System x3450 Type 7948

Problem Determination Guide

System x3450 Type 7948

Problem Determination Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 79, and the *Warranty and Support Information* document on the IBM *Resource* CD.

First Edition (May 2008)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use the information in this section to help you identify potential unsafe conditions in an IBM® product that you are working on. Each IBM product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-IBM alterations or attachment of non-IBM features or options that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

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

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical currents.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.
- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
  - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
  - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Safety statements

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled with “Statement 1”, translations for that caution statement are in the *Safety Information* document under “Statement 1”.

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Statement 1:

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2:

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3:

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

Statement 4:

≥ 18 kg (39.7 lb)

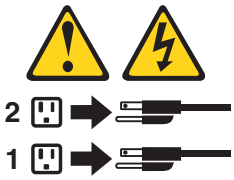
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 8:

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 13:

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 15:

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Chapter 1. Introduction

This *Problem Determination Guide* contains information to help you solve problems that might occur in the IBM System x3450 Type 7948 server. It describes the diagnostic procedures, error codes and suggested actions, and help for solving problems.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Related documentation

In addition to this document, the following documentation also comes with the server or can be downloaded from the web:

- *Quick Start User's Guide*

  This printed document contains instructions for setting up the server and basic instructions for installing some optional devices.
- *Service Guide*

  This document is in Portable Document Format (PDF) on the IBM *Resource* CD, if the CD was shipped with the server. You can also download this document from the web. It provides general information about the server, including information about features, and how to configure the server. It also contains detailed instructions for installing, removing, and connecting optional devices that the server supports.
- *Rack Installation Instructions*

  This printed document contains instructions for installing the server in a rack.
- *Safety Information*

  This document is in PDF on the IBM *Resource* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Warranty and Support Information*

  This document is in PDF on the IBM *Resource* CD. It contains information about the terms of the warranty and getting service and assistance.

Additional documentation might be included on the IBM *Resource* CD. If the *Resource CD* in did not come with the server, you can download the server documentation from the web at http://www.ibm.com/systems/support/.

The xSeries and System x Tools Center is an online information center that contains information about tools for updating, managing, and deploying firmware, device drivers, and operating systems. The xSeries and System x Tools Center is at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

The server might have features that are not described in the documentation that comes with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site. To check for updated documentation and technical updates, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3450** and click **Go**.

Notices and statements in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the IBM *Resource* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Chapter 2. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the server.

For additional problem solving information, see “Troubleshooting tables” on page 46 and “Solving undetermined problems” on page 65.

If you cannot diagnose and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 77 for more information.

Diagnostic tools

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes, error messages, and error logs**

  The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” for more information.
- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 46.
- **Server LEDs**

  Use the LEDs on the server to diagnose system errors quickly. See “Error LEDs” on page 55 for more information.
- **Dynamic System Analysis (DSA) program**

  The IBM Dynamic Systems Analysis (DSA) program is an online system information collection and analysis tool that you can use to provide information to IBM service and support to aid in the diagnosis of the system problems. For more information about the online DSA program, see “Dynamic System Analysis program” on page 61 or go to http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008. Documentation on how to use DSA is included with the downloadable files.

For additional problem solving information, see the *Service Guide* on the IBM *Resource* CD. If the *Resource CD* did not come with the server, you can download the documentation at:

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3450** and click **Go**.

POST

When you turn on the server, it performs a series of tests to check the operation of the server components and some optional devices in the server. This series of tests is called the power-on self-test, or POST.

If a power-on password is set, you must type the password and press Enter, when you are prompted, for POST to run.

If POST is completed without detecting any problems, the server startup is completed.

If POST detects a problem, several beeps might sound, or an error message is displayed. See “POST error beep codes” and “POST error codes” on page 8 for more information.

POST error beep codes

A POST beep code is a series of short beep codes that are separated by pauses. A beep code indicates that POST has detected a problem.

The following table describes the POST beep codes and suggested actions to correct the detected problems.

A single problem might cause more than one error message. When this occurs, correct the cause of the first error message. The other error messages usually will not occur the next time POST runs.

Exception: If multiple error codes indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 49 for information about diagnosing microprocessor problems.

Table 1. POST beep codes

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, System x3450 Type 7948,” on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Beep code	Description	Action
3	Memory error detected.	1. Make sure that no memory DIMM is lit. 2. If a memory LED is lit, reseat the DIMM. 3. Replace the DIMM if the problem remains.
6	BIOS rolling back error detected.	1. The server is running the backup BIOS. 2. Update the BIOS to the latest version. See “Updating the firmware” on page 67 for more information

BMC beep codes

A BMC beep code is a combination of short or long beeps or series of short beeps that are separated by pauses. For example, a “1-2-3-2” beep code is one short beep, a pause, two short beeps, and pause, three short beeps, and two short beep.

The baseboard management controller (BMC) will generate beep codes when it detects problems. The BMC beep codes will sound each time you turn on the server if a problem is detected.

The following table lists the baseboard management controller (BMC) beep codes that sounds when you turn on the server and a problem is detected.

Table 2. BMC beep codes

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, System x3450 Type 7948,” on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Beep code	Description	Action
1-5-2.1	CPU: Empty slot/population error - Processor slot 1 is not populated.	A microprocessor must be installed in slot 1.
1-5-4-2	Power fault: DC power unexpectedly lost (power good dropout)	1. Make sure that the power supply cord is correctly connected to the server and to a working electrical outlet. 2. (Trained service technician only) Replace the power supply. 3. (Trained service technician only) Replace the system board.
1-5-4-4	Power control fault failure.	1. (Trained service technician only) Replace the power supply. 2. (Trained service technician only) Replace the system board.

Error logs

The server generates two error logs:

- **POST error log**

  This log contains the error codes and messages that were generated during POST.
- **BMC system event error log**

  This log contains errors and messages that were generated by the BMC controller.

You can view the contents of the POST error log and the BMC system event log from the BIOS Setup Utility program. The system error log and BMC system event log are limited in size. When these logs are full, new entries will not overwrite existing entries; therefore, you must periodically clear them through the BIOS Setup Utility program. When you are troubleshooting an error, be sure to clear both logs so that you can find current errors more easily.

Entries that are written to the system error log and BMC system event log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

Each system-event/error log entry is displayed on its own page. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

Viewing error logs from the BIOS Setup Utility program

You can view the contents of the POST error log and the BMC system event error log from the BIOS Setup Utility program. For complete information about using the BIOS Setup Utility, see “Using the BIOS Setup Utility program” on page 68.

Viewing the POST error log: To view the POST error log, complete the following steps:

1. Turn on the server.
2. When the prompt `Press F2 to enter Setup` is displayed, press F2.
3. From the BIOS Setup main menu, select **Error Manager**.

Viewing the BMC system event log using the SELView Utility: The BMC system event log is accessible through the BIOS Setup Utility program using the extensible firmware interface (EFI) based System Event Log View (SELView) Utility. For additional information about the EFI Shell utilities, tools, and commands, see the documentation that is included in the downloadable files for the server at http://www.ibm.com/systems/support/.

You can use the SELView Utility to:

- View BMC system event log (SEL) data
- Save the system event log entries into a file
- Delete the current system event log entries
- View a system event log that you previously saved

The SELView Utility graphical user interface (GUI) screen consists of the three sections listed below. Use the <TAB> key to navigate between the three sections of the screen. Use the arrow keys to view options on the Menu bar.

- Menu bar (at the top of the screen)
- SEL event pane (in the middle of the screen)

- Event information pane (at the bottom of the screen)

To access the SELView Utility to view the system event log, complete the following steps:

1. Download the SELView Utility files to the USB key from the IBM web site.
   a. http://www.ibm.com/systems/support/.
   b. Under **Product support**, click **System x**.
   c. Under **Popular links**, click **Software and device drivers**.
   d. Click **IBM System x3450** to display the matrix of downloadable files for the server.

