Error Messages

Error Message/Symptom	FRU/Action
Address Exceeds the Size of Your Memory An invalid memory address was entered. Diagnostic Tests display this message during the Locate Bad Chips option.	1. Enter the correct address. 2. Memory Module 3. IBM SBC
Arithmetic Functions Failed An error was detected during the CPU Test.	1. Microprocessor 2. IBM SBC
Base Memory Test Failed An error was detected in base memory.	1. Memory Module 2. IBM SBC
Boot Sector Unreadable A boot sector read error was detected on the hard disk drive.	1. Hard Disk Drive 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter 4. IBM SBC
Bus Noise Test Failed RAM Test detected an error in the memory bus.	1. Memory Module 2. IBM SBC
Butterfly Cylinder Access Test Failed Hard Disk Drive Test detected mismatch between the data read and the data stored on the drive.	1. Hard Disk Drive 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter 4. IBM SBC
Clock Stopped Real-time clock has stopped working.	1. Battery (see page A-7) 2. IBM SBC
CMOS Clock Test Failed Time and Date Settings for CMOS and DOS **do not** Match.	1. Battery (see page A-7) 2. IBM SBC
Controller Diagnostic Test Failed An error was detected while testing the Hard Disk Controller (Adapter).	1. Hard Disk Drive Adapter 2. Hard Disk Drive 3. IBM SBC
Cylinder 0 errors Test detected an error reading the first cylinder of the hard disk drive.	1. Hard Disk Drive 2. Hard Disk Drive Adapter 3. IBM SBC
Device is Not Ready **Ready the Device...** **or** **Press Any Key**	1. Ensure the device is powered-on. 2. Replace failing device. 3. Device Adapter 4. IBM SBC
Disk Error Encountered Opening Output File **Press Any Key To Continue.**	1. Hard Disk Drive 2. Hard Disk Drive Adapter 3. IBM SBC
DMA #X Failed Main Components Test detected an error while testing the DMA controller.	1. IBM SBC
DMA Page Register Failed DMA page register error	1. IBM SBC
Drive (x) Media (y) Mismatch FAT ID mismatch with installed drive.	1. Check diskette and diskette drive capacity. 2. Diskette Drive 3. IBM SBC
Error in video buffer. **Bad bits.** Analog Video PMC Form Factor Card memory test error.	1. Analog Video PMC Form Factor Card Adapter 2. IBM SBC 3. Display

Error Message/Symptom	FRU/Action
Exception Interrupt In Protected Mode Diags Cannot Continue Server error, remove one adapter at a time until the symptom goes away.	1. Any Adapter 2. IBM SBC 3. Processor
Extended Memory Test Failed Extended memory error.	1. Memory Module 2. IBM SBC
Floppy Drive Failed Diskette drive(s) failed.	1. Diskette Drive 2. IBM SBC 3. Diskette Drive Cable
General Function Failed Remove one adapter at a time until the symptom goes away.	1. Any Adapter 2. IBM SBC 3. Processor
Hard Drives Failed Hard Disk Drive test error.	1. Hard Disk Drive 2. Hard Disk Drive Adapter 3. IBM SBC
Incorrect DOS version	1. Ensure you are using DOS version 3.0 or higher.
INT Mask Register Failed INT Mask Register error.	1. Microprocessor 2. IBM SBC
Invalid Date Clock/DOS date mismatch.	1. CMOS Backup Battery (see “Safety Notice 4” on page A-7) 2. IBM SBC
Invalid Time Clock/DOS time mismatch. Back-up clock and DOS time of day settings do not match.	1. CMOS Backup Battery (see “Safety Notice 4” on page A-7) 2. IBM SBC
Linear Cylinder Access Test Failed Hard disk drive error.	1. Hard Disk Drive 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter 4. IBM SBC
Logic Function Failed CPU Logic test error.	1. Microprocessor 2. IBM SBC
Loopback Error COM Port Test or Parallel Port error. A wrap plug must be installed to successfully complete these tests.	1. IBM SBC 2. Wrap Plug
Main Components Failed IBM SBC error.	1. IBM SBC 2. Processor
Memory test cannot run at this location in memory Not enough free memory available to start the memory test.	1. Memory Module 2. IBM SBC
Missing QAPlus/PRO Files(s) One or more diagnostic support files are missing.	1. Diagnostic Diskette
NO LOOPBACK PLUG. Skipping External loopback test No wrap plug installed.	1. Install the wrap plug on the serial port; then rerun the test. 2. IBM SBC Serial Cable 3. IBM SBC
Not ready Printer not on-line or not ready.	1. Ready Printer 2. Printer 3. Printer Cable 4. IBM SBC

