopqrstuvwxyz ()~ abcdefghijklmnopqrstuvwxyz ()~ abcdefghijklmnopqrstuvwxyz ()~ abcdefghijklmnopqrstuvwxyz ()~ mnopqrstuvwxyz ()~ mnopqrstuvwxyz ()~ </pre> <p>IBM Graphics Printer</p> <p>Character Set 1</p> <pre> rstuvwxyz ()~ai efghijklmnopqrstuvwxyz ()~aióú efghijklmnopqrstuvwxyz ()~aióúñ ghijklmnopqrstuvwxyz ()~aióúññ hijklmnopqrstuvwxyz ()~aióúñññ ijklmnopqrstuvwxyz ()~aióúññññ mnopqrstuvwxyz ()~aióúñññññ </pre>

PRINTER

Error Description	Diagnostic Action
<p>1400 Printer Entry</p>	<p>YES: Go to Step 8.</p> <p>NO: The first line of the printout shows that the printer defaults to a character set that does not support all of the international characters.</p> <p>Is the international character set required?</p> <p>YES: Remove the top cover (see Section 5).</p> <p>Is position 7 of DIP switch 1 set to On? (see Section 4).</p> <p>YES: Replace the logic card.</p> <p>NO: Remove the plastic cover from DIP switch 1. Set position 7 to On. Install the plastic cover on the DIP switch. Install the printer top cover, then go to Step 6.</p> <p>NO: Go to Step 8.</p>

PRINTER

Error Description	Diagnostic Action
<p>1400 Printer Entry</p>	<p>8. Insert the Advanced Diagnostics diskette and set the Power switch on the system unit to On. Advance to diagnostic menu 5.</p> <p>Note: If the signal cable was connected to a Monochrome Display and Printer Adapter, option 4 should be displayed. Option 9 should be displayed for the Serial/Parallel Adapter, or option 10 for the Alternate Serial/Parallel Adapter.</p> <p>Is the correct option (4, 9, or 10) missing?</p> <p>YES: Replace the adapter (see Section 5).</p> <p>NO: Do the diagnostic tests for the option adapter installed.</p> <p>Did the diagnostic tests finish without any errors?</p> <p>YES: Go to Step 9.</p> <p>NO: Replace the adapter (see Section 5).</p> <p>9. Check all pins of the printer cable, pin to pin, for shorts or opens (see Section 4).</p> <p>Any shorts or opens?</p> <p>YES: Replace the Printer Cable.</p> <p>NO: Go to Power Supply Check (220/240 Volt or 120 Volt)</p>

Failure Symptom	Page
Power Supply Check	
220/240 Volt	3-1400-10
120 Volt	3-1400-12
Print Head	
No Printing	3-1400-18
Print head carriage not moving	3-1400-21
Forms	
Forms not advancing; overprinting	3-1400-22
Forms jamming or tearing	3-1400-22
Ribbon	
Ribbon jammed	3-1400-24
Print Quality	
Printing too light: poor print quality	3-1400-25
Smudged printing	3-1400-26
Uneven printing (characters or lines)	3-1400-26
Rows of print dots missing	3-1400-27
Random print dots missing	3-1400-27
Extra print dots	3-1400-29
Does not print international character set	3-1400-5
Printing continues beyond end-of-forms	3-1400-31
Doublespacing—abnormal characters	3-1400-31
False end-of-forms alarm	3-1400-32
Uneven horizontal spacing	3-1400-33
Control Panel	3-1400-34

Error Description	Diagnostic Action
Power Supply Check 220/240 Volt	<p>1. Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Set the printer Power switch to On. Measure the resistance between the voltage terminals on the power cord.</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>Is the resistance 40 to 50 ohms?</p> <p>YES: Go to Step 3, page 3-1400-15. NO: Unplug the power cord from the printer. Measure the resistance between the two lower pins of the AC socket at the rear of the printer.</p> <p>Is the resistance 40 to 50 ohms?</p> <p>YES: Replace the printer power cord. NO: Check for an open fuse (see Section 4).</p> <p>Is the fuse open?</p> <p>Continued on the next page.</p>

Error Description	Diagnostic Action
<p>Power Supply Check 220/240 Volt</p>	<p>YES: Replace the fuse (see Section 5). Set the printer Power switch to Off. Plug the printer power cord into the printer and the outlet. Set the printer Power switch to On for 1 minute.</p> <p>Does the fuse open?</p> <p>YES: Go to Step 2 on page 3-1400-14.</p> <p>NO: The problem is solved.</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>NO: Measure the resistance between the wires in positions 1 and 4 of the transformer-primary power connector (see Section 4).</p> <p>Is the resistance 40 to 50 ohms?</p> <p>YES: Replace the fuse-filter card (see Section 5).</p> <p>NO: Replace the power transformer (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
Power Supply Check 120 Volt	<p>1. Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Set the printer Power switch to On. Measure the resistance between the voltage terminals on the Power cord.</p> <p>Is the resistance 2 to 12 ohms?</p> <p>YES: Go to Step 3. NO: Check for an open fuse (see Section 4).</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>Is the fuse open?</p> <p>YES: Replace the fuse (see Section 5). Set the printer Power switch to Off. Plug the printer power cord into the outlet. Set the printer Power switch to On for 1 minute.</p> <p>Does the fuse open?</p> <p>YES: Go to Step 2. NO: The problem is solved.</p> <p>NO: Continue on the next page.</p>

Error Description	Diagnostic Action
Power Supply Check 120 Volt	<p>NO: Measure the resistance on the primary side of the power transformer (see Section 4).</p> <p>Is the resistance approximately 12 ohms?</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>YES: Replace the fuse-filter card (see Section 5).</p> <p>NO: Replace the power transformer (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
Power Supply Check 120 Volt	<p>2. Set the printer Power switch to Off. Unplug the printer power cord from the outlet. Replace the fuse (see Section 5). Disconnect the power transformer connector from the fuse-filter card (see Section 4). Plug the printer power cord into the outlet. Set the printer Power switch to On for 1 minute then Off. Unplug the printer power cord from the outlet and check for an open fuse.</p> <p>Is the fuse open?</p> <p>DANGER: Static voltage may be present on the fuse-filter card. Use extreme caution in this area.</p> <p>YES: Replace the fuse-filter card (see Section 5).</p> <p>NO: Replace the power transformer (see Section 5).</p>

Error Description	Diagnostic Action																									
Power Supply Check 120 Volt	<p data-bbox="344 151 919 310"> 3. Disconnect CN2 (see Section 4). Plug the printer power cord into the outlet. Set the printer Power switch to On. Measure the voltages on the plug side of CN2 (see the chart below). </p> <p data-bbox="389 345 905 472"> DANGER: Line voltages are present on the AC filter, circuit board, and the transformer. Be careful when measuring secondary voltages. </p> <table border="1" data-bbox="346 513 933 696"> <thead> <tr> <th>Color</th> <th>+ Lead</th> <th>- Lead</th> <th>Min. Voltage</th> <th>Max. Voltage</th> </tr> </thead> <tbody> <tr> <td>Gray</td> <td>CN2-1</td> <td>CN2-2</td> <td>7.6 Vac</td> <td>10.4 Vac</td> </tr> <tr> <td>Orange</td> <td>CN2-3</td> <td>CN2-4</td> <td>19.5 Vac</td> <td>26.5 Vac</td> </tr> <tr> <td>Red</td> <td>CN2-5</td> <td>CN2-6</td> <td>8.1 Vac</td> <td>10.9 Vac</td> </tr> <tr> <td>Blue</td> <td>CN2-7</td> <td>CN2-8</td> <td>13.0 Vac</td> <td>17.6 Vac</td> </tr> </tbody> </table> <p data-bbox="389 857 777 886"> Are the voltages within range? </p> <p data-bbox="389 920 650 950"> YES: Go to Step 4. </p> <p data-bbox="389 954 873 1016"> NO: Replace the power transformer (see Section 5). </p>	Color	+ Lead	- Lead	Min. Voltage	Max. Voltage	Gray	CN2-1	CN2-2	7.6 Vac	10.4 Vac	Orange	CN2-3	CN2-4	19.5 Vac	26.5 Vac	Red	CN2-5	CN2-6	8.1 Vac	10.9 Vac	Blue	CN2-7	CN2-8	13.0 Vac	17.6 Vac
Color	+ Lead	- Lead	Min. Voltage	Max. Voltage																						
Gray	CN2-1	CN2-2	7.6 Vac	10.4 Vac																						
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Red	CN2-5	CN2-6	8.1 Vac	10.9 Vac																						
Blue	CN2-7	CN2-8	13.0 Vac	17.6 Vac																						

PRINTER

Error Description	Diagnostic Action									
Power Supply Check 120 Volt	<p data-bbox="277 164 804 354"> 4. Set the printer Power switch to Off. Connect CN2 (see Section 4). Set the Power switch to On then measure the voltages at CN3 (see Section 4), as shown in the chart below. Use the ground pin on the driver circuit card. </p> <p data-bbox="322 391 849 483"> DANGER: Line voltage is present on the AC filter circuit board and transformer. Be careful when measuring DC voltages. </p> <table border="1" data-bbox="281 518 866 638"> <thead> <tr> <th data-bbox="281 518 476 574">Pin No.</th> <th data-bbox="476 518 671 574">Min. Voltage</th> <th data-bbox="671 518 866 574">Max. Voltage</th> </tr> </thead> <tbody> <tr> <td data-bbox="281 574 476 605">CN3-16</td> <td data-bbox="476 574 671 605">4.5 Vdc</td> <td data-bbox="671 574 866 605">5.5 Vdc</td> </tr> <tr> <td data-bbox="281 605 476 638">CN3-20</td> <td data-bbox="476 605 671 638">11.0 Vdc</td> <td data-bbox="671 605 866 638">15.4 Vdc</td> </tr> </tbody> </table> <p data-bbox="322 678 795 706"> Are + 5 and + 14 Vdc within range? </p> <p data-bbox="322 743 583 771"> YES: Go to Step 5. </p> <p data-bbox="322 776 815 836"> NO: Replace both control cards (see Section 5). </p>	Pin No.	Min. Voltage	Max. Voltage	CN3-16	4.5 Vdc	5.5 Vdc	CN3-20	11.0 Vdc	15.4 Vdc
Pin No.	Min. Voltage	Max. Voltage								
CN3-16	4.5 Vdc	5.5 Vdc								
CN3-20	11.0 Vdc	15.4 Vdc								

Error Description	Diagnostic Action						
Power Supply Check 120 Volt	<p data-bbox="334 159 878 224">5. Measure the + 24 Vdc (use the ground pin on the driver circuit card).</p> <table border="1" data-bbox="338 256 923 345"> <thead> <tr> <th data-bbox="338 256 535 313">Pin No.</th> <th data-bbox="535 256 732 313">Min. Voltage</th> <th data-bbox="732 256 923 313">Max. Voltage</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 313 535 345">CN3-18</td> <td data-bbox="535 313 732 345">21.6 Vdc</td> <td data-bbox="732 313 923 345">26.4 Vdc</td> </tr> </tbody> </table> <p data-bbox="376 418 651 448">Is + 24 Vdc present?</p> <p data-bbox="376 483 912 578">YES: The power supply checks good. If you still have a problem go to page 3-1400-9, "Failure Symptom."</p> <p data-bbox="376 578 640 607">NO: Go to Step 6.</p> <p data-bbox="334 643 895 834">6. Using the 60-volt scale, measure the DC voltages at pins CN6-1 and CN6-2 of control circuit card (use the DC ground pin on the driver circuit card for the common lead). Subtract the lower reading from the higher.</p> <p data-bbox="376 870 793 899">Is the difference 0.5 to 0.9 Vdc?</p> <p data-bbox="376 935 872 997">YES: Replace both control cards (see Section 5).</p> <p data-bbox="376 997 876 1091">NO: Replace the heat sink/power transistor assembly (see Section 5).</p>	Pin No.	Min. Voltage	Max. Voltage	CN3-18	21.6 Vdc	26.4 Vdc
Pin No.	Min. Voltage	Max. Voltage					
CN3-18	21.6 Vdc	26.4 Vdc					

PRINTER

Error Description	Diagnostic Action
No Printing	<p>1. Does the print head carriage move back and forth normally when attempting to print?</p> <p>YES: Go to page 3-1400-27, "Rows of Print Dots Missing." NO: Go to Step 2.</p> <p>2. Set the printer Power switch to Off. Check for a loose or broken carriage belt. Replace if broken, adjust if loose (see Section 5).</p> <p>3. Remove the ribbon cartridge. Turn the knob on the cartridge to check for jamming. Replace the cartridge if it is jammed.</p> <p>4. Check the print head for broken wires. Replace the print head if the wires are damaged (see Section 5).</p> <p>5. Move the print head assembly and check for smooth mechanical movement.</p> <p>Is the movement smooth?</p> <p>YES: Go to Step 6. NO: Check for worn or broken gears in the carriage drive assembly.</p> <p>Are any gears worn or broken?</p> <p>Continue on the next page.</p>

Error Description	Diagnostic Action
No Printing	<p>YES: Replace the carriage drive assembly (see Section 5).</p> <p>NO: Replace the print mechanism assembly (see Section 5).</p> <p>6. Set the printer Power switch to On and move the print head to the leftmost position. Then, while moving the print head to the center of the print line, check that the voltage at CN6-20 on the driver circuit card (see Section 4), shifts from an up level (approximately + 5 Vdc) to a down level (approximately 0 Vdc). Use the ground pin on the driver circuit card for the common lead.</p> <p>Is there an Up level to a Down level meter deflection.</p> <p>YES: Go to Step 7.</p> <p>NO: Is there a constant down level?</p> <p>YES: Go to page 3-1400-10, "Power Supply Check." If the power supply checks OK, replace the left margin sensor (see Section 5).</p> <p>NO: Continue on the next page.</p>

Error Description	Diagnostic Action
No Printing	<p>NO: Set the printer Power switch to Off. Check continuity from CN6-20 (driver circuit card) to terminal 1 of the the left-margin sensor, and from CN6-15 to terminal 2 of the left-margin sensor (see Section 4).</p> <p>Is either line open?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Replace the left-margin sensor (see Section 5).</p> <p>7. Check for a meter deflection from an up level (approximately + 5 Vdc) to a down level (approximately 0 Vdc) on pin CN6-19 on the driver circuit card (see Section 4) while applying slight left or right pressure to the print head to the next detented position. Use the driver circuit card ground pin for the common lead.</p> <p>Does the meter deflect from an up level to a down level?</p> <p>YES: Go to Step 8.</p> <p>NO: Is there a constant up level?</p> <p>Continue on the next page.</p>

Error Description	Diagnostic Action
No Printing	<p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Check for + 5 Vdc at CN5-18 (see Section 4).</p> <p>Is there + 5 Vdc?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Go to page 3-1400-10, "Power Supply Check."</p> <p>8. Set the printer Power switch to Off. Measure the resistance between pin CN6-13 (driver circuit card), and pins CN6-21, 22, 23 and 24 (stepper motor coils) on the cable end.</p> <p>Is the resistance approximately 45 ohms?</p> <p>YES: Replace the control card (see Section 5).</p> <p>NO: Replace the print mechanism assembly (see Section 5).</p>
Print Head Carriage Not Moving	Go to page 3-1400-18, "No Printing."

PRINTER

Error Description	Diagnostic Action
Forms Do Not Advance	<ol style="list-style-type: none"> 1. Check the position of the forms feeding into the printer. The forms path must be parallel to the printer sides. Reposition the forms for parallel feeding.
Overprinting	<ol style="list-style-type: none"> 2. Remove any obstructions from the forms path (jagged edges on the forms box, torn paper in the print mechanism, and the like).
Forms Jamming Or Tearing	<ol style="list-style-type: none"> 3. Inspect the left and right forms tractors for: <ul style="list-style-type: none"> --Poor positioning --Loose covers --Loose lock levers --Worn springs --Broken feed pins <p>Replace the left or right forms tractors if damaged (see Section 5).</p> 4. Check for a loose or broken carriage belt, and for broken cogs on the belt. Adjust if loose or replace it if broken (see Section 5). 5. Inspect the print head for broken wires. Replace it if the wires are damaged (see Section 5). 6. Check the print-head gap adjustment. Adjust if out of tolerance (see Section 5).

Error Description	Diagnostic Action
<p>Forms Do Not Advance</p> <p>Overprinting</p> <p>Forms Jamming Or Tearing</p>	<p>7. Check for a bent or pitted ribbon shield. Replace the shield if damaged (see Section 5).</p> <p>8. Check the platen for damage. Replace the print mechanism assembly if the platen is damaged (see Section 5).</p> <p>9. Set the printer Power switch to Off. Advance the forms by turning the Forms Advance knob. Check the intermediate gear for worn or broken teeth and replace the gears if damaged. Check the left and right tractors for broken feedpins. Replace the tractors if the feedpins are broken (see Section 5).</p> <p>10. Measure the resistance on the form-feed motor coils between pin CN6-14 and pins CN6-25, 26, 27, and 28 on the driver circuit card (see Section 4). Is the resistance 45 ohms?</p> <p>YES: Check for + 24 Vdc at CN3-18 (see Section 4).</p> <p>Is there + 24 Vdc?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: See page 3-1400-10, "Power Supply Check."</p> <p>NO: Replace the print mechanism assembly (see Section 5).</p>

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Error Description	Diagnostic Action
Ribbon Jammed	<ol style="list-style-type: none"><li data-bbox="285 172 866 302">1. Remove the ribbon cartridge. Try printing to verify that the print head carriage works normally. If the carriage fails, see page 3-1400-18, "No Printing."<li data-bbox="285 334 849 431">2. Advance the ribbon by hand and check for binding. Replace the ribbon cartridge if the ribbon is binding.<li data-bbox="285 464 810 594">3. Check the carriage drive assembly for worn or broken ribbon drive gears. Replace the assembly if the gears are damaged (see Section 5).<li data-bbox="285 626 855 691">4. Check for a bent ribbon shield; replace if necessary (see Section 5).<li data-bbox="285 724 832 854">5. Check the print head for broken or binding wires. Replace the print head if the wires are broken or binding (see Section 5).

Error Description	Diagnostic Action
<p data-bbox="146 154 281 219">Printing Too Light</p> <p data-bbox="146 284 281 349">Poor Print Quality</p>	<ol style="list-style-type: none"> <li data-bbox="338 154 920 251">1. Check that the ribbon has enough ink and is not damaged. Replace the cartridge if needed. <li data-bbox="338 284 920 381">2. Advance the ribbon by hand and check the ribbon cartridge for binding. Replace it if binding occurs. <li data-bbox="338 414 920 511">3. Visually check for worn or broken ribbon drive gears, replace the carriage drive assembly if it is damaged (see Section 5). <li data-bbox="338 544 920 609">4. Check for a bent ribbon shield and replace as necessary (see Section 5). <li data-bbox="338 641 920 771">5. Check the print head for broken or binding wires. Replace the print head if wires are broken or binding (see Section 5). <li data-bbox="338 803 920 933">6. Verify that the print-head gap is 0.6 to 0.65 mm (0.024 to 0.026 in.) with the lever in the center position (see Section 5). <li data-bbox="338 966 920 1031">7. Check the print head for loose mounting (see Section 5). <li data-bbox="338 1063 920 1193">8. Check the platen, print-head carriage shafts, and print mechanism frame for a looseness or damage. Replace the print mechanism if needed (see Section 5).

PRINTER

Error Description	Diagnostic Action
Smudged Printing	<ol style="list-style-type: none"> 1. Check and replace the ribbon cartridge if it: <ul style="list-style-type: none"> --Is jammed --Is seated improperly --Has excessive ink --Is oily or dirty 2. Check for a dirty, oily, or damaged platen. Replace the print mechanism if the platen is damaged (see Section 5). 3. Check for a dirty print head or print wires. Clean as needed. 4. Check for a dirty or bent ribbon shield; replace the shield if it is damaged (see Section 5). 5. Check the ribbon drive assembly for worn or broken ribbon drive gears; replace the assembly if required (see Section 5).
Uneven Printing	<p>If the printing at the top or bottom of characters, or left or right of the print line is uneven, and no adjustments will correct this, replace the print mechanism assembly (see Section 5).</p>

Error Description	Diagnostic Action
<p>Rows of Print Dots Missing or Random Print Dots missing</p>	<ol style="list-style-type: none"> 1. Check the ribbon for damage (folds, holes, tears). Replace the cartridge if the ribbon is damaged. 2. Verify that the print-head gap is between 0.6 to 0.65 mm (0.024 to 0.026 in.) at the center position of the adjusting lever (see Section 5). 3. Check the platen for damage. Replace the print mechanism if the platen is damaged (see Section 5). 4. Check the print head for broken wires. If the wires are broken, replace the print head (see Section 5). 5. Remove CN6 on the driver circuit card (see Section 4). Measure the resistance between pin CN6-10 (male side) and each head coil pin (CN6-1 to 9, male side). <p>Is the resistance approximately 22 ohms?</p> <p>Continue on the next page.</p>

PRINTER

Error Description	Diagnostic Action
<p>Rows of Print Dots Missing or Random Print Dots Missing</p>	<p>YES: Replace both control cards (see Section 5).</p> <p>NO: Disconnect the print-head cable and check the resistance of pins 1 through 9 on the print-head cable (see Section 4).</p> <p>Is the resistance approximately 22 ohms?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Replace the print head (see Section 5).</p>

Error Description	Diagnostic Action
<p>Extra Print Dots</p>	<ol style="list-style-type: none"> 1. Do the "Offline Diagnostic Test" (see page 3-1400-42). Examine the / and Y characters for extra dots. 2. Remove CN6 on the driver circuit card (see Section 4). Measure the resistance between pin CN6-10 (male side) and each head coil pin (CN6-1 to 9, male side). <p>Is the resistance approximately 22 ohms?</p> <p>YES: Go to Step 3. NO: Disconnect the print-head cable and measure the resistance from pins 1 through 9 on the print-head cable to common (see Section 4).</p> <p>Is the resistance approximately 22 ohms?</p> <p>YES: Replace the print mechanism assembly (see Section 5). NO: Replace the print head (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
Extra Print Dots	<p>3. Measure the resistance between pins CN6-1 to 9 (see Section 4) with respect to every other pin.</p> <p>Are any pins shorted together?</p> <p>NO: Replace both control cards (see Section 5).</p> <p>YES: Disconnect the print-head cable and recheck pins CN6-1 to 9 with respect to every other pin.</p> <p>Are any pins shorted together?</p> <p>YES: Replace the print mechanism assembly (see Section 5).</p> <p>NO: Replace the print head (see Section 5).</p>

Error Description	Diagnostic Action
<p>Printing Continues beyond End-of-Forms</p>	<ol style="list-style-type: none"> <li data-bbox="334 159 891 415">1. Set the printer Power switch to Off. Check the continuity of the End-of-Forms switch from pin CN6-18 on the driver circuit card (see Section 4) to the ground pin on the driver circuit card (open when the forms are inserted, and shorted when the forms are removed). Replace the print mechanism assembly if the switch fails (see Section 5). <li data-bbox="334 548 870 708">2. Check for + 5 Vdc at CN6-18 on the driver circuit card (see Section 4) with the forms inserted. If the voltage is \emptyset Vdc, check the power supply. Use the ground pin on the driver card.
<p>Double-spacing or Abnormal Characters</p>	<p>Replace both control cards (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
False End-of-Forms Alarm	<p>1. Is the No Paper light off?</p> <p>YES: Go to Step 2. NO: Are the forms inserted properly? YES: Go to page 3-1400-31, "Printing Continues beyond End-of-Forms." NO: Insert the forms properly.</p> <p>2. Set the printer Power switch to Off then to On.</p> <p>Is the alarm still sounding?</p> <p>YES: Measure for + 10.5 to + 12.5 Vdc on pin 1 of the control panel (see Section 4).</p> <p>Is the voltage approximately +12 Vdc?</p> <p>YES: Replace both control cards (see Section 5). NO: Replace the control panel (see Section 5). NO: Do the "Offline Diagnostic Test" (see page 3-1400-42).</p> <p>Does the alarm sound?</p> <p>YES: Replace the print mechanism (see Section 5). NO: Go to page 3-1400-1, "Printer Entry", if a printer failure is still suspected.</p>

Error Description	Diagnostic Action
Uneven Horizontal Spacing	<ol style="list-style-type: none"><li data-bbox="338 159 916 256">1. Check for a loose print-head carriage belt; adjust the belt tension if needed (see Section 5).<li data-bbox="338 289 887 354">2. Check for a loosely mounted print head (see Section 5).<li data-bbox="338 386 894 483">3. Check for worn gears in the carriage drive assembly and replace the assembly if needed (see Section 5).<li data-bbox="338 516 916 613">4. Check for bent or binding carriage shafts; replace the print mechanism if needed (see Section 5).

Error Description	Diagnostic Action												
Control Panel	<p>1. Set the printer Power switch to On. Measure the voltages at CN3 as shown in the chart below. Use the ground on the driver circuit card.</p> <table border="1" data-bbox="289 337 874 492"> <thead> <tr> <th>Pin No.</th> <th>Min. Voltage</th> <th>Max. Voltage</th> </tr> </thead> <tbody> <tr> <td>CN3-16</td> <td>4.5 Vdc</td> <td>5.5 Vdc</td> </tr> <tr> <td>CN3-20</td> <td>11.0 Vdc</td> <td>15.4 Vdc</td> </tr> <tr> <td>CN3-18</td> <td>21.6 Vdc</td> <td>26.4 Vdc</td> </tr> </tbody> </table> <p>Are all voltages correct?</p> <p>YES: Go to Step 2. NO: Go to page 3-1400-10, "Power Supply Check."</p> <p>2. Set the printer Power switch to Off. Disconnect the Printer Cable at the printer. Insert the forms and set the Power switch to On.</p> <p>Are the Power, Ready, and Online lights on?</p> <p>YES: Go to Step 6. NO: Is the alarm sounding and is the No Paper light on?</p> <p>YES: Go to page 3-1400-32, "False End-of-Forms Alarm." NO: Go to Step 3.</p> <p>Continued on the next page.</p>	Pin No.	Min. Voltage	Max. Voltage	CN3-16	4.5 Vdc	5.5 Vdc	CN3-20	11.0 Vdc	15.4 Vdc	CN3-18	21.6 Vdc	26.4 Vdc
Pin No.	Min. Voltage	Max. Voltage											
CN3-16	4.5 Vdc	5.5 Vdc											
CN3-20	11.0 Vdc	15.4 Vdc											
CN3-18	21.6 Vdc	26.4 Vdc											

Error Description	Diagnostic Action
Control Panel	<p>3. Is the Power light on?</p> <p>YES: Go to Step 4. NO: Measure for approximately + 10 to + 12 Vdc at pin 9 on the control panel. Use pin 8 for ground (see Section 4).</p> <p>Is approximately + 12 Vdc present?</p> <p>YES: Replace the control panel (see Section 5). NO: Go to page 3-1400-10, "Power Supply Check."</p> <p>4. Is the Online light on?</p> <p>YES: Go to Step 5. NO: Measure for approximately + 10 to + 12 Vdc at pin 1 on the control panel. Use the ground pin on the driver circuit card (see Section 4).</p> <p>Is approximately +12 Vdc present?</p> <p>YES: Replace both control cards (see Section 5). NO: Replace the control panel (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
Control Panel	<p data-bbox="280 175 604 204">5. Is the Ready light on?</p> <p data-bbox="325 240 586 269">YES: Go to Step 6.</p> <p data-bbox="325 272 841 431">NO: Measure for approximately + 12 Vdc at pin 4 on the control panel. Use the ground pin on the driver circuit card for the ground lead (see Section 4).</p> <p data-bbox="413 467 759 529">Is approximately + 12 Vdc present?</p> <p data-bbox="413 565 825 626">YES: Replace the control cards (see Section 5).</p> <p data-bbox="413 630 825 691">NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p>6. Set the printer Power switch to Off. Insert the forms under the end-of-forms switch. Set the printer Power switch to On. Press the Online button.</p> <p>Is the Online light off?</p> <p>YES: Go to Step 7. NO: Measure for approximately + 4.0 to + 5.5 Vdc on pin 5 of the control panel. Use pin 8 for ground (see Section 4).</p> <p>Is approximately + 5 Vdc present?</p> <p>NO: Replace both control cards (see Section 5). YES: Press and hold the Online button. Measure 0 to + 1.5 Vdc on pin 5 of the control panel.</p> <p>Is approximately + 1.5 Vdc present?</p> <p>YES: Replace both control cards (see Section 5). NO: Replace the control panel (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
Control Panel	<p>7. Press the Line Feed button.</p> <p>Do the forms advance one line?</p> <p>YES: Go to Step 8.</p> <p>NO: Measure for approximately + 4.0 to + 5.5 Vdc on pin 7 of the control panel. Use pin 8 for ground (see Section 5).</p> <p>Is approximately + 5 Vdc present?</p> <p>NO: Replace both control cards (see Section 5).</p> <p>YES: Press and hold the Line Feed button. Measure 0 to + 1.5 Vdc on pin 7 of the control panel.</p> <p>Is approximately + 1.5 Vdc present?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: Replace the control panel (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p>8. Press the Form Feed button.</p> <p>Do the forms advance?</p> <p>YES: Go to Step 9.</p> <p>NO: Measure for approximately + 4.0 to + 5.5 Vdc on Pin 6 of the control panel. Use pin 8 for ground (see Section 5).</p> <p>Is approximately + 5 Vdc present?</p> <p>NO: Replace both control cards (see Section 5).</p> <p>YES: Press and hold the Form Feed button. Measure 0 to + 1.5 Vdc on pin 6 of the control panel.</p> <p>Is approximately + 1.5 Vdc present?</p> <p>YES: Replace both control cards (see Section 5).</p> <p>NO: Replace the control panel (see Section 5).</p>

PRINTER

Error Description	Diagnostic Action
Control Panel	<p data-bbox="285 170 787 235">9. Remove the forms from the printer. Press the Online button.</p> <p data-bbox="329 267 622 300">Does the alarm sound?</p> <p data-bbox="329 332 611 365">YES: Go to Step 10.</p> <p data-bbox="329 365 824 495">NO: Measure for approximately + 5 Vdc from pin CN6-18 on the driver circuit card to the ground pin on the driver circuit card.</p> <p data-bbox="420 527 867 560">Is approximately + 5 Vdc present?</p> <p data-bbox="420 592 835 690">YES: Replace the print mechanism assembly (see Section 5).</p> <p data-bbox="420 690 856 950">NO: Check that the voltage at pin 10 of the control panel pulses from 0 to + 12 Vdc. Use pin 8 for ground. Set the printer Power switch to Off and then On before measuring the voltage. It will pulse only eight times.</p> <p data-bbox="505 982 856 1047">Does the voltage pulse 0 to + 12 Vdc?</p> <p data-bbox="505 1079 851 1177">YES: Replace the control panel (see Section 5).</p> <p data-bbox="505 1177 851 1274">NO: Replace the control cards (see Section 5).</p>

Error Description	Diagnostic Action
Control Panel	<p data-bbox="336 167 802 196">10. Does the No Paper light go On?</p> <p data-bbox="394 232 862 326">YES: The control panel checks OK. Return to page 3-1400-1, "Printer Entry."</p> <p data-bbox="394 329 902 423">NO: Measure for approximately + 10 to + 12 Vdc at pin 3 of the control panel.</p> <p data-bbox="483 459 830 521">Is approximately + 12 Vdc present?</p> <p data-bbox="483 557 846 618">YES: Replace both control cards (see Section 5).</p> <p data-bbox="483 621 900 683">NO: Replace the control panel (see Section 5).</p>

PRINTER

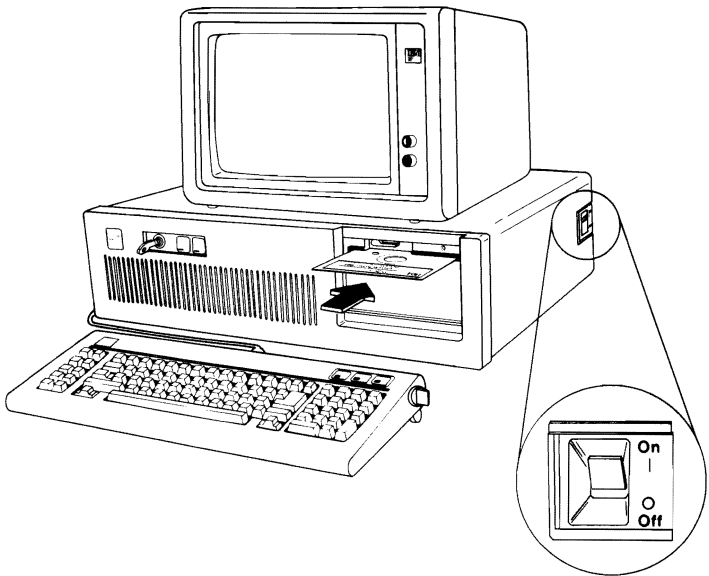
Notes:



Synchronous Data Link Control (SDLC) Communications Adapter

You have entered this PIC because you received a 15XX error message, or suspect an SDLC Communications Adapter problem.

1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.
-



CONTINUE 

Your screen should match the one below.