   Note: You can download the SELView Utility files to a USB flash drive or create a bootable CD.
2. After you download the files to the USB key device, type the command `ls` to view the contents of the USB key device.
3. Insert the USB key device into the USB port on the front of the server.
4. Start the server.
5. When the prompt `Press F2 to enter Setup` is displayed, press F2.
6. From the BIOS Setup main menu, select **Boot Manager**.
7. In the **Boot Manager** window, select **EFI Shell** and press Enter. The server boots to the EFI Shell.
8. Type the `map` command on the command line to view the device ID assigned to the USB key device.
9. At the EFI Shell prompt, type fs*n* (where n is the filesystem number for the USB key device).
10. Change the directory to the SELVIEW directory using the command: `cd selview`.
11. To start the SELView Utility, type the `selview` command at the command line.
12. Use the Tab key and tab to the SEL events pane.
13. Select a system event log entry using the arrow keys.
14. Tab to the event information pane and use the Up and Down arrow keys to read information in the system event log entry.

For more information on how to view the system event error log and to use the EFI commands, see the documentation that is included with the downloadable files.

POST error codes

POST issues three types of POST error messages:

Minor This error message will be displayed on the video screen or in the Error Manager screen. The server continues to boot but at a reduced state. You can choose to replace the component that caused the error. The POST Error Pause option setting in BIOS setup has no effect on this error.

Major This error message is displayed in the Error Manager screen and is logged to the system event log (SEL). The POST Error Pause option setting in BIOS setup controls whether the server pauses in Error Manager, at which time you can correct the problem or continue to boot the server.

Fatal This error message is displayed in the Error Manager screen and is logged to the system event log (SEL). The server will not start until the error is corrected. Replace the component that caused the error and restart the server. The POST Error Pause option setting in BIOS setup has no control on the server to pause in Error Manager.

