
Chapter 8. Service Information

This section contains the general checkout procedures, related service procedures, Symptom-to-FRU indexes, and removal and replacement procedures for the IBM 7587 Industrial Computer.

Note: This manual and the diagnostic tests are intended to test **only** IBM products. Non-IBM products of any kind including adapter cards, accelerator boards, options, or non-IBM devices, can give false errors and invalid system unit responses. If you remove a non-IBM device and the symptom goes away, the problem is with the device you removed.

Configuration/Setup Utility Program

Attention

A customized setup configuration (other than default settings) might exist on the system unit you are servicing. Running the Configuration/Setup Utility program might alter those settings. Note the current configuration settings and verify that the settings are in place when service is complete.

The Configuration/Setup Utility program is stored in the permanent memory of the system unit. This program includes settings for the following:

- Devices and I/O Ports
- Date and Time
- Security
- Start Options
- Advanced Setup
- ISA Legacy Resources

To run the Configuration/Setup Utility program, do the following.

1. Power-off the system unit and wait a few seconds until all in-use lights go off.
2. Power-on the system unit.
3. When the Configuration/Setup Utility prompt appears on the screen during startup, press F1.
4. When the Configuration/Setup Utility menu appears, follow the instructions on the screen.
5. When finished, select **System Summary** to verify that any configuration changes have been accepted.

BIOS Levels

An incorrect level of BIOS can cause false error and unnecessary FRU replacement. Use the following information to determine the current level of BIOS installed in the system unit, the latest BIOS available for the system unit, and where to obtain the latest level of BIOS.

- Current Level BIOS information.
 1. Run the Configuration/Setup Utility program to determine the level of BIOS installed.
- Sources for determining the latest level BIOS available.
 1. World Wide Production Solutions Home Page
<http://wwprodsoln.bocaratton.ibm.com/>
 2. Bulletin Board System (BBS)
 3. Levels 1 and 2 Support
 4. RETAIN
- Sources for obtaining the latest level BIOS available.
 1. World Wide Production Solutions Home Page
<http://wwprodsoln.bocaratton.ibm.com/>
 2. Bulletin Board System (BBS)
 3. Levels 1 and 2 Support

To update (flash) the BIOS, see “Flash (BIOS/VPD) Update Procedure.”

Vital Product Data

Each system unit has a unique vital product data (VPD) code stored in the nonvolatile memory on the IBM SBC. After you replace the IBM SBC, the VPD must be updated. To update the VPD, see “Flash (BIOS/VPD) Update Procedure.”

Flash (BIOS/VPD) Update Procedure

Attention

Refer to the information label located inside the system unit cover for any model-specific information.

You need to update the VPD only if the processor board is changed. Otherwise, the Flash update program retains the VPD. To update the VPD, do the following.

1. Power-off the system unit.
2. Insert the Flash update diskette into drive A.
3. Power-on the system unit.
4. When the Update Utility appears, select your country/keyboard, and then press Enter.
5. If the system unit serial number was previously recorded, the number is displayed with an option to update it. Press **Y** to update the serial number.
6. Type the 7-digit serial number of the system unit you are servicing, and then press Enter.
7. Follow the instructions on the screen to complete the Flash (BIOS/VPD) update procedure.

Diagnostic and Test Tools

The following tools are available to help identify and resolve hardware-related problems:

- Power-on self-test (POST)
 - POST LED Blink Codes
 - Error Code Format
- Error messages
- QAPlus/PRO Diagnostic Program.

Power-On Self-Test (POST)

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

- Checks some basic IBM SBC operations
- Checks the memory operation
- Starts the video operation
- Verifies that the diskette drive is working
- Verifies that the hard disk drive is working

If POST finishes without detecting any problems, a single LED blink occurs and the first screen of your operating system or application program appears.

If POST detects a problem, an error message appears on your screen. A single problem can 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.

POST LED Blink Codes

POST generates blinking LEDs to indicate successful completion of POST or to indicate the tests detect an error. One blink and the appearance of text on the display indicates successful completion of the POST. More than one blink indicates the POST detects an error.

