
Chapter 5. Solving Problems

This chapter contains information that could help you solve some problems that might arise with your computer. The chapter is organized as follows:

- “Diagnostic Tools” describes the diagnostic tools available to you for solving system unit problems.
- “Testing the System Unit” on page 5-2 describes what to check before testing the system unit, and how to start and run the test programs.
- “Troubleshooting Charts” on page 5-4 helps you quickly find solutions for most system unit problems.
- “Error Messages” on page 5-9 lists messages you might see on your screen when you either have a hardware problem or change the system unit setup.

If you are unable to resolve a problem using this information, you should call for the assistance of a trained service technician.


Diagnostic Tools

The following tools are available to diagnose hardware-related problems:

Power-on Self-Test (POST)

Each time you turn on the system unit, it performs a series of tests that check the operation of the base system unit. This series of tests is called the *power-on self-test* or *POST*. This test:

- Checks basic system-board operations
- Checks the memory operation
- Compares the current system configuration with that established by the Configuration/Setup Utility program
- Starts the video operation
- Verifies that the diskette drive is working
- Verifies that the hard disk drive is working

While the memory is tested, numbers indicating the amount of available base and extended memory appear in the top-left corner of your screen, and the Configuration/Setup Utility program symbol  appears in the top-right corner of your screen.

Note: The amount of available memory shown might be less than expected because of basic input/output (BIOS) shadowing in random access memory (RAM).

Configuration/Setup Utility Program

The Configuration/Setup Utility program lets you view and change important information about your system unit. Also, it displays text messages describing POST errors. For detailed information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Program” on page 4-6.

If your Configuration/Setup Utility program normally displays in your native language, but then displays in English or a language other than your own, call for service.

Diagnostic Programs

Your 7587 Industrial Computer comes with a Diagnostics diskette, which contains the hardware diagnostic programs. Use this diskette when you suspect a hardware failure. This program requires minimal interaction from you. You can use it to test the base system unit, as well as the keyboard and some external devices.

Troubleshooting Charts

The troubleshooting charts list symptoms of problems (such as “The mouse is not working”), as well as steps to correct the problem.

Error Messages

Error messages that appear on the screen might be text, numeric, or both. There are three types of error messages:

- *POST error messages* appear if POST finds a problem.
- *Diagnostic error messages* appear if a problem is detected by the test program.
- *Software-generated error messages* appear if a problem or conflict is detected by the application program, the operating system, or both. For an explanation of these messages, refer to the information that came with the software package.

Testing the System Unit

The test programs are designed to test *IBM* products only. Non-IBM products might present misleading error messages or unexpected system unit responses. If you want to test a non-IBM product, refer to the information that came with the product.

If the system unit does not start when you press the power switch, do the following.

1. Make sure all cables are connected securely to the correct locations.
2. Check to see if the voltage-selection switch is set to the correct position.

Starting the System Unit

Note: For the following procedure, if the Enter password message appears on the screen, a power-on password is set. Type the correct password, and then press Enter to continue.

1. Turn on all external devices, and then turn on the system unit.
2. Watch the screen, and watch the speaker LED on the front panel for a blink. Numbers indicating the amount of base memory and extended memory appear in the top-left corner of the screen. The system unit is running POST.

Note: The amount of available memory shown might be less than expected because of BIOS shadowing in RAM.

The Configuration/Setup Utility program symbol  appears in the top-right corner of the screen.

- If POST finishes without detecting any problems, you will see one blink on the speaker LED on the front panel. The first screen of your operating system or application program appears.
- If POST detects a problem, you will see more than one blink or no blinks, and an error code or number will appear for a few seconds in the top-left corner of your screen. An error panel appears, and the error message number and explanation are shown. You can press Enter to run the Configuration/Setup Utility program, or press Esc to continue starting the operating system.

A single problem might cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system unit.

- For any other condition, have the system unit serviced.

3. Find your system unit response in the following table; then go to the section specified.

System Unit Response	Go to:
Application program or operating system appears.	"Starting the Diskette-Based Diagnostic Program."
Blank screen, unreadable screen, or other response.	"Troubleshooting Charts" on page 5-4.
POST error code or message appears.	"Error Messages" on page 5-9.

Starting the Diskette-Based Diagnostic Program

The diagnostic programs found on the Diagnostics diskette can be used to test the system unit and many of its components. To start the diagnostic programs, do the following.

1. Turn off the system unit.
2. Insert the Diagnostics diskette into the primary diskette drive.
Note: If the system unit does not have a diskette drive, have the network administrator make the diskette image available to the system unit. After the diskette image is made available, continue with the next step.
3. Turn on the system unit.
4. When the Main Menu appears, follow the instructions on the screen to make your selections.