The following table describes the POST error codes and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
0012	CMOS date and time not set.	Major	1. Re-enter the CMOS date and time. 2. Replace the CMOS lithium battery, if necessary. 3. (Trained service technician only) Replace the system board.
0048	Password check failed.	Fatal	1. Enter the correct System power-on password. 2. Clear the password by setting the Password Reset Jumper to ″reset″. See the *Service Guide* on the IBM *Resource* CD for information on resetting the password. 3. Restart the server and set the Password Reset Jumper to ″normal″. See the *Service Guide* on the IBM *Resource* CD for information on resetting the password. 4. Enter the new system power-on password in BIOS Setup.
0108	Keyboard component encountered a lock error.	Minor	1. Try again with a known working keyboard, replace the keyboard, if necessary.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
0109	Keyboard component encountered a stuck key error.	Minor	1. Make sure that no keys are pressed on the keyboard during system startup. 2. Try again with a known working keyboard, replace the keyboard, if necessary.
0140	PCI component encountered a PERR error.	Major	1. Make sure that the PCI Express card is properly seated in the correct PCI slot. 2. Make sure that the PCI Express card device drivers are installed and updated. 3. Replace the PCI Express card, if the problem remains. 4. (Trained service technician only) Replace the system board.
0141	PCI resource conflict error.	Major	1. Set the BIOS Setup option to automatically configure the PCI resources. 2. Update the system BIOS to the latest version. See "Updating the firmware" on page 67 for more information.
0146	Insufficient memory to shadow PCI ROM.	Major	1. Swap the PCI Express card in the PCI slot to see if the problem goes away. 2. Remove any additional PCI add-in cards that might be consuming ROM area.
0192	L3 cache size mismatch.	Fatal	1. Make sure that both of the microprocessors have matching cache sizes (for example: 12 MB last level cache). 2. Both microprocessors must match for proper operation. 3. (Trained service technician only) Replace the microprocessor.
0194	CPUID, processor family are different.	Fatal	1. Make sure that both microprocessors have matching microprocessor numbers (for example, Intel® Xeon® E5472 microprocessor). 2. (Trained service technician only) Replace the microprocessor.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
0195	Front side bus mismatch.	Fatal	1. Make sure that both microprocessors have matching front side bus speeds (for example, 1600 MHz, or 1333 MHz). 2. Both microprocessors must match for proper operation. 3. (Trained service technician only) Replace the microprocessor.
0196	Processor model mismatch.	Major	1. Make sure that both microprocessors have matching microprocessor numbers (for example, Intel Xeon E5472 microprocessor). 2. Both microprocessors must match for proper operation. 3. (Trained service technician only) Replace the microprocessor.
0197	Processor speeds mismatched.	Major	1. Make sure that both microprocessors have matching microprocessor numbers (for example, Intel Xeon E5472 microprocessor). 2. Both microprocessors must match for proper operation. 3. (Trained service technician only) Replace the microprocessor.
0198	Processor family is unsupported.	Major	1. The server only supports Intel Xeon 5400, 5300, 5200, and 5100 series microprocessors. 2. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported microprocessors for the server. 3. (Trained service technician only) Replace the microprocessor.
5220	CMOS/NVRAM configuration cleared.	Major	1. Displayed when CMOS/NVRAM is cleared in the BIOS Setup menu. 2. Reset the BIOS Setup values to the Default Values (as desired) and restart the server. For additional information on CMOS, see the *Service Guide* on the IBM *Resource* CD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
5221	Passwords cleared by jumper.	Major	1. Displayed when the Password Reset jumper on the system board is set to the reset position. 2. Reset the Password Reset jumper to the normal position for normal operation. See the *Service Guide* on the IBM *Resource* CD for information on resetting the password.
5224	Password clear Jumper is set.	Major	1. Displayed when the Password Reset jumper on the system board is set to the reset position. 2. Reset the Password Reset jumper to the normal position for normal operation. See the *Service Guide* on the IBM *Resource* CD for information on resetting the password.
8110	Processor 01 internal error (IERR) on last boot.	Major	1. An IERR error can be caused by various sources, including PCI add-in cards. 2. Make sure that the PCI add-in card is properly installed with the latest device driver updates. 3. Replace the PCI card or I/O device. 4. (Trained service technician only) Replace the microprocessor.
8111	Processor 02 internal error (IERR) on last boot.	Major	1. An IERR error can be caused by various sources, including the PCI add-in card. 2. Make sure that the PCI add-in card is properly installed with the latest device driver updates. 3. Replace the PCI card or I/O device. 4. (Trained service technician only) Replace the microprocessor.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8120	Processor 01 thermal trip error on last boot.	Major	Make sure that: • The system fans are connected and operating at the normal RPMs. • The environmental ambient temperature is not abnormal. • A normal software workload is running. • The microprocessor heatsink is installed correctly. • (Trained service technician only) Replace the microprocessor.
8121	Processor 02 thermal trip error on last boot.	Major	Make sure that: • The system fans are connected and operating at the normal RPMs. • The environmental ambient temperature is not abnormal. • A normal software workload is running. • The microprocessor heatsink is installed correctly. • (Trained service technician only) Replace the microprocessor.
8130	Processor 01 disabled.	Major	1. Make sure that the microprocessor is enabled in the system BIOS Setup. 2. (Trained service technician only) Make sure that the microprocessor is installed correctly and that the heatsink assembly is installed correctly. 3. Start the server again.
8131	Processor 02 disabled.	Major	1. Make sure that the microprocessor is enabled in the system BIOS Setup. 2. (Trained service technician only) Make sure that the microprocessor is installed correctly and that the heatsink assembly is installed correctly. 3. Start the server again.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8140	Processor 01 failed FRB-3 Timer.	Minor	1. Fault Resilient Boot (FRB) "three-strike" error detected. 2. Set the microprocessor in the BIOS Setup to retest on next boot to clear the error. 3. Start the server again. 4. (Trained service technician only) Replace the microprocessor.
8141	Processor 02 failed FRB-3 Timer.	Minor	1. Fault Resilient Boot (FRB) "three-strike" error detected. 2. Set the microprocessor in the BIOS Setup to retest on next boot to clear the error. 3. Start the server again. 4. (Trained service technician only) Replace the microprocessor.
8160	Processor 01 unable to apply BIOS update.	Major	1. Make sure that the correct firmware update package is being applied. 2. Update the server using the latest firmware update package. See "Updating the firmware" on page 67 for more information.
8161	Processor 02 unable to apply BIOS update.	Major	1. Make sure that the correct firmware update package is being applied. 2. Update the server using the latest firmware update package. See "Updating the firmware" on page 67 for more information.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8170	Processor 01 failed Self Test (BIST).	Major	1. Make sure that the microprocessor is enabled in the system BIOS Setup. 2. (Trained service technician only) Make sure that the microprocessor is installed correctly and that the heatsink assembly is installed correctly. 3. Start the server again to run the test. 4. (Trained service technician only) Swap the microprocessor with one that is known to work, replace the microprocessor, if necessary.
8171	Processor 02 failed Self Test (BIST).	Major	1. Make sure that the microprocessor is enabled in the system BIOS Setup. 2. (Trained service technician only) Make sure that the microprocessor is installed correctly and that the heatsink assembly is installed correctly. 3. Start the server again to run the test. 4. (Trained service technician only) Swap the microprocessor with one that is known to work, replace the microprocessor, if necessary.
8180	Processor 01 BIOS does not support the current stepping for processor.	Minor	Update the system BIOS to the latest version. See "Updating the firmware" on page 67 for more information.
8181	Processor 02 BIOS does not support the current stepping for processor.	Minor	Update the system BIOS to the latest version. See "Updating the firmware" on page 67 for more information.
8190	Watchdog timer failed on last boot.	Major	1. Power-off the server; then, restart the server. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8198	Operating system boot watchdog timer expired on last boot	Major	1. Power-off the server; then, restart the server. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board.
8300	Baseboard management controller failed self-test.	Major	1. Start the server again. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
84F2	Baseboard management controller failed to respond.	Major	1. Start the server again. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
84F3	Baseboard management controller in update mode.	Major	Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information.
84F4	Sensor data record empty.	Major	Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information.
84FF	System event log full.	Minor	Clear the system event log in BIOS Setup to free up space. See "Viewing the BMC system event log using the SELView Utility" on page 6 for details.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8500	Memory component could not be configured in the selected RAS mode.	Major	1. You must install matched DIMM sets across the channels to support memory mirroring. 2. Make sure that each memory channel is populated with matching DIMM configurations.
8520	DIMM_A1 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8521	DIMM_A2 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8522	DIMM_A3 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8523	DIMM_A4 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8524	DIMM_B1 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8525	DIMM_B2 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8526	DIMM_B3 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8527	DIMM_B4 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8528	DIMM_C1 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8529	DIMM_C2 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
852A	DIMM_C3 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
852B	DIMM_C4 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
852C	DIMM_D1 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
852D	DIMM_D2 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
852E	DIMM_D3 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
852F	DIMM_D4 failed Self Test (BIST).	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8540	DIMM_A1 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8541	DIMM_A2 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8542	DIMM_A3 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8543	DIMM_A4 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8544	DIMM_B1 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8545	DIMM_B2 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8546	DIMM_B3 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8547	DIMM_B4 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8548	DIMM_C1 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8549	DIMM_C2 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
854A	DIMM_C3 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
854B	DIMM_C4 Disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
854C	DIMM_D1 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
854D	DIMM_D2 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
854E	DIMM_D3 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
854F	DIMM_D4 disabled.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM is enabled in BIOS Setup. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Replace the DIMM.
8550	CLTT configuration failed. Defaulting to OLTT	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM has a thermal sensor. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Make sure that there is proper airflow within chassis (all system fans working). 5. OLTT (Open-Loop Thermal Throttling) will be enabled when CLTT (Closed-Loop Thermal Throttling) is disabled. 6. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8560	DIMM_A1 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8561	DIMM_A2 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8562	DIMM_A3 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8563	DIMM_A4 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8564	DIMM_B1 component encountered a Serial Presence Detection (SPD) fail err	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8565	DIMM_B2 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8566	DIMM_B3 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8567	DIMM_B4 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8568	DIMM_C1 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
8569	DIMM_C2 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
856A	DIMM_C3 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
856B	DIMM_C4 component encountered a Serial Presence Detection (SPD) fail error	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
856C	DIMM_D1 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
856D	DIMM_D2 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
856E	DIMM_D3 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.
856F	DIMM_D4 component encountered a Serial Presence Detection (SPD) fail error.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8580	DIMM_A1 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8581	DIMM_A2 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8582	DIMM_A3 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8583	DIMM_A4 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8584	DIMM_B1 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8585	DIMM_B2 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8586	DIMM_B3 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8587	DIMM_B4 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8588	DIMM_C1 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
8589	DIMM_C2 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
858A	DIMM_C3 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
858B	DIMM_C4 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
858C	DIMM_D1 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
858D	DIMM_D2 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
858E	DIMM_D3 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
858F	DIMM_D4 correctable ECC error encountered.	Minor/Major after 10 errors	1. The DIMM has detected an ECC correctable error. 2. Try again and verify if the DIMM continues to encounter an ECC correctable error (>10 times). 3. Replace the DIMM.
85A0	DIMM_A1 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM with a known DIMM that works; then, replace DIMM, if necessary.
85A1	DIMM_A2 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A2	DIMM_A3 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A3	DIMM_A4 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A4	DIMM_B1 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
85A5	DIMM_B2 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A6	DIMM_B3 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A7	DIMM_B4 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A8	DIMM_C1 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85A9	DIMM_C2 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85AA	DIMM_C3 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85AB	DIMM_C4 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85AC	DIMM_D1 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
85AD	DIMM_D2 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85AE	DIMM_D3 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85AF	DIMM_D4 uncorrectable ECC error encountered.	Major	1. The DIMM has detected an uncorrectable ECC error. 2. Make sure that the DIMM is installed correctly. 3. Replace the DIMM.
85FC	Closed loop thermal throttling could not be configured, defaulting to open loop.	Major	1. Make sure that the DIMM is installed correctly. 2. Make sure that the DIMM has a thermal sensor. 3. Make sure that the server supports the DIMM type and speed. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server. 4. Make sure that there is proper airflow within chassis (all system fans working). 5. OLTT (Open-Loop Thermal Throttling) will be enabled when CLTT (Closed-Loop Thermal Throttling) is disabled. 6. Replace the DIMM.
8601	Override jumper is set to force boot from lower alternate BIOS bank of flash ROM Minor.	Minor	1. The BIOS Select Jumper (J3H1) is set to positions 1 and 2. This causes the server to boot from lower (secondary) bank. 2. Move the BIOS Select Jumper (J3H1) to positions 2 and 3 for normal operation and to clear the error code.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
8602	WatchDog timer expired (secondary BIOS may be bad!).	Minor	Update the system BIOS to latest version. See "Updating the firmware" on page 67 for more information.
8603	Secondary BIOS checksum fail.	Minor	Update the system BIOS to latest version. See "Updating the firmware" on page 67 for more information.
8604	Chipset Reclaim of non critical variables complete.	Minor	1. Restart the server to see if the error remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information.
9000	Unspecified processor component has encountered a non specific error.	Major	1. Make sure that the processor re-test option is selected in BIOS Setup. 2. Check to see if the CPU fault LED is lit. 3. Restart the server to see if the error remains. 4. (Trained service technician only) Replace the microprocessor, if necessary.
9223	Keyboard component was not detected.	Minor	1. Make sure that the keyboard cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the keyboard. 4. (Trained service technician only) Replace the system board, if necessary.
9226	Keyboard component encountered a controller error.	Minor	1. Make sure that the keyboard cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the keyboard. 4. (Trained service technician only) Replace the system board, if necessary.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
9243	Mouse component was not detected.	Minor	1. Make sure that the cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the mouse. 4. (Trained service technician only) Replace the system board, if necessary.
9246	Mouse component encountered a controller error.	Minor	1. Make sure that the cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the mouse. 4. (Trained service technician only) Replace the system board, if necessary.
9266	Local Console component encountered a controller error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the serial device; then, start the server again to see if the problem remains.
9268	Local Console component encountered an output error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the serial device; then, start the server again to see if the problem remains.
9269	Local Console component encountered a resource conflict error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the serial device; then, start the server again to see if the problem remains.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
9286	Remote Console component encountered a controller error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the serial device; then, start the server again to see if the problem remains.
9287	Remote Console component encountered an input error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the serial device; then, start the server again to see if the problem remains.
9288	Remote Console component encountered an output error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. Replace the serial device; then, start the server again to see if the problem remains.
92A3	Serial port component was not detected.	Major	1. Make sure that the serial device cable is connected correctly. 2. Make sure that the cable that is being used is the correct cable. 3. Start the server again to see if the problem remains. 4. (Trained service technician only) Replace the system board, if necessary.
92A9	Serial port component encountered a resource conflict error.	Major	1. Start the server again to see if the problem remains. 2. (Trained service technician only) Replace the system board, if necessary.
92C6	Serial Port controller error.	Minor	1. Make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. (Trained service technician only) Replace the system board, if necessary.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
92C7	Serial Port component encountered an input error.	Minor	1. If present, make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. (Trained service technician only) Replace the system board, if necessary.
92C8	Serial Port component encountered an output error.	Minor	1. If present, make sure that the serial device cable is connected correctly. 2. Start the server again to see if the problem remains. 3. (Trained service technician only) Replace the system board, if necessary.
94C6	LPC component encountered a controller error.	Minor	1. Start the server again to see if the problem remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
94C9	LPC component encountered a resource conflict error.	Major	1. Start the server again to see if the problem remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
9506	ATA/ATPI component encountered a controller error.	Minor	1. Make sure that the hard disk drive or optical drive cable is connected correctly. 2. Start the server again to see if the problem remains. 3. (Trained service technician only) Replace the system board, if necessary.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
95A6	PCI component encountered a controller error.	Minor	1. Start the server again to see if the problem remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
95A7	PCI component encountered a read error.	Minor	1. Start the server again to see if the problem remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
95A8	PCI component encountered a write error.	Minor	1. Start the server again to see if the problem remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
9609	Unspecified software component encountered a start error.	Minor	1. Restart the server to see if the error remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
9641	PEI Core component encountered a load error.	Minor	1. The Pre-EFI initialization core was enabled by BIOS. 2. Restart the server to see if the error remains. 3. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 4. (Trained service technician only) Replace the system board, if necessary.
9667	PEI module component encountered a illegal software state error.	Fatal	1. Restart the server to see if the error remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
9687	DXE core component encountered a illegal software state error.	Fatal	1. A Driver Execution Environment error was detected. 2. Restart the server to see if the error remains. 3. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 4. (Trained service technician only) Replace the system board, if necessary.
96A7	DXE boot services driver component encountered a illegal software state error.	Fatal	1. Restart the server to see if the error remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
96AB	DXE boot services driver component encountered invalid configuration.	Minor	1. Restart the server to see if the error remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.
96E7	SMM driver component encountered a illegal software state error.	Fatal	1. A Server Management Mode error was detected. 2. Restart the server to see if the error remains. 3. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 4. (Trained service technician only) Replace the system board, if necessary.
0xA022	Processor component encountered a mismatch error.	Major	1. Make sure that both of the microprocessors match (microprocessor number, cache sizes, front side bus, etc.) 2. Both microprocessors must match for proper operation. 3. (Trained service technician only) Replace the microprocessor. 4. Start the server again to see if the problem remains.
0xA027	Processor component encountered a low voltage error.	Minor	1. Start the server again to see if the problem remains. 2. (Trained service technician only) Replace the system board, if necessary. 3. (Trained service technician only) Replace the power supply.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
0xA028	Processor component encountered a high voltage error.	Minor	1. Start the server again to see if the problem remains. 2. (Trained service technician only) Replace the system board, if necessary. 3. (Trained service technician only) Replace the power supply.
0xA421	PCI component encountered a SERR error.	Fatal	1. Make sure that the PCI Express card is correctly installed. 2. Make sure that the PCI Express card has the latest version of the device drivers and firmware installed. 3. Replace the PCI card. 4. (Trained service technician only) Replace the system board.
0xA500	ATA/ATPI ATA bus SMART not supported.	Minor	1. SMART-capable ATA/ATAPI drives are required to enable the SMART reporting function. 2. Install supported SMART-capable drives. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported drives for the server
0xA501	ATA/ATPI ATA SMART is disabled	Minor	1. SMART-capable ATA/ATAPI drives are required to enable the SMART reporting function. 2. Install supported SMART-capable drives. Go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported DIMMs for the server
0xA5A0	PCI Express component encountered a PERR error.	Minor	1. Make sure that the PCI Express card is correctly installed. 2. Make sure that the PCI Express card has the latest version of the device drivers and firmware installed.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Response type	Action
0xA5A1	PCI Express component encountered a SERR error.	Fatal	1. Make sure that the PCI Express card is correctly installed. 2. Make sure that the PCI Express card have the latest version of the device drivers and firmware installed.
0xA5A4	PCI Express IBIST error.	Major	1. Make sure that the PCI Express card is correctly installed. 2. Start the server again to see if the problem remains. 3. Replace the PCI Express card. 4. (Trained service technician only) Replace the system board, if necessary.
0xA6A0	DXE boot services driver Not enough memory available to shadow a legacy option ROM.	Minor	1. Restart the server to see if the error remains. 2. Update the server BIOS, BMC, and FRU/SDR firmware using the latest firmware update package. See "Updating the firmware" on page 67 for more information. 3. (Trained service technician only) Replace the system board, if necessary.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the server.