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SELECT AN OPTION

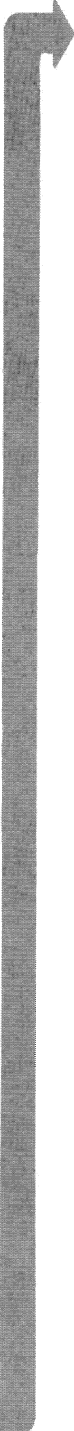
- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 4 – SETUP**
- 9 – END DIAGNOSTICS**

**SELECT THE ACTION DESIRED
?**

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

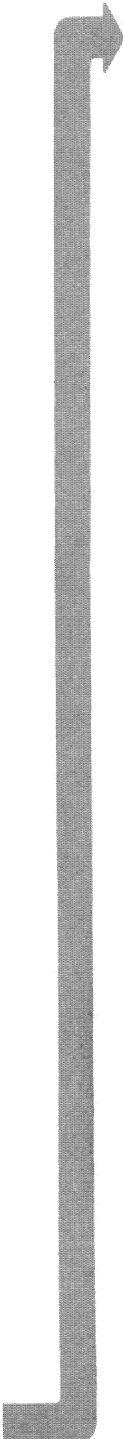
YES 

- 
1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 4. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.
 5. Select **15** (**SDLC COMMUNICATIONS ADAPTER**) then press **Enter**.



SDLC

CONTINUE 



Your screen should match the one below.

TESTING – SDLC COMMUNICATIONS ADAPTER

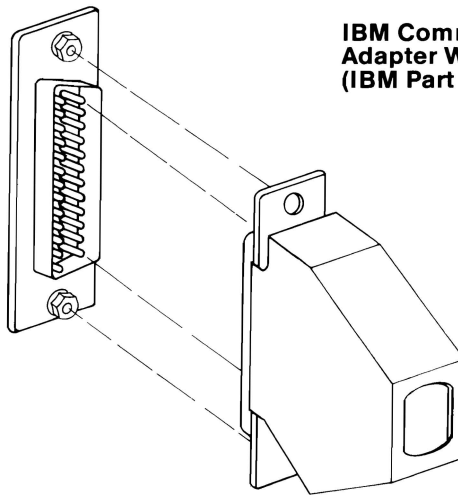
**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SDLC ADAPTER (Y/N)?**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-1500-7.

YES 

1. Press **Y (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?)** then **Enter**.
2. Disconnect the communications cable from the modem.
3. Connect the wrap plug to the communications cable, as shown below.
4. Press **Enter** to begin the test. This test may take up to 15 seconds.




**IBM Communications
Adapter Wrap Plug
(IBM Part 8529280)**

**DID YOU RECEIVE A MESSAGE TELLING YOU
TO INSTALL THE WRAP PLUG ON THE
ADAPTER?**

NO You have successfully completed the SDLC Communications Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES

SDLC

- 
1. Disconnect the wrap plug from the communications cable.
 2. Disconnect the communications cable from the SDLC Adapter.
 3. Connect the wrap plug to the adapter.
 4. Press **Enter** to begin the test. This test may take up to 15 seconds.

Your screen should match the one below.

TESTING – SDLC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SDLC ADAPTER (Y/N)? y**

**INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER?**

**INSTALL THE WRAP PLUG ON THE ADAPTER
AND PRESS ENTER?**

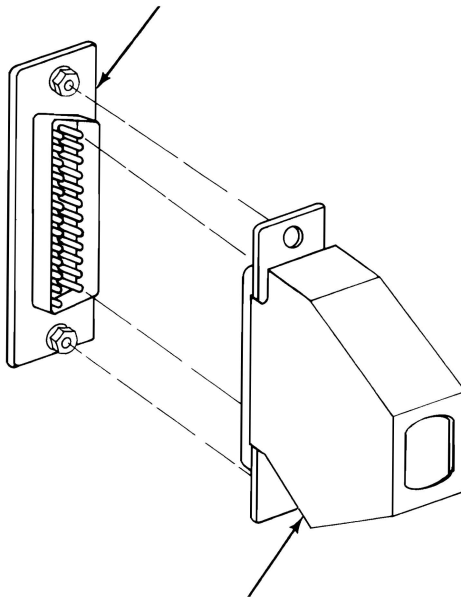
DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the SDLC Communications Adapter
(see Section 5).

NO Replace the Communications Adapter Cable.

1. Press **N** (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?) then **Enter**.
 2. Connect the wrap plug to the SDLC Adapter, as shown below.
-

Communications Adapter Connector



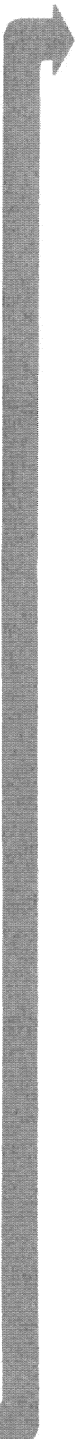
**IBM Communications
Adapter Wrap Plug
(IBM Part 8529280)**

SDLC

CONTINUE



3-1500-7



Press **Enter** to begin the test. This test may take up to 15 seconds.

TESTING – SDLC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE SDLC ADAPTER (Y/N)? n**

**INSTALL THE WRAP PLUG ON THE ADAPTER
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

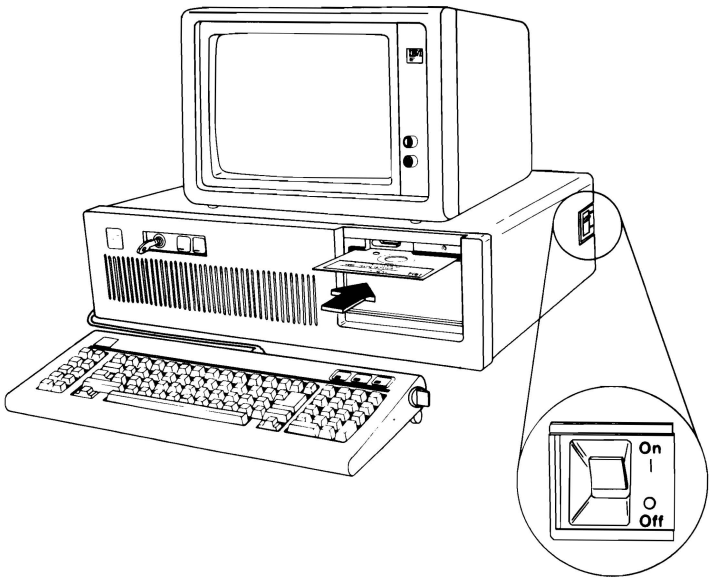
- NO** You have successfully completed the SDLC Communications Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.
- YES** Replace the SDLC Communications Adapter (see Section 5).

Fixed Disk Drive

You have entered this PIC because you received a 17XX error message, or you suspect a problem with the fixed disk drive, or Fixed Disk and Diskette Drive Adapter.

Warning: Normal shipping and handling can result in permanent loss of all data and formatting on the fixed disk drive; refer to your DOS manual and backup all information.

1. Set the system unit's Power switch to Off.
2. Insert the Advanced Diagnostics diskette into drive A.
3. Set the system unit's Power switch to On.




CONTINUE



3-1700-1

FIXED DISK



Your screen should match the one below.

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ADVANCED DIAGNOSTICS
Version X.XX
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SELECT AN OPTION


- 0 - SYSTEM CHECKOUT
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 3 - PREPARE SYSTEM FOR MOVING
- 4 - SETUP
- 9 - END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO If you received a 17XX error message during the POST, go to page 3-1700-7; if you did not receive an 17XX error message, go to page 3-020-1.

YES 




If you have a **1790** and **1791** error message, press the **F1** key and continue.

Note: If the **BASIC** screen appears when you load diagnostics go to 3-020-1.

1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
3. Press **Y** (**IS THE LIST CORRECT(Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering **Yes**. If you cannot correct the list, you still must answer **Yes** before you can continue.
4. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.
5. Select **17** (**FIXED DISK DRIVE(S) & ADAPTER**) then press **Enter**.

CONTINUE 



Your screen should match the one below.

FIXED DISK DIAGNOSTIC MENU

- 1 - WRITE, READ, COMPARE (TEST CYLINDER)
- 2 - SEEK TEST
- 3 - HEAD SELECT
- 4 - ERROR DETECTION AND CORRECTION
- 5 - RUN ALL TESTS
- 6 - READ VERIFY
- 7 - FORMAT MENU
- 9 - RETURN TO CONTROL PROGRAM

**FOR OPTION 9
PRESS "9" AND "ENTER"**

FOR OTHER OPTIONS

ENTER OPTION, DRIVE(1,C), AND "ENTER"

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-1700-7.

YES 



Type **5, C or D (RUN ALL TESTS)** then **Enter**.


A series of diagnostic tests are made of the Fixed Disk Drive Adapter and the fixed disk drive selected; make a note of any error messages displayed.

17XX

DID YOU RECEIVE A 17XX ERROR MESSAGE?

YES Go to page 3-1700-7.

NO 



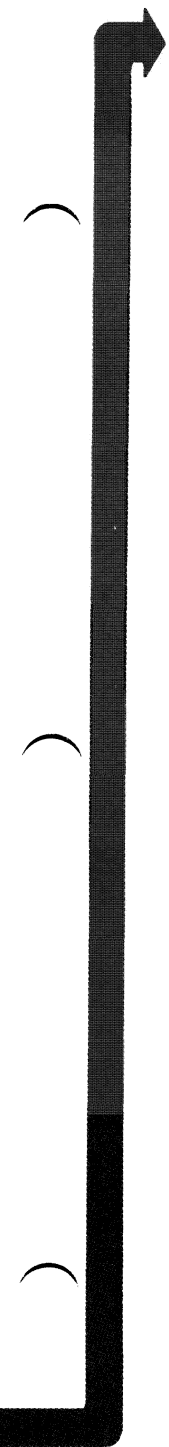
The fixed disk drives and adapter multiple tests have finished without an error. Continue with Step 1 to do the individual diagnostic tests.

1. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 2. Select **17 (FIXED DISK DRIVE(S) & ADAPTER)** then press **Enter**.
 3. Follow the instructions on your screen and perform each test (1, 2, 3, and 4), one at a time, to be sure that the Fixed Disk Drive Adapter and the fixed disk drive selected are functioning correctly.
-

DID YOU RECEIVE A 17XX ERROR MESSAGE?

- NO** You have successfully completed the advanced diagnostic tests for the fixed-disk drive selected. If two fixed-disk drives are installed and you have not tested the second drive, go to page 3-1700-5 and run the diagnostic tests for the second fixed-disk drive. If you suspect an intermittent problem, go to page 3-010-1.

YES 



Find your error code in the figure below, and go to the page indicated.

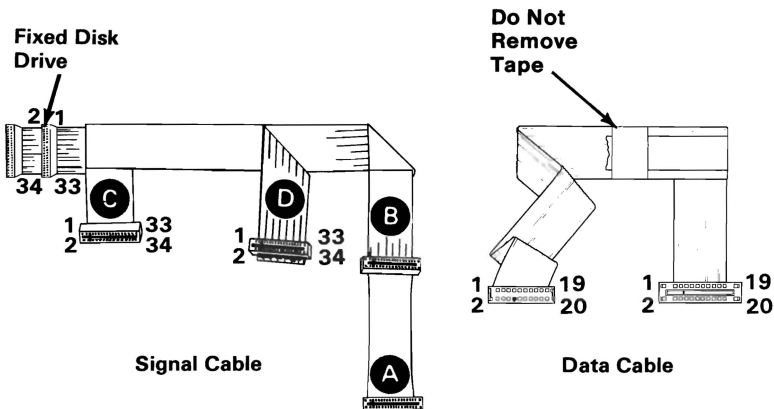
Error Code	Go to Page
1701	3-1700-11
1702	3-1700-13
1703	3-1700-8
1704	3-1700-13
1705	3-1700-8
1706	3-1700-8
1707	3-1700-8
1708	3-1700-8
1709	3-1700-8
1710	3-1700-13
1711	3-1700-8
1712	3-1700-8
1713	3-1700-8
1714	3-1700-11
1780 - Drive C *	3-1700-11
1781 - Drive D *	3-1700-11
1782 - Adapter *	3-1700-13
1790 - Drive C *	3-1700-3
1791 - Drive D *	3-1700-3

* Indicates a POST error code and the suspect failing FRU.

You should be on this page if you have a **1703, 1705, 1706, 1707, 1708, 1709, 1711, 1712, or 1713** error code.

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover (see Section 5).
3. See the figure below and check the fixed disk drive's data and signal cables for continuity. The line numbers at one end of the cable match the line numbers at the other end, except for those listed below (check all lines for continuity).

Fixed Disk Drive C Signal Cable Connector		Fixed Disk Drive D Signal Cable Connector	
Pin Numbering		Pin Numbering	
Adapter End	Drive End	Adapter End	Drive End
29	25	29	29
28	26	28	28
27	27	27	27
26	28	26	26
25	29	25	25



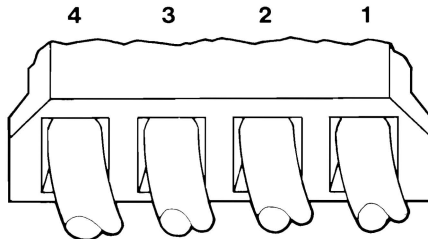
DO ALL LINES HAVE CONTINUITY?

NO Replace the failing cable (see Section 5).

YES 

1. Ensure all electrical connections are secure by connecting all fixed disk drive cables, and disconnecting then connecting the Fixed Disk and Diskette Drive Adapter.
2. Set the system unit's Power switch to On.
3. Check the voltages at the failing fixed disk drive's power connector as shown below.

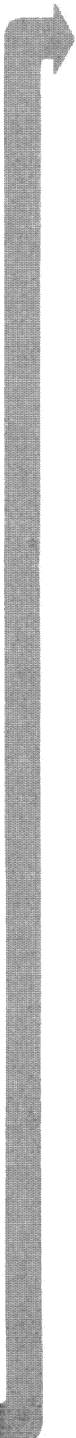
Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



ARE THE VOLTAGES CORRECT?

NO Go to page 3-020-1.

YES 

- 
1. Repeat the operation or diagnostic test that failed; if the same error message appears continue with Step 2. If you did not receive an error message repeat the advanced diagnostic tests to ensure the fixed disk drive is operating correctly.
 2. Turn to page 3-1700-15 and perform a conditional format on the failing fixed disk drive, then continue with Step 3.

Warning: Formatting results in a complete loss of data on the fixed disk drive; refer to your DOS manual and back up all information, if possible.

3. Repeat the operation or diagnostic test that failed.
-

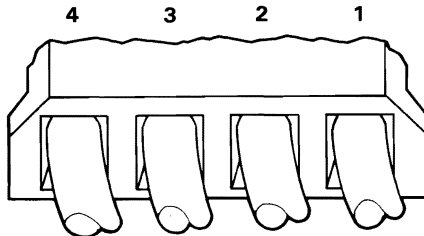
**DOES THE SAME FAILURE OCCUR AFTER THE
FIXED DISK DRIVE IS FORMATTED?**

- YES** Replace the failing fixed disk drive. If this does not correct your problem replace the Fixed Disk and Diskette Drive Adapter (see Section 5).
- NO** Go to page 3-1700-1 and repeat the advanced diagnostic tests to verify the problem is corrected.

You should be on this page if you have a **1701**, **1714**, **1780**, or **1781** error code.

1. Set the system unit's Power switch to Off.
2. Remove the system unit's cover (see Section 5).
3. Ensure that all electrical connections are secure by disconnecting then connecting all fixed disk drive cables and the Fixed Disk and Diskette Drive Adapter.
4. Set the system unit's Power switch to On.
5. Check the voltages at the failing fixed disk drive's power connector as shown below.

Power Connector			
Min Vdc	Max Vdc	- Lead	+ Lead
+ 4.8	+ 5.2	2	4
+ 11.5	+ 12.6	3	1



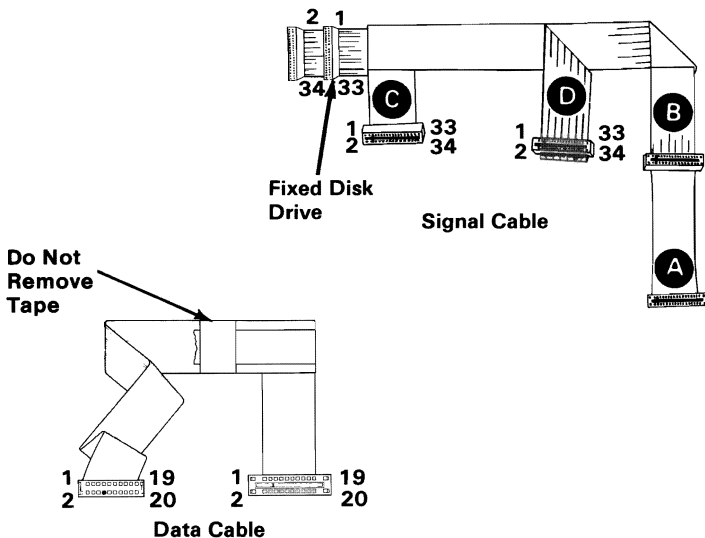
ARE THE VOLTAGES CORRECT?

NO Go to page 3-020-1.

YES 

1. Set the system unit's Power switch to Off.
2. See the figure below to check the fixed disk drive's data and signal cables for continuity. The line numbers at one end of the cable match the line numbers at the other end, except for those listed below (check all lines for continuity).

Fixed Disk Drive C Signal Cable Connector		Fixed Disk Drive D Signal Cable Connector	
Pin Numbering		Pin Numbering	
Adapter End	Drive End	Adapter End	Drive End
29	25	29	29
28	26	28	28
27	27	27	27
26	28	26	26
25	29	25	25



DO ALL LINES HAVE CONTINUITY?

NO Replace the failing cable (see Section 5).

YES Replace the failing fixed disk drive. If this does not correct your problem, replace the Fixed Disk and Diskette Drive Adapter (see Section 5).

You should be on this page if you have a **1702**, **1704**, **1710**, or **1782** error code.

1. Remove the system unit's cover (see Section 5).
 2. Ensure that all electrical connections are secure by disconnecting then connecting all fixed disk drive cables and the Fixed Disk and Diskette Drive Adapter.
 3. Set the system unit's Power switch to On.
 4. Repeat the operation or diagnostic test that failed.
-

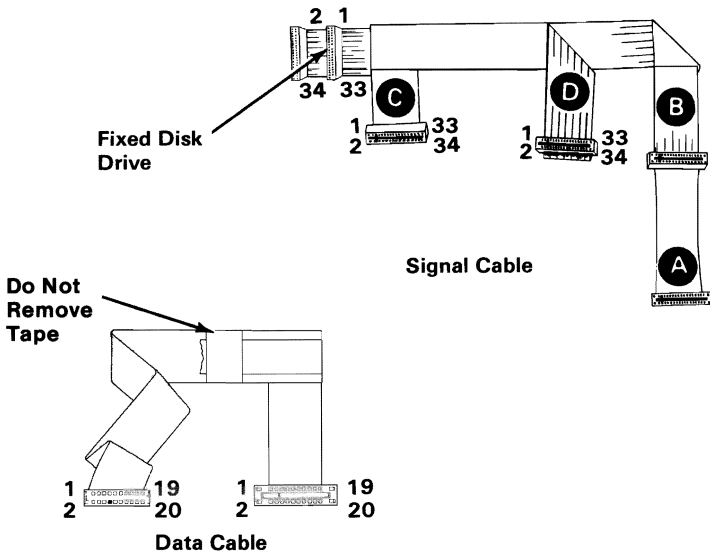
DID THE SAME FAILURE OCCUR?

NO Go to page 3-1700-1 and repeat the advanced diagnostic tests to verify the problem is corrected.

YES 

1. Set the system unit's Power switch to Off.
2. See the figure below to check the fixed disk drive's data and signal cables for continuity. The line numbers at one end of the cable match the line numbers at the other end, except for those listed below (check all lines for continuity).

Fixed Disk Drive C Signal Cable Connector		Fixed Disk Drive D Signal Cable Connector	
Pin Numbering		Pin Numbering	
Adapter End	Drive End	Adapter End	Drive End
29	25	29	29
28	26	28	28
27	27	27	27
26	28	26	26
25	29	25	25



DO ALL LINES HAVE CONTINUITY?

NO Replace the failing cable (see Section 5).

YES Replace the Fixed Disk and Diskette Drive Adapter. If this does not correct your problem replace the system board (see Section 5).


Formatting a Fixed Disk Drive

Before you replace a failing fixed disk drive, try to format it, as follows:

Warning: Formatting results in a complete loss of data on the fixed disk drive; refer to your DOS manual and back up all information, if possible.

1. Set the system unit's Power switch to Off.
2. Ensure all fixed disk drive and Fixed Disk and Diskette Drive Adapter cables are connected and tight.
3. Insert your Advanced Diagnostics diskette into drive A.
4. Set the system unit's Power switch to On.
5. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
6. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
7. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.

CONTINUE 

- 
8. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 9. Select **17 (FIXED DISK DRIVE(S) & ADAPTER)** then press **Enter**.
 10. Press **7, (FORMAT MENU)** then press **C or D (ENTER DRIVE ID (C/D))** then **Enter**.
 11. Press **1, (CONDITIONAL FORMAT)** then press **C or D (ENTER DRIVE ID (C/D))** then **Enter**.
 12. Press **Y or N (ALL DEFECTS WILL BE SHOWN ON THE DISPLAY, THEY CAN ALSO BE PRINTED ON LPT1. IS A HARD COPY NEEDED?)** then **Enter**.
 13. Press **Y (DO YOU WANT TO CONTINUE Y/N?)** then **Enter**.
 14. Press **Y (THIS IS YOUR LAST CHANCE TO CANCEL)** then **Enter**.

Note: The Advanced Diagnostics Format program is different from the IBM Disk Operating System (DOS) Format program. Before transferring information from backup diskettes to the fixed disk drive, format the fixed disk drive using your DOS diskette, refer to the DOS manual for a description of the Format commands.


Binary Synchronous Communications (BSC) Adapter

You have entered this PIC because you received a 20XX error message, or suspect a BSC Adapter problem.

Turn to Section 6 and ensure the following conditions exist:

1. The primary BSC Adapter is set for "Primary BSC" operation.
2. If a second BSC Adapter is installed, it is set for "Alternate BSC" operation.

CONTINUE 

- 
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.
 4. Your screen should match the one below.
-

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SELECT AN OPTION

- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 4 – SETUP**
- 9 – END DIAGNOSTICS**

**SELECT THE ACTION DESIRED
?**

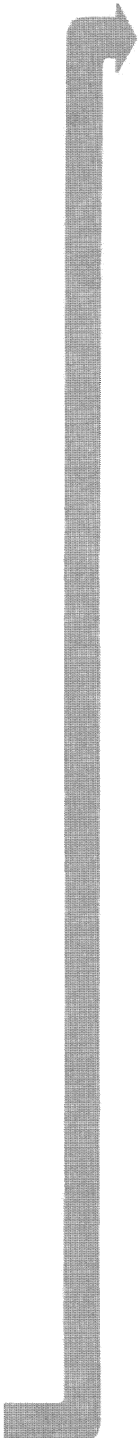
DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES 

1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
5. Select **20 (BSC COMMUNICATIONS ADAPTER)** then press **Enter**.

CONTINUE 



Your screen should match the one below.

TESTING – BSC COMMUNICATIONS ADAPTER

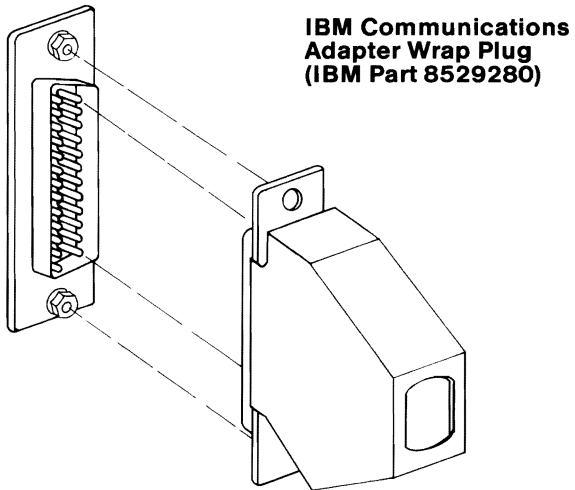
**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE BSC ADAPTER (Y/N)?**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-2000-7.

YES 


1. Press **Y (IS AN IBM COMMUNICATIONS CABLE ATTACHED?)** then **Enter**.
 2. Disconnect the communications cable from the modem.
 3. Connect the wrap plug to the communications cable, as shown below.
 4. Press **Enter** to begin the test. This test may take up to 30 seconds.
-



**DID YOU RECEIVE A MESSAGE TELLING YOU
TO INSTALL THE WRAP PLUG ON THE
ADAPTER?**

NO You have successfully completed the BSC Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 

- 
1. Disconnect the wrap plug from the communications cable.
 2. Disconnect the communications cable from the BSC Adapter.
 3. Connect the wrap plug to the adapter.
 4. Press **Enter** to begin the test. This test may take up to 30 seconds.
-

TESTING – BSC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE BSC ADAPTER (Y/N)? y**

**INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER?**

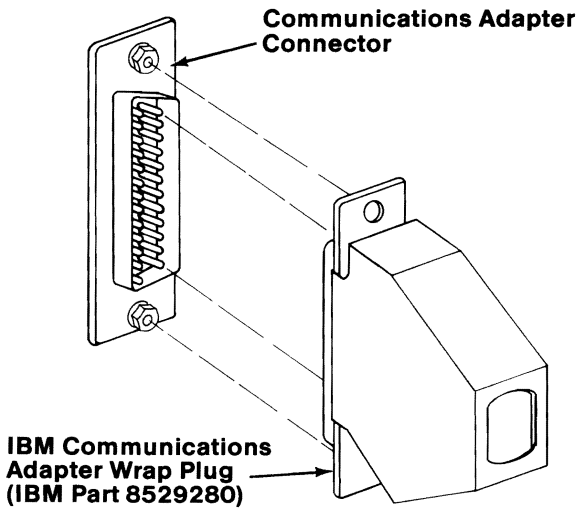
**INSTALL THE WRAP PLUG ON THE ADAPTER
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

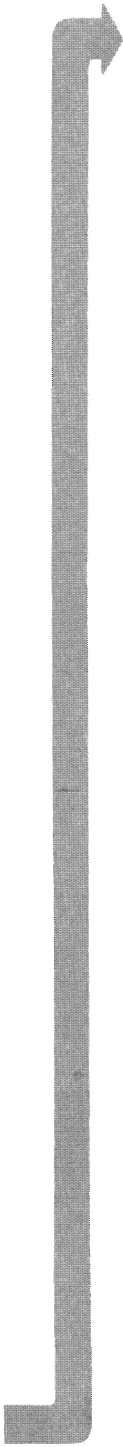
YES Replace the BSC Communications Adapter (see Section 5).

NO Replace the Communications Adapter Cable.

1. Press **N (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?)** then **Enter**.
 2. Connect the wrap plug to the BSC Adapter, as shown below.
-



CONTINUE 



Press **Enter** to begin the test. This test may take up to 30 seconds.

TESTING – BSC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE BSC ADAPTER (Y/N)? n**

**INSTALL THE WRAP PLUG ON THE ADAPTER
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

NO You have successfully completed the BSC Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES Replace the BSC Adapter (see Section 5).

Alternate Binary Synchronous Communications (BSC) Adapter


You have entered this PIC because you received a 21XX error message, or you suspect a problem with the alternate BSC Adapter.

Turn to Section 6 and ensure the following conditions exist:

1. The primary BSC Adapter is set for "Primary BSC" operation.
2. A second BSC Adapter is installed and set for "Alternate BSC" operation.

ALT BSC

CONTINUE 

- 
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.
 4. Your screen should match the one below.
-

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SELECT AN OPTION


- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 4 – SETUP**
- 9 – END DIAGNOSTICS**

**SELECT THE ACTION DESIRED
?**

DOES YOUR SCREEN MATCH THE ONE ABOVE?

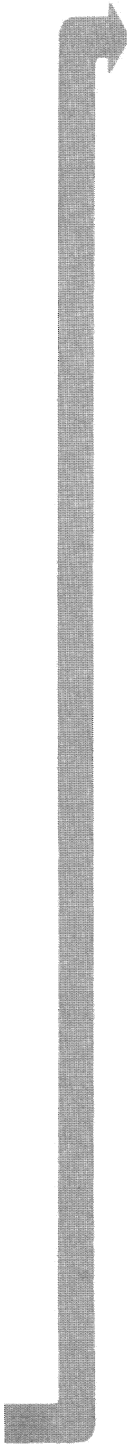
NO Go to page 3-020-1.

YES 

- 
1. Press **0** (**SYSTEM CHECKOUT**) then **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 3. Press **Y** (**IS THE LIST CORRECT (Y/N)?**) then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 4. Press **0** (**RUN TESTS ONE TIME**) then **Enter**.
 5. Select **21** (**ALT BSC COMMUNICATIONS ADAPTER**) then press **Enter**.

ALT BSC

CONTINUE 



Your screen should match the one below.

TESTING – ALT BSC COMMUNICATIONS ADAPTER

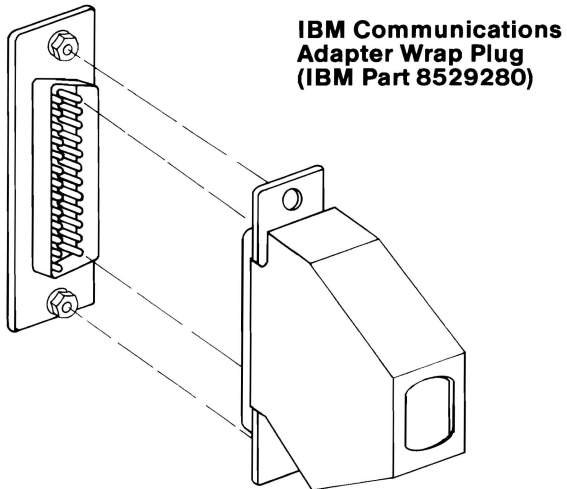
**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT BSC ADAPTER (Y/N)?**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED?**

NO Go to page 3-2100-7.

YES 

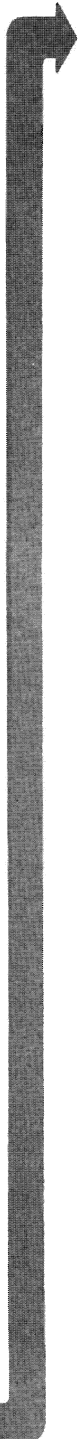
1. Press **Y (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?)** then **Enter**.
 2. Disconnect the communications cable from the modem.
 3. Connect the wrap plug to the communications cable, as shown below.
 4. Press **Enter** to begin the test. This test may take up to 30 seconds.
-



DID YOU RECEIVE A MESSAGE TELLING YOU TO INSTALL THE WRAP PLUG ON THE ADAPTER?

NO You have successfully completed the alternate BSC Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 

- 
1. Disconnect the wrap plug from the communications cable.
 2. Disconnect the communications cable from the alternate BSC Adapter.
 3. Connect the wrap plug to the adapter.
 4. Press **Enter** to begin the test. This test may take up to 30 seconds.

Your screen should match the one below.

TESTING – ALT BSC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT BSC ADAPTER (Y/N)? y**

**INSTALL THE WRAP PLUG ON THE END
OF THE CABLE AND PRESS ENTER?**

**INSTALL THE WRAP PLUG ON THE ADAPTER
AND PRESS ENTER?**

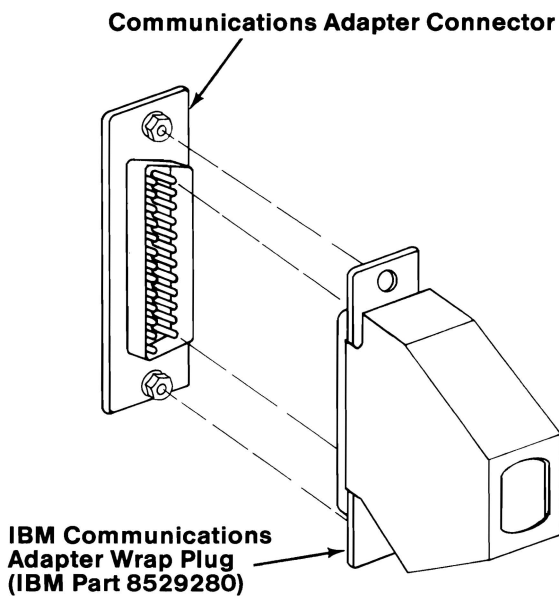
DID YOU RECEIVE AN ERROR MESSAGE?

YES Replace the alternate BSC Adapter (see Section 5).

NO Replace the Communications Adapter Cable.

