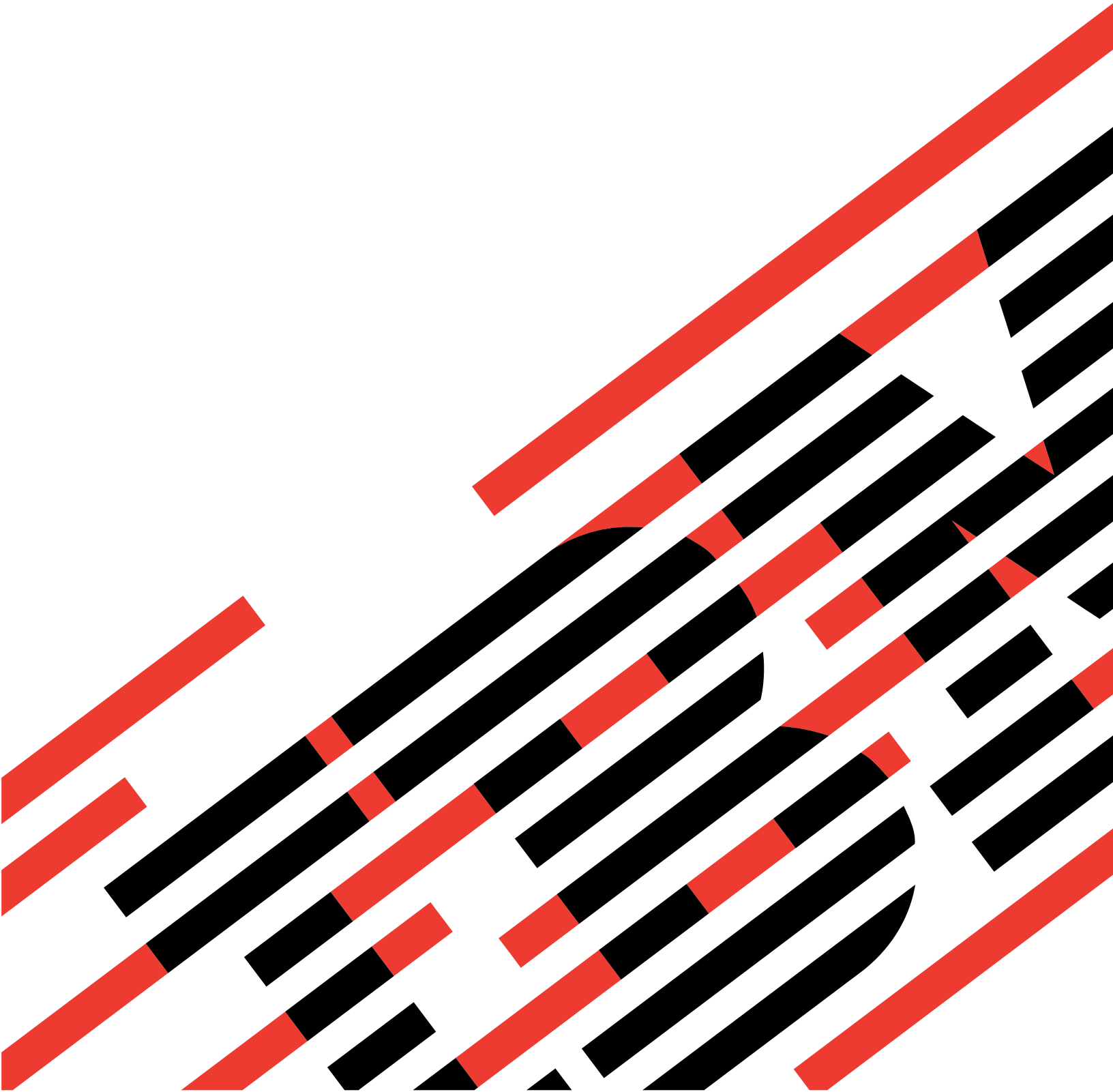
IBM

eserver

BladeCenter T Management Module

User's Guide



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User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 67.

First Edition (May 2004)

Contents

Safety v

Chapter 1. Introducing the BladeCenter T management module 1
Related documentation 1
Notices and statements used in this document. 2
Controls and indicators 3
Management-module controls and indicators 3
KVM (keyboard, video, mouse) module indicators and input/output connectors 4
LAN-module indicators and input/output connectors 6

Chapter 2. Configuring the management module and BladeCenter T unit . . 9
Setting up the remote connection 11
Cabling the Ethernet port 11
Configuring the management module for remote access. 13

Chapter 3. Using the management-module Web interface 15
User authority 15
Starting the management-module Web interface 17
Management-module Web interface options 18
Monitors 18
System Status 18
Event Log. 21
LEDs 22
Hardware VPD 23
Firmware VPD 23
Blade Tasks 24
Power/Restart 24
On Demand 25
Remote Control. 25
Firmware Update 27
Configuration 28
Serial Over LAN 29
I/O Module Tasks 29
Power/Restart 30
Management. 30
Firmware Update 31
MM Control 31
General Settings 32
Login Profiles 32
Alerts 34
Port Assignments 34
Network Interfaces 35
Network Protocols. 37
Security 38
Configuration File 39
Firmware Update 39
Restore Defaults 39
Restart MM 40
Network and security configuration 40
Configuring SNMP 40
Configuring SMTP. 42
Configuring LDAP 42
Setting up a client to use the LDAP server. 43

Configuring the LDAP client authentication . . . 45
Configuring the LDAP search attributes . . . 45
Secure Web server and secure LDAP . . . 47
Configuring security . . . 48
SSL certificate overview . . . 49
SSL server certificate management . . . 49
Enabling SSL for the secure Web server . . . 55
SSL client certificate management . . . 55
SSL client trusted certificate management . . . 55
Enabling SSL for the LDAP client . . . 57
Configuring the secure shell server . . . 57
Generating a Secure Shell server key . . . 57
Enabling the Secure Shell server . . . 58
Using the Secure Shell server . . . 59
Configuring Wake on LAN . . . 59
Verifying the Wake on LAN configuration . . . 59
Linux-specific configuration . . . 60
Using the configuration file . . . 60
Backing up your current configuration . . . 61
Restoring and modifying your ASM configuration . . . 61
Using the remote disk feature . . . 62

Appendix A. Getting help and technical assistance . . . 65
Before you call . . . 65
Using the documentation . . . 65
Getting help and information from the World Wide Web . . . 66
Software service and support . . . 66
Hardware service and support . . . 66

Appendix B. Notices . . . 67
Edition notice . . . 67
Trademarks . . . 68
Important notes . . . 68
Product recycling and disposal . . . 69
Battery return program . . . 69
Electronic emission notices . . . 70
Federal Communications Commission (FCC) statement . . . 70
Industry Canada Class A emission compliance statement . . . 70
Australia and New Zealand Class A statement . . . 70
United Kingdom telecommunications safety requirement . . . 70
European Union EMC Directive conformance statement . . . 71
Taiwanese Class A warning statement . . . 71
Chinese Class A warning statement . . . 71
Japanese Voluntary Control Council for Interference (VCCI) statement . . . 71

Index . . . 73

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.

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 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.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Chapter 1. Introducing the BladeCenter T management module

This *Management Module User's Guide* contains information about configuring the management module and managing components that are installed in the IBM® @server BladeCenter™ T unit.

Your BladeCenter T unit comes with one hot-swap management module in management-module bay 1. You can add a management module in management-module bay 2. Only one of these management modules can be active at one time, functioning as the primary management module; a second management module, if present, provides redundancy. The secondary management module remains inactive until it is switched to act as primary.

When two management modules are installed in the BladeCenter T unit, both management modules must always have the same level of firmware, at a level that supports redundant management-module function. This helps ensure a smooth changeover of control from the active management module to the redundant management module. The latest level of management-module firmware is available at the IBM Support Web site at http://www.ibm.com/pc/support/.

The management module functions as a service processor and a keyboard/video/mouse (KVM) multiplexor for all of the blade servers that are installed in the BladeCenter T unit. It controls the keyboard, mouse, and video KVM-module external connections for use by a local console. The management module also controls three LAN-module external connections: two RJ-45 connectors for 10/100 Mbps Ethernet remote management connection and an alarms connector that can be used for monitoring BladeCenter T status.

The service processor in the management module communicates with the service processor in each blade server to support features such as blade server power-on requests, error and event reporting, KVM requests, and requests to use the BladeCenter T shared media tray (CD-ROM drive and USB port).

You configure BladeCenter T components using the management module, setting information such as IP addresses. The management module communicates with all components in the BladeCenter T unit, detecting their presence or absence, reporting their status, and sending alerts for error conditions when they are required.

Related documentation

In addition to this *User's Guide*, the following documentation is provided in Portable Document Format (PDF) on the IBM *BladeCenter T Documentation* CD that comes with your BladeCenter T Management Module.

- *Safety Information*

  This document 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.

- *BladeCenter T Management Module Installation Guide*

  This document contains instructions for installing an IBM BladeCenter T management module option in a BladeCenter T unit and creating the initial configuration.
- *BladeCenter T HS20 Type 8832 Hardware Maintenance Manual and Troubleshooting Guide*

  This document contains information to help you solve BladeCenter T HS20 problems yourself, and it contains information for service technicians.
- *BladeCenter T Types 8720 and 8730 Installation and User's Guide*

  This document contains instructions for setting up and configuring the BladeCenter T unit and basic instructions for installing some options. It also contains general information about the BladeCenter T unit.
- *BladeCenter T Types 8720 and 8730 Hardware Maintenance Manual and Troubleshooting Guide*

  This document contains information to help you solve BladeCenter T problems yourself, and it contains information for service technicians.
- *BladeCenter T Types 8720 and 8730 Rack Installation Instructions*

  This document contains instructions for installing the BladeCenter T unit in a rack.
- *IBM eServer BladeCenter Serial over LAN Setup Guide*

  This document explains how to update and configure BladeCenter components for Serial over LAN (SOL) operation. The SOL connection provides access to the text-console command prompt on each blade server, enabling the blade servers to be managed from a remote location.