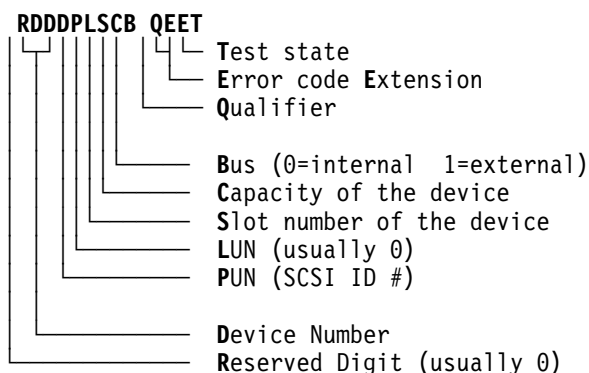
POST Error Code Format

This section provides an explanation of the encoded non-SCSI and SCSI POST error codes. Error messages are displayed on the screen as 3, 4, 5, 8, 12, or 13 digits. An “X” in an error message can be any number or letter. The shorter POST errors are highlighted in “Symptom-to-FRU Index” on page 8-14. Some digits will represent different information for SCSI errors versus non-SCSI errors.

The following figure shows which digits display the shorter POST errors. The figure also defines additional SCSI information.

Notes:

1. Non-IBM device error codes and documentation supersede this list.
2. Duplicate SCSI ID settings will cause misleading error symptoms or messages.



Error Messages

Messages generated by the software—the operating system or application programs—generally are text messages, but they also can be numeric. Basically, there are five types of error messages:

- POST error messages
- POST LED blink codes
- Diagnostic error messages
- Software-generated messages
- Multiple messages

Error Message	Description
POST Error Messages	Displayed when POST finds problems with the hardware or detects a change in the hardware configuration.
POST LED Blink Codes	Blinks emitted from the speaker LED if POST finds a problem. One blink indicates POST completed successfully. Multiple blinks indicate POST found a problem.
Diagnostic Error Messages	Displayed when a test program finds a problem with a hardware option.
Software-Generated Error Messages	Displayed if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.
Multiple Messages	The first error that occurs can cause additional errors. Follow the suggested action of the first error displayed. In this case, the system displays more than one error message. Always follow the suggested action instructions for the <i>first</i> error message displayed.

QAPLus/PRO Diagnostic Program

The QAPLus/PRO diagnostic program shipped on diskette with the 7587 Industrial Computer provides the primary method for testing the system unit. You can use this DOS-based program to test the IBM components of the system unit and some external devices. The amount of time required to test all components depends on the number of components. The more optional adapters and devices you have attached to your system unit, the longer the testing takes. To access QAPLus/PRO, boot the system unit with the QAPLus/PRO diskette in the diskette drive.

This test program includes the following features.

Feature	Description
Advanced Diagnostic Tests	Identifies most problems associated with the following major components: <ul style="list-style-type: none">• IBM SBC• Hard disk drives• Diskette drives• CD-ROM drives• RAM• Serial and parallel ports• Analog Video PMC Form Factor Card adapter• Printer• Keyboard• Mouse
Flexible Test Control	Allows you to: <ul style="list-style-type: none">• Run groups of tests in batch• Specify parameters to use for each test (for example, video modes, disk cylinders, and port addresses)• Specify the number of passes you want to run (one to continuous)• Log the test results to a text dBase (DBF) format file• Save all test settings for future use• View System Information• View the server's configuration information (for example, you can view the IRQ/DMA assignments, memory usage, and device drivers)• Select System Utilities• Run a low-level format• Format a diskette

The QAPLus/PRO program provides advanced functions and utilities for users and service or support professionals to troubleshoot even the most difficult problems.

Module Tests Menu

Attention

A customized setup configuration (other than default settings) might exist on the system unit you are servicing. Running the Configuration/Setup Utility program might alter those settings. Note the current configuration settings and verify the settings are in place when service is complete. To start the Configuration/Setup Utility program, see "Configuration/Setup Utility Program" on page 8-1.

Normally, when you select the Module Tests Menu, all adapters and devices installed in the system unit are highlighted on the menu.

- If an adapter or device not installed in the system unit is highlighted on the menu, use the procedure in "Undetermined Problem" on page 8-27 to find the problem.
- If an adapter or device is installed in the system unit and is not highlighted on the menu, you have one of the following conditions.
 - The diagnostic code for the adapter or device is not on the diagnostic diskette.
 - The SCSI controller failed (on the IBM SBC or SCSI adapter).
 - An unrecognizable adapter is installed.
 - The missing device is defective or requires an additional diskette or service manual.
 - A defective adapter caused the device not to be highlighted on the menu.

If a device is missing from the list, replace the device. If this does not correct the problem, use the procedure in "Undetermined Problem" on page 8-27 to find the problem.

Program Navigation

You can maneuver within the test programs by typing the first letter of a menu choice, pressing the function keys, or using command-line options.