Notes:

1. If the Main Menu screen does not appear and you do not get an error message, have the system unit serviced.
2. If the system unit stops after you start the diagnostic program and you cannot continue, have the system unit serviced.

If testing does not find a problem, but you still have one, go to "Troubleshooting Charts" on page 5-4 and look for the problem symptom.

Troubleshooting Charts

If you have just added new software or a new system unit option and your system unit is not working, do the following before using the Troubleshooting chart.

- Remove the software or device you just added
- Run the diagnostic programs to determine if the system unit is running correctly.
- Reinstall the new software or new device

You can use the troubleshooting charts in this chapter to find solutions to problems that have definite symptoms. These charts are arranged alphabetically. Look for your symptom in the left column of the chart. Instructions and probable solutions to your problem are in the right column of the chart.

Diskette Drive Problems	Action
Diskette drive in-use light stays on or the system unit bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none">1. The diskette is good and not damaged. (Try another diskette you know to be good.)2. The diskette is inserted correctly (label up and metal-shutter end first) in the drive.3. The diskette contains the necessary files to start the system unit.4. Your software program is OK (see page 5-9). <p>If the diskette drive in-use light stays on, or the system unit continues to bypass the diskette drive, have the system unit serviced.</p>

Display Self-Tests	Action
Some displays have their own self-tests.	<p>If you suspect a problem with your display:</p> <ol style="list-style-type: none">1. Turn off the display and system unit.2. Disconnect the display signal cable from the system unit.3. Set the Brightness and Contrast controls to the center position.4. Turn on the display.5. Is the screen white in the center with some shading near the edges, and does it have a black strip on either one side, both sides, top, or bottom? <p>Yes The display has successfully passed the self-test. Refer to the instructions supplied with your display for additional testing information. If you still have a problem with the display, and you have not already done so, check "Display Problems" below.</p> <p>If you still cannot find the problem, have the display and system unit serviced.</p> <p>No Refer to the instructions supplied with your display for further testing information.</p>

Display Problems	Action
Wavy, unreadable, rolling, or distorted screen, or screen jitter.	<p>Do the following:</p> <ol style="list-style-type: none"> 1. If the display self-tests show the display is OK, consider the location of the display. Magnetic fields around transformers, appliances, fluorescent lights, or other displays can cause screen jitter, or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the display and move the device and the display at least 305 millimeters (12 inches) apart. (Moving a color display while it is turned on might cause screen discoloration.) Turn the display on. <p>Note: The distance between displays and diskette drives should be at least 76 millimeters (3 inches) to prevent diskette drive read/write errors.</p> <ol style="list-style-type: none"> 2. Verify that the refresh rate is set correctly. Change it if necessary. <p>If the problem remains, have the display and system unit serviced.</p>
The display works when you turn on the system unit but goes blank when you start some application programs.	<p>Do the following:</p> <ol style="list-style-type: none"> 1. Check that the primary display cable is connected to the video connector. 2. Check that the software program is OK. 3. Run the diagnostic tests to isolate the cause of the problem.
Blank screen and no LED blink. Note: If you are not sure if you saw the LED blink, turn the system unit off, then on again, and watch for the LED to blink.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The system unit power cable is plugged into a working electrical outlet and into the system unit. 2. The cables connected to the system unit are secure. 3. The system unit and display power switches are on. 4. The voltage-selection switch is set to the correct position. 5. A math coprocessor, processor upgrade, or other option that was just installed is installed correctly. <p>If the items above are correct and the screen remains blank, have the system unit serviced.</p>
Blank screen and 1 LED blink.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The display power cable is connected to the display and to a working electrical outlet. 2. The display is turned on and the Brightness and Contrast controls are adjusted correctly. 3. The display signal cable is connected to the correct connector on the system unit. <p>If the screen remains blank, run the display self-tests (see page 5-4). If those tests show the display is OK, have the system unit serviced.</p>
Blank screen, continuous LED blinking, or more than 1 blink.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The voltage selection switch is properly set for the electrical power used in your country. <p>If the voltage selection switch is in the correct position and the system continues to show no response, have the system unit serviced.</p>
Blank screen and 3 LED blinks.	<p>POST could not find usable 640KB of memory required to start the system unit.</p> <p>Have the system unit serviced.</p>
Only the cursor “_” appears.	<p>Have the system unit serviced.</p>
Wrong characters appear on the screen.	<p>Have the system unit serviced.</p>

General Problems	Action
Problems such as broken cover locks or indicator lights not working.	Have the system unit serviced.

