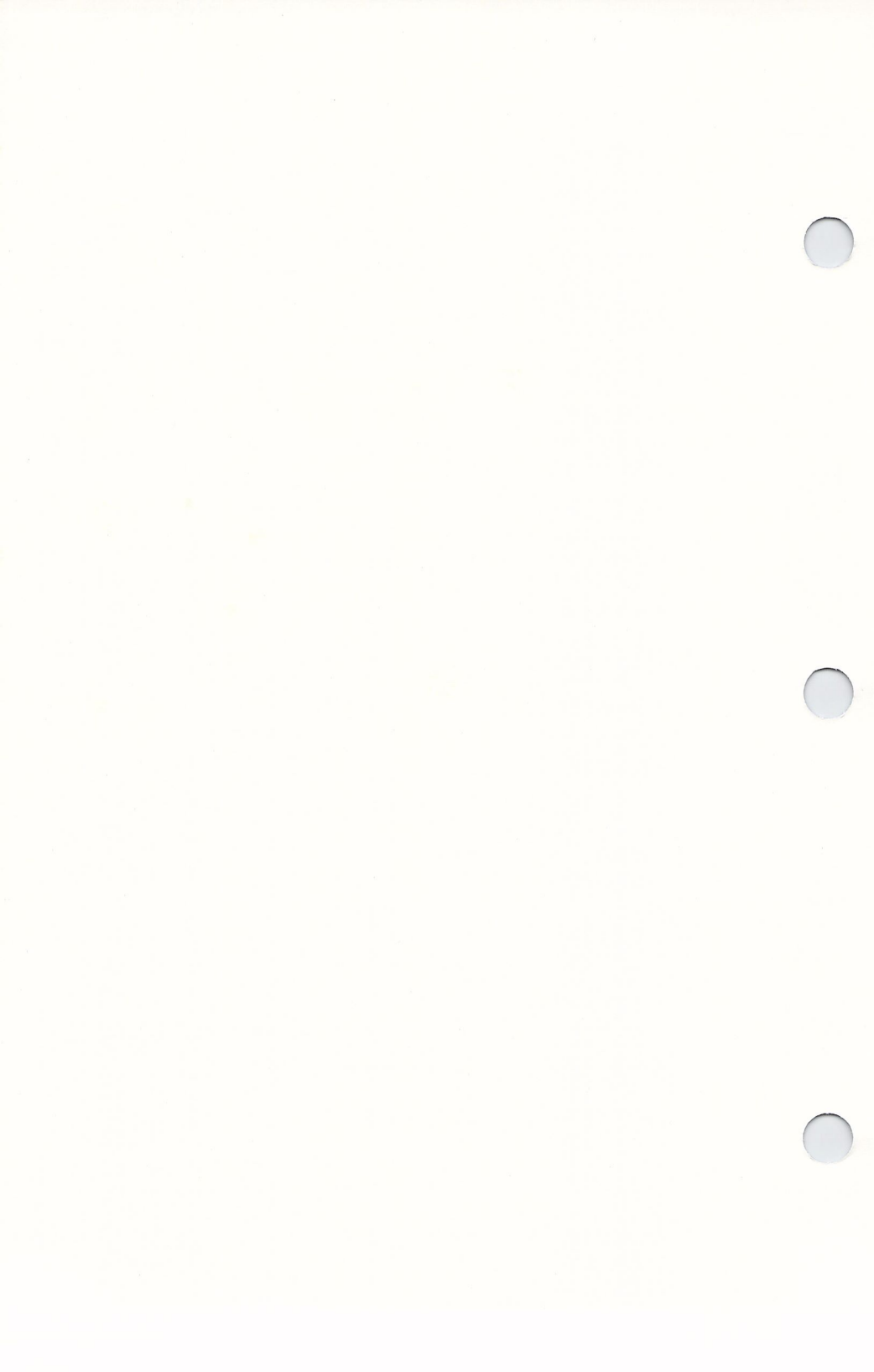




PC Convertible  
Hardware Maintenance  
and Service





PC Convertible<sup>®</sup>

Hardware Maintenance  
and Service

## First Edition (February 1986)

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# Federal Communications Commission

## Radio Frequency Interference

### Statement

**Warning:** This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subject 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 this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

## Instructions to User

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals, and the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.

- Plug the equipment into a different outlet so that the equipment and receiver are on different circuits.
- Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
- Ensure that card slot covers, where applicable, are in place when no card is installed.
- If peripherals not offered by IBM are used with equipment, it is suggested to use shielded, grounded cables, with in-line filters if necessary.

If necessary, consult your dealer service representative for additional suggestions.

IBM is not responsible for any radio or television interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

# Safety Inspection Guide

## IBM PC Convertible

This inspection guide can assist you in identifying potentially unsafe conditions on this product. Each machine is designed and built with safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, you should use good judgment to identify conditions not covered by this inspection guide.

If any unsafe conditions are present, you should determine how serious the apparent hazard could be and whether you should continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

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

This 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 that you remove all non-IBM devices and attachments from the unit before you conduct the safety inspection.

## Reference Literature:

- *IBM PC Convertible Guide to Operations*
- Any applicable safety publications.

## Safety checklist:

1. Press the system unit power switch off and disconnect the power cord.
2. Check exterior covers for damage (such as loose, broken, or sharp edges).
3. Check the power cord for the following:
  - The cord set should be the appropriate molded type. Refer to Section 4, "Parts Catalog."
  - The insulation must not be worn or frayed.
4. Remove the rear cover from the system unit.
5. Remove the keyboard.
6. Check for any non-IBM alterations, and use good judgement to ensure the safety of them.
7. Check inside the system 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 that the voltage specified on the voltage tag (bottom panel of the power supply) matches the voltage of the power receptacle. If in doubt, verify the voltage.



10. Check that the following labels are installed:

- “Battery Warning: Do not dispose of battery in fire or water. See instructions for disposal in the battery installation instructions.”
- “Caution: Hazardous Area. Do not remove this cover. Trained Service Personnel Only. No Serviceable Components Inside.”

11. Check the condition of the battery.



# Preface

The IBM PC Convertible Hardware Maintenance and Service Manual (HMS) is used by trained service personnel to isolate a failing unit and to take the necessary action to make the unit operational.

This manual provides operational instructions and hardware information that is necessary to find the failing part and make the repair. Complete operating instructions can be found in *IBM PC Convertible Guide to Operations*. Hardware design and interface information can be found in *IBM PC Convertible Technical Reference*.

The user should be trained on the IBM PC Convertible system and be familiar with a multimeter.

This manual contains four sections and two appendixes:

- Section 1, "Introduction," describes the system unit and optional features, the service diagnostics, and the items required to service the system.
- Section 2, "Problem Isolation Charts," provides step-by-step procedures for each area of the system to isolate the failing unit. The Problem Isolation Charts (PICs) use a symptom to determine which tests to run and the actions to take to make the unit operational.
- Section 3, "Service Information," provides information on locations, removal and replacements, adjustments, and testing of assemblies, subassemblies, and individual parts of the system.

- Section 4, “Parts Catalog,” provides parts lists of assemblies, subassemblies, and individual replaceable parts of the system.
- Appendix A, “POST and Diagnostic Error Codes,” provides a list of the error codes and the tests or components that caused the failure.
- Appendix B, “Serial and Parallel Adapter Wrap Jumpers,” provides a list of the connector pins that can be jumpered to put the serial adapter and the parallel adapter into wrap mode.

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# Section 1. Introduction

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CRT DISPLAY ADAPTER

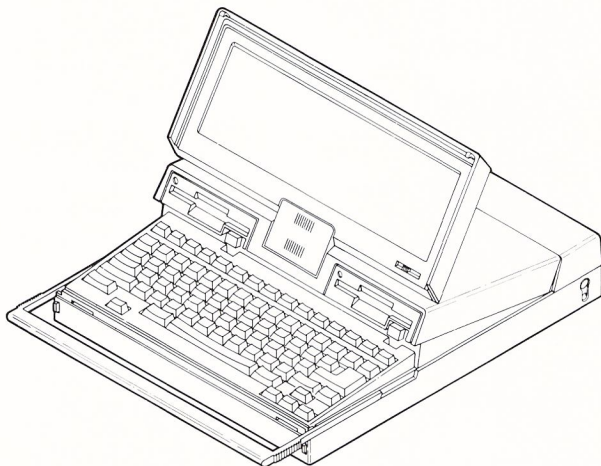
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# IBM PC Convertible System

The IBM PC Convertible is a compact, portable, battery-operated computer. It can be operated from a battery pack, an ac adapter, or a 12-volt dc automobile power adapter.

The computer consists of a system unit with options and accessories available to tailor it to meet different needs.



The IBM PC Convertible System Unit consists of a system board containing an 80C88 microprocessor and system adapters, memory, a keyboard, a detachable 80 character by 25 line liquid crystal display (LCD), a nickel cadmium battery pack, and an ac adapter. The system uses 90 millimeter (3.5 inch) diskettes.

Some of the options and accessories available for the IBM PC Convertible are:

- 128K-byte memory card (expansion up to 512K bytes)
- An internal modem (US only)
- A serial/parallel adapter
- A CRT display adapter
- A 9-inch monochrome monitor
- A 13-inch color monitor
- A 40-characters-per-second portable printer
- A 12-volt dc (negative ground) automobile power adapter
- A nickel cadmium battery pack (replacement)
- A battery charger
- A portable printer cable.

# How to Use the Problem Isolation Charts (PICs)

The PICs direct you through the tests to run, the measurements to make, and the actions necessary to repair or replace the failing unit.

Always begin with “Start” on page 2-3.

## Start

This is the entry point for using all the Problem Isolation Charts (PICs).

Your system may have a POST error indication (audio, visual, or error code), an Advanced Diagnostic error indication (error

Using error indications, “Start” directs you to the correct PIC.

## Liquid Crystal Display (LCD)

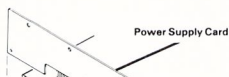
### Power

Use this PIC when your system has no power indication, when you suspect a power group (power supply, battery pack, ac adapter, or automobile power adapter) problem, or when you are directed here from another PIC.

POST, when  
et a LCD

These PICs will guide you through a series of steps that use the IBM PC Convertible Advanced Diagnostic Diskette to find the failing unit.

## Power Supply Card 1050



The “Service Information” section will guide you to complete the repair.

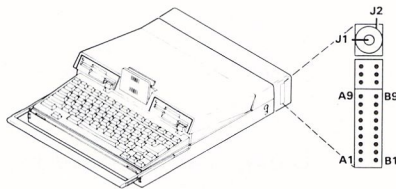
This is an example of a page from the PICs.

Steps to take,  
tests, checks,  
or observations.

Question to  
be answered  
YES or NO.

Instructions  
to replace a  
Field Replaceable  
Unit (FRU), make  
adjustment, or go  
to another page.

Measure the voltages at the pins on the CRT-display-adaptor, direct-drive, and phone-jack connectors, as shown in the table below.



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| A4  | B5        | +2.4         | +5.5         |
| A5  | B5        | +2.4         | +5.5         |
| A6  | B5        | +2.4         | +5.5         |
| A7  | B5        | +2.4         | +5.5         |
| J1  | J2        | +1.0         | +2.4         |

ARE ALL THE VOLTAGES WITHIN THE LIMITS  
SHOWN IN THE TABLE?

NO Replace the CRT display adaptor. Refer to Section 3,  
"Service Information" on page 3-1.

YES Go to page 2-500-46.

2-500-45

# Service Diagnostics

The service diagnostics for the IBM PC Convertible consist of the Power-On Self Test (POST) and the Advanced Diagnostics.

The POST, residing in read-only memory (ROM), and the Advanced Diagnostics, residing on the IBM PC Convertible Advanced Diagnostic Diskette, are used, along with this manual, to isolate the failure and describe the action necessary to return the system to operation.

To test your system, you should first run the POST and then run the Advanced Diagnostics.

To run the POST and the Advanced Diagnostics and isolate the failure, you may need:

- An *IBM PC Convertible Hardware Maintenance and Service* manual.
- An IBM PC Convertible Advanced Diagnostic Diskette.
- A blank test diskette.
- A *Guide to Operations*.
- A multimeter.
- Serial adapter and parallel adapter wrap plugs. (These wrap plugs must be purchased separately. Refer to Section 4, "Parts Catalog" on page 4-1.)
- The section containing the 3-1400 pages in a PC, PC XT, or PC AT *Hardware Maintenance and Service* manual for printer service.

**Note:** The following shortened names are used in the Diagnostics to represent the indicated option or device.

**Matrix printer** = IBM Matrix Printer  
IBM Graphics Printer

**Portable printer** = IBM PC Convertible Printer

# Power-On Self Test (POST) Description

The POST tests the operation of the following:

- System board
- Memory
- Keyboard adapter
- Display adapters
- Diskette adapter
- Serial/parallel adapter - serial port
- Internal modem (not tested if powered on with system profile set to RESUME mode or reset by Ctrl, Alt, and Del keys).

The POST runs every time your system is powered on or reset.

When you power on your system with the system profile set to RESUME, or when you reset your system by pressing and holding the Ctrl, Alt, and Del keys, the POST validates the first 128K bytes of memory and tests the system board and the system adapters. The data in memory is not altered.

When you power on your system with the system profile set to IPL, or when you reset your system by pressing and holding the Ctrl, Fn, and Del keys, the POST tests all of the memory and tests the system board and the system adapters.

**Warning:** When running the POST with the system profile set to IPL or by pressing the Ctrl, Fn, and Del keys, the data in memory is altered. Any data that is in system memory should be saved on diskette before starting the POST.

The POST tells you the condition of your system by audio and visual responses.



## Power-On Self Test (POST) Audio Responses

The system beeps once when you press the system unit power switch on and the POST starts.

**Note:** The POST can also be started by pressing and holding the Ctrl, Fn, and Del keys. The system will beep once when the keys are pressed.

Once the POST starts, the condition of your system is indicated by audio responses (beeps). Listen closely for the number and duration (long or short) of the beeps. Questions will be asked about the beeps that occur during the POST or when the POST completes. Do not count the beep that occurs when you press the power switch on or press the Ctrl, Fn, and Del keys, unless you are specifically asked to by the question.

The following are the POST audio responses:

| RESPONSE                    | MEANING   |
|-----------------------------|---|
| 1 short beep                | The POST has completed correctly.   |
| 2 short beeps               | An error has occurred but the system is operational.  |
| 1 long beep + 1 short beep  | An error has occurred and the system is not operational.  |
| 1 long beep + 2 short beeps | The LCD is not installed or the LCD controller is bad, and the CRT display adapter is not installed or is not operational. The system automatically powers off. |
| 3 short beeps               | The battery pack is low and no external power source is connected to the system. The system automatically powers off.   |
| No beep                     | The POST can not run or the speaker failed.   |

# Power-On Self Test (POST) Operation

To reset the system and run the POST:

1. Remove all diskettes from the drives.
2. If the system is powered on, press the power switch off.
3. Insert the Advanced Diagnostic diskette into drive A.
4. Press the system unit power switch on and wait about 10 seconds.
5. Press and hold the Ctrl, Fn, and Del keys.

**Note:** The system beeps once when the Ctrl, Fn, and Del keys are pressed.

6. Release the keys.

# Power-On Self Test (POST) Correct Responses

If the POST completes correctly, you get the following sequence of responses.

1. A **XXX Kb OK** message displays. The memory tested increases in 64K-byte increments until it equals the memory installed in your system.
2. The system beeps once.

**Note:** Two short beeps with the System Clock icon is also an indication of successful completion of the POST.

3. One of the following displays:
  - The Insert Diskette A icon (if there is no diskette in drive A)
  - The IBM PC CONVERTIBLE ADVANCED DIAGNOSTICS menu.

# Power-On Self Test (POST) Error Responses

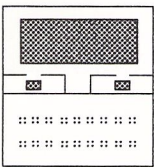
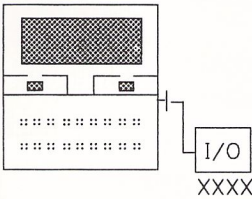
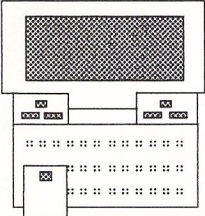
If the POST detects an error, the test stops and gives you one or more of the following indications.

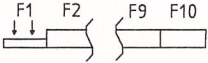
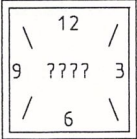

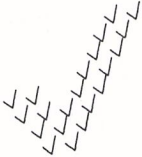
- No audio or visual response (blank display and no beeps)
- An audio response (more than one beep)
- One or more icons with an error code
- An icon with a read-only memory (ROM) address
- An incorrect memory size
- An incorrect display (such as no cursor, incorrect characters, or unstable)
- A combination of two or more of the above.

Make a note of all the error conditions that occur. If multiple error codes occur, use the first one that occurs.

## Power-On Self Test (POST) Icons

A POST icon is a graphic display that tells you the condition of your system. The following table describes the meaning of the icons displayed by the IBM PC Convertible

| ICON   | MEANING  |
|--|--|
| <p>System Unit</p> <p>XXX Kb OK</p>  <p>XXXX</p>        | <p>A POST error was detected in the system unit. The error code or codes indicate the failing area.</p>  |
| <p>Options</p> <p>XXX Kb OK</p>  <p>I/O</p> <p>XXXX</p> | <p>A POST error was detected on an adapter or attachment that is not in the system unit. The error code or codes and the read-only memory (ROM) address indicate the failing area.</p> |
| <p>Insert Diskette A</p>                              | <p>There is no diskette in drive A. The F1 prompt also displays with the icon.</p> <p>If a broken diskette occurs with this icon, it indicates a diskette read failure.</p>            |

| ICON  | MEANING   |
|---|---|
| <p>F1 Prompt</p>           | <p>An error or warning condition has occurred, but does not prevent the system from operating. However, the device that caused the condition may not function correctly.</p>  |
| <p>System Clock</p>        | <p>The system clock is incorrect. It may not have been set or is incorrect because power was lost. The system time is invalid and the system profile is set to the default state.</p>   |
| <p>Low Battery</p>         | <p>The battery is too low to operate the system without the ac adapter or automobile power adapter installed.</p> <p>If the ac adapter or automobile power adapter is not installed, the system gives three short beeps and powers off without displaying any message.</p> <p><b>Note:</b> The battery takes about 24 hours to completely charge.</p> |
| <p>I/O Channel Check</p>  | <p>An I/O channel check has occurred.</p>   |

## Advanced Diagnostics Description

The Advanced Diagnostics are used with the Problem Isolation Charts (PICs) in Section 2. You can select and run the tests individually or in combination with others or you can run all the tests. Any requirements or setup instructions to run the tests are described in the PIC for the device being tested.

To completely test your system, you must run the Power-On Self Test (POST) before running the Advanced Diagnostics. Refer to “Power-On Self Test (POST) Operation” on page 1-12.

To begin the problem isolation, always go to “Start” on page 2-3.

## Advanced Diagnostics Operation

To run the Advanced Diagnostics:

1. Insert the Advanced Diagnostic diskette into drive A.
2. Press and hold the Ctrl, Fn, and Del keys.
3. Release the keys.
4. Follow the instructions on each menu to select and run the tests.

**Note:** For explanations of each menu and its options, refer to “Advanced Diagnostics Menus” on page 1-19.

If the Advanced Diagnostics complete without an error, the SYSTEM CHECKOUT menu displays. You can rerun or exit the Advanced Diagnostics at this time.

# Advanced Diagnostics Special Key Functions

Special key functions for the Advanced Diagnostics are:

| KEY             | FUNCTION   |
|-----------------|--|
| F1              | Continues running the diagnostics.   |
| F7              | Moves the message on the screen to the left (CRT monitor only).  |
| F8              | Moves the message on the screen to the right (CRT monitor only).   |
| Ctrl + Fn + Del | Resets the system and starts the POST.   |
| Ctrl + Break    | Returns to the INSTALLED DEVICES menu or the ADVANCED DIAGNOSTICS menu.  |
| Ctrl + P        | Prints each line on the printer, as the line displays.   |
| Ctrl + N        | Cancel the output to the printer.  |
| Ctrl + C        | Stops the diagnostics and returns to the INSTALLED DEVICES menu or the ADVANCED DIAGNOSTICS menu.                      |
| Ctrl + S        | Stops the diagnostics when running in RUN TESTS MULTIPLE TIMES mode. The diagnostics continue when any key is pressed. |
| Shift + PrtSc   | Prints what is on the display.   |

**Note:** While the diagnostics are running, the keyboard may be inhibited. Therefore, you may have to try the keys again.



## Advanced Diagnostics Menu

The following pages describe the diagnostic menus and the function of each option.

On each of the menus, after you select the option or options, you must press Enter to continue.

# IBM PC CONVERTIBLE ADVANCED DIAGNOSTICS Menu

This is the first menu displayed.

```
The IBM PC CONVERTIBLE  
ADVANCED DIAGNOSTICS  
Version X.XX  
(C)Copyright IBM Corp 1986
```

SELECT AN OPTION

```
0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
4 - SET SYSTEM PROFILE  
9 - EXIT TO SYSTEM DISKETTE
```

ENTER THE ACTION DESIRED

```
? _
```

## **0 - RUN DIAGNOSTIC ROUTINES**

Loads all the Advanced Diagnostics and starts the system checkout procedure.

## **1 - FORMAT DISKETTE**

Formats a diskette for running the diskette drive tests only.

## **2 - COPY DISKETTE**

Copies the IBM PC Convertible Advanced Diagnostic Diskette to another diskette.

## **4 - SET SYSTEM PROFILE**

Allows you to check or set the time, date, or system options. See *Guide to Operations*.

## **9 - EXIT TO SYSTEM DISKETTE**

Runs the POST and loads the program from the diskette in drive A.

## INSTALLED DEVICES Menu

This menu displays all of the devices and options that the Diagnostics device presence test senses are installed.

If the memory size is correct, choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter. The INSTALLED DEVICES menu displays again.

If the memory size is not correct, choose **N (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter. Enter the correct memory size and then press Enter. The INSTALLED DEVICES menu displays again with the correct memory size.

THE INSTALLED DEVICES ARE:

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE MEMORY SIZE CORRECT (Y/N) ? N

HOW MUCH MEMORY IS INSTALLED (KB) ? \_

- Y** Redisplays the INSTALLED DEVICES menu.
- N** Displays the HOW MUCH MEMORY IS INSTALLED (KB) ? message.

This menu is the INSTALLED DEVICES menu again, with all of the devices and options that the device presence test senses are installed.

THE INSTALLED DEVICES ARE:

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

- Y Displays the SYSTEM CHECKOUT menu.
- N Displays an ERROR - INSTALLED DEVICES LIST 0199 message. Press Enter to continue running the diagnostics.

This list should always include the system board, keyboard, liquid crystal display or CRT display adapter, at least one diskette drive, and at least 128K bytes of memory.

## SYSTEM CHECKOUT Menu

This menu allows you to select the number of times to run the tests, use the error log, or end the diagnostics.

### SYSTEM CHECKOUT

- 0 - RUN TESTS ONE TIME
- 1 - RUN TESTS MULTIPLE TIMES
- 2 - LOG UTILITIES
- 3 - LOOP POST/DIAGNOSTICS
- 9 - EXIT DIAGNOSTIC ROUTINES

ENTER THE ACTION DESIRED

? \_

### 0 - RUN TESTS ONE TIME

Runs the selected tests once. Displays the TEST SELECTION menu.

### 1 - RUN TESTS MULTIPLE TIMES

Runs the selected tests one or more times without operator intervention. Displays the TEST SELECTION menu.

### 2 - LOG UTILITIES

Supports the error log and the time of day functions. Displays the LOG UTILITIES menu.

### 3 - LOOP POST/DIAGNOSTICS

Loops the POST and selected diagnostics to assist in the isolation of intermittent failures. Displays the TEST SELECTION menu.

### 9 - EXIT DIAGNOSTIC ROUTINES

Returns to the IBM PC CONVERTIBLE ADVANCED DIAGNOSTICS menu (first menu).

# TEST SELECTION Menu

This menu allows you to select the device or devices to be tested. Enter the corresponding numbers, separated by commas or spaces. To test all the devices, press Enter.

## TEST SELECTION

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

ENTER THE NUMBER(S) OF OPTIONS TO TEST  
OR PRESS ENTER TO SELECT ALL OPTIONS  
? \_

## 1 - SYSTEM BOARD

Tests the 80C88 processor, real-time clock, and any system board function that requires visual or audio verification or operator intervention. All other system board testing is done in the POST.

## 2 - XXXKB MEMORY

Tests all installed random access memory and verifies correct addressing.

## 3 - KEYBOARD

Tests the keyboard adapter, cable, and all the key positions.

**50 - LIQUID CRYSTAL DISPLAY**

Displays another LCD menu for test selection.

**5 - CRT DISPLAY ADAPTER**

Displays the CRT DISPLAY ADAPTER menu.

**6 - 2 DISKETTE DRIVE(S)**

Displays the DISKETTE DIAGNOSTIC menu.

**9 - SERIAL/PARALLEL ADAPTER - PARALLEL PORT**

Tests the parallel adapter. Requires the parallel adapter wrap plug (IBM Part 8529228).

**11 - INTERNAL MODEM**

Tests the internal modem.

**12 - SERIAL/PARALLEL ADAPTER - SERIAL PORT**

Tests the serial adapter and IBM Communications Cable. Requires the serial adapter wrap plug (IBM Part 8529280).

**Note:** If the internal modem is not installed, the serial/parallel adapter - serial port will be Option 11.

**51 - PORTABLE PRINTER**

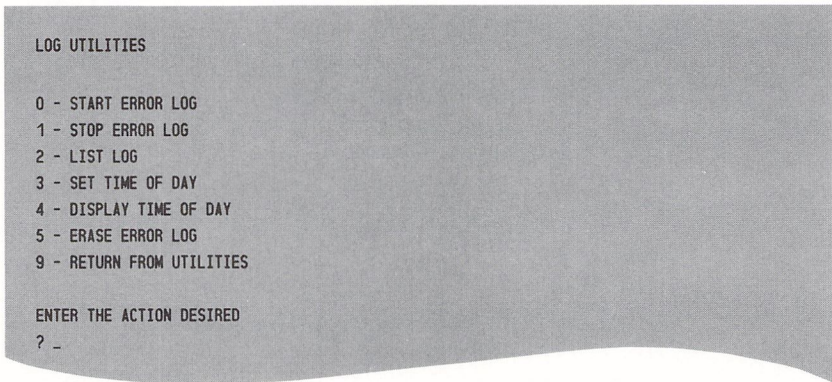
Tests the printer adapter and the printer cable and prints a pattern on the portable printer in different print modes.

**14 - MATRIX PRINTER**

Tests the printer cable and prints a pattern on the printer in different print modes.

# LOG UTILITIES Menu

This menu allows you to start, stop, and list the error log and to set and check the time of day.



## 0 - START ERROR LOG

Starts recording the failures detected by diagnostic tests. Errors can be logged to a diskette drive that is not being tested or to a printer. If you are logging errors onto a diskette, use a **copy** of the Advanced Diagnostic diskette that is not write-protected.

## 1 - STOP ERROR LOG

Stops recording the failures detected by the diagnostic tests.

## 2 - LIST LOG

Lists the logged failures from the diskette onto the display.

## 3 - SET TIME OF DAY

Sets the current time of day, using a 24-hour clock. Does not reset the time in the real-time clock.



**4 - DISPLAY TIME OF DAY**

Displays the current time of day or displays the elapsed time since the diagnostic program was loaded, if no time of day was set.

**5 - ERASE ERROR LOG**

Deletes the logged errors from the diskette.

**9 - RETURN FROM UTILITIES**

Returns to the SYSTEM CHECKOUT menu.

# LIQUID CRYSTAL DISPLAY TEST SELECTION Menu

This menu allows you to select the mode used for running the LCD tests. Enter the corresponding number and then press Enter.

TESTING - LIQUID CRYSTAL DISPLAY

LIQUID CRYSTAL DISPLAY TEST SELECTION

- 1 - TEST IN MONOCHROME MODE
- 2 - TEST IN GRAPHICS MODE
- 9 - EXIT TO CONTROL PROGRAM
- 10 - RUN ALL ABOVE TESTS

ENTER THE ACTION DESIRED

? \_

## **1 - TEST IN MONOCHROME MODE**

Displays the LIQUID CRYSTAL  
DISPLAY TEST - MONOCHROME  
MODE menu.

## **2 - TEST IN GRAPHICS MODE**

Displays the LIQUID CRYSTAL  
DISPLAY TEST - GRAPHICS MODE  
menu.

## **9 - EXIT TO CONTROL PROGRAM**

Returns to the SYSTEM CHECKOUT  
menu or continues other tests.

## **10 - RUN ALL ABOVE TESTS**

Runs all of the monochrome and graphics  
mode tests.



# LIQUID CRYSTAL DISPLAY TEST - MONOCHROME MODE Menu

This menu allows you to select the LCD test or tests to be run in monochrome mode. Enter the corresponding number and then press Enter. To run all the monochrome mode tests, choose **10 (RUN ALL ABOVE TESTS)** and press Enter.

TESTING - LIQUID CRYSTAL DISPLAY

LIQUID CRYSTAL DISPLAY TEST  
- MONOCHROME MODE

- 0 - DISPLAY ADAPTER TEST
- 1 - PEL/DRIVER TEST
- 2 - DISPLAY ATTRIBUTES
- 3 - CHARACTER SET
- 4 - 80 X 25 DISPLAY
- 9 - EXIT FROM TEST
- 10 - RUN ALL ABOVE TESTS

ENTER THE ACTION DESIRED

? \_

## 0 - DISPLAY ADAPTER TEST

Tests the LCD adapter and the LCD memory and checks for the correct addressing of LCD memory.

## 1 - PEL/DRIVER TEST

Tests all the pixels by turning them on and then off.

## 2 - DISPLAY ATTRIBUTES

Tests the display attribute logic for normal, reverse, line underscore, blinking display, nondisplay, and nondisplay black.

**3 - CHARACTER SET**

Displays the primary and alternate character fonts.

**4 - 80 X 25 DISPLAY**

Fills the screen with a ripple pattern of characters using the 80 x 25 display mode.

**9 - EXIT FROM TEST**

Returns to the LIQUID CRYSTAL DISPLAY TEST SELECTION menu, SYSTEM CHECKOUT menu, or continues other tests.

**10 - RUN ALL ABOVE TESTS**

Runs all of the monochrome mode tests.

# LIQUID CRYSTAL DISPLAY TEST - GRAPHICS MODE Menu

This menu allows you to select the LCD test or tests to be run in graphics mode. Enter the corresponding number, and then press Enter. To run all the graphics mode tests, choose **10 (RUN ALL ABOVE TESTS)** and press Enter.

TESTING - LIQUID CRYSTAL DISPLAY

LIQUID CRYSTAL DISPLAY TEST  
- GRAPHICS MODE

- 0 - DISPLAY ADAPTER TEST
- 1 - PEL/DRIVER TEST
- 2 - DISPLAY ATTRIBUTES
- 3 - CHARACTER SET
- 4 - 80 X 25 DISPLAY
- 5 - 40 X 25 DISPLAY
- 6 - 320 X 200 GRAPHICS
- 7 - 640 X 200 GRAPHICS
- 8 - SCREEN PAGING
- 9 - EXIT FROM TEST
- 10 - RUN ALL ABOVE TESTS

ENTER THE ACTION DESIRED  
? \_

## 0 - DISPLAY ADAPTER TEST

Tests the LCD adapter and the LCD memory and checks for the correct addressing of LCD memory.

## 1 - PEL/DRIVER TEST

Tests all the pixels by turning them on and then off.

## 2 - DISPLAY ATTRIBUTES

Tests the display attribute logic for normal, reverse, blinking display, nondisplay, and nondisplay black modes.

**3 - CHARACTER SET**

Displays the primary and alternate character fonts.

**4 - 80 X 25 DISPLAY**

Fills the screen with a ripple pattern of characters using the 80 x 25 display mode.

**5 - 40 X 25 DISPLAY**

Fills the screen with a ripple pattern of characters using the 40 x 25 display mode.

**6 - 320 X 200 GRAPHICS**

Tests the 320 x 200 graphics mode.

**7 - 640 X 200 GRAPHICS**

Tests the 640 x 200 graphics mode.

**8 - SCREEN PAGING**

Displays eight video pages of 0 through 7 and then returns back to 0 to test the LCD memory addressing logic.

**9 - EXIT FROM TEST**

Returns to the LIQUID CRYSTAL DISPLAY TEST SELECTION menu.

**10 - RUN ALL ABOVE TESTS**

Runs all of the graphics mode tests.

# CRT DISPLAY ADAPTER TEST Menu

This menu allows you to select the CRT display adapter and color monitor tests. Enter the corresponding number, and then press Enter. To run all the CRT display adapter tests, choose **10 (RUN ALL ABOVE TESTS)** and press Enter.

TESTING - CRT DISPLAY ADAPTER

CRT DISPLAY ADAPTER TEST MENU

- 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
- 8 - SCREEN PAGING
- 9 - EXIT TO CONTROL PROGRAM
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION

-

## 0 - DISPLAY ADAPTER TEST

Tests the CRT display adapter and the CRT display memory and checks for the correct addressing of CRT display memory.

## 1 - DISPLAY ATTRIBUTES

Tests the display attribute logic for intensity, reverse video, blinking, nondisplay, and underline modes.

## 2 - CHARACTER SET

Checks character ROM by displaying all the available characters.



**3 - 80 X 25 DISPLAY**

Fills the screen with a ripple pattern of characters using the 80 x 25 display mode.

**4 - 40 X 25 DISPLAY**

Fills the screen with a ripple pattern of characters using the 40 x 25 display mode.

**5 - 320 X 200 GRAPHICS**

Tests the 320 x 200 graphics mode and displays color set 0 and color set 1.

**6 - 640 X 200 GRAPHICS**

Tests the 640 x 200 graphics mode.

**8 - SCREEN PAGING**

Displays eight video pages of 0 through 7 and then returns back to 0 to test the CRT display memory addressing logic.

**9 - EXIT TO CONTROL PROGRAM**

Returns to the SYSTEM CHECKOUT menu or continues with the other tests.

**10 - RUN ALL ABOVE TESTS**

Runs tests 0, 1, 2, 3, 4, 5, 6, and 8.

## 11 - VIDEO TEST

Used for voltage measurements on the video, intensity, and composite output signals.

## 12 - SYNC TEST

Used for voltage measurements on the horizontal and vertical sync output signals.

**Note:** You must disconnect the display signal cable before running the sync test. The sync frequency changes if the cable is not disconnected.



# DISKETTE DIAGNOSTIC Menu

This menu allows you to select the diskette diagnostic test or tests to be run. Enter the corresponding number and then press Enter.

```
TESTING - 2 DISKETTE DRIVE(S)

DISKETTE DIAGNOSTIC MENU

OPTION
1 - SEQUENTIAL ACCESS
2 - RANDOM SEEK
3 - VERIFY DISKETTE
4 - SPEED TEST
5 - DSKT CHANGE TEST
9 - RETURN TO CONTROL PROGRAM
10 - RUN ALL ABOVE TESTS (1, 2, 3, AND 5)

FOR OPTION 9
ENTER "9" AND "ENTER"

FOR ALL OTHER OPTIONS (1 THRU 5 OR 10)
ENTER OPTION, DRIVE, AND "ENTER"
? _
```

## 1 - SEQUENTIAL ACCESS

Tests the basic diskette operations including a sequential write, read, and data compare.

## 2 - RANDOM SEEK

Tests the basic diskette operations, including a series of 50 random seeks, each followed by a write, read, and compare of data.

## 3 - VERIFY DISKETTE

Verifies each sector to determine if data can be accessed without an error.

**4 - SPEED TEST**

Measures the time for one revolution of the diskette.

**5 - DSKT CHANGE TEST**

Verifies that the diskette logic recognizes that a diskette was removed and a diskette was inserted. Checks the write-protect logic.

**9 - RETURN TO CONTROL PROGRAM**

Returns to the SYSTEM CHECKOUT menu or continues other tests.

**10 - RUN ALL ABOVE TESTS**

Runs all of the tests except the speed test.



# Section 2. Problem Isolation Charts

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# Start

This is the entry point for using all the Problem Isolation Charts (PICs).

Your system may have a POST error indication (audio, visual, or error code), an Advanced Diagnostic error indication (error code, missing device on the installed devices list, or missing or extra characters/dots on the LCD or printer), an undetermined problem, or an intermittent problem.

**Note:** Read “Power-On Self Test (POST) Audio Responses” on page 1-11 before continuing with the problem isolation.

**Be sure you complete the following steps before going to another PIC.**

1. Press the system unit power switch off.
2. Set any power switches on all external options or devices off.
3. Disconnect external power from the system unit and all external options and devices.
4. Disconnect all external options and devices from the I/O connector on the rear of the system unit.
5. Disconnect the battery pack.
6. Reconnect the battery pack.
7. Reconnect all external IBM options and devices. Do not connect any non-IBM devices or any modified options, except the display or television.
8. Ensure that all external cables and connectors are secure and in the correct location.
9. Go to page 2-4.

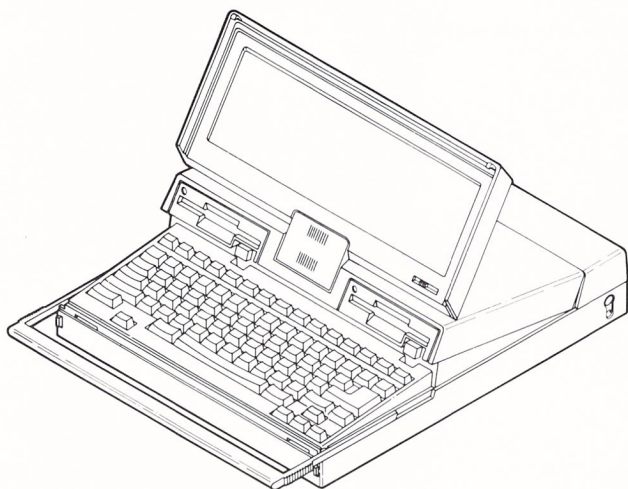
10. Remove all diskettes from the drives.
  11. Reconnect external power to the system unit and all external options and devices.
  12. Set the power switch on all external options or devices on.
- 

**DO YOU HAVE AN INTERMITTENT PROBLEM?**

---

**No** Go to page 2-5.

**YES** Go to “Intermittent Problem” on page 2-010-1.



---

## DO YOU KNOW WHAT THE REPORTED ERROR INDICATIONS ARE?

---

**NO** Go to page 2-6.

**YES** If your system has a POST error indication, go to “POST Error Indication Chart” on page 2-15.

If your system has an Advanced Diagnostic error indication, go to “Advanced Diagnostic Error Indication Chart” on page 2-21.

If your system has a known problem on a device, go to the PIC for that device. (Refer to the Table of Contents on page 2-1.)

The system beeps once when you press the system unit power switch on indicating that power has been turned on.

1. Press the system unit power switch on.
  2. If the system does not beep once, press the system unit power switch again.
- 

**DID THE SYSTEM BEEP ONCE WHEN YOU PRESSED THE POWER SWITCH?**

---

**NO** Go to “Power” on page 2-020-1.

**YES** Go to page 2-7.

The POST starts and takes about 30 seconds to complete.

The POST completes correctly, if the following sequence of responses occurs:

- A **XXX Kb OK** message displays. The tested memory increases in 64K-byte increments until it equals the memory installed in your system.
- The system beeps twice and the System Clock icon displays for about 10 seconds.

**Note:** If the system beeps once and the System Clock icon does not display, it indicates that the time is valid and the POST completed successfully.

- The Insert Diskette A icon and F1 Prompt icon displays.
- 

### **DID THE POST COMPLETE CORRECTLY?**

---

**NO** Go to “POST Error Indication Chart” on page 2-15.

**YES** Go to page 2-8.

1. Insert the Advanced Diagnostic diskette into drive A.
2. Press and hold the Ctrl, Fn, and Del keys.

**Note:** The system beeps once when you press the Ctrl, Fn, and Del keys, indicating that a system reset was initiated.

3. Release the keys.
- 

## **DID THE SYSTEM BEEP ONCE WHEN YOU PRESSED THE KEYS?**

---

- NO** Ensure that the keyboard connector pins are not damaged and that the connector is securely connected.

Press and hold the Ctrl, Fn, and Del keys and then release the keys to run the POST again. If the same error occurs, replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

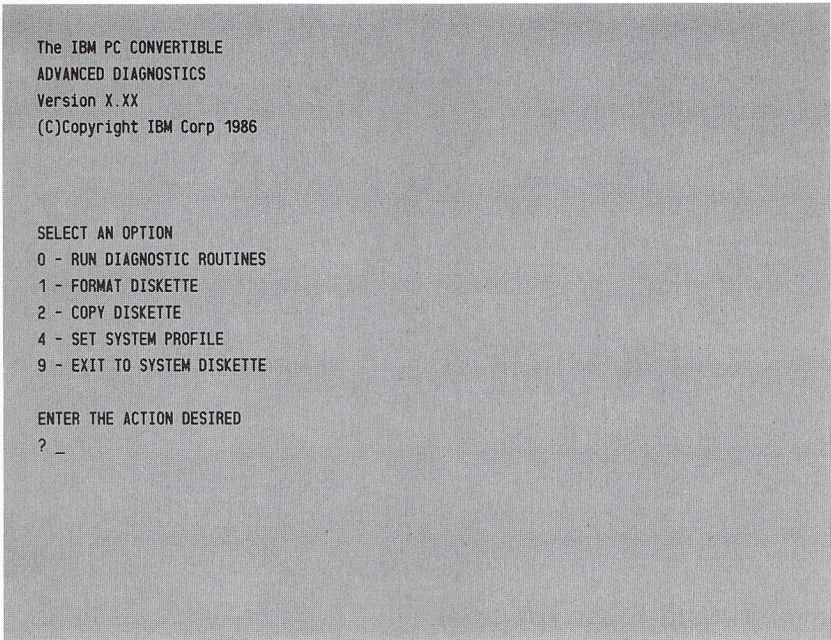
Press and hold the Ctrl, Fn, and Del keys and then release the keys to run the POST again. If the same error occurs, reinstall the original keyboard and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

- YES** Go to page 2-9.

The POST starts and takes about 30 seconds to complete.

When the POST completes, the Advanced Diagnostics should be loaded and the ADVANCED DIAGNOSTICS menu displayed.

---



---

## DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?

---

**NO** If you had a POST error, go to “POST Error Indication Chart” on page 2-15.

If the Advanced Diagnostics would not load and the ADVANCED DIAGNOSTICS menu did not display, go to “Diskette Drive” on page 2-600-1.

**YES** Go to page 2-10.

Choose **0** (RUN DIAGNOSTIC ROUTINES) and then press Enter.

---

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE MEMORY SIZE CORRECT (Y/N) ? \_

---

**DID THE INSTALLED DEVICES MENU DISPLAY?**

---

**NO** Go to "Keyboard" on page 2-300-1.

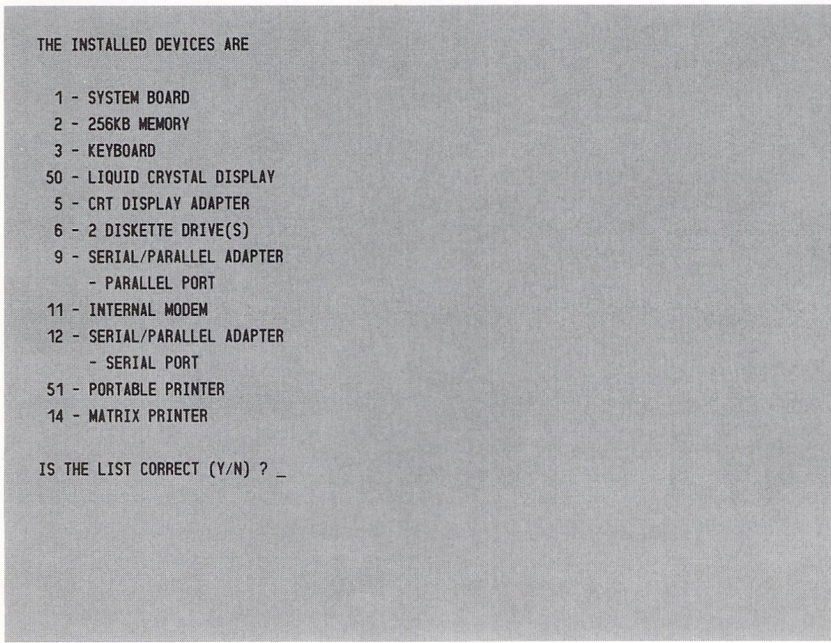
**YES** Go to page 2-11.



1. If the memory size is correct, choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter. The **INSTALLED DEVICES** menu displays again.
2. If the memory size is not correct, choose **N (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
3. Enter the correct memory size and then press Enter.

The **INSTALLED DEVICES** menu displays again with the correct memory size.