1. Press **N (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?)** then **Enter**.
 2. Connect the wrap plug to the alternate BSC Adapter, as shown below.
-

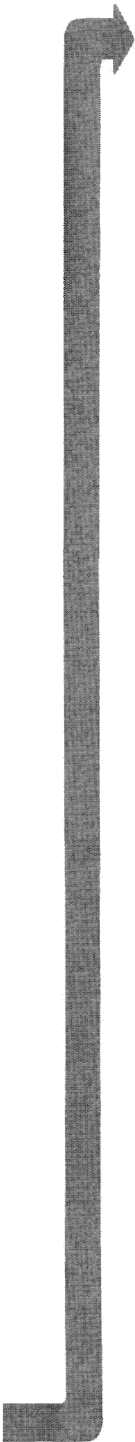
ALT BSC



CONTINUE



3-2100-7



Press **Enter** to begin the test. This test may take up to 30 seconds.

TESTING – ALT BSC COMMUNICATIONS ADAPTER

**IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT BSC ADAPTER (Y/N)? n**

**INSTALL THE WRAP PLUG ON THE ADAPTER
AND PRESS ENTER?**

DID YOU RECEIVE AN ERROR MESSAGE?

NO You have successfully completed the alternate BSC Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES Replace the alternate BSC Adapter (see Section 5).

Cluster Adapter

You have entered this PIC because you received a 22XX error message, or you suspect a Cluster Adapter problem.


Turn to Section 6 and ensure the following condition exists:

The switches on the Cluster Adapter are set correctly.

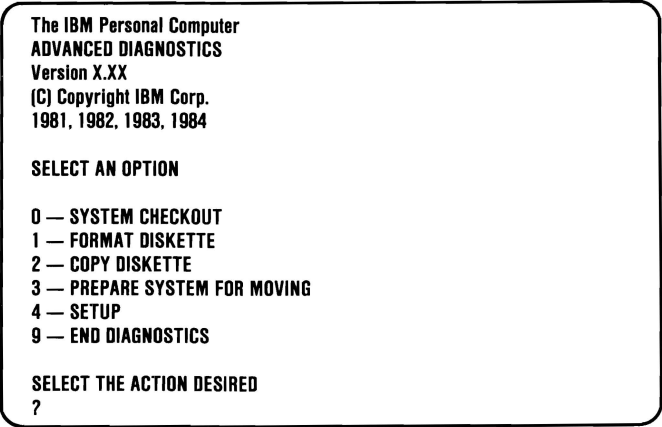
Note: Before removing a Cluster Adapter, make a note of the unit and slot in which the adapter is installed.

CONTINUE



- 
1. Set the system unit's Power switch to Off.
 2. Insert the Advanced Diagnostics diskette into drive A.
 3. Set the system unit's Power switch to On.

Your screen should match the one below.



The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version X.XX
(C) Copyright IBM Corp.
1981, 1982, 1983, 1984

SELECT AN OPTION

- 0 — SYSTEM CHECKOUT
- 1 — FORMAT DISKETTE
- 2 — COPY DISKETTE
- 3 — PREPARE SYSTEM FOR MOVING
- 4 — SETUP
- 9 — END DIAGNOSTICS

SELECT THE ACTION DESIRED
?

DOES YOUR SCREEN MATCH THE ONE ABOVE?

NO Go to page 3-020-1.

YES 

1. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
3. Press **Y** or **N (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering yes. If you cannot correct the list, you still must answer **Yes** before you can continue.
4. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
5. Select **22 (CLUSTER ADAPTER)** then press **Enter**.

The following is displayed.

TESTING

X CLUSTER ADAPTER(S)

- 1 — TEST CLUSTER ADAPTER**
- 2 — DISPLAY CLUSTER STATUS**
- 9 — RETURN TO CONTROL PROGRAM**

**TYPE THE OPTION NUMBER
AND PRESS 'ENTER'**

?

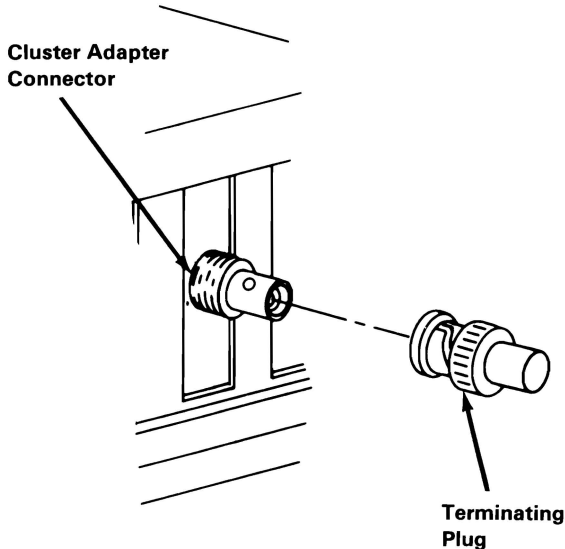
CONTINUE 

Do the following:

1. Press **1 (TEST CLUSTER ADAPTER)** then **Enter**.
2. If more than one adapter is installed, respond to **ENTER NUMBER OF CLUSTER ADAPTER TO TEST**, then press **Enter**.
3. Press **Y** or **N (IS A CABLE CONNECTED TO THE CLUSTER ADAPTER? (Y/N))** then **Enter**.

If you pressed **Y**, do the next step; otherwise, go to Step 5.

4. Remove the coaxial cable from the adapter by turning the cable connector counterclockwise, then move it away from the Cluster Adapter connector.
5. When instructed to do so, connect the terminating plug (IBM P/N 6323481) to the Cluster Adapter connector (see the figure below).
6. Press **Enter**.



CONNECT THE TERMINATING PLUG TO THE CLUSTER ADAPTER.

CONTINUE

You may have an error message similar to the one below.

```
0:02:51
ERROR —
CLUSTER ADAPTER(S) 22XX X
ADAPTER SELECT SET INCORRECTLY


PRESS ENTER TO CONTINUE
?
```

CLUSTER ADAPTER

DID THE ABOVE ERROR MESSAGE APPEAR?

YES Your adapter has more than one adapter number switch set on. Refer to Section 6 and correct any errors. If all of the switch settings are correct, replace the failing Cluster Adapter and terminating plug (see Section 5).

NO 



You may have an error message similar to the one below.

X:XX:XX
ERROR —
CLUSTER ADAPTER(S) 22XX
REPLACE CLUSTER ADAPTER X

PRESS ENTER TO CONTINUE
?

**ARE THE DISPLAYED SWITCH SETTINGS
CORRECT AND DID THE TEST RUN WITHOUT
THE ABOVE ERROR MESSAGE?**

NO Replace the Cluster Adapter and its terminating plug (see Section 5).

YES 

If you want to test the Cluster Adapter again, or test a different Cluster Adapter, go to page 3-2200-4.

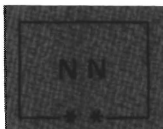
DO YOU WANT TO DISPLAY THE CLUSTER STATUS?

NO Press **9** then **Enter**. You have successfully completed the Cluster Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

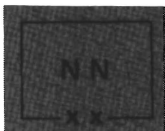
YES 

The following explains the cluster status that may appear on your screen.

NN is any station address from 0 to 63.



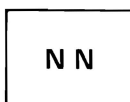
The system you are using is indicated on the screen in blinking reverse video, and the box is marked by two asterisks.



Stations in the cluster that have their Power switch set to On, are displayed in reverse video, and their boxes are marked by two Xs.



If another system has the same station address as yours, a long beep sounds every 3 seconds, and the box appears in blinking reverse video with an X and asterisk.



A station address not in the cluster is indicated by a box in normal video; the box has no Xs or asterisks.

A **CLUSTER ACCESS ERROR** message may appear in reverse video.

CONTINUE 

Perform the following steps to obtain the cluster status.

1. Press **2 (DISPLAY CLUSTER STATUS)** then **Enter**.
2. If more than one adapter is installed, respond to **ENTER NUMBER OF CLUSTER ADAPTER TO TEST**, then press **Enter**.
3. Press **Y** or **N (IS A CABLE CONNECTED TO THE CLUSTER ADAPTER?)** then **Enter**.
4. If a cable is not connected to the Cluster Adapter, connect the cable then press **Enter**.

TESTING — X CLUSTER ADAPTER(S)

1 — TEST CLUSTER ADAPTER
2 — DISPLAY CLUSTER STATUS
9 — EXIT CLUSTER ADAPTER TESTS

ENTER NUMBER OF ACTION DESIRED? 2

ENTER NUMBER OF CLUSTER
ADAPTER TO TEST (X-X) ? X

IS A CABLE CONNECTED TO THE
CLUSTER ADAPTER (Y/N) ? n

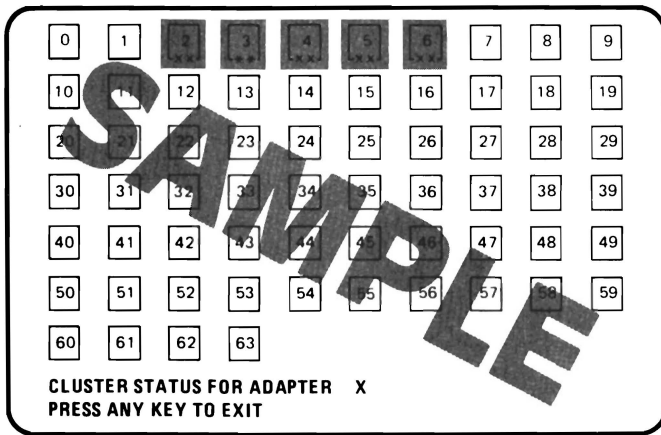
CONNECT THE CABLE TO THE
CLUSTER ADAPTER

PRESS ENTER WHEN READY
?

CONTINUE

Wait 15 seconds.

The cluster-status screen presentation will show 64 boxes that represent the stations in the cluster that have their Power switch set to On and that are connected to the main coaxial bus.

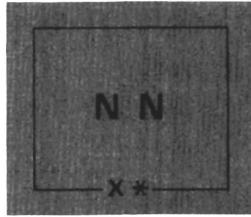


DO ALL STATIONS IN THE CLUSTER APPEAR AND REMAIN ON THE SCREEN?

YES Your cluster is operating properly. Press any key to end the test. You have successfully completed the Cluster Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

NO

You may have an error similar to the one shown below (a box in blinking reverse video with an X and asterisk, and a beep sounding every 3 seconds).

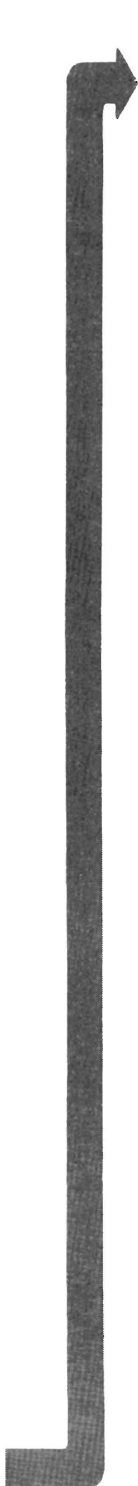


DID YOU RECEIVE THE ERROR DESCRIBED ABOVE?

YES Another system has the same station address as yours. Compare your cluster map with the status screen presentation. Perform a diagnostic test of any system missing from the cluster status screen.

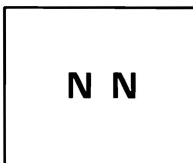
Refer to Section 6 and correct any errors. If all switch settings are correct, replace the failing Cluster Adapter (see Section 5).

NO 



You may have an error similar to the one shown below (a box in normal video with no Xs or asterisks) for a station address that is in the cluster.

Note: Multiple grounds on the Cluster cables may cause stations to appear on the status screen presentation intermittently. Contact the Installation Manager.



DID YOU RECEIVE THE ERROR DESCRIBED ABOVE?

YES Go to page 3-2200-14.

NO 

You may have a Cluster Access Error.

X:XX:XX
ERROR —
X CLUSTER ADAPTER(S) 22XX X
CLUSTER ACCESS ERROR

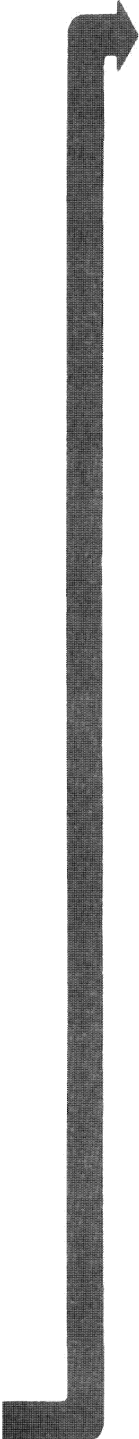
PRESS ENTER TO CONTINUE
?

CLUSTER ADAPTER

DID YOU RECEIVE THE ERROR DESCRIBED ABOVE?

NO You have successfully completed the Cluster Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

YES 



You have a Cluster Access Error, or the cluster map shows station addresses in the cluster that are not displayed on the Cluster Status screen. Do the following:

1. Perform diagnostic tests on any station that has a Cluster Access Error or that is not indicated on any status screen.
2. If the diagnostic tests fail, replace the failing adapter (see Section 5).
3. If the diagnostic tests pass, continue testing until all stations that had an access error or did not appear in any status screen presentation are tested.
4. If the Cluster Adapters check good and stations still have cluster access errors or do not appear in the Cluster status screen presentations, notify the Installation Manager that you suspect a problem with a coaxial cable or terminating plug.

If you have followed these procedures and still have an unsolved problem, request technical assistance.

Enhanced Graphics Adapter

You have entered this PIC because you suspect a problem with the display connected to the Enhanced Graphics Adapter, you received an audible error code, or you have an error message indicating an Enhanced Graphics Adapter problem.

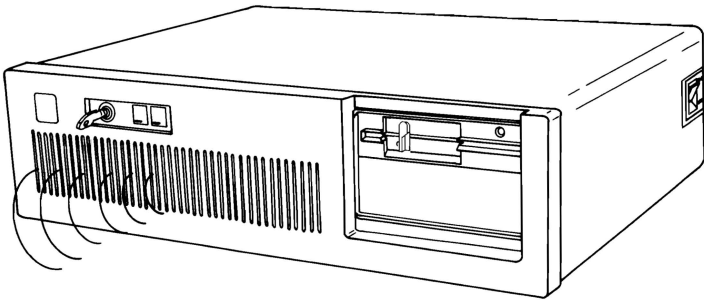
Ensure the switches on the adapter and system board are set correctly for your configuration.

Note: If two display adapters are installed in your system, continue with this PIC. If a failure is not found, continue with the PIC for the second display adapter.

CONTINUE



1. Set the Power switch on the System Unit to Off.
 2. Insert your Advanced Diagnostics diskette.
 3. Set the Power switch on the System Unit to On.
 4. Turn you brightness and contrast controls fully clockwise.
 5. Note any audio response during POST.
-



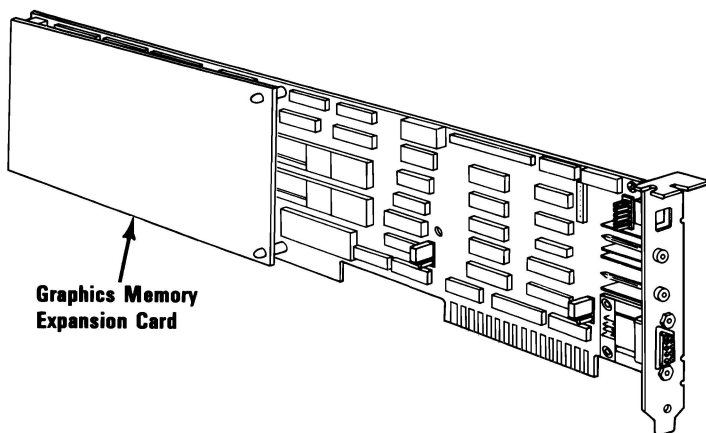
**IS YOUR ERROR INDICATION ONE LONG AND
THREE SHORT "BEEPS"?**

NO Go to page 3-2400-5.

YES 

You have received an audible error code of one long and three short beeps.

Your Enhanced Graphics Adapter may have a Graphics Memory Expansion Card installed on it.

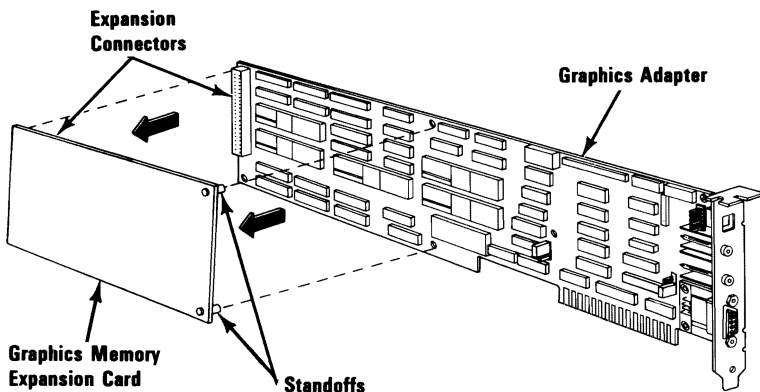


**DO YOU HAVE A GRAPHICS MEMORY
EXPANSION CARD INSTALLED?**

NO Replace the Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustments."

YES 

1. Set the Power switch on the System Unit to Off.
 2. Remove the Graphics Memory Expansion Card installed on your Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustments."
 3. Install the Enhanced Graphics Adapter without the Expansion Card.
 4. Set the Power switch on the expansion unit (if installed) and the System Unit to On.
-



DID THE SAME FAILURE OCCUR WITH THE EXPANSION CARD REMOVED?

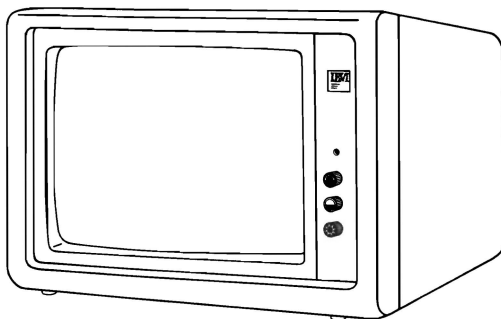
- NO** You have a bad Graphics Memory Expansion Card or a bad Memory Module installed on it. To isolate the failure go to page 3-2400-75.
- YES** Replace the Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustments."

Follow the steps below to run the diagnostic routines.

Note: If the screen is unreadable go to 3-2400-6.

1. Press 0 (**SYSTEM CHECK**) then Enter.
 2. Depending on the configuration of your system, questions about attached devices may appear on your screen. Press Y or N as required, the Enter.
 3. Press Y or N (**IS THE LIST CORRECT(Y/N)?**) then Enter (if the list is incorrect, follow the instructions on the display to correct the list before answering yes).
 4. Press 0 (**RUN TEST ONE TIME**) then Enter.
 5. Select 24 (**Enhanced Graphics Adapter**) then press Enter.
-

CONTINUE 



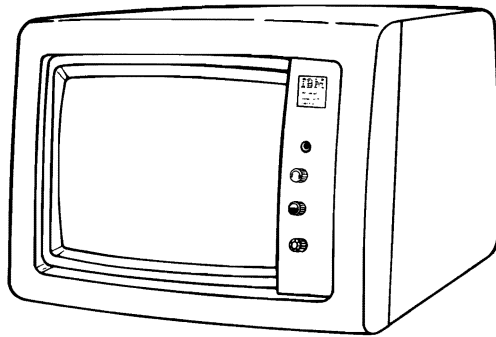
IS THE SCREEN DARK (NO ILLUMINATION)?

NO Select the display attached to your Enhanced Graphics Adapter from the following list and go to the page indicated.

- IBM Enhanced Color Display, **3-2400-11**
- IBM Color Display, **3-2400-32**
- IBM Monochrome Display, **3-2400-49**.

YES 

If you are using a non-IBM display continue on page 3-2400-60.

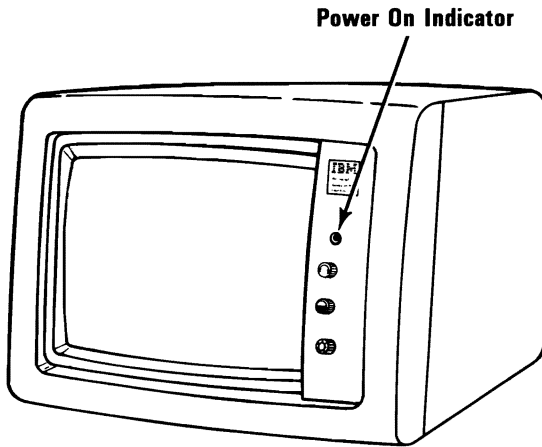


**DO YOU HAVE AN IBM MONOCHROME
DISPLAY ATTACHED TO THE ENHANCED
GRAPHICS ADAPTER?**

YES Go to page 3-2400-60.

NO 

1. Check the power on indicator on your display.

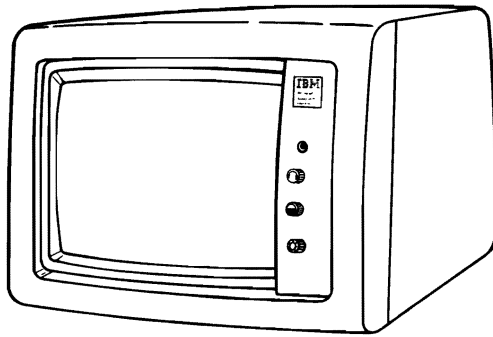


IS THE POWER ON INDICATOR LIGHTED?

NO Go to page 3-2400-10.

YES 

1. Set the Power switch on the System Unit to Off.
 2. Set the Power switch on the display to Off.
 3. Disconnect the display signal cable from the back of the Enhanced Graphics Adapter.
 4. Set the Power switch on the display to On.
-

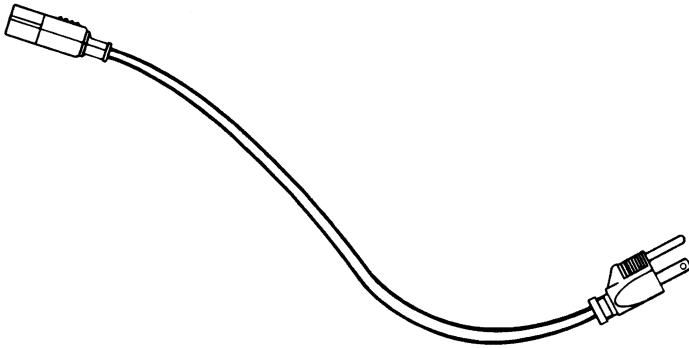


IS THE SCREEN STILL DARK (NO ILLUMINATION)?

- NO** Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.
- YES** Replace the display. See Section 5, "Removal/Replacement and Adjustments".

The power cord may not be supplying power to your display.

1. Check continuity of the display power cord.
-



DID THE POWER CORD CHECK OUT GOOD?

NO Replace the power cord.

YES Replace the display. See Section 5, "Removal/Replacement and Adjustments".

Diagnostics will have successfully loaded and the screen below will be displayed.

**COLOR DISPLAY AND
ENHANCED GRAPHICS ADAPTER TEST**

- 0 - DISPLAY ADAPTER AND MEMORY TEST
 - 1 - DISPLAY ATTRIBUTES
 - 2 - CHARACTER SET
 - 3 - 80X25 DISPLAY
 - 4 - 40X25 DISPLAY
 - 5 - 320X200 GRAPHICS
 - 6 - HI-RES GRAPHICS
 - 7 - LIGHT PEN TEST
 - 8 - SCREEN PAGING
 - 9 - EXIT TO MAIN MENU
 - 10 - RUN ALL ABOVE TESTS
 - 11 - VIDED TEST
 - 12 - SYNC TEST
- ENTER NUMBER OF DESIRED ACTION 

IS THE ABOVE SCREEN STABLE?

NO Go to page 3-2400-60.

YES IS THE SCREEN READABLE?

NO Go to page 3-2400-73.

YES 

Your display may function correctly except that the cursor is out of position or is missing.

**COLOR DISPLAY AND
ENHANCED GRAPHICS ADAPTER TEST**

- 0 - DISPLAY ADAPTER AND MEMORY TEST
 - 1 - DISPLAY ATTRIBUTES
 - 2 - CHARACTER SET
 - 3 - 80X25 DISPLAY
 - 4 - 40X25 DISPLAY
 - 5 - 320X200 GRAPHICS
 - 6 - HI-RES GRAPHICS
 - 7 - LIGHT PEN TEST
 - 8 - SCREEN PAGING
 - 9 - EXIT TO MAIN MENU
 - 10 - RUN ALL ABOVE TESTS
 - 11 - VIDEO TEST
 - 12 - SYNC TEST
- ENTER NUMBER OF DESIRED ACTION - ☼ -

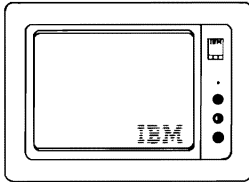
**IS THE CURSOR VISIBLE AND CORRECTLY
POSITIONED ON YOUR DISPLAY?**

NO Go to Page 3-2400-73, Failure Isolation -
Graphics Adapter.

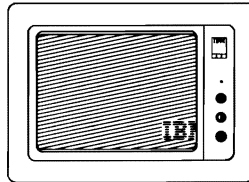
YES 

Your screen may be distorted or the characters may be the wrong size, as shown in the examples below.

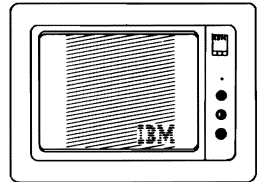
If the characters are the wrong size, go to Section 5, "Removal/Replacement and Adjustments" and perform the vertical size adjustment. Then answer the question below.



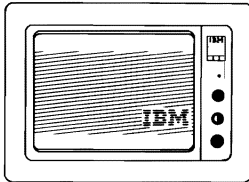
Too Dim



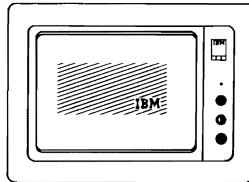
Too Wide



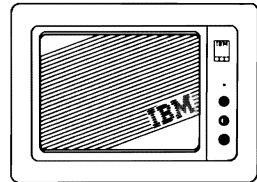
Too Narrow



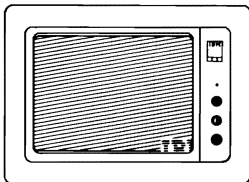
Too Short



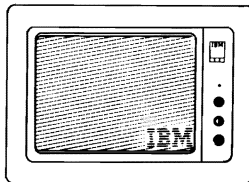
Shrunken



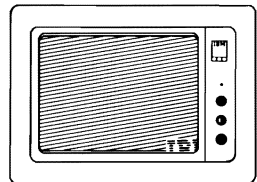
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus




**Characters Shifted Left
or Right, or Up or Down,
Off the Display Area**

**IS YOUR SYMPTOM THE SAME AS ONE OF THE
EXAMPLES SHOWN?**

YES Replace the display. See Section 5,
"Removal/Replacement and Adjustments".

NO 



Select 1Ø then press Enter.

The total amount of graphics memory installed on your Enhanced Graphics Adapter will be displayed.

XXX will be 064, 128, or 256 depending on the amount of graphics memory installed.

XXXXB GRAPHICS MEMORY INSTALLED.

IS THIS CORRECT(Y/N)?

IS THE CORRECT AMOUNT OF GRAPHICS MEMORY DISPLAYED?

NO Press N then Enter. Type in the correct amount of graphics memory installed and press Enter. Go to the next page.

YES Press Y then Enter. Go to the next page.

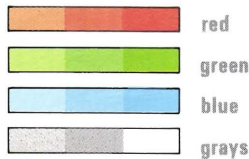
The display adapter and memory test should run without an error code being displayed. If the test runs successfully, the display attributes screen will be displayed.

Note: This test may take up to 10 seconds to complete.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.

THIS LINE IS BLINKING.



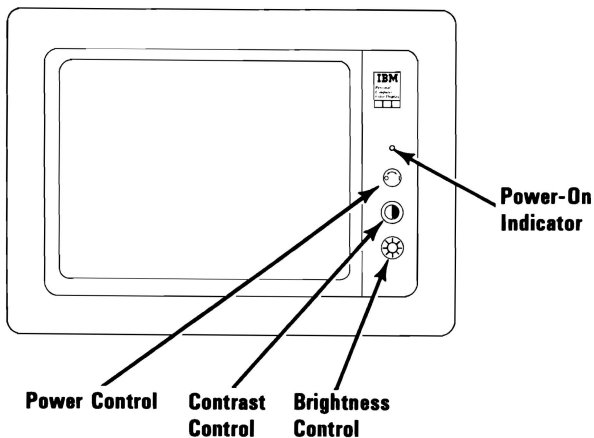
IS THE SCREEN CORRECT? (Y/N) 

DO YOU HAVE AN ERROR MESSAGE?

YES Go to Page 3-2400-72, Failure Isolation.

NO 

1. Turn the Brightness control counterclockwise, the brightness of the screen should decrease. Turn the Brightness control clockwise, the brightness of the screen should increase.
 2. Pull out and turn the Contrast control counterclockwise, the brightness of the characters should decrease. Turn the Contrast control clockwise, the brightness of the characters should increase. Push the Contrast control in, the screen should return to a preset value.
-



DO THE CONTROLS WORK CORRECTLY?

NO Replace the Enhanced Graphics Display.

YES 





Check the following items on the first display attributes screen.


1. All colors should be present and of the correct hue.
2. Adjust the brightness and contrast controls until the intensified line is brighter than the other lines.
3. The appearance of each line on your display should match the description on that same line.

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.

THIS LINE IS BLINKING.

	red
	green
	blue
	grays

IS THE SCREEN CORRECT? (Y/N) 

IS THE FIRST DISPLAY ATTRIBUTES SCREEN CORRECT?

NO Is the problem with the colors?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

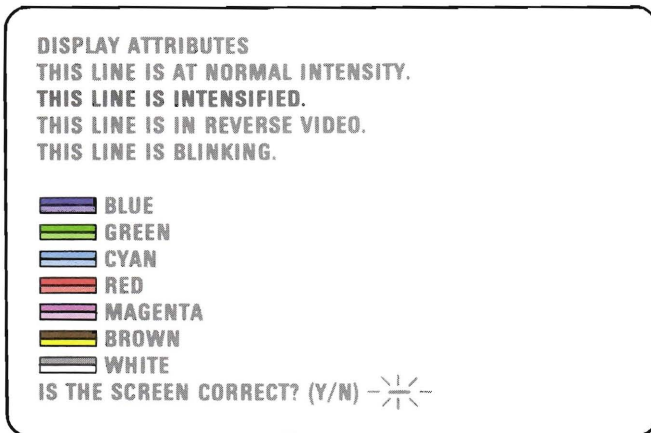
YES Replace the Display.

YES 

Press Y then Enter. The screen shown below will appear on your display.

Check the following items on the second display attributes screen.

1. All colors should be present and of the correct hue.
2. Adjust the brightness and contrast controls until the intensified line is brighter than the other lines.
3. The appearance of each line on your display should match the description on that same line.



IS THE SECOND DISPLAY ATTRIBUTES SCREEN CORRECT?

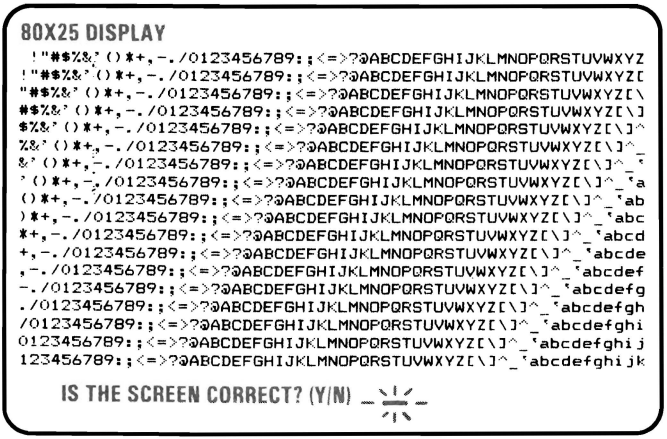
NO Is the problem with the colors?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES Replace the Display.

YES 

Press Y then Enter. The screen shown below will appear on your display. The border should be black.



IS THE BORDER BLACK AND ARE THE CHARACTERS PRESENT AND COMPLETE?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES

Press Y then Enter. The screen shown below will appear on your display. The border should be black.

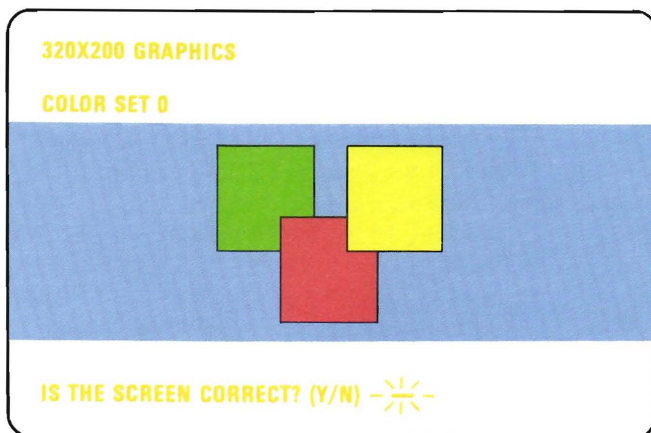
```
40X25 DISPLAY
!"#$%&'()*+,-./0123456789:;<=>?
!"#$%&'()*+,-./0123456789:;<=>?@
!"#$%&'()*+,-./0123456789:;<=>?@A
!"#$%&'()*+,-./0123456789:;<=>?@AB
!"#$%&'()*+,-./0123456789:;<=>?@ABC
!"#$%&'()*+,-./0123456789:;<=>?@ABCD
!"#$%&'()*+,-./0123456789:;<=>?@ABCDE
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEF
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFG
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGH
IS THE SCREEN CORRECT? (Y/N) -☀-
```

IS THE BORDER BLACK AND ARE THE CHARACTERS PRESENT AND COMPLETE?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below should appear on your display. The background should be dark cyan. From left to right the boxes should be intensified green, intensified red and intensified yellow. The characters are printed in intensified yellow.