About the checkout procedure

Before you perform the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page v.
- The Dynamic System Analysis (DSA) Portable Edition is an online system information collection and analysis tool that you can use to provide information to IBM service and support to aid in the diagnosis of the system problems.
- If multiple error codes or LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 49 for information about diagnosing microprocessor problems.
- If the server is halted and a POST error code is displayed, see “Error logs” on page 6. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 46 and “Solving undetermined problems” on page 65.
- For information about power-supply problems, see “Solving power problems” on page 63.
- For intermittent problems, check the error log; see “Error logs” on page 6.

Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. Is the server part of a cluster?
   - **No:** Go to step 2.
   - **Yes:** Shut down all failing servers that are related to the cluster. Go to step 2.
2. Complete the following steps:
   a. Make sure that the ac power supply LED on the rear of the power supply is lit (green), indicating that the power supply is operating correctly (see “Power-supply LED” on page 59).
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility at http://www.ibm.com/servers/eserver/serverproven/compat/us/.
   d. Check all cables and power cords.
   e. Set all display controls to the middle positions.
   f. Turn on all external devices.
   g. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 46.
   h. Check the system-status LED on the front control panel. If it is lit, check the LEDs on the system board (see “Error LEDs” on page 55).
   i. Check for the following results:
      - Successful completion of POST, indicated by one beep
      - Successful completion of startup
3. Did more than one beep sound, or was a POST error code displayed?
   - **Yes:** Find the beep code or error code in “POST error beep codes” on page 4 or “POST error codes” on page 8; if necessary, see “Solving undetermined problems” on page 65.
   - **No:** Find the failure symptom in “Troubleshooting tables” on page 46.
     – If you still suspect a problem, see “Solving undetermined problems” on page 65.