Typing the First Letter of a Menu Choice: Throughout the test programs, typing the first letter of an option on a menu is the same as moving to that item with the cursor and pressing Enter; however, this function is not enabled on test group screens.

Pressing the Function Keys: Press the following keys to maneuver throughout the test programs.

Keys	Action
Enter	Select an item, run the test module, or run the test
Down Arrow (↓)	Moves the cursor down
Up Arrow (↑)	Moves the cursor up
F1	Calls up the appropriate Help information. Use the up arrow key (↑) or the down arrow key (↓) to scroll through the information. Pressing F1 from within a Help screen provides a help index from which you can select different categories. One of the important help categories is function key usage. Pressing Esc exits Help and returns to where you left off.
Esc	Go back to the previous menu

Additional functions are available with the following keys.

Keys	Action
Tab	Move to test group (or move to parameters)
Spacebar	Toggle modules on/off (or toggle tests on/off)
F2	View test results log
F10	Local menu
+	Next logical unit number (for example, LUN 1, LUN 2, and so forth)
–	Previous logical unit number

Command-Line Options: The following command-line options are available when initially starting the diagnostic program from within its directory. Enter **QAPLPRO /XXX**, where **/XXX** represents one of the following commands.

Command	Action
/B&W	The /B&W command line option forces the program to load in Black and White (Monochrome) mode, which is often more readable on laptop computers.
/LOG=file	The /LOG=file command line option directs the test programs to start using a specified Error Log file.
/INT10	The /INT10 command line option forces the test programs to use the BIOS for screen writes.
/OXXX	The /OXXX command line option, where XXX=test group (for example, MBD/MEM/VID/HDU/ FDU/KBD/COM/LPT, and so forth) omits the designated test group from testing.
/USERCONFIG=file	The /USERCONFIG=file command line option tells the test programs to look for a user diagnostic configuration file other than the default USERDIAG.CFG.
/SCRIPT=file[,R]	The /SCRIPT=file[,R] command line option with the “,R” runs the selected script. See “Scripting” on page 8-8 for a description of scripting.
Note: You can use a “–” instead of a “/” as the command-line switch.	

Viewing the Test Groups

As you move the cursor bar up or down in the Module Tests Menu, the right-hand screen changes to show the attributes, parameters, and the selected tests of the corresponding test group. The “◆” mark indicates a module selected for testing.

The indicated attributes are characteristics of the selected test module that are used by the test programs to determine which tests to run or how to run selected tests. Attributes are also used to limit the allowable range of parameters (for example, – ending cylinder).

Parameters are values you select to establish the scope of tests. For example, you can select Extended Memory testing parameters and limit the testing to a specific range of test blocks by specifying the starting and ending memory block. This might be appropriate if prior experience indicates that problems are likely to exist in a specific area of memory. By selecting these limiting parameters, you reduce memory testing time.

Scripting

Scripting lets you select specific groups of tests, testing parameters, and options. Your selection is saved for later use as a test *script*. To set up a test script, first select all the appropriate test groups and specific tests you want to run from the Module Tests selection under Diagnostics. You also should select appropriate testing parameters and options. See “Program Navigation” on page 8-6 for instructions on saving a test script.

Changing Logical Unit Numbers

In some instances, you can have more than one logical unit number (LUN) for a particular module. LUNs represent individual devices within a test group or module. For example, you might have two diskette drives or two hard disk drives; or you might have base, extended, shadow, and cache memory installed in the system unit. This configuration might result in as many as 4 or 5 different LUNs in the Memory Test Group.

From either the Module Tests Menu or a test group window, you can change to a different LUN (where applicable) by pressing the plus (+) key (next LUN) or the minus (–) key (previous LUN).

Test-Group Specifications

In the upper-right-hand portion of the testing screen (or just the upper portion if you switched to an individual test group screen) are the specifications for the related test group.

Note: In the Hard Disk Test Group specification area, if a software program compressed your drive, the indicated size is the compressed size of the logical drive.

Starting the Diagnostic Program

To start the diagnostic program, do the following.

1. Insert the diagnostic diskette into drive A.
2. Power-on the system unit.
3. When the diagnostic **Main Menu** is displayed, select **Diagnostics** and press Enter.
4. Select **Quick Check** and press Enter.
5. Follow the instructions that appear on your screen. If an error is displayed, go to “Symptom-to-FRU Index” on page 8-14.