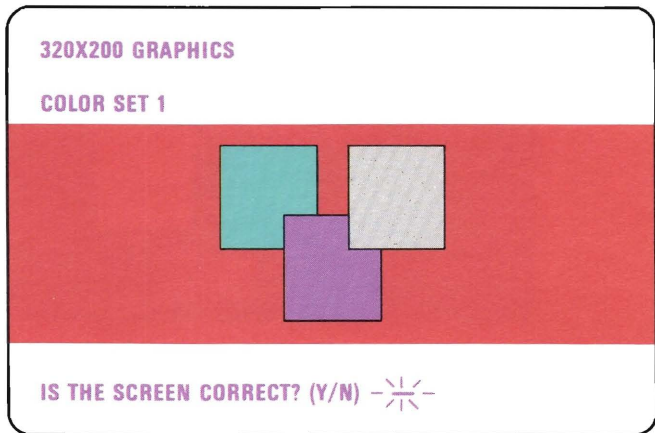


IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below will appear on your display. The background should be intensified red. From left to right the boxes should be dark cyan, dark magenta and non-intensified white (light grey). The characters are printed in dark magenta.

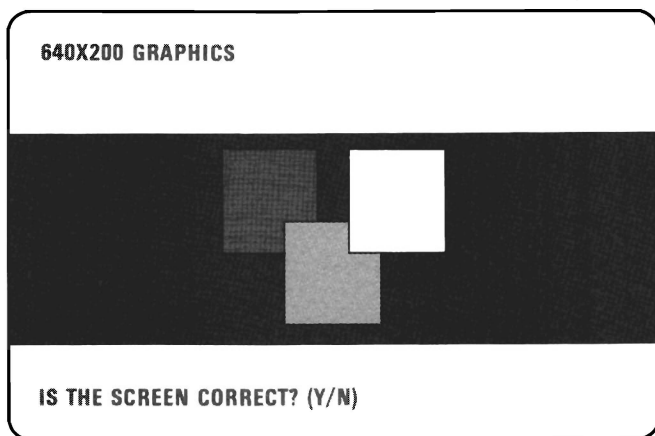


IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below will appear on your display. The background should be black. From left to right the boxes should be gray, gray and white. The characters are printed in white.

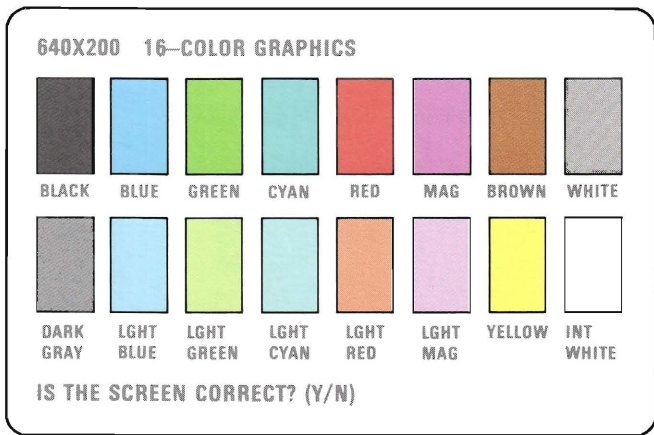


IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below will appear on your display. The background should be black. The 16 colorbars should match the description written below them.



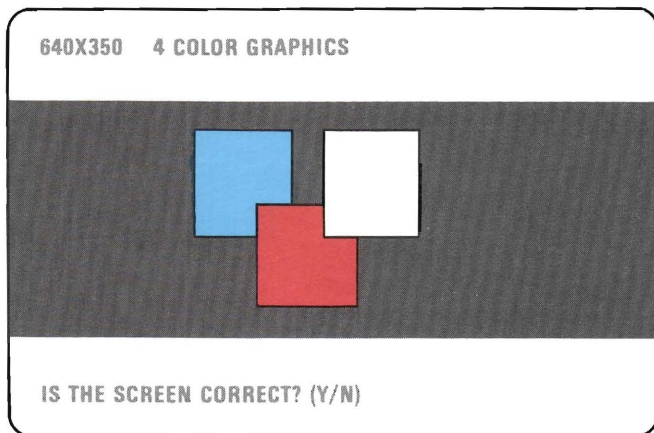
IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

The following screen will only appear if you have 64KB of graphics memory. If you have 128KB or more proceed to the next page.

Press Y then Enter. The screen shown below will appear on your display. The background should be black. From left to right the boxes should be blue, red and white. The characters are printed in white.



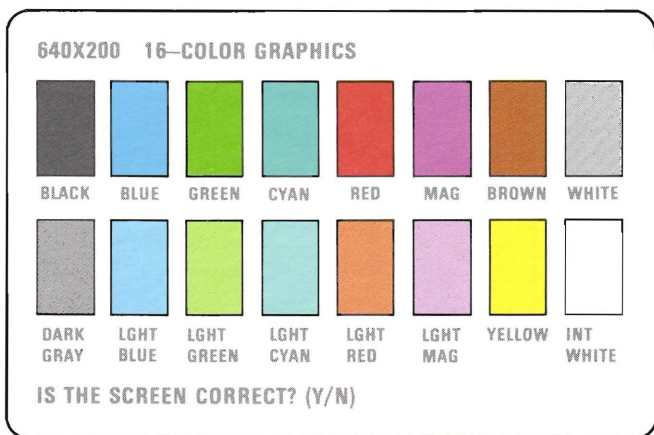
IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

The following screen will only appear if you have 128KB or more of graphics memory. If you only have 64KB proceed to the next page.

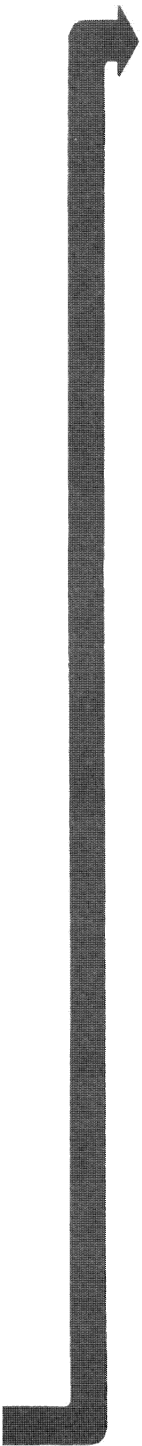
Press Y then Enter. The screen shown below will appear on your display. The background should be black. The 16 colorbars should match the description written below them.



IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES



Press Y then Enter. The screen shown below will appear on your display.

LIGHT PEN TEST

SKIP LIGHT PEN TEST? 

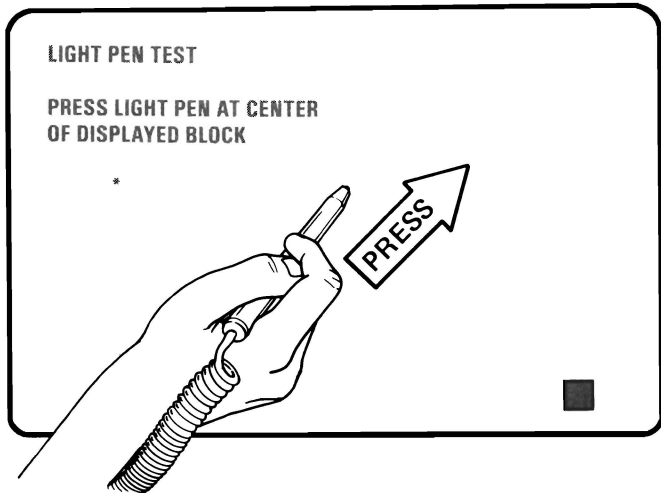
DO YOU HAVE A LIGHT PEN INSTALLED?

NO Go to page 3-2400-30.

YES 

This is a timed test. If you wait longer than 60 seconds to respond or if you are not careful where you place the top of the pen before you push it, you may receive an error message.

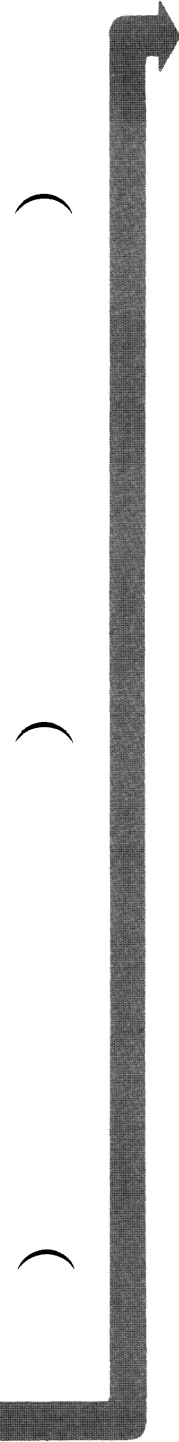
1. Position the tip of the light pen in the center of the block and press the pen toward the display as shown below. The displayed block will be replaced by an asterisk (*). Repeat this procedure for each new block that appears.
 2. Press N and then Enter to start the test.
-



WERE YOU ABLE TO COMPLETE THE LIGHT PEN TEST (DISPLAY CHANGES TO VIDEO PAGE 0)?

NO Replace the light pen.

YES 



You have gone through the PICs without successfully resolving your problem. The following steps should help you to find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Review the "Start" PIC.
3. Select "LOG UTILITIES" in the diagnostic menu to start an error log, and select "RUN TESTS MULTIPLE TIMES." This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to the "Start" PIC , or the appropriate PIC for the symptom.

If you have followed these procedures and still have an unresolved problem, you should seek technical assistance.

Diagnostics have successfully loaded and the screen shown below will be displayed.

COLOR DISPLAY AND
ENHANCED GRAPHICS ADAPTER TEST

- 0 - DISPLAY ADAPTER AND MEMORY TEST
 - 1 - DISPLAY ATTRIBUTES
 - 2 - CHARACTER SET
 - 3 - 80X25 DISPLAY
 - 4 - 40X25 DISPLAY
 - 5 - 320X200 GRAPHICS
 - 6 - 640X200 GRAPHICS
 - 7 - LIGHT PEN TEST
 - 8 - SCREEN PAGING
 - 9 - EXIT TO MAIN MENU
 - 10 - RUN ALL ABOVE TESTS
 - 11 - VIDEO TEST
 - 12 - SYNC TEST
- ENTER NUMBER OF DESIRED ACTION - ☼ -

IS THE ABOVE SCREEN STABLE?

NO Go to Section 5, "Removal/Replacement and Adjustments," and perform the vertical hold adjustment. Then begin this page again, and if you still do not have a stable screen, go to page 3-2400-60.

YES IS THE SCREEN READABLE?

NO Go to page 3-2400-73.

YES 

Your display may function correctly except that the cursor is out of position or is missing.

**COLOR DISPLAY AND
ENHANCED GRAPHICS ADAPTER TEST**

- 0 - DISPLAY ADAPTER AND MEMORY TEST
- 1 - DISPLAY ATTRIBUTES
- 2 - CHARACTER SET
- 3 - 80X25 DISPLAY
- 4 - 40X25 DISPLAY
- 5 - 320X200 GRAPHICS
- 6 - 640X200 GRAPHICS
- 7 - LIGHT PEN TEST
- 8 - SCREEN PAGING
- 9 - EXIT TO MAIN MENU
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION - ☼ -

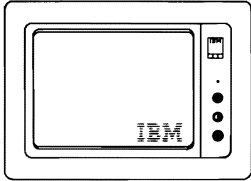
**IS THE CURSOR VISIBLE AND CORRECTLY
POSITIONED ON YOUR DISPLAY?**

NO Go to Page 3-2400-73, Failure Isolation -
Graphics Adapter.

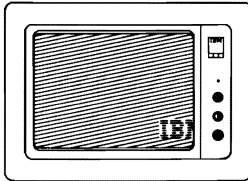
YES 

Your screen may be distorted or the characters may be the wrong size, as shown in the examples below.

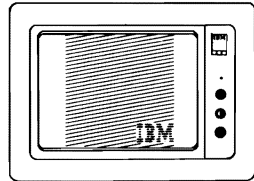
If the characters are the wrong size, go to Section 5, "Removal/Replacement and Adjustments" and perform the vertical size adjustment. Then answer the question below.



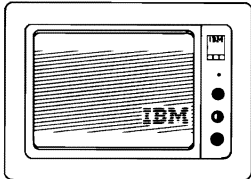
Too Dim



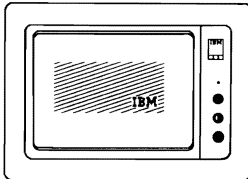
Too Wide



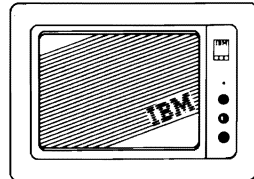
Too Narrow



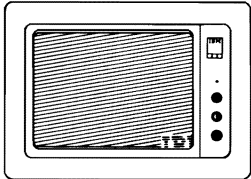
Too Short,



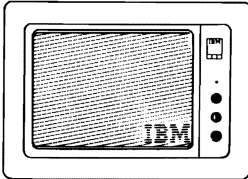
Shrunken



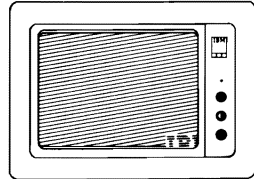
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus




**Characters Shifted Left
or Right, or Up or Down,
Off the Display Area**

**IS YOUR SYMPTOM THE SAME AS ONE OF THE
EXAMPLES SHOWN?**

YES Replace the display. See Section 5,
"Removal/Replacement and Adjustments".

NO



Select 1Ø then press Enter.

The total amount of graphics memory installed on your Enhanced Graphics Adapter will be displayed.

XXX will be 064, 128, or 256 depending on the amount of graphics memory installed.

XXXXKB GRAPHICS MEMORY INSTALLED.

IS THIS CORRECT(Y/N)?

IS THE CORRECT AMOUNT OF GRAPHICS MEMORY DISPLAYED?

NO Press N then Enter. Type in the correct amount of graphics memory installed and press Enter. Go to the next page.

YES Press Y then Enter. Go to the next page.

The display adapter and memory test should run without an error code being displayed. If the test runs successfully, the display attributes screen will be displayed.

Note: This test may take up to 10 seconds to complete.








DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY.

THIS LINE IS INTENSIFIED.

THIS LINE IS IN REVERSE VIDEO.

THIS LINE IS BLINKING.

 BLUE
 GREEN
 CYAN
 RED
 MAGENTA
 BROWN
 WHITE

IS THE SCREEN CORRECT? (Y/N) 

DO YOU HAVE AN ERROR MESSAGE?

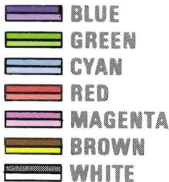
YES Go to Page 3-2400-72, Failure Isolation.


NO 

Check the following items on the display attributes screen.

1. All colors should be present and of the correct hue.
2. Adjust the brightness and contrast controls until the intensified line is brighter than the other lines.
3. The appearance of each line on your display should match the description on that same line.

DISPLAY ATTRIBUTES
THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.
THIS LINE IS BLINKING.



IS THE SCREEN CORRECT? (Y/N) 

IS THE DISPLAY ATTRIBUTES SCREEN CORRECT?

NO Is the problem with the colors?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES Replace the Display.

YES 

Press Y then Enter. The screen shown below will appear on your display. The border should be black.

80X25 DISPLAY

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`a  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`ab  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abc  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcd  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcde  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcdef  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcdefg  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcdefgh  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcdefghi  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcdefghij  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\n^_`abcdefghijk
```

IS THE SCREEN CORRECT? (Y/N) 

IS THE BORDER BLACK AND ARE THE CHARACTERS PRESENT AND COMPLETE?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below will appear on your display. The border should be white.

40X25 DISPLAY

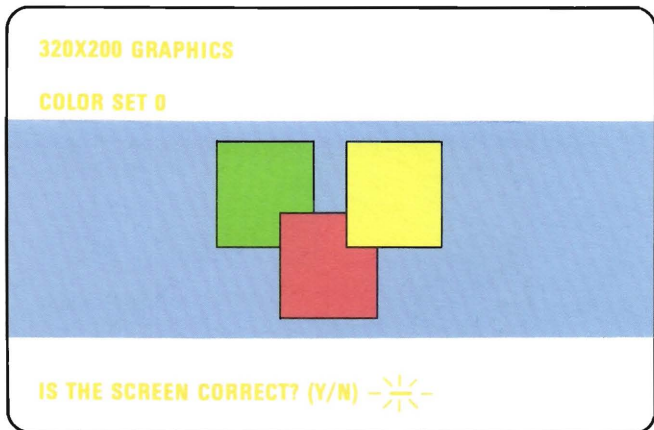
```
!"#$%&'()*+,-./0123456789:;<=>?  
!"#$%&'()*+,-./0123456789:;<=>?@  
!"#$%&'()*+,-./0123456789:;<=>?@A  
!"#$%&'()*+,-./0123456789:;<=>?@AB  
!"#$%&'()*+,-./0123456789:;<=>?@ABC  
!"#$%&'()*+,-./0123456789:;<=>?@ABCD  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDE  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEF  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFG  
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGH  
IS THE SCREEN CORRECT? (Y/N) -☀-
```

IS THE BORDER WHITE AND ARE THE CHARACTERS PRESENT AND COMPLETE?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES

Press Y then Enter. The screen shown below will appear on your display. The background should be dark cyan. From left to right the boxes should be intensified green, intensified red and intensified yellow. The characters are printed in intensified yellow.

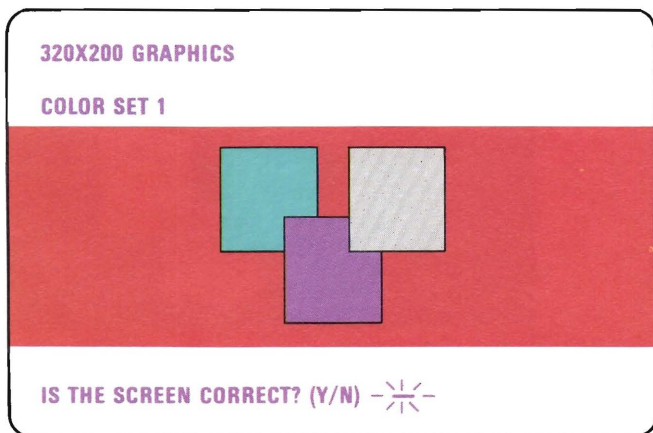


IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below will appear on your display. The background should be intensified red. From left to right the boxes should be dark cyan, dark magenta and non-intensified white (light grey). The characters are printed in dark magenta.

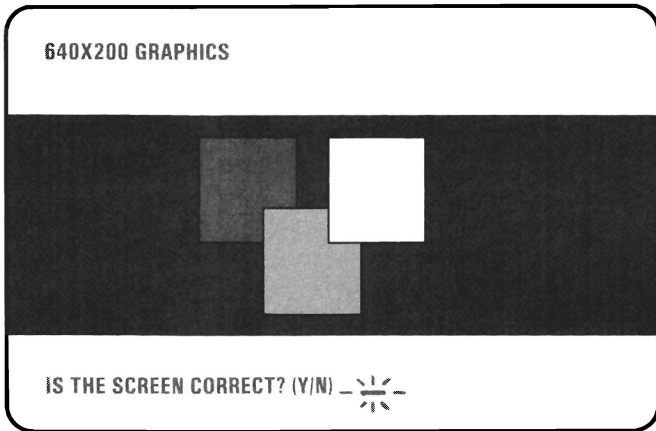


IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

Press Y then Enter. The screen shown below will appear on your display. The background should be black. From left to right the boxes be gray, gray and white. The characters are printed in white.

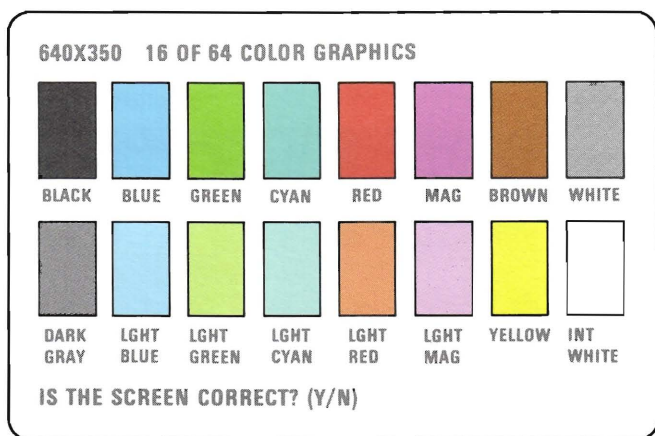


IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

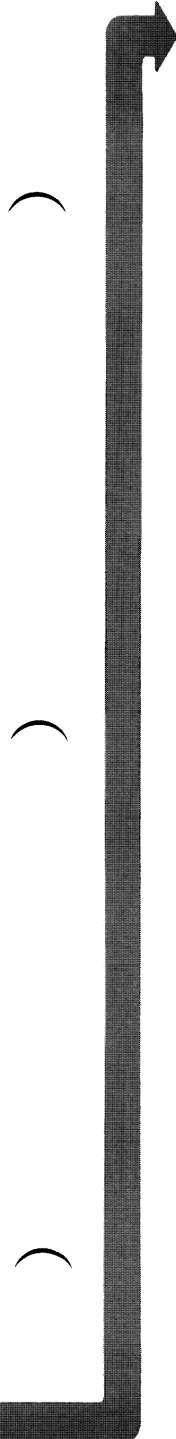
Press Y then Enter. The screen shown below will appear on your display. The background should be black and the 16 colorbars should match the description written below each colorbar.



IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 



Press Y then Enter. The screen shown below will appear on your display.

LIGHT PEN TEST

SKIP LIGHT PEN TEST? 

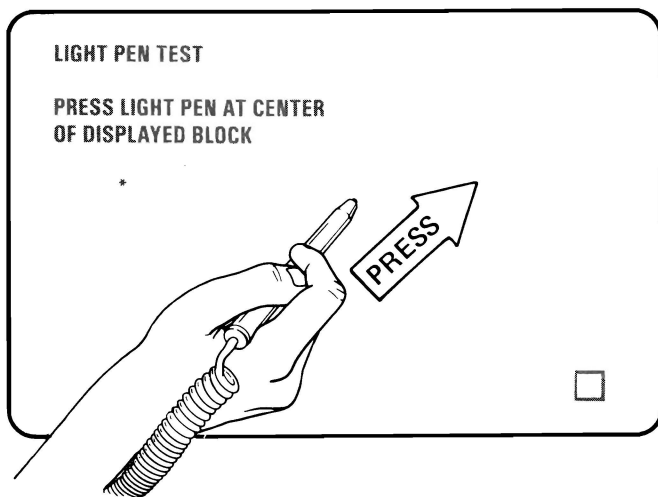
DO YOU HAVE A LIGHT PEN INSTALLED?

NO Go to page 3-2400-47.

YES 

This is a timed test. If you wait longer than 60 seconds to respond or if you are not careful where you place the top of the pen before you push it, you may receive an error message.


1. Position the tip of the light pen in the center of the block and press the pen toward the display as shown below. The displayed block will be replaced by an asterisk (*). Repeat this procedure for each new block that appears.
 2. Press N and then press Enter to start the test.
-



WERE YOU ABLE TO COMPLETE THE LIGHT PEN TEST (DISPLAY CHANGES TO VIDEO PAGE 0)?

NO Replace the light pen.

YES 




You have gone through the PICs without successfully resolving your problem. The following steps should help you to find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Review the "Start" PIC.
3. Select "LOG UTILITIES" in the diagnostic menu to start an error log, and select "RUN TESTS MULTIPLE TIMES." This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to the "Start" PIC or the appropriate PIC for the symptom.

If you have followed these procedures and still have an unresolved problem, you should seek technical assistance.

Diagnostics have successfully loaded and the screen shown below will be displayed.

**IBM MONOCHROME DISPLAY AND
ENHANCED GRAPHICS ADAPTER TEST**

- 0 – DISPLAY ADAPTER AND MEMORY TEST
 - 1 – DISPLAY ATTRIBUTES
 - 2 – CHARACTER SET
 - 3 – 80X25 DISPLAY
 - 4 – 640X350 MONO GRAPHICS
 - 8 – SCREEN PAGING
 - 9 – EXIT TO MAIN MENU
 - 10 – RUN ALL ABOVE TESTS
 - 11 – VIDEO TEST
 - 12 – SYNC TEST
- ENTER NUMBER OF DESIRED ACTION 

IS THE ABOVE SCREEN STABLE?

NO Go to Page 3-2400-60

YES IS THE SCREEN READABLE?

NO Go to page 3-2400-73.

YES 

Your display may function correctly except that the cursor is out of position or is missing.

**IBM MONOCHROME DISPLAY AND
ENHANCED GRAPHICS ADAPTER TEST**

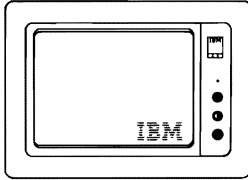
- 0 – DISPLAY ADAPTER AND MEMORY TEST
 - 1 – DISPLAY ATTRIBUTES
 - 2 – CHARACTER SET
 - 3 – 80X25 DISPLAY
 - 4 – 640X350 MONO GRAPHICS
 - 8 – SCREEN PAGING
 - 9 – EXIT TO MAIN MENU
 - 10 – RUN ALL ABOVE TESTS
 - 11 – VIDEO TEST
 - 12 – SYNC TEST
- ENTER NUMBER OF DESIRED ACTION -☀-

**IS THE CURSOR VISIBLE AND CORRECTLY
POSITIONED ON YOUR DISPLAY?**

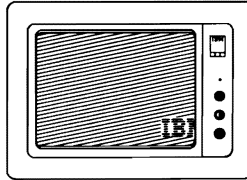
NO Go to Page 3-2400-73, Failure Isolation -
Graphics Adapter.

YES 

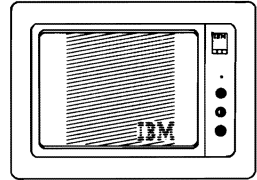
Your screen may be distorted or the characters may be the wrong size, as shown in the examples below.



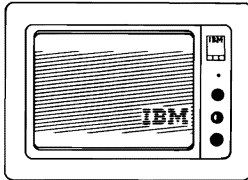
Too Dim



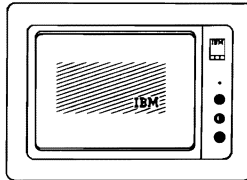
Too Wide



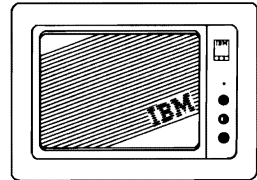
Too Narrow



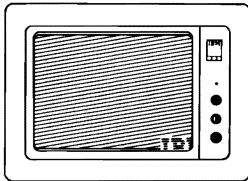
Too Short



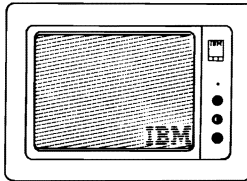
Shrunken



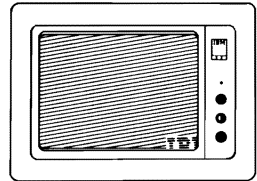
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus




**Characters Shifted Left
or Right, or Up or Down,
Off the Display Area**

**IS YOUR SYMPTOM THE SAME AS ONE OF THE
EXAMPLES SHOWN?**

YES Replace the display. See Section 5,
"Removal/Replacement and Adjustments."

NO



Select 1Ø then press Enter.

The total amount of graphics memory installed on your Enhanced Graphics Adapter will be displayed.

XXX will be 064, 128, or 256 depending on the amount of graphics memory installed.

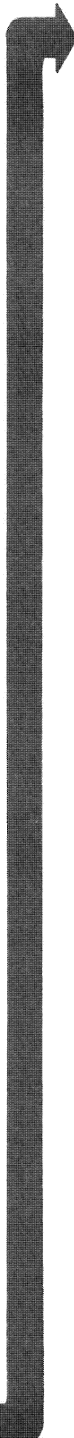
XXXKB GRAPHICS MEMORY INSTALLED.

IS THIS CORRECT(Y/N)?

**IS THE AMOUNT OF GRAPHICS MEMORY
DISPLAYED CORRECT?**

NO Press N then Enter. Type in the correct amount of graphics memory installed and press Enter. Go to the next page.

YES Press Y then Enter. Go to the next page.



The display adapter and memory test should run without an error code being displayed. If the test runs successfully the display attributes screen will be displayed.

Note: This test may take up to 10 seconds to complete.

DISPLAY ATTRIBUTES

**THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.**

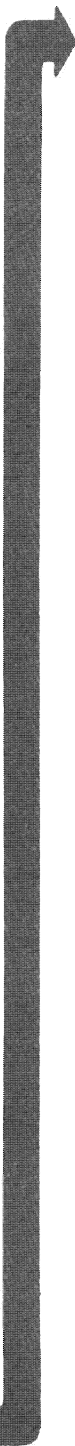
**THIS LINE IS BLINKING.
THIS LINE IS UNDERLINED.**

IS THE SCREEN CORRECT? (Y/N) -☼-

DO YOU HAVE AN ERROR MESSAGE?

YES Go to Page 3-2400-72, Failure Isolation.

NO 



Check the following items on the display attributes screen.

1. Adjust the brightness and contrast controls until the intensified line is brighter than the other lines.
 2. The appearance of each line on your display should match the description on that same line.
-

DISPLAY ATTRIBUTES

**THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.**

**THIS LINE IS BLINKING.
THIS LINE IS UNDERLINED.**

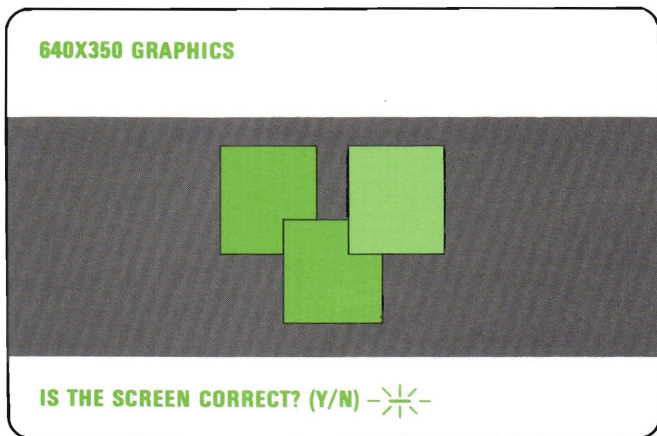
IS THE SCREEN CORRECT? (Y/N) 

**IS THE DISPLAY ATTRIBUTES SCREEN
CORRECT?**

NO Go to Page 3-2400-73, Failure Isolation -
Graphics Adapter.

YES 

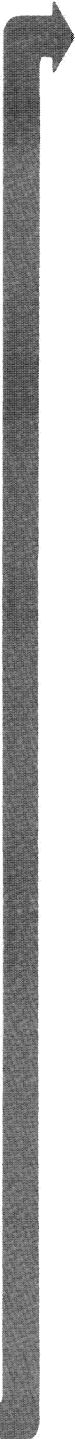
Press Y then Enter. The screen shown below will appear on your display. The background should be black. From left to right the boxes should be green, green and blinking. The characters are printed in green.



IS THE GRAPHIC DISPLAY CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

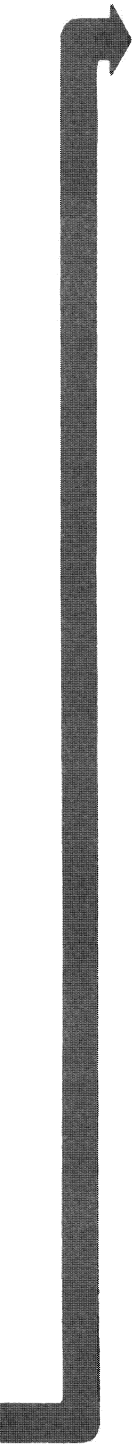
YES 



You have gone through the PICs without successfully resolving your problem. The following steps should help you to find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Review the "Start" PIC.
3. Select "LOG UTILITIES" in the diagnostic menu to start an error log, and select "RUN TESTS MULTIPLE TIMES." This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to the "Start" PIC or the appropriate PIC for the symptom.

If you have followed these procedures and still have an unresolved problem, you should seek technical assistance.

- 
1. Set the Power switch on the System Unit to Off.
 2. Disconnect all cables, devices, and wrap plugs from the asynchronous and alternate asynchronous adapters (if attached).
 3. Insert your Advanced Diagnostics diskette.
 4. Set the Power switch on the System Unit to On.
 5. Press the following keys in the sequence listed and listen for the "BEEP" each time you press Enter.
-

CONTINUE



Audio Response Diagnostics — Part 1

Note: Use the numbers on the top row of the keyboard; do not use the numeric keypad. If the Enhanced Graphics Adapter is the only display adapter installed, skip Step 2.

STEPS		AUDIO RESPONSE
1. Press Ø	Press Enter	1 BEEP
Note: If you do not have a display attached to the second display adapter, answer No in Step 2.		
2. Press Y or N	Press Enter	1 BEEP
3. Press Y	Press Enter	1 BEEP
4. Press Ø	Press Enter	1 BEEP

WERE YOU ABLE TO COMPLETE THE AUDIO RESPONSE DIAGNOSTICS BY PRESSING THE ABOVE SEQUENCE OF KEYS?

NO You may have a power supply or connector problem. Check your connectors. Go to PIC 3-020-1, "Power."

YES 

Audio Response Diagnostics — Part 2

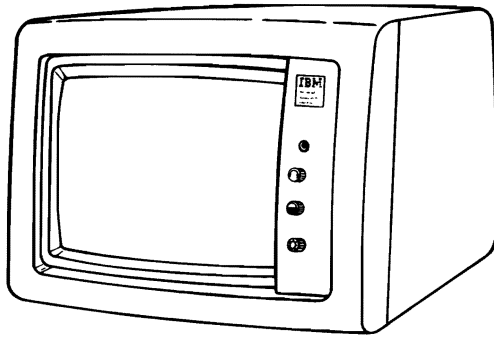
STEPS		AUDIO RESPONSE
5. Press 24	Press Enter	2 Beeps

**WERE YOU ABLE TO COMPLETE THE AUDIO
RESPONSE DIAGNOSTICS BY PRESSING THE
ABOVE SEQUENCE OF KEYS?**

NO Replace the Enhanced Graphics Adapter.

YES 

The diagnostic procedures are different for color and monochrome displays.

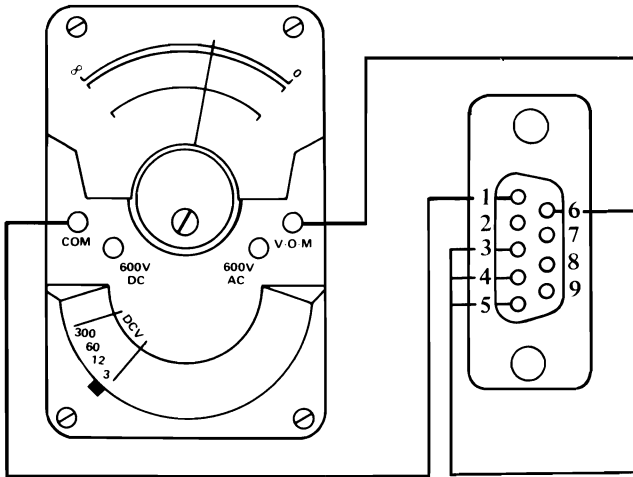


DO YOU HAVE A MONOCHROME DISPLAY ATTACHED TO THE ENHANCED GRAPHICS ADAPTER?

YES Go to page 3-2400-68 to continue.

NO 

1. Disconnect the display signal cable.
2. Select 11 then press Enter.
3. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below. Verify the switch setting to be sure of your system configuration.



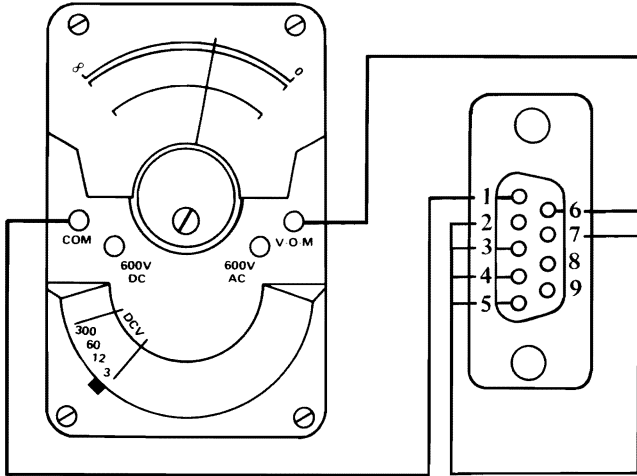
Pins	Color	Enhanced in normal color	Enhanced in enhanced color
3	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc
4	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc
5	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc
6	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc	2.5 - 5.5 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

1. Press Enter.
2. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below.



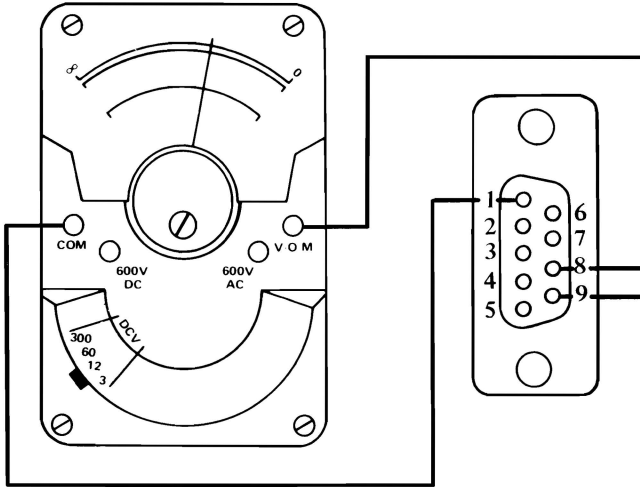
Pins	Color	Enhanced in normal color	Enhanced in enhanced color
2	GROUND	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc
3	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc
4	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc
5	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc
6	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc
7	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc	0.0 - 0.5 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES

1. Press 9 and wait for two "BEEPS".
2. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below.



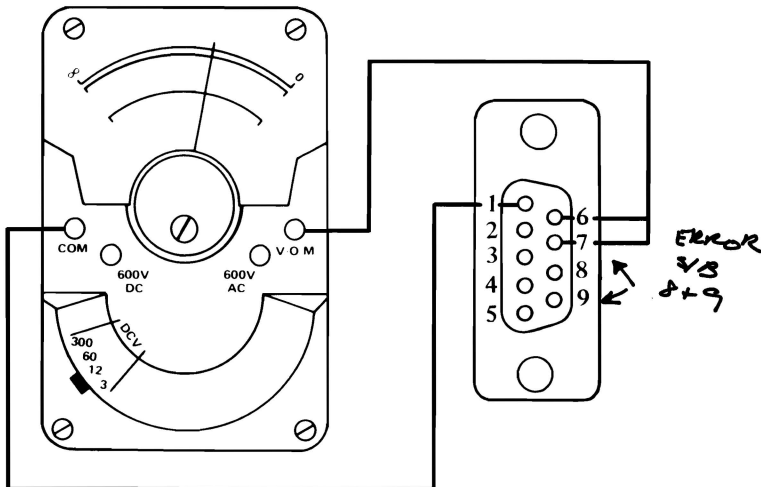
Pins	Color	Enhanced in normal color	Enhanced in enhanced color
8	0.0 - 0.7 Vdc	0.0 - 0.7 Vdc	0.0 - 0.7 Vdc
9	0.0 - 0.4 Vdc	2.4 - 5.5 Vdc	2.4 - 5.5 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

1. Select 12 then press Enter.
2. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below.



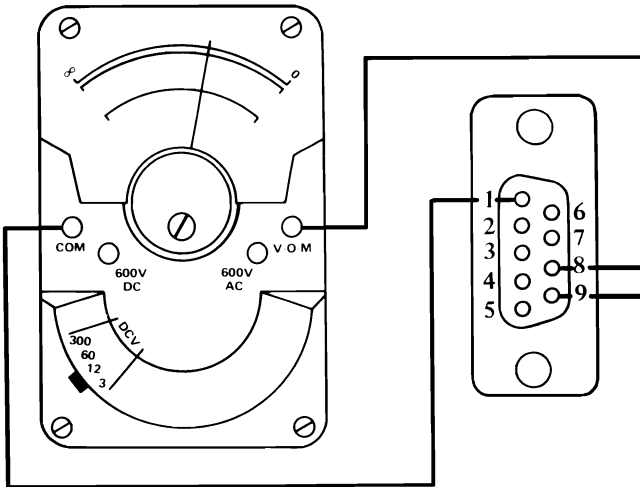
Pins	Color	Enhanced in normal color	Enhanced in enhanced color
8	0.8 - 1.5 Vdc	1.5 - 2.5 Vdc	1.5 - 2.5 Vdc
9	0.5 - 1.0 Vdc	0.5 - 1.0 Vdc	2.4 - 5.5 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES Replace the color display.

1. Disconnect the monochrome display signal cable.
2. Select 11 then press Enter.
3. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below. Verify the switch setting to be sure of your system configuration.



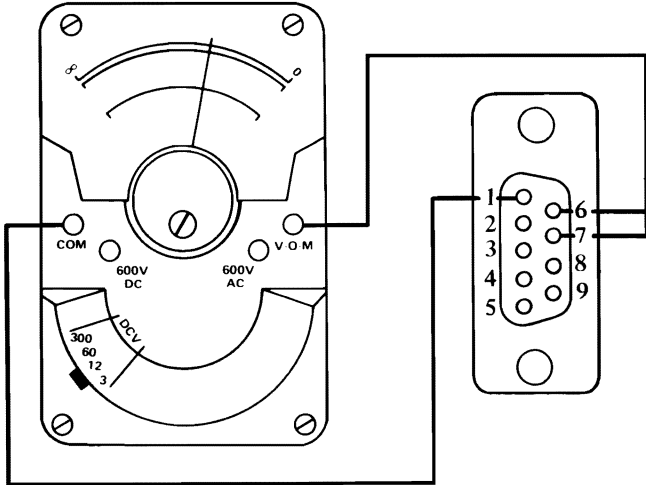
Pins	Voltage
6	2.4 - 3.8 Vdc
7	2.4 - 3.8 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES

1. Press Enter.
2. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below.



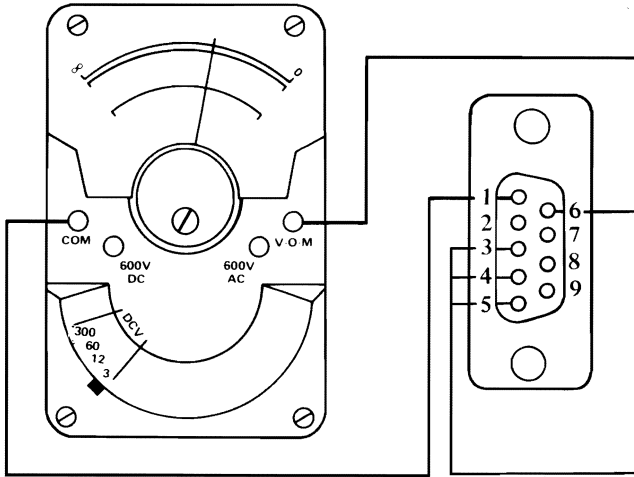
Pins	Voltage
6	0.0 - 0.5 Vdc
7	0.0 - 0.5 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES 

1. Press Enter and wait for two beeps.
2. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below.



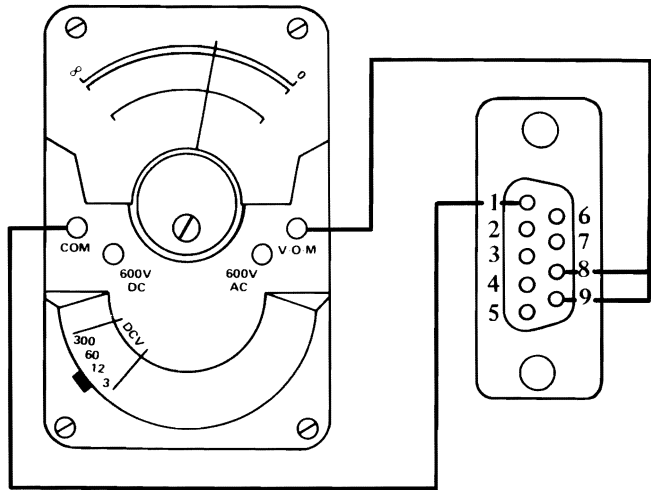
Pins	Voltage
8	0.4 - 1.1 Vdc
9	3.0 - 4.2 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES

1. Select 12 then press Enter.
2. Measure the voltage present, at the nine pin connector on the adapter, between pin 1 (ground) and the pins shown in the chart below.



Pins	Voltage
8	0.4 - 1.1 Vdc
9	3.0 - 4.2 Vdc

WERE THE VOLTAGES CORRECT?

NO Go to Page 3-2400-73, Failure Isolation - Graphics Adapter.

YES Replace the monochrome display.

Failure Isolation

The following procedures help you isolate the failing components. You have entered this procedure because you received an error message during one of the diagnostic test.

Your error message may also contain the phrase "FAILING GRAPHICS MEMORY XXX XXX" (XXX XXX is a six digit number), as shown in the example below.