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms.

If you have just added new software or a new optional device and the server is not working, complete the following steps before you use the troubleshooting tables:

1. Check the LEDs on the front panel or the system board (see “Error LEDs” on page 55).
2. Remove the software or device that you just added.
3. Reinstall the new software or new device.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, System x3450 Type 7948,” on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, System x3450 Type 7948,” on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables. If the problem remains, replace the drive.

Intermittent problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the system event/error log (see "Error logs" on page 6). 3. See "Solving undetermined problems" on page 65.

Keyboard, mouse, or pointing-device problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
All or some keys on the keyboard do not work.	1. Make sure that: • The keyboard is compatible with the server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/. • The keyboard cable is securely connected. • The server and the monitor are turned on. 2. If you are using a USB keyboard, run the BIOS Setup Utility program and enable keyboardless operation. 3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Keyboard b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The mouse or pointing device does not work.	1. Make sure that: • The mouse is compatible with the server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/. • The mouse or pointing-device cable is securely connected to the server. • The mouse or pointing-device device drivers are installed correctly. • The server and the monitor are turned on. • The mouse option is enabled in the BIOS Setup Utility program. 2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
The amount of system memory that is displayed is less than the amount of installed physical memory.	1. Make sure that: • No error LEDs are lit on the front control panel assembly or on the system board. • The memory modules are seated correctly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the BIOS Setup Utility program. • All DIMMs are enabled. The server might have automatically disabled a DIMM when it detected a problem. • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. 2. Make sure that there is no memory mismatch when the server contains more than the minimum memory configuration and that you have installed the correct number of DIMMs (see the *Service Guide* on the IBM *Resource* CD for information about the supported DIMM configuration). 3. Reseat the DIMMs. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. DIMMs b. (Trained service technician only) System board

Microprocessor problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	1. Make sure that the microprocessor is supported on this server. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board

Monitor or video problems

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
Testing the monitor	1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server. 3. (Trained service technician only) Replace the system board.
The screen is blank.	1. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 52. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • A single beep sounds when the server is turned on, indicating the successful completion of POST. 2. Make sure that the correct server is controlling the monitor, if applicable. 3. Make sure that damaged BIOS code is not affecting the video; see the *Service Guide* on the IBM *Resource* CD for detailed information. 4. See "Solving undetermined problems" on page 65.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	1. Make sure that: • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application.
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. **Attention:** Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. **Notes:** a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the BIOS code with the correct language (see the *Service Guide* on the IBM *Resource* CD for details on updating the BIOS code). 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
An IBM optional device that was just installed does not work.	1. Make sure that: • The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the BIOS Setup Utility program. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that used to work does not work now.	1. Make sure that all of the cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. Reseat the failing device. 4. Replace the failing device.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The power/sleep button does not work (the server does not start). **Note:** The power/sleep button will not function until 20 seconds after the server has been connected to ac power.	1. Make sure that the front control-panel assembly power/sleep button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. Press the power/sleep button. 2. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The server contains the correct type of DIMMs. • The DIMMs are correctly seated. • The LED on the power supply do not indicate a problem. • The microprocessor is correctly installed. 3. Reseat the following components: a. DIMMs b. Power supply cables to all internal components 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. DIMMs b. (Trained service technician only) Power supply. 5. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 6. See "Power-supply LED" on page 59. 7. See "Solving undetermined problems" on page 65.
The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: a. Press Ctrl+Alt+Delete. b. Turn off the server by holding the power/sleep button for 5 seconds. c. Restart the server. d. If the server fails POST and the power/sleep button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the front control-panel assembly are not lit.	See "Solving undetermined problems" on page 65.

Serial port problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	Make sure that each port is assigned a unique address in the BIOS Setup Utility program and none of the serial ports is disabled.
A serial device does not work.	1. Make sure that: • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector. 2. Reseat the following components: a. Failing serial device b. Serial cable 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing serial device b. Serial cable c. (Trained service technician only) System board

Software problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that: • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact your place of purchase of the software.

Universal Serial Bus (USB) port problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A USB device does not work.	1. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. 2. Make sure that the USB configuration options are set correctly in the BIOS Setup Utility program. 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Error LEDs

The server has various component error LEDs that is lit when an error is detected. These LEDs and described in the followings sections.

Light guided diagnostic LEDs

Light guided diagnostics is a system of LEDs on various external and internal components of the server.

The server is designed so that LEDs remain lit when the server is connected to an ac power source but is not turned on, provided that the power supply is operating correctly. This feature helps you to isolate the problem when the operating system is shut down.

Many errors are first indicated by a lit system-status LED on the front control-panel assembly of the server. If this LED is lit, one or more LEDs elsewhere in the server might also be lit and can direct you to the source of the error.

Before you work inside the server to view the LEDs, read the safety information that begins on page v.

If an error occurs, view the server LEDs in the following order:

1. Check the control-panel assembly on the front of the server. If the system-status LED is lit, it indicates that an error has occurred.
2. Check the front and rear of the server to determine whether any component LEDs are lit.
3. Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a DIMM error will light the LED next to the failing DIMM on the system board.

   Look at the system service label on the server, which gives an overview of internal components. This information can often provide enough information to correct the error.

The following illustration shows the system-board LEDs. The system board has error LEDs that will help to locate the source of the error.

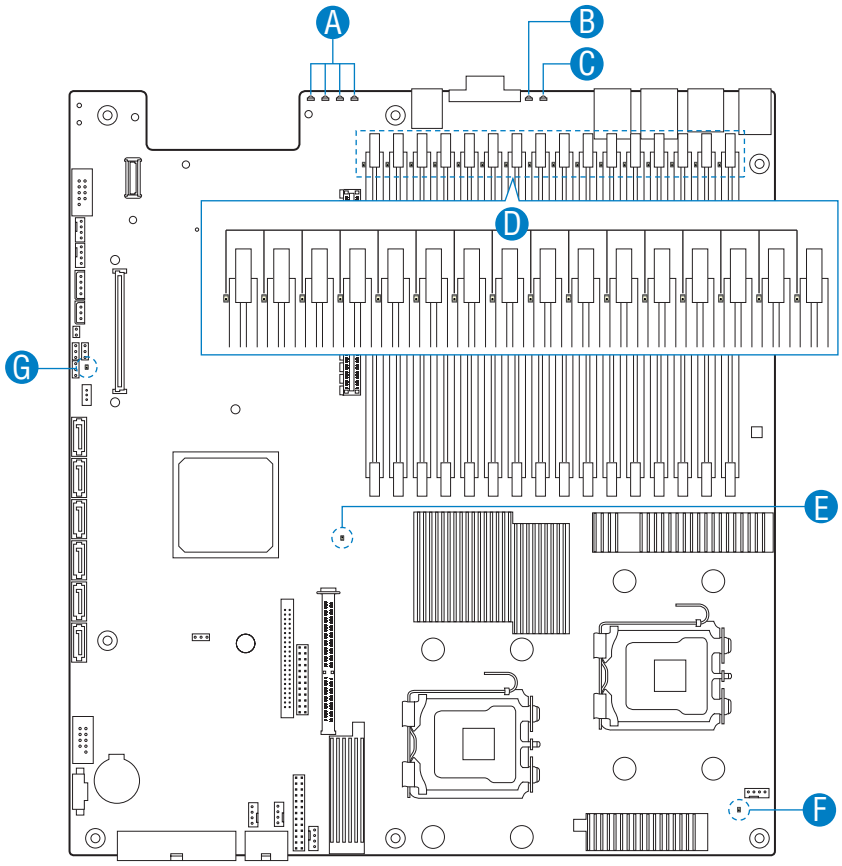


Table 3. Light-guided LEDs

Call-out letter	LED name	Description
A	POST code diagnostic LEDs	For debug use only.
B	System Identification (ID) LED	• This LED helps identify the server from other servers. The default for System ID LED is OFF. • When this LED is lit and blue, it indicates that the power/sleep button on the control panel have been pressed or that a software program has activated it.