Error Message/Symptom	FRU/Action
No 'type-amatic' repeat At least one repeat key must be tested during this test or an error will occur. Typematic test error.	1. Keyboard 2. IBM SBC Keyboard/Mouse Cable 3. IBM SBC
Not used by any standard device IRQ is not currently being used by a non-standard device.	1. IBM SBC
Numeric Proc Failed NPU test error.	1. Microprocessor 2. IBM SBC
Parallel Ports Failed Test Report Summary message.	1. IBM SBC
Pass (N): ** Errors ** Drive (X) Failed Diskette drive read/write test error.	1. Diskette Drive 2. IBM SBC 3. Diskette Drive Cable
Pass (N) Drive Not Ready Diskette drive door is open or defective.	1. Ensure diskette drive is ready. 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
Pass (N): Drive (X) Write Protected or Unformatted	1. Insert a non-write protected, formatted diskette into the diskette drive; then rerun the test. 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
Pass (N): Unknown Media Drive (X) Diskette Drive Test error.	1. Diskette 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
Place Hi-density Media in Drive Media/drive mismatch.	1. Diskette 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
Printer Failed Printer powered-on and ready?	1. Printer 2. Printer Cable 3. IBM SBC
Printer Fault Printer powered-on and ready?	1. Printer 2. Printer Cable 3. IBM SBC
Printer Not Selected Ensure the printer is powered-on and ready.	1. Printer 2. Printer Cable 3. IBM SBC
Program or File Not Found **Press Any Key** Diagnostics cannot find the USER(N).COM file.	1. Diagnostic Diskette 2. Diskette Drive 3. IBM SBC
Program Too Big To Fit In Memory Too many Terminate and Stay Resident programs in memory.	1. Reboot the system unit from the Diagnostic Diskette.
QAPlus/PRO Cannot Be Re-run because of Error in Relocating Program Diagnostics failed to relocate the Diagnostic Test programs so the memory space it resides in was not tested.	1. Diagnostic Diskette 2. Memory Module 3. IBM SBC

Error Message/Symptom	FRU/Action
RAM Memory Error in Block n. Bad bits n Memory error.	1. Memory Module 2. IBM SBC
RAM Test Failed Memory error.	1. Memory Module 2. IBM SBC
Read error on cylinder n Hard disk drive format error.	1. Hard Disk Drive 2. Hard Disk Drive Adapter 3. IBM SBC
Read Errors Diskette drive read error.	1. Diskette 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
Receive Error Serial Port loopback test error.	1. Serial Port Cable 2. IBM SBC
Refresh Failure Diagnostic Test detected an error while testing the DMA controller's RAM refresh cycle.	1. Memory Module 2. IBM SBC
RTC Interrupt Failure Diagnostic Test cannot detect the Real-Time clock interrupt.	1. IBM SBC
Serial Chip Error COM Port error, general.	1. Serial Port Cable 2. IBM SBC
Serial Compare Error COM Port error; information transmitted is not the same as information received.	1. Serial Port Cable 2. IBM SBC
Serial Time-out Error COM Port error; time interval is too long between transmitted and received data.	1. Serial Port Cable 2. IBM SBC
Serious Memory Error — Diags Cannot Continue Memory Test error.	1. Memory Module 2. IBM SBC
Sorry, You Need A Mouse Mouse or mouse driver was not detected.	1. Mouse 2. IBM SBC
System Hangs Go to "Undetermined Problem" on page 8-27.	1. Any device 2. Any adapter 3. IBM SBC
The Address Exceeds the Size of Your Memory An invalid memory address was entered. The Diagnostic Tests display this message during the Locate Bad Chips option under the interact menu if an invalid memory address was entered at the "Enter Memory Address Of Bad Chip" prompt.	1. Enter the correct address. 2. Memory Module 3. IBM SBC
That Number Is Out of Range An invalid bit number was entered. Diagnostic Tests display this message during the Locate Bad Chips option.	1. Enter the correct number. 2. Memory Module 3. IBM SBC
Too Many Errors — Test Aborted Too many errors; the Diagnostic Test cannot continue.	1. Microprocessor 2. IBM SBC
Transmit Error Internal or external serial port loopback test failure.	1. Serial Port Cable 2. IBM SBC

Error Message/Symptom	FRU/Action
Analog Video PMC Form Factor Card Adapter Failed Test Result Summary displayed if “Fail” was at the Quit/Fail/Pass menu of any video test.	1. Analog Video PMC Form Factor Card Adapter 2. IBM SBC 3. Display
Write error on cylinder n Hard disk drive write error.	1. Hard Disk Drive 2. Hard Disk Drive Adapter
Write Errors Diskette drive write error.	1. Diskette 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
Write Protected or Unformatted Diskette is write protected or is not formatted.	1. Insert a non-write-protected, formatted diskette into the diskette drive; then rerun the test. 2. Diskette Drive 3. IBM SBC 4. Diskette Drive Cable
You Cannot Delete the Motherboard “Remove Board” option was selected. The Diagnostic Tests display this message during the Locate Bad Chips option.	1. Make the correct selection. 2. Memory Module 3. IBM SBC 4. Processor

Miscellaneous Symptoms

Symptom	FRU/Action
Changing colors.	1. Display
Computer will not power-off. See “Power Supply” on page 8-13.	1. Power Switch 2. IBM SBC
Computer will not power-on. See “Power Supply” on page 8-13.	1. Power Switch 2. Power Supply 3. IBM SBC
Diskette drive in-use light remains on or does not light when drive is active.	1. Diskette Drive 2. IBM SBC 3. Diskette Drive Cable
Flashing cursor with an otherwise blank display.	1. IBM SBC 2. Primary Hard Disk Drive 3. Hard Disk Drive Cable
Incorrect memory size during POST.	1. Run the memory tests. 2. Memory Module 3. IBM SBC
“Insert a Diskette” icon appears with a known-good diagnostic diskette in the first 3.5-inch diskette drive.	1. Diskette Drive 2. IBM SBC 3. Diskette Drive Cable 4. Network Adapter
Intensity or color varies from left to right of characters and color bars.	1. Display 2. Analog Video PMC Form Factor Card
No power, or fan not running.	1. See “Power Supply” on page 8-13.
Nonsystem disk or disk error-type message with a known-good diagnostic diskette.	1. Diskette Drive 2. IBM SBC 3. Diskette Drive Cable