```
0:01:52
ERROR -
Enhanced Graphics Adapt-XXX 2401 S
0 - DISPLAY ADAPTER AND MEMORY TEST
FAILING GRAPHICS MEMORY XXX XXX

PRESS ENTER TO CONTINUE
?
```

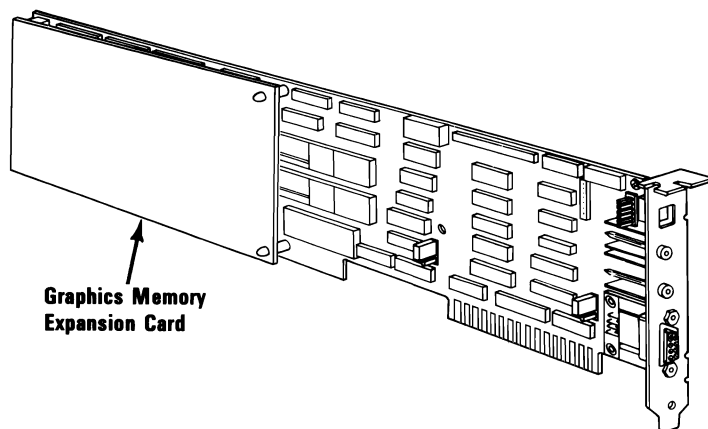
DOES YOUR ERROR MESSAGE CONTAIN THE PHRASE, "FAILING GRAPHICS MEMORY XXX XXX"?

YES Go to Page 3-2400-79, Failure Isolation - Memory Module.

NO 

Failure Isolation - Graphics Adapter

The following procedures help you isolate the failing components on the Enhanced Graphics Adapter.



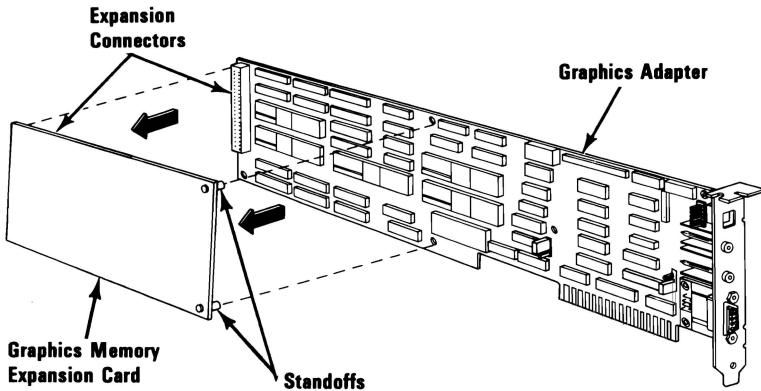
Graphics Memory
Expansion Card

DO YOU HAVE A GRAPHICS MEMORY EXPANSION CARD INSTALLED?

NO Replace the Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustments."

YES 

1. Remove the Graphics Memory Expansion Card installed on your Enhanced Graphics Adapter. See Section 5, "Removal/Replacements and Adjustments."
 2. Install the Enhanced Graphics Adapter without the Expansion Card. See Section 5.
 3. Set the Power switch on the System Unit to On.
 4. Rerun the failing diagnostic test.
-



DID THE SAME FAILURE OCCUR WITH THE EXPANSION CARD REMOVED?

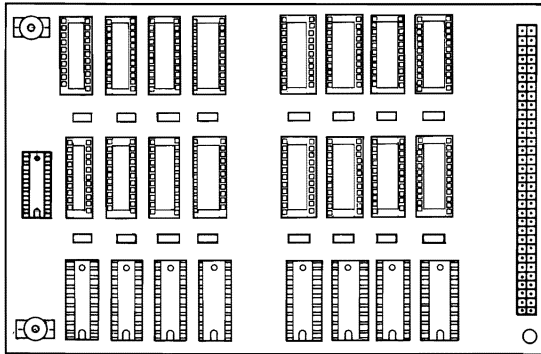
NO You have a bad Graphics Memory Expansion Card or a bad Memory Module installed on it. To isolate the failure go to page 3-2400-75.

YES Replace the Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustments."

Failure Isolation-Expansion Card

The following procedures help you isolate the failing components on the Graphics Memory Expansion Card.

1. Refer to the procedure on page 3-2400-78 and remove the memory modules installed on bank 03.
-



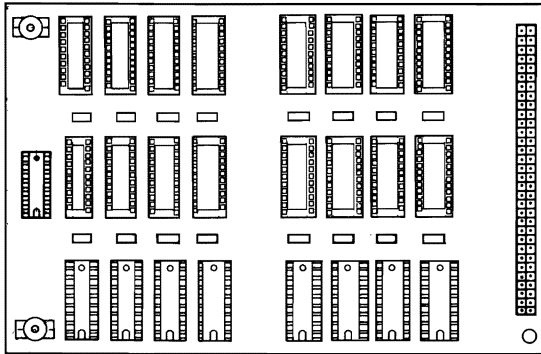
DID THE SAME FAILURE OCCUR WITH BANK 03 MODULES REMOVED?

- NO** Replace the 8 modules in Bank 03. See Section 5, "Removal/Replacement and Adjustment." Rerun the failing diagnostic test to verify the fix.

Note: If you replace all 8 modules and the failure reoccurs replace the Graphics Memory Expansion Card.

YES 

1. Refer to the procedure on page 3-2400-78 and remove the memory modules installed on bank 02.
-



**DID THE SAME FAILURE OCCUR WITH BANK 02
MODULES REMOVED?**

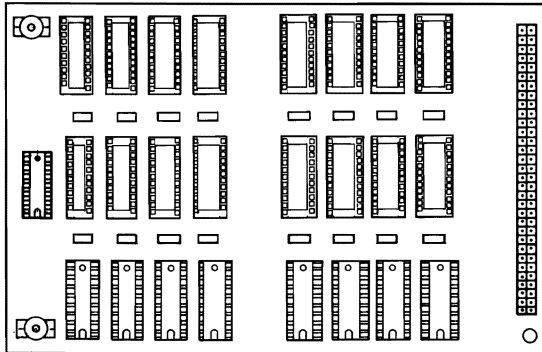
- NO** Replace the 8 modules in Bank 02. See Section 5, "Removal/Replacement and Adjustment." Rerun the failing diagnostic test to verify the fix.

Note: If you replace all 8 modules and the failure reoccurs replace the Graphics Memory Expansion Card.

YES



1. Refer to the procedure on page 3-2400-78 and remove the memory modules installed on bank 01.
-



**DID THE SAME FAILURE OCCUR WITH BANK 01
MODULES REMOVED?**

- NO** Replace the 8 modules in Bank 01. See Section 5, "Removal/Replacement and Adjustment." Rerun the failing diagnostic test to verify the fix.

Note: If you replace all 8 modules and the failure reoccurs replace the Graphics Memory Expansion Card.

- YES** Replace the Graphics Memory Expansion Card. See Section 5, "Removal/Replacement and Adjustment."

The following procedure helps you to isolate a failing bank of memory modules. Remove the modules one bank at a time and rerun the failing diagnostic test.

- 1** Set the Power switch on the System Unit to Off.
- 2** Remove the Graphics Memory Expansion Card installed on your Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustment."
- 3** Remove all 8 Graphics Memory Modules installed on the selected Bank of the Graphics Memory Expansion Card.
- 4** Install the Graphics Memory Expansion Card on the Enhanced Graphics Adapter.
- 5** Install the Enhanced Graphics Adapter in the System Unit.
- 6** Set the Power switch on the System Unit to On.
- 7** Rerun the failing diagnostic test.

**RETURN TO THE STEP THAT DIRECTED YOU
HERE.**

Failure Isolation - Memory Modules

This procedure helps you to identify a failing Graphics Memory Module. You have entered this procedure because you received a six-digit error code when you ran the Enhanced Graphics Adapter memory test.

A memory failure displays the failing address in the form of a six-digit error code. If the first two digits are **00**, or if the last two digits are **11**, it indicates a failure on the Enhanced Graphics Adapter. The examples, error code **000210**, or error code **020211** correspond to a failing module on the adapter. The modules are not replaceable on the adapter, so the adapter must be replaced.

```
0:01:52
ERROR -
Enhanced Graphics Adapt-XXX 2401 S
0 - DISPLAY ADAPTER AND MEMORY TEST
Failing GRAPHICS MEMORY XXX XXX