Additional documentation might be included on the IBM *BladeCenter T Documentation* CD.

Your blade server might have features that are not described in the documentation that you received with the blade 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 your server documentation. These updates are available from the IBM Web site. Complete the following steps to check for updated documentation and technical updates:

1. Go to http://www.ibm.com/pc/support/.
2. In the **Learn** section, click **Online publications**.
3. On the "Online publications" page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **BladeCenter T**.
5. Click **Continue**.

Notices and statements used 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 *BladeCenter T Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in the documentation:

- **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.

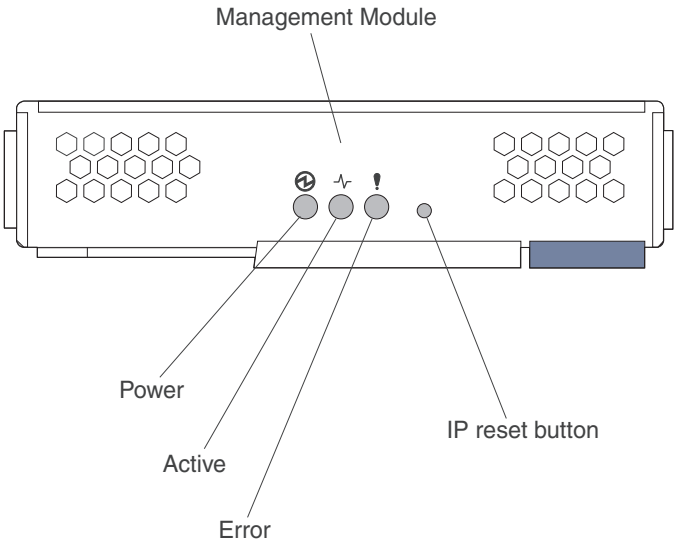
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement 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.

Controls and indicators

This section describes the LEDs and controls on the BladeCenter T management modules, KVM modules, and LAN modules. This section also identifies the external ports on the KVM and LAN modules.

Management-module controls and indicators

These management-module controls and indicators provide status information about the management module and remote management connection. For additional information, see the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *BladeCenter T Documentation* CD.



Management-module LEDs: These LEDs provide status information about the management module and remote management connection.

- **Power:** When this green LED is lit, it indicates that the management module has power.
- **Active:** When this green LED is lit, it indicates that the management module is actively controlling the BladeCenter T unit. Only one management module actively controls the BladeCenter T unit. If two management modules are installed in the BladeCenter T unit, this LED is lit on only one.
- **Error:** When this amber LED is lit, it indicates that an error has been detected somewhere on the management module. When this LED is lit, the system error LED (critical, major, or minor) on each of the BladeCenter T system-status panels is also lit.

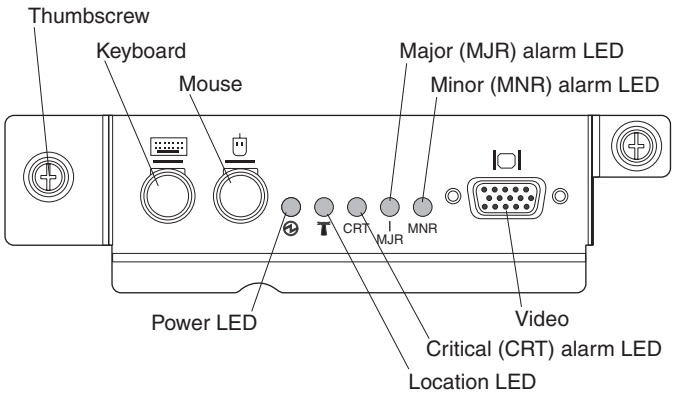
Management-module IP reset button: *Do not* press this button unless you intend to erase your configured IP addresses for the management module and lose connection with the remote management station, the switch modules, and the blade servers. If you press this button, you will have to reconfigure the management module settings (see the information beginning with Chapter 2, “Configuring the management module and BladeCenter T unit,” on page 9 for instructions).

Press this recessed button to reset the IP configuration of the management module network interfaces (Ethernet 1, Ethernet 2, gateway address, and so on) to the factory defaults and then restart the management module.

Use a straightened paper clip to press the button.

KVM (keyboard, video, mouse) module indicators and input/output connectors

The KVM module is a hot-swap module that is installed on the rear of the BladeCenter T unit and is held in place by captive thumbscrews. This module contains two PS/2® connectors for the keyboard and mouse, a system-status panel, and an HD-15 video connector.



System-status LEDs: These LEDs provide status information for the BladeCenter T unit.

- **Power:** When continuously lit, this green LED indicates the presence of power in the BladeCenter T unit. The LED turns off when the power source is interrupted.

  Attention: If the power LED is off, it does not mean electrical power is not present in the BladeCenter T unit. The LED might be burned out. To remove all electrical power from the BladeCenter T unit, you must disconnect all power cords from all power modules.
- **Location:** This blue LED is for system identification. A system administrator or servicer uses this LED to locate a specific BladeCenter T unit for service or repair. You can turn off the location LED through the Web interface or a remote management console.

Alarm LEDs: These LEDs provide alarm notifications for the BladeCenter T unit.

- **CRT (Critical alarm, amber (default) or red):** When continuously lit, this LED indicates the presence of a critical system fault. The system comes with amber as the default. See “LEDs” on page 22 for information about setting the color of this LED.

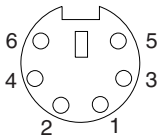
  A critical system fault is an error or event that is unrecoverable. In this case, the system cannot continue to operate. An example is the loss of a large section of memory that causes the system to be incapable of operating.

- **MJR (Major alarm, amber (default) or red):** When continuously lit, this LED indicates the presence of a major system fault. The system comes with amber as the default. See “LEDs” on page 22 for information about setting the color of this LED.

  A major system fault is an error or event that has a discernible impact to system operation. In this case, the system can continue to operate but with reduced performance. An example is the loss of one of two mirrored disks.
- **MNR (Minor alarm, amber):** When continuously lit, this LED indicates the presence of a minor system fault. A minor system fault is an error or event that has little impact to system operation. An example is a correctable ECC error.

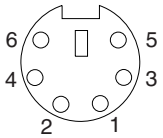
Connectors: The KVM module has the following I/O connectors:
- **Keyboard connector:** The BladeCenter T KVM module contains one PS/2-style keyboard connector.

  Use this connector to connect a PS/2 keyboard to the BladeCenter T unit.



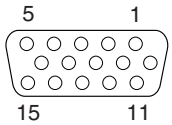
- **Mouse connector:** The BladeCenter T KVM module contains one PS/2-style mouse connector.

  Use this connector to connect a PS/2 mouse to the BladeCenter T unit.



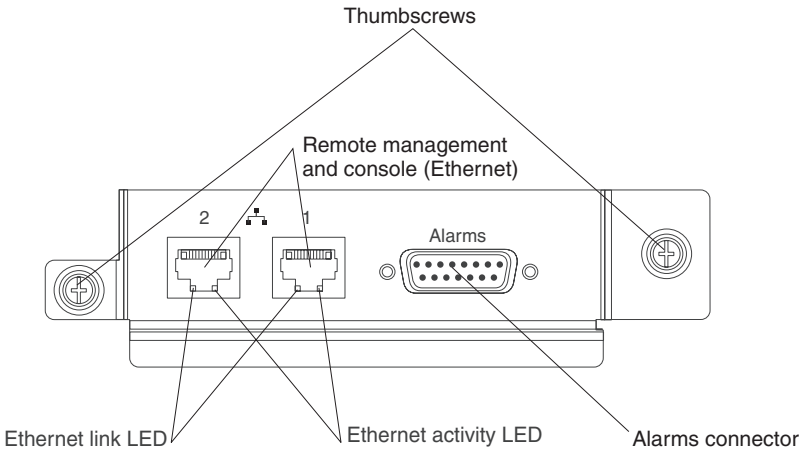
- **Video connector:** The BladeCenter T KVM module contains one standard video connector. The integrated video controller on each blade server is compatible with SVGA and VGA and communicates through this video port.

  Use this connector to connect a video monitor to the BladeCenter T unit.



LAN-module indicators and input/output connectors

The LAN module is a hot-swap module that is installed on the rear of the BladeCenter T unit and is held in place by captive thumbscrews. The LAN module provides the electrical and mechanical interface to the BladeCenter T unit for the two local area network (Ethernet) connections, as driven from each management module, and the telco external alarms. This module contains two RJ-45 connectors with LEDs and one DSUB 15P telco alarm connector.



LAN-module LEDs: These LEDs provide status information about the LAN connection:

- **Ethernet link:** When this green LED is lit, there is an active connection through the port to the network.
- **Ethernet activity:** When this green LED is flashing, it indicates that there is activity through the port over the network link.

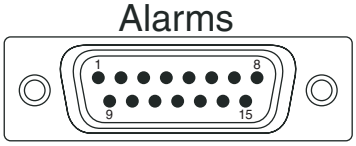
LAN-module connectors:

- **Remote management and console (Ethernet) connectors:** The LAN module provides two Ethernet RJ-45 connectors.

  The BladeCenter T LAN module contains two 10/100 Mb Ethernet connectors that provide the remote connections, driven from each management module, to the network management station on the network.