Module Tests Selection: If the test programs do not find a problem, or you want to perform in-depth testing, the Module Tests selection provides a method to run individual tests on a single module. For example, you can run an individual test for the diskette drive, or you can run groups of tests for several modules. In the Module Tests selection, you can define how many times each test should run and how the test program should log the errors.

To start the Module Tests, do the following.

1. Insert the diagnostic diskette into drive A.
2. Power-on the system unit.
3. When the diagnostic **Main Menu** is displayed, select **Diagnostics** and press Enter.
4. Select **Module Tests** from the Diagnostics Menu.
5. Use the up and down arrow keys (↑ and ↓) to move the highlight bar from one selection to the next in the Module Tests Menu.
6. Use the following instructions to select and run tests.

Note: As you scroll down the selection menu, the Test Group window to the right changes to correspond to the highlighted Module.

Running Selected Module Tests

To run selected tests for a test group, do the following.

1. Use the up and down arrow keys (↑ and ↓) to move the cursor to your selection.
2. Press Enter.

A “◆” appears next to your selection.

Running All Selected Modules

To run all selected test modules, do the following.

1. Use the down arrow key (↓) to move the cursor to the last choice, **Run All Selected**.
2. Press Enter.

A “◆” appears next to your selection.

Changing Selected Tests in Test Groups

To change selected tests in a test group, do the following.

1. Use the up and down arrow keys (↑ and ↓) to move the cursor to your selection.
2. Press Tab to move into the expanded Test Group window.
3. Scroll to the test you want to select or deselect.

Attention

Items indicated by a directly adjacent “*” (**red** text on color screens) are destructive tests.

4. Press the spacebar at the highlighted test to toggle between select (indicated by a “◆”) and deselect.

Note: Typing the first letter of a test does not activate the test, unlike menu operations.

5. Press Enter.

Running an Individual Test

To run an individual test, do the following.

1. Use the up and down arrow keys (↑ and ↓) to move the highlighted bar to the test you want to run.
2. Press Enter to run the test.

The results of the test appear in the lower-right-hand Test Log window. Also, if you enabled Test Logging, the results are recorded in the Test Log.

3. When the test completes, press Esc to return to the Module Tests Menu.

Stopping the Tests

To stop running a specific test or stop testing after you have started a test, press Esc while the test is running. The test pauses at the first possible opportunity, and the Skip/Abort Test Menu appears with the following options.

Option	Action
Continue	The test program begins testing where it stopped.
Skip to next test	The test program skips the current test, but remaining tests for the selected Test Module continue.
Skip to next group	The test program skips the remaining tests in the current test group.
Abort all tests	The test program stops and returns to the previous menu.

General Checkout

Attention

The drives in the system unit you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

Diagnostic error messages appear when a test program finds a problem with a hardware option. For the test programs to properly determine if a test *Passed*, *Failed*, or *Aborted*, the test programs check the error-return code at test completion.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

Notes:

1. Before replacing any FRUs, ensure the latest level of BIOS is installed in the system unit. A down-level BIOS might cause false errors and unnecessary replacement of the IBM SBC. For more information on how to determine and obtain the latest level BIOS, see "BIOS Levels" on page 8-2.
2. If multiple error codes are displayed, diagnose the first error code displayed.
3. If the system unit stalls with a POST error, go to "Symptom-to-FRU Index" on page 8-14.
4. If the system unit stalls and no error is displayed, go to "Undetermined Problem" on page 8-27.
5. If an installed device is not recognized by the diagnostic program, that device might be defective.

001

- Power-off the system unit and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Insert the Diagnostic diskette into drive A.
- Power-on all external devices.
- Power-on the system unit.
- Check for the following responses:
 1. One or two blinks (depending on the diagnostic version level).
 2. Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSES?

Yes No

002

Go to the "Symptom-to-FRU Index" on page 8-14.

003

ARE ALL INSTALLED DEVICES IN THE COMPUTER HIGHLIGHTED ON THE MODULE TEST MENU OR HARDWARE CONFIGURATION REPORT?

Yes No

004

Go to "Module Tests Menu" on page 8-6.

005

Run the Advanced Diagnostic test. If necessary, refer to "Diagnostic and Test Tools" on page 8-3.

- If you receive an error, go to "Symptom-to-FRU Index" on page 8-14.
- If the test stops and you cannot continue, replace the last device tested.
- If the system unit has incorrect keyboard responses, go to "Keyboard."
- If the printer has incorrect responses, go to "Printer" on page 8-12.
- If the display has problems such as jittering, rolling, shifting, or being out of focus, go to "Display" on page 8-14.