Symptom	FRU/Action
Other display symptoms not listed previously (including blank or illegible display).	1. See “Display” on page 8-14. 2. IBM SBC 3. Display
Power-on indicator or hard disk drive in-use light not on, but system unit works correctly.	1. Power Supply 2. IBM SBC 3. LED Cables
Printer problems.	1. See “Printer” on page 8-12.
Program loads from the hard disk with a known-good diagnostic diskette in the first 3.5-inch diskette drive.	1. Run Setup. 2. Diskette Drive 3. Diskette Drive Cable 4. IBM SBC 5. Power Supply
Serial or parallel port device failure (IBM SBC port).	1. Check external device self-test. 2. External Device 3. IBM SBC Keyboard/Mouse Cable 4. Cable 5. IBM SBC
Serial or parallel port device failure (adapter port).	1. Check external device self-test. 2. External Device 3. Cable 4. Alternate Adapter 5. IBM SBC
Some or all keys on the keyboard do not work.	1. Keyboard 2. Keyboard Cable 3. IBM SBC Keyboard/Mouse Cable 4. IBM SBC
Battery inaccurate.	1. Battery (see page A-7) 2. IBM SBC

Hard Disk Drive Boot Error

A hard disk drive boot error (error codes 1962 and I999030X) can be caused by the following.

Cause	Actions
The start-up drive is not in the boot sequence in the configuration.	Check the configuration and ensure the start-up drive is in the boot sequence.
No operating system is installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the start-up drive is corrupted.	The drive must be formatted. Do the following. 1. Attempt to access and recover (back up) the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive.
The drive is defective.	Replace the hard disk drive.

Undetermined Problem

Check the power supply voltages. See “Power Supply” on page 8-13. If the voltages are correct, return here and continue with the following steps.

1. Power-off the system unit.
2. Remove or disconnect the following, one at a time:
   a. Non-IBM devices
   b. External devices (modem, printer, or mouse)
   c. Any adapters
   d. Memory modules
      Before removing or replacing memory modules, see “Removing and Replacing an IBM SBC” on page 8-34.
   e. Extended video memory
   f. External Cache
   g. External Cache RAM
   h. Hard disk drive
   i. Diskette drive
3. Power-on the system unit to re-test it.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the IBM SBC. See “Removing and Replacing an IBM SBC” on page 8-34.

Removal and Replacement Procedures

This section describes the step-by-step procedures for removing and replacing features and field-replaceable units (FRUs) within the 7587 Industrial Computer. ***These procedures should be performed only by trained service personnel, because performing steps incorrectly could lead to personal injury or system unit damage.***

Before performing any removal and replacement procedures, be sure to read and understand the information in “Safety Information” on page A-10 and in “Handling Electrostatic-Discharge-Sensitive Devices” on page A-15.

CAUTION:

- **Power must always be switched off before performing any removal/replacement procedures; if possible, electrical power and any backup power source should also be unplugged or otherwise disconnected. To assure that power is switched off and disconnected in the correct order, start every removal and replacement procedure with “Switching Off Power and Disconnecting Cables” on page 8-29.**
- **Depending on the options installed, this system unit could weigh more than one person can comfortably lift. Do not attempt to lift it by yourself if you think it is too heavy for you.**

Attention:
Whenever handling electronic components, use precautions to prevent component damage due to electrostatic discharge. See “Handling Electrostatic-Discharge-Sensitive Devices” on page A-15 for a list of those precautions.

Reference Note
When performing any of the procedures that follow, refer to Figure 1-1 on page 1-1 and Figure 1-2 on page 1-2.

Switching Off Power and Disconnecting Cables

Use the following procedure to power-off the system unit and disconnect all cables **before** beginning any removal/replacement procedure. If it is necessary to remove the system unit from its mounting place, use this procedure **before** removing the system unit.

1. Remove any data media (diskettes, CDs, and so forth) from the system unit.
2. Switch off all power to the system unit and any attached devices.
3. Tag all cables connected to the system unit or somehow note their respective connectors to prevent confusing them when they are unplugged.
4. If you have a modem or fax machine attached, disconnect the telephone line from the wall outlet and then from the system unit.
5. Unplug or otherwise disconnect all electrical power and any backup power source.
6. Unplug all other cables connected to the system unit. Where applicable, unplug all cables at the receptacle end first, and then at the device end. (For D-shell connectors, remove the 2 screws that secure each cable to its D-shell connector, and then unplug the cable.)

When reassembling the system unit, reverse these steps.

You now are ready to proceed.