  Use these ports for remote management and remote console.

  The network management station, through these connectors, can access control functions running in the management module, the service processor on each blade server, or within each switch module. However, it cannot use these ports to communicate with application programs running in the blade servers. The network management station must direct those communications through a network connected to the external ports in the I/O modules in the BladeCenter T unit.
- **Alarms connector:** The LAN module provides one telco DB15 alarms connector (male) for critical, major, and minor telco alarms. Each of the alarms has a relay that enables multiple system alarm indicators to be daisy-chained together. Table 1 on page 7 shows the pinouts for the telco alarms connector.



Note: The service processor, management module, or systems-management function must monitor the alarm reset inputs to maintain the fault condition that you set for the unit. The alarm reset inputs can be voltages in excess of standard logic levels, so you must to electrically or optically isolate them from the monitoring logic.

Table 1. Telco alarms connector pinout

Pin #	Description	I/O	Pin #	Description	I/O
1	Minor alarm reset +	I	9	Minor alarm normally closed	O
2	Minor alarm reset -	I	10	Minor alarm common	O
3	Major alarm reset +	I	11	Major alarm normally open	O
4	Major alarm reset -	I	12	Major alarm normally closed	O
5	Critical alarm normally open	O	13	Major alarm common	O
6	Critical alarm normally closed	O	14	Reserved	
7	Critical alarm common	O	15	Reserved	
8	Minor alarm normally open	O			

The electrical specifications for the alarms connector are as follows:

– **Outputs**
  - Voltage range: 0 V dc to -100 V dc (maximum current 0.3 A at 100 V dc)
  - Current range: 0 A to 1 A (maximum voltage 30 V dc at 1 A)
  - Worst-case VA: 1 A at -30 V dc (30 VA maximum) indefinitely

– **Inputs**
  - Voltage range: 0 V dc to -100 V dc (including transients)
  - Differential input voltage: 3 V dc to 72 V dc

– **Reset input activation**

  Pulse width: 200 ms (minimum) to 300 ms

Chapter 2. Configuring the management module and BladeCenter T unit

Important: You configure only the primary (active) management module. The secondary management module receives the configuration and status information automatically from the primary management module when necessary. The configuration information in this chapter applies to the primary management module, which might be the only management module installed in the BladeCenter T unit.

The BladeCenter T unit automatically detects the modules and blade servers that are installed and stores the vital product data (VPD). When the BladeCenter T unit is started, the management module automatically configures the remote management port on the management module, accessed through the LAN module on the rear of the BladeCenter T unit, so that you can configure and manage the BladeCenter T unit and blade servers. You configure and manage the BladeCenter T unit remotely, through the management module, using the Web-based user interface.

Note: There are two ways to configure the switch modules; through the management-module Web interface, or through an external switch-module port enabled through the management module, using a Telnet interface or a Web browser. See the documentation that comes with the switch module for more information.

For the active management module to communicate with the I/O modules in the BladeCenter T unit, you must configure the IP addresses for the following internal and external ports:

- The external Ethernet (remote management) port on the management module, accessed through the LAN module on the rear of the BladeCenter T unit (see the information beginning on page 35 for information). The initial management module autoconfiguration enables the network management station to connect to the management module to configure the port completely and to configure the rest of the BladeCenter T unit.
- The internal Ethernet port on the management module for communication with the I/O modules (see the information beginning on page 35 for information).
- The management port on each switch module provides for communication with the management module. You configure this port by configuring the IP address for the switch module (see the information beginning on page 30 for information).

  Note: Some types of I/O modules, such as the pass-thru module, have no management port.

See the documentation that comes with the I/O module to determine what else you must configure in the I/O module.

To communicate with the blade servers for functions such as deploying an operating system or application program over the network, you must also configure at least one external (in-band) port on an Ethernet switch module in I/O-module bay 1 or 2. See the *Installation and User's Guide* for your BladeCenter T unit for general information about configuring the external ports on Ethernet I/O modules.

The management module supports the following Web browsers for remote access. The Web browser that you use must be Java™-enabled, must support JavaScript™

1.2 or later, and must have the Java Virtual Machine (JVM) 1.4.1 or later Plug-in installed. The JVM Plug-in is available at the Java Web site at http://www.java.com/.

- Microsoft® Internet Explorer 5.5 (with latest Service Pack installed), or later
- Netscape Navigator 4.72, or later (version 6 is not supported)
- Mozilla version 1.3, or later

For best results when using the Web browser, set the monitor to 256 colors. Use only the video resolutions and refresh rates given in the following table. These are the only video resolution and refresh rate combinations that are supported for all system configurations.

Resolution	Refresh rate
640 x 480	60 Hz
640 x 480	72 Hz
640 x 480	75 Hz
640 x 480	85 Hz
800 x 600	60 Hz
800 x 600	72 Hz
800 x 600	75 Hz
800 x 600	85 Hz
1024 x 768	60 Hz
1024 x 768	75 Hz

The Web interface does not support the double-byte character set (DBCS) languages.

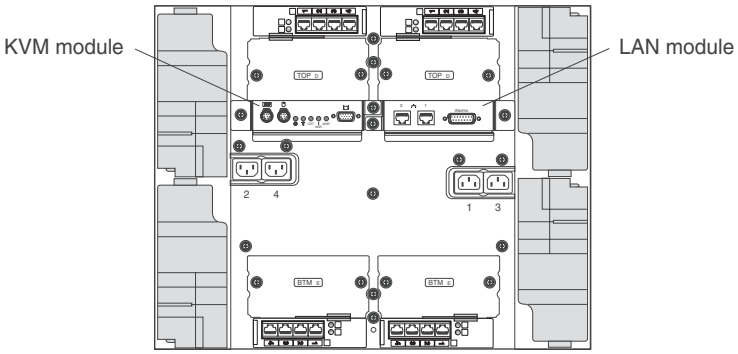
The Web-based user interface communicates with the management and configuration program that is part of the firmware that comes with the management module. You can use this program to perform the following tasks:

- Defining the login IDs and passwords.
- Selecting recipients for alert notification of specific events.
- Monitoring the status of the BladeCenter T unit and blade servers.
- Controlling the BladeCenter T unit and blade servers.
- Accessing the I/O modules to configure them.
- Changing the startup sequence in a blade server.
- Setting the date and time.
- Using a remote console for the blade servers.
- Changing ownership of the keyboard, video, and mouse.
- Changing ownership of the CD-ROM drive and USB ports. (The CD-ROM drive in the BladeCenter T unit is viewed as a USB device by the blade server operating system.)
- Activating On Demand blade servers.
- Setting the active color of the critical (CRT) and major (MJR) alarm LEDs

You also can use the management and configuration program to view some of the blade server configuration settings. See Chapter 3, “Using the management-module Web interface,” on page 15 for more information.

Setting up the remote connection

To configure and manage the BladeCenter T unit and blade servers, you must first set up the remote connection through an Ethernet port on the LAN module. The LAN module is on the rear of the BladeCenter T unit at the top-right side.

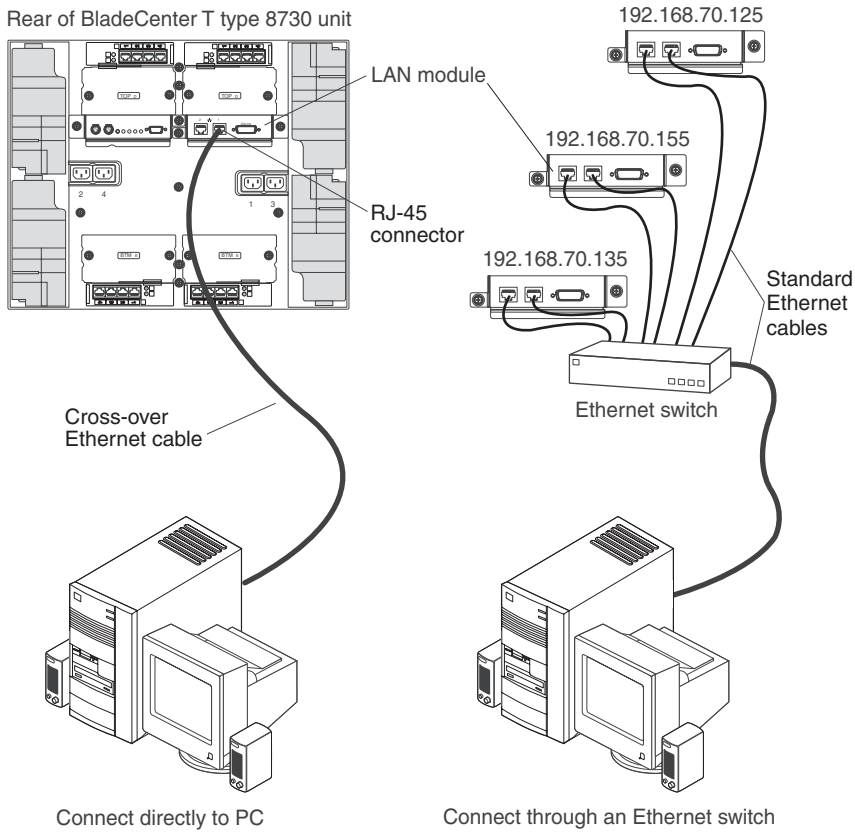


Cabling the Ethernet port

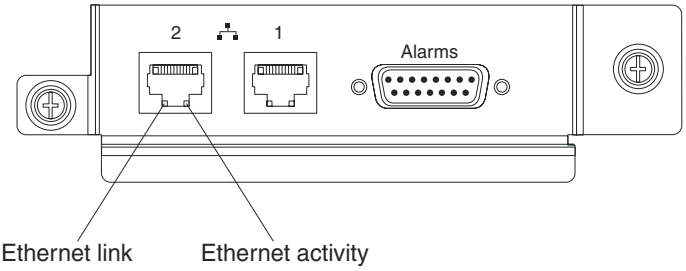
You can connect to an Ethernet port directly from a personal computer (PC) using a cross-over cable, or you can make the connection through an Ethernet switch.