Table 3. Light-guided LEDs (continued)

Call-out letter	LED name	Description
C	System status LED	When the ac power is applied to the server and the 5 volt standby voltage in supplied by the power supply, the BMC controller requires 5 to 10 seconds to initialize. The system status LED will continue to blink during this time, alternating between amber and green, and the power/sleep button function is disabled (preventing the server from starting). After the BMC initialization is complete, the system status LED stops blinking and the ability of power/sleep button to turn on the server is restored. When this LED is off, it indicates that the server is not connected to an ac power source. When this LED is alternating between green and amber, it indicates the following: • Pre power-on 15 to 20 seconds BMC initialization when AC power is applied to the server was not followed. The control panel buttons are disabled until BMC initialization is complete. When this LED is green, it indicates that the server powered up without incident and is ready for use. When this LED is green and blinking, it indicates any of the following: • The server performance is decreased. • The server is unable to use all of the memory installed (when more than one DIMM is installed). • The correctable errors have exceeded the threshold of 10 and is migrating to a spare DIMM (memory sparing). All space DIMMs are in use and redundancy capability is no longer available. The corresponding DIMM LED will be lit. • If the server is configured for memory mirroring and it has only two DIMMs installed, mirroring will not occur. • PCI Express link error occurred. • A CPU failure: disabled, if two processors are installed and one fail. • A fan alarm: fan failure. The number of working fans must be more than the minimum needed to cool the server. • A non-critical threshold was crossed: temperature and voltage. When this LED is amber and blinking, it indicates any of the following: • A non-fatal alarm: the server might fail. • A critical voltage threshold was exceeded. • The VRD signal or connection was established. • The server did not have the minimum number of fan that is required to cool the server or a fan failed. • The server is in non-sparing and non-mirroring mode if the threshold of ten correctable errors have been exceeded within the window of time. When this LED is amber continuously, it indicates any of the following: • A fatal alarm: server has failed or shutdown. • A DIMM failure when one DIMM is installed; no good memory. • A run-time memory uncorrectable error occurred in non-redundant mode. • An IERR signal was established. • Processor 1 is missing. • The temperature (CPU ThermTrip, memory TempHi, critical threshold is exceeded). • No good power: power fault. • Processor configuration error (for example, processor stepping mismatch).
D	Memory fault LEDs	When this LED is amber, it indicates that a memory DIMM has failed.
E and F	CPU fault LEDs	When this LED is amber, it indicates that a processor has been disabled or that a processor configuration error has been detected.
G	5 volt standby LED	When this LED is amber, it indicates that the server is connected to an ac power source and that the power supply has supplied the 5 volt standby voltage to the system board. Some components require that the 5 volt standby voltage be present even when the server is off (such as the BMC within ESB2-E and the onboard NICs).

The following illustration show the front control-panel with additional LEDs.

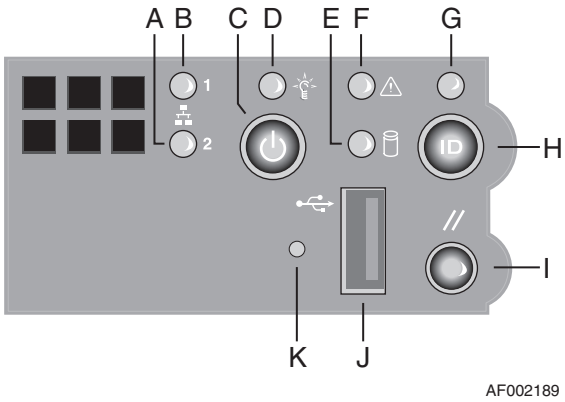


Table 4. LEDs on the front control panel

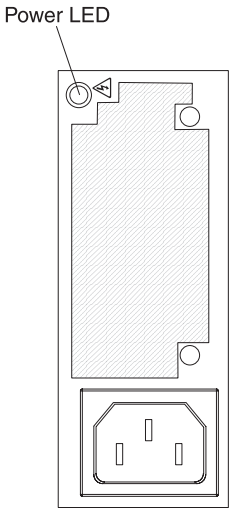
Call-out letter	LEDs or control feature	Description
A and B	NIC activity LEDs	When this LED is green continuously, it indicates that a link has been established between the server and the network.
C	Power/sleep button	Press this button to power the server on and off and to put the server in an ACPI sleep state.
D	Power/sleep LED	When this LED is green continuously, it indicates that the server is connected to an ac power source. When this LED is green and blinking, it indicates that server is in S1 sleep state. When this LED is not lit, it indicates that the power is off and is in ACPI S4 or S5 state.
E	Hard disk drive activity LED	When this LED is green and flashing, it indicates that the hard drive is in use. When this LED is not lit, it indicates that the hard drive is not in use.
F	System status LED	See Table 3 on page 56 for details.
G	System identification (ID) LED	See Table 3 on page 56 for details.
H	System identification button	Press this button to turn the system ID LED on or off.
I	Reset button	Press this button to restart and initialize the server.
J	USB 2.0 port	Use this connector to connect a USB device.
K	NMI button	Press this button to place the server in a interrupt state for diagnostic purposes.

Power-supply LED

The following minimum configuration is required for the server to start:

- One microprocessor
- Two 512 MB DIMM
- Power supply
- Power cord
- System board

The following illustration show the power-supply LED.



The following table describes the problems that are indicated by the power-supply LED on the rear of the server and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3450 Type 7948," on page 73 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Power-supply LED	Description	Action
Off	No ac power to the server or the power supply, or a problem with the ac power source.	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source.
Green	The power is good.	No action is necessary.
Green and blinking	AC power to the server and the 5 volt standby power is on, but the power supply is not on.	View the system error log (see "Error logs" on page 6).
Amber	Power supply critical event causing a shutdown; failure, OCP, OVP, OTP.	View the system error log (see "Error logs" on page 6).

Dynamic System Analysis program

IBM Dynamic System Analysis (DSA) is a system information collection and analysis tool that you can use to provide information to IBM service and support to aid in the diagnosis of the system problems. The System x3450 server supports only the online portable and installable versions of DSA. The bootable version of DSA is not supported on the server.

For more details about DSA and to download online DSA 2.11 portable or installable version of the program, go to the following web sites. For instructions on how to use the DSA tool, see the readme files that are included with the downloadable files.

- For Windows portable version, go to https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5075327&brandind=5000008
- For Windows installable version, go to https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5075325&brandind=5000008
- For Linux portable version, go to https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5075328&brandind=5000008
- For Linux installation version, go to https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5075326&brandind=5000008

Installation requirements for using the DSA program

To run DSA on the server, some operating systems might require that you manually install a device driver. The following sections describe the driver or software that you must install prior to running DSA on the server.

Microsoft Windows IPMI driver installation

If you have the Microsoft® Windows® 2003 Release 2 operating system installed on your server, you must manually install the IPMI driver because it is not installed by default with the operating system. The IPMI driver is required to access the hardware event log to view additional problem determination information. To install the IPMI driver, complete the following steps:

1. Select **Start → Settings → Control Panel**.
2. Double-click on **Add or Remove Programs**.
3. On the left side of the screen, select **Add/Remove Windows Components**.
4. Select **Management and Monitoring Tools** and click **Details**.
5. Make sure that **Hardware Management** is selected.
6. Click **OK**.
7. Click **Next**.

   To confirm that the component was installed, check the **Device Manager** and look for **Microsoft Generic IPMI Compliant Device** under **System Devices**.

Linux driver installation

There are no additional drivers required to run DSA on the server with a Linux operating system installed.