- For system units in which the mounting does not impede access, go directly to “Opening the System Unit.”
- For system units in which the mounting does impede access, it might be necessary to remove the system unit from its mounting place before starting the FRU removal/replacement procedure. This removal varies, depending on your particular mounting method.

Opening the System Unit

Loosen the 4 cover screws and lift off the system unit cover, as shown in Figure 1-2 on page 1-2.

Removing and Replacing Feature Cards

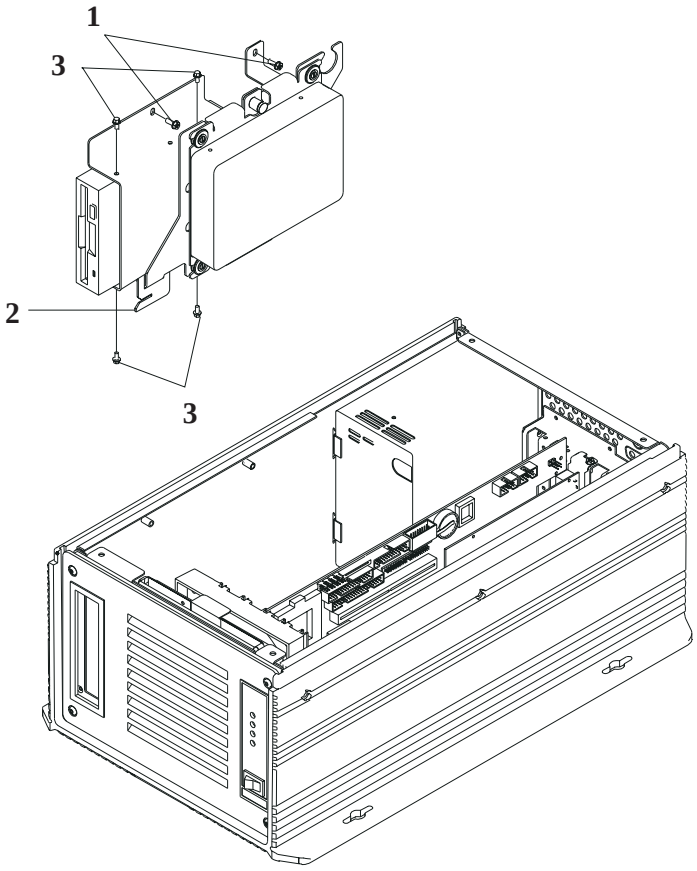
All feature cards are removed and replaced in the same way. The feature cards are secured by card retainers installed in the top cover. These retainers are adjusted to the height of the cards. If you remove a card, ensure you reinstall it in the same slot. If you change the position of a card in the backplane or install a different card, see “Installing the Card Hold-Down Spacers” on page 3-3 for information on installing the spacers. Longer feature cards are held additionally by slots in the front fan guard, while shorter cards do not reach that far.

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables.”
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Unscrew the retaining screw for the feature card to be removed.
4. Disconnect any cables going to that feature card.
5. Remove the feature card.

When reassembling the system unit, reverse these steps. Be sure that the feature card retainer properly captures all feature cards.

Removing and Replacing a Diskette Drive

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Disconnect the signal cable from the rear of the diskette drive.
4. Disconnect the power and signal cables from the hard disk drive.
5. Using the illustration, remove the 2 screws **1** that secure the diskette/hard disk drive assembly.



6. Carefully rotate the diskette/hard disk drive assembly slightly away from the side frame and slide it to the rear until the hooks **2** on the bottom of the assembly disengage from the chassis.
7. Remove the diskette/hard disk drive assembly from the 7587 Industrial Computer and place it on a flat surface.
8. Set any jumpers, switches, or terminators on the new drive just as they were set on the old drive.
9. Remove the 4 screws **3** securing the diskette drive and replace the drive.

When reassembling the system unit, reverse these steps.

Removing and Replacing a Hard Disk Drive

To remove and replace a hard disk drive, see “Installing an Internal Hard Drive” on page 3-4.

Removing and Replacing the Power Supply

CAUTION:
Never remove the cover on the power supply. If you have a problem with the power supply, you must replace the power supply FRU or have it serviced by a qualified technician.