The right Ethernet port on the LAN module is driven by management module 1, and the left Ethernet port of the LAN module is driven by management module 2.

Complete the following steps to connect the Ethernet cable to the management module.



1. Connect one end of a Category 5 or higher Ethernet cable to an Ethernet connector on the LAN module. Connect the other end of an Ethernet cable to the network.
2. Check the Ethernet LEDs to make sure that the network connection is working. The following illustration shows the locations of the Ethernet LEDs on the LAN module.



Ethernet link LED

When this green LED is lit, there is an active connection through the port to the network.

Ethernet activity LED

When this green LED is flashing, it indicates that there is activity through the port over the network link.

Configuring the management module for remote access

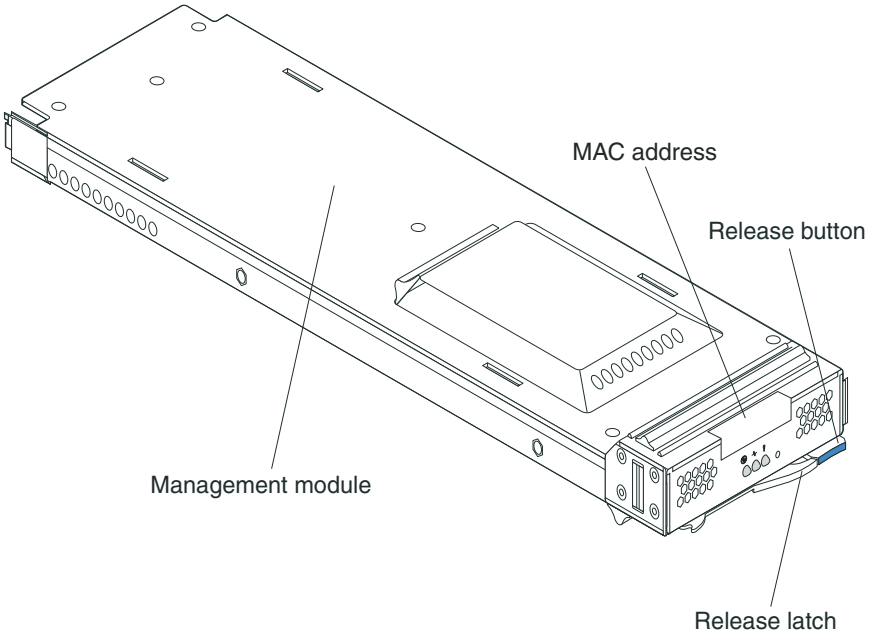
After you connect the active management module to the network, the Ethernet port connection is configured in one of the following ways:

- If you have an accessible, active, and configured dynamic host configuration protocol (DHCP) server on the network, the host name, IP address, gateway address, subnet mask, and DNS server IP address are set automatically.
- If the DHCP server does not respond within 2 minutes after the port is connected, the management module uses the factory-defined static IP address and default subnet address.

Either of these actions enables the Ethernet connection on the active management module.

Make sure your computer is on the same subnet as the management module; then, use your Web browser to connect to the management module (see “Starting the management-module Web interface” on page 17 for more information). In the browser **Address** field, specify the IP address the management module is using:

- If the IP address was assigned through a DHCP server, get the IP address from your network administrator.
- The factory-defined static IP address is 192.168.70.125, the default subnet address is 255.255.255.0, and the default host name is MM*xxxxxxxxxxxx*, where *xxxxxxxxxxxx* is the burned-in medium access control (MAC) address. The MAC address is on a label on the front of the management module, above the LEDs, as shown in the following illustration.



Note: If the IP configuration is assigned by the DHCP server, the network administrator can use the MAC address of the management module network interface to find out what IP address and host name are assigned.

Chapter 3. Using the management-module Web interface

This section provides instructions for using the management-module Web interface in the active (primary) management module. It has the following information:

- Features of the management-module Web interface that can be accessed by users, according to their authority levels (see “User authority”)
- “Starting the management-module Web interface” on page 17
- Descriptions of the management-module Web interface pages (see “Management-module Web interface options” on page 18)
- “Network and security configuration” on page 40
- “Configuring Wake on LAN” on page 59
- Backup and restore of the management-module configuration (see “Using the configuration file” on page 60)

User authority

Some fields and selections in the management-module Web interface pages can be changed or executed only by users who are assigned a required level of authority for those pages. Viewing information does not require any special command authority. Users with Supervisor command authority can change information and execute tasks in all pages.

The following table lists the management-module Web interface pages and the authority levels that are required to change information in these pages. The pages and authorities that are listed in this table apply only to changing the information in a page or executing a task specified in a page: viewing the information in a page does not require any special command authority. In the table, each row indicates the valid user command authorities that allow a user to change the information or execute a task in that page. For example, executing tasks in the **Blade Tasks → Power/Restart** page is available to users with the Supervisor authority or to users with the Blade and I/O Module Power/Restart Access authority.

Table 2. User authority relationships

Page		Authority required to change information or execute tasks								
		Supervisor	**User Account Management**	**Blade Server Remote Console Access**	**Blade Server Remote Console and Virtual Media Access**	**Blade and I/O Module Power/Restart Access**	**Ability to Clear Event Logs**	**Basic Configuration (MM, I/O Modules, Blades)**	**Network and Security Configuration**	**Advanced Configuration (MM, I/O Modules, Blades)**
Monitors	System Status	•	•	•	•	•	•	•	•	•
	Event Log (view)	•	•	•	•	•	•	•	•	•
	Event Log (clear)	•					•			
	LEDs	•	•	•	•	•	•	•	•	•
	Hardware VPD	•	•	•	•	•	•	•	•	•
	Firmware VPD	•	•	•	•	•	•	•	•	•
Blade Tasks	Power/Restart	•				•				
	On Demand	•				•				
	Remote Control (remote console)	•		•	•					
	Remote Control (virtual media)	•			•					
	Firmware Update	•								•
	Configuration	•						•		•
	Serial over LAN	•							•	•
I/O Module Tasks	Power/Restart	•				•				
	Management	•							•	•
	Firmware Update	•								•
MM Control	General Settings	•						•		•
	Login Profiles	•	•							•
	Alerts	•						•		•
	Port Assignments	•							•	•
	Network Interfaces	•							•	•
	Network Protocols	•							•	•
	Security	•							•	•
	Configuration File	•								•
	Firmware Update	•								•
	Restore Defaults	•								•
	Restart MM	•								•

Starting the management-module Web interface

Complete the following steps to start the management-module Web interface:

1. Open a Web browser. In the address or URL field, type the IP address or host name defined for the management-module remote connection (see “Configuring the management module for remote access” on page 13 for details).

   The Enter Network Password page opens.

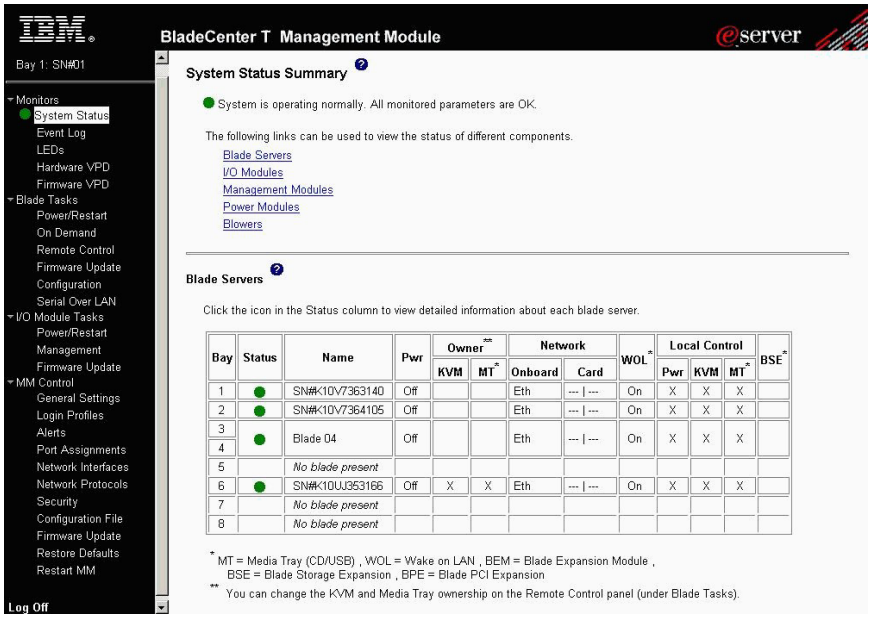
2. Type your user name and password. If you are logging in to the management module for the first time, you can obtain your user name and password from your system administrator. All login attempts are documented in the event log.

   Note: The initial factory-defined user ID and password for the management module are as follows:

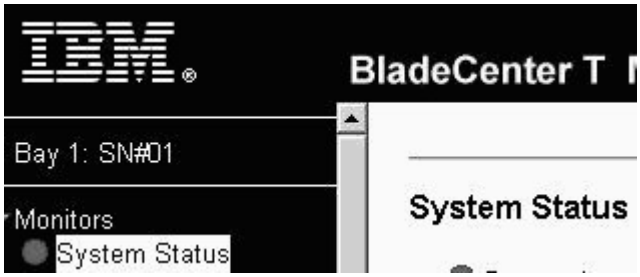
   - User ID: USERID (all capital letters)
   - Password: PASSW0RD (note the zero, not O, in PASSW0RD)

3. Follow the instructions on the screen. Be sure to set the timeout value that you want for your Web session.

The BladeCenter T management-module Web interface page opens.