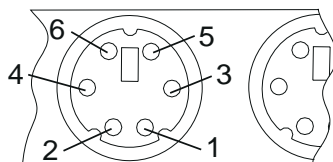
Keyboard

If the keyboard is experiencing problems and a mouse or other pointing device is attached, remove it to see if the error symptom goes away. If the symptom goes away, the mouse or pointing device is defective. If the symptom does not go away, do the following.

001

- Power-off the system unit.
- Disconnect the keyboard cable from the system unit.
- Power-on the system unit and check the keyboard cable connector on the system unit for the voltages shown. All voltages are $\pm 5\%$.

Pin	Voltage (vDC)
1	+5.0
2	Not Used
3	Ground
4	+5.0
5	+5.0
6	Not Used



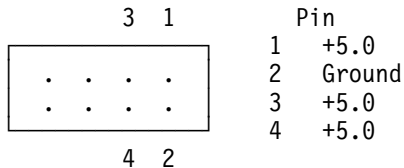
(continued)

ARE THE VOLTAGES CORRECT?

Yes No

002

- Power-off the system unit.
- Disconnect the keyboard/mouse cable from the IBM SBC.
- Power-on the system unit and check the keyboard/mouse connector on the IBM SBC for the voltages shown.



ARE THE VOLTAGES CORRECT?

Yes No

003

Replace the keyboard/mouse cable. If the problem remains, replace the IBM SBC.

004

Replace the Analog Video PMC Form Factor Card.

005

On keyboards with a detachable cable, replace the cable. If the problem remains or if the cable is permanently attached to the keyboard, replace the keyboard. If the problem remains, replace the IBM SBC.

Printer

If a printer is experiencing problems, do the following.

1. Make sure the printer is properly connected and powered on.
2. Run the printer self-test.

If the printer self-test does not run correctly, the problem is in the printer. Refer to the printer service manual.

If the printer self-test runs correctly, install a wrap plug in the parallel port and run the diagnostic tests to determine which FRU failed.

If the diagnostic tests (with the wrap plug installed) do not detect a failure, replace the printer cable. If that does not correct the problem, replace the IBM SBC or adapter connected to the printer cable.

Power Supply

If the power-on indicator is not on, the power-supply fan is not running, or the system unit will not power-off, do the following.

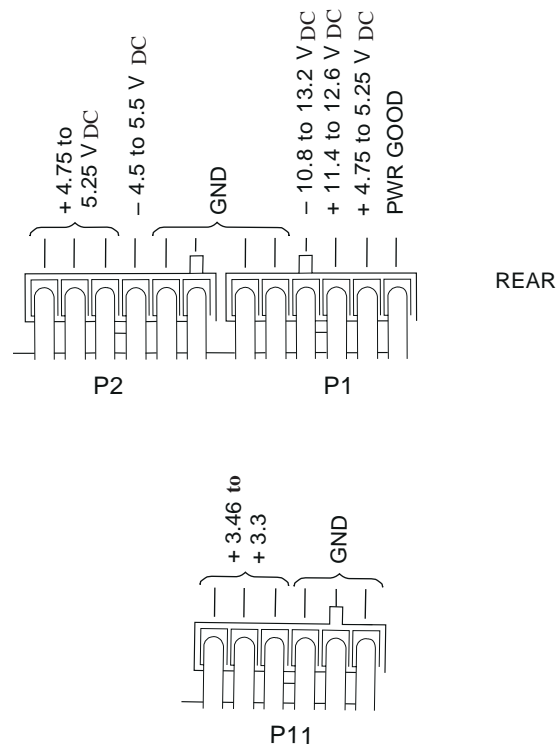
Check/Verify	FRU/Action
1. Verify that the voltage-selector switch is set for the correct voltage.	Correct the voltage-selector switch setting.
2. Check the following for proper installation. <ul style="list-style-type: none">• Power Cord• On/Off Switch connector• On/Off Switch Power Supply connector• Backplane Power Supply connectors	Reseat
3. Check the power cord for proper continuity.	Power Cord
4. Check the power-on switch for continuity.	Power-on Switch

If these are correct, check the voltages shown in “Backplane Power-Supply Connections.”

Backplane Power-Supply Connections

The backplane of the 7587 Industrial Computer has 5 green LEDs at the front next to the power supply connectors, one for each of the five output voltages from the power supply. If any of these LEDs is not lit, verify the power supply cables are correctly installed on the backplane. If the power supply connections are correct and the previous checks are correct, replace the power supply.