---



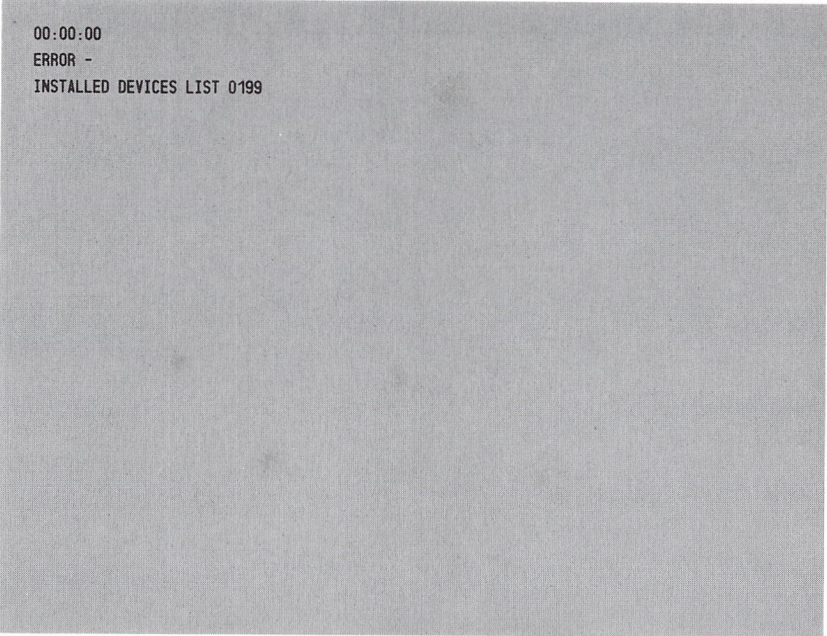
### **DID THE INSTALLED DEVICES MENU DISPLAY AGAIN?**

---

**NO** Go to “Keyboard” on page 2-300-1.

**YES** Go to page 2-12.

1. Ensure that all the devices and options installed on your system are listed and correct.
  2. If the list is correct, choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  3. If the list is not correct, choose **N (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
- 



00:00:00  
ERROR -  
INSTALLED DEVICES LIST 0199

---

**DID AN INSTALLED DEVICES LIST ERROR 0199  
MESSAGE DISPLAY?**

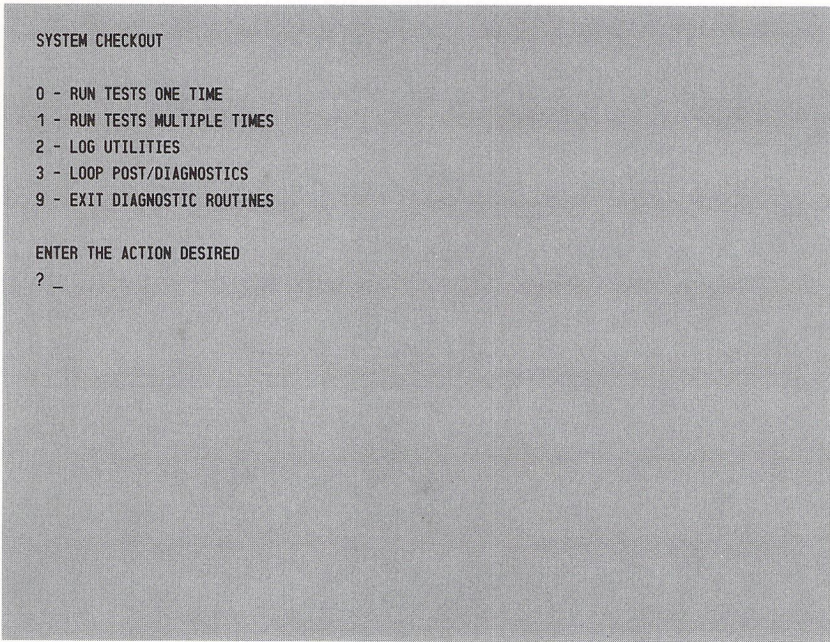
---

**NO** Go to page 2-13.

**YES** Go to “Advanced Diagnostic Error Indication Chart” on page 2-21.

The SYSTEM CHECKOUT menu should display.

---



START

### DID THE SYSTEM CHECKOUT MENU DISPLAY?

---

**NO** Go to “Keyboard” on page 2-300-1.

**YES** Go to page 2-14.

1. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
2. If you suspect that a device is failing, choose the option for that device and then press Enter and go to the PIC for the suspected device. (Refer to the Table of Contents on page 2-1.)
3. If you do not know which device is failing, press Enter to run all the tests.
4. Follow the directions on your display to run the tests.

**Note:** To visually verify the screens, printouts, and so on, refer to the PIC for the device that you are testing. If the screen or the printout does not match the illustration in the PIC, press N and then press Enter.

---

## **DID THE TESTS RUN WITHOUT AN ERROR INDICATION?**

---

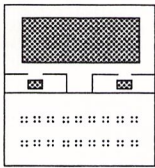
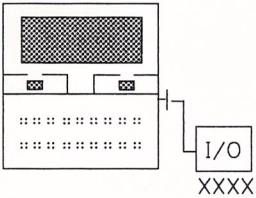
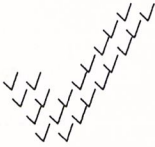
- NO** Go to “Advanced Diagnostic Error Indication Chart” on page 2-21.
- YES** The POST and Advanced Diagnostics have completed without an error.

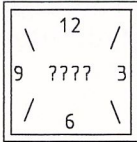
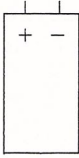
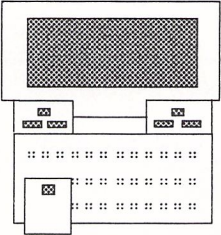
If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

# POST Error Indication Chart

Locate your error indication in the charts on the following pages and perform the action indicated.

If the system has an error code, disregard any other indications and use the System Unit icon or the Options icon indication in the following charts for troubleshooting.

| INDICATION  | ACTION  |
|---|---|
| <p>System Unit icon</p> <p>XXX Kb OK</p>  <p>XXXX</p>      | <p>Go to “POST Error Code Chart” on page 2-19.</p>  |
| <p>Options icon</p> <p>XXX Kb OK</p>  <p>I/O<br/>XXXX</p> | <p>Go to “POST Error Code Chart” on page 2-19.</p> <p><b>Note:</b> If error codes are under both icons, start with the first error code under the System Unit icon and go to page 2-19.</p> |
| <p>I/O Channel Check</p>                                 | <p>Go to “Power” on page 2-020-1.</p> <p>To restart, press the Ctrl, Fn, and Del keys.</p>  |

| INDICATION  | ACTION   |
|---|--|
| <p data-bbox="111 121 288 154">System Clock</p>    | <p data-bbox="426 121 754 154">Press any key to continue.</p> <p data-bbox="426 186 872 308">Set the system clock by selecting Option 4 (Set System Profile) on the ADVANCED DIAGNOSTICS menu.</p> <p data-bbox="426 349 841 470">If the problem continues, replace the system board. Refer to Section 3, "Service Information" on page 3-1.</p>               |
| <p data-bbox="111 495 333 673">3 short beeps<br/>-OR-<br/>3 short beeps and flashing screen<br/>-OR-<br/>Low Battery icon</p>  | <p data-bbox="426 495 841 584">Recharge the battery pack. Refer to Section 3, "Service Information" on page 3-1.</p> <p data-bbox="426 617 841 738">If the problem continues, replace the battery pack. Refer to Section 3, "Service Information" on page 3-1.</p> <p data-bbox="426 771 810 836">If the problem continues, go to "Power" on page 2-020-1.</p> |
| <p data-bbox="111 917 329 950">Insert Diskette A</p>    | <p data-bbox="426 917 857 1015">Insert the Advanced Diagnostic diskette into drive A and press the F1 key to continue.</p> <p data-bbox="426 1047 857 1112">If the problem continues, go to "Diskette Drive" on page 2-600-1.</p> <p data-bbox="426 1144 878 1234">If a broken diskette occurs with this icon, it indicates a diskette read failure.</p>       |

The following indications refer to the beeps that can occur after the POST has started. They do not refer to the beep that occurs when you press the system unit power switch on or when you press the Ctrl, Fn, and Del keys.

| INDICATION  | ACTION   |
|---|--|
| No beeps and the Insert Diskette A icon or the ADVANCED DIAGNOSTICS menu displays   | Replace the speaker. Refer to Section 3, "Service Information" on page 3-1.<br><br>If the problem continues, replace the system board. Refer to Section 3, "Service Information" on page 3-1.        |
| 1 long, 2 short beeps<br>-OR-<br>1 or 2 short beeps and blank or unreadable display<br>-OR-<br>No cursor, missing or extra characters, partial display, unstable display, or unreadable display | If an LCD is installed on the system unit, go to "Liquid Crystal Display (LCD)" on page 2-5000-1.<br><br>If an LCD is not installed on the system unit, go to "CRT Display Adapter" on page 2-500-1. |
| 1 or 2 short beeps and the ADVANCED DIAGNOSTICS menu does not display   | Go to "Diskette Drive" on page 2-600-1.  |

START

| INDICATION   | ACTION                         |
|--|--------------------------------|
| No power indication<br>-OR-<br>No beep and blank display<br>-OR-<br>Continuous beep<br>-OR-<br>Repeating short beeps<br>-OR-<br>1 long, 1 short beep and blank display<br>-OR-<br>System will not power off when the power switch is pressed | Go to "Power" on page 2-020-1. |

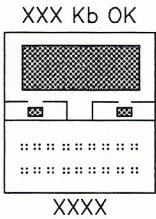


# POST Error Code Chart

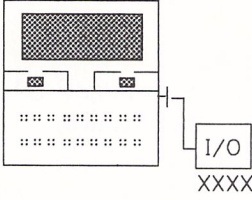
If an error code appears under the System Unit icon, locate the error code in the following chart and perform the action indicated.

If an error code appears under the Options icon, go to page 2-20 and locate the error code in the chart and perform the action indicated.

**Note:** The XX can be any number.

| ERROR CODE  | ACTION   |
|---|--|
| <p>System Unit icon</p>  |  |
| 01XX  | Go to "System Board" on page 2-100-1.  |
| 02XX XX   | Go to "Memory" on page 2-200-1.  |
| 03XX  | Go to "Keyboard" on page 2-300-1.  |
| 06XX  | Go to "Diskette Drive" on page 2-600-1.  |
| 11XX  | Go to "Internal Modem" on page 2-1100-1.   |
| 50XX  | Go to "Liquid Crystal Display (LCD)" on page 2-5000-1.                           |
| 51XX  | Replace the system board. Refer to Section 3, "Service Information" on page 3-1. |

START

| ERROR CODE  | ACTION  |
|---|---|
| <p>Options icon<br/>XXX Kb OK</p>  <p>The diagram shows a computer system with a monitor displaying a grid pattern, a keyboard, a mouse, and a box labeled 'I/O' with 'XXXX' below it. A line connects the 'I/O' box to the computer system.</p> |   |
| 05XX  | Go to “CRT Display Adapter” on page 2-500-1.                    |
| 11XX or 12XX  | Go to “Serial/Parallel Adapter - Serial Port” on page 2-1200-1. |

# Advanced Diagnostic Error Indication Chart

If you entered this page with an Advanced Diagnostic error code, locate your error code in the chart on the following pages and go to the PIC indicated in the action column.

If you entered this page with an installed device or option missing from the installed devices list, locate your missing device or option in the chart on the following pages and go to the PIC indicated in the action column.

If your system has a known problem on a device, go to the PIC for that device.

**Note:** If multiple external options attached to the system unit I/O channel connector are missing from the installed devices list, you should go to the PIC for the option that is installed nearest to the system unit.

**Note:** The XX can be any number.

| ERROR CODE | DEVICE/ OPTION | ACTION  |
|------------|----------------|---|
| 01XX       | System Board   | Go to "System Board" on page 2-100-1.<br><br><b>Note:</b> A 0199 error message means that you chose <b>N</b> on the INSTALLED DEVICES menu. Do not replace the system board. In this chart, locate the device or option that was missing from the INSTALLED DEVICES menu, and go to the PIC indicated in the action column. |

START

| <b>ERROR CODE</b>                      | <b>DEVICE/ OPTION</b>                    | <b>ACTION</b>  |
|--|--|--|
| 02XX XX                                | Memory                                   | Go to "Memory" on page 2-200-1.                                  |
| 03XX                                   | Keyboard                                 | Go to "Keyboard" on page 2-300-1.                                |
| 05XX                                   | CRT Display Adapter                      | Go to "CRT Display Adapter" on page 2-500-1.                     |
| 06XX                                   | Diskette Drive                           | Go to "Diskette Drive" on page 2-600-1.                          |
| 09XX                                   | Serial/ Parallel Adapter - Parallel Port | Go to "Serial/Parallel Adapter - Parallel Port" on page 2-900-1. |
| 11XX<br>(Internal Modem installed)     | Internal Modem                           | Go to "Internal Modem" on page 2-1100-1.                         |
| 11XX<br>(Internal Modem not installed) | Serial/ Parallel Adapter - Serial Port   | Go to "Serial/Parallel Adapter - Serial Port" on page 2-1200-1.  |
| 12XX                                   | Serial/ Parallel Adapter - Serial Port   | Go to "Serial/Parallel Adapter - Serial Port" on page 2-1200-1.  |

| <b>ERROR CODE</b> | <b>DEVICE/ OPTION</b>          | <b>ACTION</b>   |
|-------------------|--------------------------------|---|
| 14XX              | Matrix/<br>Graphics<br>Printer | Go to “IBM Matrix/Graphics Printer” on page 2-1400-1.         |
| 50XX              | Liquid<br>Crystal<br>Display   | Go to “Liquid Crystal Display (LCD)” on page 2-5000-1.        |
| 51XX              | Portable<br>Printer            | Go to “IBM PC Convertible Portable Printer” on page 2-5100-1. |



# Intermittent Problem

Use this PIC when the POST and the Advanced Diagnostics run correctly or if you suspect an intermittent problem.

If you suspect an intermittent problem, you can run the POST and the Advanced Diagnostics more than one time to try to recreate the failure.

The following steps show you how to create an error log for recording error messages to help you diagnose a failure in your system.

## Creating the Error Log

1. Insert the Advanced Diagnostic diskette into drive A.
2. Press and hold the Ctrl, Fn, and Del keys.
3. Release the keys.
4. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
5. Choose **Y** or **N (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
6. Choose **Y** or **N (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
7. Choose **2 (LOG UTILITIES)** and then press Enter.
8. Choose **0 (START ERROR LOG)** and then press Enter.

9. Choose **D (LOG TO DISK OR PRINTER (D P) ?)** and then press Enter.

**Note:** When you choose LOG TO DISK, the following message displays:

Choose **A** or **B (ENTER THE DRIVE ID FOR ERROR LOG ?)** and then press Enter.

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 the printer.

If recording errors on a diskette, use a **copy** of the Advanced Diagnostics diskette or a blank DOS-formatted diskette that is not write-protected.

10. Choose **9 (RETURN FROM UTILITIES)** and then press Enter.



## Starting the Test (Looping the POST/Diagnostics)

The following procedure causes the POST and selected Advanced Diagnostics to run the number of times you choose. If you only want to loop the POST, refer to “Looping the POST” on page 2-010-5. If you only want to loop the Advanced Diagnostics, refer to “Looping the Advanced Diagnostics” on page 2-010-6.

1. Choose **3 (LOOP POST/DIAGNOSTICS)** and then press Enter.
2. Choose the numbers for the devices that you suspect are failing and then press Enter. To run all the tests, press Enter.
3. Enter the number of times to run the tests and then press Enter. To run the maximum number of times (65,535), press Enter.
4. Choose **N (WAIT EACH TIME AN ERROR OCCURS (Y/N) ?)** and then press Enter.
5. Follow the directions on your display and select all available tests for the selected devices.

The Advanced Diagnostic tests run for all the selected devices. Then the system automatically powers off, waits 15 seconds, automatically powers back on, and runs the POST. This sequence repeats for the number of times you selected.

If an error occurs during the POST, the POST stops looping and gives the error indications. Go to “POST Error Indicator Chart” on page 2-15.

## Ending the Test and Displaying the Error Log

1. Press and hold the Ctrl key, and then press the Break key.
2. Release the keys.
3. Choose **Y** or **N (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
4. Choose **Y** or **N (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
5. Choose **2 (LOG UTILITIES)** and then press Enter.
6. Choose **2 (LIST LOG)** and then press Enter.
7. Choose **A** or **B (ENTER THE DRIVE ID FOR ERROR LOG ?)** and then press Enter.
8. If no errors occurred, press Enter to continue.

If an Advanced Diagnostic error occurred, go to “Advanced Diagnostic Error Indication Chart” on page 2-21.

# Looping the POST

The following steps put your system in loop mode and run the POST continuously.

1. Press the system unit power switch off.
2. Remove any diskettes from drives A and B.
3. Press the system unit power switch on.

**Note:** If the system is set for RESUME mode, press and hold the Ctrl, Fn, and Del keys to start the POST, release the keys, and then continue with step 4.

4. When the F1 Prompt icon displays, press and hold the Ctrl and L keys.
5. Release the keys.

The POST runs continuously until an error occurs or until you stop it by powering the system unit off.

If an error occurs, go to “POST Error Indication Chart” on page 2-15.

If an error occurs and you want to continue looping the POST, press and hold the Ctrl and L keys and then release the keys.

# Looping the Advanced Diagnostics

The following steps run the Advanced Diagnostics multiple times:

1. Insert the Advanced Diagnostic diskette into drive A.
2. Press and hold the Ctrl, Fn, and Del keys.
3. Release the keys.
4. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
5. Choose **Y or N (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
6. Choose **Y or N (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
7. Choose **1 (RUN TESTS MULTIPLE TIMES)** and then press Enter.
8. Choose the numbers for the devices that you suspect are failing and then press Enter. To run all the tests, press Enter.
9. Enter the number of times to run the tests and then press Enter. To run the maximum number of times (65,535), press Enter.
10. Follow the directions on your display and select all available tests for the selected devices.

To stop the tests, press and hold the Ctrl key, and then press the Break key.

# Power

Use this PIC when your system has no power indication, when you suspect a power group (power supply, battery pack, ac adapter, or automobile power adapter) problem, or when you are directed here from another PIC.

If you suspect a problem with the following accessories, go to the page indicated to test them and return to this page if you do not find a problem.

- To test the battery charger, go to page 2-020-36.
- To test the automobile power adapter, go to page 2-020-38.

Power on is indicated by any of the following:

- The system beeps one or more times.
- The cursor and characters display.
- The diskette drive light turns on.

If you entered this PIC with a failing symptom, record this symptom as the original failure.

When you make voltage measurements, ensure that the system unit is powered on. Some failures may cause the system unit to power itself off.

**Note:** Ensure that connector pins are not damaged or contaminated and the connectors are securely connected before replacing parts.

---

## DID THE PROBLEM OCCUR WHEN USING THE AC ADAPTER OR DC AUTOMOBILE ADAPTER?

---

**NO** Go to page 2-020-2.

**YES** Go to page 2-020-7.

1. Disconnect the ac adapter, if attached.
  2. Press the system unit power switch once and wait about 30 seconds for the POST to complete.
  3. If you do not have any indication that power is on, reseal the battery connector. Refer to Section 3, "Service Information" on page 3-1.
  4. Press the system unit power switch again and wait about 30 seconds for the POST to complete.
- 

**DO YOU HAVE ANY INDICATION THAT POWER IS ON?**

---

**NO** Go to page 2-020-5.

**YES** Go to page 2-020-3.

---

**DID YOU HEAR 3 SHORT BEEPS? (DO NOT COUNT THE BEEP WHEN THE POWER SWITCH WAS PRESSED.)**

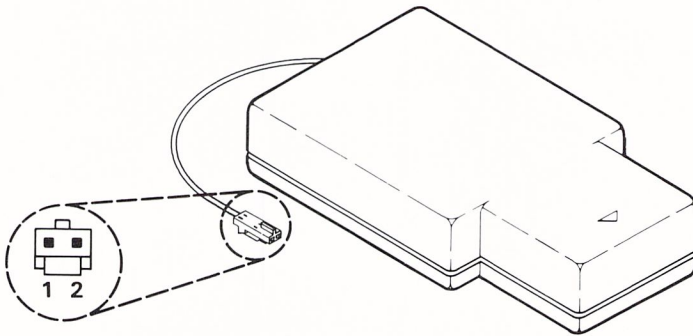
---

**NO** Go to page 2-020-5.

**YES** Go to page 2-020-4.

Measure the voltage at the connector pins on the battery as shown in the table below.

---



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 1   | 2         | +8.5         | +12.0        |

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

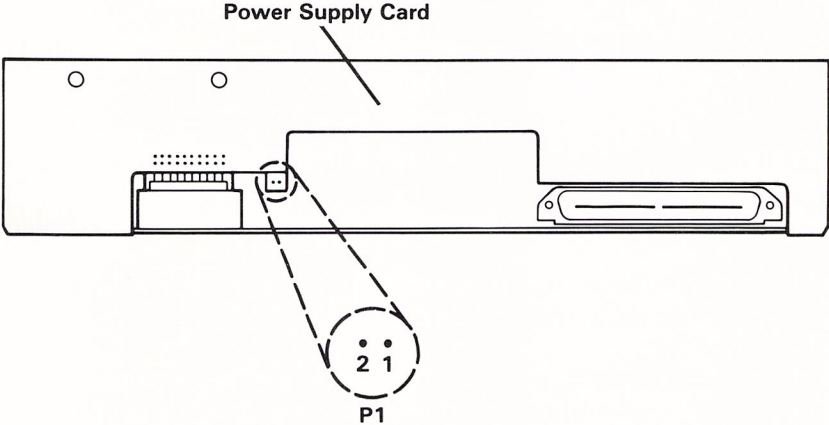
---

**NO** Go to page 2-020-5.

**YES** Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.



1. Remove the battery pack.
2. Connect the ac adapter to an electrical outlet and to your system unit.
3. Press the system unit power switch on and wait about 30 seconds for the POST to complete.
4. Measure the voltage at the P1 connector pins on the power supply card as shown in the table below.



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 1   | 2         | +12.0        | +16.0        |

Go to page 2-020-6.

---

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

---

**NO** Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

If the same failure occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Recharge the battery pack. Refer to Section 3, "Service Information" on page 3-1.

If the same failure occurs, replace the battery pack. Refer to Section 3, "Service Information" on page 3-1.

If the same failure occurs, replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

If the same failure occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

---

**WERE YOU SENT HERE FROM ANOTHER PIC  
BECAUSE OF AN INCORRECT VOLTAGE?**

---

**NO** Go to page 2-020-8.

**YES** Go to page 2-020-28.

1. Press the system unit power switch off.
  2. Disconnect all external power from the system unit.
  3. Disconnect all external options installed.
  4. Remove the battery pack.
  5. Connect the ac adapter to an electrical outlet and to your system unit.
  6. If you do not have an LCD installed, reconnect the CRT display adapter and monitor.
  7. Press the system unit power switch on and wait about 30 seconds for the POST to complete.
- 

Go to page 2-020-9.

---

## DID THE ORIGINAL FAILURE OCCUR?

---

**NO** There is a problem with one of the external options.

Press the system unit power switch off. Reinstall each of the external options to the system unit one at a time, and power the system on after installing each option.

When the original failure occurs:

- Inspect the last option installed for damage or contaminated connector pins.
- Replace the last option installed.

If the same failure occurs, reinstall the original option and replace the power supply card. Refer to Section 3, “Service Information” on page 3-1.

If the same failure occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, “Service Information” on page 3-1.

If you have an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Go to page 2-020-10.

Power on is indicated by any of the following:

- The system beeps one or more times.
  - The cursor and characters display.
  - The diskette drive light turns on.
- 

**DO YOU HAVE ANY INDICATION THAT POWER IS ON?**

---

**NO** Go to page 2-020-28.

**YES** Go to page 2-020-11.

**2-020-10**

---

**DO YOU HEAR ANY BEEPS? (COUNT THE BEEP WHEN THE POWER SWITCH IS PRESSED.)**

---

**NO** Replace the speaker. Refer to Section 3, "Service Information" on page 3-1.

If the same failure occurs, replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-020-12.

Check your system unit for the following conditions:

- Blank display.
  - No beeps. (Do not count the beep that occurs when you press the power switch on.)
  - Diskette drive light turns on.
- 

**DO YOU HAVE ALL OF THE ABOVE CONDITIONS?**

---

**NO** Go to page 2-020-13.

**YES** Go to page 2-020-25.



---

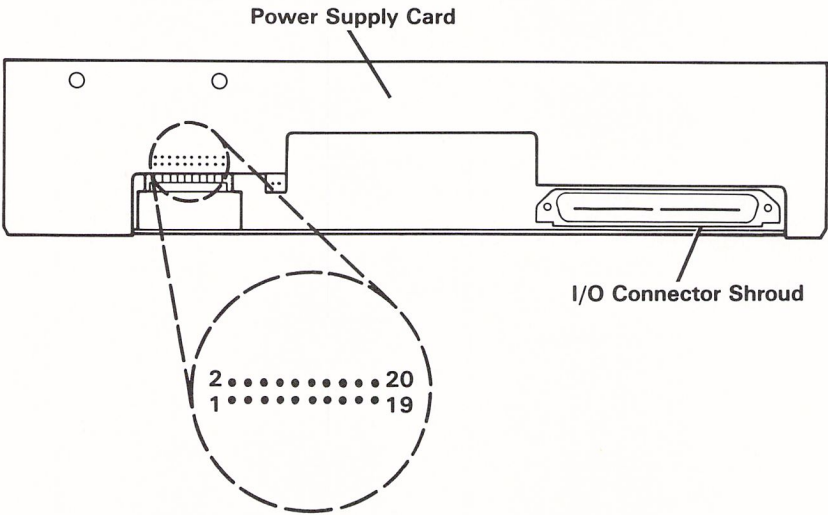
**DO YOU HAVE A BLANK DISPLAY WITH ONE LONG  
BEEP AND ONE SHORT BEEP?**

---

**NO** Go to page 2-020-14.

**YES** Go to page 2-020-25.

Measure the voltages at the pins on the power supply card as shown in the table below. Use the shroud on the I/O connector for ground (gnd).



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 1   | + 4.70       | + 5.35       |
| 5   | + 4.50       | + 5.35       |
| 7   | + 4.50       | + 5.35       |
| 9   | + 4.50       | + 5.35       |
| 17  | +13.0        | +16.0        |
| 18  | +13.0        | +16.0        |
| 19  | +13.0        | +16.0        |

Go to page 2-020-15.

---

**ARE ALL THE VOLTAGES WITHIN THE LIMITS  
SHOWN IN THE TABLE?**

---

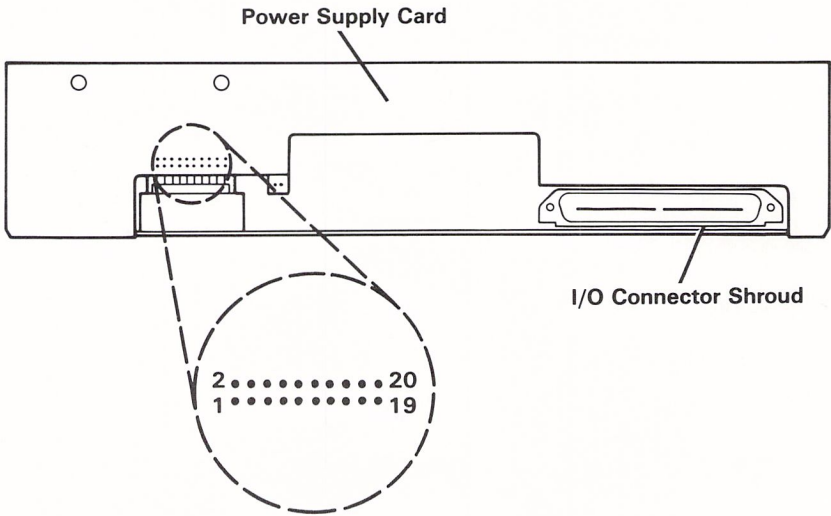
**NO** Replace the power supply card. Refer to Section 3, “Service Information” on page 3-1.

If the same failure occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, “Service Information” on page 3-1.

**YES** Go to page 2-020-16.

Measure the voltages at the pins on the power supply card as shown in the table below. Use the shroud on the I/O connector for ground (gnd).

---



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 6   | -11.96       | -14.04       |
| 11  | +11.04       | +12.96       |
| 13  | + 4.85       | + 5.25       |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

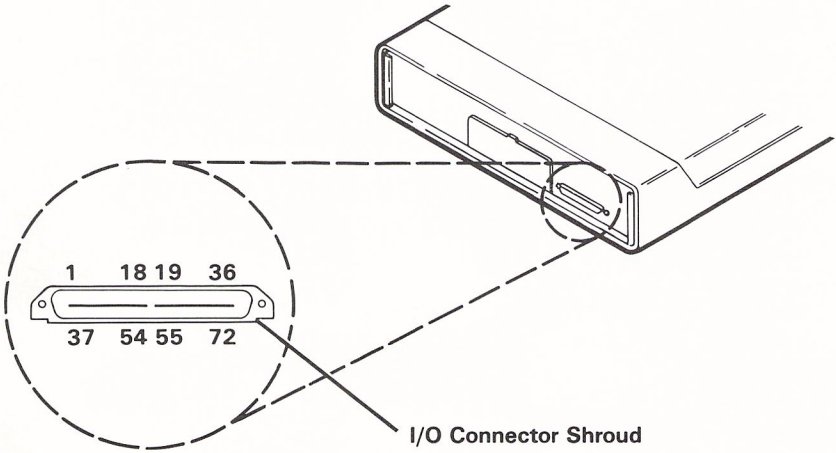
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**NO** Go to page 2-020-24.

**YES** Go to page 2-020-17.

Measure the voltages at the pins on the I/O connector as shown in the table below. Use the shroud on the I/O connector for ground (gnd).

---



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 3   | + 4.75       | + 5.25       |
| 12  | +10.94       | +12.96       |
| 16  | + 9.2        | +16.0        |
| 29  | + 4.5        | + 5.5        |
| 30  | + 7.3        | +16.0        |
| 70  | + 4.5        | + 5.5        |
| 25  | -11.86       | -13.94       |

POWER

Go to page 2-020-18.

---

**ARE ALL THE VOLTAGES WITHIN THE LIMITS  
SHOWN IN THE TABLE?**

---

**NO** Reseat the power supply card and measure the voltages again.

If any of the voltages are still not within the limits, replace the system board. Refer to Section 3, "Service Information" on page 3-1.

If the same failure occurs, reinstall the original system board and replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-020-19.

1. Press and hold the Ctrl, Fn, and Del keys.
  2. Release the keys.
  3. Wait about 30 seconds for the POST to complete.
- 

**DID THE POST COMPLETE CORRECTLY?**

---

**NO** Go to page 2-020-20.

**YES** Go to page 2-020-22.

---

**DID AN I/O CHANNEL CHECK OR POST 0121 ERROR OCCUR?**

---

**NO** Go to page 2-020-25.

**YES** If the internal modem is not installed, replace the system board. Refer to Section 3, "Service Information" on page 3-1.

If the internal modem is installed, go to page 2-020-21.



1. Press the system unit power switch off.
  2. Disconnect the ac adapter.
  3. Remove the internal modem.
  4. Reconnect the ac adapter.
  5. Press the system unit power switch on and wait about 30 seconds for the POST to complete.
- 

### **DID AN I/O CHANNEL CHECK OR POST 0121 ERROR OCCUR?**

---

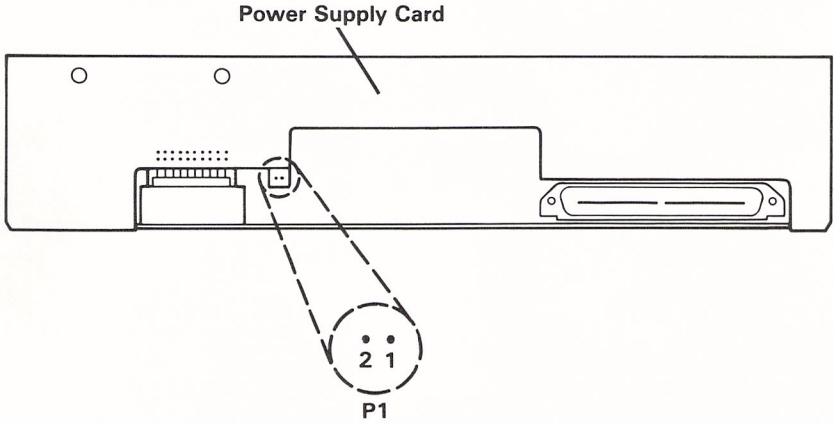
**NO** Replace the internal modem. Refer to Section 3, "Service Information" on page 3-1.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

1. Press the system unit power switch off.
  2. Disconnect the P1 battery pack connector.
  3. Connect the ac adapter to an electrical outlet and to your system unit.
  4. Press the system unit power switch on and wait about 30 seconds for the POST to complete.
- 

Go to page 2-020-23.

Measure the voltage at the P1 connector pins on the power supply card as shown in the table below.



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 1   | 2         | +13.0        | +16.0        |

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

- NO** Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.
- YES** You have completed the system power check. Go to "Start" on page 2-3 to run the POST and the diagnostics.

If you suspect an intermittent problem, go to "Intermittent Problem" on page 2-010-1.

**POWER**

---

## ARE ALL THREE VOLTAGES ZERO?

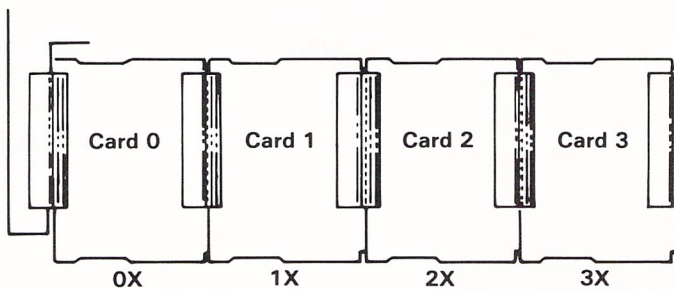
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**NO** Replace the power supply card. Refer to Section 3, “Service Information” on page 3-1.

If the same failure occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, “Service Information” on page 3-1.

**YES** Go to page 2-020-25.

1. Press the system unit power switch off.
  2. Disconnect the ac adapter or automobile power adapter, if installed.
  3. Remove the battery pack, if installed.
  4. Remove the internal modem, if installed.
  5. Disconnect the keyboard.
  6. Remove the diskette drives.
  7. Disconnect the LCD, if installed.
  8. Remove all memory cards except card 0.
  9. Reinstall the battery pack, if removed in step 3.
  10. Reconnect the ac adapter or automobile power adapter, if removed in step 2.
  11. Press the system unit power switch on and wait about 30 seconds for the POST to complete.
- 



---

Go to page 2-020-26.

---

**IS THE POST INDICATION ONE LONG AND TWO SHORT BEEPS? (DO NOT COUNT THE BEEP WHEN THE POWER SWITCH IS PRESSED.)**

---

**NO** Go to page 2-020-27.

**YES** There is a problem with one of the options or devices.

Press the system unit power switch off. Reinstall each of the external options to the system unit one at a time, and power the system on after installing each option.

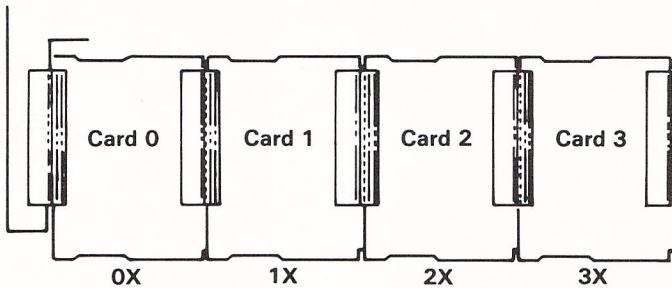
**Note:** Reinstall the display first, so any messages can be seen.

When the original failure occurs:

- Inspect the last option or device installed for damaged or contaminated connector pins.
- Replace the last option or device installed.

Run the POST again. If the same failure occurs, replace the system board. Refer to Section 3, "Service Information" on page 3-1.

1. Press the system unit power switch off.
  2. Disconnect the ac adapter or automobile power adapter, if installed.
  3. Remove the battery pack, if installed.
  4. Replace memory card 0.
  5. Reinstall the battery pack, if removed in step 3.
  6. Reconnect the ac adapter or automobile power adapter, if removed in step 2.
  7. Press the system unit power switch on and wait about 30 seconds for the POST to complete.
- 



---

**IS THE POST INDICATION ONE LONG AND TWO SHORT BEEPS? (DO NOT COUNT THE BEEP WHEN THE POWER SWITCH IS PRESSED.)**

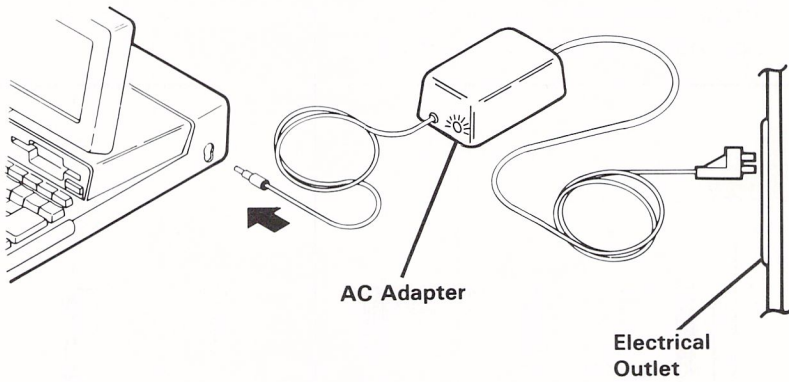
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**NO** Reinstall the original memory card and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Memory card 0 corrected the problem.

Verify that the electrical outlet is working.

---



**IS THE LIGHT ON THE AC ADAPTER ON?**

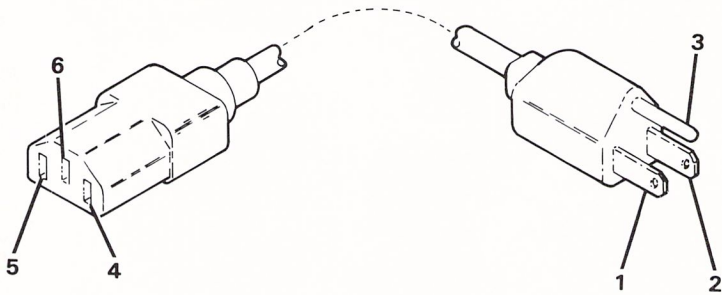
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**NO** Go to page 2-020-29.

**YES** Go to page 2-020-30.



1. Press the system unit power switch off.
  2. Disconnect the ac adapter power cord from the electrical outlet.
  3. Disconnect the power cord from your ac adapter.
  4. Measure for continuity between the pins on the power cord as shown in the table below.
- 



| PIN | PIN |
|-----|-----|
| 1   | 4   |
| 2   | 5   |
| 3   | 6   |

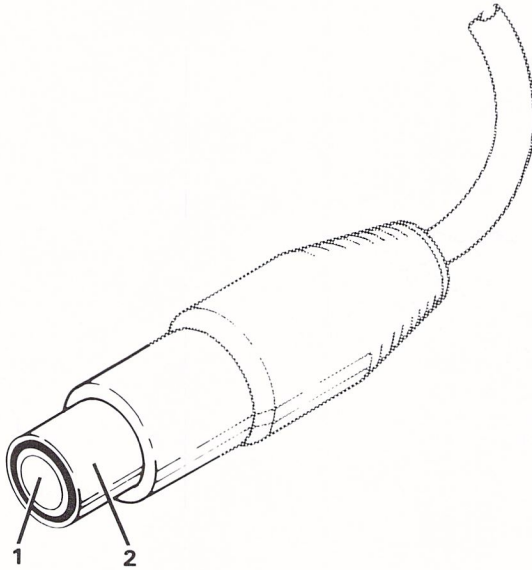
**IS THERE CONTINUITY BETWEEN THE PINS ON THE POWER CORD?**

---

**NO** Replace the power cord.

**YES** Replace the ac adapter.

1. Disconnect the ac adapter cable from the system unit.
  2. Measure the voltage at the plug on the ac adapter cable as shown in the table below.
- 



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 1   | 2         | +14.0        | +16.0        |

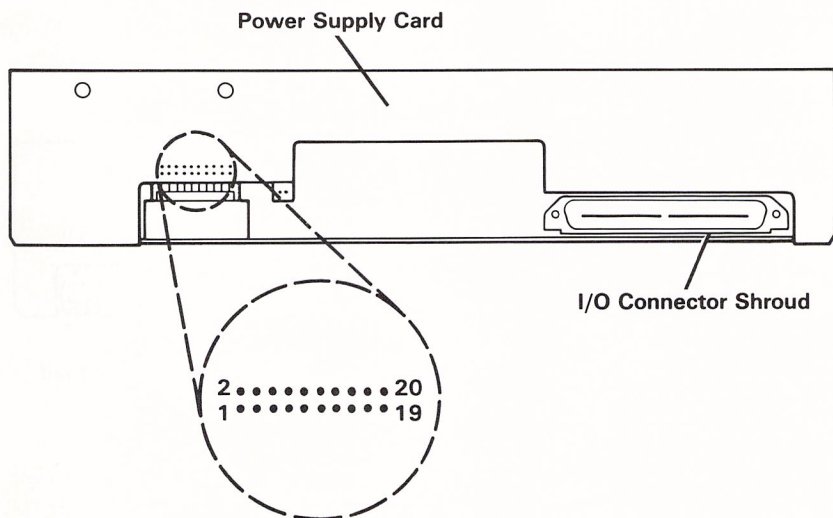
**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

---

**NO** Replace the ac adapter.

**YES** Go to page 2-020-31.

1. Connect the ac adapter cable to the system unit.
  2. Measure the voltage at pin 1 on the power supply card. Use the shroud on the I/O connector for ground (gnd).
- 



| MIN volts dc | MAX volts dc |
|--------------|--------------|
| +4.5         | +5.5         |

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

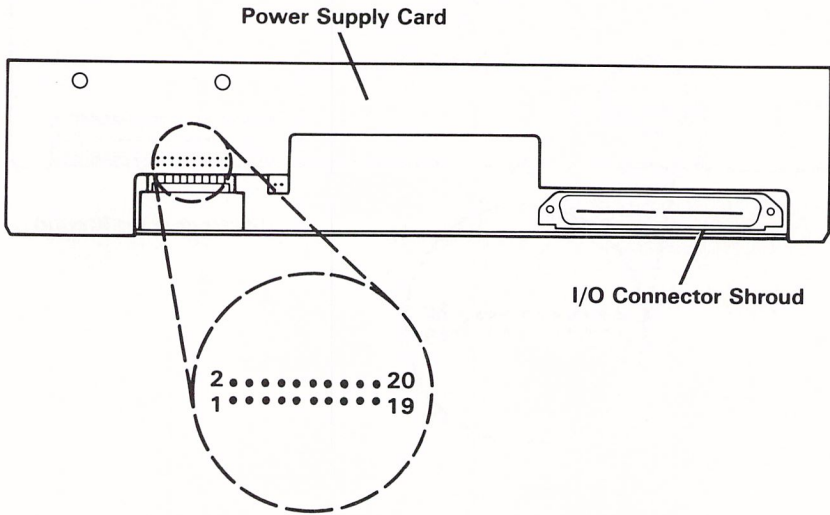
---

**NO** Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

Run the POST again. If the same error occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-020-32.

1. Measure the voltages at pin 1 on the power supply card. Use the shroud on the I/O connector for ground (gnd).
  2. Press the system unit power switch once.
- 



---

**DID THE VOLTAGE GO TO ABOUT 0-VOLTS DC WHILE THE POWER SWITCH WAS PRESSED?**

---

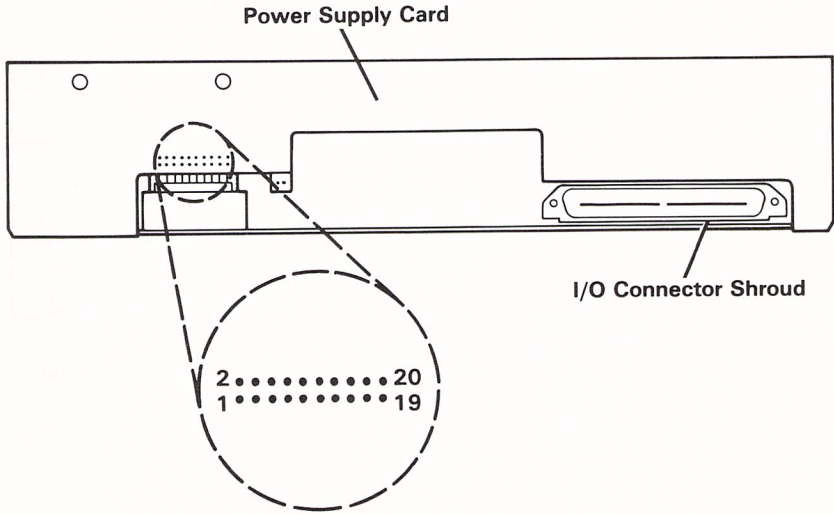
**NO** Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

Run the POST again. If the same error occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-020-33.

Measure the voltage at pin 3 on the power supply card when you press and release the power switch. Use the shroud on the I/O connector for ground (gnd).

**Note:** The voltage may only be present for a short time during the POST.



| MIN volts dc | MAX volts dc |
|--------------|--------------|
| +4.5         | +5.5         |

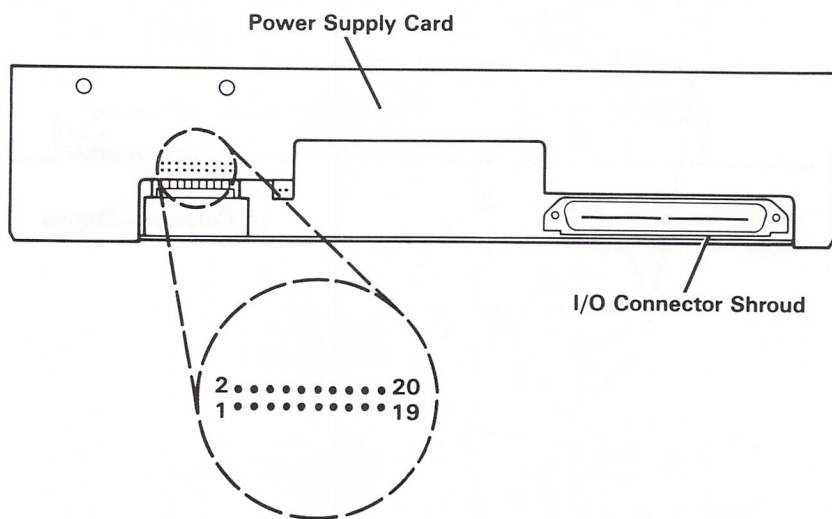
**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

**NO** Go to page 2-020-34.

**YES** Go to page 2-020-14.

Measure the voltage at pin 5 on the power supply card when you press and release the power switch. Use the shroud on the I/O connector for ground (gnd).

**Note:** The voltage may only be present for a short time during the POST.



| MIN volts dc | MAX volts dc |
|--------------|--------------|
| +4.5         | +5.5         |

Go to page 2-020-35.