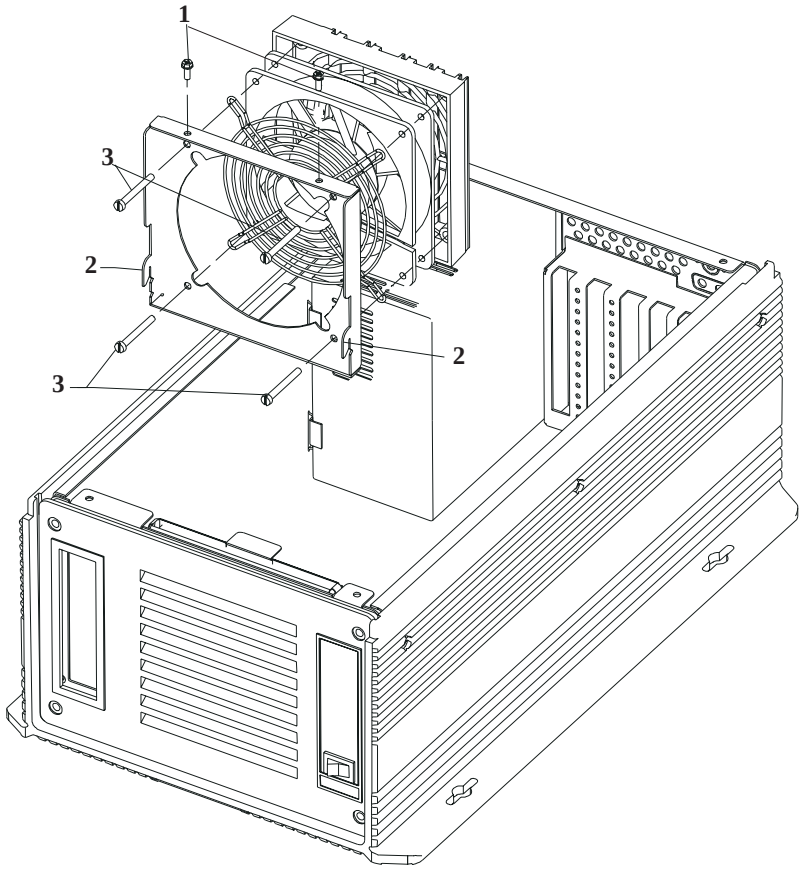
1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover. (It is not necessary to slide back the chassis.)
3. Unplug the power cables to all drives within the system unit.
4. Unplug the 4 power cables to the backplane.
5. Remove the 4 screws that secure the power supply to the rear mounting bracket.
6. Slide the power supply forward slightly to release it from its side bracket, and lift it out.

When reassembling the system unit, reverse these steps. Note that all connectors from the power supply are keyed; they can be attached only one way.

Attention:
Be sure to set the voltage switch on the power supply to the correct position. If you set it to the wrong position, you might damage your system unit when you turn it on.

Removing and Replacing the Front Fan

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Disconnect the fan power connector.
4. Remove the air filter assembly as described in “Cleaning Air Filters” on page 4-2.
5. Note the slot position of any adapter cards and the IBM SBC.
6. Remove the IBM SBC and any full-length adapter cards that reach the rear card guide.
7. Using the illustration, remove the 2 mounting screws **1**.



8. Remove the fan/card guide assembly from the unit by lifting the assembly up and to the rear until the hooks **2** are free of the frame.
9. Place the fan/card guide assembly on a flat surface.
10. Remove the 4 screws **3** that hold the fan/card guide assembly together.
11. Replace the fan and reassemble the fan/card guide assembly, making sure the arrow on the fan showing the airflow direction is pointing into the unit. (Refer to the illustration to make sure you have assembled the fan/card guide assembly correctly.)

When reassembling the system unit, reverse these steps. Be sure the feature card retainer properly captures all feature cards.

Removing and Replacing the LED Assembly

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Disconnect the switch cable from the power supply lead.
4. Disconnect the 3 LED connectors from the IBM SBC.
5. Remove the 6 screws **1** holding the lower cover to the chassis and remove the lower cover.