Note: These voltages must be checked with the power supply cables connected to the backplane.



Display

If the screen is rolling, replace the display assembly. If that does not correct the problem, replace the Analog Video PMC Form Factor Card.

If the screen is not rolling, do the following to run the display self-test:

1. Power-off the system unit and display.
2. Disconnect the display signal cable.
3. Power-on the display.
4. Turn the brightness and contrast controls to their maximum setting. The screen should be a uniform white or light gray test color.
5. If you do not see the test color, replace the display. If there is a test color on the screen, replace the Analog Video PMC Form Factor Card.

Note: During the first two or three seconds after the display is powered on, the following might occur while the display synchronizes with the system unit.

- Unusual patterns or characters
- Static, crackling, or clicking sounds
- A “power-on hum” on larger displays

A noticeable odor might occur on new displays or displays recently removed from storage. These sounds, display patterns, and odors are normal; do not replace any parts.

If you are unable to correct the problem, go to “Undetermined Problem” on page 8-27.

Symptom-to-FRU Index

The Symptom-to-FRU Index tables list error symptoms, as well as FRUs to be replaced and corrective actions to take. The FRUs and corrective actions are listed in order of decreasing effectiveness in problem solving. Replace the FRUs or take actions in the order suggested. The Xs in the tables represent a number from 0 to 9.

These tables also can be used to help you decide which FRUs to have available when servicing a system unit.

Always begin with “General Checkout” on page 8-10. If you are unable to correct the problem using these tables, go to “Undetermined Problem” on page 8-27.

Notes:

1. If you have both an error message and an incorrect blink response, diagnose the error message first.
2. If you cannot run the diagnostic tests, but did receive a POST error message, diagnose the POST error message.
3. If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
4. Check all power supply voltages before you replace the IBM SBC. (See “Power Supply” on page 8-13.)
5. Check the hard disk drive jumper settings before you replace a hard disk drive. (See “Hard Disk Drive Jumper Settings” on page D-2.)

Important

1. Some errors are indicated with a series of blink codes. (See "LED Blink Symptoms" on page 8-15.)
2. The processor is a separate FRU from the IBM SBC. (See "Removing and Replacing an IBM SBC" on page 8-34.)

LED Blink Symptoms

The LED blink symptoms appear on the LED on the front panel of the system unit. See the following examples.

The IBM 586 or 586E Single-Board Computer (IBM SBC) and the Analog Video PMC Form Factor Card provide the processor function for the 7587 Industrial Computer. If the blink codes indicate an IBM SBC failure, or there is no blink and the system unit is not responding, separate the Analog Video PMC Form Factor Card from the IBM SBC and rerun the test. If the failure goes away or changes, replace the Analog Video PMC Form Factor Card first, and then the IBM SBC.

Blinks	Description
1-2-X	<ul style="list-style-type: none">• One blink• A pause (or break)• Two blinks• A pause (or break)• Any number of blinks
4	Four continuous blinks

Blink Symptom/Error	FRU/Action
1-1-3 CMOS read/write error	1. Run Setup. 2. IBM SBC
1-1-4 ROM BIOS check error	1. IBM SBC
1-2-X DMA error	1. IBM SBC
1-3-X	1. Memory Module 2. IBM SBC
1-4-4	1. Keyboard 2. IBM SBC
1-4-X Error detected in first 64KB of RAM.	1. Memory Module 2. IBM SBC
2-1-1, 2-1-2	1. Run Setup. 2. IBM SBC
2-1-X First 64KB of RAM failed.	1. Memory Module 2. IBM SBC
2-2-2	1. Analog Video PMC Form Factor Card 2. IBM SBC
2-2-X First 64KB of RAM failed.	1. Memory Module 2. IBM SBC
2-3-X	1. Memory Module 2. IBM SBC