PRESS ENTER TO CONTINUE
?
```

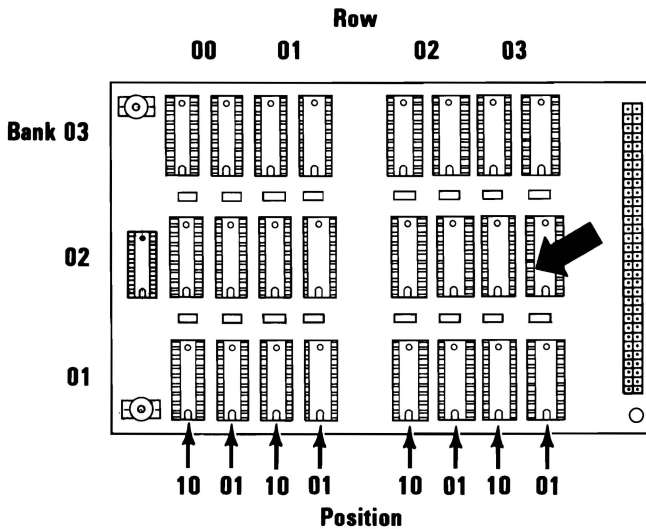
ARE THE FIRST TWO DIGITS OF THE ERROR CODE 00, OR THE LAST TWO DIGITS 11?

YES Replace the Enhanced Graphics Adapter. See Section 5, "Removal/Replacement and Adjustment."


NO 

The first two digits of the error code identifies the bank that has the failing module. The third and fourth digits identify the row. The last two digits identify the failing position (left or right) of the module. For example, error code **020301** corresponds to a failing module identified by the arrow in bank **02**, row **03**, the **right** module position.

1. Replace the failing Graphics Memory Module. See Section 5, "Removal/Replacement and Adjustment."



CONTINUE



Go to page 3-2400-1 and rerun the diagnostics. After the diagnostics are complete, return to this page.

0:01:52
ERROR -
Enhanced Graphics Adapt-XXX 2401 S
0 - DISPLAY ADAPTER AND MEMORY TEST
FAILING GRAPHICS MEMORY XXX XXX

PRESS ENTER TO CONTINUE
?

**DID YOU RECEIVE A GRAPHICS MEMORY
ERROR CODE?**

NO Your system is functioning correctly.

YES 



Compare this error code with the previous error code.

0:01:52
ERROR —
Enhanced Graphics Adapt-XXX 2401 S
0 — DISPLAY ADAPTER AND MEMORY TEST
FAILING GRAPHICS MEMORY XXX XXX

PRESS ENTER TO CONTINUE
?

IS THE NEW ERROR CODE IDENTICAL TO THE PREVIOUS ERROR CODE?

- NO** There is another failing Graphics Memory Module. Go to 3-2400-79 and follow that procedure again.
- YES** Replace the Graphics Memory Expansion Card. See Section 5, "Removal/Replacement and Adjustment."

Color Printer

You have entered this PIC because you received a 29XX error message, or you suspect a problem with your Color Printer.

1. Ensure the Color Printer power cord is plugged into a functioning, properly grounded outlet.
2. Ensure the Color Printer Power switch is turned On.
3. Repeat the operation or diagnostic test that failed.



29XX

COLOR PRINTER

DID YOU RECEIVE A 29XX ERROR CODE, OR HAVE A PROBLEM WITH YOUR COLOR PRINTER?

- NO** Repeat the operation or diagnostic test to ensure that the Color Printer is functioning properly. If you suspect an intermittent problem, go to page 3-010-1.
- YES** Refer to the *IBM Color Printer Hardware Maintenance and Service* manual for further diagnostic tests.

Notes:



PC Network

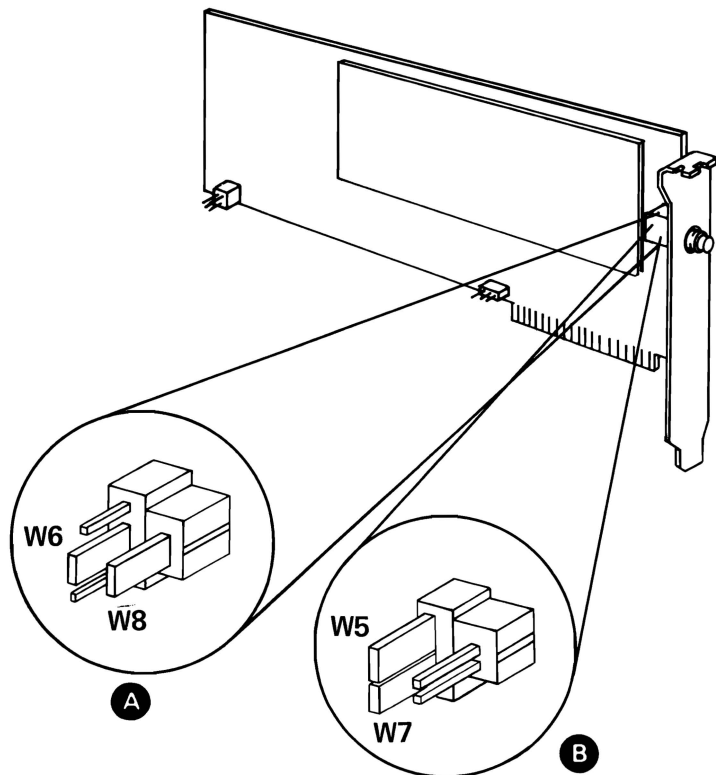
You have entered this PIC because you have a 30XX error code, a 31XX error code, a CC0000 ROM error, or have identified a PC Network failure.

Note: After replacing any component on the PC Network return to this page and perform the diagnostic routines for the PC Network.

CONTINUE 

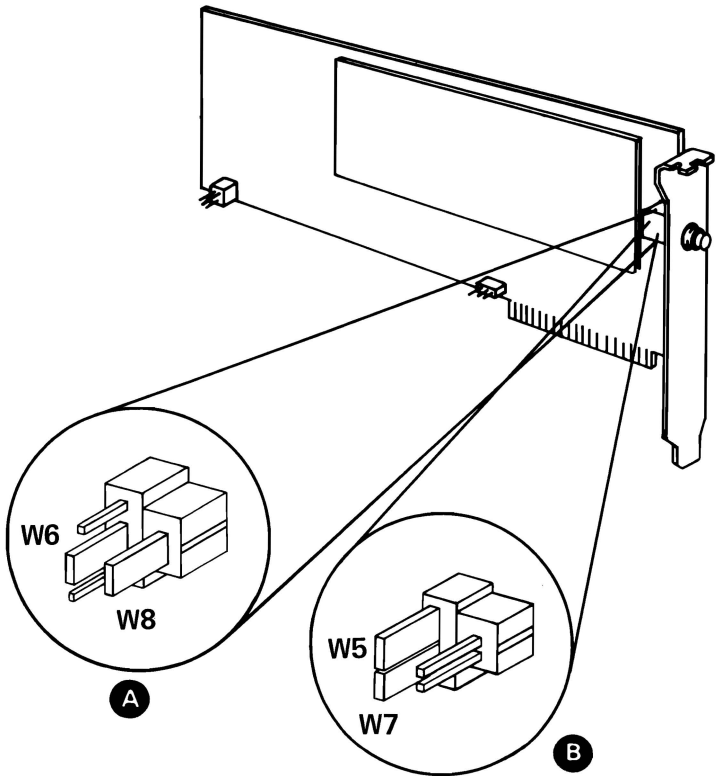
Make sure that the jumpers have been set correctly on the failing computer. To do this:

1. Set the Power switch on the system unit to Off.
2. Remove the cover on the system unit.
3. When one PC Network Adapter is installed make sure that **W8** (the ROM enable jumper) is positioned as **A**.
4. When two PC Network Adapters are installed make sure that **W8** is positioned as **A** in one adapter and **W8** is removed as **B** in the other adapter.



CONTINUE

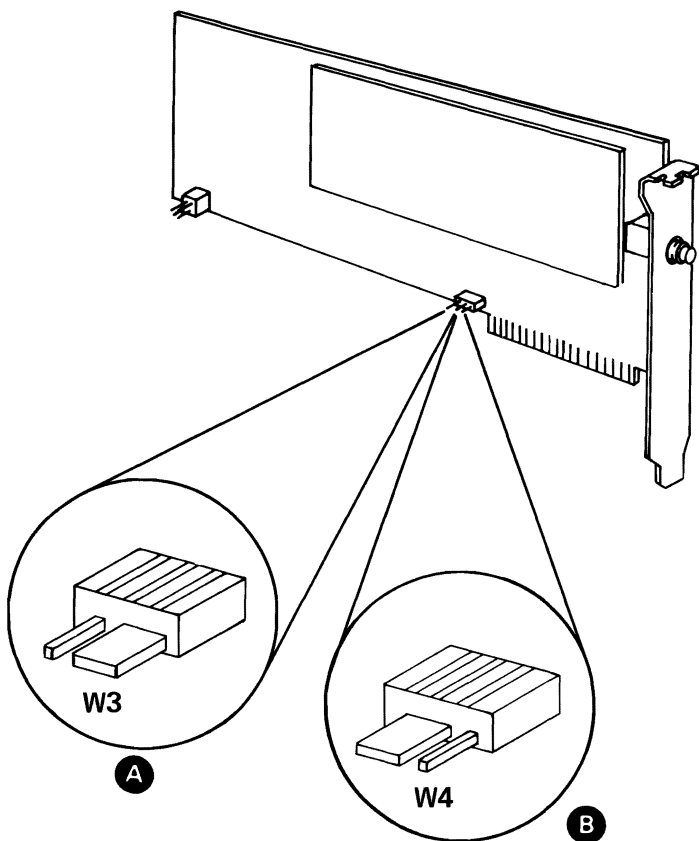
5. When **W6** is jumpered as **A** the PC Network Adapter is identified as the primary PC Network Adapter.
6. When **W5** and **W7** are jumpered as **B** the PC Network Adapter is identified as the alternate PC Network Adapter.
7. When two PC Network Adapters are installed make sure that one adapter is jumpered as **A** and the other as **B** .




PC NETWORK

CONTINUE

8. When **W3** is jumpered as **A** the PC Network Adapter uses interrupt level 2.
9. When **W4** is jumpered as **B** the PC Network Adapter uses interrupt level 3.
10. When two PC Network Adapters are installed make sure that one adapter is jumpered as **A** and the other as **B**.



Install the covers, then continue.




The following pages describe how to run the diagnostic routines for your PC Network.

1. Set the system unit's Power switch to Off.
 2. Wait at least 5 seconds.
 3. Insert the Advanced Diagnostics diskette into drive A.
 4. Set the system unit's Power switch to On.
 5. Observe the Power On Self Test (POST).
-

DOES AN ERROR MESSAGE OCCUR DURING THE POST?

YES Press F1, then continue with the next page.

NO 

- 
1. The advanced diagnostic diskette loads and you will receive the advanced diagnostics option menu.
 2. Press **0**(zero), then **Enter**.
 3. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 4. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.
 5. Press **1 (RUN TESTS MULTIPLE TIMES)**, then **Enter**.
 6. Follow the instructions on the display to select the PC Network Adapters you wish to test.
 7. Select the number of times to run the tests, then press **Enter**. (Press **Enter** to run tests continuously.)
 8. Press **Y (WAIT EACH TIME AN ERROR OCCURS (Y/N)?)**, then **Enter**.

CONTINUE 

The following appears.



TESTING PC NETWORK

DO YOU RECEIVE AN ERROR MESSAGE?

NO Go to page 3-3000-10.

YES 

PC NETWORK

The following figures list the possible PC Network errors. Take the action indicated if an error occurs.

Error	Cause	Action
3001	Processor Error	Replace Primary PC Network Adapter
3002	ROM Failure	Replace Primary PC Network Adapter
3003	ID Failure	Replace Primary PC Network Adapter
3004	RAM Failure	Replace Primary PC Network Adapter
3005	Host Interrupt Failure	Replace Primary PC Network Adapter
3006	+ or - 12-Vdc Failure	Replace Primary PC Network Adapter
3007	Digital Wrap Failure	Replace Primary PC Network Adapter
3008	Host Interrupt Failure	Replace Primary PC Network Adapter
3009	Sync. Failure	Replace Primary PC Network Adapter
3010	Time Out Failure	Replace Primary PC Network Adapter
3011	Time Out Failure	Replace Primary PC Network Adapter
3012	Digital Failure	Replace PC Network Adapter
3013	Digital Failure	Replace Primary PC Network Adapter
3014	Digital Failure	Replace Primary PC Network Adapter
3015	Analog Failure (RF)	Go to page 3-3000-13
3020	ROM BIOS Failure	Go to page 3-3000-11
3041*	Continuous RF signal detected	Go to page 3-3000-13
3042*	Continuous RF signal sent	Replace Primary PC Network Adapter

* If a 3041 or 3042 error occurs with the cover removed, install the cover and re-run the test. If the error remains, take the action indicated in the figure above.

CONTINUE

Error	Cause	Action
3101	Processor Error	Replace Alternate PC Network Adapter
3102	ROM Failure	Replace Alternate PC Network Adapter
3103	ID Failure	Replace Alternate PC Network Adapter
3104	RAM Failure	Replace Alternate PC Network Adapter
3105	Host Interrupt Failure	Replace Alternate PC Network Adapter
3106	+ or - 12-Vdc Failure	Replace Alternate PC Network Adapter
3107	Digital Wrap Failure	Replace Alternate PC Network Adapter
3108	Host Interrupt Failure	Replace Alternate PC Network Adapter
3109	Sync Failure	Replace Alternate PC Network Adapter
3110	Time Out Failure	Replace Alternate PC Network Adapter
3111	Time Out Failure	Replace Alternate PC Network Adapter
3112	Digital Failure	Replace PC Network Adapter
3113	Digital Failure	Replace Alternate PC Network Adapter
3114	Digital Failure	Replace Alternate PC Network Adapter
3115	Analog Failure (RF)	Go to page 3-3000-13
3120	ROM BIOS Failure	Go to page 3-3000-11
3141*	Continuous RF signal detected	Go to page 3-3000-13
3142*	Continuous RF signal sent	Replace Alternate PC Network Adapter

* If a 3141 or 3142 error occurs with the cover removed, install the cover and re-run the test. If the error remains, take the action indicated in the figure above.

Your screen should be similar to the one below.

The Network Status Monitor helps find additional symptoms if you have completed the PICs without solving your problem.

NETWORK ADAPTER TESTS SUCCESSFUL

DISPLAY NETWORK STATUS MONITOR

**THE NETWORK STATUS MONITOR PROVIDES
STATISTICAL INFORMATION ABOUT THE
NETWORK WHICH CAN BE USED AS AN AID
IN NETWORK PROBLEM DETERMINATION**

**(Y/N)
?**

**DO YOU WANT TO DISPLAY THE NETWORK
STATUS MONITOR?**

NO You have completed the PC Network advanced diagnostics tests.

Note: Seek technical assistance if you have followed these procedures and still have a problem.

YES Press Y and go to page 3-3000-53.

You are on this page because the ROM BIOS check failed.

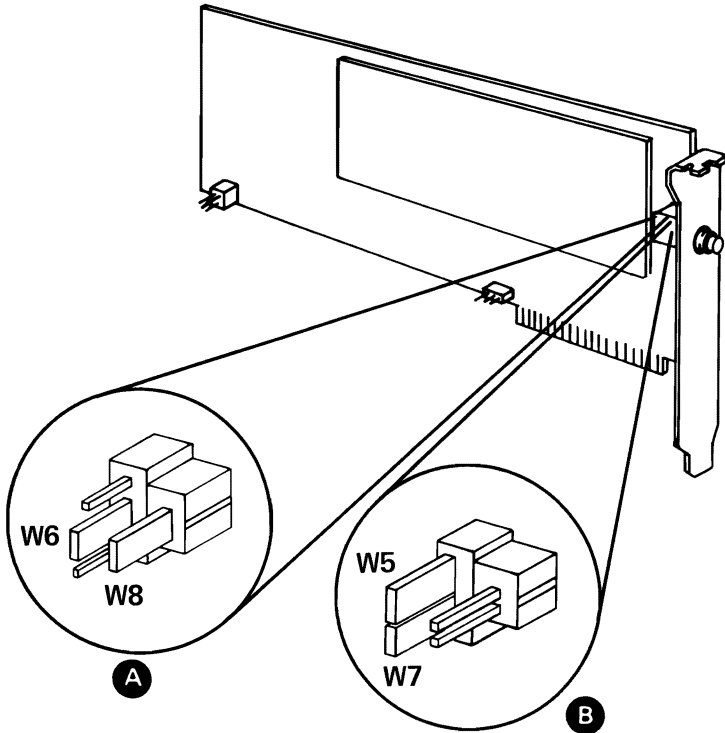
Determine if two PC Network Adapters are installed in the failing computer.

**ARE TWO PC NETWORK ADAPTERS INSTALLED
IN THE COMPUTER?**

NO Replace the PC Network Adapter.

YES 

1. Set the Power switch on the system unit to Off.
2. Remove the cover on the system unit.
3. When two PC Network Adapters are installed make sure that **W8** is positioned as **A** in one adapter and **W8** is removed as **B** in the other adapter.



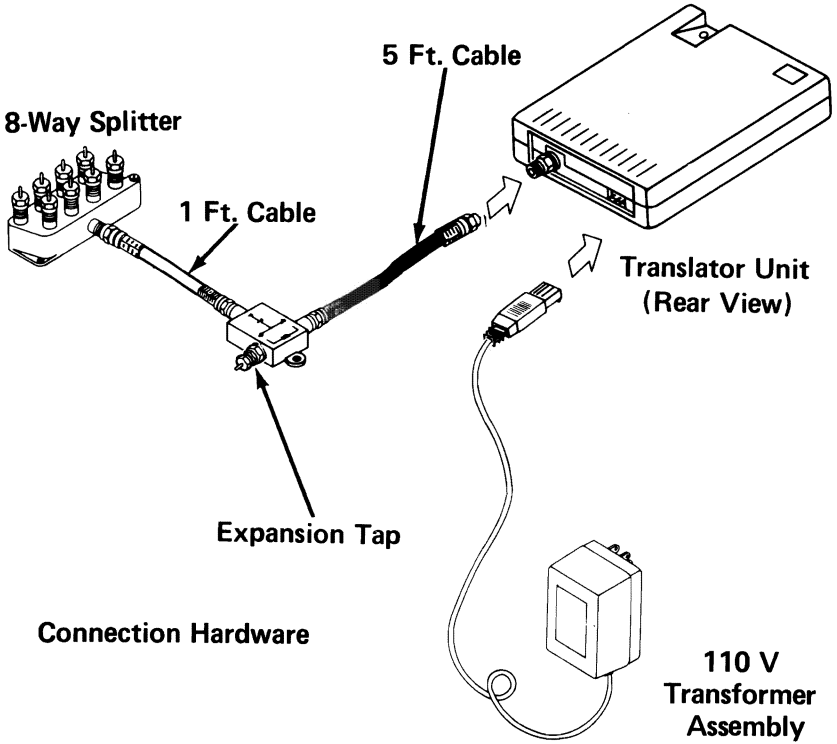
ARE THE JUMPERS SET CORRECTLY?

NO Correct the jumper position.

YES Replace the PC Network Adapter with **W8** positioned as **A** .

The components of the PC Network are:

- The Translator Assembly



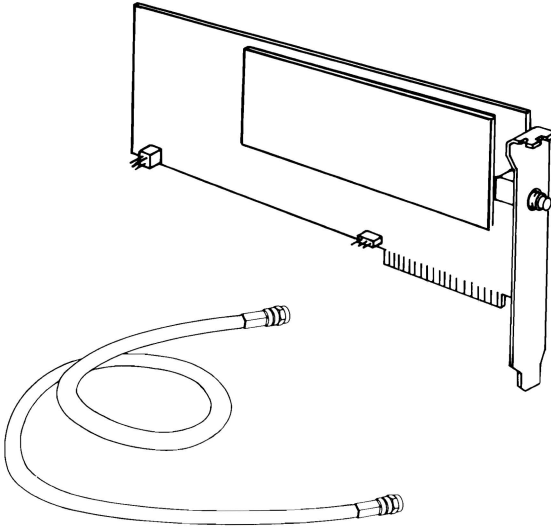
Connection Hardware

**110 V
Transformer
Assembly**

CONTINUE



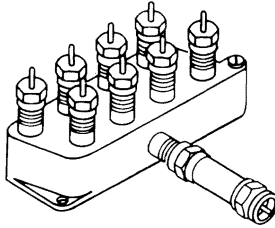
- The PC Network Adapter and adapter cable.



CONTINUE

- The Base Expander.

**Taps to Short,
Medium, or Long
Distance Kits**

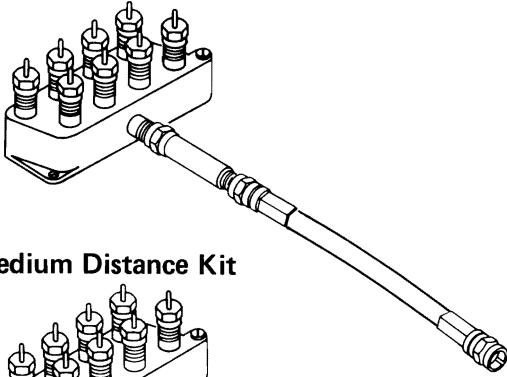


**To Expansion Tap of
Connection Hardware**

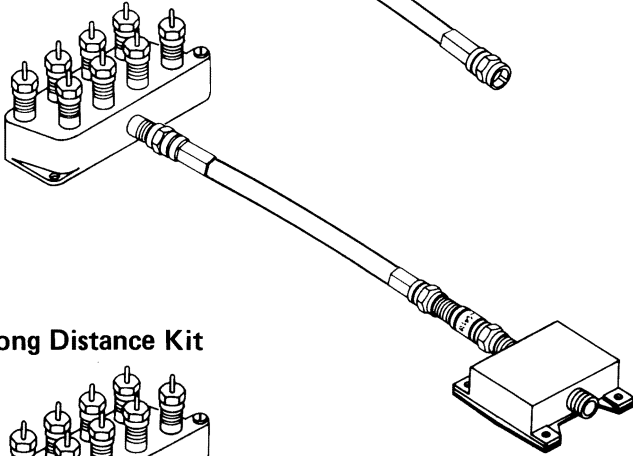
CONTINUE

• Expansion Kits

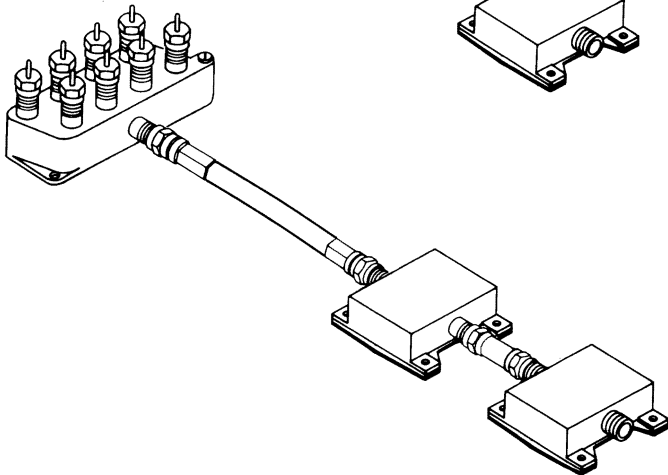
Short Distance Kit



Medium Distance Kit

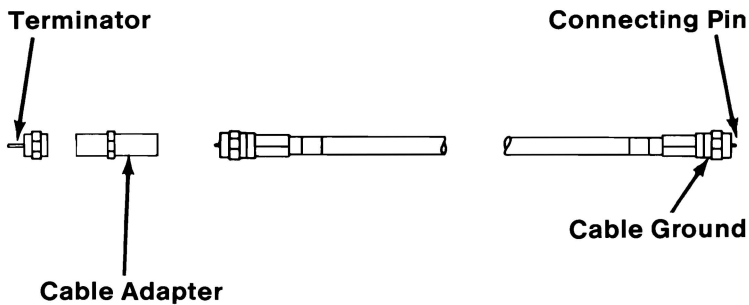


Long Distance Kit




CONTINUE

- Coaxial Cable



CONTINUE



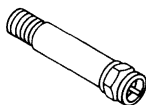
The following pages isolate the failing component on the PC Network.

Before performing the network diagnostic procedure, do the following.

- Obtain a diagram of the failing PC Network. Include in this diagram:
 - The location of the Translator Unit and the Base Expansion Kit
 - The location of any installed Expansion Kits
 - The location of all cable connections
 - The location of all working computers
 - The location of all failing computers.

CONTINUE 

- Make sure that you are able to access:
 - The Translator Unit
 - The Base Expander
 - All Expansion Kits.
- Make sure that you have the 30 Db attenuator test device.

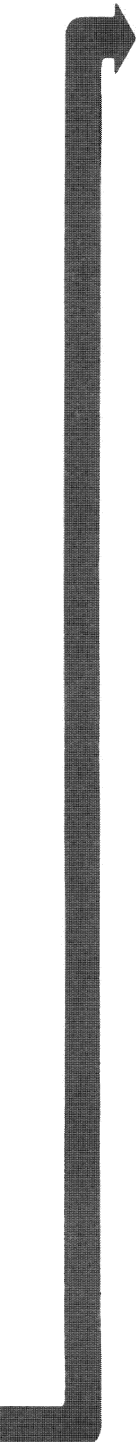


30Db Attenuator

DO ALL COMPUTERS HAVE A PC NETWORK FAILURE?

NO Go to page 3-3000-29.

YES 

- 
1. Go to a failing computer.
 2. Set the Power switch on the system unit (and the expansion unit, if attached) to Off.
 3. Perform the Power On Self Test (POST) on the computer.
-

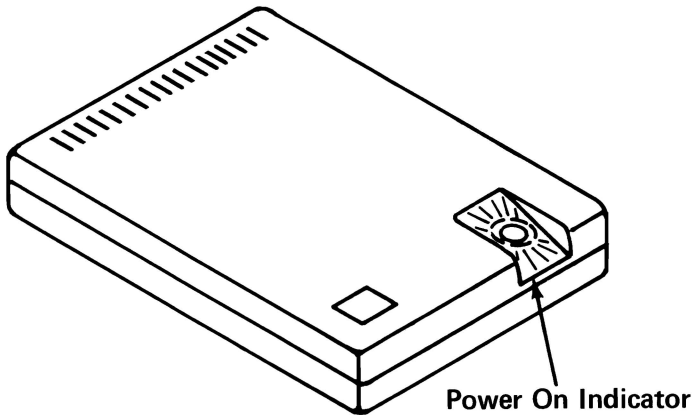
**DOES A 3041 OR A 3141 ERROR MESSAGE
OCCUR DURING THE POST?**

YES Perform the POST on each computer on the failing PC Network until a 3042 or a 3142 error message occurs. Replace the primary PC Network Adapter if a 3042 error message occurs. Replace the alternate PC Network Adapter if a 3142 error message occurs.

NO 

You have determined that a single computer is not causing your PC Network problem.

1. Go to the Translator Unit.
2. Make sure the Transformer's power cord is connected to a functioning, properly-grounded, wall outlet.
3. Check if the Translator Unit's Power On Indicator is on.

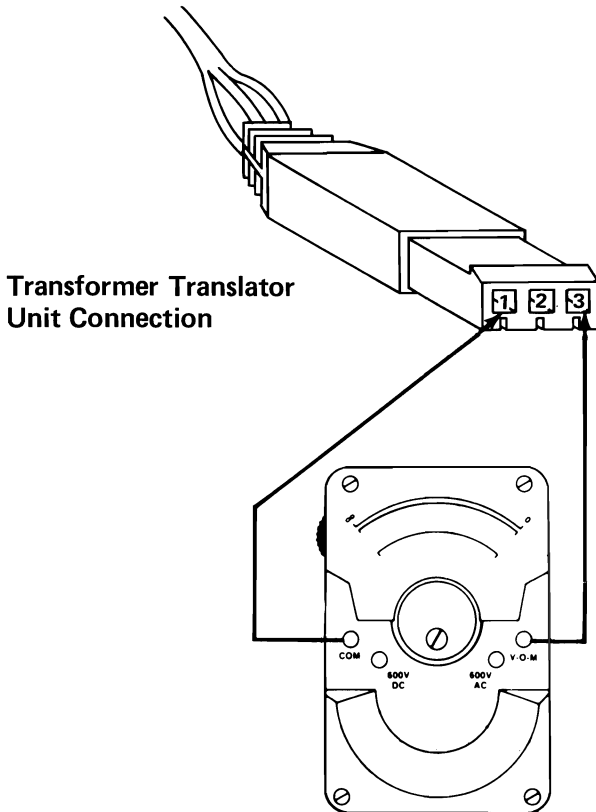


IS THE TRANSLATOR UNIT'S POWER ON INDICATOR ON?

YES Go to page 3-3000-25.

NO 

1. Unplug the Transformer from the wall outlet.
2. Disconnect the Transformer from the Translator Unit.
3. Set your meter on the 60 Vac scale.
4. Plug the Transformer into the wall outlet.
5. Measure the voltage between pins 1 and 3 on the Transformer's connecting cable as shown below.



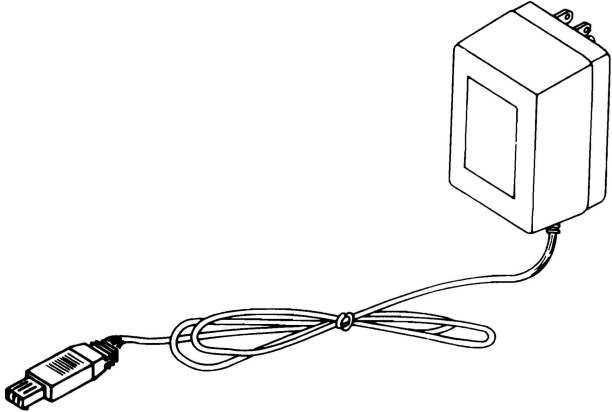
IS THE VOLTAGE BETWEEN 14 AND 25 VAC?

YES Replace the Translator Unit.

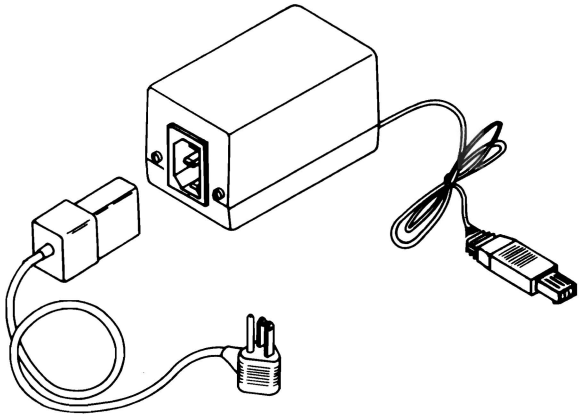
NO

Determine if the Transformer is a PC Network 120V Transformer or a PC Network 230V Transformer.

- The 120V Transformer is shown below.



- The 230V Transformer and power cord are shown below.

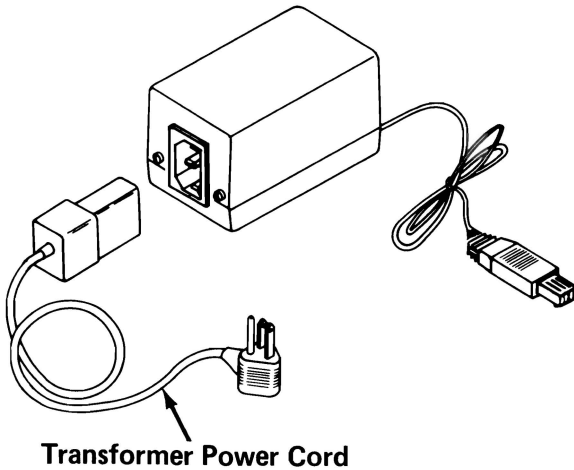


IS THE TRANSFORMER A 120V TRANSFORMER?

YES Replace the 120V Transformer.

NO 

1. Unplug the 230V Transformer's power cord from the wall outlet.
 2. Disconnect the 230V Transformer's power cord from the 230V Transformer.
 3. Set your meter to the Ohms X 1 scale.