---

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

---

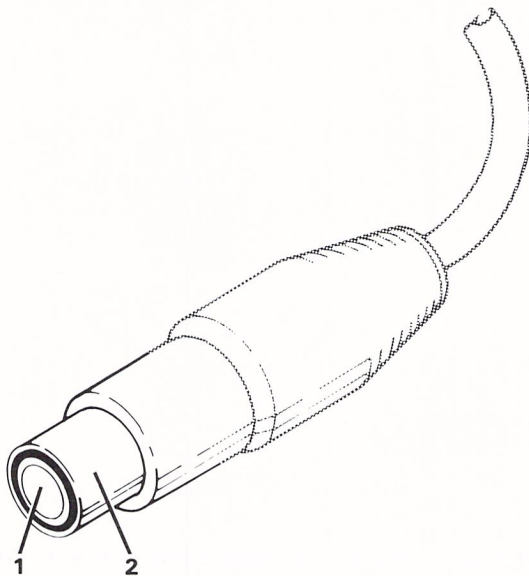
**NO** Replace the power supply card. Refer to Section 3, “Service Information” on page 3-1.

Run the POST again. If the same error occurs, reinstall the original power supply card and replace the system board. Refer to Section 3, “Service Information” on page 3-1.

**YES** Replace the system board. Refer to Section 3, “Service Information” on page 3-1.

Run the POST again. If the same error occurs, reinstall the original system board and replace the power supply card. Refer to Section 3, “Service Information” on page 3-1.

1. Connect the battery charger to an operational electrical outlet.
  2. Measure the voltage at the plug on the battery charger cable as shown in the table below.
- 



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 1   | 2         | +14.0        | +16.0        |

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

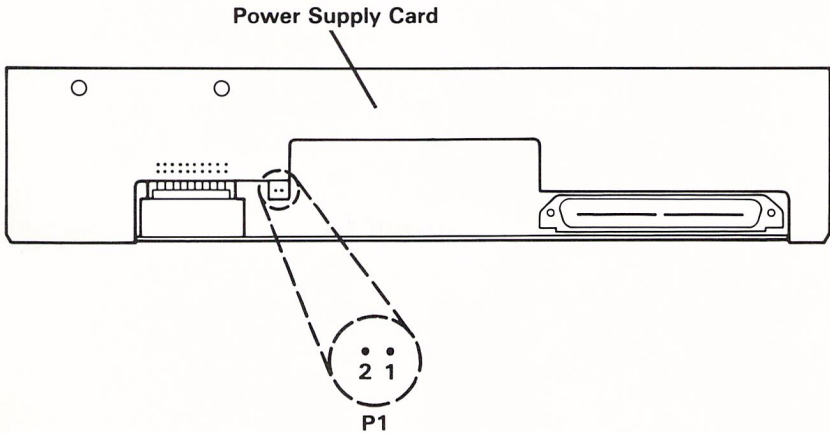
---

**NO** Replace the battery charger.

**YES** Go to page 2-020-37.



1. Disconnect the P1 battery pack connector.
2. Connect the battery charger to your system unit.
3. Measure the voltage at the P1 connector pins on the power supply card as shown in the table below.



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 1   | 2         | +13.0        | +16.0        |

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

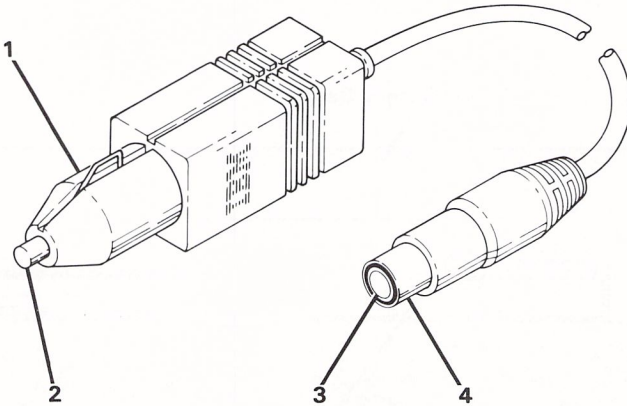
**NO** Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

**YES** The battery charger is not failing.

If the problem still occurs, go to "Intermittent Problem" on page 2-010-1.

Using the Rx1 scale, measure for continuity between the pins on the automobile power adapter cable as shown in the table below.

---



| PIN | PIN | Measurement |
|-----|-----|-------------|
| 1   | 4   | 0 ohms      |
| 2   | 3   | 0 ohms      |
| 3   | 4   | 20 ohms     |
| 4   | 3   | Infinity    |

**ARE THE MEASUREMENTS CORRECT?**

---

**NO** Replace the automobile power adapter.

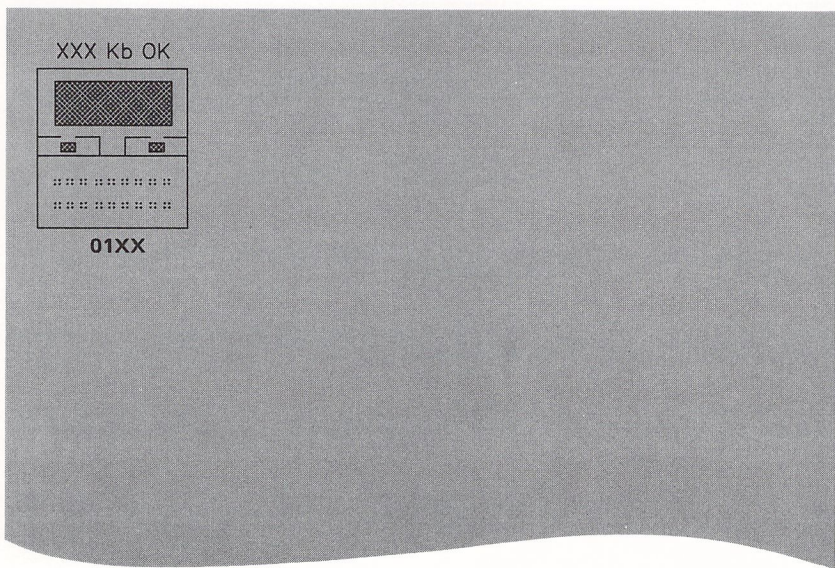
**YES** The automobile power adapter is not failing.

If the problem still occurs, go to “Intermittent Problem” on page 2-010-1.

# System Board

Use this PIC when you have a 01XX error message or when you are directed here from another PIC.

1. Press the system unit power switch off.
  2. Insert the Advanced Diagnostic diskette into drive A.
  3. Press the system unit power switch on and wait about 10 seconds.
  4. Press and hold the Ctrl, Fn, and Del keys.
  5. Release the keys.
- 



## DID A POST 01XX ERROR OCCUR?

---

**NO** Go to page 2-100-3.

**YES** Go to page 2-100-2.

Locate your error code in the following chart and perform the action indicated.

| ERROR CODE                                   | ACTION   |
|--|--|
| 0101<br>0102<br>0103<br>0105<br>0151<br>0163 | Replace the system board. Refer to Section 3, "Service Information" on page 3-1. |
| 0164<br>0171                                 | Go to "Memory" on page 2-200-1.  |
| 0121   | Go to "Power" on page 2-020-1.   |
| 0175   | Go to "Liquid Crystal Display (LCD)" on page 2-5000-1.                           |
| 0170   | The LCD was not in use when suspended.   |
| 0172   | The Diskette was active when suspended.  |
| 0174   | The LCD configuration changed.   |

**Note:** Error codes 0170, 0172, and 0174 are not hardware errors. These errors are resume errors. Refer to *Guide to Operations*.

---

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SELECT AN OPTION  
0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
4 - SET SYSTEM PROFILE  
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED  
? \_

## DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-100-4.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
  3. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  4. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  5. Choose **1 (SYSTEM BOARD)** and then press Enter.
  6. Choose **Y (DO YOU WANT TO TEST YOUR SYSTEM CLOCK (Y/N) ?)** and then press Enter.
- 

TESTING - SYSTEM BOARD

IF YOU TEST YOUR SYSTEM CLOCK,  
THE TIME AND ALARM SETTINGS  
NEED TO BE RESET.

DO YOU WANT TO TEST YOUR  
SYSTEM CLOCK (Y/N) ? \_

---

Go to page 2-100-5.

---

00:00:00  
ERROR -  
SYSTEM BOARD 01XX

## DID A 01XX ERROR OCCUR?

---

**NO** The POST and the system board test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Replace the system board. Refer to Section 3, “Service Information” on page 3-1.

**Note:** A 0199 error message means that you choose **N** in the **INSTALLED DEVICES** menu. Do not replace the system board. Go to “Start” on page 2-3 and verify the installed devices.

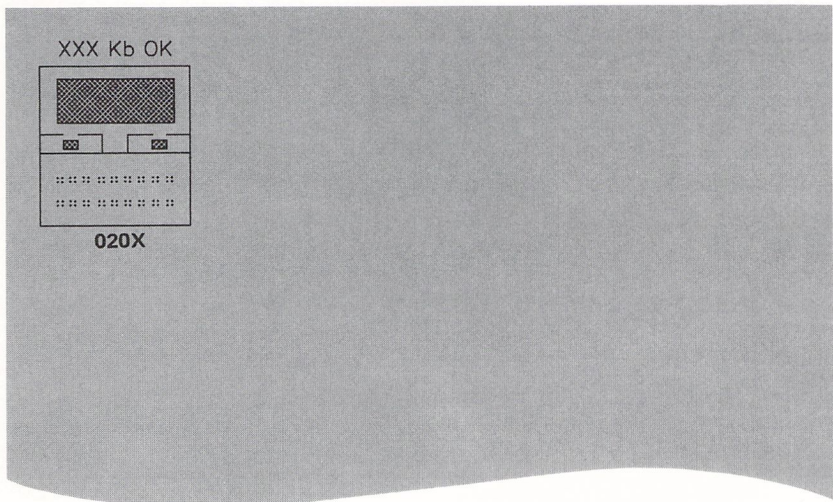




# Memory

Use this PIC when you have a 02XX error message, when the amount of memory tested does not match the amount installed, when you are directed here from another PIC, or when you suspect a memory failure.

1. Press the system unit power switch off.
2. Insert the Advanced Diagnostic diskette into drive A.
3. Press the system unit power switch on and wait about 10 seconds.
4. Press and hold the Ctrl, Fn, and Del keys.
5. Release the keys.

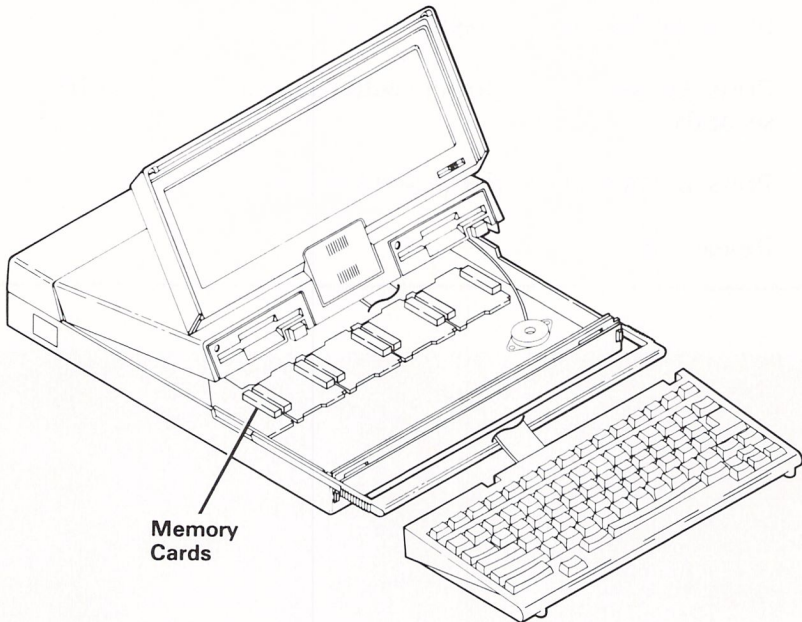


## DID A POST 0201 OR 0202 ERROR OCCUR?

**NO** Go to page 2-200-8.

**YES** Go to page 2-200-2.

1. Make a note of the error code and all of the characters following it.
  2. Move the keyboard away from the memory cards, but do not disconnect it. Refer to Section 3, "Service Information" on page 3-1.
- 



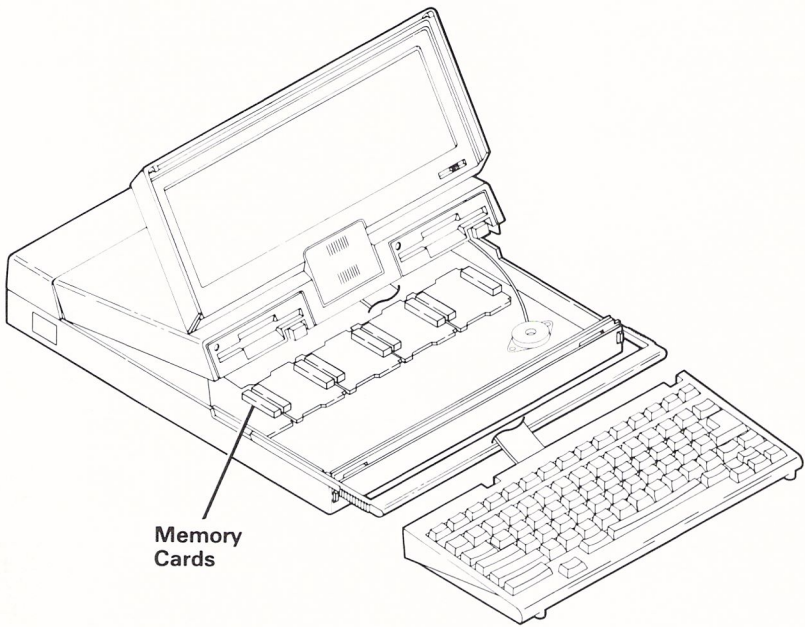
**ARE ALL THE MEMORY CARDS SECURELY CONNECTED TO EACH OTHER AND TO THE SYSTEM BOARD?**

---

**NO** Connect the memory cards to each other and to the system board. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the memory test.

**YES** Go to page 2-200-3.



---

**DOES YOUR SYSTEM HAVE MORE THAN ONE  
MEMORY CARD INSTALLED?**

---

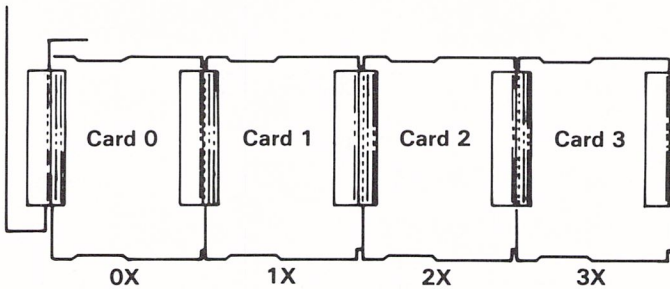
**NO** Replace the memory card. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the memory test. If the same error occurs, reinstall the original memory card and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-200-4.

A memory data failure displays the failing card and module in a 2-character code following a 0201 error code. The first character of the 2-character code indicates the failing memory card.

---



### DID A 0201 XX ERROR OCCUR?

---

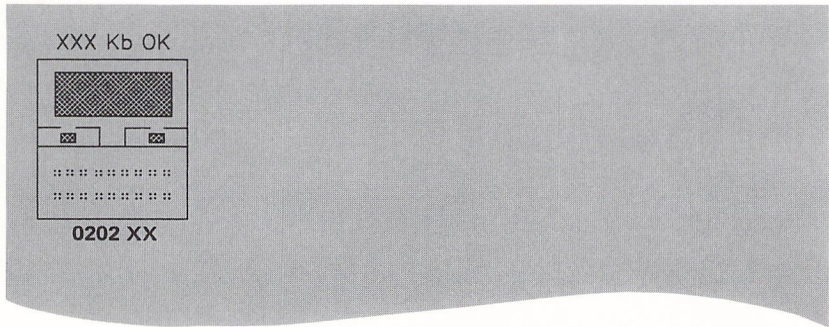
**NO** Go to page 2-200-5

**YES** Replace the failing memory card using the above chart. (For example; if the 2-character code=0X, replace memory card 0.) Refer to Section 3, "Service Information" on page 3-1.

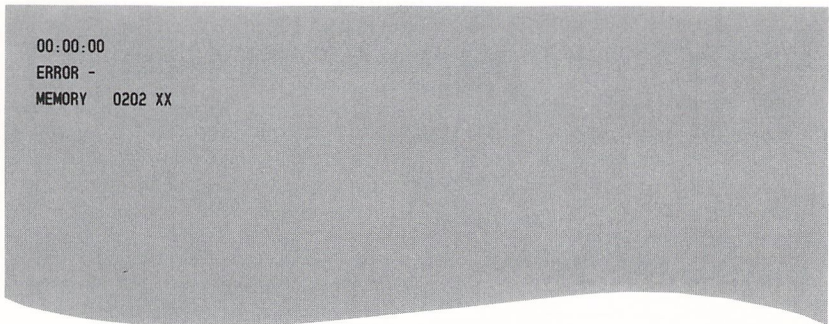
Run the POST and the memory test. If the same error occurs, reinstall the memory card that was removed and go to page 2-200-6.

A memory addressing failure displays the failing card and module in a 2-character code following an 0202 error code. The first character of the 2-character code indicates the failing memory card.

---



OR



---

**DID A POST OR ADVANCED DIAGNOSTIC 0202 XX ERROR OCCUR?**

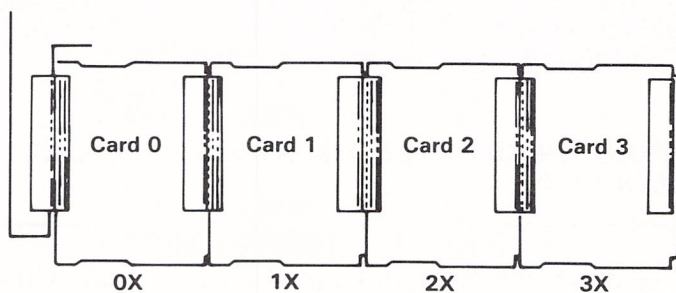
---

**NO** The POST and the memory test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

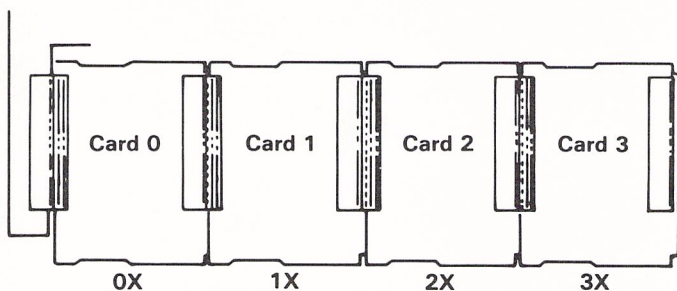
**YES** Go to page 2-200-6.

1. Record the 2-character code following the error code.
  2. Press the system unit power switch off.
  3. Disconnect the ac adapter or dc automobile adapter, if installed.
  4. Remove the battery pack, if installed.
  5. Find the suspected failing memory card in the example below.
  6. Mark the failing memory card and make a note of its location.
  7. If the card location is position 1, 2, or 3, swap the card with the card in position 0.
  8. If the card location is position 0, swap the card with the card in the last position.
  9. Reinstall the battery pack, if removed in step 4.
  10. Reconnect the ac adapter or dc automobile adapter, if disconnected in step 3.
- 



Go to page 2-200-7.

1. Press the system unit power switch on and wait about 10 seconds.
  2. Run the POST and/or memory test again.
- 



---

### DID THE SAME FAILURE OCCUR?

---

**NO** Replace the marked memory card. Refer to Section 3, "Service Information" on page 3-1.

**YES** If the suspected failing memory card was in position 0, replace the system board. Refer to Section 3, "Service Information" on page 3-1.

If the suspected failing memory card was in position 1, 2, or 3, replace the memory card in the position just before the position noted. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the memory test again. If the same error occurs, continue to swap all memory cards with a known good card. When the error disappears, replace the last card removed.

If the error continues, replace the system board. Refer to Section 3, "Service Information" on page 3-1.

---

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SELECT AN OPTION

- 0 - RUN DIAGNOSTIC ROUTINES
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 4 - SET SYSTEM PROFILE
- 9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? -

---

## DID THE ADVANCED DIAGNOSTIC MENU DISPLAY?

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-200-9.

**2-200-8**



Choose **0** (**RUN DIAGNOSTIC ROUTINES**) and then press Enter.

---

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE MEMORY SIZE CORRECT (Y/N) ? \_

**DOES THE AMOUNT OF MEMORY LISTED MATCH THE AMOUNT OF MEMORY INSTALLED IN YOUR SYSTEM?**

---

**NO** Choose **N** (**IS THE MEMORY SIZE CORRECT (Y/N) ?**) and then press Enter.

Enter the correct memory size and then press Enter.

Go to page 2-200-10, step 2.

**YES** Go to page 2-200-10.

1. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
  2. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  3. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  4. Choose **2 (XXX KB MEMORY)** and then press Enter.
  5. The memory size increases in 16K-byte increments until all of the memory is tested or until an error occurs. If you receive an error message, make a note of the error code and all of the characters that follow it.
- 

TESTING - 256KB MEMORY

XXX KB MEMORY OK

THIS TEST MAY TAKE UP TO TWO MINUTES

---

## **DID A 0201 OR 0202 ERROR OCCUR?**

---

**NO** The POST and the memory test have completed without an error.

If you suspect an intermittent problem, go to "Intermittent Problem" on page 2-010-1.

**YES** Go to page 2-200-2.

# Keyboard

Use this PIC when you have a 03XX error message, when the keyboard is missing from the installed devices list, when you are directed here from another PIC, or when you suspect a keyboard failure.

1. Press the system unit power switch off.
2. Insert the Advanced Diagnostic diskette into drive A.
3. Press the system unit power switch on and wait about 10 seconds.
4. Press and hold the Ctrl, Fn, and Del keys.
5. Release the keys.

**Note:** Ensure that the keyboard connector pins are not damaged and that the connector is securely connected before replacing the keyboard.

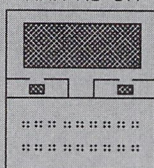
---

---

Go to page 2-300-2.

---

XXX Kb OK



030X

---

## DID A POST 0301 OR 0304 ERROR OCCUR?

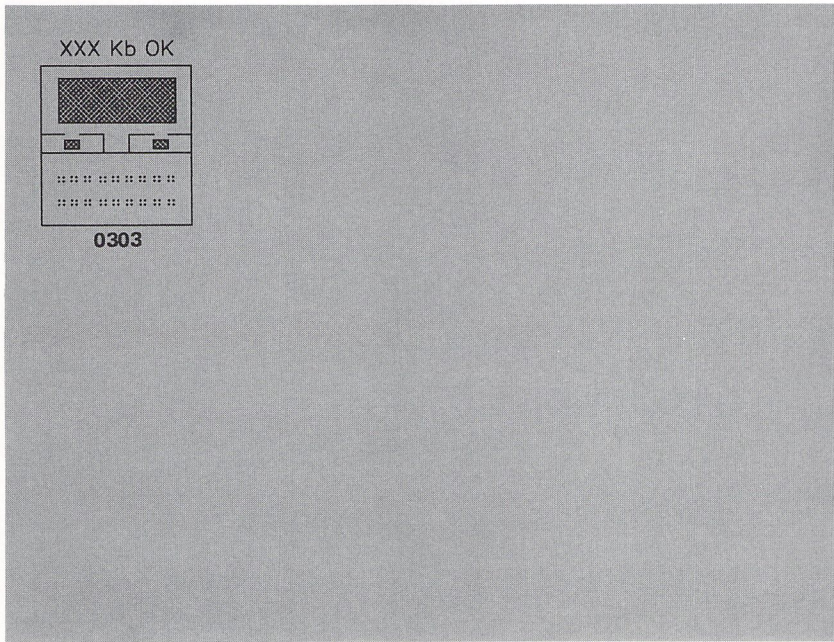
---

**NO** Go to page 2-300-3.

**YES** Ensure that the keyboard connector pins are not damaged and that the connector is securely connected.

Run the POST again. If the same error occurs, replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

Run the POST again. If the same error occurs, reinstall the original keyboard and replace the system board. Refer to Section 3, "Service Information" on page 3-1.



---

**DID A POST 0303 ERROR OCCUR?**

---

**NO** Go to page 2-300-4.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

Run the POST again. If the same error occurs, reinstall the original system board and replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

---

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SELECT AN OPTION

- 0 - RUN DIAGNOSTIC ROUTINES
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 4 - SET SYSTEM PROFILE
- 9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? -

---

**DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?**

---

**NO** Go to page 2-300-9.

**YES** Go to page 2-300-5.

**2-300-4**

1. Choose **:0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.

**Note:** If the memory size message does not display, continue with the question below.

---

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

## DID THE INSTALLED DEVICES MENU DISPLAY?

---

**NO** Replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

Load and run the Diagnostics again. If the same error occurs, reinstall the original keyboard and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-300-6.

---

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

## IS THE KEYBOARD LISTED ON THE INSTALLED DEVICES LIST?

---

**NO** Ensure that the keyboard connector pins are not damaged and that the connector is securely connected.

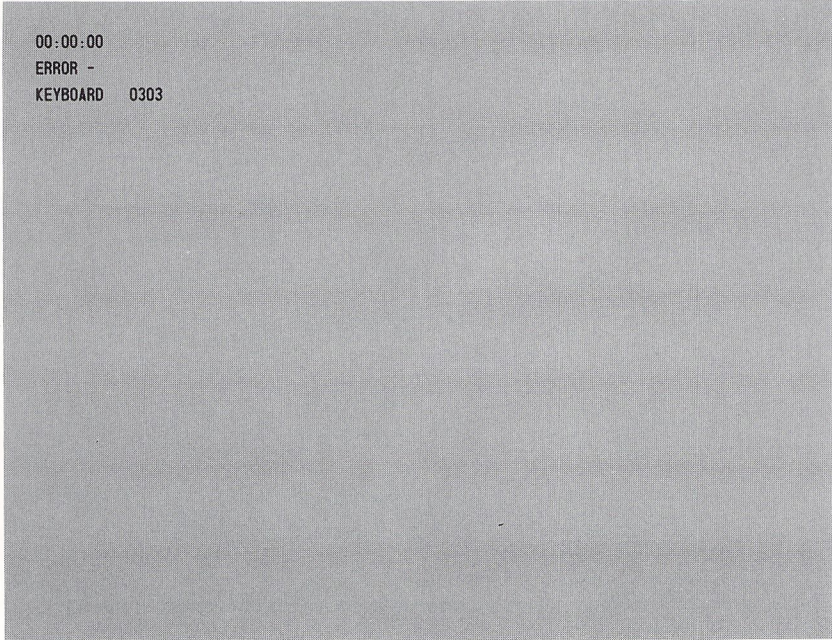
Load and run the Diagnostics again. If the keyboard is not on the installed devices list, replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

Load and run the Diagnostics again. If the keyboard is not on the installed devices list, reinstall the original keyboard and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-300-7.



1. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  2. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  3. Choose **3 (KEYBOARD)** and then press Enter.
- 



00:00:00  
ERROR -  
KEYBOARD 0303

KEYBOARD

## **DID A 0303 ERROR OCCUR?**

---

**NO** Go to page 2-300-8.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

Run the keyboard test again. If the same error occurs, reinstall the original system board and replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

If the keyboard illustration does not display on your screen, answer no to the question below.

1. Follow the directions on your display to run the keyboard and typematic tests.
  2. If any key does not function correctly, choose **N** and then press Enter.
- 

### **DID THE KEYBOARD AND TYPEMATIC TESTS COMPLETE CORRECTLY?**

---

**NO** Ensure that the keyboard connector pins are not damaged and that the connector is securely connected.

Replace the keyboard. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the keyboard test again. If the same failure occurs, reinstall the original keyboard and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** The POST and the keyboard test have completed without an error.

If you suspect an intermittent problem, go to "Intermittent Problem" on page 2-010-1.

1. Press the system unit power switch off and wait about 10 seconds.
  2. Remove the battery and the ac adapter or automobile power adapter.
  3. Reinstall the battery and the ac adapter or automobile power adapter.
  4. Press the system unit power switch on and wait about 45 seconds for the POST to complete and the Advanced Diagnostics to load.
- 

### **DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?**

---

**NO** Go to “Start” on page 2-3.

**YES** Replace the keyboard. Refer to Section 3, “Service Information” on page 3-1.

Run the POST again, using the Ctrl, Fn, and Del. keys. If the same failure occurs, reinstall the original keyboard and replace the system board. Refer to Section 3, “Service Information” on page 3-1.



# CRT Display Adapter

Use this PIC when you are not able to complete the POST, when you have a 05XX error message, when the CRT display adapter is missing from the installed devices list, or when you suspect a CRT display adapter failure.

**Note:** The CRT display adapter is functional only if the system unit power is supplied by the ac adapter. The CRT display adapter will not operate on battery power.

1. Press the system unit power switch off.
2. Set the power switches on all external options and devices off.
3. Disconnect external power from the system unit and all external options and devices.
4. Disconnect all external options from the I/O connector on the rear of the system unit.
5. Disconnect the battery pack.
6. Remove the LCD, if installed.
7. Reconnect the battery pack.
8. Reconnect all external options removed in step 4.
9. Ensure all external cables and connectors are secure and in the correct location.
10. Remove all diskettes from the drives.
11. Reconnect external power to the system unit and all external options and devices.
12. Set the power switches on all external options and devices on.
13. Go to page 2-500-2.

14. If you have a monitor attached to the CRT display adapter, set the brightness and contrast controls for maximum brightness and contrast.
  15. If you have a television set attached to the CRT display adapter, perform the following steps.
    - a. Ensure the television set is functioning properly.
    - b. Ensure that the television connector cable is securely connected to the VHF terminals on the television set.
    - c. Ensure that the television connector cable is securely connected to the CRT display adapter.
    - d. Set the channel selector switch on the connector for your television set to the proper channel (3 or 4) for your area.
    - e. Set the COMPUTER/TELEVISION switch on the connector for your television set to COMPUTER.
    - f. Set your television set brightness and contrast controls to the center.
  16. Press the system unit power switch on.
  17. Listen for the audio responses during the POST.
- 

**DID THE POST COMPLETE WITH ONE LONG AND TWO SHORT BEEPS?**

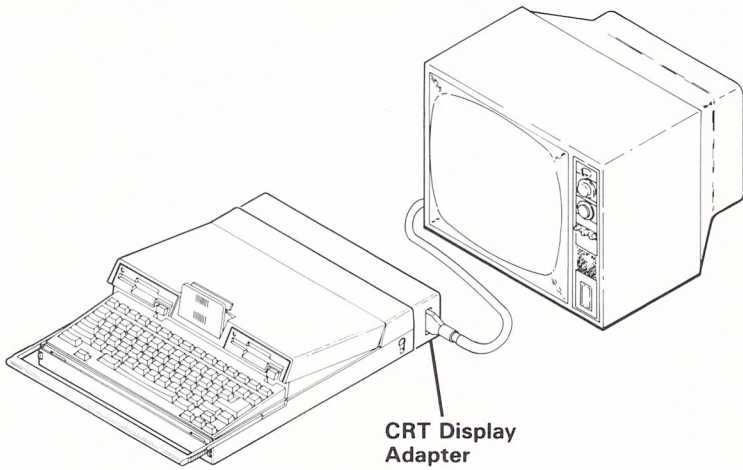
---

**NO** Go to page 2-500-3.

**YES** Go to page 2-500-30.

Do not attempt to service the television set.

---



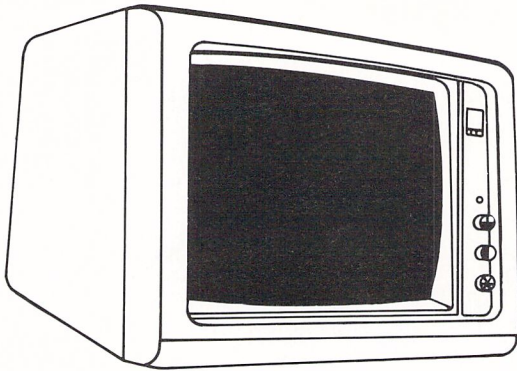
CRT DISPLAY ADAPTER

**IS A TELEVISION SET ATTACHED TO YOUR CRT DISPLAY ADAPTER?**

---

**NO** Go to page 2-500-4.

**YES** Go to page 2-500-5.



**IS THE SCREEN DARK (NO ILLUMINATION)?**

---

**NO** Go to page 2-500-5.

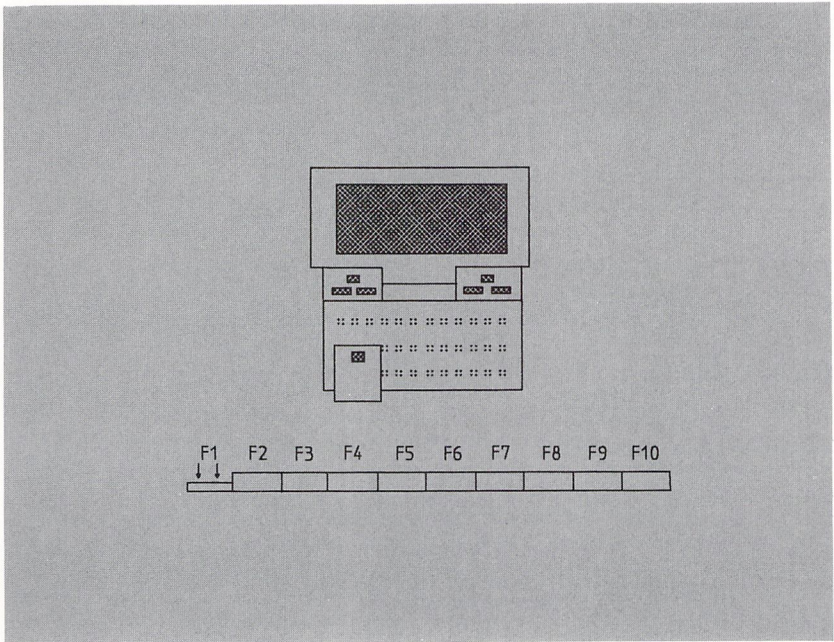
**YES** Go to page page 2-500-35.

**Note:** If you do not have an IBM monitor, go to page 2-500-43.



If the Insert Diskette A icon and the F1 Prompt icon or any part of them displays, but is not stable or readable, answer the question yes.

---



**DID THE INSERT DISKETTE A AND THE F1 PROMPT  
ICONS OR ANY PART OF THEM DISPLAY?**

---

**NO** Go to page 2-500-40.

**YES** Go to page 2-500-6.

1. If you have a monitor attached to the CRT display adapter, set the brightness and contrast controls to the center of their range.
  2. Insert the Advanced Diagnostic diskette into drive A.
  3. Press the F1 key.
  4. If the ADVANCED DIAGNOSTIC menu or any part of the menu displays, but is not stable or readable, answer the question yes.
- 

```
The IBM PC CONVERTIBLE
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp 1986
```

```
SELECT AN OPTION
0 - RUN DIAGNOSTIC ROUTINES
1 - FORMAT DISKETTE
2 - COPY DISKETTE
4 - SET SYSTEM PROFILE
9 - EXIT TO SYSTEM DISKETTE
```

```
ENTER THE ACTION DESIRED
? _
```

---

## DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-500-7.

The audio responses that occur after you press Enter are given in the following steps to help you if your screen is not readable.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter. (1 short beep)
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter. (1 short beep)
  3. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter. (1 short beep)
  4. Choose **0 (RUN TESTS ONE TIME)** and then press Enter. (1 short beep)
  5. Choose **5 (CRT DISPLAY ADAPTER)** and then press Enter. (2 short beeps)
- 

---

Go to page 2-500-8.

## The CRT DISPLAY ADAPTER TEST menu displays.

---

TESTING - CRT DISPLAY ADAPTER

CRT DISPLAY ADAPTER TEST MENU

- 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
- 8 - SCREEN PAGING
- 9 - EXIT TO CONTROL PROGRAM
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION

-

---

### IS THE SCREEN STABLE AND READABLE?

---

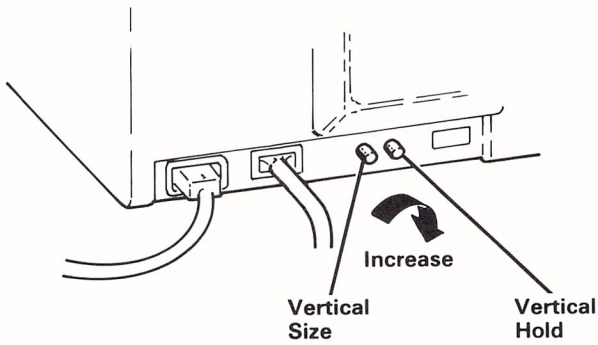
**NO** If you have an IBM Color Monitor, an IBM PCjr Color Monitor, or an IBM PC Convertible Monochrome Monitor, go to page 2-500-9.

If you have a television set attached to the CRT display adapter, go to page 2-500-42.

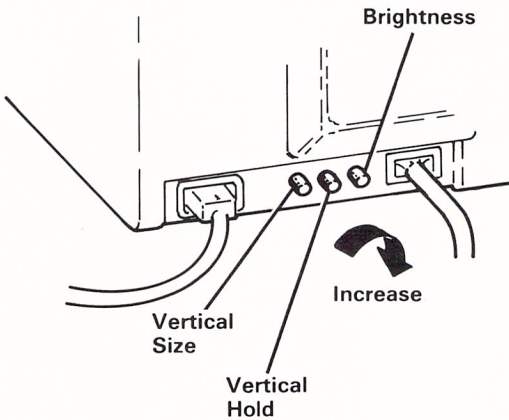
If you do not have one of the above monitors or a television set attached, go to page 2-500-44, step 5.

**YES** Go to page 2-500-10.

1. Increase the vertical hold control all the way.
  2. Decrease the vertical hold control until the image stops rolling and is steady.
- 



### COLOR DISPLAY CONTROLS



### MONOCHROME DISPLAY CONTROLS

#### IS THE DISPLAY STEADY AND READABLE?

---

**NO** Go to page 2-500-44, step 5.

**YES** Go to page 2-500-10.

Your monitor or television may function correctly, but the cursor may be missing or not in its correct position, as shown in the menu.

---

TESTING - CRT DISPLAY ADAPTER

CRT DISPLAY ADAPTER TEST MENU

- 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
- 8 - SCREEN PAGING
- 9 - EXIT TO CONTROL PROGRAM
- 10 - RUN ALL ABOVE TESTS
- 11 - VIDEO TEST
- 12 - SYNC TEST

ENTER NUMBER OF DESIRED ACTION

-

---

## IS THE CURSOR IN THE CORRECT POSITION ON YOUR SCREEN?

---

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** If you have a monitor attached to the CRT display adapter, go to page 2-500-11.

If you have a television set attached to the CRT display adapter, go to page 2-500-15.

The characters on your display may be the wrong size.

---

## ARE THE CHARACTERS THE WRONG SIZE?

---

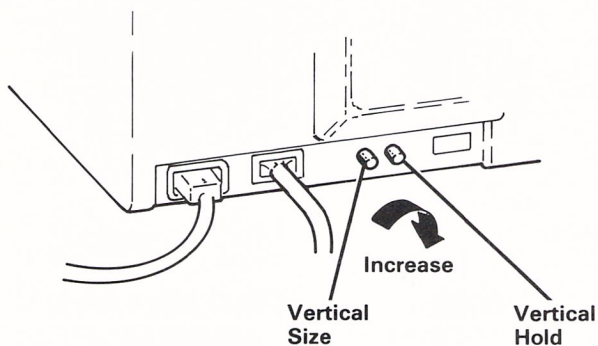
**NO** Go to page 2-500-14.

**YES** If you have an IBM PC Convertible Monochrome Monitor, go to page 2-500-13.

If you have an IBM PC Convertible Color Monitor, replace the monitor.

If you do not have an IBM PC Convertible Monochrome Monitor or an IBM PC Convertible Color Monitor, go to page 2-500-12.

1. Press the system unit power switch off.
  2. Increase the brightness and contrast controls all the way.
  3. Decrease the vertical size control all the way. A black area appears across the top and the bottom of your display.
  4. Increase the vertical size control until both of the black areas disappear.
  5. Press the system unit power switch on.
  6. Choose the correct responses until the CRT DISPLAY ADAPTER TEST menu displays.
  7. Adjust the brightness and contrast controls for eye comfort.
- 



**ARE THE CHARACTERS THE CORRECT SIZE?**

---

**NO** Replace the monitor.

**YES** Go to page 2-500-14.



Turn the vertical size control to adjust the character size.

---

**ARE YOU ABLE TO ADJUST THE SIZE OF THE CHARACTERS?**

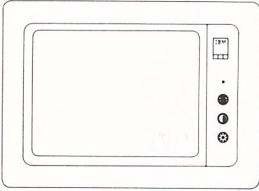
---

**NO** Replace the monitor.

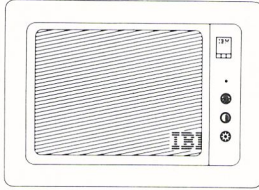
**YES** Go to page 2-500-14.

The image on your display may be distorted.

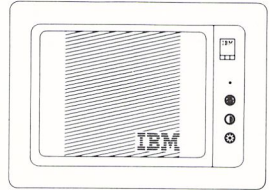
---



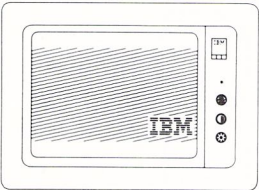
**Too Dim**



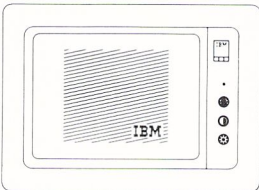
**Too Wide**



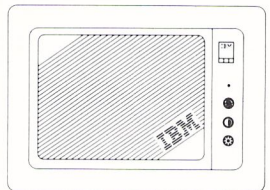
**Too Narrow**



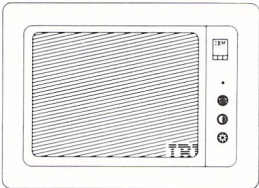
**Too Short**



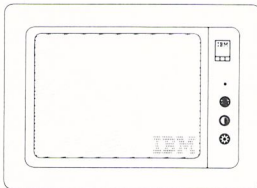
**Too Small**



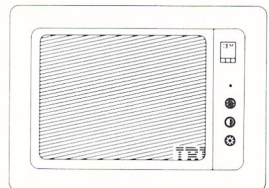
**Tilted**



**Changes Size When  
Brightness Control  
Turned**



**Out of Focus**



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

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

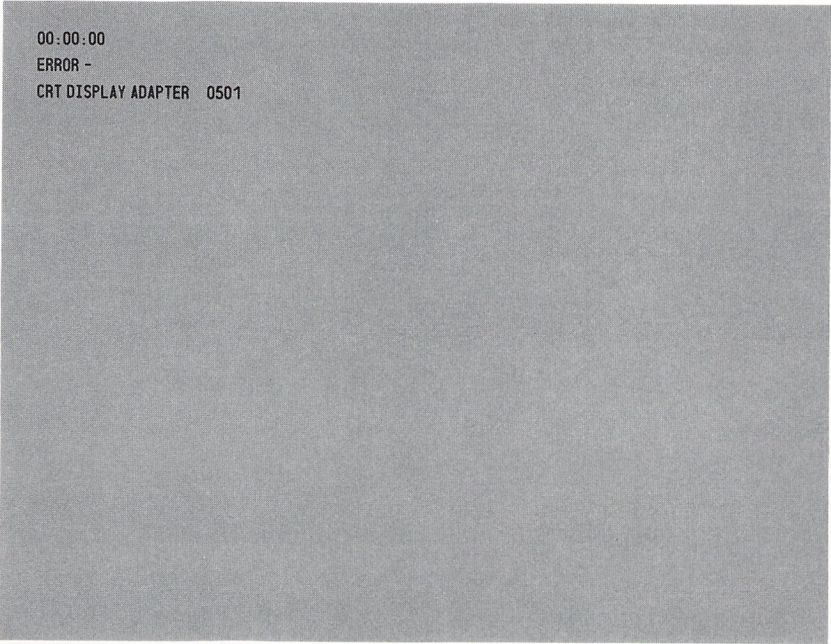
---

**NO** Go to page 2-500-15.

**YES** Replace the monitor.

Choose **10 (RUN ALL OF THE ABOVE TESTS)** and then press Enter.

---



00:00:00  
ERROR -  
CRT DISPLAY ADAPTER 0501

CRT DISPLAY ADAPTER

### **DID A 0501 ERROR OCCUR?**

---

**NO** Go to page 2-500-16.

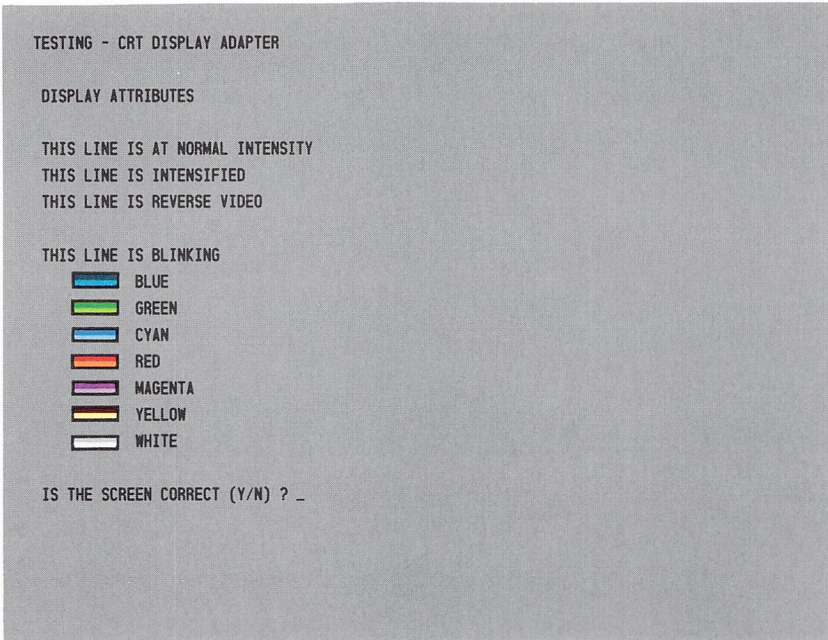
**YES** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

If you have an IBM Color Monitor or another direct-drive color monitor, continue on page 2-500-17.