Note: The upper-left corner of the management-module Web interface page shows the location and identity of the active (primary) management module. In the following example, the primary management module is identified as SN#01 and is installed in management-module bay 1.



Management-module Web interface options

Run the management and configuration program from the management-module Web interface to select the BladeCenter T settings that you want to view or change.

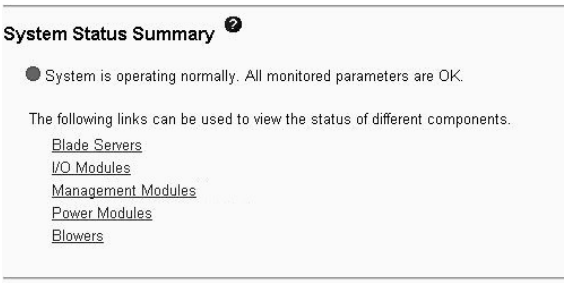
The navigation pane (on the left side of the management-module Web interface window) contains navigational links that you use to manage your BladeCenter T unit and check the status of the components (modules and blade servers). The links that are in the navigation pane are described in the following sections.

Online help is provided for the management-module Web interface. Click the help (?) icon next to a section or choice to display additional information about that item.

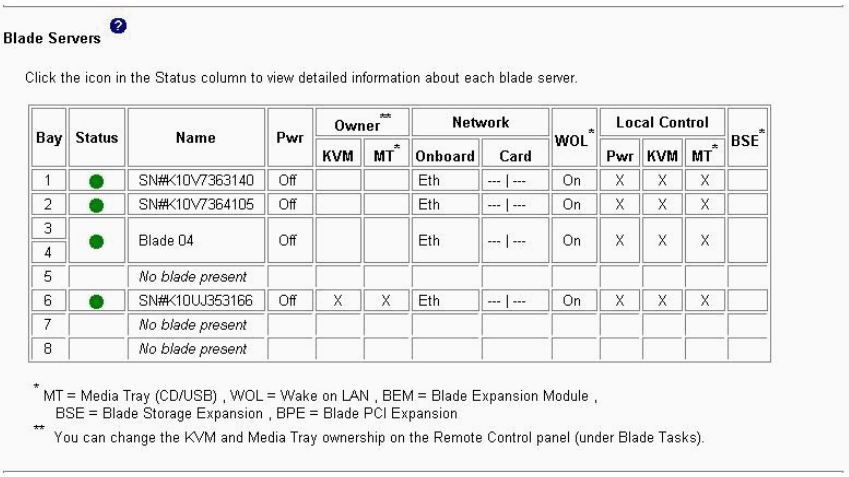
Monitors

Select the choices in the **Monitors** section to view the status, settings, and other information about components in the BladeCenter T unit.

System Status



Select **System Status** to view the overall system status, a list of outstanding events that require immediate attention, and the overall status of each of the blade servers and other components in the BladeCenter T unit.



Blade Servers

Click the icon in the Status column to view detailed information about each blade server.

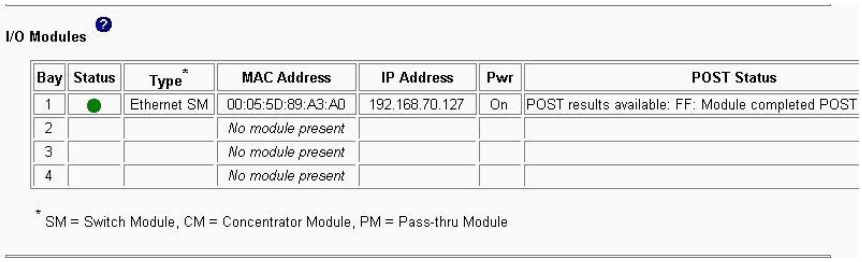
Bay	Status	Name	Pwr	Owner**		Network		WOL*	Local Control			BSE*
				KVM	MT*	Onboard	Card		Pwr	KVM	MT*	
1	●	SN#K10V7363140	Off			Eth	--- | ---	On	X	X	X	
2	●	SN#K10V7364105	Off			Eth	--- | ---	On	X	X	X	
3 4	●	Blade 04	Off			Eth	--- | ---	On	X	X	X	
5		*No blade present*										
6	●	SN#K10UJ353166	Off	X	X	Eth	--- | ---	On	X	X	X	
7		*No blade present*										
8		*No blade present*										

* MT = Media Tray (CD/USB) , WOL = Wake on LAN , BEM = Blade Expansion Module , BSE = Blade Storage Expansion , BPE = Blade PCI Expansion

** You can change the KVM and Media Tray ownership on the Remote Control panel (under Blade Tasks).

When you click **Blade Servers**, the following information is displayed:

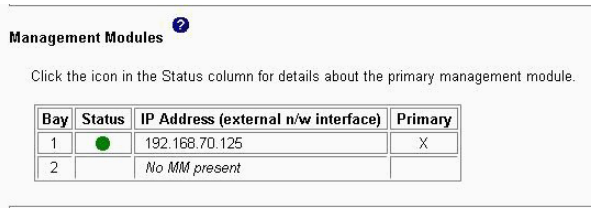
- **Bay** - The lowest-number bay that the blade server occupies.
- **Status** - An icon that indicates good, warning, or bad status for the blade server. Click the icon for more detailed status information.
- **Name** - The name of the blade server.
- **Pwr** - The power state (on or off) of the blade server.
- **Owner** - An indication of whether the blade server is the current owner of the following BladeCenter T resources:
  - **KVM** - Keyboard, video, and mouse
  - **MT** - The media tray containing the CD-ROM drive and USB port
- **Network** - An indication of which network interfaces are on the blade server (Onboard) and the I/O expansion options (Card). For example, an Onboard status of `Eth` indicates that the blade server has integrated Ethernet controllers on the system board and a Card status of `Fibre` indicates that the blade server has a Fibre Channel I/O expansion option installed.
- **WOL** - An indication of whether the Wake on LAN® feature is currently enabled for the blade server. The Wake on LAN feature is enabled by default in blade server BIOS and cannot be disabled. The BladeCenter T management module provides a single point of control for the Wake on LAN feature, enabling the settings to be controlled for either the entire BladeCenter T unit or a single blade server. Wake on LAN settings that are made in the management module override the settings in the blade server BIOS. See “Power/Restart” on page 24 for information.
- **Local Control** - An indication of whether the following options are enabled:
  - Local power control
  - Local keyboard, video, and mouse switching
  - Local CD-ROM drive and USB port switching
- **BSE** - An indication of whether a SCSI expansion unit occupies the blade bay.



When you click **I/O Modules**, the following information is displayed:

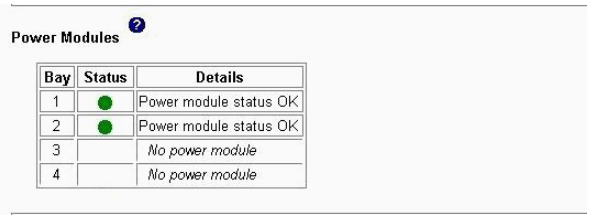
- **Bay** - The number of the bay that the I/O module occupies.
- **Status** - An icon that indicates good, warning, or bad status for the I/O module.
- **Type** - The type of I/O module in the bay, such as an Ethernet I/O module, Fibre Channel I/O module, or pass-thru module.
- **MAC Address** - The medium access control (MAC) address of the I/O module.

  Note: Some types of I/O modules, such as a pass-thru module, have no MAC address nor IP address.
- **IP Address** - The IP address of the I/O module.
- **Pwr** - The power state (on or off) of the I/O module.
- **Details** - Text information about the status of the I/O module.



When you click **Management Module**, the following information is displayed:

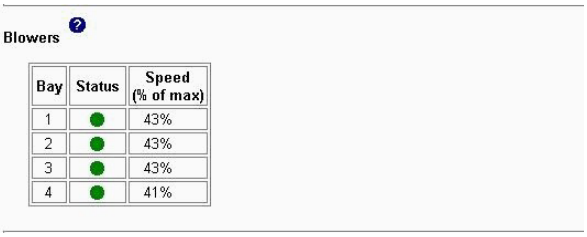
- **Bay** - The number of the bay that the management module occupies.
- **Status** - An icon that indicates good, warning, or critical status for the management module. Click the icon for more detailed status information, such as self-test results, power-supply voltage levels, and the inside temperature of the BladeCenter T unit.
- **IP Address** - The IP address of the remote management and console connection (external Ethernet port) on the management module.
- **Primary** - An indication of which management module is the primary, or active, management module.



When you click **Power Modules**, the following information is displayed:

- **Bay** - The number of the bay that the power module occupies.
- **Status** - An icon that indicates good, warning, or critical status for the power module.