Intermittent Problems	Action
A problem occurs only occasionally and is difficult to detect.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All cables and cords are securely connected to the rear of the system unit and attached options. 2. When the system unit is turned on, air is flowing from the rear of the system unit at the power supply fan grill. If there is no air flow, the power supply fan is not working. This causes the system unit to overheat and shut down. <p>Run the diagnostic tests in loop mode to verify that the system unit components are working correctly.</p> <p>If the items above are correct and the test programs found no problem, the next time the problem occurs, make a note of what the problem is and what the system unit is doing when the problem occurs. Then contact your place of purchase or service technician for help.</p>

Keyboard, Mouse, or Pointing-Device Problems	Action
All or some keys on the keyboard do not work.	<p>Verify that the keyboard cable is securely connected to the correct port on the system unit.</p> <p>You might have a password or the unattended start mode set. To use the system unit, enter the correct password.</p> <p>If the password is not working correctly, have the system unit serviced.</p> <p>If you forget your power-on password, you can erase it by removing the memory-retention battery for 10 minutes, reinstalling it, configuring the system unit, and setting a new power-on password.</p> <p>Run the diagnostic tests to verify the system unit components are working correctly.</p> <p>If the test programs do not find the problem, have the keyboard, keyboard cable, and system unit serviced.</p>
The mouse or pointing-device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The mouse or pointing-device roller ball is clean. 2. The mouse or pointing-device cable is securely connected. 3. The device drivers are in the correct path and are installed correctly. 4. The mouse drivers are loaded. 5. The mouse cable is securely connected to the correct port on the system unit. 6. The unattended start mode is not set. The unattended start mode disables the pointing-device port when the system unit is turned on, and the device driver will not be loaded. <p>Note: The pointing-device port is also known as the auxiliary-device port or mouse port.</p>

Option Problems	Action
An option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The option is designed for the system unit. 2. You followed the installation instructions supplied with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. There are no interrupt or address conflicts. Check any switches on all the installed options to ensure that their interrupts and addresses are not the same. <p>Run the IRQ/DMA test located on the Diagnostics diskette. If the test programs find no problem, have the system unit or the option serviced.</p>
An option that used to work does not work now.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All the option hardware and cable connections are secure. Reseat the option if you are not sure. 2. There are no interrupt or address conflicts. Check any switches on all the installed options to ensure that their interrupts and addresses are not the same. <p>If the option came with its own test instructions, use those instructions to test the option.</p> <p>If the items above are correct and the test programs found no problem, have the system unit and option serviced.</p>

Power-on Problems	Action
No blink, power-on indicator does not come on, and power supply fan does not run.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The power cables are plugged into properly grounded, operational, electrical outlets and are connected correctly to the system unit components. 2. The voltage-selection switch is set to the correct position. <p>If the items above are correct, have the system unit serviced.</p>
No LED blink during POST.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All the option hardware and cable connections are secure. Reseat the options if you are not sure. 2. The voltage-selection switch is set to the correct position. <p>If the items above are correct, have the system unit and option serviced.</p>
No blink, power supply fan runs, power-on indicator is on, and system unit stops during POST with a message displayed.	<p>Go to "POST Messages" on page 5-10.</p> <p>If the error message displayed is not listed, have your system unit serviced.</p>
No blink and the system unit is otherwise functional.	Have the system unit serviced.

Printer Problems	Action
The printer does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The printer is turned on and is online. 2. The printer signal cable is connected to the correct parallel or serial connector on the system unit. <p>Note: Non-IBM printer cables may cause unpredictable problems.</p> <ol style="list-style-type: none"> 3. The printer is working correctly by running the tests described in the printer manual. 4. You have assigned the printer port correctly in your operating system or application program. <p>Run the Printer Test and port diagnostic test included with the system diagnostic programs. If the port diagnostic tests show the system unit is OK, replace the printer cable.</p>