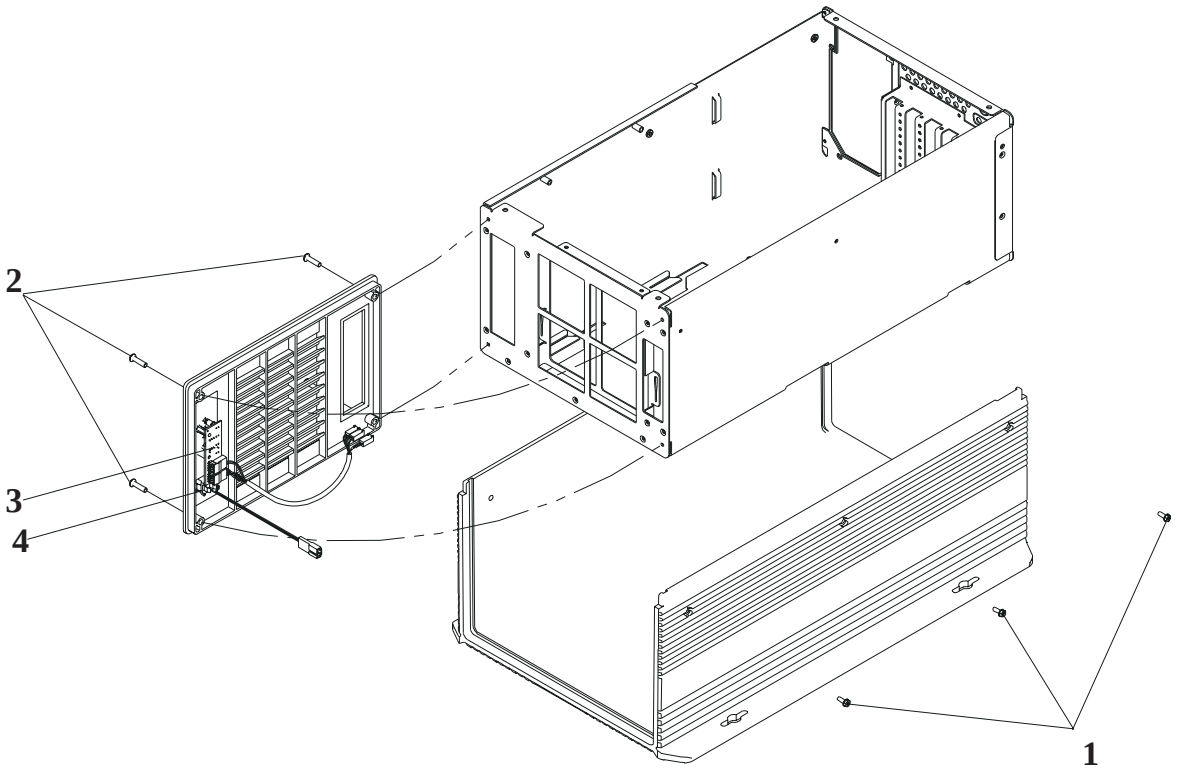


Figure 8-1. Removing and Replacing the LED Assembly

6. Remove the 4 screws **2** holding the front fascia to the chassis, and remove the fascia with the LED board attached.
7. Remove the screw **3** that holds the LED board to the fascia, and replace the LED board.

When reassembling the system unit, reverse these steps.

Removing and Replacing the Power Switch

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Disconnect the switch cable from the power supply lead.
4. Press the retaining clips on each side of the power switch (**4** in Figure 8-1 on page 8-33), and slide the switch out of the fascia.
5. Install the new switch.

When reassembling the system unit, reverse these steps.

Removing and Replacing an IBM SBC

Notes Before You Begin

- The BIOS and Vital Product Data (VPD) for the system unit you are servicing must be installed on the new IBM SBC after it is installed in the system unit.
- Always ensure the latest level of BIOS is installed on the system unit. A down-level BIOS may cause false errors and unnecessary replacement of the IBM SBC.
- Remove any installed options on the old SBC, and install them on the new IBM SBC.
- Ensure the new IBM SBC jumper settings match the old IBM SBC jumper settings.
- If the new IBM SBC does not correct the problem, reinstall the options on the old IBM SBC, reinstall the old IBM SBC, then replace the processor.

  The processor is a separate FRU from the IBM SBC and is not included with the IBM SBC FRU. If you are instructed to replace the IBM SBC, remove the processor chip from the old IBM SBC and install it on the new SBC (see “Removing and Replacing the Processor Chip” on page 8-36).

To remove and replace an IBM SBC

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Disconnect the cables from the top of the IBM SBC (see “Removing SIMMs” on page 3-8).
4. Remove the retaining screw on the IBM SBC rear bracket (see “Removing SIMMs” on page 3-8).
5. Lift the IBM SBC out of the backplane and remove it from the system unit (see “Removing SIMMs” on page 3-8).
6. Move all the external components from the old IBM SBC to the replacement IBM SBC. See “Removing SIMMs” on page 3-8 and “Cache Memory Modules” on page 3-8 for instructions on replacing the components.
7. Install the new IBM SBC in the system unit, making sure it is seated securely in the backplane.
8. Reinstall the retaining screw in the IBM SBC rear bracket.
9. Using the illustration Figure 6-1 on page 6-2, reconnect the cables to the IBM SBC.
10. Reinstall the covers and all external cables you disconnected.
11. Update the Flash and VPD. To do this, **you must run the Flash Update program using the Flash Update diskette**. See “BIOS Levels” on page 8-2, “Vital Product Data” on page 8-2, and “Flash (BIOS/VPD) Update Procedure” on page 8-2.

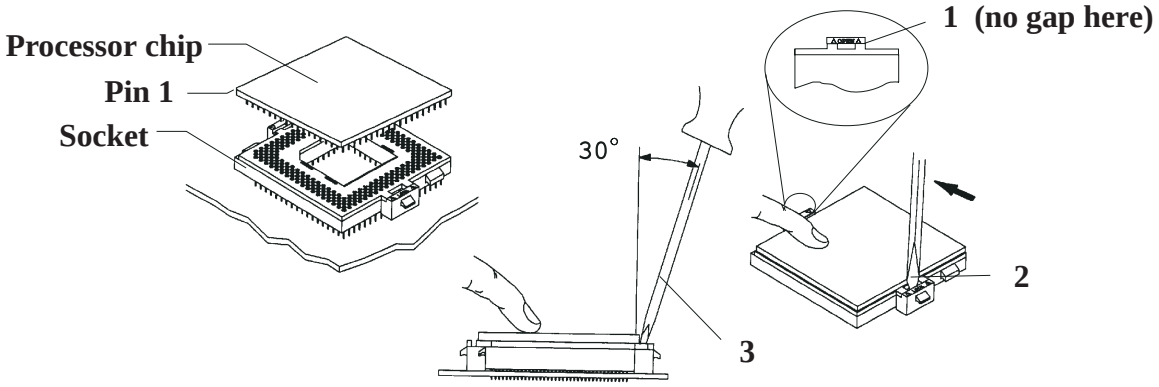
To remove and replace IBM SBC memory

See “System Memory (SIMMs)” on page 3-6.

Removing and Replacing the Processor Chip

To remove and replace the processor chip, do the following.

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Remove the IBM SBC as described in “Removing and Replacing an IBM SBC” on page 8-34.
4. Remove the heat sink clip and the heat sink (see “Bottom Cover and IBM SBC” on page 9-5 for location).