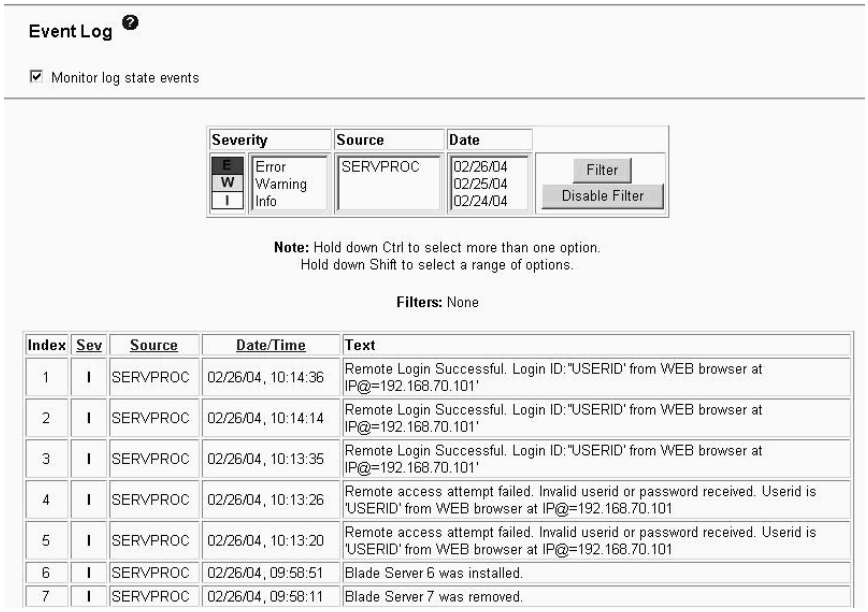
- **Details** - Text information about the status of the power module.



When you click **Blowers**, the following information is displayed:

- **Bay** - The number of the bay that the blower module occupies.
- **Status** - An icon that indicates good, warning, or critical status for the blower module.
- **Speed** - The current speed of the blower module, as a percentage of the maximum revolutions per minute (rpm). The blower speed varies with the thermal load. An entry of `Offline` indicates that the blower is not functioning.

Event Log



Select **Event Log** to view entries that are currently stored in the management-module event log. This log includes entries for events that are detected by the blade servers. The log displays the most recent entries first. Information about all remote access attempts is recorded in the event log, and the management module sends out the applicable alerts if it is configured to do so.

The maximum capacity of the event log is 750 entries. When the log is 75% full, the BladeCenter T MNR (minor alarm) LED is lit. When the log is full, new entries overwrite the oldest entries, and the BladeCenter T MJR (major alarm) LED is lit. If you do not want the management module to monitor the state of the event log, clear the **Monitor log state events** check box at the top of the event log page.

You can sort and filter entries in the event log. See the event log help for more information.

LEDs

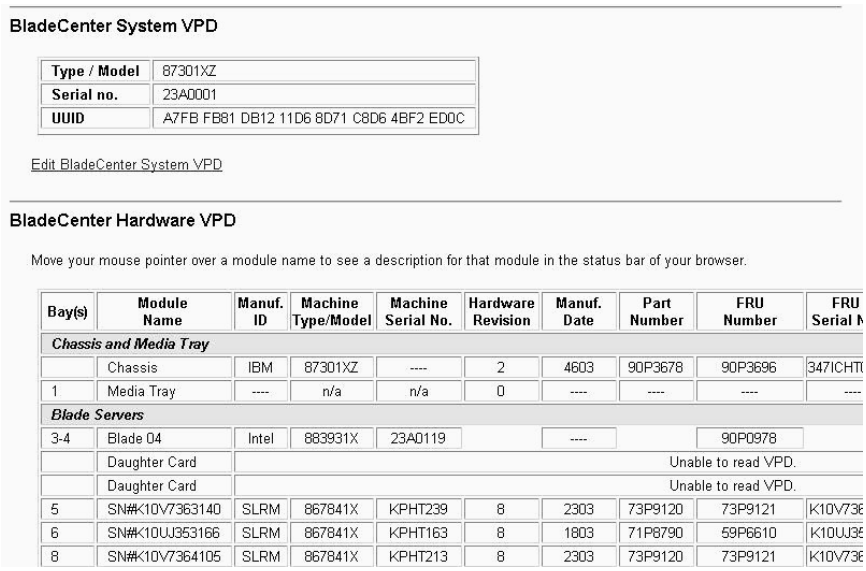
Select **LEDs** to view the state of the BladeCenter T system-status panel and blade server control panel LEDs. You can also use this choice to turn on, turn off, or flash the location LED on the BladeCenter T unit and the blade servers, and control how the LEDs respond to alarms.

The following information is displayed:

- **Front and Rear Panel LEDs** - Controls and displays the state of the following LEDs on the BladeCenter T system LED panel:
  - Critical Alarm (CRT LED)
  - Major Alarm (MJR LED)
  - Minor Alarm (MNR LED)
  - Location

  You can change the state of the location LED and select the active LED color (red or amber) for the critical and major alarm LEDs. This color selection is applied to the LEDs on the front and rear of the BladeCenter T unit and to the LED indications that are shown on this page. You can also specify whether the management module lights LEDs for all alarm types that occur (critical, major, or minor) or whether it lights only the LED that corresponds to the highest level alarm that occurs. Amber is the default color for the critical and major alarm LEDs. The management module is also set to light the LEDs for all alarm types that occur (critical, major, or minor), by default.
- **Set Alarm Panel LEDs** - Sets a descriptive text message that is associated with alarms of the specified level of severity. The message is displayed on the System Status page when an alarm of that severity level occurs. The LED that is associated with the alarm severity level might also be lit.
- **Blade Server LEDs** - The state of the following LEDs on the blade server control panel. You can change the state of the information and location LEDs.
  - Power
  - Error
  - Information
  - Keyboard, video, and monitor select
  - Media (CD-ROM and USB port) select
  - Location

Hardware VPD



BladeCenter System VPD

Type / Model	87301XZ
Serial no.	23A0001
UUID	A7FB FB81 DB12 11D6 8D71 C8D6 4BF2 ED0C

Edit BladeCenter System VPD

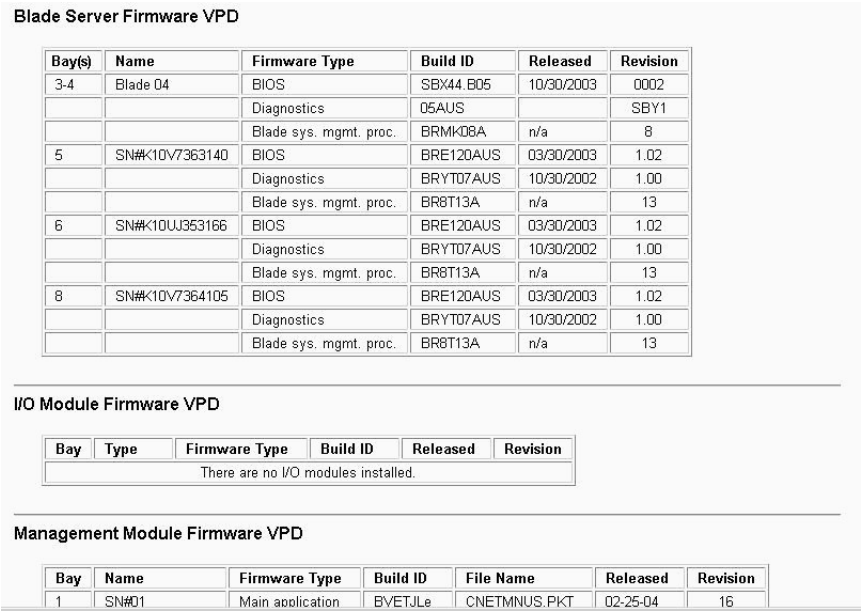
BladeCenter Hardware VPD

Move your mouse pointer over a module name to see a description for that module in the status bar of your browser.

Bay(s)	Module Name	Manuf. ID	Machine Type/Model	Machine Serial No.	Hardware Revision	Manuf. Date	Part Number	FRU Number	FRU Serial N
Chassis and Media Tray									
	Chassis	IBM	87301XZ	----	2	4603	90P3678	90P3696	347ICHT
1	Media Tray	----	n/a	n/a	0	----	----	----	----
Blade Servers									
3-4	Blade 04	Intel	883931X	23A0119		----		90P0978	
	Daughter Card	Unable to read VPD.							
	Daughter Card	Unable to read VPD.							
5	SN#K10V7363140	SLRM	867841X	KPHT239	8	2303	73P9120	73P9121	K10V736
6	SN#K10UJ353166	SLRM	867841X	KPHT163	8	1803	71P8790	59P6610	K10UJ35
8	SN#K10V7364105	SLRM	867841X	KPHT213	8	2303	73P9120	73P9121	K10V736

Select **Hardware VPD** to view the hardware vital product data (VPD) for the BladeCenter T unit. When the BladeCenter T unit is started, the management module collects the vital product data and stores it in nonvolatile memory. The management module then modifies the stored VPD as components are added to or removed from the BladeCenter T unit. At the bottom of the page, you can also view the log of modules that have been installed in or removed from the BladeCenter T unit.

Firmware VPD



Blade Server Firmware VPD

Bay(s)	Name	Firmware Type	Build ID	Released	Revision
3-4	Blade 04	BIOS	SBX44.B05	10/30/2003	0002
		Diagnostics	05AUS		SBY1
		Blade sys. mgmt. proc.	BRMK08A	n/a	8
5	SN#K10V7363140	BIOS	BRE120AUS	03/30/2003	1.02
		Diagnostics	BRYT07AUS	10/30/2002	1.00
		Blade sys. mgmt. proc.	BR8T13A	n/a	13
6	SN#K10UJ353166	BIOS	BRE120AUS	03/30/2003	1.02
		Diagnostics	BRYT07AUS	10/30/2002	1.00
		Blade sys. mgmt. proc.	BR8T13A	n/a	13
8	SN#K10V7364105	BIOS	BRE120AUS	03/30/2003	1.02
		Diagnostics	BRYT07AUS	10/30/2002	1.00
		Blade sys. mgmt. proc.	BR8T13A	n/a	13

I/O Module Firmware VPD

Bay	Type	Firmware Type	Build ID	Released	Revision
There are no I/O modules installed.					