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

A composite monochrome monitor will have various patterns and shades of gray to represent the colors.

---



---

## ARE ALL THE COLORS PRESENT ON YOUR SCREEN?

---

**NO** If you have a monitor attached to the CRT display adapter, go to page 2-500-44.

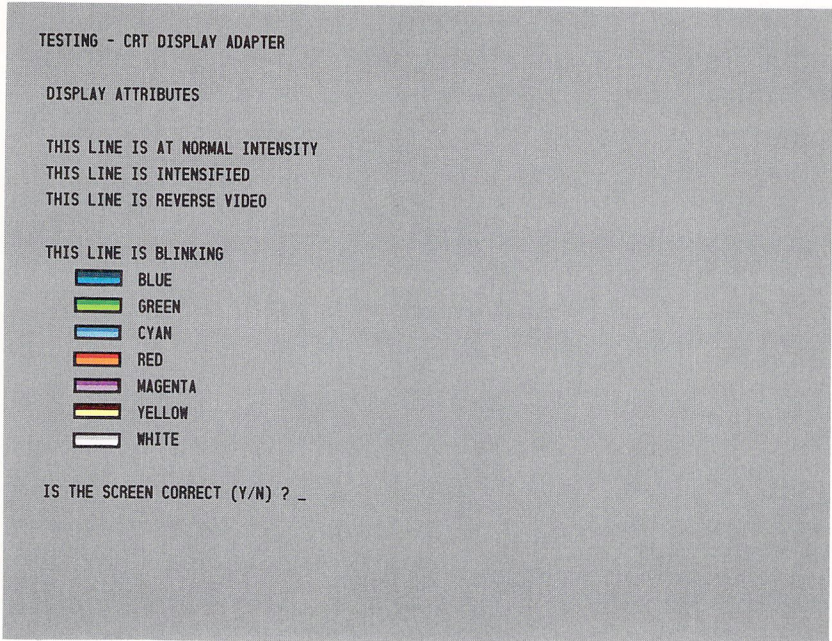
If you have a television set attached to the CRT display adapter, go to page 2-500-42.

**YES** Go to page 2-500-17.

Direct-drive monitors may not support the intensified line. If you do not have an IBM Color Monitor, go to page 2-500-18.

Adjust the brightness and contrast controls until the intensified line is brighter than the other lines.

---



---

### IS THE INTENSIFIED LINE BRIGHTER THAN THE OTHER LINES?

---

**NO** If you have a monitor attached to the CRT display adapter, go to page 2-500-44.

If you have a television set attached to the CRT display adapter, go to page 2-500-42.

**YES** Go to page 2-500-18.

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

A composite monochrome monitor will have various patterns and shades of gray to represent the colors.

Direct-drive monitors may not support the intensified line attribute.

Each line on your monitor should match the description stated in the line.

---

TESTING - CRT DISPLAY ADAPTER

DISPLAY ATTRIBUTES

THIS LINE IS AT NORMAL INTENSITY

THIS LINE IS INTENSIFIED

THIS LINE IS REVERSE VIDEO

THIS LINE IS BLINKING

-  BLUE
-  GREEN
-  CYAN
-  RED
-  MAGENTA
-  YELLOW
-  WHITE

IS THE SCREEN CORRECT (Y/N) ? \_

---

Go to page 2-500-19.

**2-500-18**

---

**DO ALL OF THE LINES MATCH THEIR DESCRIPTIONS?**

---

**NO** If you have a monitor attached to the CRT display adapter, go to page 2-500-44.

If you have a television set attached to the CRT display adapter, go to page 2-500-42.

**YES** Go to page 2-500-20.

Choose Y and then press Enter.

TESTING - CRT DISPLAY ADAPTER

CHARACTER SET LOW

|     |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-----|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0   | ▢ | ▣ | ▤ | ▥  | ▦ | ▧ | ▨ | ▩ | ▪ | ▫ | ▬ | ▭ | ▮ | ▯ | ▰ | ▱ | ▲ | △ | ▴ | ▵ | ▶ | ▷ | ▸ | ▹ | ► | ▻ | ▼ | ▽ | ▾ | ▿ |
| 16  | ▶ | ◀ | ↕ |    | ¶ | § | ≡ | ‡ | ↑ | ↓ | ← | → | ↔ | ↵ | ↶ | ↷ | ↸ | ↹ | ↺ | ↻ | ↼ | ↽ | ↾ | ↿ | ⇀ | ⇁ | ⇂ | ⇃ | ⇄ | ⇅ |
| 32  | ! | " | # | \$ | % | & | ' | ( | ) | * | + | , | . | / |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 48  | 0 | 1 | 2 | 3  | 4 | 5 | 6 | 7 | 8 | 9 | : | ; | < | = | > | ? |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 64  | @ | A | B | C  | D | E | F | G | H | I | J | K | L | M | N | O |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 80  | P | Q | R | S  | T | U | V | W | X | Y | Z | [ | \ | ] | ^ | _ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 96  | ` | a | b | c  | d | e | f | g | h | i | j | k | l | m | n | o |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 112 | p | q | r | s  | t | u | v | w | x | y | z | { |   | } | ~ | Δ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

IS THE SCREEN CORRECT (Y/N) ? \_

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

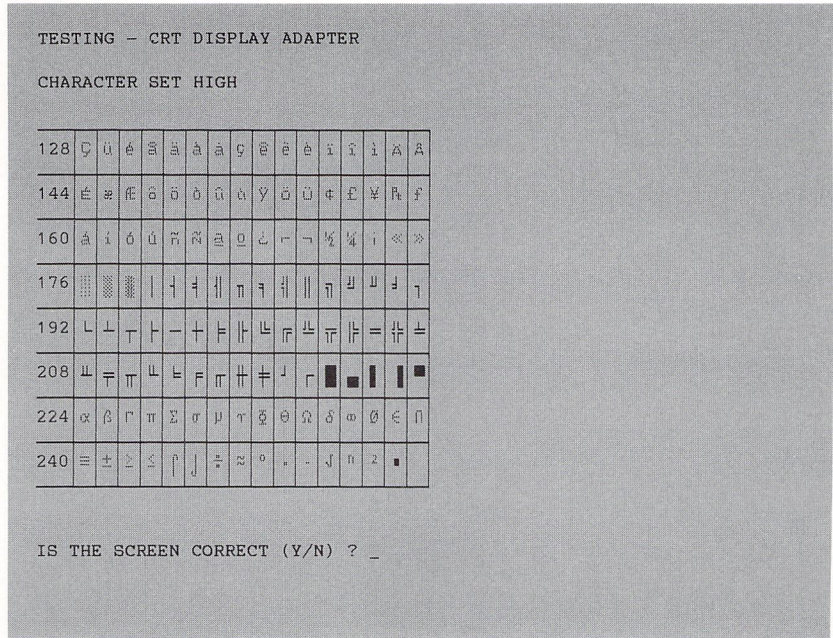
**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-21.

**2-500-20**



Choose Y and then press Enter.



CRT DISPLAY ADAPTER

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

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-22.



Choose Y and then press Enter.

```
TESTING - CRT DISPLAY ADAPTER

40X25 DISPLAY

!"#$%&^()*+,-./0123456789:;<=> DEF
!"#$%&^()*+,-./0123456789:;<=> EFG
!"#$%&^()*+,-./0123456789:;<=>?@ FGH
!"#$%&^()*+,-./0123456789:;<=>?@A GHI
!"#$%&^()*+,-./0123456789:;<=>?@AB HIJ
!"#$%&^()*+,-./0123456789:;<=>?@ABC IJK
!"#$%&^()*+,-./0123456789:;<=>?@ABCD JK
!"#$%&^()*+,-./0123456789:;<=>?@ABCDE L
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF M
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFG N
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGH O
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHI P
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHIJ Q
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHIJK R
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHIJKL S
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM T
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN U
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO V

IS THE SCREEN CORRECT (Y/N) ? _
```

CRT DISPLAY ADAPTER

**DOES YOUR SCREEN MATCH THE EXAMPLE ABOVE?  
(IS THE BORDER WHITE AND ARE ALL THE  
CHARACTERS PRESENT AND COMPLETE?)**

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

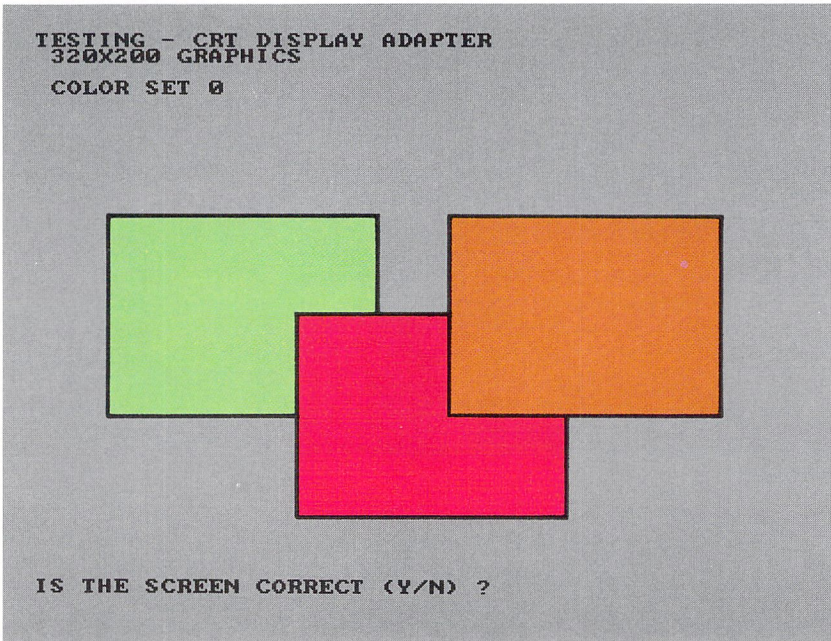
**YES** Go to page 2-500-24.

Choose Y and then press Enter.

A composite monochrome monitor will have various patterns and shades of gray to represent the colors.

The background should be dark. The boxes should be, from left to right, green, red, and yellow. The characters should be yellow.

---



**DOES YOUR SCREEN MATCH THE EXAMPLE ABOVE?**

---

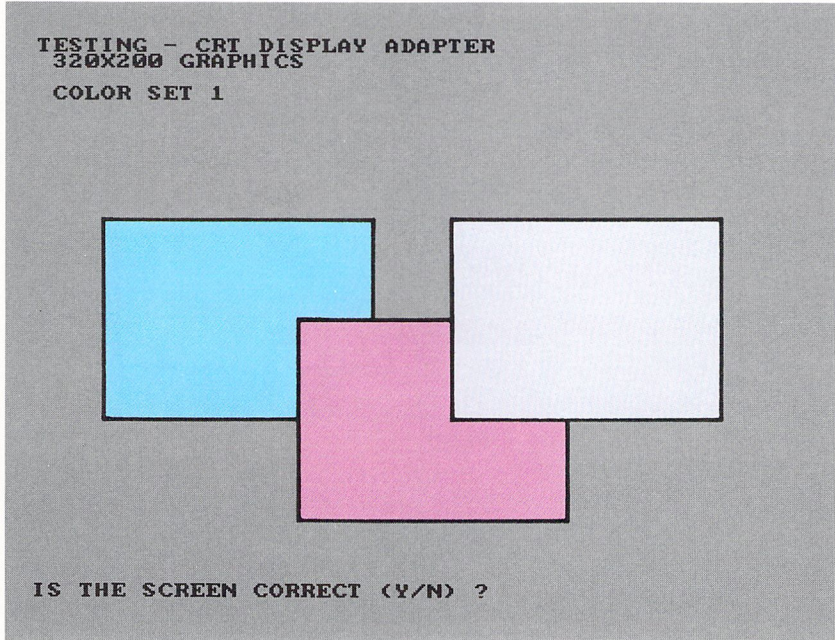
**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-25.

Choose Y and then press Enter.

A composite monochrome monitor will have various patterns and shades of gray to represent the colors.

The background should be dark. The boxes should be, from left to right, cyan, magenta, and gray. The characters should be white.



**DOES YOUR SCREEN MATCH THE EXAMPLE ABOVE?**

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

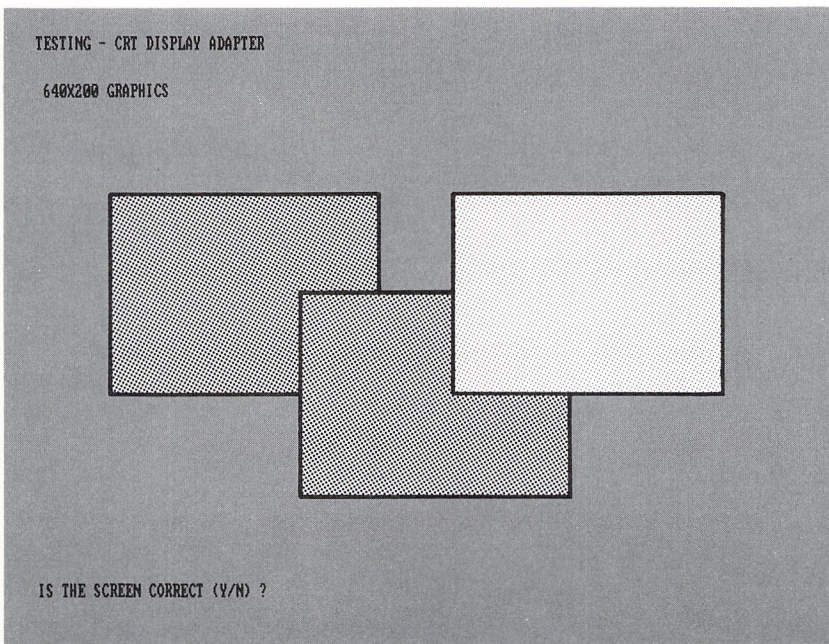
**YES** Go to page 2-500-26.

Choose Y and then press Enter.

A composite monochrome monitor will have various patterns and shades of gray to represent the colors.

The background should be dark. The boxes should be, from left to right, gray, gray, and white. The characters should be white.

---



**DOES YOUR SCREEN MATCH THE EXAMPLE ABOVE?**

---

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-27.

**2-500-26**

1. Choose **Y** and then press Enter.
  2. Follow the directions on your display.
- 

TESTING - CRT DISPLAY ADAPTER

THIS TEST WILL DISPLAY 8 PAGES  
NUMBERED 0 THROUGH 7.

PAGE 0 WILL DISPLAY ALL 0s.  
PAGE 1 ALL 1s. ETC. THE LAST  
PAGE DISPLAYED WILL BE PAGE 0  
AGAIN. FOLLOW THE INSTRUCTIONS  
ON THE BOTTOM OF EACH SCREEN  
UNTIL ALL 8 PAGES HAVE BEEN  
DISPLAYED.

PRESS ENTER KEY TO DISPLAY PAGE 0.

---

Go to page 2-500-28.





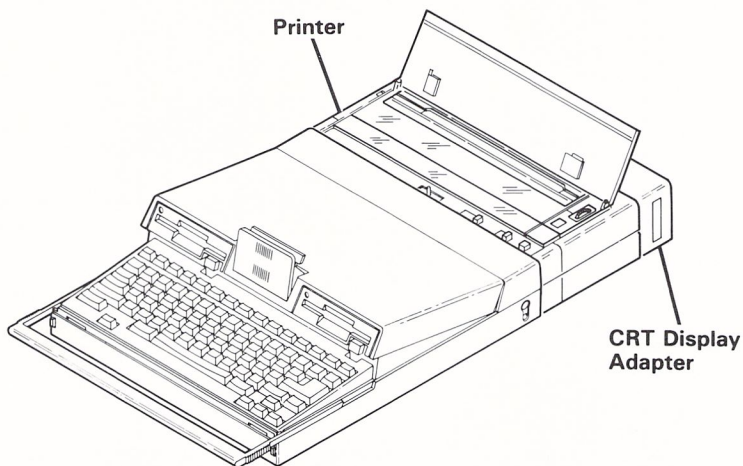
---

**DID ALL EIGHT VIDEO PAGES DISPLAY CORRECTLY?**

---

- NO** Replace the CRT display adapter. Refer to Section 3, “Service Information” on page 3-1.
- YES** The POST and the CRT display adapter test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.



**ARE ANY OTHER EXTERNAL OPTIONS INSTALLED  
ON THE SYSTEM UNIT I/O CONNECTOR WITH THE  
CRT DISPLAY ADAPTER?**

---

**NO** Go to page 2-500-32.

**YES** Go to page 2-500-31.

1. Press the system unit power switch off.
  2. Disconnect all external options from the I/O connector on the rear of the system unit.
  3. Connect the CRT display adapter to the system unit.
  4. Press the system unit power switch on.
  5. Listen for the audio responses during the POST.
- 

### **DID THE POST COMPLETE WITH ONE LONG AND TWO SHORT BEEPS?**

---

**NO** Reinstall each of the external options into its original location. Run the POST after each installing each option.

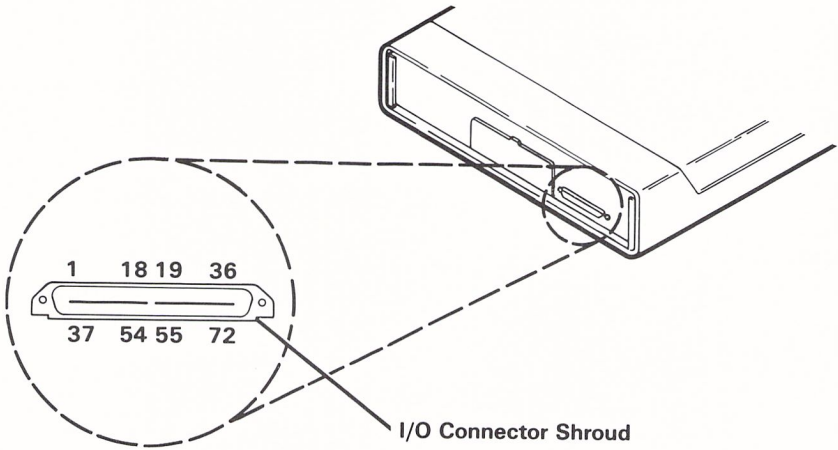
If the same failure occurs:

- Inspect the last option installed for damaged or contaminated I/O connector pins.
- Replace the last option installed.

If you have an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Go to page 2-500-32.

1. Disconnect the CRT display adapter from the system unit.
  2. Measure the voltages at the I/O connector pins on the system unit, as shown in the table below. Use the shroud on the I/O connector for ground (gnd).
- 



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 29  | +4.5         | +5.5         |
| 16  | +9.2         | +16.0        |

**ARE THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

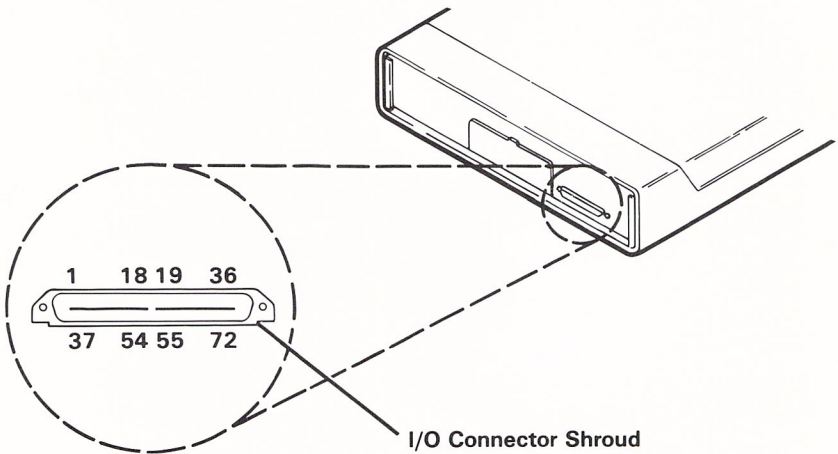
---

**NO** Go to "Power" on page 2-020-1.

**YES** Go to page 2-500-33.

1. Measure the voltage at the I/O connector pin on the system unit, as shown in the table below. Use the shroud on the I/O connector for ground (gnd).
2. Press the system unit power switch on to start the POST.

**Note:** The voltage will only be present for a short time. The system will automatically power off after one long and two short beeps occur. The system unit power switch must be pressed to run the POST again.



| PIN  | MIN volts dc | MAX volts dc |
|------|--------------|--------------|
| 1.70 | +4.5         | +5.5         |

Go to page 2-500-34.

**DID THE VOLTAGE GO TO ABOUT 5 VOLTS DC  
DURING THE POST?**

---

**NO** Go to “Power” on page 2-020-1.

**YES** Replace the CRT display adapter. Refer to Section 3, “Service Information” on page 3-1.

Run the POST again. If the same error occurs, reinstall the original CRT display adapter and replace the system board. Refer to Section 3, “Service Information” on page 3-1.

Check the power light on your monitor.

---

**IS THE POWER LIGHT ON?**

---

**NO** Go to page 2-500-38.

**YES** Go to page 2-500-36.

---

**DO YOU HAVE AN IBM PC CONVERTIBLE  
MONOCHROME MONITOR ATTACHED?**

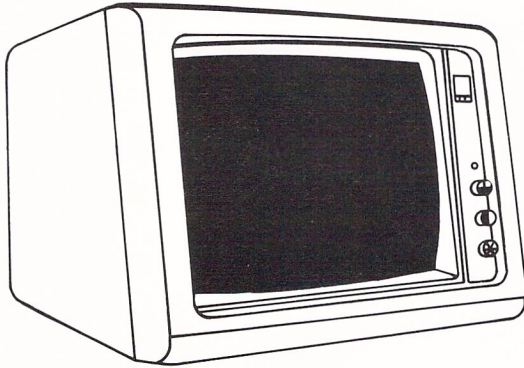
---

**NO** Go to page 2-500-37.

**YES** Go to page 2-500-43.



1. Set the power switch on your color monitor off.
  2. Press the system unit power switch off.
  3. Disconnect the color monitor signal cable from your CRT display adapter.
  4. Set the power switch on your color monitor on.
- 



### IS THE SCREEN DARK (NO ILLUMINATION)?

---

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Replace the color monitor.

---

**DOES YOUR MONITOR HAVE A REMOVABLE POWER  
CORD?**

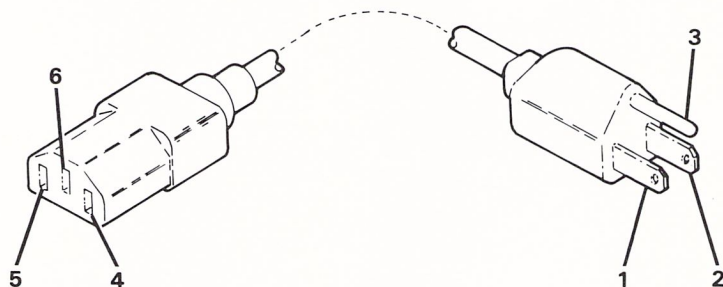
---

**NO** Replace the monitor.

**YES** Go to page 2-500-39.

**2-500-38**

1. Set the power switch on your monitor off.
  2. Press the system unit power switch off.
  3. Disconnect the monitor power cord from the electrical outlet.
  4. Disconnect the power cord from your monitor.
  5. Measure for continuity between the pins on the power cord as shown in the table below.
- 



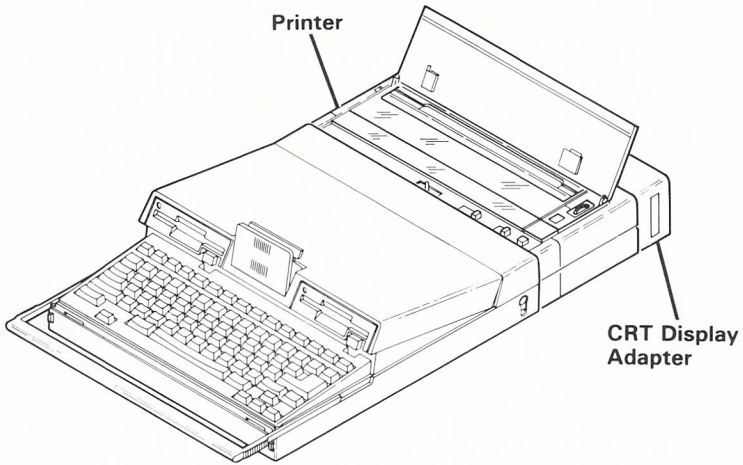
| PIN | PIN |
|-----|-----|
| 1   | 4   |
| 2   | 5   |
| 3   | 6   |

**IS THERE CONTINUITY BETWEEN THE PINS ON THE POWER CORD?**

---

**NO** Replace the power cord.

**YES** Replace the monitor.



**ARE ANY OTHER EXTERNAL OPTIONS INSTALLED  
ON THE SYSTEM UNIT I/O CONNECTOR WITH THE  
CRT DISPLAY ADAPTER?**

---

**NO** Go to page 2-500-42.

**YES** Go to page 2-500-41.

1. Press the system unit power switch off.
  2. Disconnect all external options from the I/O connector on the rear of the system unit.
  3. Connect the CRT display adapter to the system unit.
  4. Press the system unit power switch on.
  5. Run the POST and the CRT display adapter tests.
- 

## DID THE SAME FAILURE OCCUR?

---

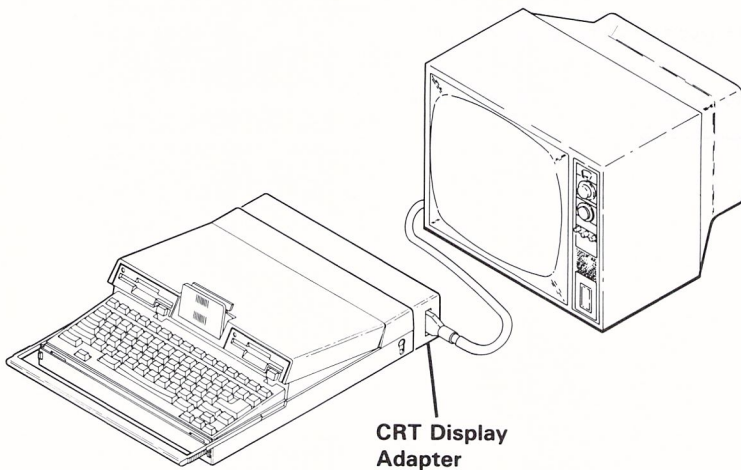
**NO** Reinstall each of the external options into its original location. Run the POST and the CRT adapter test after each installing each option.

If the same failure occurs:

- Inspect the last option installed for damaged or contaminated I/O connector pins.
- Replace the last option installed.

If you have an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Go to page 2-500-42.



---

**IS A TELEVISION SET ATTACHED TO YOUR CRT DISPLAY ADAPTER?**

---

**NO** Go to page 2-500-43.

**YES** Replace the IBM Connector for Television.

Run the POST and the CRT display adapter test. If the same error occurs, reinstall the original IBM Connector for Television and replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the CRT display adapter test. If the same error occurs, reinstall the original CRT display adapter and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

The audio responses that occur after you press Enter are given in the following steps to help you if your screen is blank.

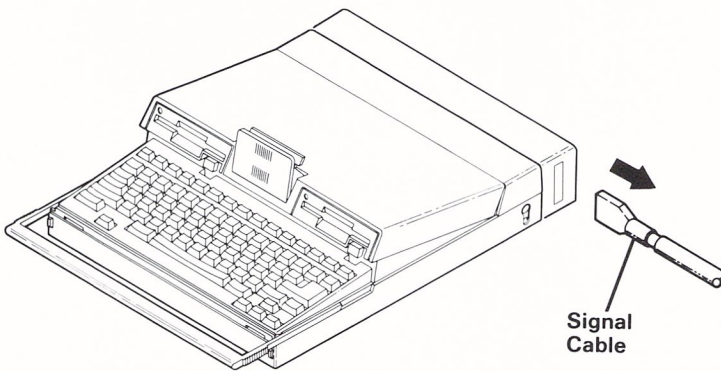
1. Insert the Advanced Diagnostic diskette into drive A.
  2. Press F1. (1 short beep)
  3. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter. (1 short beep)
  4. Press Enter. (1 short beep)
- 

---

Go to page 2-500-44, step 2.

The audio responses that occur after you press Enter are given in the following steps to help you if your screen is blank or not readable.

1. Press **N** and then press Enter. (1 long + 1 short beep)
  2. Press Enter. (1 short beep)
  3. Choose **0 (RUN TESTS ONE TIME:)** and then press Enter. (1 short beep)
  4. Choose **5 (CRT DISPLAY ADAPTER)** and then press Enter. (2 short beeps)
  5. Choose **11 (VIDEO TEST)** and then press Enter. (no beep)
  6. Disconnect the signal cable from your CRT display adapter.
- 

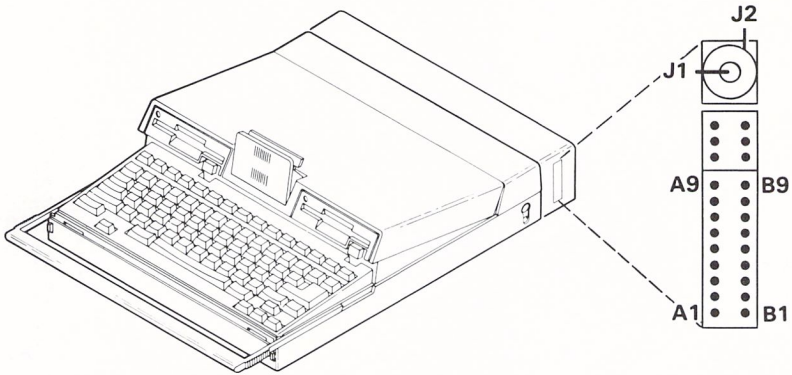


---

Go to page 2-500-45.



Measure the voltages at the pins on the CRT-display-adapter, direct-drive, and phone-jack connectors, as shown in the table below.



CRT DISPLAY ADAPTER

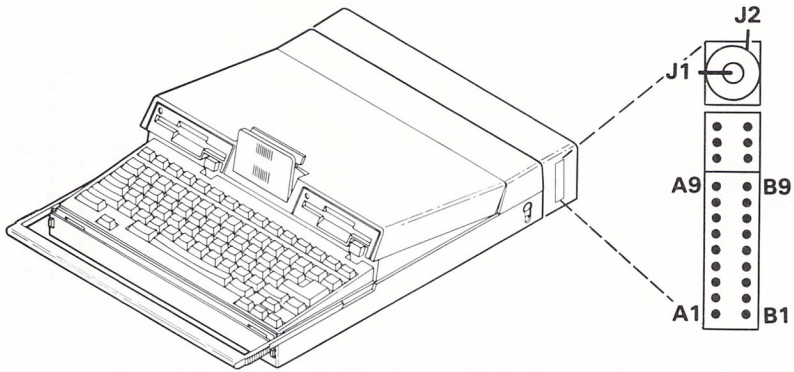
| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| A4  | B5        | +2.4         | +5.5         |
| A5  | B5        | +2.4         | +5.5         |
| A6  | B5        | +2.4         | +5.5         |
| A7  | B5        | +2.4         | +5.5         |
| J1  | J2        | +1.0         | +2.4         |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-46.

1. Press Enter. (1 short beep)
2. Measure the voltages at the pins on the CRT-display-adaptor, direct-drive, and phone-jack connectors, as shown in the table below.



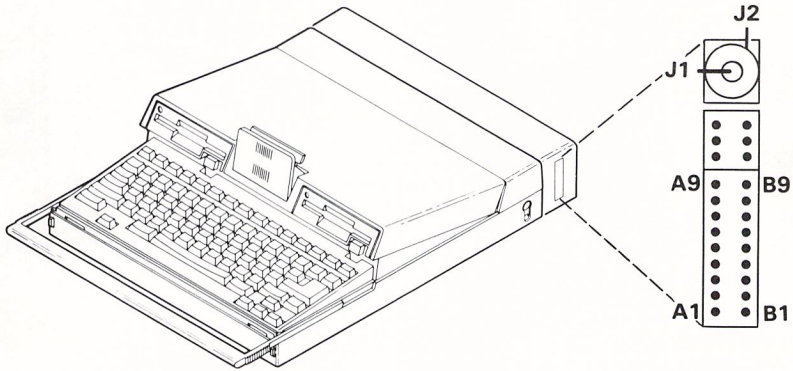
| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| A4  | B5        | +0.0         | +0.5         |
| A5  | B5        | +0.0         | +0.5         |
| A6  | B5        | +0.0         | +0.5         |
| A7  | B5        | +0.0         | +0.5         |
| J1  | J2        | +0.0         | +0.9         |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-47.

1. Press the 9 key. (2 beeps)
2. Measure the voltages at the pins on the CRT-display-adapter, direct-drive, and phone-jack connectors, as shown in the table below.



CRT DISPLAY ADAPTER

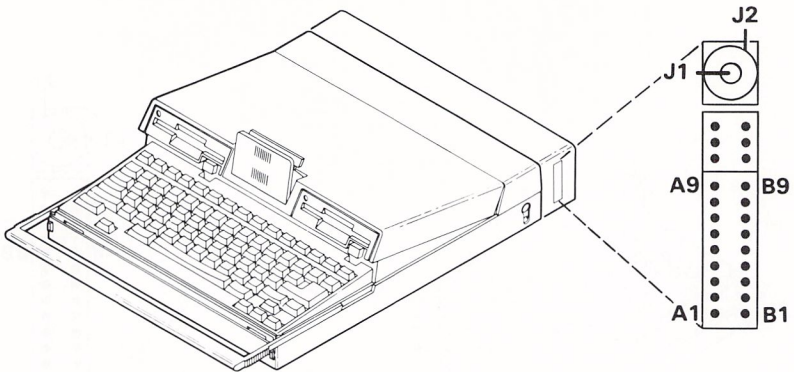
| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| B3  | B5        | +0.0         | +0.7         |
| B1  | B5        | +0.0         | +0.3         |
| J1  | J2        | +0.4         | +1.5         |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-500-48.

1. Choose **12 (SYNC TEST)** and then press Enter. (no beep)
  2. Measure the voltages at the pins on the CRT-display-adaptor, direct-drive, and phone-jack connectors, as shown in the table below.
- 



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| B3  | B5        | +0.8         | +1.5         |
| B1  | B5        | +0.3         | +1.0         |
| J1  | J2        | +0.2         | +0.6         |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

---

**NO** Replace the CRT display adapter. Refer to Section 3, "Service Information" on page 3-1.

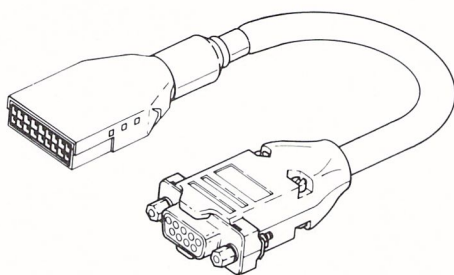
**YES** Go to page 2-500-49.

**DO YOU HAVE AN IBM PC CONVERTIBLE  
MONOCHROME MONITOR ATTACHED?**

---

**NO** Go to page 2-500-50.

**YES** Go to page 2-500-52.



**IS YOUR MONITOR ATTACHED WITH AN ADAPTER  
CABLE?**

---

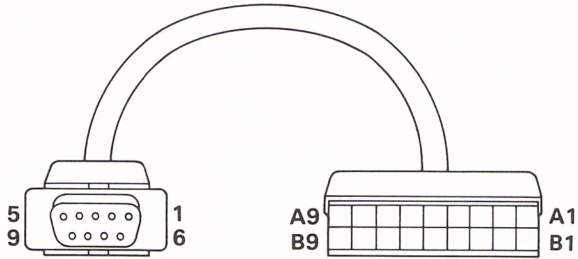
**NO** Replace the monitor.

**YES** Go to page 2-500-51.

**2-500-50**

Measure for continuity between the pins on the adapter cable for your IBM Color Monitor.

---



| 9 PIN CONNECTOR | 2 x 9 PIN CONNECTOR |
|-----------------|---------------------|
| 1               | B9                  |
| 2               | B5                  |
| 3               | A5                  |
| 4               | A7                  |
| 5               | A4                  |
| 6               | A6                  |
| 8               | B3                  |
| 9               | B1                  |

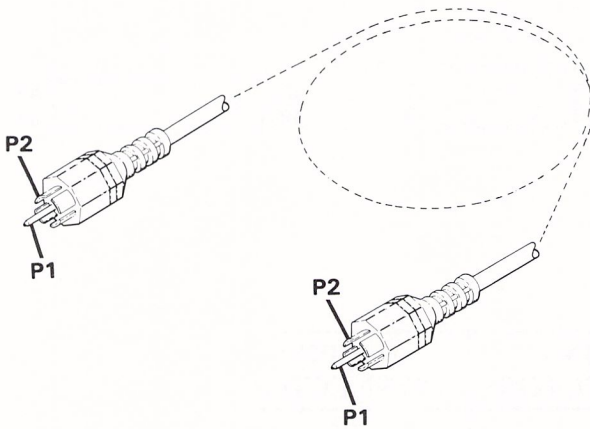
**IS THERE CONTINUITY BETWEEN THE PINS ON YOUR ADAPTER CABLE?**

---

- NO** Replace the adapter cable.
- YES** Replace the color monitor.

CRT DISPLAY ADAPTER

1. Press your monitor power switch off.
  2. Disconnect the signal cable from your monitor.
  3. Measure for continuity between the pins on the signal cable.
- 



| PIN | PIN |
|-----|-----|
| P1  | P1  |
| P2  | P2  |

**IS THERE CONTINUITY BETWEEN THE PINS ON YOUR SIGNAL CABLE?**

---

**NO** Replace the signal cable.

**YES** Replace the monitor.



# Diskette Drive

Use this PIC when you have a 06XX error message, when you have been directed here from another PIC, when you have two diskette drives installed and only one is listed on the installed devices list, or when you suspect a diskette drive failure.

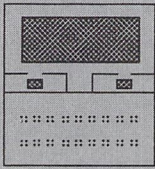
You will need a blank (scratch), formatted diskette to run the diskette diagnostics.

1. Press the system unit power switch off.
2. Insert the Advanced Diagnostic diskette into drive A.
3. Press the system unit power switch on and wait about 10 seconds.
4. Press and hold the Ctrl, Fn, and Del keys.
5. Release the keys.

**Note:** If a 0601 error displays with an F1 prompt, diskette drive B failed during the POST. If a 0601 error displays without an F1 prompt, diskette drive A failed during the POST.

---

XXX Kb OK



0601

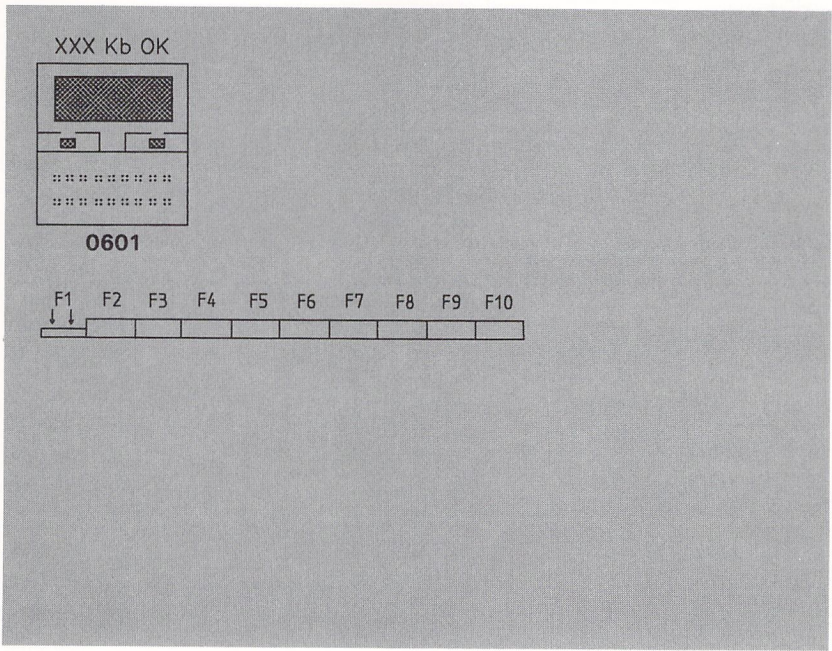
---

**DID A 0601 ERROR OCCUR?**

---

**NO** Go to page 2-600-13.

**YES** Go to page 2-600-3.



**DID THE F1 PROMPT DISPLAY WITH THE 0601 ERROR?**

---

**NO** Go to page 2-600-10.

**YES** Go to page 2-600-4.

1. Press the system unit power switch off.
2. Ensure that the diskette drive signal/power cable connector is securely connected to the diskette drive and the system board.

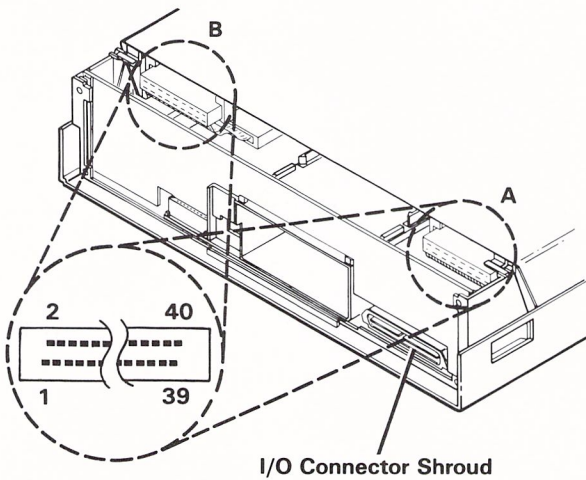
**Note:** If your system unit has two diskette drives installed, check the connector on each drive.

3. Press the system unit power switch on.
- 

Go to page 2-600-5.

Measure the voltages at the pins on the diskette drive signal/power cable connector at the diskette drive end, as shown in the table below. Use the shroud on the I/O connector for ground (gnd).

**Note:** If your system unit has two diskette drives installed, measure the voltages on each drive.

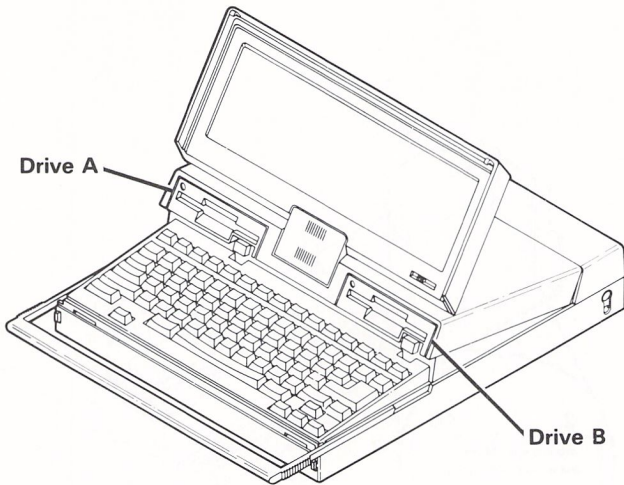


| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 38  | + 4.75       | + 5.25       |
| 40  | +10.94       | +12.86       |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

**NO** Go to page 2-600-9.

**YES** Go to page 2-600-6.



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

---

**NO** Replace diskette drive A. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the diskette test. If the same error occurs, reinstall the original diskette drive and go to page 2-600-8.

**YES** Go to page 2-600-7.

The following steps help you isolate the failure by exchanging the positions of diskette drive A and diskette drive B.

1. Press the system unit power switch off.
2. Remove and mark diskette drive A and diskette drive B. Refer to Section 3, "Service Information" on page 3-1.
3. Install diskette drive A into drive B position.
4. Install diskette drive B into drive A position.
5. Press the system unit power switch on and wait about 10 seconds.
6. Run the POST and the diskette test using a different scratch diskette.

**Note:** If a 0601 error displays with an F1 prompt, diskette drive B failed during the POST. If a 0601 error displays without an F1 prompt, diskette drive A failed during the POST.

---

#### DID A FAILURE FOLLOW THE DISKETTE DRIVE?

---

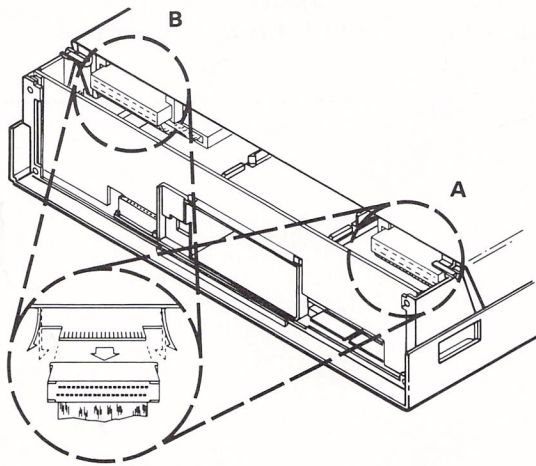
**NO** Go to page 2-600-8.

**YES** Replace the failing diskette drive. Refer to Section 3, "Service Information" on page 3-1.

1. Press the system unit power switch off.
2. Disconnect drive A and drive B signal/power cables at both ends.
3. Connect drive A cable in drive B position.
4. Connect drive B cable in drive A position.
5. Press the system unit power switch on.
6. Run the POST and diskette test.

**Note:** If a 0601 error displays with an F1 prompt, diskette drive B failed during the POST. If a 0601 error displays without an F1 prompt, diskette drive A failed during the POST.