Screen Messages	Action
An I9990301 message	<p>A hard disk drive problem occurred. Do the following:</p> <ol style="list-style-type: none"> 1. Verify that cables connected to the hard disk drive are secure. 2. If you just installed a secondary hard disk drive, verify that the drive jumpers are set correctly. 3. Run the diagnostic tests to verify that the hard disk drive is working correctly. 4. If the hard disk drive is not working correctly, have the system unit serviced.
An I9990305 message	<p>An operating system could not be found.</p> <p>Run the diagnostic tests to verify the hard disk drive is working correctly. If there is a problem with the hard disk drive (such as a bad sector), you might have to reinstall the operating system.</p>
Password prompt	<p>A power-on or administrator password is set. To use the system unit, enter the correct password.</p> <p>If the password is not working correctly, have the system unit serviced.</p> <p>If you forget your power-on password, you can erase it by removing the memory-retention battery for 10 minutes, reinstalling it, configuring the system, and setting a new power-on password.</p>
Error prompt —or— Any other information or message.	<p>Do the following:</p> <ol style="list-style-type: none"> 1. Turn off the system unit. 2. Insert the Diagnostics diskette in the primary diskette drive. 3. Turn on the system unit. 4. If the error appears again, have the system unit serviced. 5. If the error does not appear again, follow the screen messages. When the Main Menu appears, follow the instructions on the screen to make your selections. <p>If the Main Menu does not appear, have the system unit serviced.</p>

Software Problems	Action
Is your software program OK?	<p>To determine if problems are caused by the software, verify that:</p> <ol style="list-style-type: none"> 1. Your system unit has the minimum memory requirements needed to use the software. Refer to the information supplied with the software to verify memory requirements. 2. The software is designed to operate on your system unit. 3. Other software works on your system unit. 4. The software you are using works on another system unit. <p>If you received any error messages when using the software program, refer to the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If the items above have been verified and the problem remains, contact your place of purchase or service technician for help.</p>

Note: If you cannot find your problem in the troubleshooting charts, go to “Starting the System Unit” on page 5-2 to test the system unit. If you have already run the test program, or if running the test does not find the problem, have the system unit serviced.

Error Messages

Error messages indicate that a problem exists in your hardware or software. Troubleshooting and servicing of complex problems resulting in these error messages should be performed by a trained service technician.

System unit problems can result in two types of error messages — POST and diagnostic.

- POST error messages appear when POST finds problems with the hardware during startup or when a change in the hardware configuration is found. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages and include brief text messages (except I999XXXX errors).
- Diagnostic error messages appear when the Diagnostic program detects a problem with a hardware option. The messages present text information that can be used to identify a failing part.

Note: Error messages for operating-system and software problems are generally text messages, but they also can be numeric messages. For information about these error messages, refer to the information that came with the operating system or application program, or both.

POST Messages

The system unit might display more than one error message. Often, the first error to occur causes subsequent errors. Always follow the suggested action for the *first* error message that appears.

In the following table, *X* can be any alphanumeric character.

POST Message	Description
10X	A failure occurred during testing of the SBC and microprocessor. Action: Have the system unit serviced.
110	A memory parity failure occurred during testing of the SBC. Action: Run the diagnostic tests to verify that a problem exists in the memory-module kits. See if you can reconfigure (swap) your system memory to aid in identifying the defective memory module. If you cannot identify the defective memory module in this way, have the system unit serviced.
111 112 113	An input/output (I/O) channel check occurred during testing of the SBC and memory. This failure generally is caused by an adapter. Action: Have the system unit serviced.
114	An adapter read-only memory (ROM) error occurred. Action: Remove the options. If you can boot the system unit without the option installed, reinstall each option and retest. When an option fails, replace it. If the problem cannot be isolated and corrected, have the system unit serviced.
115	A direct memory access (DMA) error occurred. Action: Have the system unit serviced.
116	A system-board port read/write error occurred. Action: Have the system unit serviced.
120	A microprocessor error occurred. Action: Have the system unit serviced.
151	A failure occurred during the testing of the real-time clock. Action: Run the diagnostic programs to get more information.
161	The memory-retention battery is dead. CAUTION: Danger of explosion if the memory-retention battery is incorrectly replaced. Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Action: You can still use the system unit without replacing the battery, but you will have to run the Configuration/Setup Utility program and set the time and date each time you turn on the system unit.

POST Message	Description
162	<p>A change in device configuration occurred. This error occurs under one or more of the following conditions:</p> <ul style="list-style-type: none"> • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the system unit as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. <p>Action: Verify that all external devices are turned on. External devices must be turned on before the system unit is turned on.</p> <p>If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic programs might isolate the failing device, but you must have the system unit serviced.</p>
163	<p>The clock is not working correctly.</p> <p>Action: Set the correct date and time. If the date and time are set correctly and saved and the 163 error message reappears, replace the memory-retention battery.</p> <p>If this does not correct the problem, have the system unit serviced.</p> <p>Until the system unit is serviced, it can be used, but any application programs that use the date and time will be affected.</p>
164	<p>A change in the memory configuration occurred. This error can be caused by adding memory, removing memory, or incorrectly installing memory.</p> <p>Note: The system unit can be used with decreased memory capacity.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you have newly installed memory, verify that the new memory is correct for your system unit and that the memory module configuration matches one of the configurations shown in the system memory table. 2. Running the diagnostic tests might isolate the location of the problem memory-module kit and provide additional information. 3. If the system diagnostic tests fail, have the system unit serviced.
20X	<p>A failure occurred during testing of the memory. This error can be caused by incorrectly installed memory, a failing memory-module kit, or a system-board failure.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed memory, verify that the new memory is correct for your system unit, that it is installed correctly, and that the memory module configuration matches one of the configurations shown in the system memory table. 2. Run the diagnostic tests to verify the problem. <p>If the system diagnostic tests fail, have the system unit serviced.</p>