Management Module Firmware VPD

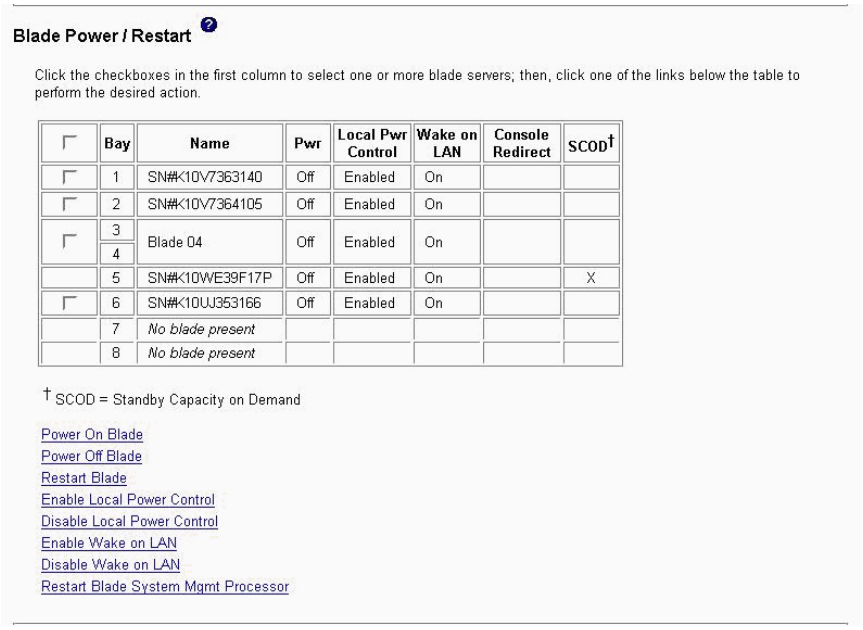
Bay	Name	Firmware Type	Build ID	File Name	Released	Revision
1	SN#01	Main application	BVETJLe	CNETMNUS.PKT	02-25-04	16

Select **Firmware VPD** to view the vital product data (VPD) for the firmware in all blade servers, I/O modules, and management modules in the BladeCenter T unit. The firmware VPD identifies the firmware type, build ID, release date, and revision number. The VPD for the firmware in the management modules also includes the file name of the firmware components. (After you select **Firmware VPD**, it takes up to 30 seconds to refresh and display information.)

Blade Tasks

Select the choices in the **Blade Tasks** section to view and change the settings or configurations of blade servers in the BladeCenter T unit.

Power/Restart



Blade Power / Restart

Click the checkboxes in the first column to select one or more blade servers; then, click one of the links below the table to perform the desired action.

	Bay	Name	Pwr	Local Pwr Control	Wake on LAN	Console Redirect	SCOD†
☐	1	SN#K10V7363140	Off	Enabled	On		
☐	2	SN#K10V7364105	Off	Enabled	On		
☐	3 4	Blade 04	Off	Enabled	On		
	5	SN#K10WE39F17P	Off	Enabled	On		X
☐	6	SN#K10UJ353166	Off	Enabled	On		
	7	*No blade present*					
	8	*No blade present*					

† SCOD = Standby Capacity on Demand

Power On Blade
Power Off Blade
Restart Blade
Enable Local Power Control
Disable Local Power Control
Enable Wake on LAN
Disable Wake on LAN
Restart Blade System Mgmt Processor

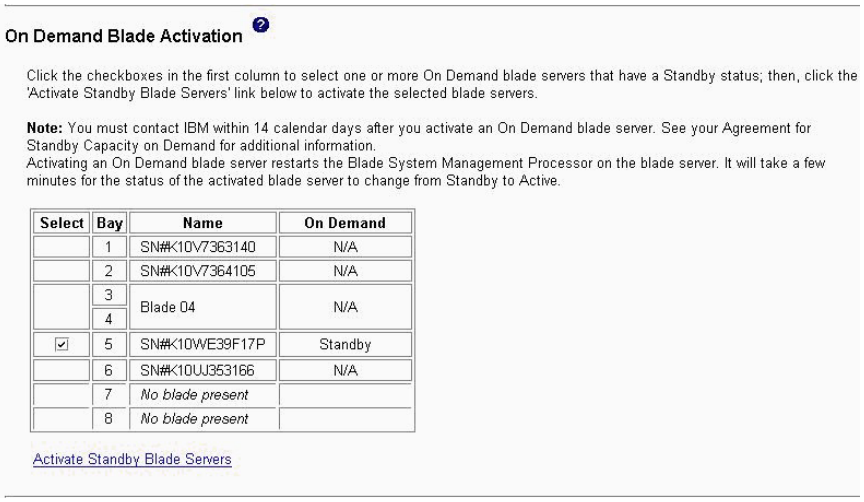
Select **Power/Restart** to perform the following actions on any blade server in the BladeCenter T unit.

Note: You cannot perform these actions on an On Demand blade server with a Standby status (indicated by an X in the SCOD column). To activate an On Demand blade server, see the instructions in “On Demand” on page 25.

- Turn on or turn off the selected blade server (set the power state on or off).
- Enable or disable local power control. When local power control is enabled, a local user can turn on or turn off the blade server by pressing the power-control button on the blade server.
- Enable or disable the Wake on LAN feature.
- Restart the blade server or the service processor in the blade server.
- See which blade servers are currently under the control of a remote console (indicated by an X in the Console Redirect column).

Select the blade servers on which you want to perform an action; then, click the applicable link below the table for the action that you want to perform.

On Demand



Select **On Demand** to activate an On Demand blade server with Standby status. You must activate an On Demand blade server with Standby status before you can turn it on. When you activate an On Demand blade server, its status changes from Standby to Active, making the blade server available for use.

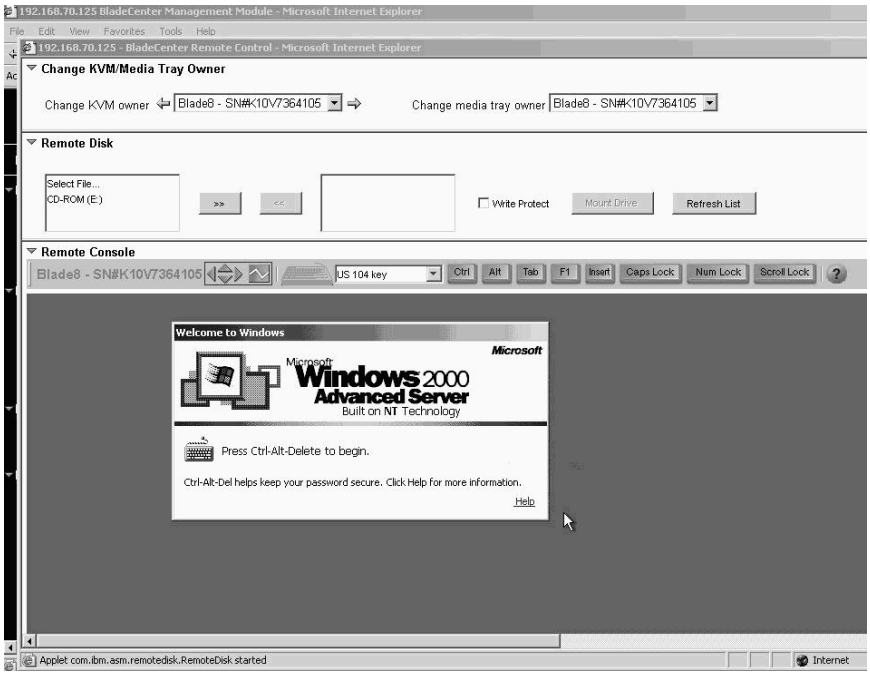
Select the check boxes in the Select column for one or more On Demand blade servers that have a Standby status; then, click the **Activate Standby Blade Servers** link to activate the selected blade servers. Blade servers with an On Demand status of N/A are not On Demand blade servers.

Note: You must contact IBM within 14 calendar days after you activate an On Demand blade server. See your *Agreement for Standby Capacity on Demand* for additional information.

Remote Control

Select the Remote Control choice to perform the following tasks:

- View and change the current owners of the keyboard, monitor, and mouse (KVM), and of the CD-ROM drive and USB port (Media tray).
- View the details of any currently active remote control session (user ID, client IP address, start time).
- Disable local switching of the KVM and of the media tray for all blade servers until they are explicitly enabled again. This prevents a local user from switching the console display to a different blade server while you are performing remote control tasks.
- Redirect a blade server console to the remote console.



On the remote console, you can perform the following tasks:

- Change the owner of the KVM and of the media tray to the blade server that you need to view.
- Select and access the disk drives in the media tray.
- Mount a disk drive or disk image, from the computer that is acting as the remote console, onto a blade server. The mounted disk drive or disk image will appear as a USB device that is attached to the blade server. See “Using the remote disk feature” on page 62 for information and instructions.
- Access files at any available network location.
- View the current blade server display.
- Control the blade server as if you were at the local console, including restarting the blade server and viewing the POST process, with full keyboard and mouse control.

Remote console keyboard support includes all keys. Icons are provided for keys that might have a special meaning to the blade server. For example, to transmit Ctrl+Alt+Del to the blade server, you must click the **Ctrl** icon and then press the Alt and Del keys on the keyboard.

Only one remote-control session is allowed at a time. If a remote-control session is already active, you can end the current session and start a new one.

The timeout value for a remote-control session is the same as the timeout value that you set for the management-module Web interface session when you logged in.

When you redirect a blade server Linux X Window System session console to the remote console, the ability of the remote console applet to accurately track the location of the mouse cursor depends on the configuration of the X Window System. Complete the following procedure to configure the X Window System for accurate mouse tracking. Type the commands through the remote console or at the keyboard attached to the BladeCenter T unit. Note that these changes require root privileges.