 4. Check continuity on the 230V Transformer's power cord.
-



IS THE 230V TRANSFORMER'S POWER CORD GOOD?

YES Replace the 230V Transformer.

NO Replace the 230V Transformer's power cord.

Refer to the diagram you obtained on page 3-3000-18 to determine the location of all the computers on your failing PC Network.

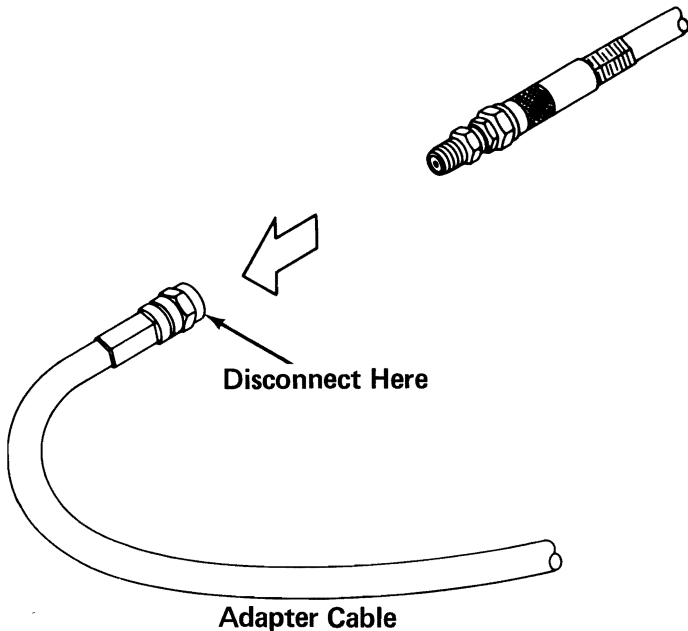
DO YOU HAVE ANY COMPUTERS ATTACHED TO THE TRANSLATOR UNIT'S SPLITTER?

YES Go to page 3-3000-49.

NO 

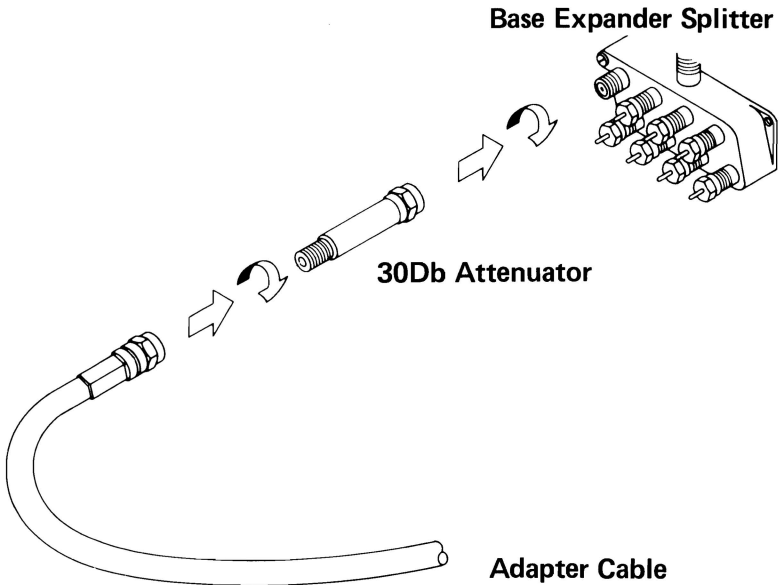
1. Go to any computer.
2. Set the Power switch on the system unit (and the expansion unit, if attached) to Off.
3. Disconnect the computer's adapter cable from the PC Network as shown below.
4. Move the computer and adapter cable to the Base Expander splitter.

Warning: Before moving the computer, refer to the relocation procedure in the *Guide to Operations* manual to prevent damage to the computer.



CONTINUE

5. Disconnect a cable from a tap on the Base Expander splitter.
 6. Attach the attenuator test device to the end of the computer's adapter cable.
 7. Attach the other end of the attenuator test device to the Base Expander tap that you just disconnected.
 8. Perform the POST on the computer.
-

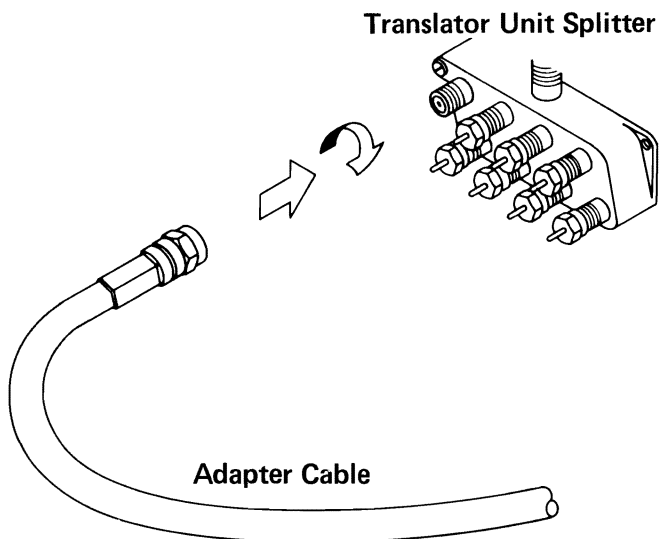


**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

NO Go to page 3-3000-47.

YES 

1. Disconnect the adapter cable from the Base Expander's splitter.
 2. Disconnect the attenuator test device from the adapter cable.
 3. Connect the adapter cable to a tap on the Translator Unit's splitter.
 4. Perform the POST on the computer.
-



DOES A 30XX OR A 31XX ERROR CODE MESSAGE OCCUR DURING THE POST?

YES Go to page 3-3000-49.


NO Replace the Base Expander.

You are here if some computers are working on the PC Network.

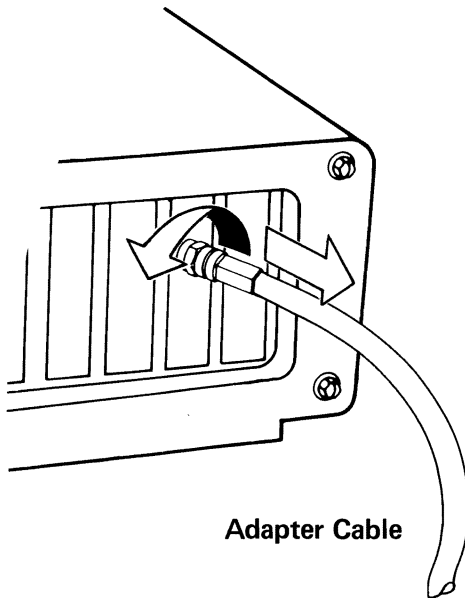
IS ONLY ONE COMPUTER FAILING ON THE PC NETWORK?

NO Go to page 3-3000-40.

YES 

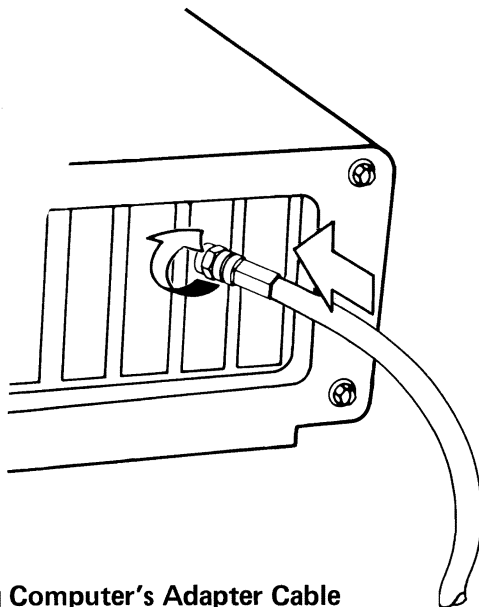
- 
1. Go to the failing computer.
 2. Set the Power switch on the system unit to Off.
 3. Disconnect the adapter cable from the back of the failing computer as shown below.
 4. Move the failing computer next to any working computer.

Warning: Before moving the computer, refer to the relocation procedure in the *Guide to Operations* manual to prevent damage to the computer.



CONTINUE 

5. Disconnect the adapter cable from the back of the working computer.
 6. Attach the failing computer to the adapter cable of the working computer that was just disconnected.
 7. Perform the Power On Self Test (POST) on the failing computer.
-




**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

YES Replace the primary PC Network Adapter of the failing computer if you received a 30XX error message. Replace the alternate PC Network Adapter if you received 31XX error message.

NO





Refer to the diagram you obtained on page 3-3000-18 to determine where the failing computer was originally located on the PC Network.

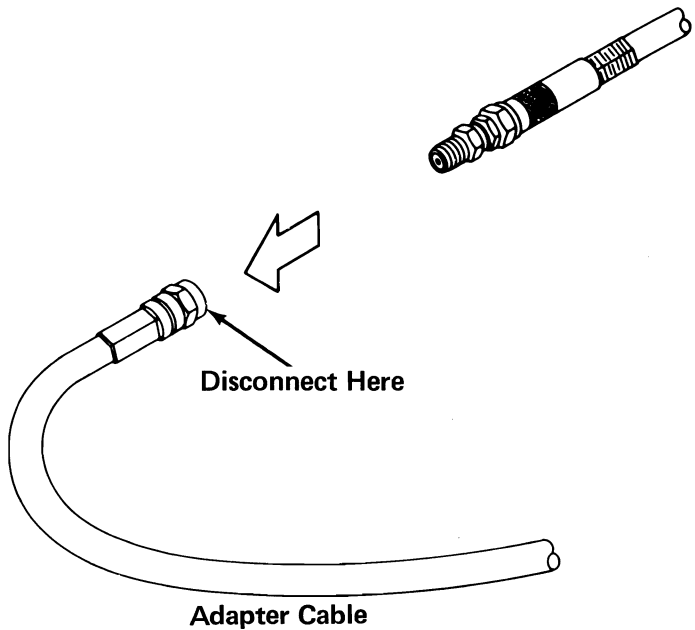
WAS THE FAILING COMPUTER ORIGINALLY ATTACHED TO THE TRANSLATOR UNIT SPLITTER?

NO Go to page 3-3000-35.

YES 

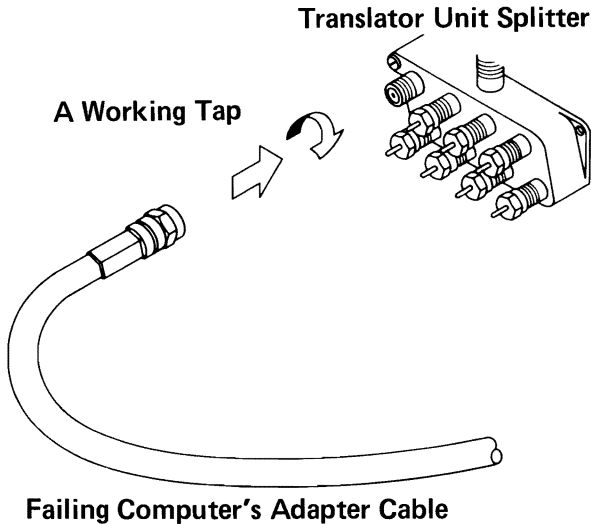
1. Set the Power switch on the system unit to Off.
2. Disconnect the adapter cable attached to the failing computer as shown below.
3. Move the failing computer and adapter cable to the Translator Unit.

Warning: Before moving the computer, refer to the relocation procedure in the *Guide to Operations* manual to prevent damage to the computer.



CONTINUE

4. Determine the tap on the Translator Unit splitter to which the failing computer was originally connected.
 5. Disconnect the failing computer's original cable from the tap at the Translator Unit splitter.
 6. Attach the failing computer's adapter cable to the tap you disconnected.
 7. Perform the POST on the failing computer.
-



**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

- YES** Replace the Translator Unit Connection Hardware.
- NO** The problem is in the cable between the Translator Unit splitter and the failing computer. Go to the Cable Isolation Procedure on page 3-3000-50 to isolate the failing cable.

Determine if there were any other computers attached to the Expansion Kit splitter where the failing computer was originally located.

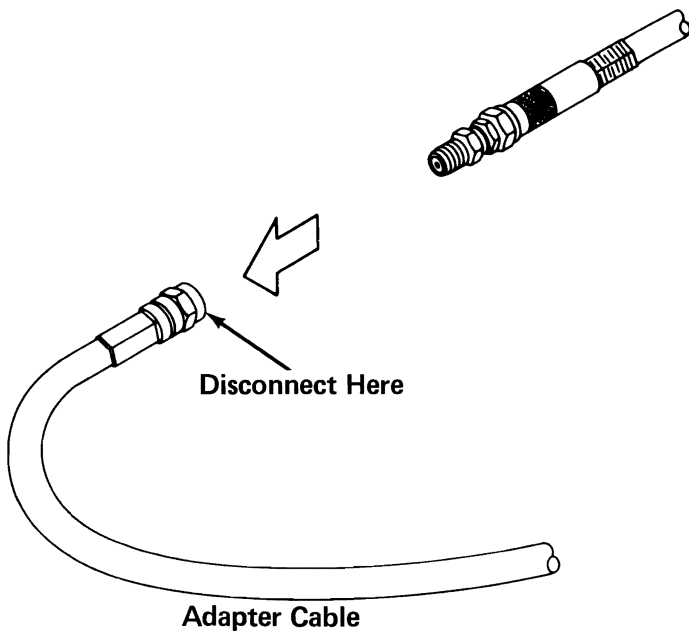
**WAS THE FAILING COMPUTER THE ONLY
COMPUTER ATTACHED TO THE EXPANSION
KIT SPLITTER?**

NO Go to page 3-3000-48.

YES 

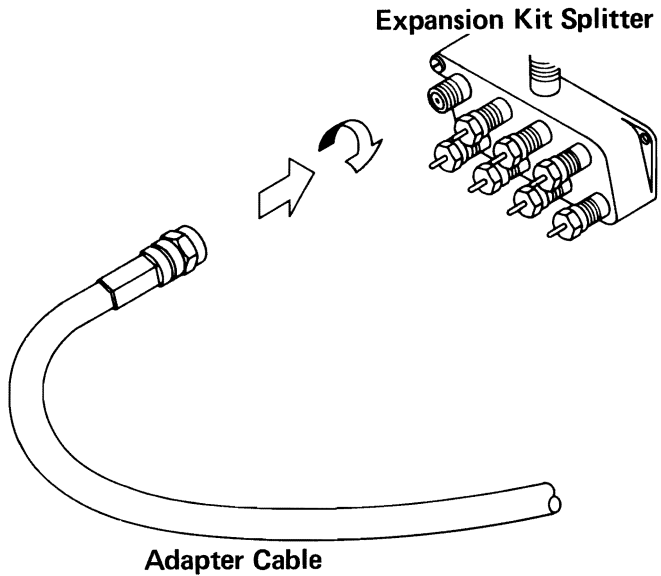
1. Set the Power switch on the system unit to Off.
2. Disconnect the adapter cable attached to the failing computer as shown below.
3. Move the failing computer and adapter cable to the failing Expansion Kit splitter.

Warning: Before moving the computer, refer to the relocation procedure in the *Guide to Operations* manual to prevent damage to the computer.



CONTINUE

4. Disconnect the cable from the Expansion Kit splitter tap.
 5. Connect the adapter cable of the failing computer to the tap you disconnected.
 6. Perform the POST on the failing computer.
-



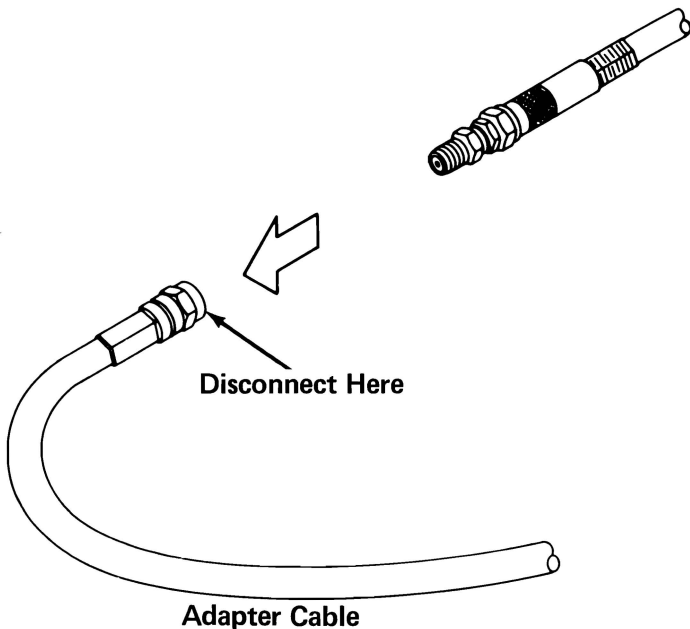
**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

NO The problem is in the cable between the Expansion Kit splitter and the failing computer. Go to the Cable Isolation Procedure on page 3-3000-50 to isolate the failing cable.

YES 

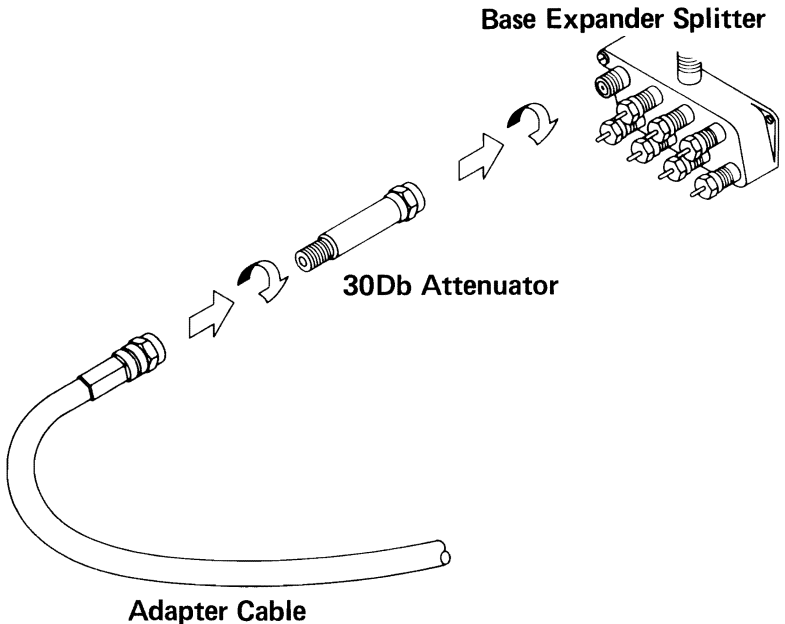
1. Go to any computer.
2. Set the Power switch on the system unit (and the expansion unit, if attached) to Off.
3. Disconnect the computer's adapter cable from the PC Network as shown below.
4. Move the computer and the adapter cable to the Base Expander splitter.

Warning: Before moving the computer, refer to the relocation procedure in the *Guide to Operations* manual to prevent damage to the computer.



CONTINUE

5. Determine which cable leads from the Base Expander splitter to the failing Expansion Kit splitter.
 6. Disconnect the cable from the tap on the Base Expander splitter.
 7. Attach the attenuator test device to the end of the computer's adapter cable.
 8. Attach the other end of the attenuator test device to the Base Expander tap that you just disconnected.
 9. Perform the POST on the computer.
-



**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

NO Go to page 3-3000-47.

YES Replace the Base Expander.

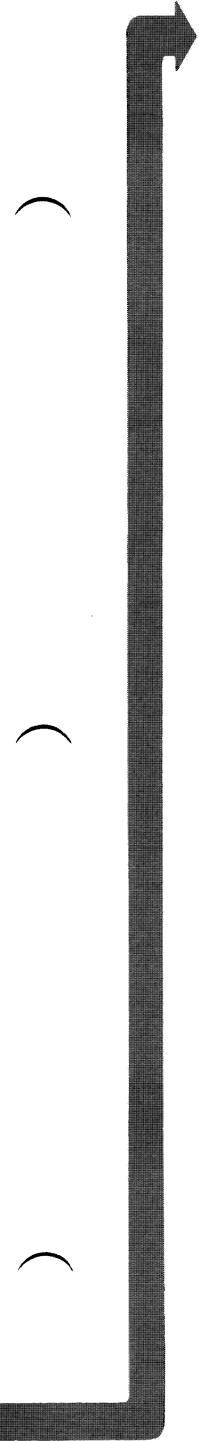
You are on this page because some computers are working and some computers are failing.

Refer to the diagram you obtained on page 3-3000-18 to determine where the failing computers are in the PC Network.

ARE THERE ANY FAILING COMPUTERS WHICH ATTACH TO THE TRANSLATOR UNIT'S SPLITTER?

YES Replace the Translator Unit's Connection Hardware.

NO 

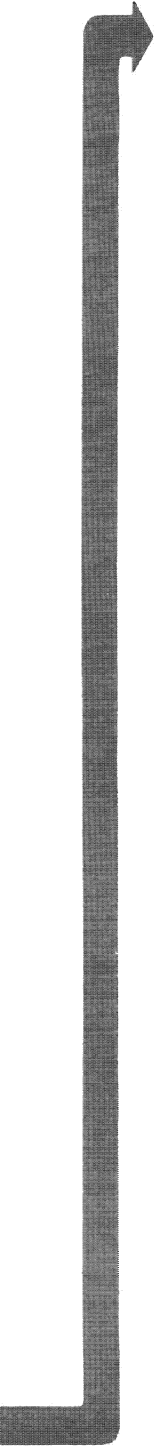


While referring to the diagram you obtained on page 3-3000-18 determine how many Expansion Kits have failing computers.

IS THERE MORE THAN ONE EXPANSION KIT WITH FAILING COMPUTERS?

YES Replace the Base Expander.

NO 

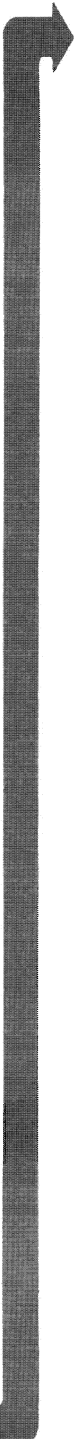
- 
1. Determine on which Expansion Kit your computers are failing.
 2. Determine if any computers are working on the Expansion Kit.
-

ARE THERE ANY COMPUTERS THAT WORK ON THE EXPANSION KIT?

YES Replace the Expansion Kit that has failing computers attached to it.

NO





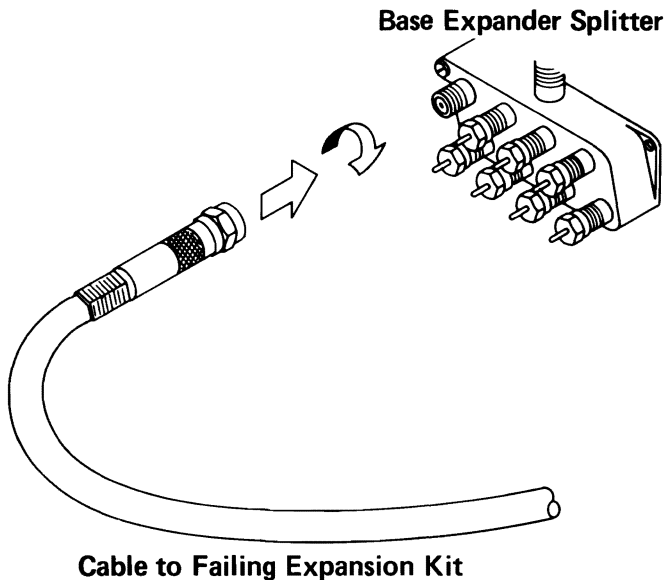
While referring to the diagram you obtained on page 3-3000-18 determine how many Expansion Kits have computers attached to them.

DOES THE BASE EXPANSION KIT HAVE MORE THAN ONE EXPANSION KIT WITH COMPUTERS ATTACHED TO IT?

NO Go to page 3-3000-45.

YES 

1. Locate the cable that connects the failing Expansion Kit splitter with the Base Expander splitter.
 2. Remove this cable from the Base Expander splitter tap.
 3. Attach the cable to another working tap on the Base Expander splitter.
 4. Perform the Power On Self Test (POST) on a failing computer.
-



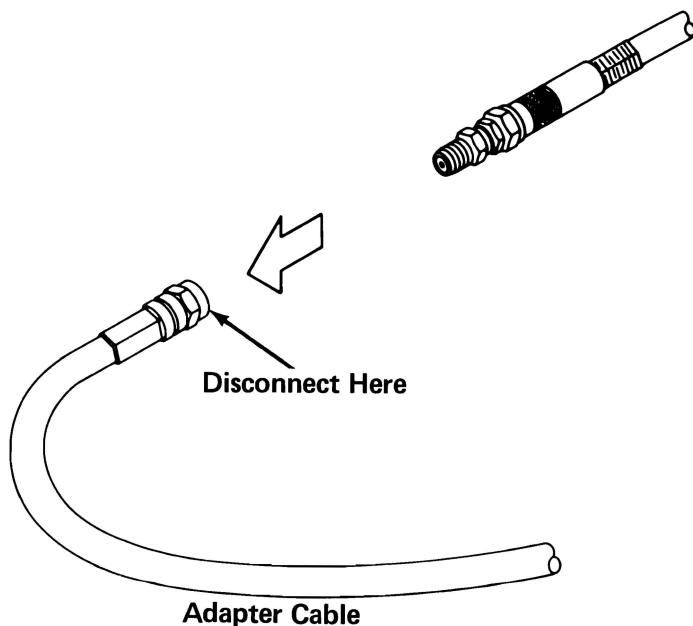
**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

NO Replace the Base Expander.

YES Go to page 3-3000-47.

1. Go to any computer on the PC Network.
2. Set the Power switch on the system unit (and the expansion unit, if attached) to Off.
3. Disconnect the computer's adapter cable from the PC Network as shown below.
4. Move the computer and the adapter cable to the Base Expander splitter.

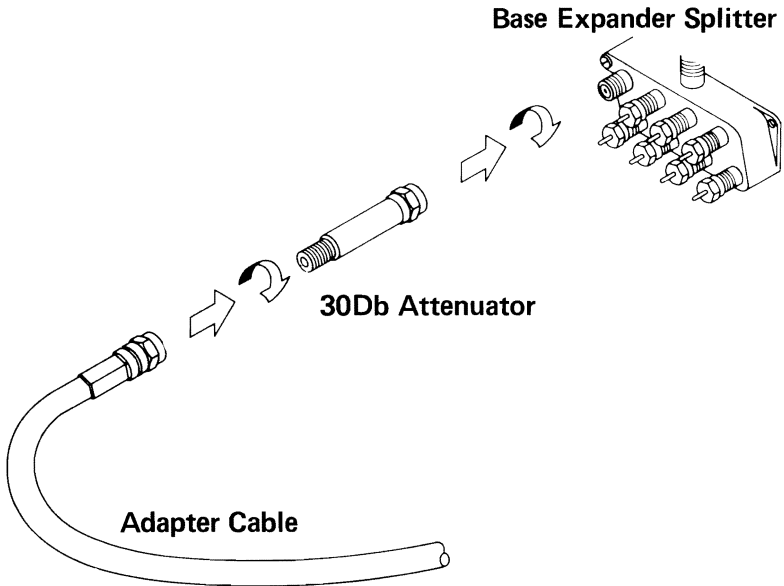
Warning: Before moving the computer, refer to the relocation procedure in the *Guide to Operations* manual to prevent damage to the computer.



PC NETWORK

CONTINUE


5. Disconnect the Cable attached to the Base Expander splitter.
 6. Attach the attenuator test device to the end of the computer's adapter cable.
 7. Attach the other end of the attenuator test device to the Base Expander tap that you just disconnected.
 8. Perform the POST on the computer.
-



**DOES A 30XX OR A 31XX ERROR MESSAGE
OCCUR DURING THE POST?**

YES Replace the Base Expander.

NO 



Go to the cable isolation procedure on page 3-3000-50 and determine if the cable between the Base Expander and the failing Expansion Kit is good and return here.

IS THE CABLE GOOD?

YES Replace the failing Expansion Kit.

NO Replace the failing cable.

Go to the cable isolation procedure on page 3-3000-50 and determine if the cable between the failing computer and the Expansion Kit is good and return here.

IS THE CABLE GOOD?

YES Replace the failing Expansion Kit.

NO Replace the failing cable.

1. Go to the Translator Unit Connection Hardware.
 2. Check the Translator Unit Connection Hardware for loose or damaged connections.
-

**IS THE TRANSLATOR UNIT CONNECTION
HARDWARE DAMAGED?**

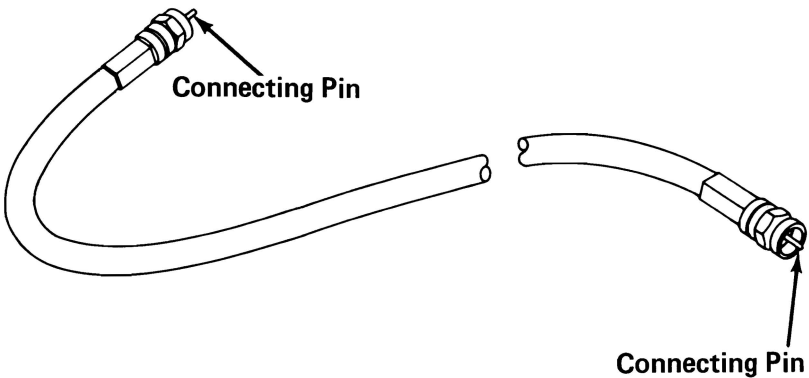
- YES** Replace the Translator Unit Connection Hardware.
- NO** Replace the Translator Unit and the Translator Unit Connection Hardware.

CABLE ISOLATION PROCEDURE

The following procedure tests a cable.

Disconnect the cable to be tested.

- **Cable pins broken**
 - Check both ends of the cable for broken or bent connecting pins.
-



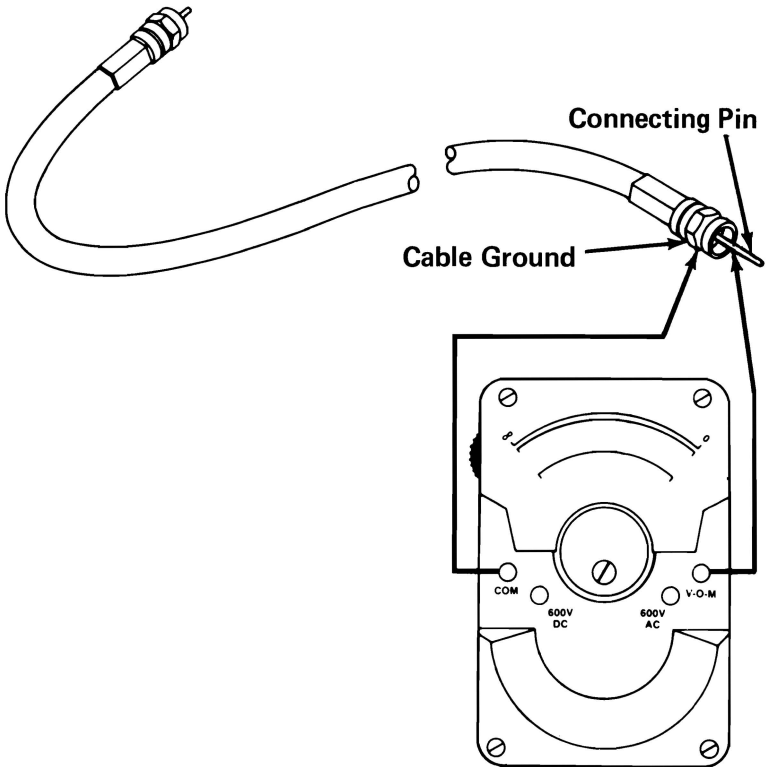
ARE THE PINS BROKEN OR BENT?

YES Replace the cable.

NO 

- **Cable Shorted**

- Set your meter to the Ohms X 1 scale.
- Refer to the figure below and check the cable for continuity.



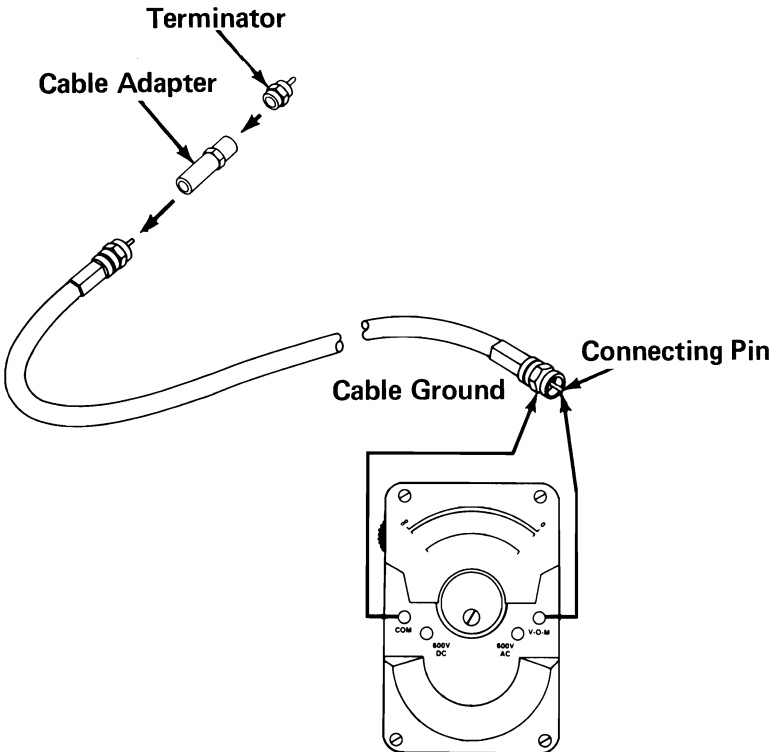
DOES THE CABLE HAVE CONTINUITY BETWEEN THE CENTER PIN AND GROUND?

YES Replace the cable.

NO 

- **Cable Open**

- Attach a cable adapter to one end of the cable
- Attach a terminator to the cable adapter.
- Set your meter to the Ohms X 1 scale.
- Refer to the figure below and measure the resistance of the cable.
- The resistance of the cable should be between 60 and 90 ohms.



IS THE RESISTANCE FOR THE CABLE CORRECT?

NO Replace the cable.

YES Your cable checks out well.

You are here to run the Network Status Monitor.

The Network Status Monitor reports:

- Traffic and error statistics for a specified adapter (Adapter Status)
- Current adapter setup for a specified adapter (Adapter Configuration).

The Network Status Monitor reports status information for remote adapters and the local adapter. A remote adapter can be any adapter in the network. The local adapter is the network adapter you selected in the Select an Option menu:

- 30 - PC Network Adapter or**
- 31 - Alternate PC Network Adapter**

The following pages show the Network Status Monitor menus and describe what each menu selection does.

CONTINUE 

Status Selection Menu

0 - DISPLAY LOCAL ADAPTER STATUS
1 - DISPLAY REMOTE ADAPTER STATUS
9 - RETURN TO DIAGNOSTICS

SELECT THE ACTION DESIRED
?

0 - DISPLAY LOCAL ADAPTER STATUS: Selects the Adapter Status menu on page 3-3000-58. This menu enables you to view the activity of the adapter you selected for the PC Network diagnostic tests (primary or alternate PC Network Adapter).

1 - DISPLAY REMOTE ADAPTER STATUS: Selects the Remote Adapter Select menu on page 3-3000-55. This allows you to view the activity of a remote adapter.

9 - RETURN TO DIAGNOSTICS: Returns to the Select an Option menu.

Remote Adapter Select Menu

This menu allows you to select the adapter you want to monitor in the network. Each PC Network Adapter has a unique ID number. If you do not know the ID number of the adapter you want to monitor page 3-3000-57 will tell you how to find the ID number.