Blink Symptom/Error	FRU/Action
2-4-X	<ol style="list-style-type: none"> 1. Run Setup. 2. Memory Module 3. IBM SBC
3-1-X DMA register failed.	<ol style="list-style-type: none"> 1. IBM SBC
3-2-4 Keyboard controller failed.	<ol style="list-style-type: none"> 1. IBM SBC 2. Keyboard
3-3-4 Screen initialization failed.	<ol style="list-style-type: none"> 1. Analog Video PMC Form Factor Card Adapter 2. IBM SBC 3. Display
3-4-1 Screen retrace test detected an error.	<ol style="list-style-type: none"> 1. Analog Video PMC Form Factor Card Adapter 2. IBM SBC 3. Display
3-4-2 POST is searching for video ROM.	<ol style="list-style-type: none"> 1. Analog Video PMC Form Factor Card Adapter 2. IBM SBC
4	<ol style="list-style-type: none"> 1. Analog Video PMC Form Factor Card Adapter 2. IBM SBC
All other blink code sequences.	<ol style="list-style-type: none"> 1. IBM SBC
One long and one short blink during POST. Base 640KB memory error or shadow RAM error.	<ol style="list-style-type: none"> 1. Memory Module 2. IBM SBC
One long blink and two or three short blinks during POST. (Analog Video PMC Form Factor Card error)	<ol style="list-style-type: none"> 1. Display Adapter 2. IBM SBC
Three short blinks during POST.	<ol style="list-style-type: none"> 1. See "Removing and Replacing an IBM SBC" on page 8-34. 2. IBM SBC
Continuous blinking.	<ol style="list-style-type: none"> 1. IBM SBC
Repeating short blinks.	<ol style="list-style-type: none"> 1. Check for stuck keyboard key. 2. Keyboard Cable 3. IBM SBC

No-Blink Symptoms

Symptom/Error	FRU/Action
No blink during POST but the system unit works correctly.	<ol style="list-style-type: none"> 1. LED Board 2. LED Cable 3. IBM SBC
No blink during POST.	<ol style="list-style-type: none"> 1. See "Undetermined Problem" on page 8-27. 2. IBM SBC 3. Memory Module 4. Any Adapter or Device 5. Power Cord 6. Power Supply

Numeric Error Codes

Error Code/Explanation	FRU/Action
000 SCSI Adapter not enabled.	1. Verify adapter device and Bus Master fields are enabled in the PCI Configuration Program.
08X Check SCSI terminator installation.	1. SCSI Cable 2. SCSI Terminator 3. SCSI Device 4. SCSI Adapter
101 IBM SBC interrupt failure.	1. IBM SBC
102 IBM SBC timer error.	1. IBM SBC
106	1. IBM SBC
110 IBM SBC memory parity error.	1. Memory Module 2. IBM SBC
111 I/O channel parity error.	1. Reseat adapters. 2. Any Adapter 3. IBM SBC
114 Adapter ROM error.	1. Adapter Memory 2. IBM SBC
129 Internal cache test error.	1. Processor 2. L2 Cache Memory 3. IBM SBC
151 Real-time clock failure.	1. IBM SBC
161 Bad battery.	1. Run Setup. 2. Battery (see page A-7) 3. IBM SBC
162 Configuration mismatch.	1. Run Setup and verify configuration. 2. Device was added, removed, changed location? If not, suspect that device. 3. Power-on external devices first, then power-on the system unit. 4. Battery (see page A-7) 5. IBM SBC
162 And unable to run diagnostic.	1. Diskette Drive 2. IBM SBC 3. Diskette Drive Cable
163 Clock not updating or invalid time set.	1. Set/check time and date. 2. Battery (see page A-7) 3. IBM SBC
164 POST detected a base memory or extended memory size mismatch error.	1. Run Setup and check System Summary menu for memory size change (see "Configuration/Setup Utility Program" on page 8-1). 2. Run the Extended Memory Diagnostic tests (Memory Test Group).
175	1. IBM SBC
176	1. Replace covers removed from the system unit.

Error Code/Explanation	FRU/Action
177 Corrupted Administrator Password.	1. IBM SBC
178	1. IBM SBC 2. IBM SBC
183	1. Enter the administrator password.
184 Password removed due to check-sum error.	1. Define new password.
185 Corrupted boot sequence.	1. Set configuration and reinstall the boot sequence.
186	1. IBM SBC
189	1. More than three password attempts were made to access the system unit. Power-off and try again.
1XX Not listed previously.	1. IBM SBC
201, 20X Memory data error.	1. Memory Module 2. IBM SBC
225 Unsupported memory.	1. Replace memory.
229 External cache test error.	1. L2 Cache Memory 2. IBM SBC
262 POST detected a base memory or extended memory type error.	1. Run Setup and Check System Summary menu for memory type change (see "Configuration/Setup Utility Program" on page 8-1). 2. Run the Extended Memory Diagnostic tests (Memory Test Group).
301	1. Keyboard 2. Keyboard Cable 3. IBM SBC Keyboard/Mouse Cable 4. IBM SBC
303 With an 8603 error.	1. Mouse 2. Keyboard 3. Keyboard Cable 4. IBM SBC Keyboard/Mouse Cable 5. IBM SBC
303 With no 8603 error.	1. Keyboard 2. Keyboard Cable 3. IBM SBC Keyboard/Mouse Cable 4. IBM SBC
3XX Not listed previously.	1. Keyboard 2. Keyboard Cable 3. IBM SBC Keyboard/Mouse Cable 4. IBM SBC
5XX	1. Analog Video PMC Form Factor Card 2. IBM SBC
601	1. Diskette Drive A 2. Diskette Drive Cable 3. IBM SBC