Solving SATA problems

For any SATA error message, one or more of the following devices might be causing the problem:

- A failing SATA device (adapter, drive, or controller)
- An incorrect SATA termination jumper setting
- A missing or incorrectly installed SATA terminator

- A defective SATA terminator
- An incorrectly installed cable
- A defective cable

For any SATA error message, follow these suggested actions in the order in which they are listed until the problem is solved:

1. Make sure that SATA devices are turned on before you turn on the server.
2. Make sure that the cables for all SATA devices are connected correctly.
3. If an SATA device is attached, make sure that the SATA termination is set to automatic.
4. Make sure that the last device in each SATA chain is terminated correctly.
5. Make sure that the SATA devices are configured correctly.

Solving power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition. To diagnose a power problem, use the following general procedure:

1. Turn off the server and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see “Solving undetermined problems” on page 65 for the minimum configuration).
4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Try the following procedures:

- Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.
  - If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.

- Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Solving undetermined problems

If the diagnostic tests did not diagnose the failure or if the server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 53.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the clear CMOS jumper to clear the CMOS memory; see the *Service Guide* for details. If you suspect that the BIOS code is damaged, see “Updating the firmware” on page 67for more information about upgrading the BIOS. You can download the Service Guide from the web at:

Check the LED on the power supply. If the LED indicates that the power supply is working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Modem, printer, mouse, and non-IBM devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules. The minimum configuration requirement are two 512 MB DIMMs on the system board.

The following minimum configuration is required for the server to start:

- One microprocessor
- Two 512 MB DIMMs on the system board
- One power supply
- Power cord
- System board

4. Turn on the server. If the problem remains, suspect the following components in the following order:
   a. System board
   b. Memory modules
   c. Microprocessor

If the problem is solved when you remove an adapter from the server but the problem recurs when you reinstall the same adapter, suspect the adapter; if the problem recurs when you replace the adapter with a different one, suspect the system board.

If you suspect a networking problem and the server passes all the system tests, suspect a network cabling problem that is external to the server.

Problem determination tips

Because of the variety of hardware and software combinations that you can encounter, use the following information to assist you in problem determination. If possible, have this information available when you request assistance from IBM:

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - Does the server fail the diagnostic tests? If so, what are the error codes?
  - What occurs? When? Where?
  - Does the failure occur on a single server or on multiple servers?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - What changes, if any, were made before the configuration failed?
  - Is this the original reported failure, or has this failure been reported before?
- Hardware configuration (print screen of the system information)
- BIOS code level
- Operating-system type and version level

You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the servers:

- Machine type and model
- BIOS level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Memory amount, type and configuration
- Configuration option settings
- Operating-system control-file setup

See Appendix A, “Getting help and technical assistance,” on page 77 for information about calling IBM for service.

Chapter 3. Configuration information

The firmware for the server is periodically updated and is available for download from the Web. This chapter provides information about updating the firmware and using the BIOS Setup utility to configure the server.

Updating the firmware

The firmware for the server is periodically updated and is available for download on the Web. Go to http://www.ibm.com/systems/support/ to check for the latest level of firmware, such as BIOS code, vital product data (VPD) code, and device drivers. Download the latest firmware for the server; then, install the firmware, using the instructions that are included with the downloaded files.

When you replace a device in the server, you might have to either update the server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware.

The following firmware updates are downloadable from the Web at http://www.ibm.com/systems/support/. Follow the instructions on how to apply the updates using documentation that is included in the downloaded files:

- BIOS code
- BMC firmware
- FRU/SDR data

Major components contain VPD code. You can select to update the VPD code when you update the BIOS code.

To download the firmware for the server, go to:

1. http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3450** to display the matrix of downloadable files for the server.

For additional information about tools for updating, managing, and deploying firmware, see the System x and xSeries Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

Update*Xpress*

The Update*Xpress* program is available for most System x and xSeries servers and optional devices. It detects supported and installed device drivers and firmware in the server and installs available updates. You can download the Update*Xpress* program from the Web at no additional cost, or you can purchase it on a CD. To download the program or purchase the CD, go to http://www.ibm.com/systems/managemment/xpress.html. Additional information about UpdateXpress is available from the System x and xSeries Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

Configuring the server

The BIOS Setup Utility program is part of the basic input/output system (BIOS) code. You can use this program to configure serial port assignments, change interrupt request (IRQ) settings, change the device startup sequence, set the date and time, and set passwords. For more information see “Using the BIOS Setup Utility program”

Using the BIOS Setup Utility program

This section provides instructions for starting the BIOS Setup Utility program and descriptions of the menu choices that are available.

Use the Right, Left, Up, and Down arrow keys to make your menu choices. A list of commands are displayed in the bottom right portion of the BIOS Setup screen that you can use to navigate within the Setup Utility. These commands are displayed at all times.

Starting the BIOS Setup Utility program

To start the BIOS Setup Utility program, complete the following steps:

1. Turn on the server. If the server is already on when you start this procedure, you must shut down the operating system, turn off the server, wait a few seconds until all in-use LEDs are turned off, and restart the server.
2. When the message `Press F2 to enter Setup` is displayed, press F2. (This prompt is displayed on the screen for only a few seconds. You must press F2 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full BIOS Setup Utility menu. If you do not type the administrator password, a limited BIOS Setup Utility menu is available.

   Note: If a serious error is detected during start up, the server will automatically enter setup and display the Error Manager screen. If the CMOS/NVRAM has been corrupted, you will not see the F2 prompt, instead, you will see the following message prompts:

   ```
   Warning: CMOS checksum invalid
   Warning: CMOS time and date not set
   ```

   For information on clearing the CMOS, see the *Service Guide*, which you can download from the web (along with the other documentation for the server) at:

   a. Go to http://www.ibm.com/systems/support/.
   b. Under **Product support**, click **System x**.
   c. Under **Popular links**, click **Publications lookup**.
   d. From the **Product family** menu, select **System x3450** and click **Go**.
3. Follow the instructions on the screen.

BIOS Setup Utility menu choices

The following choices are on the BIOS Setup Utility main menu. Depending on the version of the BIOS code, some menu choices might differ slightly from these descriptions. To select menu options, use the left and right arrow keys. For additional information about using the BIOS Setup Utility, see the *Service Guide* on the *Resource* CD. If the *Resource* CD did not come with the server, you can download the server documentation at http://www.ibm.com/systems/support/.

- **Advanced**

Select this choice to view and change configuration information for the server options.

- **Processor Configuration**

  Select this choice to view the processor information, including the type, speed, and cache size of the microprocessor.

- **Memory Configuration**

  Select this choice to view or change information about the memory that is installed in the server.

- **ATA Controller Configuration**

  Select this choice to view details about the hard disk drives that are installed in the server. Use this option also to enable, disable, or configure hard disk drives.

- **Mass Storage Controller Configuration**

  Select this choice to view or configure a RAID controller, if one is supported.

- **Serial Port Configuration**

  Select this choice to set up serial port A and serial port B.

- **USB Configuration**

  Select this choice to enable or disable USB support.

- **PCI Configuration**

  Select this choice to view or change the settings for the PCI Express card, the onboard NIC controller, or video information.

- **System Acoustic and Performance Configuration**

  Select this choice to view or change the server thermal information.

- **Security**

  Select this choice to set passwords or to lock the front control panel buttons to prevent them from being used. See the *Service Guide* on the IBM *Resource* CD for more information about resetting passwords.

  - **Administrator Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full BIOS Setup Utility menu. If an administrator password is set, the full BIOS Setup Utility menu is available only if you type the administrator password at the password prompt.

  - **User Password**

    Select this choice to set, change, or delete a user (power-on) password.

- **Server Management**

  Select this choice to view information about the server and to configure Console Redirection information. When you make changes through other choices in the BIOS Setup Utility program, some of those changes are reflected in the System Information.

- **Boot Options**

  Select this choice to view boot devices during POST or to change the order in which you want to boot the devices.