```
0 - DISPLAY LOCAL ADAPTER STATUS
1 - DISPLAY REMOTE ADAPTER STATUS
9 - RETURN TO DIAGNOSTICS

SELECT THE ACTION DESIRED
? 1

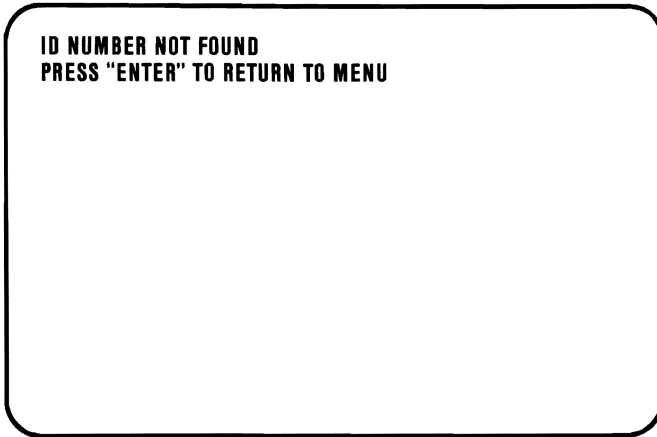
ENTER UNIT ID NUMBER
```

ENTER UNIT ID NUMBER: Enter the ID number of the adapter you want to monitor. This allows you to go to the Adapter Status menu on page 3-3000-58.

Note: When entering the ID number of the adapter, it is not necessary to enter the leading zeros.

ID Not Found Message

If the adapter you selected is not in the network or is inactive, the ID Number Not Found message appears. Check the ID Number of the adapter you want to monitor to make sure it is correct.



Press **ENTER** to return to the Status Selection menu on page 3-3000-54.

Display Adapter ID Number

To display the ID number of an adapter:

1. Go to the computer that has the adapter.
2. Go to page 3-3000-1 and run the advanced diagnostic tests for the PC Network of that computer.
3. Start the Network Status Monitor.
4. Select **0 (Display Local Adapter Status)** at the Status Selection menu.

The Adapter Status menu will show the ID number of the adapter.

Adapter Status Menu

This menu displays the traffic and error statistics for the adapter you have selected (remote or local).

The menu is updated every 5 seconds.

ADAPTER STATUS	
UNIT ID NUMBER	000001000CF0
REPORTING PERIOD IN MINUTES.....	2
CRC ERRORS.....	0
ALIGNMENT ERRORS.....	0
COLLISIONS.....	0
RETRANSMISSIONS.....	0
UNSUCCESSFUL TRANSMISSIONS.....	0
SUCCESSFUL TRANSMISSIONS.....	15
SUCCESSFUL RECEPTIONS.....	02
EXHAUSTED RESOURCES.....	0
STATUS UPDATED EVERY 5 SECONDS	
0 - ADAPTER CONFIGURATION	
1 - DISPLAY REMOTE ADAPTER STATUS	
9 - RETURN TO MENU	
SELECT THE ACTION DESIRED	
?	

0 - ADAPTER CONFIGURATION: Selects the Adapter Configuration menu on page 3-3000-61.

1 - DISPLAY REMOTE ADAPTER STATUS: Selects the Remote Adapter Select menu on page 3-3000-55.

9 - RETURN TO MENU: Selects the Status Selection menu on page 3-3000-54.

The following describes the Adapter Status menu.

UNIT ID NUMBER

The unique ID number of the adapter is shown.

REPORTING PERIOD IN MINUTES

The adapter registers the time since the last POST or System Restart (Ctrl + Alt + Del).

Note: Running the Advanced Diagnostics program causes a reset.

CRC ERRORS

The number of properly aligned frames received with a CRC error is registered as a CRC error by the adapter.

ALIGNMENT ERRORS

The number of misaligned frames received with a CRC error is registered as an alignment error by the adapter. When excessive or missing bits occur during the reception of a frame, the frame is misaligned.

COLLISIONS

When a frame from a transmitting adapter encounters any other signal (another frame, noise, another type of signal) in its path, the adapter stops transmitting and a collision is registered.

RETRANSMISSIONS

If the retransmit timer in the adapter expires a retransmission is registered by the adapter. Also, a NAK frame can cause a retransmission to be registered by the adapter.

UNSUCCESSFUL TRANSMISSIONS

The adapter registers an unsuccessful transmission if any of the following occur:

- The number of retransmissions exceeds the number permitted by the NET BIOS.
- Transmission stops due to loss of the control signal in the adapter.
- Transmission stops due to data not being supplied by the system for transmission.

SUCCESSFUL TRANSMISSIONS

The adapter registers the number of frames successfully transmitted.

SUCCESSFUL RECEPTIONS

The adapter registers the number of frames successfully received.

EXHAUSTED RESOURCES

The adapter registers the number of frames discarded because of lack of memory resources.

Adapter Configuration Menu

This menu displays the current setup of the adapter you are monitoring.

ADAPTER CONFIGURATION	
UNIT ID NUMBER	000001000CF0
JUMPER W1 ON	
JUMPER W2 ON	
JUMPER W3 ****	
JUMPER W4 ****	
VERSION 1 - 23	
SELF TEST	80
MAXIMUM POSSIBLE NCBS	32
CONFIGURED NCBS	12
FREE NCBS	11
MAXIMUM POSSIBLE SESSIONS	32
CONFIGURED SESSIONS	6
PENDING SESSIONS	0
PACKET SIZE	1062
0 - RETURN TO ADAPTER STATUS	
9 - RETURN TO MENU	
SELECT THE ACTION DESIRED	
?	

0 - RETURN TO ADAPTER STATUS: Selects the Adapter Status menu on page 3-3000-58.

9 - RETURN TO MENU: Selects the Status Selection menu on page 3-3000-54.

The following describes the Adapter Configuration menu.

UNIT ID NUMBER

The unique ID number of the adapter is shown.

JUMPER W1

The position of jumper W1 is shown. Removing jumper W1 enables the remote-program-load feature.

JUMPER W2

The position of jumper W2 is shown. W2 is always on.

JUMPER W3

The position of jumper W3 is shown (this position is displayed only for local status). When W3 is on the adapter uses interrupt level 2.

JUMPER W4

The position of jumper W4 is shown (this position is displayed only for local status). When W4 is on the adapter uses interrupt level 3.

VERSION

The software version currently used is shown. The major and minor version levels of the NET BIOS are displayed.

SELF TEST

The result of the adapter self-test is shown. The self test occurs each time POST or a System Restart is performed. The possible results are:

- 80 Successful completion.
- 81 Processor test failed.
- 82 ROM check sum test failed.
- 83 Unit ID PROM test failed.
- 84 RAM test failed.
- 85 Host interface test failed.
- 86 +/- 12V test failed.
- 87 Digital loopback test failed.
- 8E Possible constant carrier.
- 8F Analog loopback test failed.

MAXIMUM POSSIBLE NCBS

The maximum number of network control blocks (NCBs) possible for the adapter to support. This is a constant value determined by the software version level.

CONFIGURED NCBS

The maximum number of NCBs supported by the adapter as set by the NET BIOS Reset command.

FREE NCBS

The number of NCBs currently available for use.

MAXIMUM POSSIBLE SESSIONS

The maximum number of sessions the adapter can support. This is a constant value determined by the software version level.

CONFIGURED SESSIONS

The maximum number of sessions supported by the adapter as set by the NET BIOS Reset command.

PENDING SESSIONS

The number of sessions the adapter has already established, or is attempting to establish, and that have not yet been deleted.

PACKET SIZE

The maximum size, in bytes, of the session's data packet.

Node Inactive Message

If the adapter you are monitoring becomes inactive, the Node Inactive message appears and gives the status of the adapter at the time it became inactive.

ADAPTER STATUS	
UNIT ID NUMBER	000001000CF0
REPORTING PERIOD IN MINUTES	2
CRC ERRORS	0
ALIGNMENT ERRORS	0
COLLISIONS	0
RETRANSMISSIONS	0
UNSUCCESSFUL TRANSMISSIONS	0
SUCCESSFUL TRANSMISSIONS	15
SUCCESSFUL RECEPTIONS	02
EXHAUSTED RESOURCES	0

N O D E I N A C T I V E

PRESS ENTER TO CONTINUE

Press **Enter** to return to the Status Selection menu on page 3-3000-54.

Alternate PC Network

Go to page 3-3000-1 if you have a 31XX error code, a CC0000 ROM error, or suspect a problem with your Alternate PC Network Adapter.

Notes:



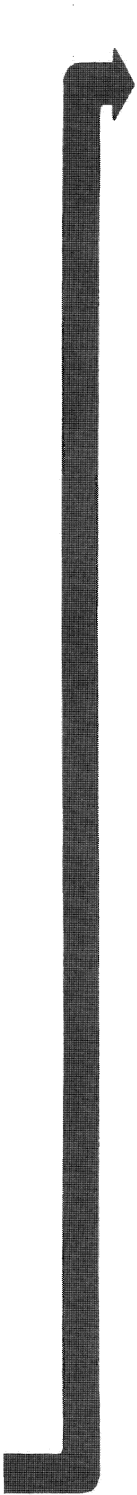
IBM General Purpose Interface Bus Adapter

You have entered this PIC because you have a 36XX error code or have identified a problem with an IBM General Purpose Interface Bus Adapter.

1. Set the system unit's Power switch to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. Set the system unit's Power switch to On.
 4. Press **0 (RUN DIAGNOSTIC ROUTINES)** then **Enter**.
 5. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 6. Press **Y** or **N (IS THE LIST CORRECT?)** then **Enter**. (If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.)
-

CONTINUE



- 
1. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 2. Select **36 (X GPIB ADAPTER(S))** then press **Enter**.
 3. Compare the number of GPIB adapters displayed on your screen to the number of GPIB adapters installed in your system.
-

TESTING - X GPIB ADAPTER(S)

THE INSTALLED GPIB ADAPTER(S) ARE:

ADAPTER	DMA	INTERRUPT (IRQ)
---------	-----	-----------------

X	X	X
---	---	---

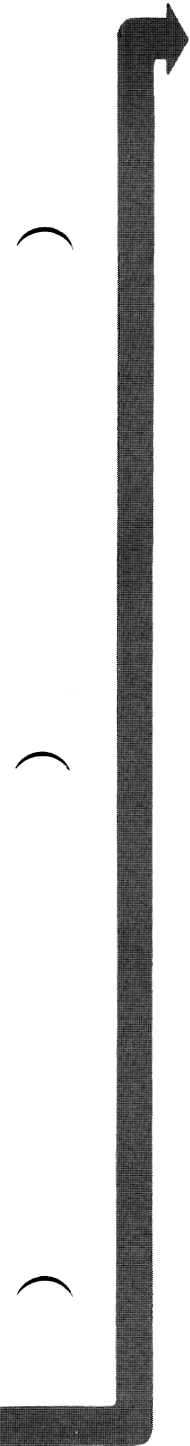
PRESS ENTER TO CONTINUE

?

ARE ALL THE GPIB ADAPTERS INSTALLED IN YOUR SYSTEM LISTED?

- NO** Check that all adapters are configured correctly (see Section 6). Replace the IBM General Purpose Interface Bus Adapter that is not listed, (see Section 5). Before installing the new adapter, make sure its jumper configuration matches those on the adapter that was replaced.


YES 

- 
1. Press **Enter**. The presentation below appears on your screen.
 2. Disconnect all cables connected to each IBM General Purpose Interface Bus Adapter.
-

**DISCONNECT ALL CABLES FROM
THE GPIB ADAPTER(S)**

**PRESS ENTER WHEN READY
?**

CONTINUE 

- 
1. Press **Enter**. The presentation below appears on your screen.
 2. Press **8 (TEST ALL GPIB ADAPTERS)**, then **Enter** to begin the test.
-

X - TEST IBM GPIB ADAPTER NUMBER X
8 - TEST ALL GPIB ADAPTERS
9 - EXIT FROM GPIB TESTS

ENTER THE ACTION DESIRED
?

DID THE TEST FINISH WITHOUT AN ERROR?

- NO** Replace the IBM General Purpose Interface Bus Adapter that failed (see Section 5). Before installing the new adapter, make sure its jumpers match those on the adapter that failed.
- YES** You have successfully completed the IBM General Purpose Interface Bus Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.


IBM Data Acquisition and Control Adapter

You have entered this PIC because you have a 38XX error code or have identified a problem with an IBM Data Acquisition and Control Adapter.

1. Set the system unit's Power switch to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. Set the system unit's Power switch to On.
 4. Press **0 (SYSTEM CHECKOUT)** then **Enter**.
 5. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then **Enter**.
 6. Press **Y** or **N (IS THE LIST CORRECT?)** then **Enter**. (If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes before you can continue.)
-

CONTINUE



- 
1. Press **0 (RUN TESTS ONE TIME)** then **Enter**.
 2. Select **38 (X DATA ACQUISITION ADAPTER(S))** then press **Enter**.
 3. Compare the number of Data Acquisition Adapters displayed on your screen to the number of Data Acquisition Adapters installed in your system.
-

TESTING - X DATA ACQUISITION ADAPTER(S)

INSTALLED DATA ACQUISITION ADAPTER(S)

ADAPTER	INTERRUPT (IRQ) LEVEL
---------	-----------------------

X	X
---	---

PRESS ENTER TO CONTINUE

?

**ARE ALL THE DATA ACQUISITION ADAPTERS
INSTALLED IN YOUR SYSTEM LISTED?**

- NO** Check that all switches are set correctly (see Section 6). Replace the IBM Data Acquisition and Control Adapter that is not listed, (see Section 5). Before installing the new adapter, make sure its switch settings match those on the adapter that was replaced.

YES



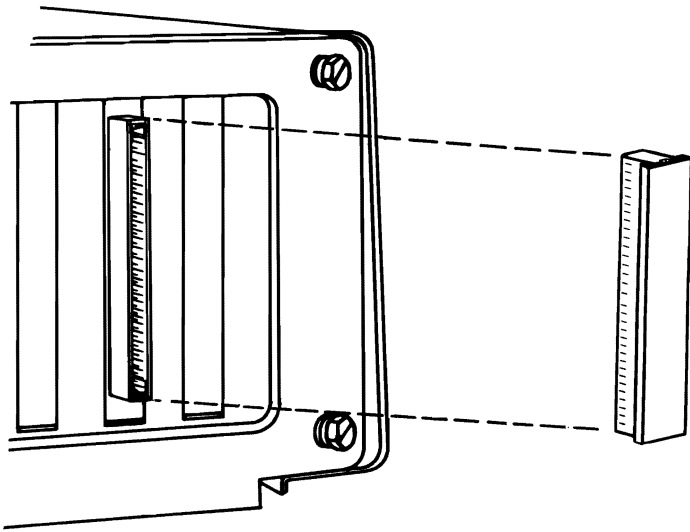
1. Press **Enter**. The presentation below appears on your screen.
 2. Disconnect all cables from each IBM Data Acquisition and Control Adapter.
-

**DISCONNECT ALL CABLES FROM THE DATA
ACQUISITION ADAPTER(S) AND ATTACH A WRAP
PLUG TO EACH DATA ACQUISITION ADAPTER**

**PRESS ENTER WHEN READY
?**

CONTINUE 

Refer to the figure below and attach a wrap plug to each IBM Data Acquisition and Control Adapter.



CONTINUE

1. Press **Enter**. The presentation below appears on your screen.
 2. Select **8 (TEST ALL DATA ACQUISITION ADAPTER(S))**, then **Enter**.
-

X - TEST DATA ACQUISITION ADAPTER X
8 - TEST ALL DATA ACQUISITION ADAPTER(S)
9 - EXIT DATA ACQUISITION ADAPTER TESTS

ENTER THE ACTION DESIRED

?

DID THE TEST PERFORM WITHOUT AN ERROR?

- NO** Replace the IBM Data Acquisition and Control Adapter that failed (see Section 5). Before installing the new adapter, make sure its switch settings match the switch settings on the adapter that failed.
- YES** You have successfully completed the IBM Data Acquisition and Control Adapter advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

Notes:

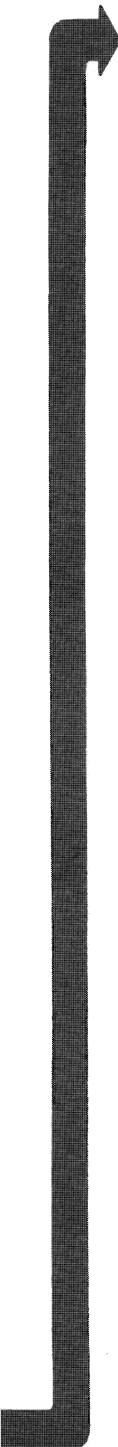


IBM Professional Graphics Controller

You have entered this PIC because the POST did not finish, you visually detected an IBM Professional Graphics Controller or IBM Professional Graphics Display problem, or you have an error message indicating a controller or display problem.

1. Set the systems unit's Power switch to Off.
 2. Insert your Advanced Diagnostics diskette in drive A.
 3. Set the system unit's Power switch to On.
 4. Set the Power control on your Professional Graphics Display to On.
-


CONTINUE 

- 
1. Turn the Brightness and Contrast controls fully clockwise on the Professional Graphics Display.
 2. Listen to the audio signal during the POST.
-

IS THE AUDIO SIGNAL 1 LONG AND 2 SHORT BEEPS?

NO Go to page 3-3900-5.

YES 

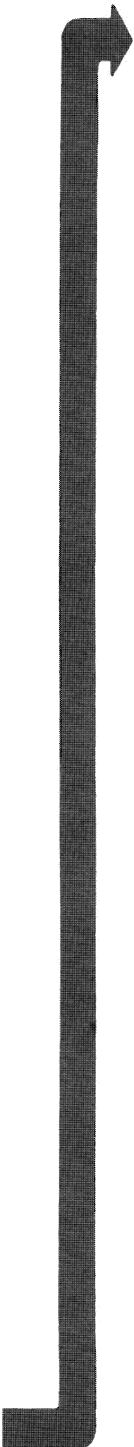


Check that the system board video switch setting is set correctly (see Section 6).

**IS THE SYSTEM BOARD VIDEO SWITCH SET
CORRECTLY?**

NO Correct the video switch setting. Go to page 3-3900-1 and repeat the diagnostics.

YES 




Determine how many display adapters are installed.

**IS MORE THAN ONE DISPLAY ADAPTER
INSTALLED?**

- NO** Replace the IBM Professional Graphics Controller (see Section 5).
- YES** Replace the display adapter other than the Professional Graphics Controller (see Section 5).

1. Press **0 (SYSTEM CHECKOUT)** then press **Enter**.
 2. Depending on the options installed in your system, questions about attached devices may appear on your screen. Press **Y** or **N** as required, then press **Enter**.
 3. Press **Y (IS THE LIST CORRECT (Y/N)?)** then **Enter**. If the list is incorrect, follow the instructions on the screen to correct the list before answering Yes. If you cannot correct the list, you still must answer Yes, before you can continue.
 4. Press **0 (RUN TESTS ONE TIME)** then press **Enter**.
-

CONTINUE 

- 
1. Press **39 (PROFESSIONAL GRAPHICS CONTROLLER)** then **Enter**.
 2. Check that the **Brightness and Contrast** controls are turned fully clockwise
-

TESTING - PROFESSIONAL GRAPHICS CONTROLLER

EMULATOR MODE

Y

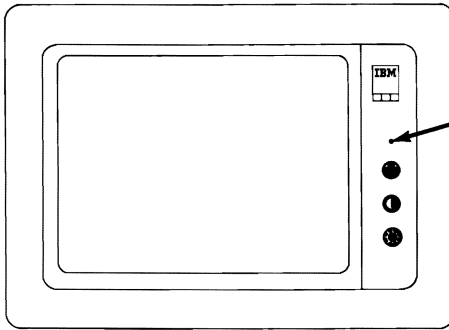
PRESS ENTER TO CONTINUE

**IS THE SCREEN OF THE PROFESSIONAL
GRAPHICS DISPLAY DARK (NO
ILLUMINATION)?**

NO Go to page 3-3900-10.

YES 

Check the Power-On indicator on your Professional Graphics Display.




Power-On Indicator

PROFESSIONAL GRAPHICS

IS THE POWER-ON INDICATOR LIGHTED?

NO Go to page 3-3900-9.

YES 

- 
1. Set the system unit's Power to Off.
 2. Set the Power control on the Professional Graphics Display to Off.
 3. Disconnect the Professional Graphics Display Signal Cable from the IBM Professional Graphics Controller.
 4. Set the Power control on the Professional Graphics Display to On.
-

IS THE SCREEN STILL DARK (NO ILLUMINATION)?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES Replace the IBM Professional Graphics Display (see Section 5).

1. Set the Power control on the Professional Graphics Display to Off.
 2. Disconnect the display's Power cord from the outlet, then from the display.
 3. Check the display's Power cord for continuity.
-

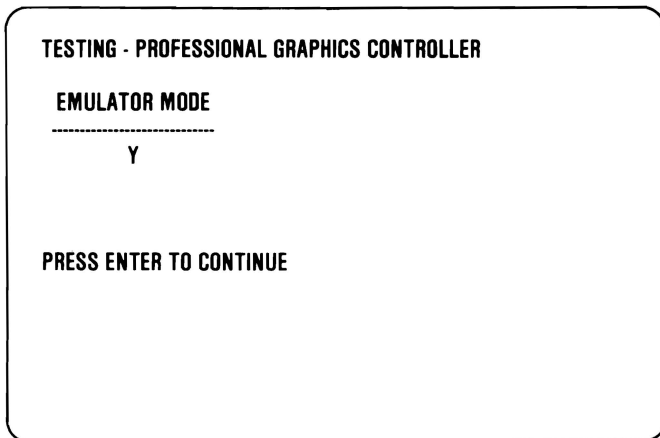
DID THE POWER CORD CHECK OK?

NO Replace the IBM Professional Graphics Display's power cord.

YES Replace the IBM Professional Graphics Display (see Section 5).

Check the presentation on your screen. If more than one display adapter is installed in your system the following presentation may not appear on the Professional Graphics Display's screen.

Note: Depending on the position of the emulator jumper, Y or N may appear.



IS THE PRESENTATION THE SAME AS THAT SHOWN ABOVE?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES 

Press Enter. Check the screen for an error message.

**DID YOU RECEIVE A U-XX ERROR MESSAGE
INDICATING THE REPLACEMENT OF A
MODULE?**

YES Go to page 3-3900-29.

NO 



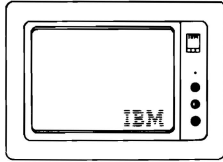
Check the screen for an error message.

**DID YOU RECEIVE AN ERROR MESSAGE
INDICATING THE REPLACEMENT OF THE
PROFESSIONAL GRAPHICS CONTROLLER?**

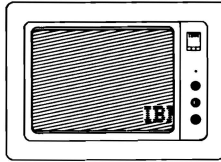
YES Replace the IBM Professional Graphics
Controller (see Section 5).

NO 

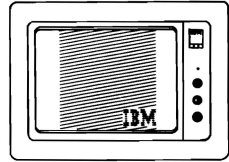
Your screen presentation may be distorted or the characters may be the wrong size, as shown in the examples below.



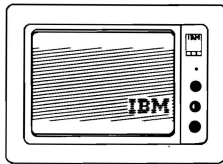
Too Dim



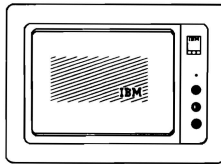
Too Wide



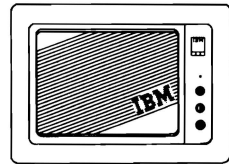
Too Narrow



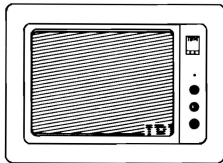
Too Short



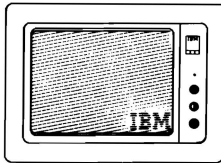
Shrunken



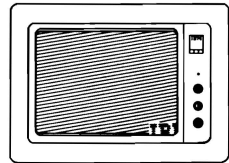
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus



**Characters Shifted
Left or Right, or Up
or Down, Off the
Display Area**

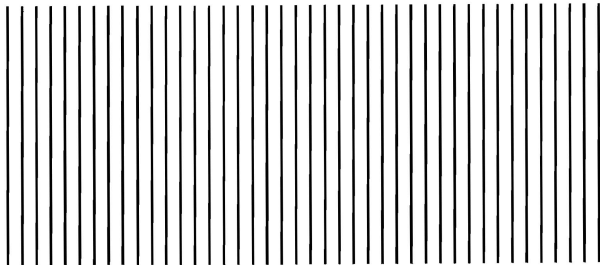
IS YOUR SCREEN UNSTABLE OR SIMILAR TO ONE OF THE ABOVE EXAMPLES?

YES Replace the IBM Professional Graphics Display (see Section 5).

NO

The presentation on your screen should be 42, evenly spaced, vertical, white lines.

**VERTICAL DISPLAY
TEST FOR EQUAL SPACING**



IS THE SCREEN CORRECT? (Y/N)

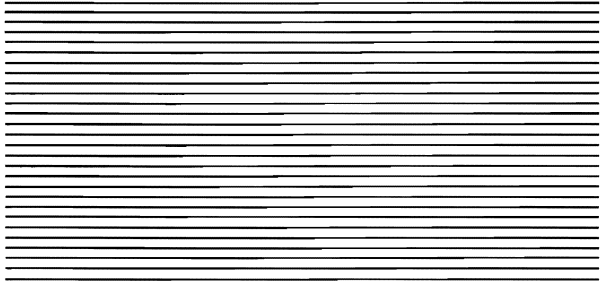
**ARE THERE 42 EVENLY-SPACED VERTICAL
WHITE LINES?**

NO Replace the IBM Professional Graphics
 Controller (see Section 5).

YES 

Press **Y**, then **Enter**. The presentation should be 28, evenly spaced, horizontal, white lines.

**HORIZONTAL DISPLAY
TEST FOR EQUAL SPACING**




IS THE SCREEN CORRECT? (Y/N)

**ARE THERE 28 EVENLY-SPACED HORIZONTAL
WHITE LINES?**

NO Replace the IBM Professional Graphics
Controller (see Section 5).

YES 



Press **Y**, then **Enter**. The following should appear on your screen.

BLANK DISPLAY 1

IS THE SCREEN CORRECT? (Y/N)

IS THE PRESENTATION ON YOUR SCREEN THE SAME AS THAT SHOWN ABOVE?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES 

Press **Y**, then **Enter**. The following should appear on your screen.

BLANK DISPLAY 2

IS THE SCREEN CORRECT? (Y/N)

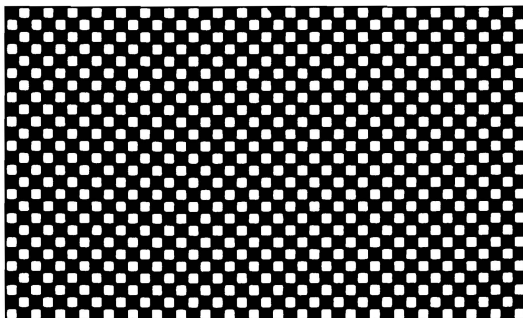
IS THE PRESENTATION ON YOUR SCREEN THE SAME AS THAT SHOWN ABOVE?

NO Replace the Professional Graphics Controller (see Section 5).

YES 

Press **Y**, then **Enter**. The presentation should be the black-and-white checkerboard shown below.

**CHECKERBOARD DISPLAY
BLACK AND WHITE**



IS THE SCREEN CORRECT? (Y/N)

**IS THE CHECKERBOARD ON YOUR DISPLAY
BLACK AND WHITE?**

NO Replace the IBM Professional Graphics
 Controller (see Section 5).

YES 

Press **Y** then **Enter**

If your IBM Professional Graphics Controller is not set to the emulator mode you have successfully completed the Professional Graphics Controller advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

The following should appear on your screen if the IBM Professional Graphics Controller is set to the emulator mode (see Section 6).

EMULATOR NUMERICAL DISPLAY

0 1 2 3 4 5 6 7 8 9

ARE 0 THROUGH 9 DISPLAYED? (Y/N)

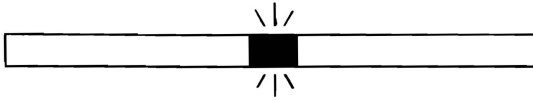
IS THE PRESENTATION ON YOUR SCREEN THE SAME AS THAT SHOWN ABOVE?

NO Replace the Professional Graphics Controller (see Section 5).

YES 

Press **Y**, then **Enter**. The presentation should be a white bar with a blinking black square in the middle.

EMULATOR CURSOR DISPLAY



IS THE SCREEN CORRECT? (Y/N)

**DO YOU HAVE A WHITE BAR WITH A BLINKING
BLACK SQUARE IN THE MIDDLE?**

NO Replace the IBM Professional Graphics Controller (see Section 5). Adjustments”).

YES



Press **Y**, then **Enter**. The following should appear on your screen.

EMULATOR ATTRIBUTE DISPLAY
THIS LINE IS AT NORMAL INTENSITY.
THIS LINE IS INTENSIFIED.
THIS LINE IS IN REVERSE VIDEO.

THIS LINE IS BLINKING.

 BLUE
 GREEN
 CYAN
 RED
 MAGENTA
 YELLOW
 WHITE

IS THE SCREEN CORRECT? (Y/N) 

**DOES EACH LINE MATCH ITS DESCRIPTION
AND ARE ALL THE COLORS PRESENT AND
CORRECT?**

NO Replace the IBM Professional Graphics
Controller (see Section 5).

YES 

Press Y, then Enter. The following should appear on your screen.

EMULATOR 80X25 DISPLAY

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ]
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[^
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`a
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`ab
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abc
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcd
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcde
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdef
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefg
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefgh
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghi
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghij
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijk
```

IS THE SCREEN CORRECT? (Y/N)

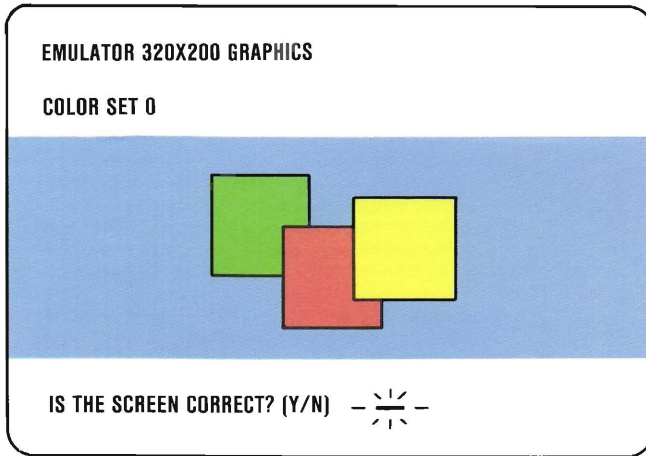


ARE ALL THE CHARACTERS PRESENT AND CORRECT (NO EXTRA DOTS IN CHARACTER BOXES OR MISSING DOTS FROM CHARACTER FIGURE)?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES

Press **Y**, then **Enter**. The following should appear on your screen.

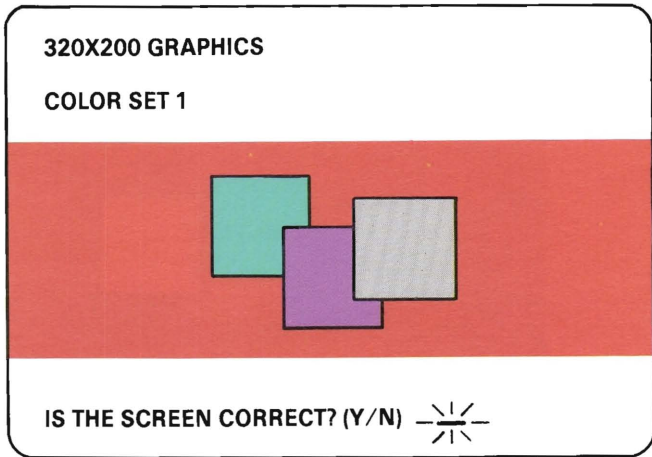


IS THE PRESENTATION THE SAME AS THAT SHOWN ABOVE?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES 

Press **Y**, then **Enter**. The following should appear on your screen.

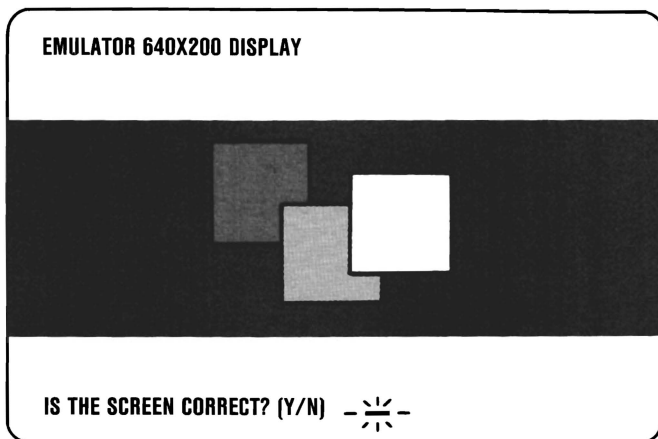


IS THE PRESENTATION THE SAME AS THAT SHOWN ABOVE?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES 

Press **Y**, then **Enter**. The following presentation should appear. The background should be black. The boxes, from left to right, should gray, gray, and white. The characters should be white.

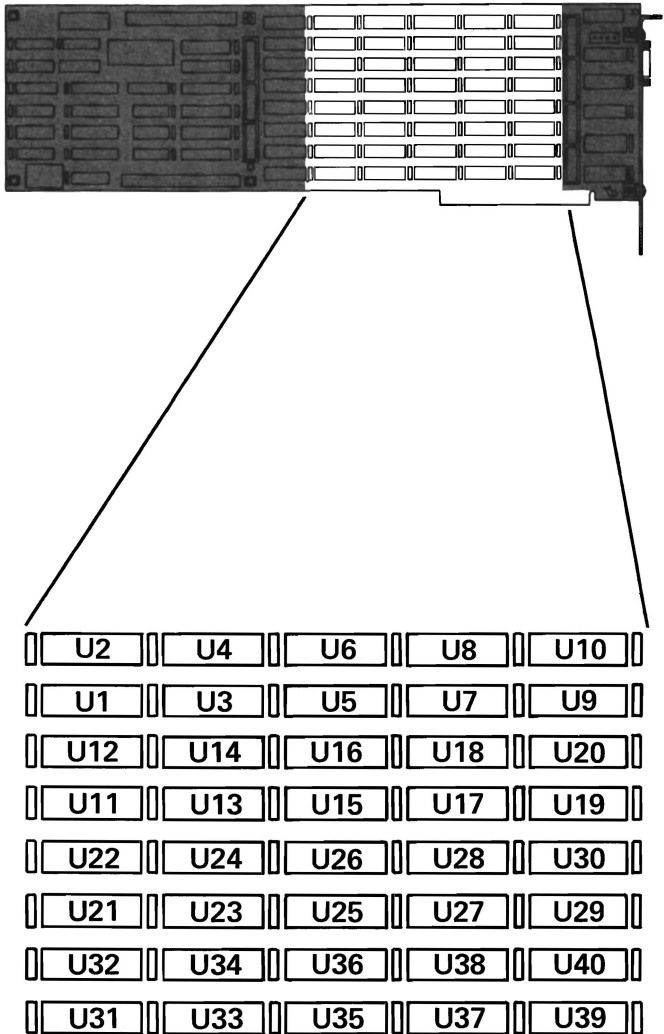


IS THE PRESENTATION THE SAME AS THAT SHOWN ABOVE?

NO Replace the IBM Professional Graphics Controller (see Section 5).

YES You have successfully completed the Professional Graphics Controller advanced diagnostic tests. If you suspect an intermittent problem, go to page 3-010-1.

Match the U-XX error code with the module location in the following illustration, then replace the memory module (see Section 5).



Notes:



Voice Communications Adapter 7100

You have entered this PIC because your system has a 71XX error code or you suspect a problem with the Voice Communications Adapter.

If the jumpers are not set correctly, all PC functions might be affected. Before starting the diagnostics tests turn to Section 4, "Locations", and ensure that the jumpers are set correctly.

To run the diagnostics, perform the following:

- Power off the System Unit.
- Put the Advanced Diagnostics Diskette in Drive A.
- Turn the System Unit on.
- Press 0 and then enter to run the diagnostics routines.

Follow the instructions that appear on your screen. Questions may appear on your screen, depending on your system. Answer yes or no as required.

After ensuring that the list of options is correct, enter the number of times you want to run the tests. Entering 0 runs each test once.

Select 71 (Voice Communications Adapter) and press enter. The following message will be displayed:

**TESTING — VOICE COMMUNICATIONS ADAPTER VOICE
COMMUNICATION BASIC TESTS RUNNING BASIC TESTS HAVE
FAILED IF THEY DO NOT COMPLETE WITHIN 30 SECONDS.**

**DID THIS MESSAGE DISPLAY FOR MORE THAN
30 SECONDS OR DID AN ERROR MESSAGE
APPEAR?**

YES Replace the Voice Communications Adapter.

NO 

The following message should now be displayed:

**BASIC TEST COMPLETED
VOICE COMMUNICATIONS ADAPTER SET FOR INTERRUPT
LEVEL. DO YOU WISH TO PERFORM THE EXTEND
DIAGNOSTIC? (Y/N)**

Before continuing, please note that the extended diagnostics require the use of a telephone; a microphone and a speaker are optional. The tests include the wrap test and the selection of the proper cables (black or white) to attach a telephone set and a telephone line to the Voice Communications Adapter.

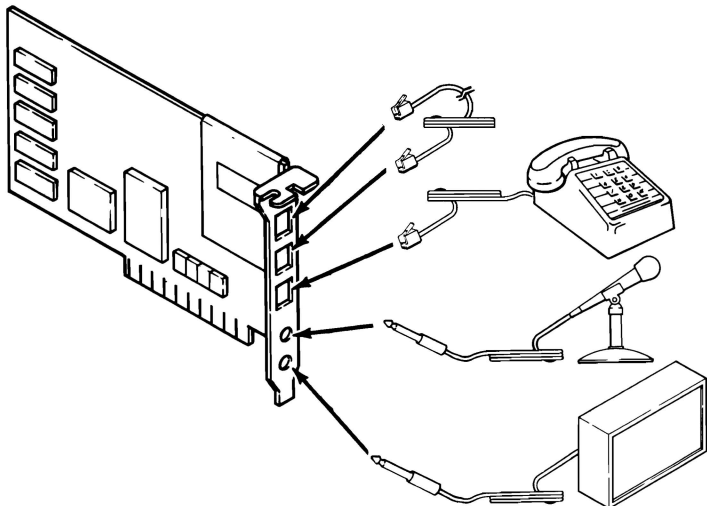
Telephone Set cables have a notch on the dark connector.

Telephone Line cables have a tab on the dark connector.

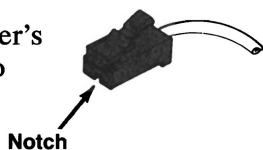
To perform the diagnostics, press **Y** and **Enter**. Follow instructions as they appear on your screen.

CONTINUE 

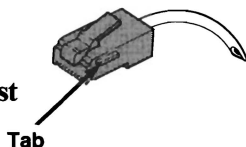
When prompted to perform the Wrap Test, setup the test as shown:



Plug the notched connector of a **Telephone Set** cable into the adapter's phone jack. Plug the other end into the telephone.



Plug the tabbed connector of a **Telephone Line** cable into the adapter's line 1 jack. Plug the other end into the line 2 jack. **This cable must be installed to pass the wrap test.**



CONTINUE



Follow prompts on the screen, answer yes or no as required.

**GO TO THE "APPLICATION SETUP" IN SECTION 3-7100 AND
CONNECT THE CABLES AS SHOWN. HANG UP THE TELEPHONE
HANDSET BEFORE STARTING THIS TEST.**

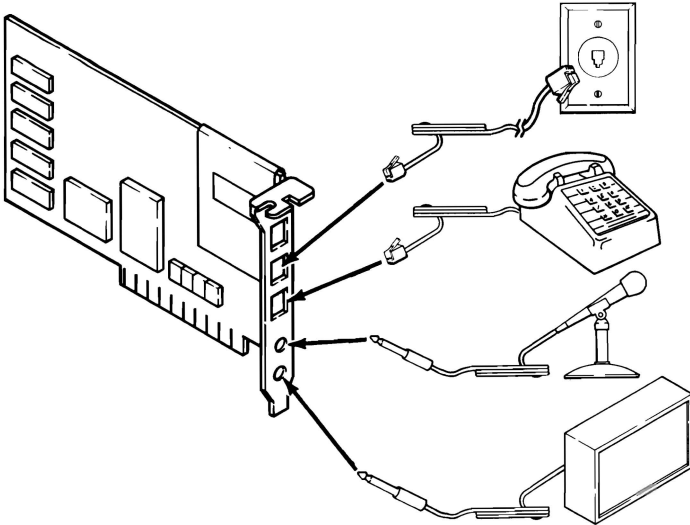
PRESS ENTER TO CONTINUE

DID THIS MESSAGE APPEAR?

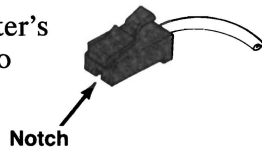
NO Go to page 3-7100-8

YES 

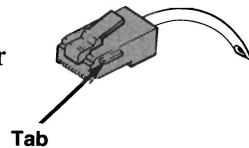
Perform the Application Setup as shown:



Plug the notched connector of a **Telephone Set** cable into the adapter's phone jack. Plug the other end into the telephone.



Plug the tabbed connector of a **Telephone Line** cable into the adapter's line 1 jack. Plug the other end into the wall jack.



CONTINUE

Follow the prompts on the screen.

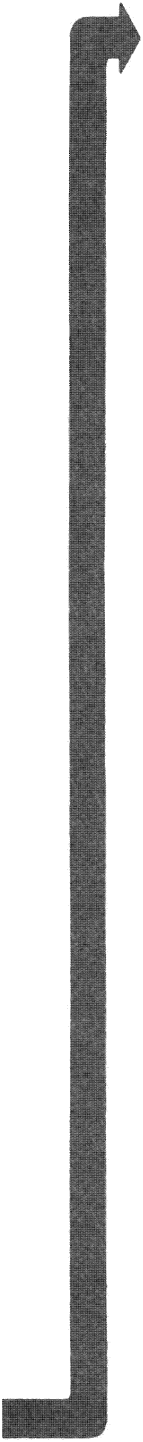
If necessary, you may be prompted to replace one or both of your cables with the opposite color cable.

Answer yes or no as required to complete the diagnostics.

DID ANY ERROR MESSAGES APPEAR?

NO Voice Communication Diagnostics are complete.

YES



Be sure that the problem cannot be isolated to one of the following:

- Cables - Check the red and green wires in each cable for continuity.
- Telephone - Connect the telephone directly to the wall jack and dial another telephone.
- Microphone and Speaker - Use a known working microphone and speaker.

If the problem is not in one of these, replace the Voice Communications Adapter.



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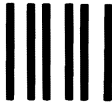
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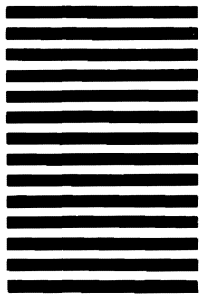
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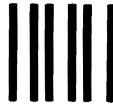
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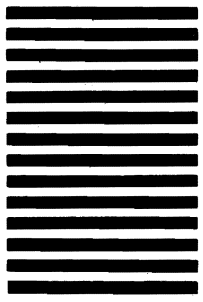
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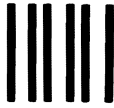
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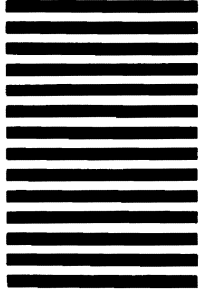


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