---



---

### DID A FAILURE OCCUR ON THE SAME DISKETTE DRIVE?

---

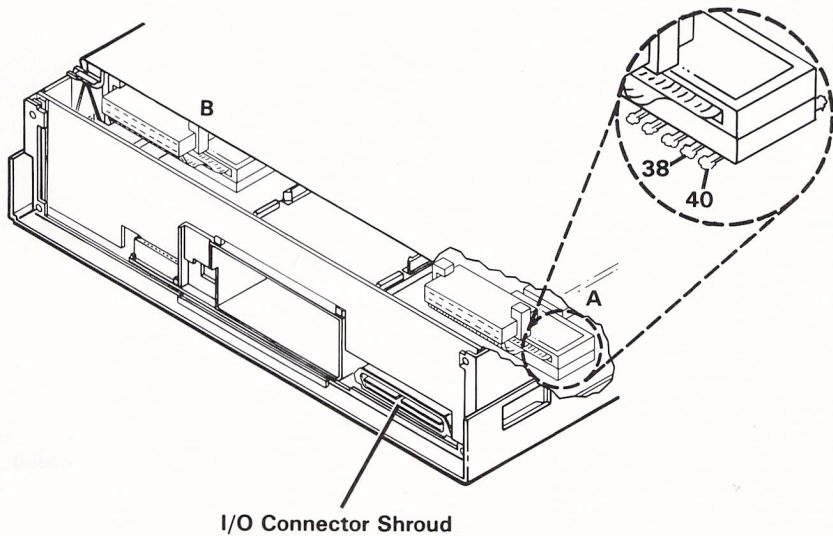
**NO** Replace the signal/power cable. Refer to Section 3, "Service Information" on page 3-1.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.



Measure the voltages at the pins on the diskette drive signal/power cable connector at the system board end, as shown in the table below. Use the shroud on the I/O connector for ground (gnd).

**Note:** If your system unit has two diskette drives installed, measure the voltages on each drive.



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 38  | + 4.75       | + 5.25       |
| 40  | +10.94       | +12.86       |

**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

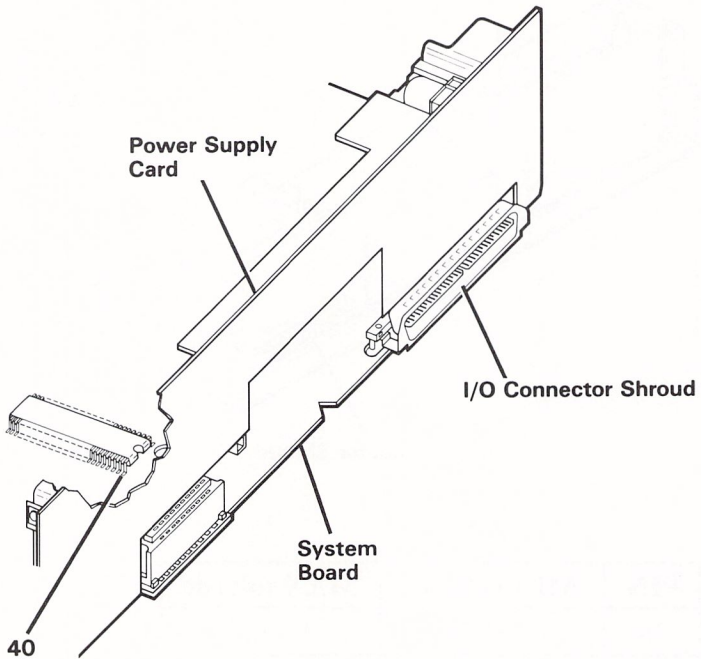
**NO** Go to "Power" on page 2-020-1.

**YES** Replace the signal/power cable for the failing diskette drive. Refer to Section 3, "Service Information" on page 3-1.

1. Press the system unit power switch off.
2. Measure the voltage at pin 40 on the module. Use the shroud on the I/O connector for ground (gnd).
3. Press the system unit power switch on.

**Note:** The voltage pulses one time each time that you run the POST.

---



**DID THE VOLTAGE GO TO ABOUT 5 VOLTS DC DURING THE POST?**

---

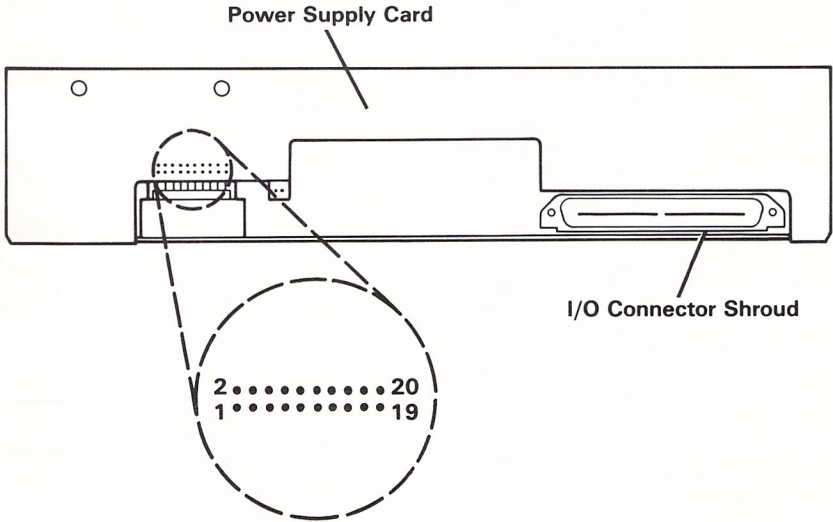
**NO** Go to page 2-600-11.

**YES** Go to page 2-600-4.

**2-600-10**

1. Press the system unit power switch off.
2. Measure the voltage at pin 2 on the power supply card input. Use the shroud on the I/O connector for ground (gnd).
3. Press the system unit power switch on.

**Note:** The voltage pulses one time each time that you run the POST.



| MIN volts dc | MAX volts dc |
|--------------|--------------|
| +4.5         | +5.35        |

Go to page 2-600-12.

---

**DID THE VOLTAGE GO TO WITHIN THE LIMITS  
SHOWN IN THE TABLE DURING THE POST?**

---

**NO** Inspect the power supply card connector for damaged or contaminated pins.

Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Inspect the power supply card connector for damaged or contaminated pins.

Replace the power supply card. Refer to Section 3, "Service Information" on page 3-1.

Run the POST again. If the same failure occurs, reinstall the original power supply card and go to "Power" on page 2-020-1.

---

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SELECT AN OPTION  
0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
4 - SET SYSTEM PROFILE  
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED  
? \_

**DID THE ADVANCED DIAGNOSTIC MENU DISPLAY?**

---

**NO** Go to page 2-600-14.

**YES** Go to page 2-600-15.

1. Remove the diskette from drive A and ensure that it is an Advanced Diagnostic diskette. If it is not, insert an Advanced Diagnostic diskette into drive A.

If it is the Advanced Diagnostic diskette, insert a backup of the Advanced Diagnostic diskette into drive A.

2. Press and hold the Ctrl, Fn, and Del keys.
  3. Release the keys.
- 

```
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```

```
SELECT AN OPTION
0 - RUN DIAGNOSTIC ROUTINES
1 - FORMAT DISKETTE
2 - COPY DISKETTE
4 - SET SYSTEM PROFILE
9 - EXIT TO SYSTEM DISKETTE
```

```
ENTER THE ACTION DESIRED
? _
```

---

**DID THE ADVANCED DIAGNOSTIC MENU DISPLAY?**

---

**NO** Go to page 2-600-4.

**YES** Go to page 2-600-15.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
- 

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

**DOES THE INSTALLED DEVICES MENU CORRECTLY LIST THE NUMBER OF DISKETTE DRIVES INSTALLED ON YOUR SYSTEM?**

---

**NO** Go to page 2-600-4.

**YES** Go to page 2-600-16.

3. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  4. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  5. Choose **6 (X DISKETTE DRIVE(S))** and then press Enter.
  6. Choose **10,A (RUN ALL ABOVE TESTS)** and then press Enter.
  7. Follow the directions on your display to run the test.
- 

```
00:00:00
ERROR -
X DISKETTE DRIVE(S) 06XX
```

---

**DID A 06XX ERROR OCCUR?**

**NO** Go to page 2-600-18.

**YES** Go to page 2-600-17.



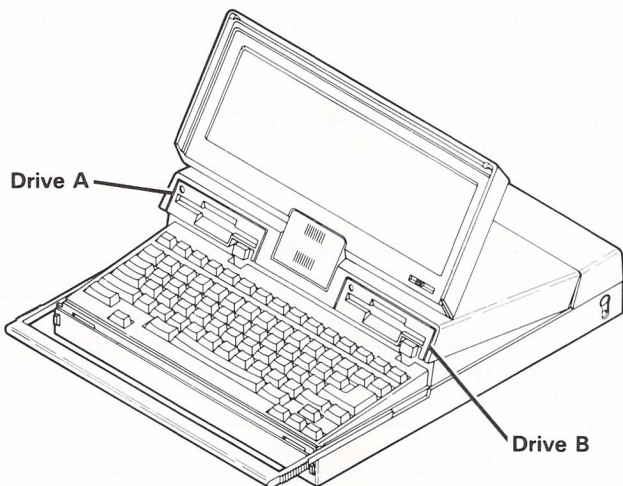
1. Run the diskette test again using another blank, formatted diskette.

**Note:** Some diskette drive failures may write bad data on the scratch diskette. Using the same diskette to test good drives could cause errors, such as missing address marks.

2. Locate your error code in the table below and take the action specified.

**Note:** If a 0601 error message is preceded by any other 06XX error message, use the first error message for troubleshooting.

| ERROR  | ACTION  |
|--|---|
| 0601   | Go to page 2-600-4.   |
| 0602<br>0603   | Incorrect diskette installed.   |
| 0606   | Go to page 2-600-4.   |
| 0607   | Ensure that the diskette is not write-protected, then go to page 2-600-4.       |
| 0608   | Replace the Advanced Diagnostic diskette.                                       |
| 0611   | Go to page 2-600-4. If intermittent 0611 errors occur, also run the speed test. |
| 0612<br>0613<br>0614<br>0621<br>0622<br>0623<br>0624<br>0625<br>0626<br>0627<br>0628 | Go to page 2-600-4.   |



---

## ARE THERE TWO DISKETTE DRIVES INSTALLED IN YOUR SYSTEM?

---

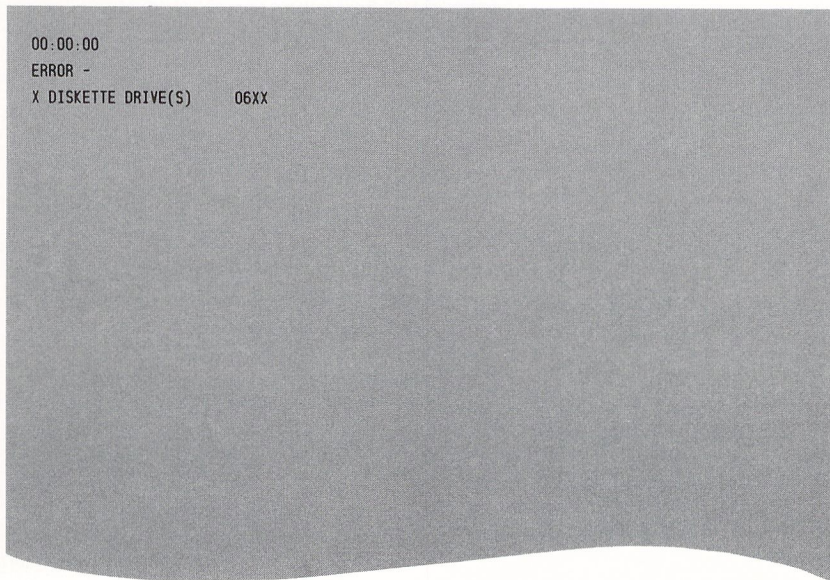
**NO** The POST and the diskette drive test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**Note:** If the diskette drive is functioning properly and the light does not come on, replace the diskette drive. Refer to Section 3, “Service Information” on page 3-1.

**YES** Go to page 2-600-19.

1. Remove the blank diskette from drive A, slide the write-protect tab to cover the opening, and insert it into drive B.
  2. Choose **10,B (RUN ALL ABOVE TESTS)** and then press Enter.
  3. Follow the directions on your display to run the test.
- 



## DID A 06XX ERROR OCCUR?

---

### NO

The POST and the diskette drive test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**Note:** If the diskette drive is functioning properly and the light does not come on, replace the diskette drive. Refer to Section 3, “Service Information” on page 3-1.

**YES** Go to page 2-600-17.



# Serial/Parallel Adapter – Parallel Port

Use this PIC when you have a 09XX error message, when the serial/parallel adapter – parallel port is missing from the installed devices list, or when you suspect a serial/parallel adapter – parallel port failure.

1. Press the system unit power switch off.
  2. Disconnect the printer cable, if it is connected to the serial/parallel adapter – parallel port.
  3. Insert the Advanced Diagnostic diskette into drive A.
  4. Press the system unit power switch on and wait about 10 seconds.
  5. Press and hold the Ctrl, Fn, and Del keys.
  6. Release the keys.
- 

---

Go to page 2-900-2.

---

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SELECT AN OPTION

- 0 - RUN DIAGNOSTIC ROUTINES
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 4 - SET SYSTEM PROFILE
- 9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? \_

---

## DID THE ADVANCED DIAGNOSTIC MENU DISPLAY?

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-900-3.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
- 

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

**IS THE SERIAL/PARALLEL ADAPTER – PARALLEL PORT LISTED ON THE INSTALLED DEVICES LIST?**

---

**NO** Go to page 2-900-7.

**YES** Go to page 2-900-4.

1. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  2. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  3. Choose **9 (SERIAL/PARALLEL ADAPTER – PARALLEL PORT)** and then press Enter.
  4. Your display should match the one shown below.
- 

TESTING - SERIAL/PARALLEL ADAPTER  
- PARALLEL PORT

INSTALL THE PARALLEL PORT WRAP PLUG  
ON THE ADAPTER AND PRESS ENTER KEY

---

**DID A 0901 ERROR OCCUR?**

**NO** Go to page 2-900-5.

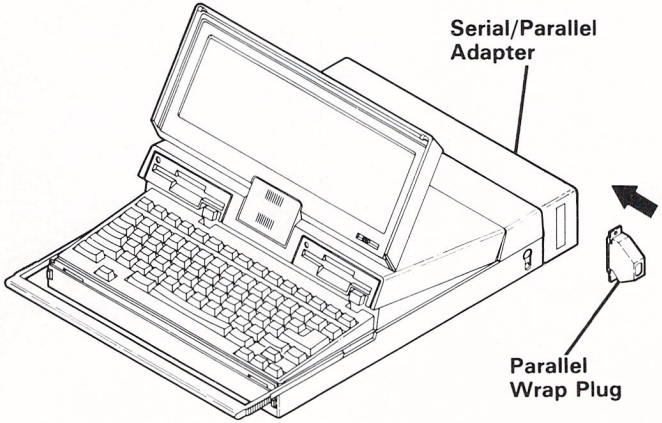
**YES** Go to page 2-900-7.

**2-900-4**



Install the parallel adapter wrap plug on the serial/parallel adapter – parallel port as shown below.

---

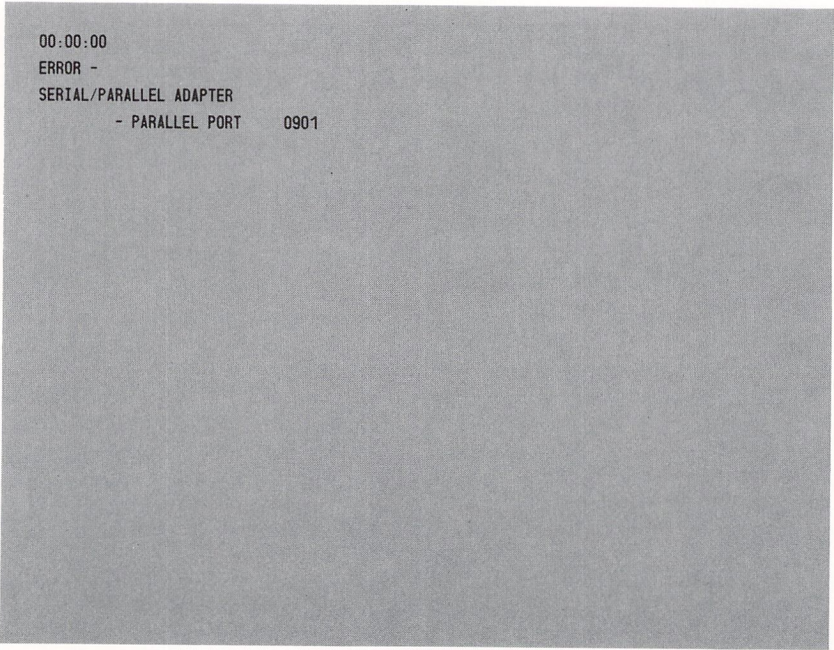


---

Go to page 2-900-6.

Press Enter to continue the test.

---



00:00:00  
ERROR -  
SERIAL/PARALLEL ADAPTER  
- PARALLEL PORT 0901

---

**DID A 0901 ERROR OCCUR?**

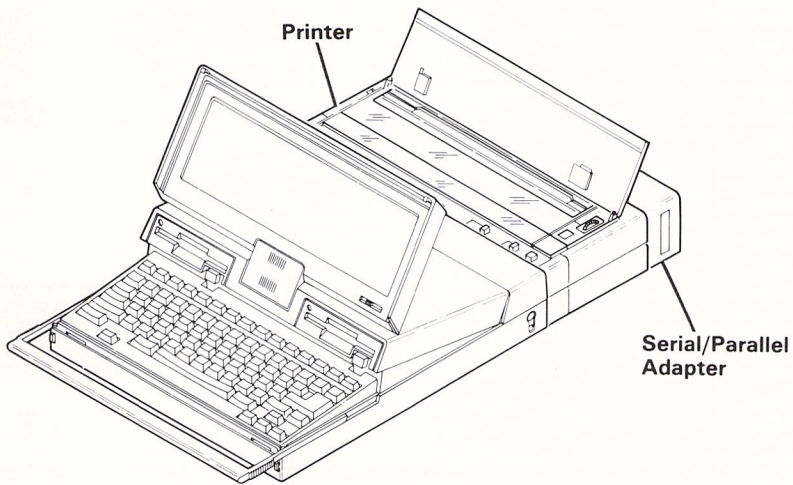
---

**NO** The POST and serial/parallel adapter – parallel port test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Go to page 2-900-7.

**2-900-6**



**ARE ANY OTHER EXTERNAL OPTIONS INSTALLED ON THE SYSTEM UNIT I/O CONNECTOR WITH THE SERIAL/PARALLEL ADAPTER?**

---

**NO** Ensure that the I/O connector pins on the system unit and the serial/parallel adapter are not damaged or contaminated.

Replace the serial/parallel adapter. Refer to Section 3, "Service Information" on page 3-1.

Load and run the Advanced Diagnostics. If the same error occurs, reinstall the original serial/parallel adapter and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-900-8.

1. Press the system unit power switch off.
  2. Disconnect all external options from the I/O connector on the rear of the system unit.
  3. Connect the serial/parallel adapter to the system unit.
  4. If you do not have an LCD installed, connect the CRT display adapter to the serial/parallel adapter.
  5. Press the system unit power switch on and wait about 10 seconds.
  6. Run the serial/parallel adapter – parallel port test again.
- 

Go to page 2-900-9.

---

## DID THE SAME FAILURE OCCUR?

---

**NO** Reinstall each of the external options into its original location. Run the serial/parallel adapter – parallel port test after installing each option.

If the same failure occurs:

- Inspect the last option installed for damaged or contaminated I/O connector pins.
- Replace the last option installed.

If you have an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Ensure that the I/O connector pins on the system unit and the serial/parallel adapter are not damaged or contaminated.

Replace the serial/parallel adapter. Refer to Section 3, “Service Information” on page 3-1.

Load and run the Advanced Diagnostics. If the same error occurs, reinstall the original serial/parallel adapter and replace the system board. Refer to Section 3, “Service Information” on page 3-1.



# Internal Modem

Use this PIC when you have an 11XX error message with the internal modem installed, when the internal modem is installed but missing from the installed devices list, or when you suspect an internal modem failure.

**Note:** An 11XX error can be from the internal modem or the serial/parallel adapter – serial port.

If an 11XX error occurs and the internal modem is installed, continue in this PIC.

If an 11XX error occurs and the internal modem is not installed, go to “Serial/Parallel Adapter – Serial Port” on page 2-1200-1.

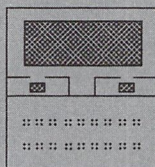
1. Press the system unit power switch off.
  2. Insert the Advanced Diagnostic diskette into drive A.
  3. Press the system unit power switch on and wait about 10 seconds.
  4. Press and hold the Ctrl, Fn, and Del keys.
  5. Release the keys.
- 

---

Go to page 2-1100-2.

---

XXX Kb OK



11XX

## DID AN 11XX ERROR OCCUR?

---

**NO** Go to page 2-1100-3.

**YES** Replace the internal modem. Refer to Section 3, "Service Information" on page 3-1.

Run the POST again. If the same failure occurs, reinstall the original internal modem and replace the system board. Refer to Section 3, "Service Information" on page 3-1.



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- SELECT AN OPTION
- 0 - RUN DIAGNOSTIC ROUTINES
  - 1 - FORMAT DISKETTE
  - 2 - COPY DISKETTE
  - 4 - SET SYSTEM PROFILE
  - 9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED  
? \_

**DID THE ADVANCED DIAGNOSTIC MENU DISPLAY?**

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-1100-4.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
- 

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

## IS THE INTERNAL MODEM LISTED ON THE INSTALLED DEVICES LIST?

---

**NO** Replace the internal modem. Refer to Section 3, "Service Information" on page 3-1.

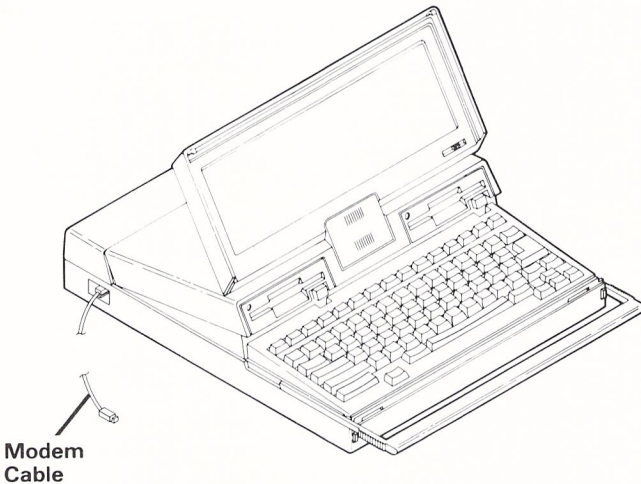
Load and run the Advanced Diagnostics. If the internal modem does not appear on the installed devices list, reinstall the original internal modem and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-1100-5.

1. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
2. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
3. Choose **11 (INTERNAL MODEM)** and then press Enter.

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
  - b. **DISCONNECT THE MODEM CABLE FROM YOUR SYSTEM UNIT AND THEN PRESS ENTER.**
- 



---

Go to 2-1100-6.

Wait about 3 minutes for the test to complete.

---

TESTING - INTERNAL MODEM

DO YOU WANT TO TEST WITH THE TELEPHONE  
LINE CONNECTED TO YOUR MODEM (Y/N) ? \_

---

**DID THE ABOVE MESSAGE DISPLAY WITHOUT AN  
11XX ERROR?**

---

**NO** Replace the internal modem. Refer to Section 3, "Service Information" on page 3-1.

Run the internal modem test again. If the same failure occurs, reinstall the original internal modem and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-1100-7.

1. Choose **Y (DO YOU WANT TO TEST WITH THE TELEPHONE LINE CONNECTED TO YOUR MODEM (Y/N) ?)** and then press Enter.
  2. Follow the directions on your display, as shown below, to run the test.
- 

TESTING - INTERNAL MODEM

DO YOU WANT TO TEST WITH THE TELEPHONE  
LINE CONNECTED TO YOUR MODEM (Y/N) ? \_

CONNECT THE MODEM CABLE TO YOUR SYSTEM  
UNIT. CONNECT THE OTHER END TO A PHONE  
WALL JACK. THEN PRESS THE ENTER KEY.

## DID AN 11XX ERROR OCCUR?

---

**NO** Go to page 2-1100-9.

**YES** Go to page 2-1100-8.

1. Disconnect the modem cable from the telephone wall outlet and then from the system unit.
2. Measure for continuity at the pins on the modem cable connectors, as shown in both of the tables below.

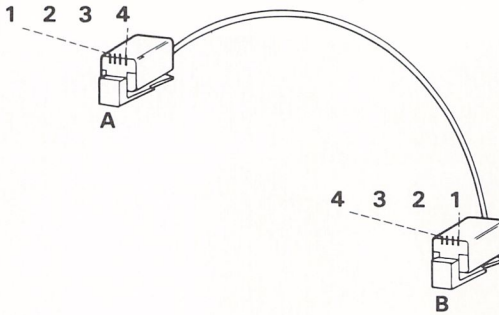


TABLE 1

| CONN A | CONN B |
|--------|--------|
| 2      | 2      |
| 3      | 3      |

TABLE 2

| CONN A | CONN B |
|--------|--------|
| 3      | 2      |
| 2      | 3      |

**IS THERE CONTINUITY BETWEEN THE PINS ON THE MODEM CABLE CONNECTORS AS SHOWN IN TABLE 1 OR TABLE 2?**

**NO** Replace the modem cable. Refer to Section 3, "Service Information" on page 3-1.

**YES** Replace the internal modem. Refer to Section 3, "Service Information" on page 3-1.

Run the internal modem test again. If the same failure occurs, reinstall the original internal modem and suspect a telephone line problem. Try another telephone line.

Run the internal modem test again. If the same failure occurs, reinstall the original internal modem and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

---

**DID THE REPORTED PROBLEM OCCUR WHEN USING THE AUTO-DIAL FEATURE (MODEM DIALS WRONG NUMBER OR FAILS TO DIAL)?**

---

**NO** Go to page 2-1100-10.

**YES** If possible, ensure that the appropriate auto-dial options (pulse-dial, tone-dial, and required pauses) match the requirements of the telephone line being used.

If the problem cannot be found, replace the internal modem. Refer to Section 3, "Service Information" on page 3-1.

Communication data errors can occur:

- From telephone line noise while transmitting or receiving data
- If you have Call Waiting and a call is received while transmitting or receiving data.

If data errors occur, wait a few minutes and place the call again. The new call may result in a better line.

Communication at 1200 baud may be more susceptible to line noise than communication at 300 baud.

---

## **CAN YOU RECREATE THE PROBLEM?**

---

**NO** The POST and internal modem tests have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Replace the internal modem. Refer to Section 3, “Service Information” on page 3-1.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.



# Serial/Parallel Adapter – Serial Port

Use this PIC when you have an 11XX error message without the internal modem installed, a 12XX error message, or when you suspect a serial port communications failure.

**Note:** An 11XX error can be from the internal modem or the serial/parallel adapter – serial port.

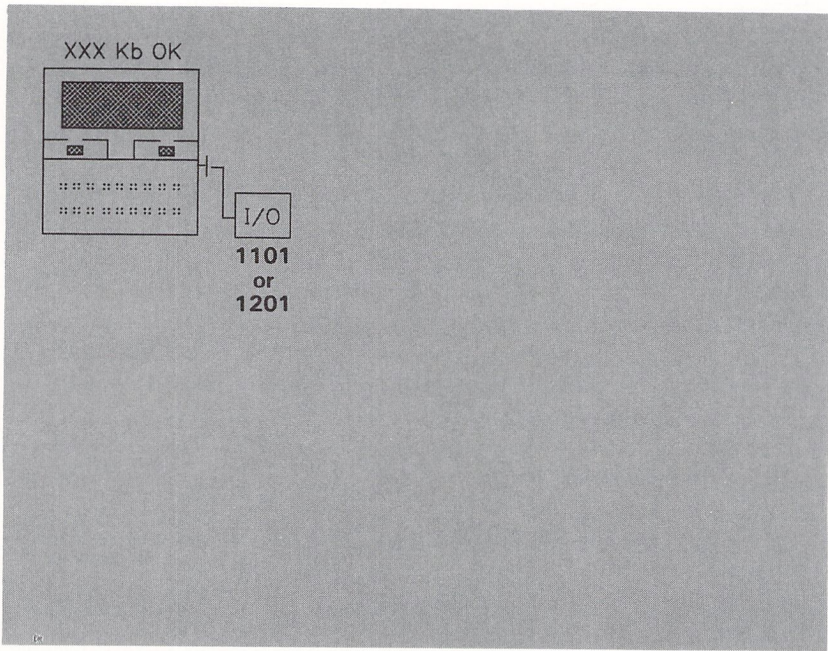
If an 11XX error occurs and the internal modem is not installed, continue in this PIC.

If an 11XX error occurs and the internal modem is installed, go to “Internal Modem” on page 2-1100-1.

1. Press the system unit power switch off.
  2. Insert the Advanced Diagnostic diskette into drive A.
  3. Press the system unit power switch on and wait about 10 seconds.
  4. Press and hold the Ctrl, Fn, and Del keys.
  5. Release the keys.
- 

---

Go to page 2-1200-2.



**DID A POST 1101 OR 1201 ERROR OCCUR?**

---

**NO** Go to page 2-1200-3.

**YES** Go to page 2-1200-9.

---

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SELECT AN OPTION  
0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
4 - SET SYSTEM PROFILE  
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED  
? \_

SERIAL PORT

## DID THE ADVANCED DIAGNOSTIC MENU DISPLAY?

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-1200-4.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
- 

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

**IS THE SERIAL/PARALLEL ADAPTER – SERIAL PORT LISTED ON THE INSTALLED DEVICES LIST?**

---

**NO** Go to page 2-1200-9.

**YES** Go to page 2-1200-5.

1. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  2. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  3. Choose **11 or 12 (SERIAL/PARALLEL ADAPTER – SERIAL PORT)** and then press Enter.
  4. Your display should match the one shown below.
- 

TESTING - SERIAL/PARALLEL ADAPTER  
- SERIAL PORT

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

---

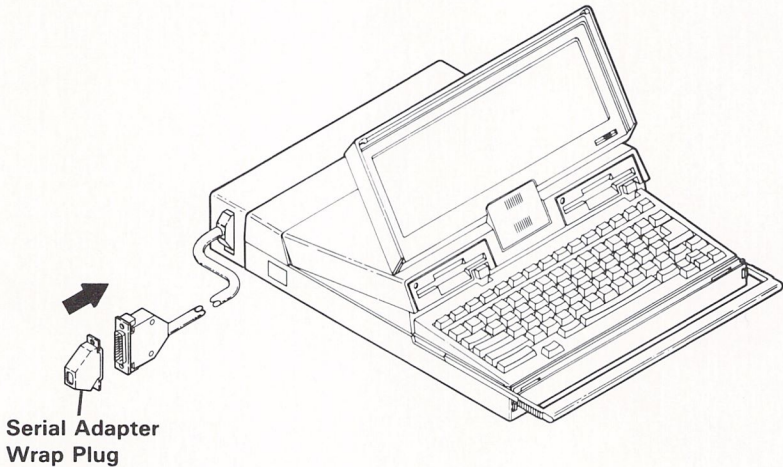
**IS AN IBM COMMUNICATIONS ADAPTER CABLE  
ATTACHED?**

---

**NO** Go to page 2-1200-8.

**YES** Go to page 2-1200-6.

1. Choose **Y (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE SERIAL PORT (Y/N) ?)** and then press Enter.
  2. Connect the serial adapter wrap plug to the end of the communications adapter cable.
  3. Press Enter to continue the test.
- 



---

### **DID A MESSAGE TO INSTALL THE WRAP PLUG ON THE ADAPTER DISPLAY?**

---

**NO** The POST and the serial/parallel adapter – serial port test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-101-1.

**YES** Go to page 2-1200-7.

1. Disconnect the serial adapter wrap plug from the communications adapter cable.
  2. Disconnect the communications adapter cable from the serial/parallel adapter – serial port connector.
  3. Connect the serial adapter wrap plug to the serial port connector on the adapter.
  4. Press Enter to continue the test.
- 

```
00:00:00
ERROR -
SERIAL/PARALLEL ADAPTER
  - SERIAL PORT      1202

REPLACE THE IBM COMMUNICATIONS
ADAPTER CABLE.
```

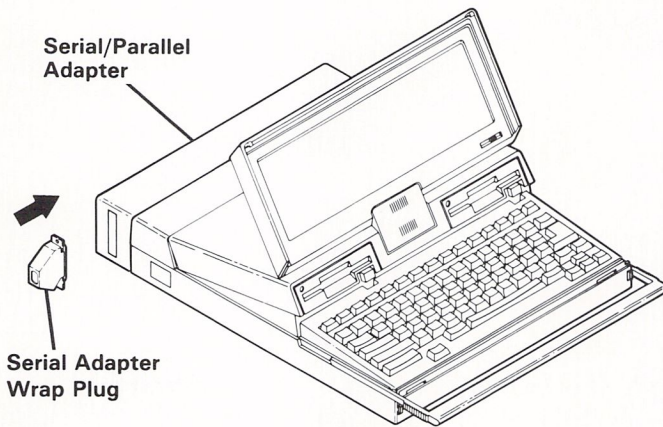
### **DID AN 1102 OR 1202 ERROR OCCUR?**

---

**NO** Go to page 2-1200-9.

**YES** Replace the communications adapter cable.

1. Choose N (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE SERIAL PORT (Y/N) ?) and then press Enter.
  2. Connect the serial adapter wrap plug to the serial port connector on the adapter.
  3. Press Enter to continue the test.
- 



## DID AN 1101 OR 1201 ERROR OCCUR?

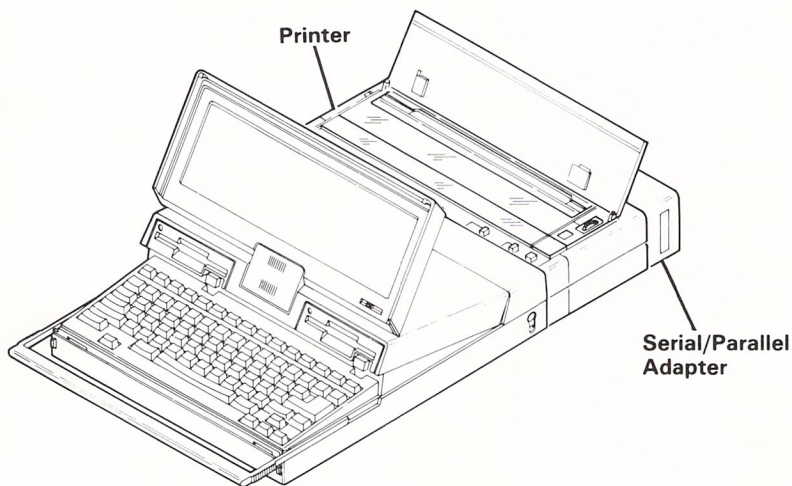
---

**NO** The POST and the serial/parallel adapter – serial port test have completed without an error.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Go to page 2-1200-9.





---

**ARE ANY OTHER EXTERNAL OPTIONS INSTALLED ON THE SYSTEM UNIT I/O CONNECTOR WITH THE SERIAL/PARALLEL ADAPTER?**

---

**NO** Ensure that the I/O connector pins on the system unit and the serial/parallel adapter are not damaged or contaminated.

Replace the serial/parallel adapter. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the serial/parallel adapter – serial port test. If the same error occurs, reinstall the original serial/parallel adapter and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-1200-10.

1. Press the system unit power switch off.
  2. Disconnect all external options from the I/O connector on the rear of the system unit.
  3. Connect the serial/parallel adapter to the system unit.
  4. If you do not have an LCD installed, connect the CRT display adapter to the serial/parallel adapter.
  5. Press the system unit power switch on and wait about 10 seconds.
  6. Run the POST and the serial/parallel adapter – serial port test.
- 

---

Go to page 2-1200-11.

---

## DID THE SAME FAILURE OCCUR?

---

**NO** Reinstall each of the external options into its original location. Run the POST and the serial/parallel adapter – serial port test after installing each option.

If the same failure occurs:

- Inspect the last option installed for damaged or contaminated I/O connector pins.
- Replace the last option installed.

If you have an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Ensure that the I/O connector pins on the system unit and the serial/parallel adapter are not damaged or contaminated.

Replace the serial/parallel adapter. Refer to Section 3, “Service Information” on page 3-1.

Run the POST and the serial/parallel.adapter – serial port test. If the same error occurs, reinstall the original serial/parallel adapter and replace the system board. Refer to Section 3, “Service Information” on page 3-1.



# IBM Matrix/Graphics Printer

Use this PIC when you have a 14XX error message, when an IBM Matrix Printer or IBM Graphics Printer is installed but missing on the installed devices list, or when you suspect an IBM Matrix or IBM Graphics Printer failure.

1. Press the system unit power switch off.
  2. Insert the Advanced Diagnostic diskette into drive A.
  3. Press the system unit power switch on and wait about 10 seconds.
  4. Press and hold the Ctrl, Fn, and Del keys.
  5. Release the keys.
- 

---

Go to page 2-1400-2.

---

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SELECT AN OPTION

- 0 - RUN DIAGNOSTIC ROUTINES
- 1 - FORMAT DISKETTE
- 2 - COPY DISKETTE
- 4 - SET SYSTEM PROFILE
- 9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? -

---

**DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?**

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-1400-3.

1. Set the printer power switch off.
  2. Ensure that the paper is inserted properly.
  3. Move the print head to the leftmost position.
  4. Set the printer power switch on.
- 

**ARE THE POWER, READY, AND ON-LINE LIGHTS ON?**

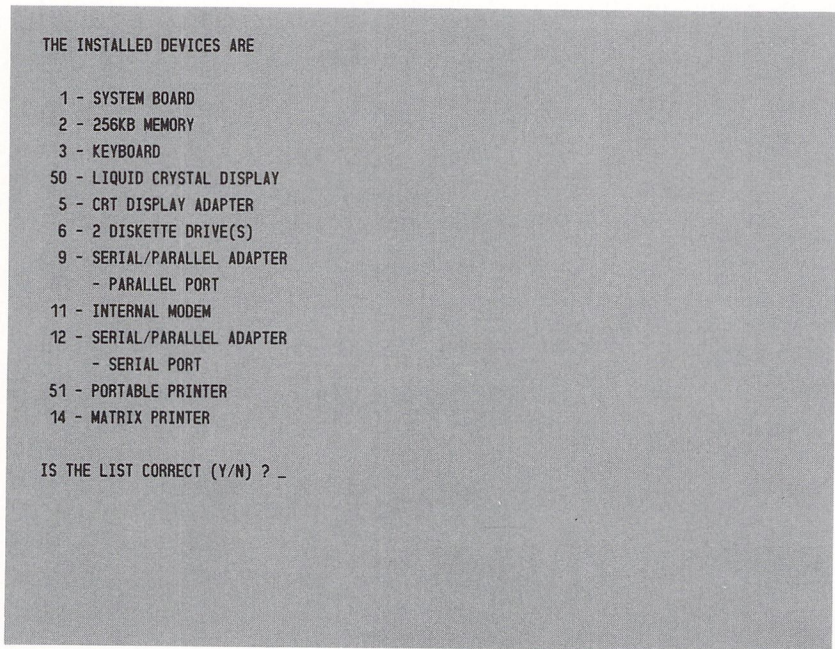
---

**NO** Go to page 2-1400-13.

**YES** Go to page 2-1400-4.

Printer power must be on before you run the Advanced Diagnostics or **14 (MATRIX PRINTER)** will not be listed on the installed devices list.

1. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
- 



**IS THE MATRIX PRINTER LISTED ON THE INSTALLED DEVICES LIST?**

---

- NO** Go to page 2-1400-5.
- YES** Go to page 2-1400-6.



---

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

**IS THE SERIAL/PARALLEL ADAPTER - PARALLEL PORT LISTED ON THE INSTALLED DEVICES LIST?**

---

**NO** Go to "Serial/Parallel Adapter - Parallel Port" on page 2-900-1.

**YES** Replace the serial/parallel adapter. Refer to Section 3, "Service Information" on page 3-1.

Load and run the Advanced Diagnostics. If the same failure occurs, reinstall the original serial/parallel adapter and go to page 2-1400-11.

1. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  2. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  3. Choose **14 (MATRIX PRINTER)** and then press Enter.
  4. Follow the directions on your display to run the matrix printer test.
- 

TESTING - MATRIX PRINTER

IF THE PARALLEL PORT WRAP PLUG  
IS INSTALLED, REMOVE IT AND  
ATTACH THE PRINTER CABLE.

PRESS ENTER TO CONTINUE

THIS TEST PRINTS A PATTERN OF  
CHARACTERS IN A COMBINATION OF  
PRINT MODES ON YOUR PRINTER.

---

## DID YOUR PRINTER PRINT?

---

**NO** Go to page 2-1400-9.

**YES** Go to page 2-1400-7.

**2-1400-6**

```

! "#$%&'()*+,-./
0123456789: ; <=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz { | } ~
! "#$%&'()*+,-./
0123456789: ; <=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ [ \ ] ^ _
`abcdefghijklmno
pqrstuvwxyz { | } ~
! "#$%&'()*+,-./
' . , / : ; < = > ?

```

**DOES THE PRINTOUT MATCH THE SAMPLE SHOWN ABOVE?**

**NO** Go to page 2-1400-8.

**YES** The printer test completed without an error.

If you continue to have a problem, go to page 2-1400-9.

!"#\$%&'()\*+,-./  
 0123456789:;<=>?  
 @ABCDEFGHIJKLMNO  
 PQRSTUVWXYZ[\]^\_  
 `abcdefghijklmnop  
 pqrstuvwxyz{ }~  
 !"#\$%&'()\*+,-./  
 0123456789:;<=>?  
 @ABCDEFGHIJKLMNO  
 PQRSTUVWXYZ[\]^\_  
 `abcdefghijklmnop  
 pqrstuvwxyz{ }~  
 !"#\$%&'()\*+,-./  
 áîóúñçéëöç-~¼í«»  
 ΣΞΓσΣβΓσΣαΓσ@Ω  
 □ □ □ □

**DOES THE PRINTOUT MATCH THE SAMPLE SHOWN ABOVE?**

**NO** Go to page 2-1400-9.

**YES** The printer test completed without an error.

If you continue to have a problem, go to page 2-1400-9.



|  |               |
|--|---------------|
| !"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI | cdefghijklmno |
| !"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI | defghijklmnop |
| "#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJ | efghijklmnopq |
| #\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK | fghijklmnopqr |
| %&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKL   | ghijklmnopqrs |
| %&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM  | ijklmnopqrst  |
| &'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN  | klmnopqrstuv  |
| '()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO  | lmnopqrstuvw  |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | mnopqrstuvwx  |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | nopqrstuvwxy  |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | opqrstuvwxy   |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | pqrstuvwxyz   |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | qrstuvwxyz{   |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | rstuvwxyz{    |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | stuvwxyz{ }   |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | tuvwxyz{ }~   |
| ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO   | uvwxyz{ }~    |

---

**DOES THE PRINTOUT MATCH THE SAMPLE SHOWN ABOVE?**

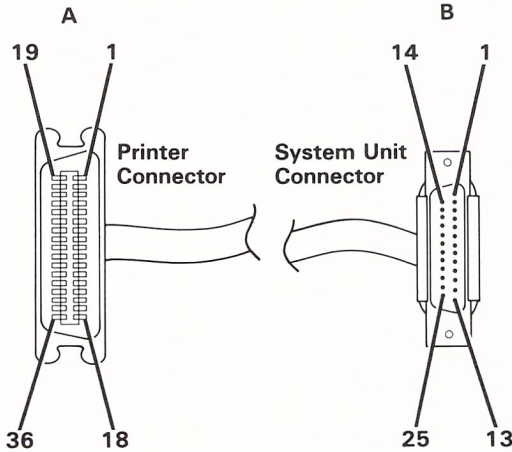
---

**NO** Go to page 2-1400-13.

**YES** Replace the serial/parallel adapter. Refer to Section 3, "Service Information" on page 3-1.

Load the Advanced Diagnostics and run the printer on line and off line tests. If the same failure occurs, reinstall the original serial/parallel adapter and go to page 2-1400-11.

1. Disconnect the printer cable from the printer.
2. Disconnect the printer cable from the serial/parallel adapter.
3. Measure for continuity on all pins of the printer cable, as shown in the table below.



MATRIX PRINTER

| A | B |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |

| A  | B  |
|----|----|
| 10 | 10 |
| 11 | 11 |
| 12 | 12 |
| 13 | 13 |
| 14 | 14 |
| 32 | 15 |
| 31 | 16 |
| 36 | 17 |

| A  | B  |
|----|----|
| 33 | 18 |
| 19 | 19 |
| 21 | 20 |
| 23 | 21 |
| 25 | 22 |
| 27 | 23 |
| 29 | 24 |
| 30 | 25 |

Go to 2-1400-12.

---

**IS THERE CONTINUITY BETWEEN THE PINS ON THE  
PRINTER CABLE?**

---

**NO** Replace the printer cable.

**YES** Go to page 2-1400-13.

**2-1400-12**



Go to the 3-1400 pages in the PC, PC XT, or PC AT *Hardware Maintenance and Service* manual to service the IBM Matrix or IBM Graphics printers.

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# Liquid Crystal Display (LCD)

Use this PIC when you are not able to complete the POST, when you have a 50XX error message, or when you suspect a LCD failure.

1. Press the system unit power switch off.
2. Set any power switches on all external options or devices off.
3. Disconnect external power from the system unit and all external options and devices.
4. Disconnect all external options from the I/O connector on the rear of the system unit.
5. Disconnect the battery pack.
6. Reconnect the battery pack.
7. Reconnect all external options removed in step 4.
8. Ensure that all external cables and connectors are secure and in the correct location.
9. Remove all diskettes from the drives.
10. Reconnect external power to the system unit and all external options and devices.
11. Set the power switch on all external options or devices on.
12. Slide the LCD contrast control all the way to your right.
13. Go to page 2-5000-2.

14. Press the system unit power switch on.

**Note:** The system should beep once when the power switch is pressed.

15. Listen for the audio responses during the POST.

---

**DID THE POST COMPLETE WITH ONE LONG AND TWO SHORT BEEPS? (DO NOT COUNT THE BEEP WHEN THE POWER SWITCH WAS PRESSED.)**

---

**NO** Go to page 2-5000-3.

**YES** Go to page 2-5000-36.

---

**DID THE LCD BECOME DARK (COMPLETELY OR PARTIALLY) SHORTLY AFTER THE SYSTEM UNIT WAS POWERED ON?**

---

**NO** Ensure that the LCD is securely connected to the system unit.

If the LCD is not securely connected, press the system unit power switch off, reseal the LCD, and go to page 2-5000-1.

If the LCD is securely connected, go to page 2-5000-32.

**YES** Go to page 2-5000-4.

---

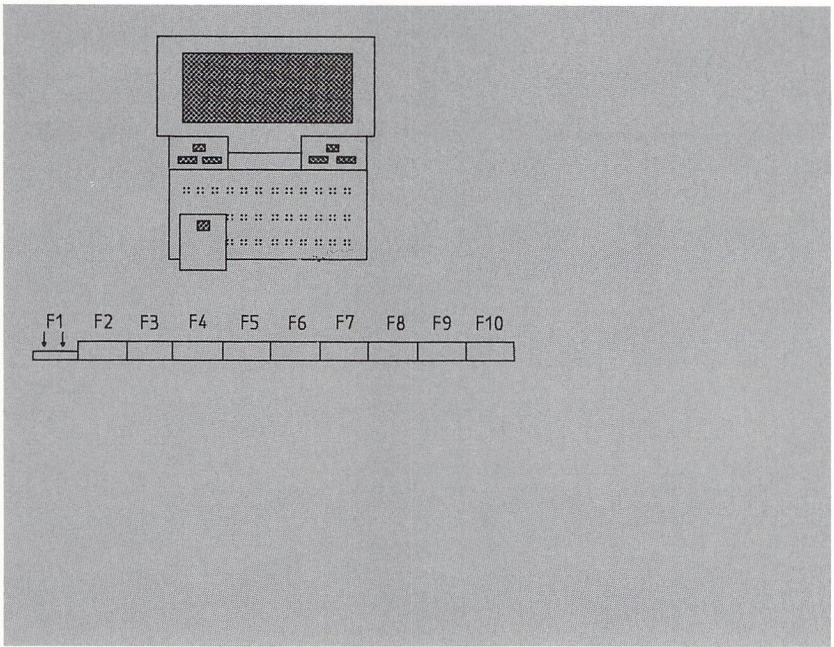
**DID A POST 50XX ERROR OCCUR?**

---

**NO** Go to page 2-5000-5.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**2-5000-4**



**DID THE INSERT DISKETTE A AND THE F1 PROMPT  
ICONS DISPLAY ON THE LCD AND ARE THEY  
READABLE?**

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-6.

---

**ARE THERE ANY MISSING ROWS OR COLUMNS OF  
DOTS?**

---

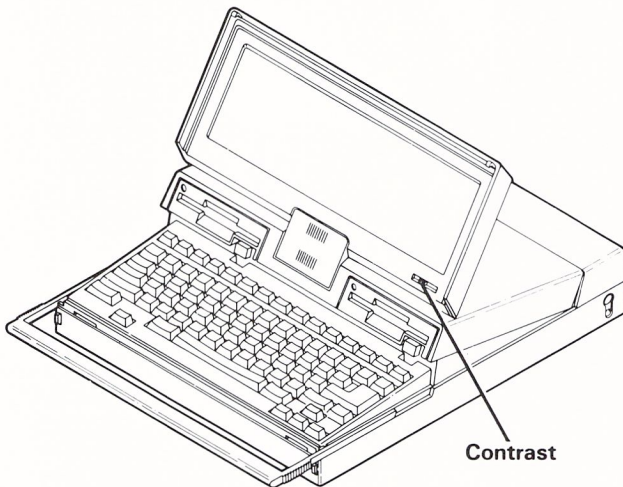
**NO** Go to page 2-5000-7.

**YES** Go to page 2-5000-37.

**2-5000-6**



1. Move the contrast control all the way to your left. Your display should get lighter.
  2. Move the contrast control all the way to your right. Your display should get darker.
  3. Move the contrast control to your left until the contrast is comfortable.
- 



### ARE YOU ABLE TO ADJUST THE CONTRAST?

---

**NO** Replace the LCD. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-5000-8.

Observe the LCD screen for any obvious problem such as distortion, flickering, instability, and so on.

---

**DID YOU OBSERVE ANY OBVIOUS PROBLEMS ON  
THE LCD SCREEN?**

---

**NO** Go to page 2-5000-9.

**YES** Go to page 2-5000-37.

**2-5000-8**

1. Insert the Advanced Diagnostic diskette into drive A.
  2. Press the F1 key.
- 

The IBM PC CONVERTIBLE  
ADVANCED DIAGNOSTICS  
Version X.XX  
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SELECT AN OPTION  
0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
4 - SET SYSTEM PROFILE  
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED  
? \_

LCD

**DID THE ADVANCED DIAGNOSTICS MENU DISPLAY  
ON THE LCD AND IS IT READABLE?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-10.

Your display may function correctly, but the cursor may be missing or not in its correct position, as shown in the menu.

---