5. Put a flat-blade screwdriver into the slot **2** on the processor socket marked ∇OPEN∇, and move the screwdriver to vertical as shown in **3**.

   Attention: ***Moving the screwdriver past vertical can damage the processor socket.***

   The processor chip will move to the side approximately 1mm (.040 inches).
6. Remove the chip.
7. Install the new processor chip, ensuring the socket slider is in the open position, moved completely in the direction indicated by the ∇OPEN∇ symbol.

   Attention: ***Installing the chip incorrectly can damage it.***
8. Locate Pin 1 on the chip. Pin 1 is indicated by a cut corner on the chip. The socket has a similar cut corner to show Pin 1.
9. Align Pin 1 on the chip with Pin 1 on the socket, and install the chip. Align the pins as you install the socket.
10. Put a flat-blade screwdriver into the slot **2** on the processor socket marked ∇LOCK∇, and move the screwdriver to vertical as shown in **3**.

    Attention: ***Moving the screwdriver past vertical can damage the processor socket.***
11. The processor chip will move approximately 1mm (.040 inches) to the latched position. Be sure the processor and socket are latched completely as shown in **1**.
12. Install the heat sink and heat sink clip.
13. Reinstall the IBM SBC and test the system unit.

Removing and Replacing an Analog Video PMC Form Factor Card or Keyboard/Mouse Cable

To remove and replace the Analog Video PMC Form Factor Card or the keyboard/mouse cable, do the following.

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Remove the 2 screws **4** from the video connector.

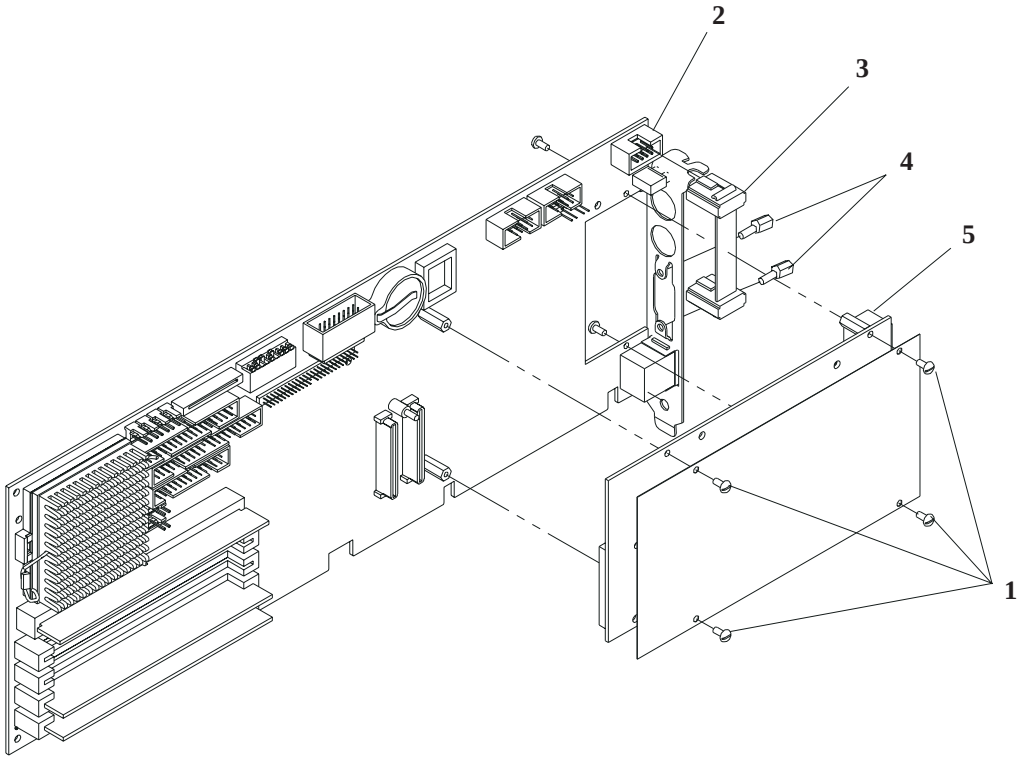


Figure 8-2. Removing and Replacing the Analog Video PMC Form Factor Card or Keyboard/Mouse Cable

4. Remove the 4 retaining screws **1** from the back of the IBM SBC.
5. Carefully separate the Analog Video PMC Form Factor Card from the IBM SBC.
6. Disconnect the keyboard/mouse cable **3** from the Analog Video PMC Form Factor Card. This cable plugs into the connectors **2** and **5**. You do not need to unplug the cable from the IBM SBC unless you are replacing the serial mouse cable.

Removing and Replacing the Backplane

To remove and replace the backplane, do the following.

1. Switch off all power to the system unit and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 8-29.
2. Loosen the 4 cover screws and lift off the system unit cover.
3. Refer to “Removing and Replacing Feature Cards” on page 8-29 and “Removing and Replacing an IBM SBC” on page 8-34, and remove all the cards plugged into the backplane
4. Refer to “Switching Off Power and Disconnecting Cables” on page 8-29 and disconnect the six cables that plug into the backplane.
5. Remove the 7 screws securing the backplane to the frame and remove the backplane. See “Bottom Cover and IBM SBC” on page 9-5 for an illustration of the backplane.