POST Message	Description
301 302 303 304 305	<p>A failure occurred during testing of the keyboard and keyboard controller. These error messages also might be accompanied by continuous LED blinking.</p> <p>Action: Ensure that:</p> <ol style="list-style-type: none"> 1. Nothing is resting on the keyboard and pressing a key 2. No key is stuck 3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the system unit. <p>Running the diagnostic tests can isolate the system unit component that failed, but you must have your system unit serviced.</p> <p>Note: If you have just connected a new mouse or other pointing device, turn the system unit off and disconnect that device. Wait at least 5 seconds, and then turn the system unit on. If the error message goes away, replace the device.</p> <p>If the error message remains, have the keyboard and cable or the system unit serviced.</p>
601	<p>A failure occurred during testing of the diskette drive and diskette-drive controller. This error can be caused by a loose or incorrectly connected cable, a failing drive, or a failing SBC.</p> <p>Action: The system unit can be used, but one or more diskette drives might not work. Running the diagnostic tests can isolate the diskette drive that failed, but you must have your system unit serviced.</p>
602	<p>The system unit is not able to start the diskette in the drive. The diskette might be damaged or formatted incorrectly.</p> <p>Action: Try another startable diskette that is in working condition.</p>
604	<p>A failure occurred during the testing of a diskette drive.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify the Configuration/Setup Utility program correctly reflects the type of diskette drive you have installed. 2. Run the system diagnostic programs. 3. If the system diagnostic programs fail, replace the diskette drive.
11XX	<p>A failure occurred during testing of the system-board serial port.</p> <p>Action: If you have a modem, serial printer, or other serial device attached to your system unit, verify the serial cable is connected correctly. If it is, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the system unit. 2. Disconnect the serial cable from the serial port. 3. Turn on the system unit. <p>If the POST error message does not reappear, either the serial cable or the device is probably failing. (See the documentation that came with the serial device for additional testing information.)</p> <p>If the POST error message reappears, have the IDE device or system unit serviced.</p>
178X	<p>A failure occurred during testing of the hard disk drive or a primary or secondary IDE device.</p> <p>Action: Run the system diagnostic tests.</p>
2401	<p>A failure occurred during testing of the video controller. This error can be caused by a failing display, a failing SBC, or a failing video adapter.</p> <p>Action: Verify that the display is connected correctly to the video port. If so, have the system unit serviced.</p>

POST Message	Description
8601 8602 8603	<p>A failure occurred during testing of the pointing device (mouse) and pointing device controller.</p> <p>Note: An 8603 error can be caused by the addition or removal of a mouse.</p> <p>This error can be caused by the pointing device or by a failing SBC.</p> <p>Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the system unit for at least 5 seconds, and then turn it back on.</p> <p>Action: Ensure the keyboard and pointing device are attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the system unit. 2. Disconnect the pointing device from the system unit. 3. Turn on the system unit. <p>If the POST error message does not reappear, the pointing device is probably failing. (See the documentation that came with the pointing device for additional testing information.) If the problem remains, have the pointing device serviced.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the failure. If the diagnostic tests do not find a problem and the POST error message remains, have the system unit serviced.</p>
19990301	<p>A hard-disk failure occurred.</p> <p>Action: Have the system unit serviced.</p>
19990305	<p>An operating system could not be found.</p> <p>Action: Run diagnostic tests to verify that the hard disk is functioning correctly. If there is a problem with the hard disk (such as a bad sector), you might have to reinstall the operating system.</p> <p>If you cannot reinstall the operating system, have the system unit serviced.</p>
Other Numbers	<p>The system unit POST found an error.</p> <p>Action: Follow the instructions on the screen.</p>

Diagnostic Messages

Diagnostic error messages appear when the Diagnostics diskette program detects a problem with the system. The messages present text information that can be used to identify a failing part.

Although parts of your system may be failing, you might be able to continue to use your system unit. However, you will need to have your system unit or option serviced.