```
The IBM PC CONVERTIBLE
ADVANCED DIAGNOSTICS
Version X.XX
(C)Copyright IBM Corp 1986
```

```
SELECT AN OPTION
0 - RUN DIAGNOSTIC ROUTINES
1 - FORMAT DISKETTE
2 - COPY DISKETTE
4 - SET SYSTEM PROFILE
9 - EXIT TO SYSTEM DISKETTE
```

```
ENTER THE ACTION DESIRED
? _
```

---

**IS THE CURSOR VISIBLE AND IN THE CORRECT POSITION ON YOUR DISPLAY?**

---

**NO** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

**YES** Go to page 2-5000-11.

**2-5000-10**

1. Choose **0 (RUN DIAGNOSTIC ROUTINES:)** and then press Enter.
  2. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
  3. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
  4. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
  5. Choose **50 (LIQUID CRYSTAL DISPLAY)** and then press Enter.
  6. If the CRT display adapter is installed, the following message displays.
- 

TESTING - LIQUID CRYSTAL DISPLAY

A CRT DISPLAY ADAPTER IS  
INSTALLED. THE LIQUID CRYSTAL  
DISPLAY WILL BE TESTED IN MONOCHROME  
MODE ONLY

PRESS ENTER TO CONTINUE

---

**DID THE ABOVE MESSAGE DISPLAY?**

---

**NO** Go to page 2-5000-13.

**YES** Go to page 2-5000-12.

The LCD will be tested in monochrome mode only. If you want to test the LCD in graphics mode, you must press the system unit power switch off, disconnect the CRT display adapter from your system unit, and run the POST and the LCD test again.

1. Press Enter to continue.
  2. Choose **10 (RUN ALL ABOVE TESTS)** and then press Enter.
- 

TESTING - LIQUID CRYSTAL DISPLAY

LIQUID CRYSTAL DISPLAY TEST  
- MONOCHROME MODE

- 0 - DISPLAY ADAPTER TEST
- 1 - PEL/DRIVER TEST
- 2 - DISPLAY ATTRIBUTES
- 3 - CHARACTER SET
- 4 - 80 X 25 DISPLAY
- 9 - EXIT FROM TEST
- 10 - RUN ALL ABOVE TESTS

ENTER THE ACTION DESIRED  
? \_

## DID A 50XX ERROR OCCUR?

---

**NO** Go to page 2-5000-14.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

The LCD will be tested in both monochrome mode and graphics mode.

1. Choose **10 (RUN ALL ABOVE TESTS)** and then press Enter.
  2. Press Enter to continue.
- 

```
TESTING - LIQUID CRYSTAL DISPLAY

LIQUID CRYSTAL DISPLAY TEST SELECTION

1 - TEST IN MONOCHROME MODE
2 - TEST IN GRAPHICS MODE
9 - EXIT TO CONTROL PROGRAM
10 - RUN ALL ABOVE TESTS

ENTER THE ACTION DESIRED
? _
```

LCD

### **DID A 50XX ERROR OCCUR?**

---

**NO** Go to page 2-5000-14.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

Your display should be all black.

---

**IS YOUR DISPLAY ALL BLACK?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-15.

**2-5000-14**



Choose **Y** and then press Enter.

Your display should change to all blank.

---

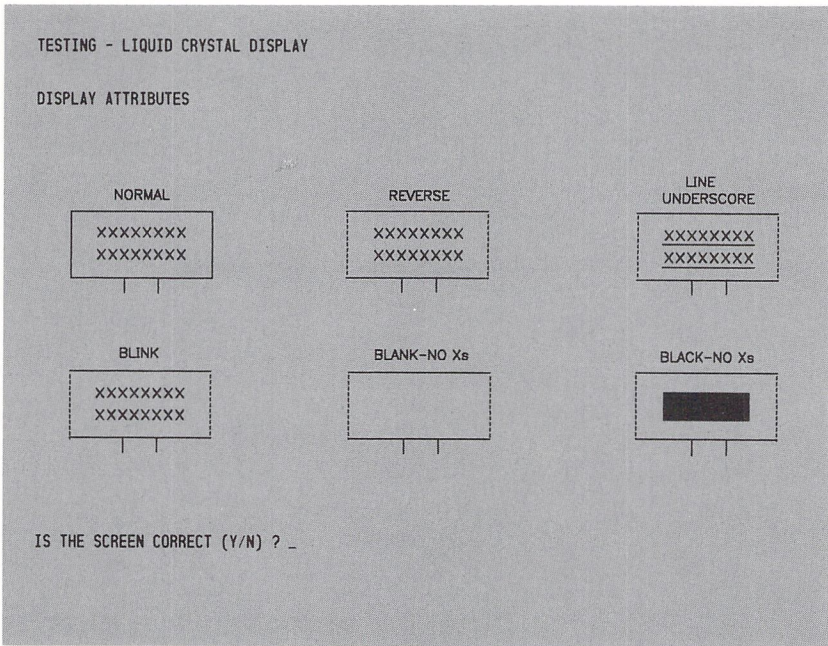
**IS YOUR DISPLAY ALL BLANK?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-16.

1. Choose **Y** and then press Enter.
  2. Ensure that the attributes for each figure on your display match the description above that figure.
- 



**DOES EACH FIGURE ON YOUR DISPLAY MATCH THE DESCRIPTION?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-17.







Choose **Y** and then press Enter.

The liquid crystal display - monochrome mode tests have completed without an error.

If the CRT display adapter is not installed, continue testing on page 2-5000-21.

If the CRT display adapter is installed and you want to test the LCD in graphics mode, you must press the system unit power switch off, disconnect the CRT display adapter from your system unit, and run the POST and the LCD test again.

If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

Press Enter to continue.

---

TESTING - LIQUID CRYSTAL DISPLAY

THE FOLLOWING SCREENS TEST  
THE LIQUID CRYSTAL DISPLAY  
IN GRAPHICS MODE

PRESS ENTER TO CONTINUE

LCD

### DID A 50XX ERROR OCCUR?

---

**NO** Go to page 2-5000-22.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

Your display should be all black.

---

**IS YOUR DISPLAY ALL BLACK?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-23.

**2-5000-22**



Choose **Y** and then press Enter.

Your display should change to all blank.

---

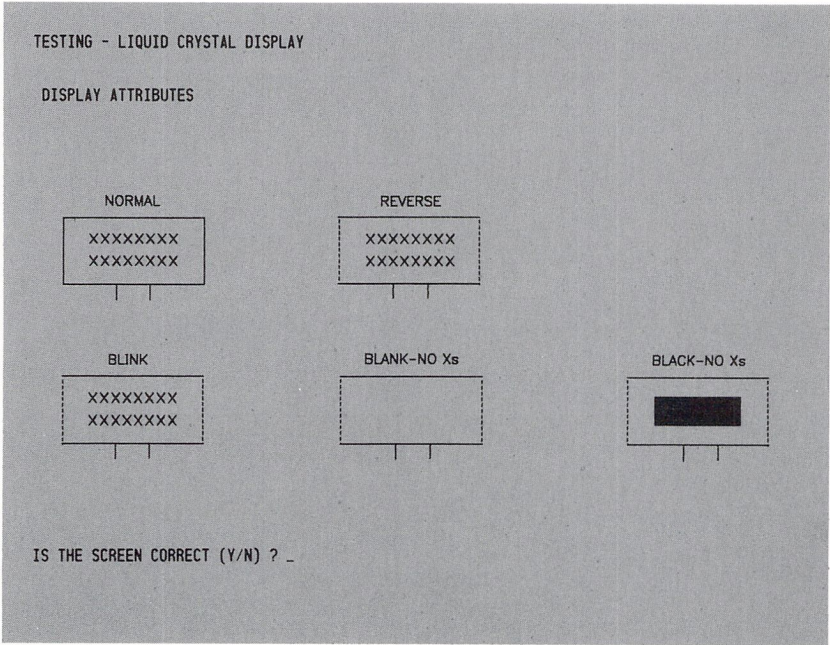
**IS YOUR DISPLAY ALL BLANK?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-24.

1. Choose Y and then press Enter.
  2. Ensure that the attributes for each figure on your display match the description above that figure.
- 



**DOES EACH FIGURE ON YOUR DISPLAY MATCH THE DESCRIPTION?**

---

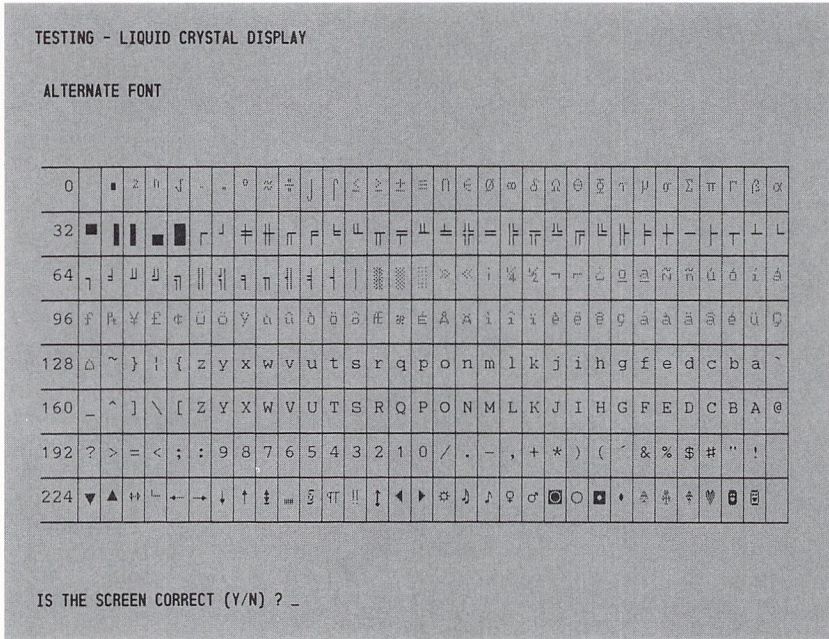
**NO** Go to page 2-5000-37

**YES** Go to page 2-5000-25.



Choose Y and then press Enter.

2. Ensure that the characters on your display match the characters shown in the example below.

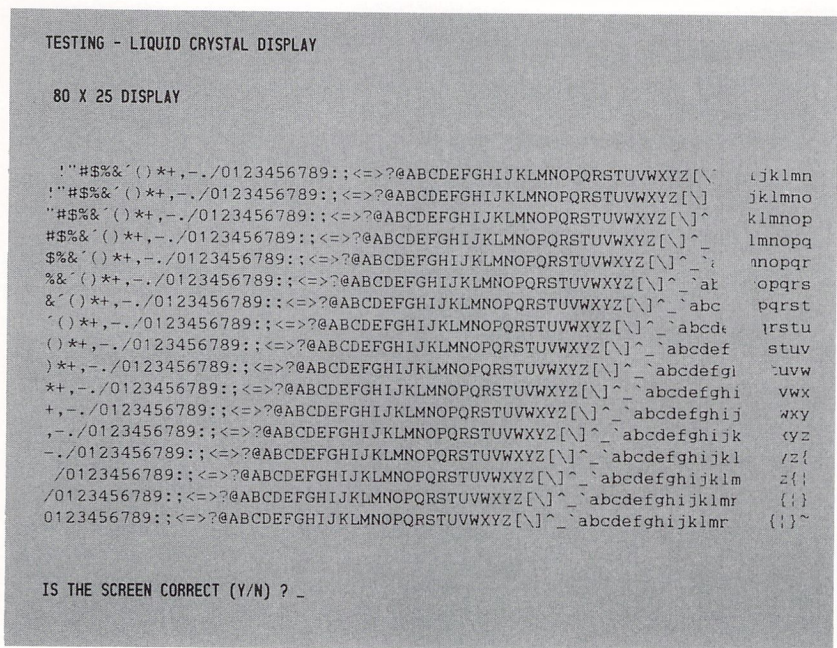


**DO THE CHARACTERS ON YOUR DISPLAY MATCH THE CHARACTERS IN THE EXAMPLE?**

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-27.

1. Choose Y and then press Enter.
2. Ensure that the characters on your display match the characters shown in the example below.



LCD

**DO THE CHARACTERS ON YOUR DISPLAY MATCH THE CHARACTERS IN THE EXAMPLE?**

- NO Go to page 2-5000-37.
- YES Go to page 2-5000-28.

1. Choose **Y** and then press Enter.
2. Ensure that the characters on your display match the characters shown in the example below.

---

TESTING - LIQUID CRYSTAL DISPLAY

40X25 DISPLAY