When reassembling the system unit, reverse these steps.

Chapter 9. Parts Catalog

Service replacement parts must be ordered by their field-replaceable unit (FRU) numbers. This chapter contains the FRU numbers for all available service replacement parts for the basic 7587 Industrial Computer. FRU numbers for adapter cards, drives, and other optional features should be obtained from the actual components or from the feature kits in which they were provided.

IBM Service Parts Warranty

For IBM service parts warranty information, see “Statement of Limited Warranty” on page v.

Backplane and Cables

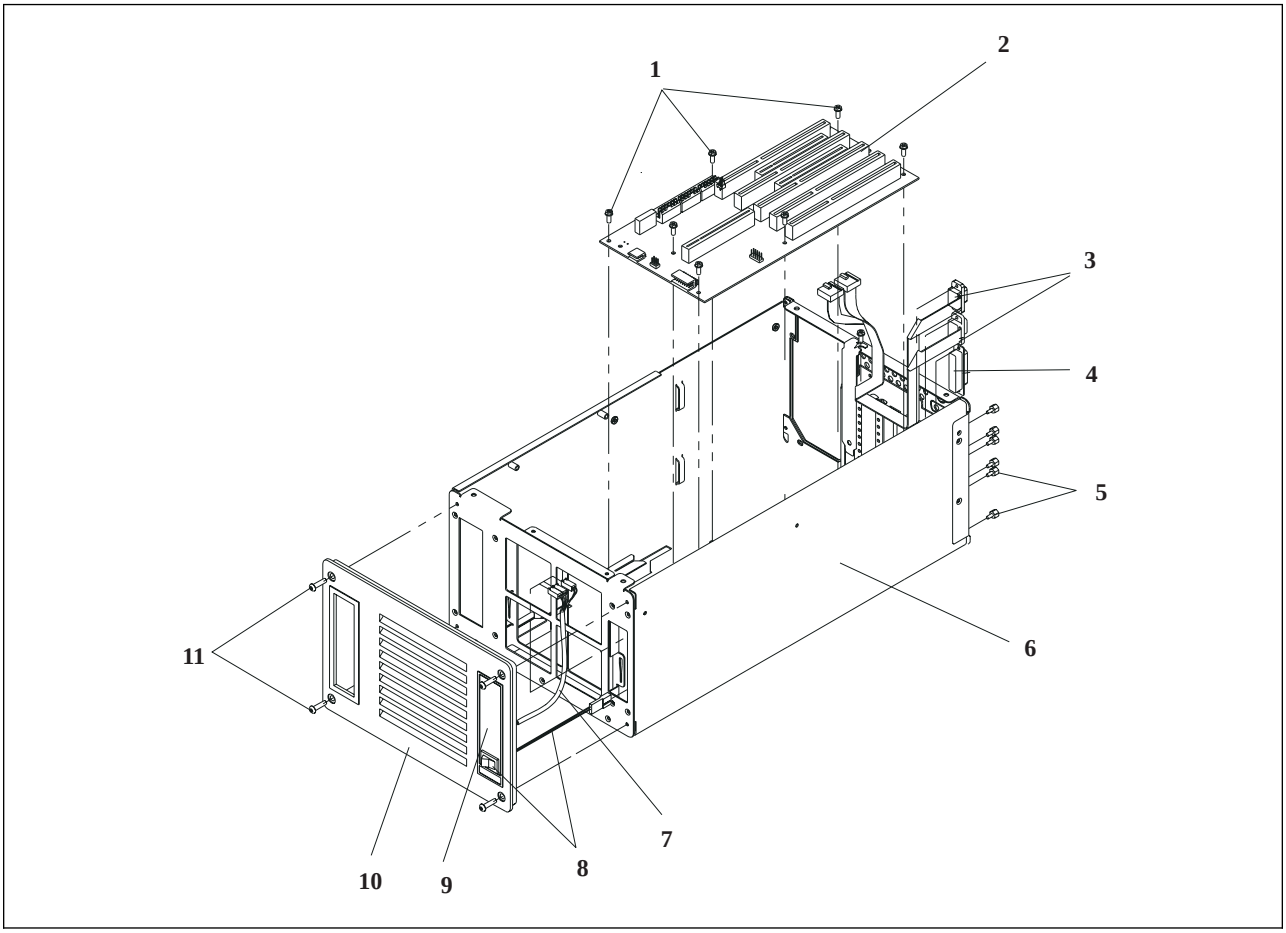


Figure 9-1. Backplane and Cables

Table 9-1. Backplane and Cables

Figure Index Number	FRU Part Number	FRU Description
1	78H5497	Mounting screws (contained in miscellaneous package)
2	78H5436	Backplane
3	78H5500	Serial cable (fits either port; includes 2 screw locks **5**)
4	78H5501	Parallel port (includes 2 screw locks **5**)
5	78H5497	Mounting screws (contained in miscellaneous package)
6	78H5496	Chassis assembly
7	78H5486	LED cable assembly
8	06H4268	On/Off switch
9	06H4264	LED board (behind bezel)
10	78H5499	Front bezel (contains bezel, label, 4 screws)
11	78H5497	Mounting screws (contained in miscellaneous package)