Error Code/Explanation	FRU/Action
602	<ol style="list-style-type: none"> 1. Diskette 2. Verify Diskette and retry.
604 And able to run diagnostic.	<ol style="list-style-type: none"> 1. Run Setup and verify diskette configuration settings. 2. Diskette Drive B 3. Diskette Drive Cable 4. IBM SBC
604 And unable to run diagnostic.	<ol style="list-style-type: none"> 1. Run Setup and verify diskette configuration settings. 2. Diskette Drive A 3. Diskette Drive Cable 4. IBM SBC
605 POST cannot unlock the diskette drive.	<ol style="list-style-type: none"> 1. Diskette Drive 2. Diskette Drive Cable 3. IBM SBC
662	1. Diskette drive configuration error or wrong diskette drive type. Run Setup and verify diskette configuration.
6XX Not listed previously.	<ol style="list-style-type: none"> 1. Diskette Drive 2. IBM SBC 3. External Drive Adapter 4. Diskette Drive Cable 5. Power Supply
962 Parallel port configuration error.	<ol style="list-style-type: none"> 1. Run Setup and verify parallel port configuration. 2. Parallel Adapter 3. IBM SBC
9XX	<ol style="list-style-type: none"> 1. Printer 2. IBM SBC
107X Check SCSI terminator installation.	<ol style="list-style-type: none"> 1. Check SCSI terminator installation. 2. SCSI Cable 3. SCSI Terminator 4. SCSI Device 5. SCSI Adapter
1101 Serial connector error or possible IBM SBC failure.	<ol style="list-style-type: none"> 1. IBM SBC 2. Any Serial Device
11XX Not listed previously.	1. IBM SBC
1692 Boot sequence error.	1. Run FDISK to ensure at least one active partition is set active.
1762 Hard disk drive configuration error.	1. Run Setup and verify hard disk drive configuration (see "Configuration/Setup Utility Program" on page 8-1).
1780 (Disk Drive 0) 1781 (Disk Drive 1) 1782 (Disk Drive 2) 1783 (Disk Drive 3)	<ol style="list-style-type: none"> 1. See "Power Supply" on page 8-13. 2. Hard Disk Drive 3. IBM SBC 4. Hard Disk Cable 5. Power Supply

Error Code/Explanation	FRU/Action
180X PCI configuration or resource error.	<ol style="list-style-type: none"> 1. Run Setup and verify PCI/ISA configuration settings. 2. If necessary, set ISA adapters to "Not available" to allow PCI adapters to configure properly. 3. Remove any suspected ISA adapters. 4. Rerun diagnostics. 5. PCI Adapter
1962 Boot sequence error.	<ol style="list-style-type: none"> 1. Possible hard disk drive problem (see "Hard Disk Drive Boot Error" on page 8-27).
2401, 2402 If screen colors are OK.	<ol style="list-style-type: none"> 1. Analog Video PMC Form Factor Card 2. IBM SBC 3. Display
2410	<ol style="list-style-type: none"> 1. Analog Video PMC Form Factor Card 2. IBM SBC 3. Display
2462 Analog Video PMC Form Factor Card memory configuration error.	<ol style="list-style-type: none"> 1. Check cable connections. 2. Run Setup and verify video configuration settings. 3. Analog Video PMC Form Factor Card Memory Modules 4. Analog Video PMC Form Factor Card Adapter 5. IBM SBC
8601, 8602	<ol style="list-style-type: none"> 1. Pointing Device (Mouse) 2. IBM SBC Keyboard/Mouse Cable 3. IBM SBC
8603, 8604	<ol style="list-style-type: none"> 1. IBM SBC 2. IBM SBC Keyboard/Mouse Cable 3. Pointing Device (Mouse)
86XX Not listed previously.	<ol style="list-style-type: none"> 1. Mouse 2. IBM SBC Keyboard/Mouse Cable 3. IBM SBC