```
!"#$%&^()*+,-./0123456789:;<=> DEF
!"#$%&^()*+,-./0123456789:;<=> EFG
!"#$%&^()*+,-./0123456789:;<=>?@ FGH
!"#$%&^()*+,-./0123456789:;<=>?@I GHI
!"#$%&^()*+,-./0123456789:;<=>?@AB HIJ
!"#$%&^()*+,-./0123456789:;<=>?@ABC IJK
!"#$%&^()*+,-./0123456789:;<=>?@ABCD JK
!"#$%&^()*+,-./0123456789:;<=>?@ABCDE LM
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF MN
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEFG NO
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHI
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJ
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJK
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKL
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLM
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMN
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO P
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO Q
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO R
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO S
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO T
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO U
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO V
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO W
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO X
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO Y
!"#$%&^()*+,-./0123456789:;<=>?@ABCDEF GHIJKLMNO Z
```

IS THE SCREEN CORRECT (Y/N) ?

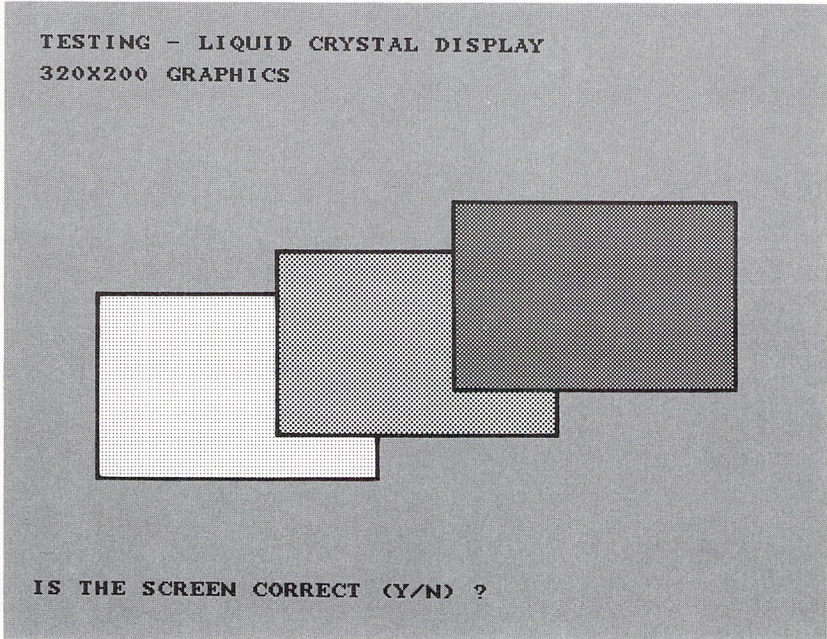
---

**DO THE CHARACTERS ON YOUR DISPLAY MATCH THE CHARACTERS IN THE EXAMPLE?**

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-29.

1. Choose **Y** and then press Enter.
  2. Ensure that the graphics on your display match the example shown below.
- 



LCD

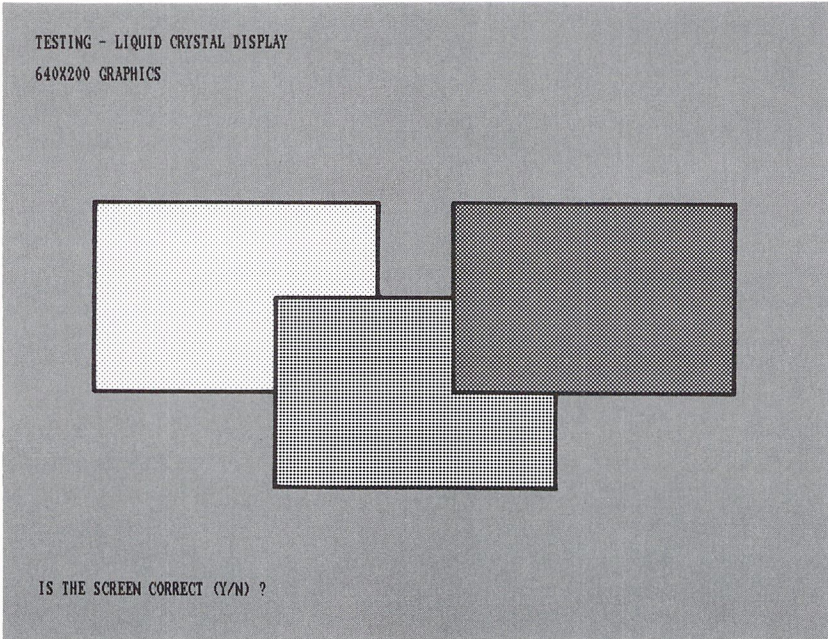
**DO THE GRAPHICS ON YOUR DISPLAY MATCH THE GRAPHICS IN THE EXAMPLE?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-30.

1. Choose **Y** and then press Enter.
  2. Ensure that the graphics on your display match the example shown below.
- 



**DO THE GRAPHICS ON YOUR DISPLAY MATCH THE GRAPHICS IN THE EXAMPLE?**

---

**NO** Go to page 2-5000-37.

**YES** Go to page 2-5000-31.



1. Choose **Y** and then press Enter.
  2. Follow the directions on your display.
  3. Look for anything wrong in the appearance or sequence of video pages 0 through 7.
- 

### **DO ALL EIGHT VIDEO PAGES DISPLAY CORRECTLY?**

---

**NO** Go to page 2-5000-37.

**YES** The POST and the LCD test have completed without an error.

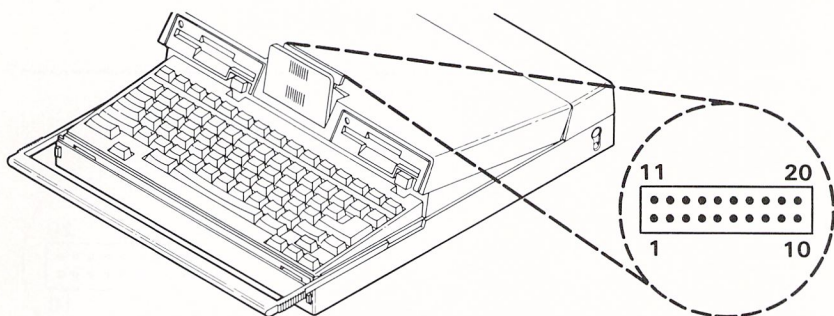
If you suspect an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

1. Press the system unit power switch off.
  2. Disconnect all power from the system unit.
  3. Remove the LCD. Refer to Section 3, "Service Information" on page 3-1.
  4. Reconnect power to the system unit.
- 

Go to page 2-5000-33.

1. Press the system unit power switch on.
2. Measure the voltages at the pins on the LCD connector, as shown in the table below.

**Note:** If the CRT display adapter is not installed, the voltage will only be present for a short period of time during the POST.



LCD

| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 11  | 12        | + 4.75       | + 5.25       |
| 16  | 12        | -11.86       | -13.94       |

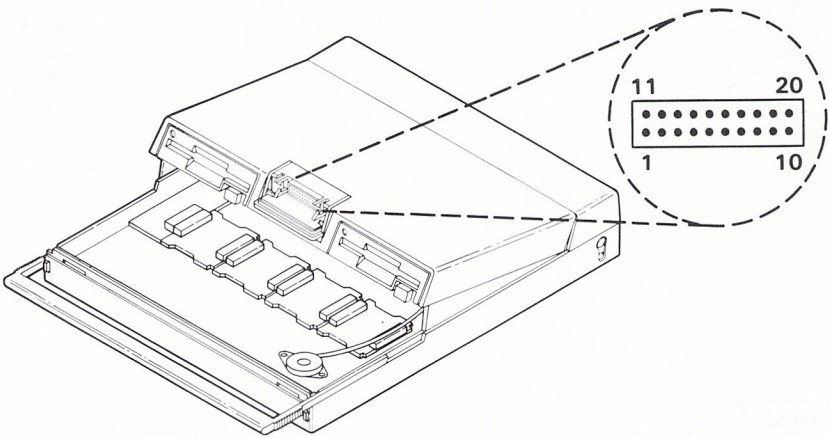
**ARE ALL THE VOLTAGES WITHIN THE LIMITS SHOWN IN THE TABLE?**

**NO** Go to page 2-5000-34.

**YES** Go to page 2-5000-37.

1. Press the system unit power switch off.
2. Disconnect all power from the system unit.
3. Disconnect the LCD connector from the system board. Refer to Section 3, "Service Information" on page 3-1.
4. Reconnect power to the system unit.
5. Press the system unit power switch on.
6. Measure the voltages at the pins on the system board/LCD connector, as shown in the table below.

**Note:** If the CRT display adapter is not installed, the voltage will only be present for a short period of time during the POST.



| PIN | PIN (gnd) | MIN volts dc | MAX volts dc |
|-----|-----------|--------------|--------------|
| 11  | 12        | + 4.75       | + 5.25       |
| 16  | 12        | - 11.86      | - 13.94      |

Go to page 2-5000-35.

---

**ARE ALL THE VOLTAGES WITHIN THE LIMITS  
SHOWN IN THE TABLE?**

---

**NO** Go to “Power” on page 2-020-1.

**YES** Ensure that the LCD connector pins on the system board and the LCD are not damaged or contaminated.

Replace the LCD yoke assembly. Refer to Section 3, “Service Information” on page 3-1.

1. If you do not have a CRT display adapter installed, go to page 2-5000-37.
  2. If you do have a CRT display adapter installed, press the system unit power switch off.
  3. Disconnect the CRT display adapter from the system unit.
  4. Press the system unit power switch on.
  5. Listen for the audio responses during the POST.
- 

**DID THE POST COMPLETE WITH ONE LONG AND TWO SHORT BEEPS? (DO NOT COUNT THE BEEP WHEN THE POWER SWITCH WAS PRESSED.)**

---

**NO** Reconnect the CRT display adapter to the system unit and go to "CRT Display Adapter" on page 2-500-1.

**YES** Go to page 2-5000-37.

1. Replace the LCD. Refer to Section 3, “Service Information” on page 3-1.

Run the POST and the LCD test. If the same failure occurs, reinstall the original LCD and continue with step 2.

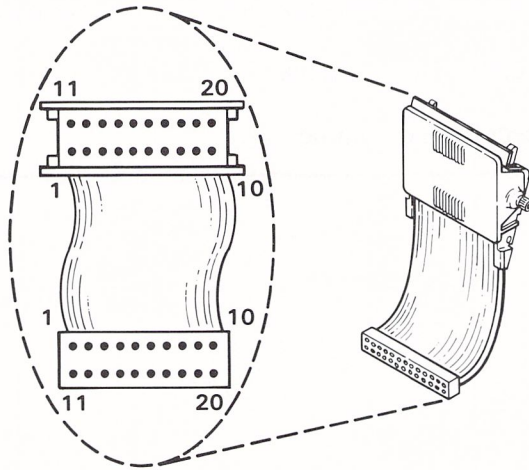
2. Press the system unit power switch off.
  3. Disconnect any external power from the system unit.
  4. Disconnect the battery pack.
  5. Disconnect the LCD cable.
- 

---

Go to page 2-5000-38.

Measure for continuity on all pins of the LCD cable, as shown in the table below.

---



| A | B |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |

| A  | B  |
|----|----|
| 8  | 8  |
| 9  | 9  |
| 10 | 10 |
| 11 | 11 |
| 12 | 12 |
| 13 | 13 |
| 14 | 14 |

| A  | B  |
|----|----|
| 15 | 15 |
| 16 | 16 |
| 17 | 17 |
| 18 | 18 |
| 19 | 19 |
| 20 | 20 |

---

Go to page 2-5000-39.



---

**IS THERE CONTINUITY BETWEEN THE PINS ON THE LCD CABLE?**

---

**NO** Replace the LCD yoke assembly. Refer to Section 3, “Service Information” on page 3-1.

**YES** Replace the system board. Refer to Section 3, “Service Information” on page 3-1.



# IBM PC Convertible Portable Printer

Use this PIC when you have a 51XX error message, when the portable printer is installed but missing from the installed devices list, or when you suspect an portable printer failure.

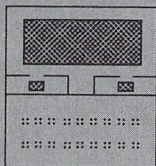
1. Press the system unit power switch off.
  2. Insert the Advanced Diagnostic diskette into drive A.
  3. Press the system unit power switch on and wait about 10 seconds.
  4. Press and hold the Ctrl, Fn, and Del keys.
  5. Release the keys.
- 

---

Go to page 2-5100-2.

---

XXX Kb OK



5101

## DID A POST 5101 ERROR OCCUR?

---

**NO** Go to page 2-5100-3.

**YES** Replace the system board. Refer to Section 3, "Service Information" on page 3-1.

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SELECT AN OPTION  
0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
4 - SET SYSTEM PROFILE  
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED  
? \_

---

**DID THE ADVANCED DIAGNOSTICS MENU DISPLAY?**

---

**NO** Go to "Start" on page 2-3.

**YES** Go to page 2-5100-4.

1. Insert paper in the printer.
  2. Move the On Line/Off Line switch to On Line.
  3. Choose **0 (RUN DIAGNOSTIC ROUTINES)** and then press Enter.
  4. Choose **Y (IS THE MEMORY SIZE CORRECT (Y/N) ?)** and then press Enter.
- 

THE INSTALLED DEVICES ARE

- 1 - SYSTEM BOARD
- 2 - 256KB MEMORY
- 3 - KEYBOARD
- 50 - LIQUID CRYSTAL DISPLAY
- 5 - CRT DISPLAY ADAPTER
- 6 - 2 DISKETTE DRIVE(S)
- 9 - SERIAL/PARALLEL ADAPTER
  - PARALLEL PORT
- 11 - INTERNAL MODEM
- 12 - SERIAL/PARALLEL ADAPTER
  - SERIAL PORT
- 51 - PORTABLE PRINTER
- 14 - MATRIX PRINTER

IS THE LIST CORRECT (Y/N) ? \_

---

**IS THE PORTABLE PRINTER LISTED ON THE  
INSTALLED DEVICES LIST?**

---

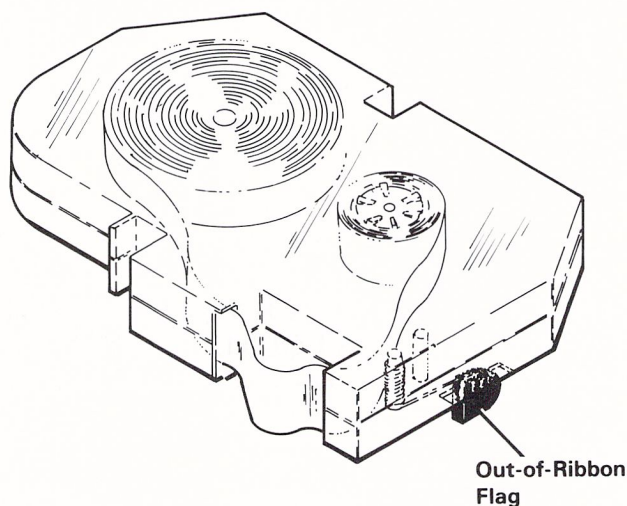
**NO** Go to page 2-5100-9.

**YES** Go to page 2-5100-5.

1. Choose **Y (IS THE LIST CORRECT (Y/N) ?)** and then press Enter.
2. Choose **0 (RUN TESTS ONE TIME)** and then press Enter.
3. Choose **51 (PORTABLE PRINTER)** and then press Enter.
4. Follow the directions on your display.

**Note:** If you are asked to check the out-of-ribbon flag on the ribbon cartridge, refer to the illustration below for the location.

---



Go to page 2-5100-6.

**Note:** If you suspect a print quality problem:

1. Check the ribbon and the paper. The print quality may be bad if the ribbon has been exposed to high temperatures.
  2. Replace the ribbon and run the portable printer test before you replace the printer.
- 

!"#\$%&'()\*+,-./  
0123456789:;<=>?  
@ABCDEFGHIJKLMNO  
PQRSTUVWXYZ[\]^\_  
`abcdefghijklmnop  
pqrstuvwxyz{|}~  
!"#\$%&'()\*+,-./  
áíóúñÑ@aö¿-~½¼;«»  
αβΓπΣσμτΦθΩδ∞φεη  
A<sup>B</sup>C<sup>D</sup>E<sup>F</sup>G<sup>H</sup>I<sup>J</sup>K<sup>L</sup>M<sup>N</sup>O<sup>U</sup>

**DOES THE PRINTOUT MATCH THE SAMPLE SHOWN ABOVE AND IS THE PRINT QUALITY GOOD?**

---

**NO** Go to page 2-5100-7.

**YES** The POST and the portable printer test completed without an error.

If you continue to have a problem, refer to Section 3, "Service Information" on page 3-1 and run the portable printer off line test. If a failure occurs, replace the portable printer.

If you suspect an intermittent problem, go to "Intermittent Problem" on page 2-010-1.



---

**DID A 51XX ERROR OCCUR?**

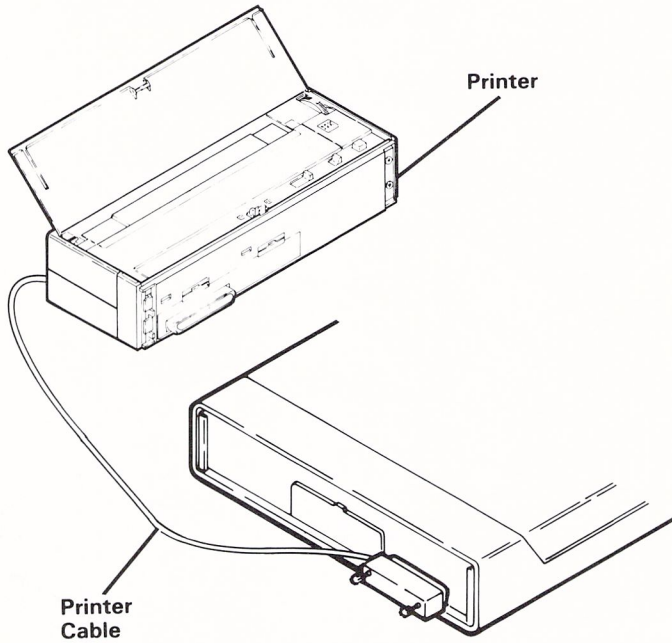
---

**NO** Go to page 2-5100-9.

**YES** Go to page 2-5100-8.

Find the error code in the following chart and perform the action indicated.

| <b>ERROR CODE</b> | <b>ACTION</b>  |
|-------------------|--|
| 5101              | Replace the system board. Refer to Section 3, "Service Information" on page 3-1.   |
| 5102              | Go to page 2-5100-9.   |
| 5103              | <p>If the On Line/Off Line switch is in the Off Line position, set it to the On Line position, then go to page 2-5100-4, and run the test again.</p> <p>If the paper is not installed properly or the out-of-ribbon flag on the ribbon cartridge is down, correct the problem, then go to page 2-5100-4, and run the test again.</p> <p>If the On Line/Off Line switch is in the On Line position and if the paper is installed properly and the ribbon cartridge is not out of ribbon, go to page 2-5100-9.</p> |
| 5104<br>5105      | Go to page 2-5100-9.   |

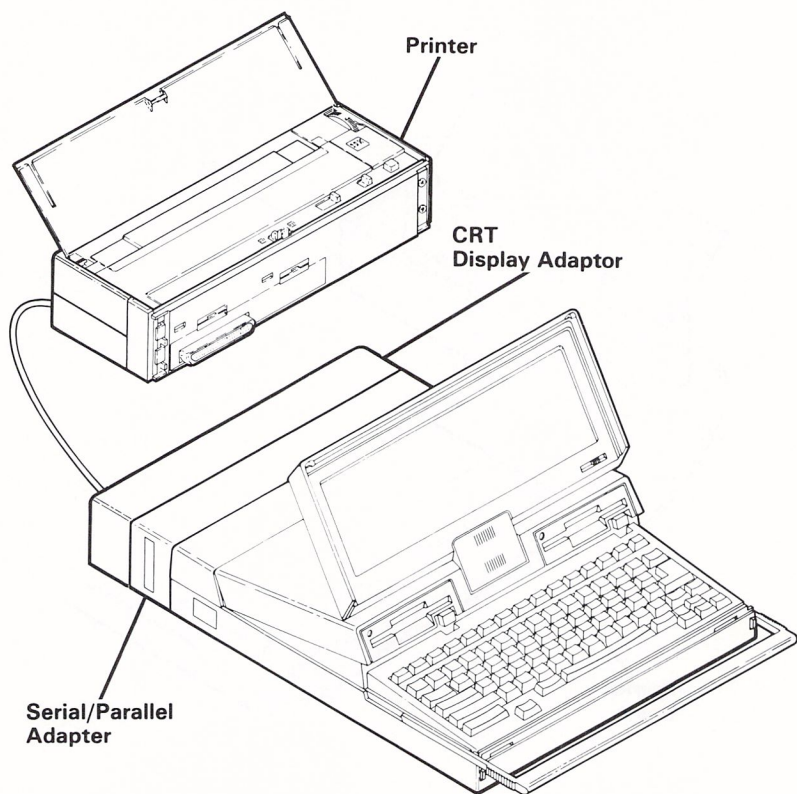


**IS THE PORTABLE PRINTER CABLE ATTACHED?**

---

**NO** Go to page 2-5100-14.

**YES** Go to page 2-5100-10.



**ARE ANY EXTERNAL OPTIONS INSTALLED BETWEEN THE SYSTEM UNIT AND THE PORTABLE PRINTER CABLE?**

---

**NO** Go to page 2-5100-13.

**YES** Go to page 2-5100-11.

1. Press the system unit power switch off.
2. Disconnect all external options (except the portable printer cable) that are installed between the system unit and the portable printer.

**Note:** If you do not have an LCD attached, leave the CRT display adapter and display attached to the system unit.

3. Connect the portable printer cable to the system unit or the CRT display adapter, if installed.
  4. Press the system unit power switch on and wait about 10 seconds.
  5. Press and hold the Ctrl, Fn, and Del keys.
  6. Release the keys.
  7. Load and run the Advanced Diagnostics.
- 

---

Go to page 2-5100-12.

---

## DID THE SAME FAILURE OCCUR?

---

**NO** Reinstall each of the external options into its original location (between the system unit and the portable printer cable). Run the POST and the Advanced Diagnostics after installing each option.

If the same failure occurs:

- Inspect the last option installed for damaged or contaminated I/O connector pins.
- Replace the last option installed.

If you have an intermittent problem, go to “Intermittent Problem” on page 2-010-1.

**YES** Go to page 2-5100-13.

1. Press the system unit power switch off.
  2. Disconnect the portable printer cable from the printer and from the system unit.
  3. Connect the portable printer to the rear of the system unit.
  4. Press the system unit power switch on and wait about 10 seconds.
  5. Press and hold the Ctrl, Fn, and Del keys.
  6. Release the keys.
  7. Load and run the Advanced Diagnostics.
- 

#### **DID THE SAME FAILURE OCCUR?**

---

**NO** Replace the portable printer cable.

**YES** Go to page 2-5100-14.

**Note:** If the portable printer was not listed on the installed devices list, go to page 2-5100-18.

---

**DID THE PORTABLE PRINTER PRINT ANYTHING?**

---

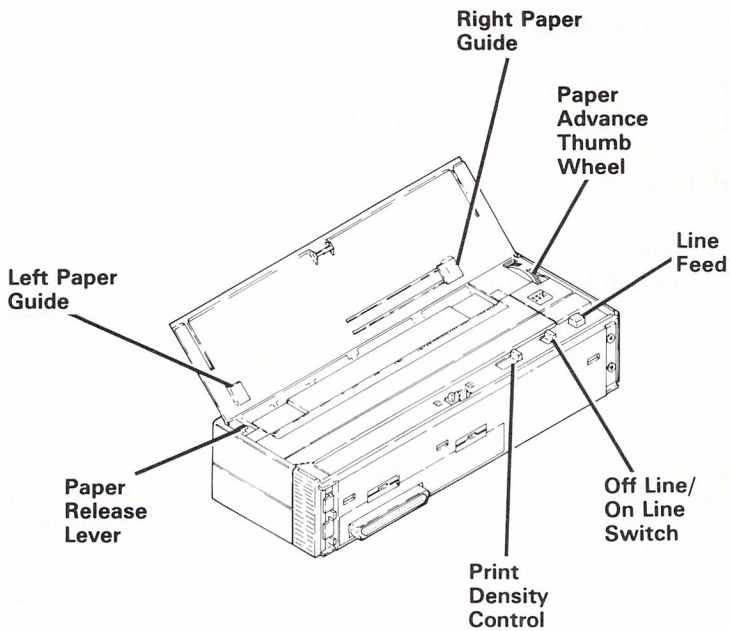
**NO** Go to page 2-5100-18.

**YES** Go to page 2-5100-15.

**2-5100-14**







Find the failing symptom in the following chart and follow the instructions in the Action column.

| FAILING SYMPTOM   | ACTION  |
|---|---|
| Print Quality   | Check the paper and ribbon.<br>Refer to <i>Guide to Operations</i> .<br><br>Replace the portable printer.<br>Refer to Section 3, "Service Information" on page 3-1. |
| Print Dots (Missing, extra, or random)<br><br>No Printing or Missing Lines<br><br>Erratic Carriage Motion | Replace the portable printer.<br>Refer to Section 3, "Service Information" on page 3-1.   |

| FAILING SYMPTOM  | ACTION  |
|--|---|
| Light or Dark Printing   | Adjust the print density.   |
| <p>Forms Feeding<br/>(Jams or Erratic)</p> <p>Forms Feeding (None)</p> | <p>Ensure that the paper release lever is set toward the rear of the printer.</p> <p>Ensure that the printer access cover is down.</p> <p>Check the paper alignment guide.</p> <p>Check for obstructions in the paper path.</p> <p>Replace the portable printer. Refer to Section 3, "Service Information" on page 3-1.</p> |
| Ribbon Not Feeding   | <p>Replace the ribbon cartridge.</p> <p>Replace the portable printer. Refer to Section 3, "Service Information" on page 3-1.</p>  |

1. Move the On Line/Off Line switch to Off Line.
  2. Press the Line Feed button on the printer.
- 

**DID THE PAPER ADVANCE IN THE PRINTER?**

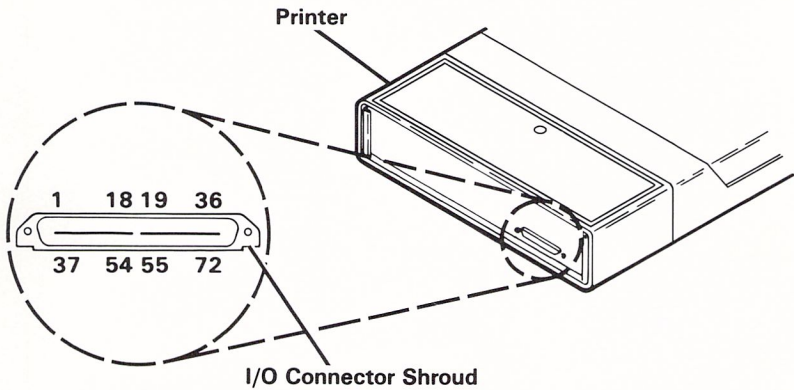
---

**NO** Go to page 2-5100-19.

**YES** Go to page 2-5100-15.

1. Loop the POST. Refer to page 2-010-5.
2. Measure the voltages at the pins on the I/O connector on the portable printer, as shown in the table below. Use the shroud on the I/O connector for ground (gnd).

**Note:** The voltage on pin 34 pulses one time each time that you run the POST.



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 34  | +4.85        | + 5.25       |
| 30  | +8.0         | +16.0        |

Go to page 2-5100-20.

---

**ARE ALL THE VOLTAGES WITHIN THE LIMITS  
SHOWN IN THE TABLE?**

---

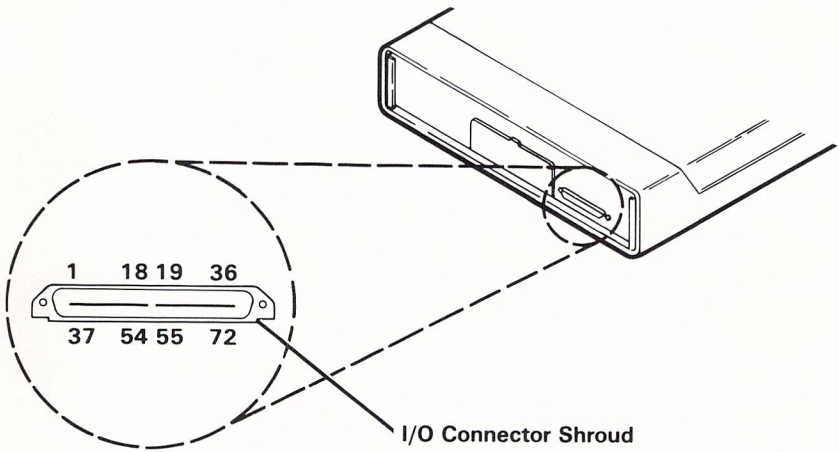
**NO** Go to page 2-5100-21.

**YES** Inspect the connectors for damaged pins.

Replace the portable printer. Refer to Section 3, "Service Information" on page 3-1.

Run the POST and the Advanced Diagnostics. If the same failure occurs, reinstall the original portable printer and replace the system board. Refer to Section 3, "Service Information" on page 3-1.

1. Press the system unit power switch off.
  2. Disconnect the portable printer from the system unit.
  3. Press the system unit power switch on.
  4. Measure the voltage at the I/O connector pin on the system unit. Use the shroud on the I/O connector for ground (gnd).
- 



| PIN | MIN volts dc | MAX volts dc |
|-----|--------------|--------------|
| 30  | +8.0         | +16.0        |

**IS THE VOLTAGE WITHIN THE LIMITS SHOWN IN THE TABLE?**

---

**NO** Go to “Power” on page 2-020-1.

**YES** Replace the system board. Refer to Section 3, “Service Information” on page 3-1.





# Section 3. Service Information

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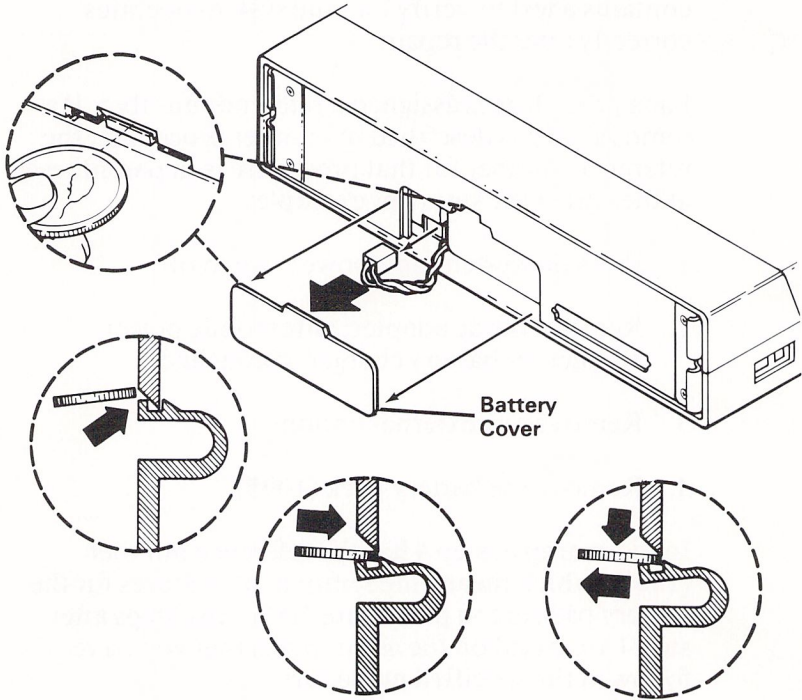
This section provides removal and replacement procedures for assemblies, subassemblies, and individual parts of the system. Also, each procedure contains a test to verify that the system operates correctly after the repair.

Each procedure is assigned a reference number. If a removal step is described in another procedure, the reference number for that procedure is in parentheses at the end of the step. For example:

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (**1005**).

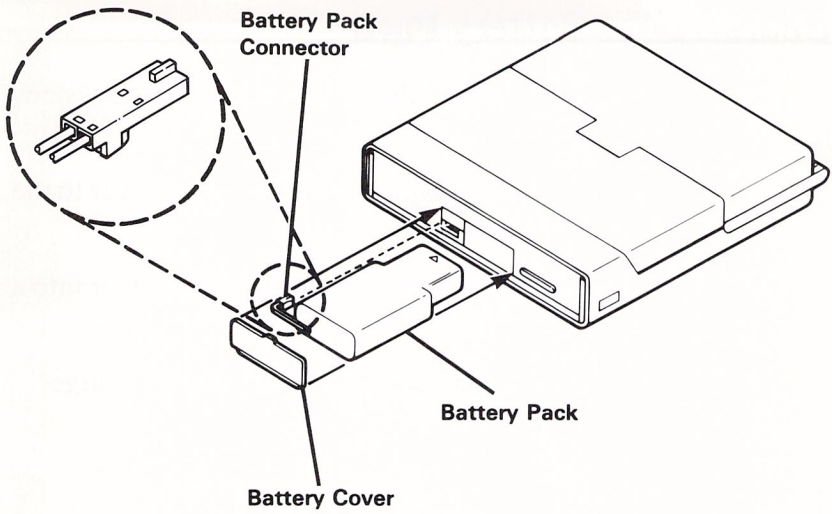
In the example, step 4 has the reference number (**1005**), which means the removal procedures for the battery pack are in procedure 1005. Any steps after step 4 are based on the assumption that you have followed the specified procedure.

# Battery Pack 1005



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Insert a coin into the slot on top of the battery cover, and press down to remove the battery cover.



5. Disconnect the battery pack connector by pressing the tab on the bottom of the connector and pulling it straight out.
6. Slide the battery pack out of the system unit.

**DANGER**  
**DISPOSE OF THE BATTERY PACK**  
**IN THE TRASH. DO NOT DISPOSE**  
**IN AN OPEN FIRE, BECAUSE THE**  
**BATTERY PACK MAY EXPLODE.**

To replace the battery pack, reverse the above steps.

## Charging the Battery Pack

1. If removed, install the battery pack into the system unit.
2. Connect the ac adapter or the battery charger to the system unit.
3. Connect the ac adapter or the battery charger into a functional electrical outlet.

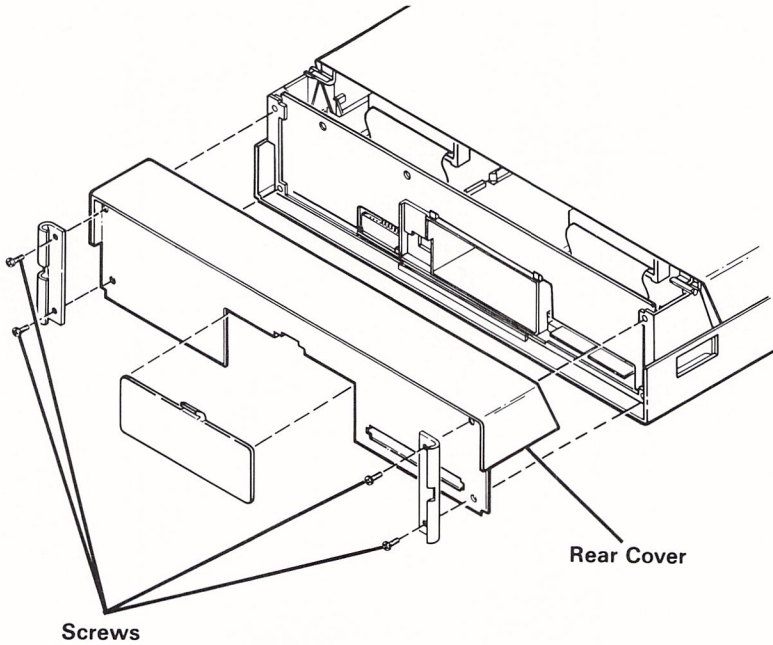
**Note:** It takes about 24 hours to fully charge the battery pack.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. If the ac adapter or automobile power adapter is attached, verify that the low-battery indicator does not display on the LCD after the battery has been charged.



# Covers 1010



## Removal and Replacement - Rear Cover 1011

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).



**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

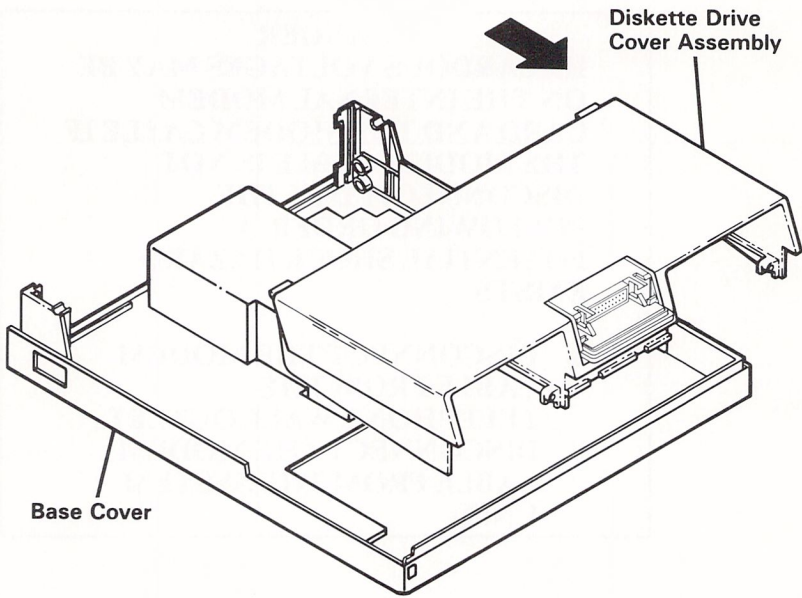
- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
- b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**

5. Remove the four rear cover screws.
6. Lift up and remove the rear cover.

To replace the rear cover, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for any external options that are attached.



## Removal and Replacement - Base Cover 1012

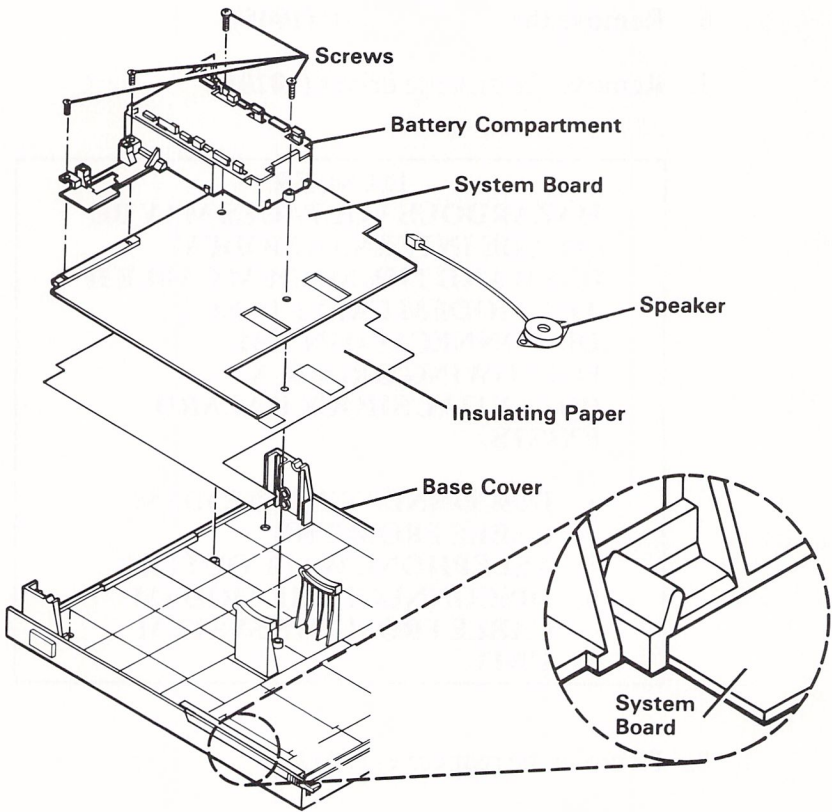
1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

6. Remove the memory cards (1045).
7. Remove the diskette drives (1020).

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
- b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**

8. Remove the rear cover (1011).
9. Remove the power supply card (1050).
10. Remove the LCD, if attached (1040).
11. Remove the diskette drive cover assembly (1013).
12. Remove the internal modem (1030).



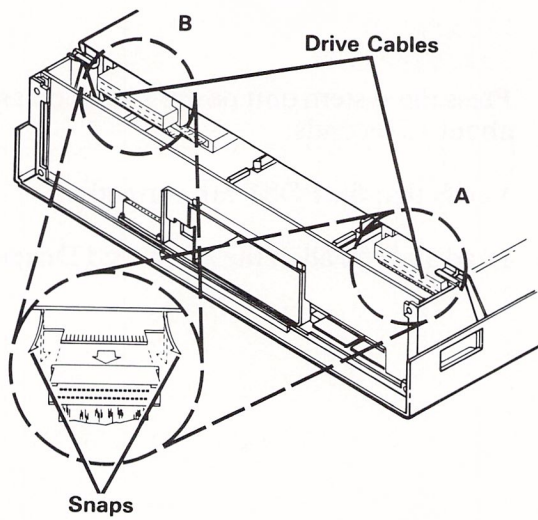
13. Remove the four system board mounting screws.
14. Remove the battery compartment.
15. Unplug the speaker leads from the system board.
16. Remove the speaker (**1055**).
17. Remove the system board (**1060**).

To replace the base cover, reverse the above steps.

**Note:** Ensure that the edge of the system board is under the tab on the handle bracket.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run all of the Advanced Diagnostics.



## Removal and Replacement - Diskette Drive Cover Assembly 1013

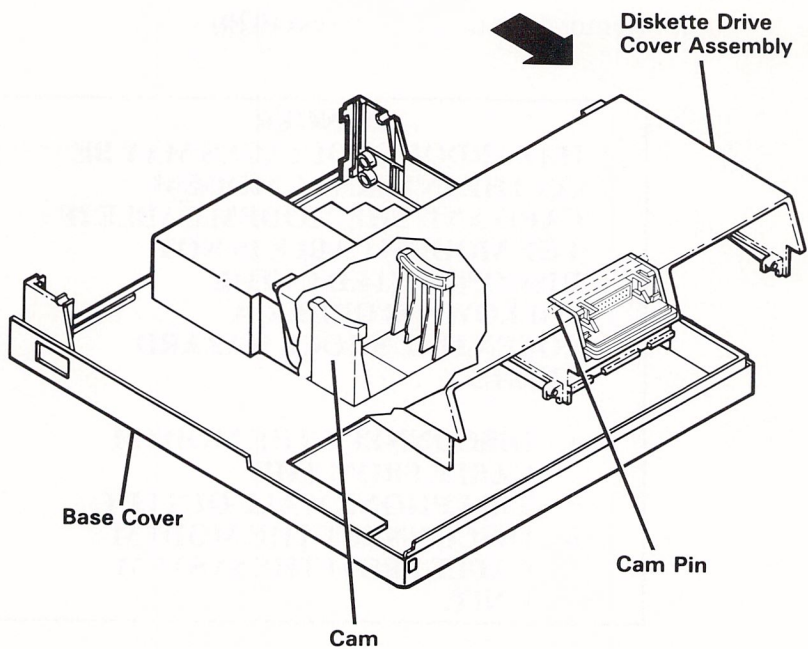
1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

6. Remove the diskette drives (1020).

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

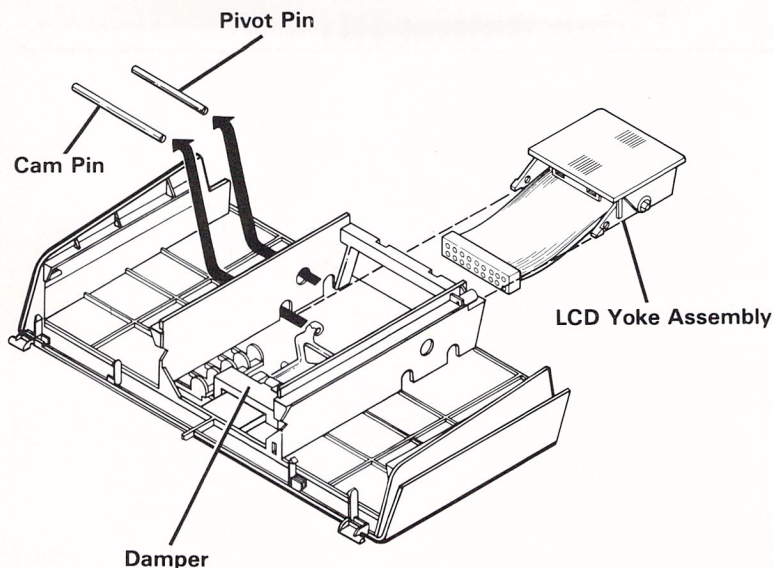
- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
- b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**

7. Remove the rear cover (1011).
8. Remove the power supply card (1050).
9. Gently press out on the four snaps and push down on the diskette drive cables to remove them.



10. Remove the LCD, if attached (1040).
11. Move the diskette drive cover assembly forward to disengage the cam pin.
12. Disconnect the LCD cable from the system board.
13. Lift the diskette drive cover assembly off the system base.





14. Push the cam pin out in the direction shown.
15. Push the pivot pin out in the direction shown.
16. Remove the LCD yoke assembly (1042).
17. Slide the damper assembly off the rubber pad.

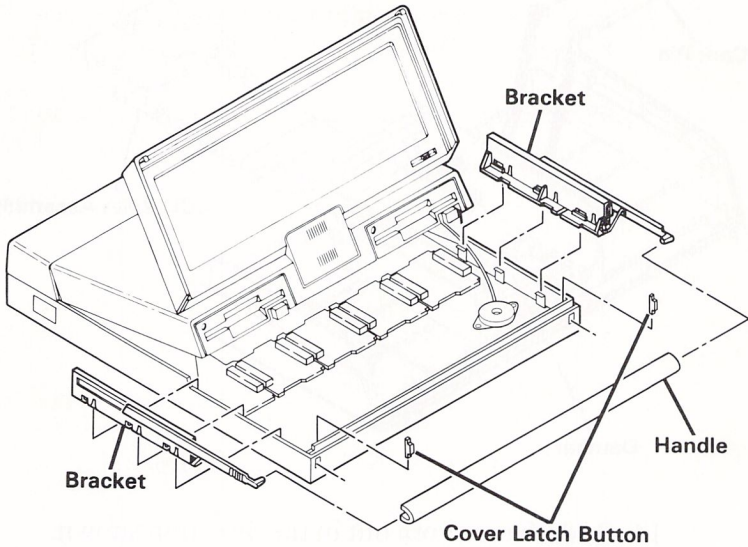
To replace the diskette drive cover assembly, reverse the above steps.

**Note:** Ensure the cam pin is centered in the LCD yoke assembly.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run all the Advanced Diagnostics.

# Cover Latch Button 1015



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (**1005**).
5. Remove the keyboard (**1035**).

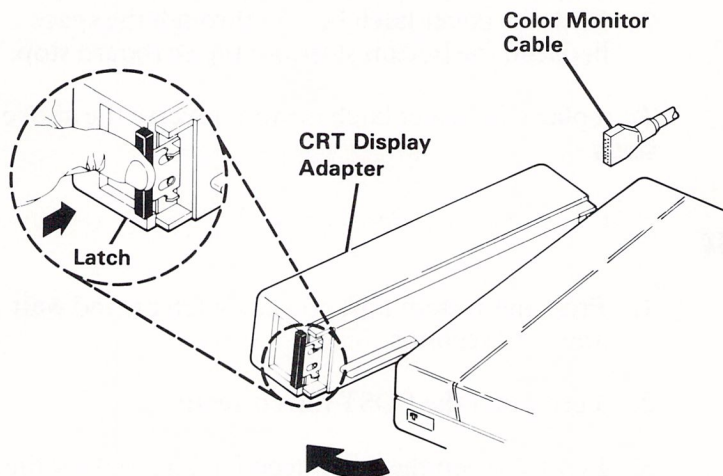
6. Remove the handle, bracket, and slide (do not separate the slide) **(1025)**.
7. Push the cover latch button through the space between the button stop and the keyboard stop.

To replace the cover latch button, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the keyboard.

# CRT Display Adapter 2010



## Removal and Replacement

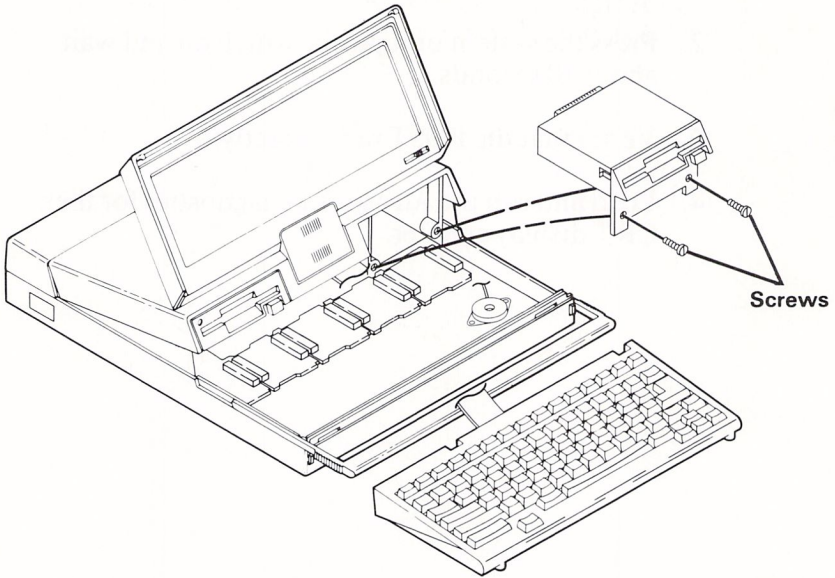
1. Press the system unit power switch to off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options attached behind the CRT display adapter.
4. Disconnect the monitor cable, if attached.
5. Push the latch on the CRT display adapter.
6. Disconnect the CRT display adapter from the system unit.

To replace the CRT display adapter, reverse the above steps.

# Test

1. Set the monitor power switch on.
2. Press the system unit power switch on and wait about 10 seconds.
3. Verify that the POST ran correctly.
4. Load and run the Advanced Diagnostics for the CRT display adapter.

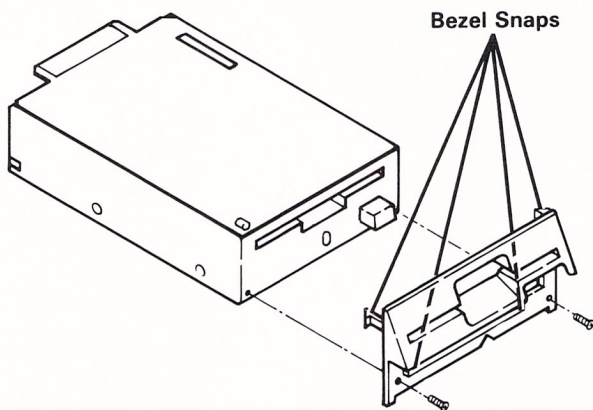
# Diskette Drives A and B 1020



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

6. Remove the two diskette drive mounting screws.
7. Slide the diskette drive out. The diskette drive will be tight until it becomes disconnected from the diskette drive cable.



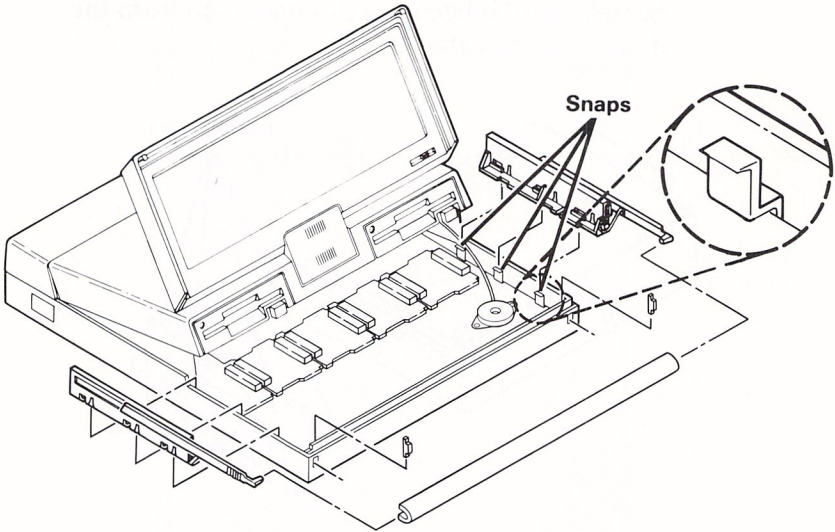
8. Gently press out the four snaps to release the bezel.
9. Remove the bezel.

To replace the diskette drive, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the diskette drives.

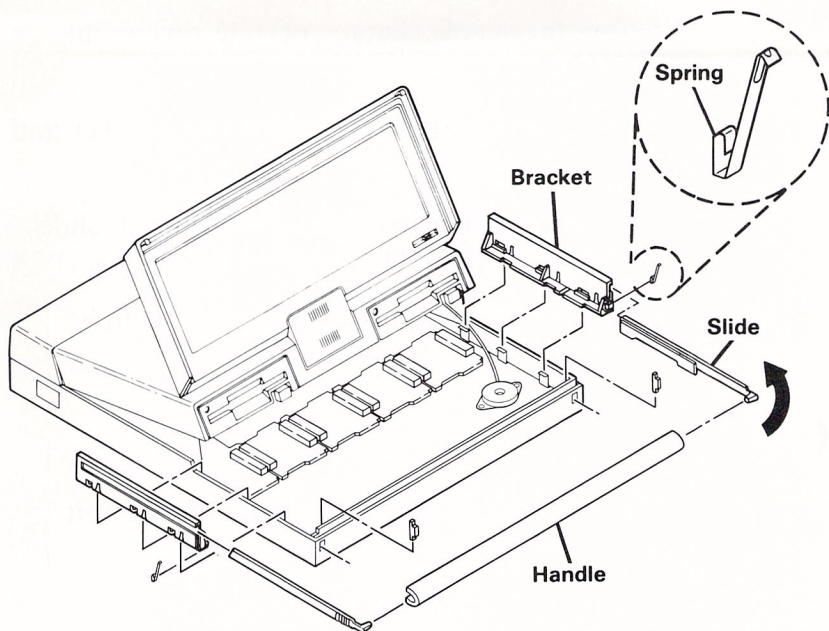
# Handle/Brackets/Slides 1025



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).
6. Press in on the three snaps on the bracket to be removed.





7. Lift and remove the bracket.
8. Separate the handle from the slide.
9. Remove the spring from the bracket.
10. Gently rotate and press down on the slide to separate the bracket and slide.

To replace the handle, bracket, or slide, reverse the above steps.

**Note:** When reassembling the handle, bracket, and slide:

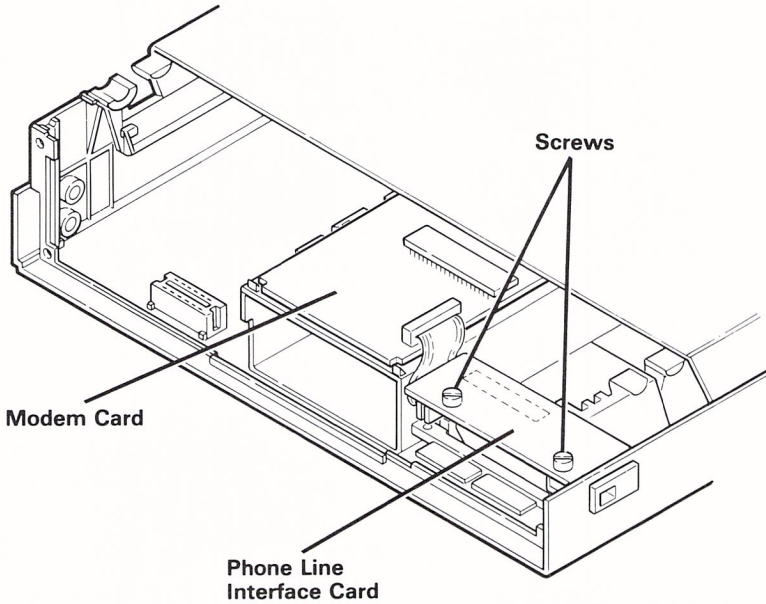
- Move the slide in far enough to clear the slide stop pin before pushing in the bracket.
- Place the handle between the slides before installing the second bracket.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the keyboard.



# Internal Modem 1030

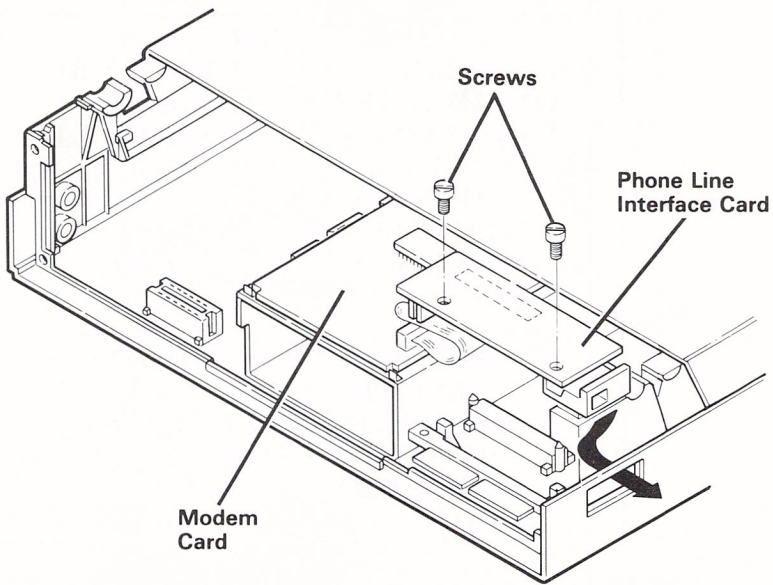


## Removal and Replacement

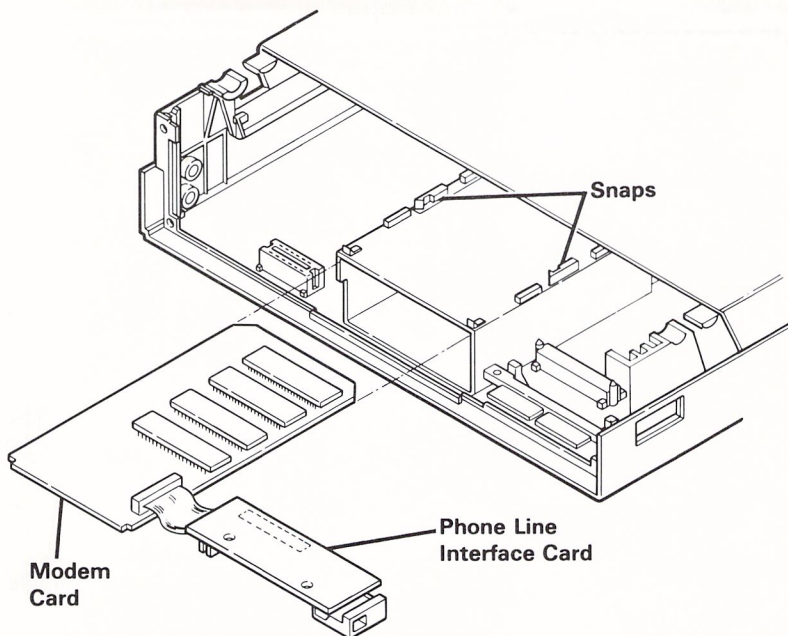
1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
  - b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**
6. Remove the rear cover (1011).
  7. Remove the power supply card (1050).