- **Boot Manager**

  Select this choice to view a list of available boot devices or to select which device to the boot. You can also use this option to launch the EFI Shell.

- **Error Manager**

  Select this choice to view any errors that were encountered during POST.

- **Exit Setup**

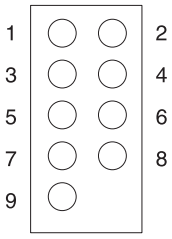
  Select this choice to save your changes and exit from the BIOS Setup Utility program. This choice also provides you with options to restore the server to the factory default values or to restore a set of default values that you define.

Changing the RJ45 serial port configuration

The server has two serial ports: an external RJ45 serial port (Serial B) and an optional internal DH10 serial header (Serial A).

You can access Serial A through a 9-pin internal DH10 header. To direct the Serial A port to the rear of the chassis, you can use a standard DH10 or DB9 cable. It follows the standard RS232 pin-out.

Table 5. Serial A header pin-out

Pin	Signal name	Serial port A header pin-out
1	DCD	
2	DSR	
3	RX	
4	RTS	
5	TX	
6	CTS	
7	DTR	
8	RI	
9	GND	

The RJ45 Serial B port is on the rear of the server and is fully functional and can support any standard serial device. The RJ45 connector enables support for serial port concentrators. To enable applications to access the system management features on the system board, the standard 8-pin CAT-5 cable from the serial concentrator must be plugged directly into the rear RJ45 serial port.

To enable the RJ45 serial port to support both of the serial port configuration standards, you must configure the jumper block that is located directly behind the RJ45 serial port to your preferred standard. To configure the serial concentrator for a DCD signal, the jumper block pins must be set to pins 1 and 2. To configure the serial concentrator for a DSR signal (default), the jumper block pins must be set to pins 3 and 4.

Note: The server is shipped with the rear RJ45 serial port configured to support a DSR signal. This is the Default.

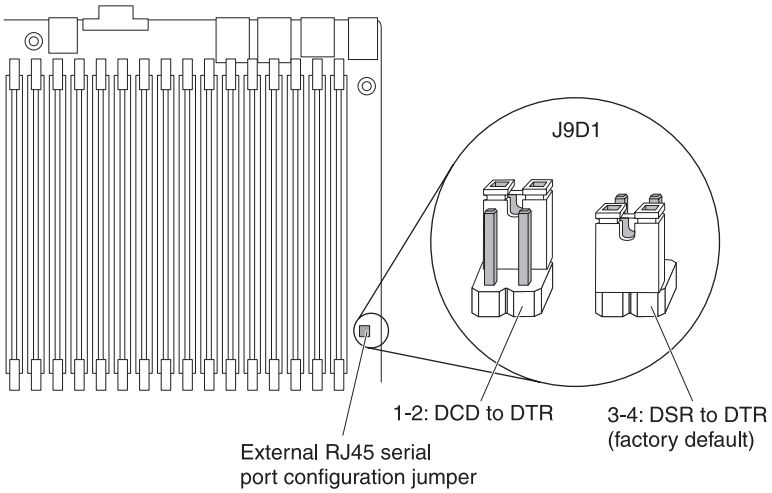


Table 6. Serial port configuration jumper setting

Pins	Results when the system reset...
1-2	Serial port is configured for DCD to DTR
3-4	Serial port is configured for DSR to DTR (default)

If a server application require a DB9 serial connector, you must use an 8-pin RJ45-to-DB9 adapter. The following table lists the pin-out requirements so that the adapter can provide RS232 support.

Table 7. RJ45 Serial B adapter pin-out

RJ45	Signal name	Abbreviation	DB9
1	Request to Send	RTS	7
2	Data Terminal Ready	DTR	4
3	Transmitted Data	TD	3
4	Signal Ground	SGND	5
5	Ring Indicator	RI	9
6	Received Data	RD	2
7	DCD or DSR	DCD/DSR	1 or 6 (see Note below)
8	Clear To Send	CTS	8

Note: The RJ45-to-DB9 adapter must match the configuration of the serial device used. Depending on whether the DSR or DCD signal is required by the serial device, one of two pin-out configurations will be used. The final configuration of the adapter must also match the pin-out that you use for the RJ45 connector.

For information about solving serial port problems, see “Serial port problems” on page 53.

Chapter 4. Parts listing, System x3450 Type 7948

The following replaceable components are available for all models of the System® x3450 Type 7948 server, except as specified otherwise in Table 8 on page 74. For an updated parts listing on the Web, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Parts documents lookup**.
4. From the **Product family** menu, select **System x3450**, and click **Continue**.

Replaceable server components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Table 8. Parts listing, Type 7948

Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
Bezel, front	46C7143		
Chassis with top cover	46C7142		
CD-ROM Mounting Kit	46C7129		
Fan board assembly		46C7130	
PCI riser assembly	46C7131		
Front panel tray assembly		46C7132	
Hard disk drive, SATA, 3.5-inch 7200 RPM 250 GB, simple-swap, with tray	39M4511		
Hard disk drive, SATA, 3.5-inch 7200 RPM 500 GB, simple-swap, with tray (optional)	39M4517		
Hard disk drive, SATA, 3.5-inch 7200 RPM 750 GB, simple-swap, with tray (optional)	43W7575		
Power supply, non-redundant 600 watt			46C7133
Microprocessor, 1600 MHz, .3.0 GHz, quad-core 120 watt, with copper heatsink (model 42x)			46C7145
Microprocessor, 1600 MHz, 3.0 GHz, quad-core 80 watt, with aluminum heatsink (models 52x, 54x, 56x, and 58x)			46C7146
Microprocessor, 1600 MHz, 2.8 GHz, quad-core 80 watt, with aluminum heatsink (model 32x)			46C7147
Microprocessor, 1600 MHz, 3.4 GHz, dual-core 80 watt, with aluminum heatsink (model 22x)			46C7148
Fan, system non-redundant		46C7134	
Cable kit, fan (for front panel)		46C7135	
Cable kit, IDE/SATA		46C7136	
Memory, 2 GB DDR2, 667 MHz, fully-buffered DIMM	39M5790		
Memory, 4 GB DDR2, 667 MHz, fully-buffered DIMM	41Y2845		
Rack handles set	46C7137		
Hard disk drive tray assembly	46C7138		
Bracket, air baffle/duct/fan (plastic)	46C7139		

Table 8. Parts listing, Type 7948 (continued)

Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
Cover, top (with labels and screw)	46C7140		
Rail kit		46C7144	
Battery, 3.0 volt		33F8354	
System board			46C7141

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination Guide* on the IBM *Resource* CD that comes with your system.
- Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/systems/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x™ and xSeries information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter® information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/intellistation/.

You can find service information for IBM systems and optional devices at http://www.ibm.com/systems/support/.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/, or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See http://www.ibm.com/planetwide/ for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc., in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

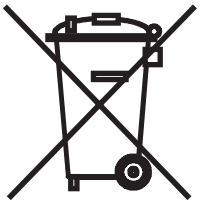
IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/index.shtml.

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM http://www.ibm.com/ibm/environment/products/index.shtml.



Notice: This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'etiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

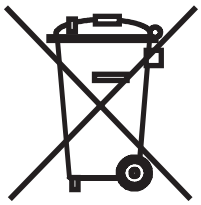
Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/index.shtml or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

For Taiwan: Please recycle batteries.

For the European Union:



Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

This notice is provided in accordance with Royal Decree 106/2008 of Spain: The retail price of batteries, accumulators, and power cells includes the cost of the environmental management of their waste.

For California:

Perchlorate material – special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Community contact:

IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Telephone: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

Taiwanese Class A warning statement

警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Chinese Class A warning statement

声　　明
此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

Korean Class A warning statement

이기기는 업무용으로 전자파 적합등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

Index

T

U

V

W

Part Number: 44W2478

Printed in USA

(1P) P/N: 44W2478