  8. Move the diskette drive cover assembly forward to disengage the cam pin.



9. Remove the two phone line interface card screws.
10. Lift up the phone line interface card to release it from the connector.
11. Slide the phone line interface card up and toward the modem card to release it from the cover.



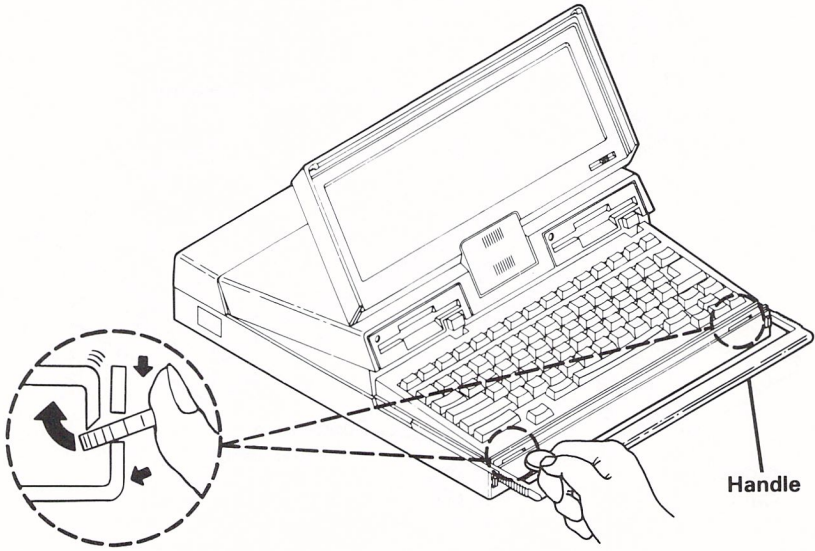
12. Press out on the two snaps to release the internal modem.
13. Slide the internal modem and phone line interface card out.

To replace the modem, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the internal modem.

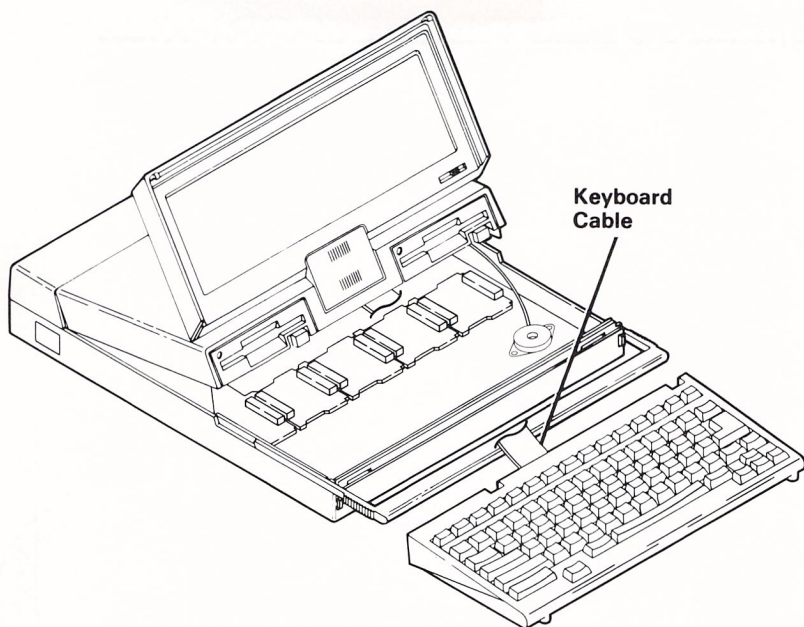
# Keyboard 1035



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Extend the handle.
6. Insert a coin in the slots and press down.





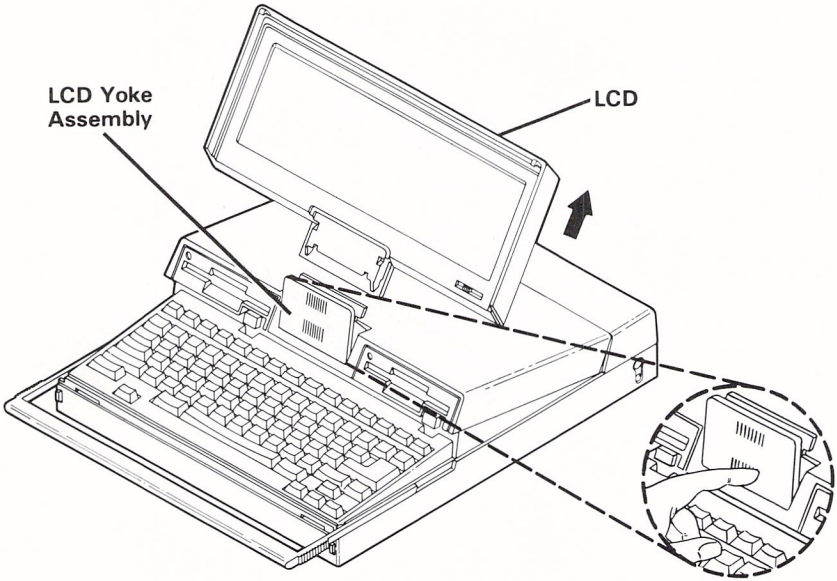
8. Gently lift up and remove the keyboard.
9. Disconnect the keyboard cable from the system board. Do not use the tabs to remove the keyboard cable connector.

To replace the keyboard, reverse the above steps.

## Test

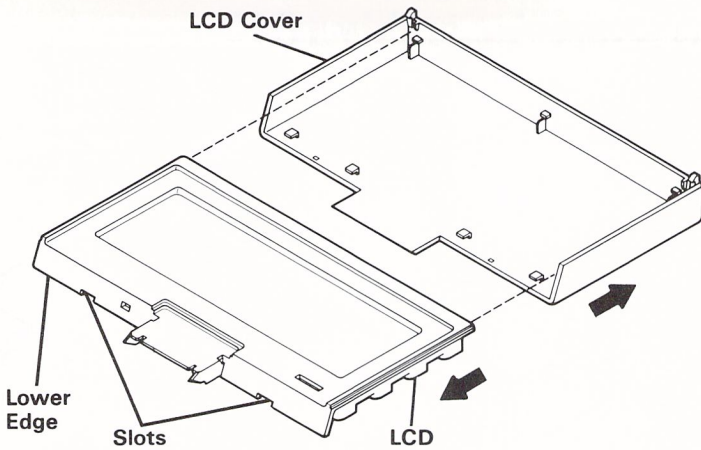
1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the keyboard.

# Liquid Crystal Display (LCD) 1040



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Press in on the bottom of the LCD yoke.
4. Remove the LCD.



5. Push screwdriver into slots to separate the lower edge of the LCD cover from the LCD.
6. Slide the LCD cover and LCD apart.

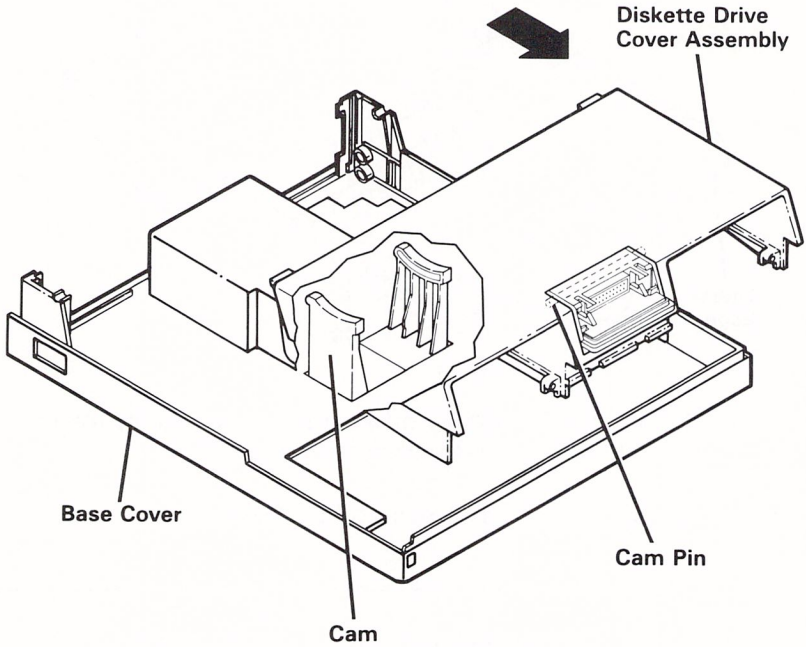
**DANGER**  
**DISPOSE OF THE LCD IN THE TRASH. IF THE LCD IS BROKEN, WEAR RUBBER GLOVES TO WIPE ANY LIQUID WITH A WET CLOTH. DISPOSE OF ANY BROKEN GLASS AND THE WET CLOTH IN THE TRASH. WASH THE GLOVES WITH SOAP AND WATER.**

To replace the LCD, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the LCD.

# LCD Yoke Assembly 1042



## Removal and Replacement

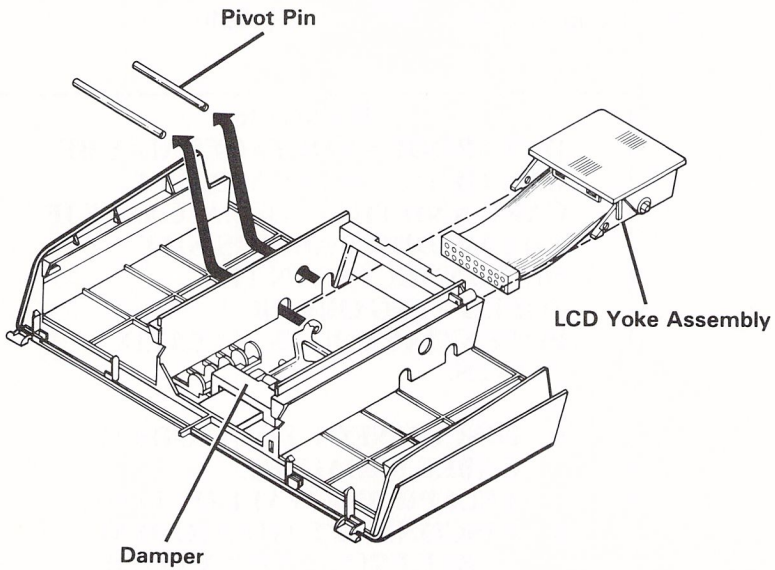
1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

6. Remove the diskette drives (1020).

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
- b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**

7. Remove the rear cover (1011).
8. Remove the LCD, if attached (1040).
9. Move the diskette drive cover assembly forward to disengage the cam pin.
10. Disconnect the LCD cable from the system board.
11. Remove the diskette drive cover assembly (1013).



12. Push the cam pin out in the direction shown.
13. Push the pivot pin out in the direction shown.
14. Remove the LCD yoke assembly.

To replace the LCD yoke assembly, reverse the above steps.

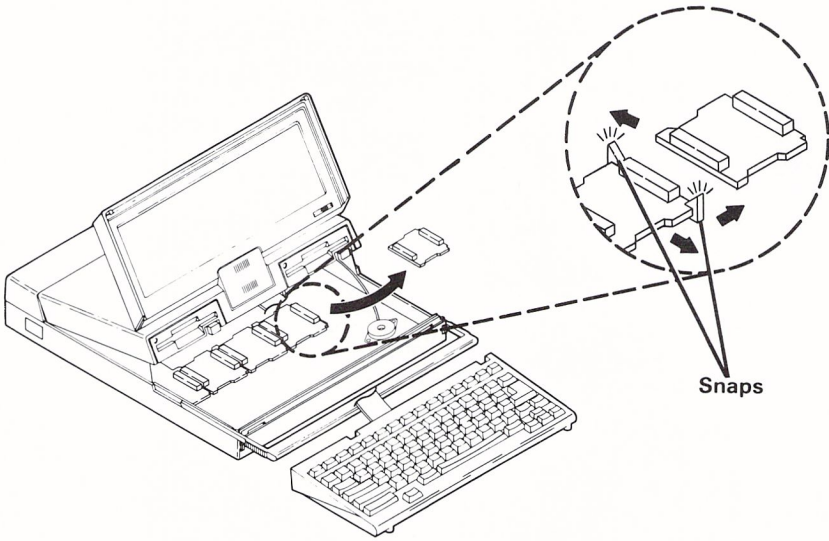
**Note:** Ensure the cam pin is centered when replacing the LCD yoke assembly.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run all the Advanced Diagnostics.



# Memory 1045



## Removal and Replacement

1. Press the system unit power switch to off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (**1005**).
5. Remove the keyboard (**1035**).



Perform the following steps for each memory card removed, starting with the one on your right.

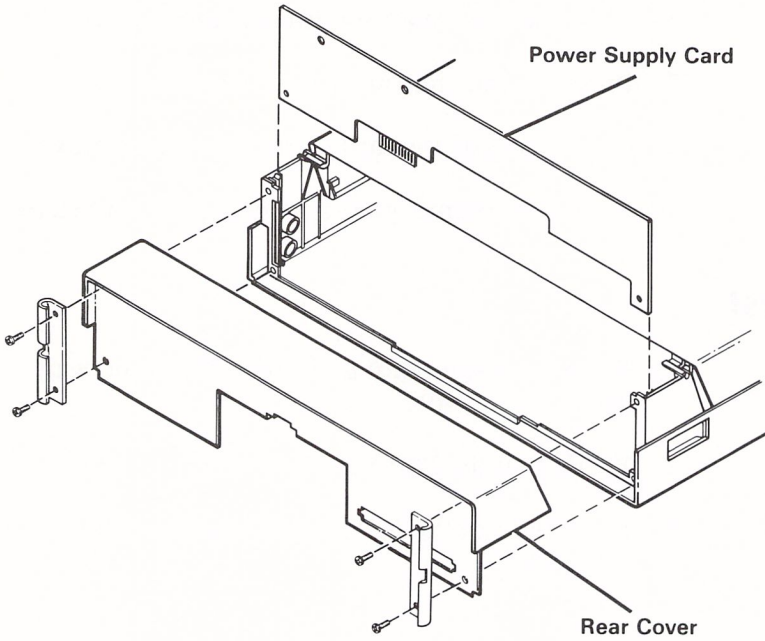
6. Press the front snap and lift the card slightly.
7. Press the rear snap and lift the card slightly.
8. Carefully slide the card to the right and remove.

To replace the memory card, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for memory.

# Power Supply Card 1050



## Removal and Replacement

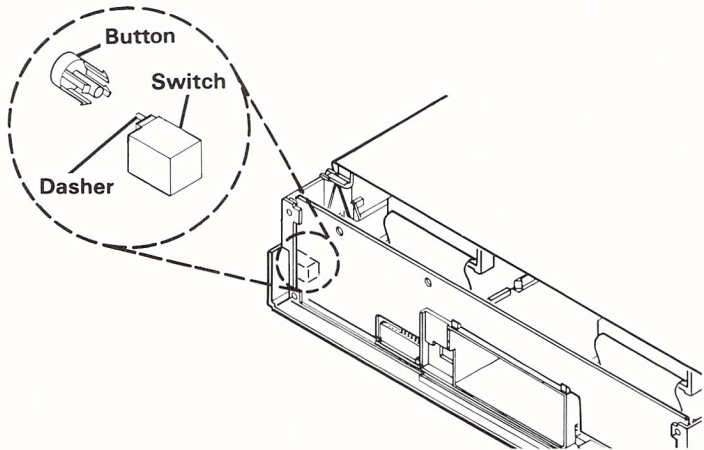
1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (**1005**).

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
- b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**

5. Remove the rear cover (1011).
6. Lift up and remove the power supply card.

To replace the power supply card, reverse the above steps.



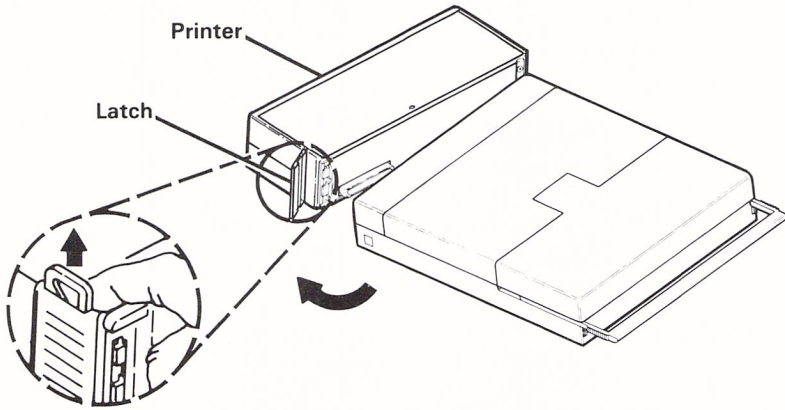
**Note:** When inserting the power supply card, ensure that the white dasher is aligned with the red power button.

# Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run all the Advanced Diagnostics.



# Portable Printer 2015



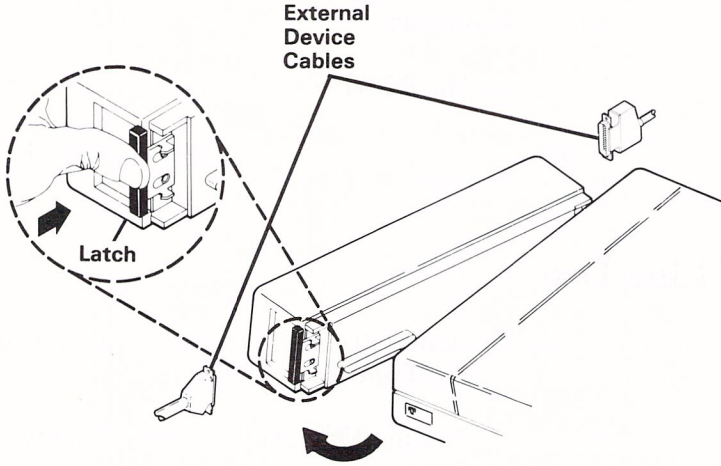
## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options attached behind the portable printer.
4. Raise the portable printer cover.
5. Lift up and swing the latch out.
6. Disconnect the portable printer from the system unit.

To replace the portable printer, reverse the above steps.



# Serial/Parallel Adapter 2020



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options attached behind the serial/parallel adapter.
4. Disconnect any external device cables.



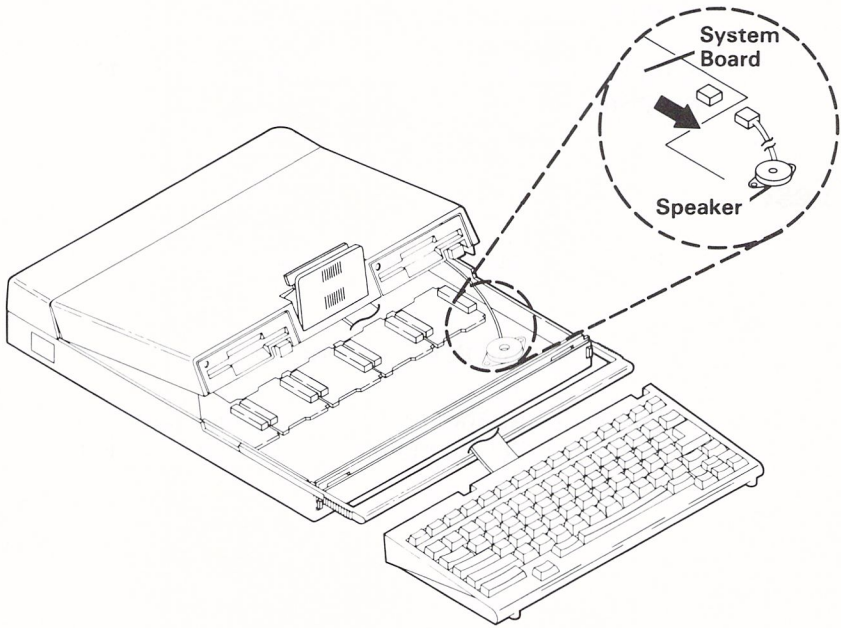
5. Push the latch on the serial/parallel adapter.
6. Disconnect the serial/parallel adapter from the system unit.

To replace the serial/parallel adapter, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run the Advanced Diagnostics for the serial/parallel adapter - serial port and parallel port.

# Speaker 1055



## Removal and Replacement

1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

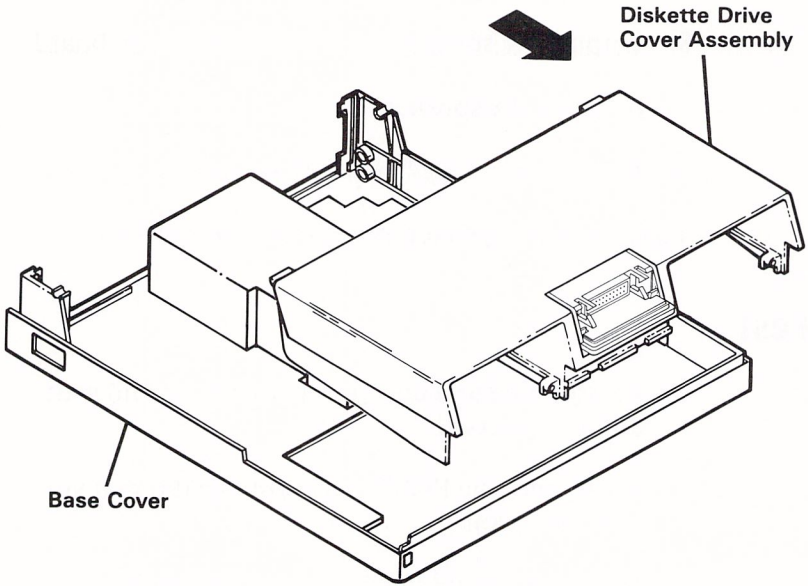
6. Remove the LCD, if attached (**1040**).
7. Lift the diskette drive cover assembly slightly.
8. Unplug the speaker leads from the system board.
9. Remove the speaker.
10. Remove any tape from the base cover.

To replace the speaker, reverse the above steps.

## Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly and that you hear one beep.
3. Load and run all the Advanced Diagnostics.

# System Board 1060



## Removal and Replacement

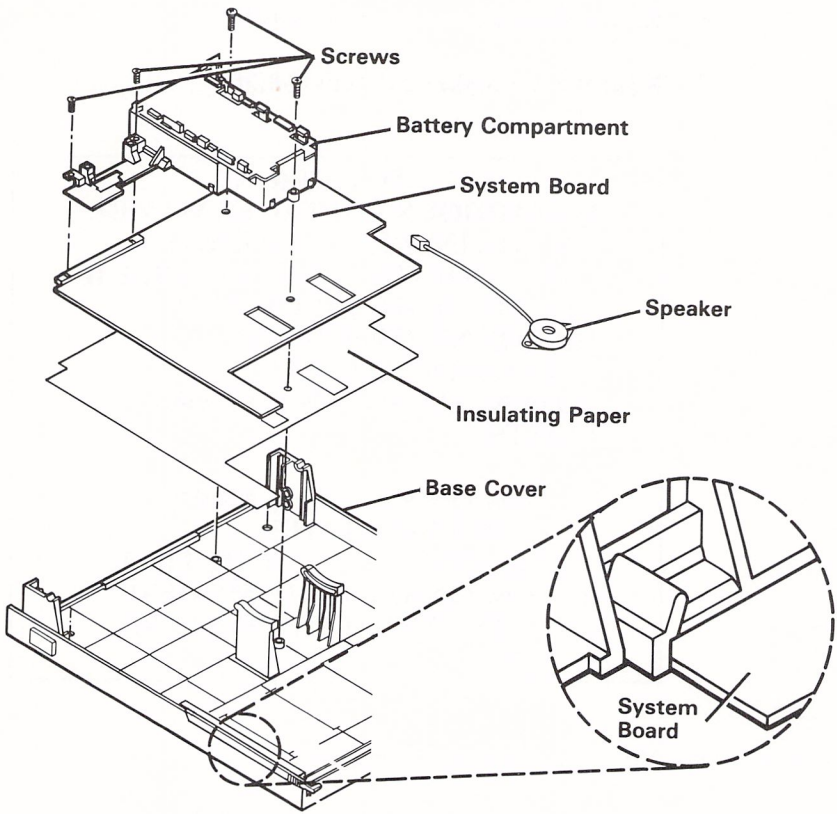
1. Press the system unit power switch off.
2. Remove the ac adapter, automobile power adapter, or battery charger, if attached.
3. Remove any external options.
4. Remove the battery pack (1005).
5. Remove the keyboard (1035).

6. Remove the memory cards (1045).
7. Remove the diskette drives (1020).

**DANGER**  
**HAZARDOUS VOLTAGES MAY BE ON THE INTERNAL MODEM CARD AND THE MODEM CABLE IF THE MODEM CABLE IS NOT DISCONNECTED IN THE FOLLOWING ORDER. A POTENTIAL SHOCK HAZARD EXISTS.**

- a. **DISCONNECT THE MODEM CABLE FROM THE TELEPHONE WALL OUTLET.**
- b. **DISCONNECT THE MODEM CABLE FROM THE SYSTEM UNIT.**

8. Remove the rear cover (1011).
9. Remove the power supply card (1050).
10. Remove the LCD, if attached (1040).
11. Remove the diskette drive cover assembly (1013).
12. Remove the diskette drive cables.
13. Unplug the speaker leads from the system board.
14. Remove the internal modem (1030).



15. Remove the four system board mounting screws.
16. Remove the battery compartment.
17. Remove the system board.

**Note:** Ensure that the insulating paper on the base cover is not damaged. If the paper is damaged, remove and replace the paper. Do not install the new paper over the old paper.

To replace the system board, reverse the above steps.

**Note:** Ensure that the edge of the system board is under the tab on the handle bracket.

# Test

1. Press the system unit power switch on and wait about 10 seconds.
2. Verify that the POST ran correctly.
3. Load and run all the Advanced Diagnostics.





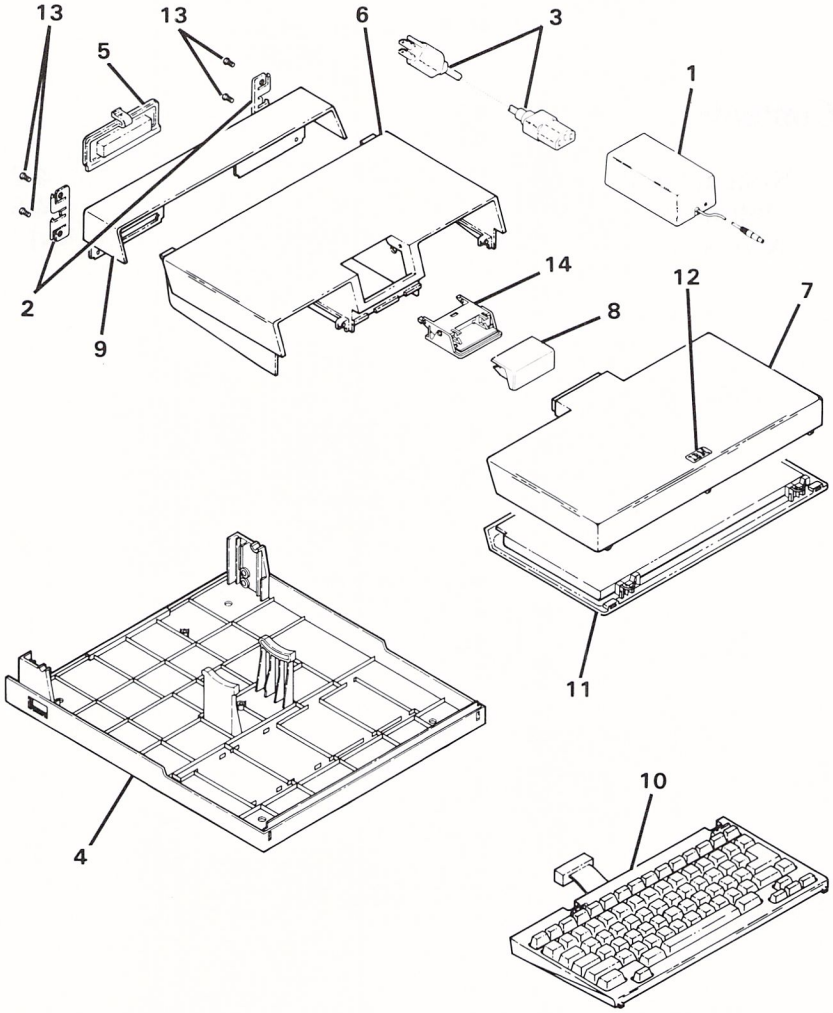
# Section 4. Parts Catalog

## Contents

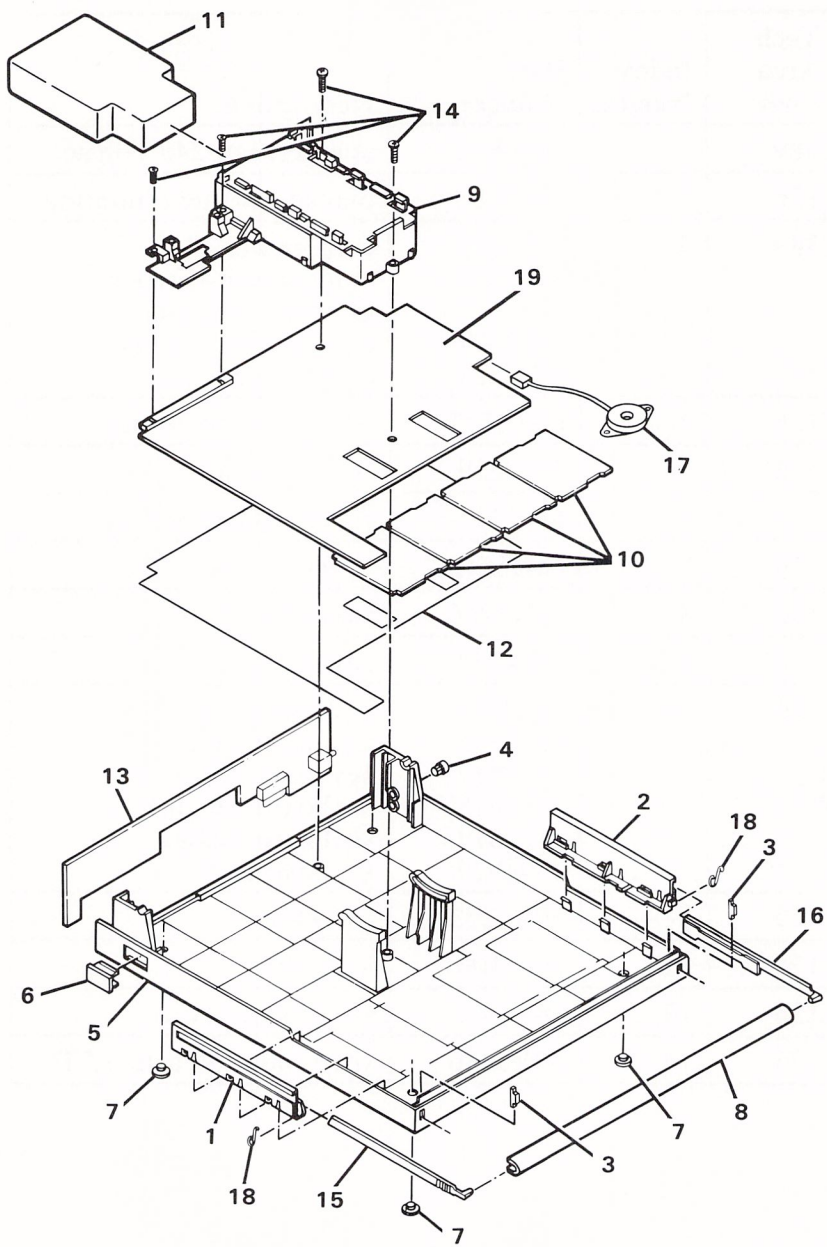
|                   |      |
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| Options .....     | 4-8  |
| Accessories ..... | 4-12 |

PARTS

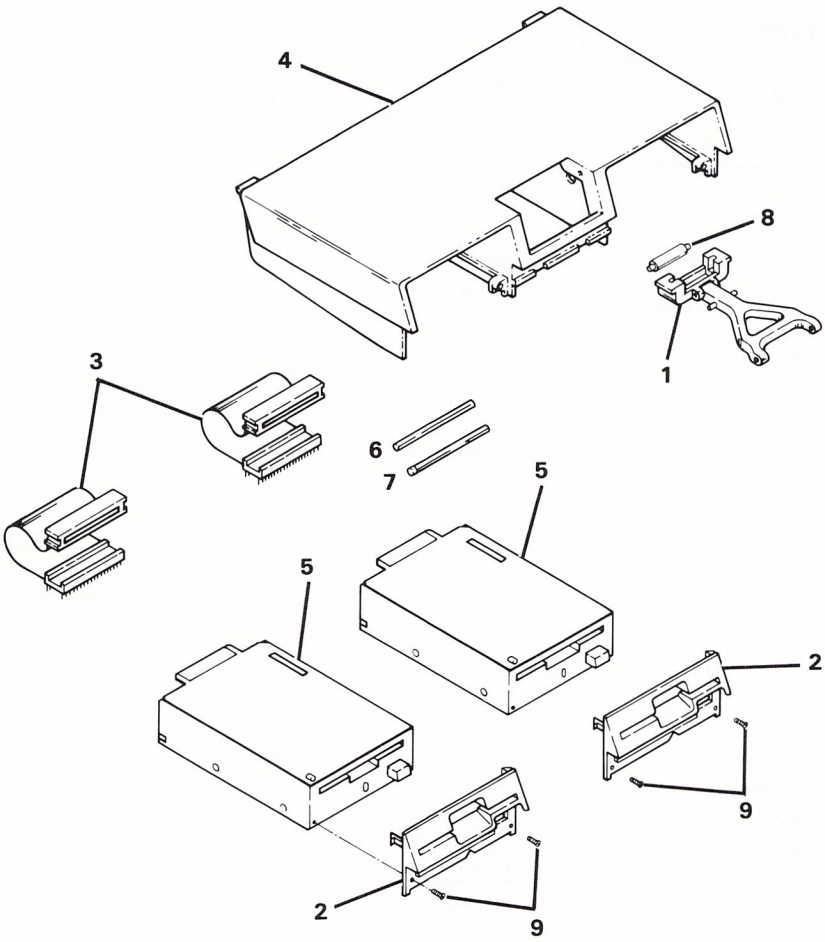
# System Unit



| <b>Tech Area Code</b> | <b>Index Number</b> | <b>Part Number</b>   | <b>Description</b>   |
|-----------------------|---------------------|--|--|
| 389                   | 1                   | 6820822  | adapter, 110-240 Volt ac   |
| 126                   | 2                   | 2682780  | bracket, printer mounting  |
| 389                   | 3                   | 6952301<br>6952320<br><br>6952374<br>6952356                   | cord, power – US<br>cord, power – French,<br>German, Spanish<br>cord, power – Italian<br>cord, power – UK      |
| 126                   | 4                   | 60X5537  | cover, base (bottom)   |
| 126                   | 5                   | 2684279  | cover, battery   |
| 126                   | 6                   | 6487135  | cover, diskette drive  |
| 126                   | 7                   | 60X5510  | cover, LCD   |
| 126                   | 8                   | 59X0266  | cover, LCD yoke  |
| 126                   | 9                   | 2684277  | cover, rear  |
| 256                   | 10                  | 6820815<br>6820816<br>6820817<br>6820818<br>6820819<br>7396929 | keyboard, UK<br>keyboard, French<br>keyboard, German<br>keyboard, Spanish<br>keyboard, Italian<br>keyboard, US |
| 439                   | 11                  | 59X0233  | LCD asm  |
| 126                   | 12                  | 2684106  | logo, IBM  |
| 126                   | 13                  | 2684282  | screw, rear cover  |
| 126                   | 14                  | 60X5486  | yoke and cable asm, LCD  |



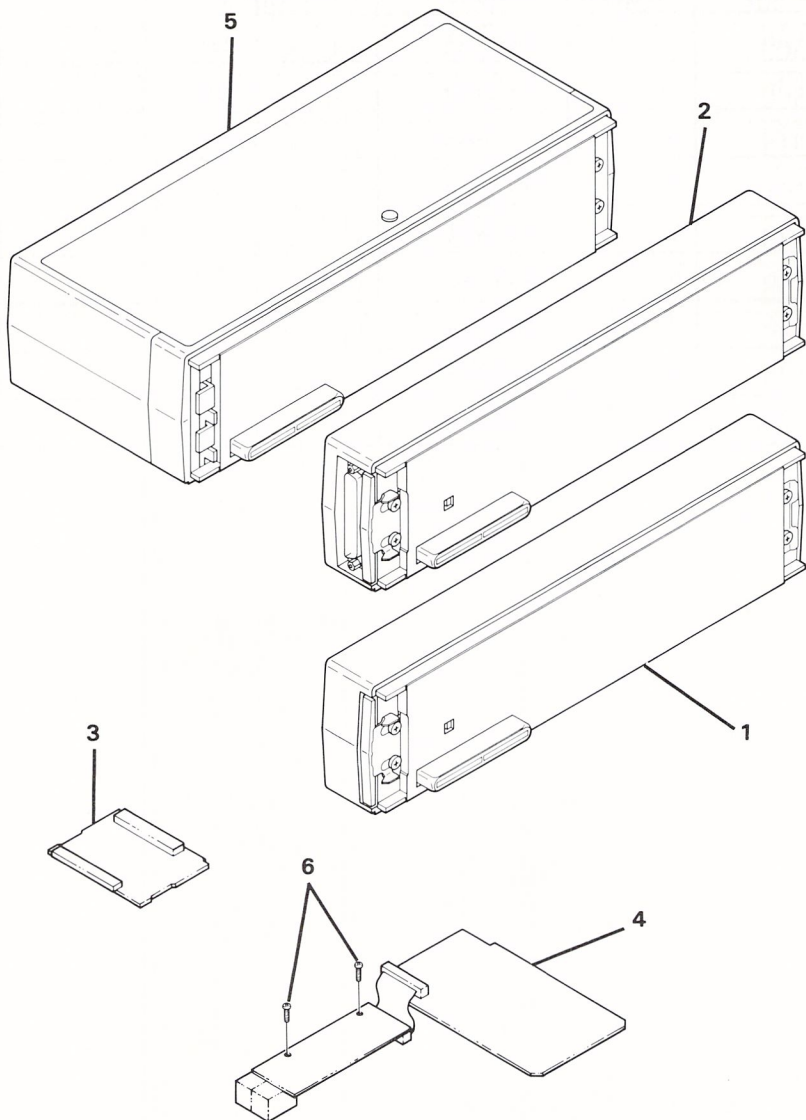
| <b>Tech Area Code</b> | <b>Index Number</b> | <b>Part Number</b> | <b>Description</b>    |
|-----------------------|---------------------|--------------------|-----------------------|
| 126                   | 1                   | 60X5541            | bracket, left handle  |
| 126                   | 2                   | 60X5542            | bracket, right handle |
| 126                   | 3                   | 2682766            | button, cover latch   |
| 126                   | 4                   | 2682774            | button, on/off        |
| 126                   | 5                   | 60X5537            | cover, base (bottom)  |
| 126                   | 6                   | 2684333            | cover, modem hole     |
| 126                   | 7                   | 6820782            | foot, base            |
| 126                   | 8                   | 2682762            | handle                |
| 126                   | 9                   | 2684332            | holder, battery       |
| 315                   | 10                  | 6820797            | memory card 128K      |
| 396                   | 11                  | 6820790            | pack, battery         |
| 126                   | 12                  | 60X5538            | paper, insulating     |
| 371                   | 13                  | 7396941            | power supply card     |
| 126                   | 14                  | 6487126            | screw                 |
| 126                   | 15                  | 2684266            | slide, left           |
| 126                   | 16                  | 2684268            | slide, right          |
| 139                   | 17                  | 59X0196            | speaker               |
| 126                   | 18                  | 2682765            | spring, cover latch   |
| 284                   | 19                  | 6820795            | system board          |



| <b>Tech Area Code</b> | <b>Index Number</b> | <b>Part Number</b> | <b>Description</b>    |
|-----------------------|---------------------|--------------------|-----------------------|
| 126                   | 1                   | 2684335            | asm, damper           |
| 126                   | 2                   | 2682840            | bezel, diskette       |
| 370                   | 3                   | 60X5478            | cable, diskette       |
| 126                   | 4                   | 6487135            | cover, diskette drive |
| 235                   | 5                   | 6820821            | drive, diskette       |
| 126                   | 6                   | 2684340            | pin, cam              |
| 126                   | 7                   | 2684339            | pin, pivot            |
| 126                   | 8                   | 2684265            | roller, damper        |
| 126                   | 9                   | 2684281            | screw, diskette drive |

PARTS

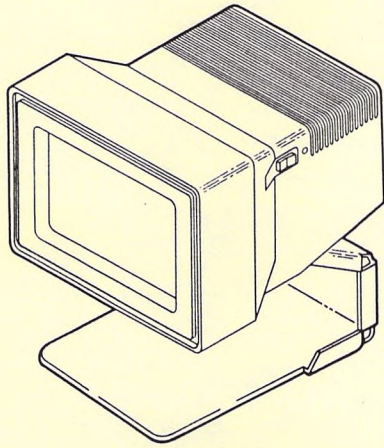
# Options



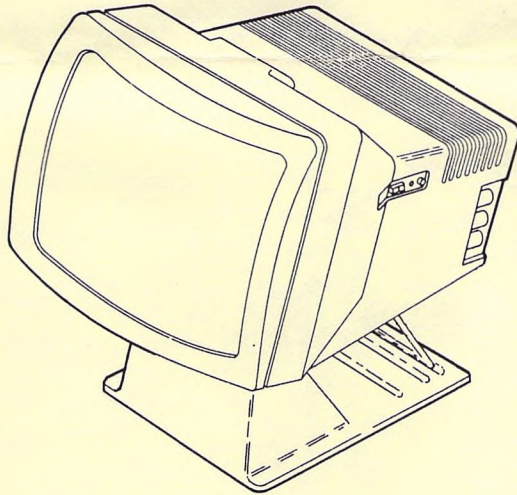


| Tech Area Code | Index Number | Part Number | Description              |
|----------------|--------------|-------------|--------------------------|
| 300            | 1            | 6820793     | adapter, CRT display     |
| 300            | 2            | 6820787     | adapter, serial/parallel |
| 315            | 3            | 6820797     | memory card, 128K        |
| 301            | 4            | 6820785     | modem, internal          |
| 844            | 5            | 6820796     | printer, portable        |
| 126            | 6            | 6487126     | screw                    |

PARTS



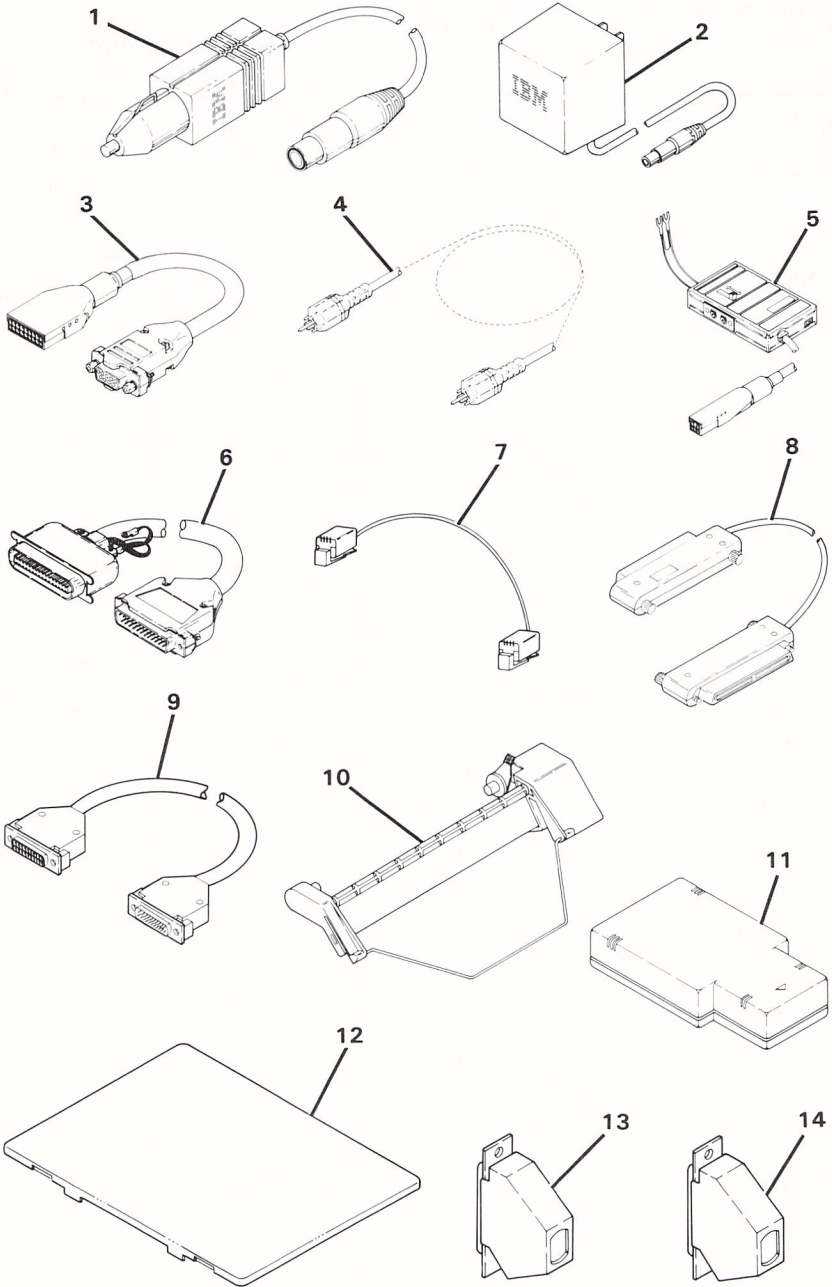
1.3



2.4

| <b>Tech Area Code</b> | <b>Index Number</b> | <b>Part Number</b> | <b>Description</b>                           |
|-----------------------|---------------------|--------------------|--|
| 841                   | 1                   | 60X5494            | display, monochrome<br>120 Volt ac, 50/60 Hz |
| 841                   | 2                   | 60X5496            | display, color<br>100/125 Volt ac, 50/60 Hz  |
| 841                   | 3                   | 60X5527            | stand, monochrome<br>display                 |
| 841                   | 4                   | 60X5530            | stand, color display                         |

# Accessories



| <b>Tech Area Code</b> | <b>Index Number</b> | <b>Part Number</b>            | <b>Description</b>  |
|-----------------------|---------------------|-------------------------------|---|
| 370                   | 1                   | 6820788                       | adapter, automobile power   |
| 370                   | 2                   | 6820798<br>6820794<br>6820824 | charger, battery<br>110 Volt ac<br>charger, battery<br>220 Volt ac<br>charger, battery<br>240 Volt ac |
| 129                   | 3                   | 8285991                       | cable, CRT display adapter to color monitor   |
| 129                   | 4                   | 60X5466                       | cable, CRT display adapter to monochrome monitor  |
| 129                   | 5                   | 8285989                       | cable, CRT display adapter to TV  |
| 129                   | 6                   | 8528214                       | cable, parallel printer   |
| 129                   | 7                   | 8285985                       | cable, modem  |
| 129                   | 8                   | 60X5479                       | cable, portable printer   |
| 129                   | 9                   | 8529274                       | cable, serial port  |
| 817                   | 10                  | 6487125                       | holder, printer paper   |
| 396                   | 11                  | 6820790                       | pack, battery   |
| 129                   | 12                  | 60X5548                       | panel, filter monochrome monitor  |
| 620                   | 13                  | 8529228                       | plug, parallel adapter wrap   |
| 620                   | 14                  | 8529280                       | plug, serial adapter wrap   |

00  
001  
002



# Appendix A. POST and Diagnostic Error Codes

## Contents

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# POST and Diagnostic Error Codes

The charts on the following pages contain error codes and the tests or components that caused the failures.

## System Board

| Error Code | Cause                            |
|------------|----------------------------------|
| 0101       | Interrupt controller failure     |
| 0102       | System timer 2 failed            |
| 0103       | System timer 0 failed            |
| 0105       | DMA controller failure           |
| 0111       | 80C88 microprocessor failure     |
| 0121       | Unexpected interrupt occurred    |
| 0151       | Real-time clock ram failed       |
| 0152       | Real-time clock failed           |
| 0163       | Real-time clock not updating     |
| 0164       | Memory size miscompare           |
| 0170       | LCD not in use when suspended    |
| 0171       | Base 128K-bytes checksum failure |
| 0172       | Diskette active when suspended   |
| 0173       | LCD not active when suspended    |
| 0174       | LCD configuration changed        |
| 0175       | LCD alternate mode failed        |
| 0199       | Installed devices list error     |



# Memory

| Error Code | Cause   |
|------------|---|
| 0201       | Memory pattern test failed  |
| 0202       | Memory address test failed<br>Data line test failed<br>Even/odd test failed |

# Keyboard

| Error Code | Cause   |
|------------|---|
| 0301       | Stuck key detected                            |
| 0302       | User indicated that the keyboard test failed  |
| 0303       | Keyboard controller failure                   |
| 0304       | Keyboard cable not attached                   |
| 0305       | User indicated that the typematic test failed |

# CRT Display Adapter

| <b>Error Code</b> | <b>Cause</b>                                     |
|-------------------|--|
| 0501              | CRT display adapter buffer failed                |
| 0503              | CRT display adapter controller failed            |
| 0508              | User indicated a display attribute test failure  |
| 0516              | User indicated a character set test failure      |
| 0524              | User indicated an 80 x 25 mode test failure      |
| 0532              | User indicated a 40 x 25 mode test failure       |
| 0540              | User indicated a 320 x 200 graphics test failure |
| 0548              | User indicated a 640 x 200 graphics test failure |
| 0564              | User indicated a paging test failure             |

# Diskette Drive and Adapter

| Error Code | Cause                        |
|------------|------------------------------|
| 0601       | Diskette adapter test failed |
| 0602       | Diskette size error          |
| 0606       | Diskette verify test failed  |
| 0607       | Write protect failure        |
| 0608       | Bad command                  |
| 0611       | Time out error               |
| 0612       | Controller error             |
| 0613       | DMA error                    |
| 0614       | DMA boundary error           |
| 0621       | Seek error                   |
| 0622       | CRC error                    |
| 0623       | Record not found error       |
| 0624       | Address mark error           |
| 0625       | Controller seek error        |
| 0626       | Data miscompare              |
| 0627       | Index error                  |
| 0628       | Diskette change error        |

# Serial/Parallel Adapter – Parallel Port

| Error Code | Cause                        |
|------------|------------------------------|
| 0901       | Parallel adapter test failed |

## Internal Modem

| Error Code | Cause                           |
|------------|---------------------------------|
| 1101       | 8250 baud generator test failed |
| 1102       | Internal modem test failed      |
| 1103       | Dial tone test 1 failed         |
| 1104       | Dial tone test 2 failed         |

# Serial/Parallel Adapter – Serial Port

| <b>Error Code</b> | <b>Cause</b>   |
|-------------------|--|
| 1201              | Serial adapter test failed<br>1101 if internal modem is not installed        |
| 1202              | External wrap test failed (cable)<br>1102 if internal modem is not installed |

# Matrix/Graphics Printer

| <b>Error Code</b> | <b>Cause</b>                         |
|-------------------|--------------------------------------|
| 1401              | Printer test failed                  |
| 1402              | Printer “Not ready” error            |
| 1403              | Printer “Paper” error                |
| 1405              | User indicated a print-pattern error |

# Liquid Crystal Display

| <b>Error Code</b> | <b>Cause</b>   |
|-------------------|--|
| 5001              | Display buffer failed                                  |
| 5002              | Font buffer failed                                     |
| 5003              | Controller failed                                      |
| 5004              | User indicated a pel/drive test failure                |
| 5008              | User indicated a display attribute test failure        |
| 5016              | User indicated a character set test failure            |
| 5020              | User indicated an alternate character set test failure |
| 5024              | User indicated an 80 x 25 mode test failure            |
| 5032              | User indicated a 40 x 25 mode test failure             |
| 5040              | User indicated a 320 x 200 graphics test failure       |
| 5048              | User indicated a 640 x 200 graphics test failure       |
| 5064              | User indicated a paging test failure                   |

# Portable Printer

| Error Code | Cause                                |
|------------|--------------------------------------|
| 5101       | Printer port failure                 |
| 5102       | Busy error                           |
| 5103       | Paper or ribbon error                |
| 5104       | Timeout                              |
| 5105       | User indicated a print-pattern error |





# Appendix B. Serial and Parallel Adapter Wrap Jumpers

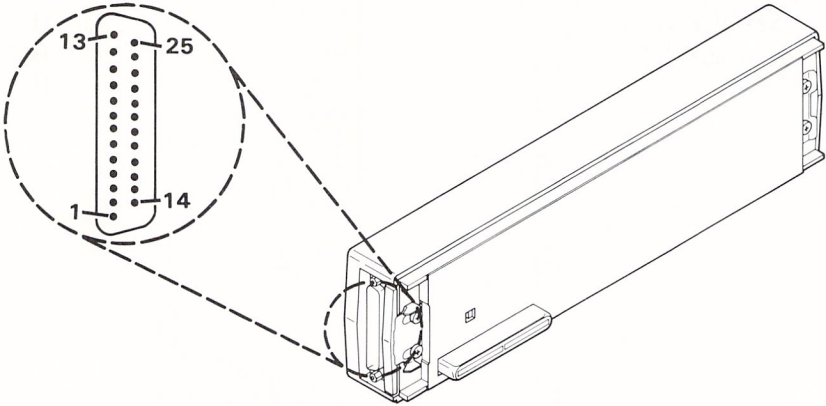
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WRAP JUMPERS

# Serial and Parallel Adapter Wrap Jumpers

The charts on the following pages show the pins to jumper to place the serial adapter and the parallel adapter into wrap mode.

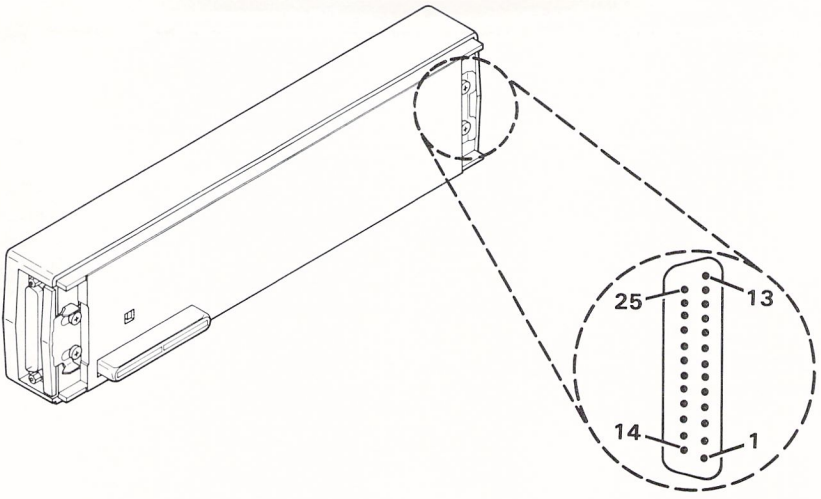


## Serial Adapter Wrap Jumpers

Jumper the pins in the first column to the pins in the second column to place the serial adapter into wrap mode.

| Pin | Pin |
|-----|-----|
| 1   | 7   |
| 2   | 3   |
| 4   | 5   |
| 4   | 8   |
| 6   | 20  |

| Pin | Pin |
|-----|-----|
| 11  | 22  |
| 15  | 23  |
| 17  | 23  |
| 18  | 25  |



## Parallel Adapter Wrap Jumpers

Jumper the pins in the first column to the pins in the second column to place the parallel adapter into wrap mode.

| Pin | Pin |
|-----|-----|
| 1   | 13  |
| 2   | 15  |
| 10  | 16  |
| 11  | 17  |
| 12  | 14  |



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**Notes:**



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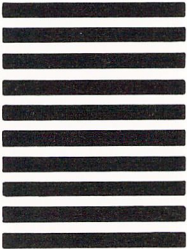
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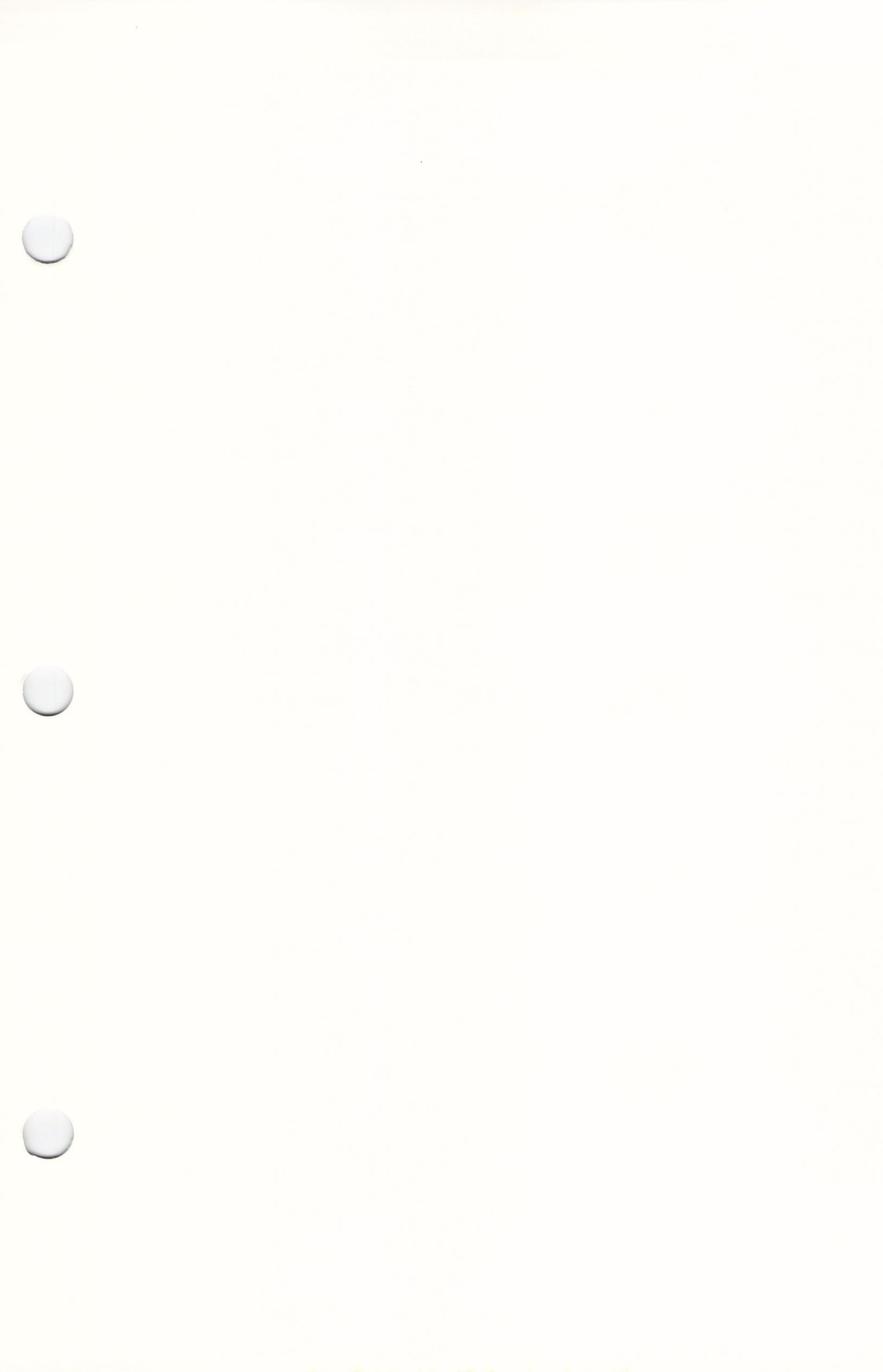
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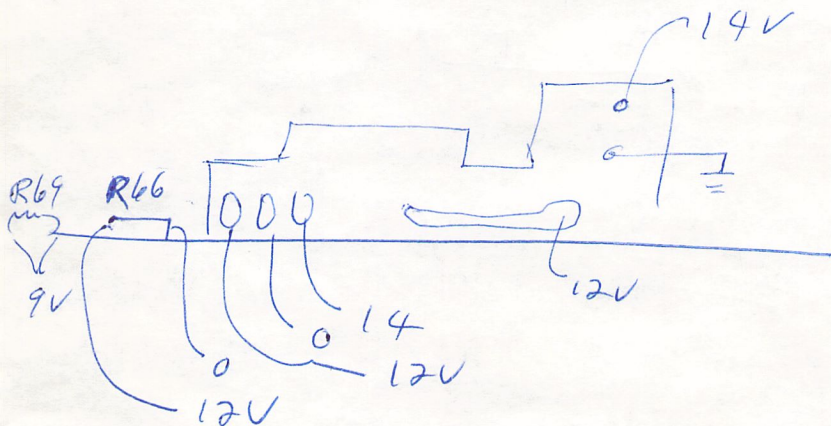
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8 ~~ABC~~ S/P

30-EGACol

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|   | 14 |   |    |    | 11 | 4  |     |     |    |     |
| 0 | 5V | 0 | 0  | 0  | 0  | 0  | 0   | 14V | 0V |     |
| 2 | 4  | 6 | 8  | 10 | 12 | 14 | 16  | 18  | 0  | 20  |
| 1 | 3  | 5 | 7  | 9  | 11 | 13 | 15  | 17  | 0  | -19 |
|   | 5V | 5 | 5V | 0  | 0  | 0  | 14V | 15V |    |     |

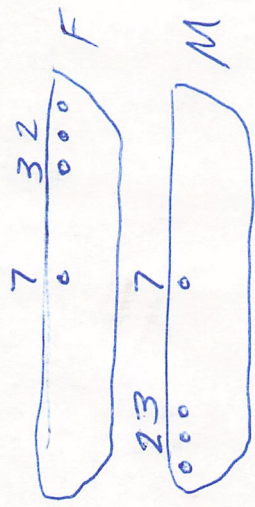
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Q 8 - Add or

FRONT



|   |   |   |   |
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| F | 2 | 3 | 7 |
| M | 3 | 2 | 7 |