1. Enter the following commands:

   `init 3` (switch to text mode if necessary)

   `rmmod mousedev` (unload the mouse device driver)

2. Add the following statement to .xinitrc in the user's home directory:

   `xset m 1 1` (turn off mouse acceleration)

3. Add the following statement to /etc/modules.conf:

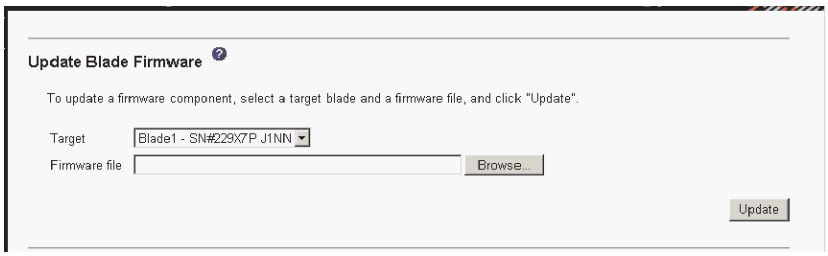
   `options mousedev xres=`*x* `yres=`*y* (notify the mouse device driver of the video resolution) where *x* and y specify the video resolution

4. Enter the following commands:

   `insmod mousedev` (reload the mouse device driver)

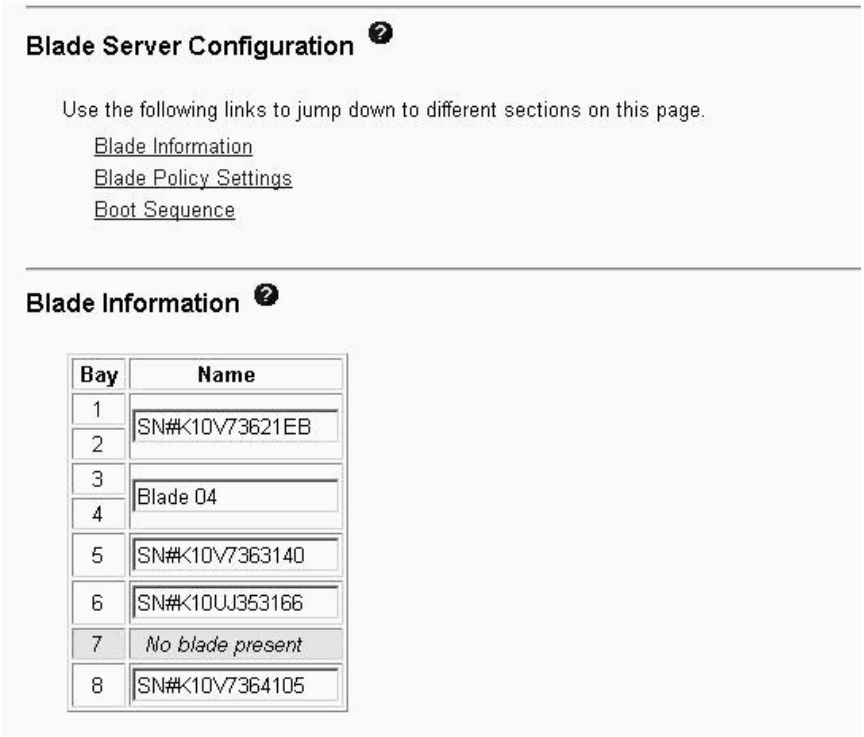
   `init 5` (return to GUI mode if necessary)

Firmware Update



Select **Firmware Update** to update the service processor firmware on a blade server. Select the target blade server and the firmware file to use for the update; then, click **Update**. You can obtain the firmware files from the IBM Support Web site at http://www.ibm.com/pc/support/.

Configuration

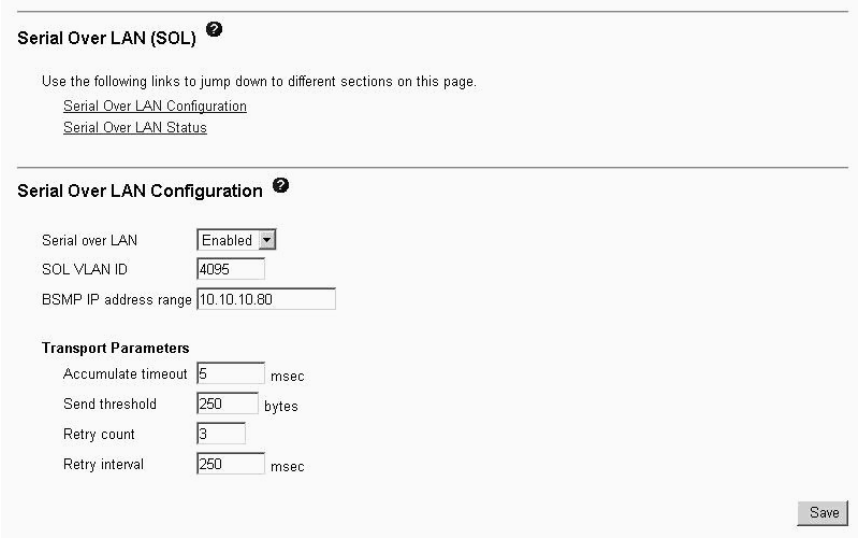


Select the Configuration choice to perform the following tasks:

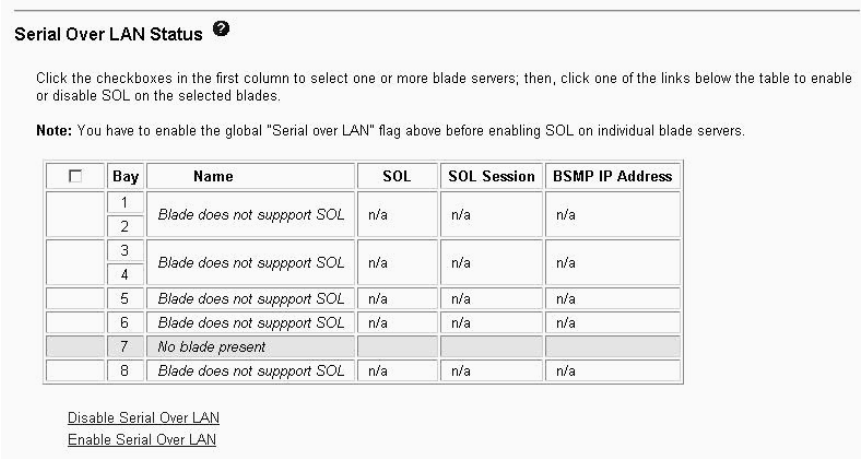
- Define a name for a blade server.
- Enable or disable the following items on all blade servers in the BladeCenter T unit:
  - Local power control
  - Local KVM control
  - Local media tray control
  - The Wake on LAN feature
- View or define the startup (boot) sequence for one or more blade servers. The startup sequence prioritizes the following boot-record sources for a blade server:
  - Hard disk drives (0 through 3). The selection of hard disk drives depends on the hard disk drives that are installed in your blade server.
  - CD-ROM.
  - Network - PXE. Selecting Network - PXE attempts a PXE/DHCP network startup the next time the blade server is turned on or restarted.

Note: To use the CD-ROM drive as a boot-record source for a blade server, the blade server must have been designated as the owner of the CD-ROM drive and USB port. You set ownership either by pressing the CD/diskette/USB select button on the blade server or through the **Remote Control** choice described in “Remote Control” on page 25.

Serial Over LAN



Select **Serial Over LAN** to view and change the global Serial over LAN (SOL) settings that are used by all blade servers in the BladeCenter T unit and to enable or disable SOL globally for the BladeCenter T unit.



Select this choice also to monitor the SOL status for each blade server and to enable or disable SOL for each blade server, and globally for the BladeCenter T unit. Enabling or disabling SOL globally does not affect the SOL session status for each blade server; SOL must be enabled both globally for the BladeCenter T unit and individually for each blade server where you plan to start an SOL session. SOL is enabled globally and on the blade servers by default.

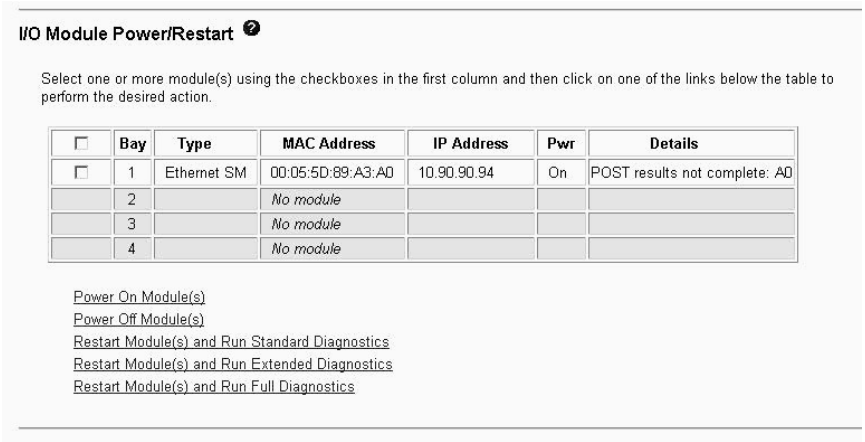
Start and run SOL sessions using the management-module command-line interface. See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information and instructions.

I/O Module Tasks

Select the choices in the I/O Module Tasks section to view and change the settings or configuration on network-interface I/O modules in the BladeCenter T unit.

Note: Some choices do not apply to, and are not available for, some types of I/O modules such as pass-thru modules.

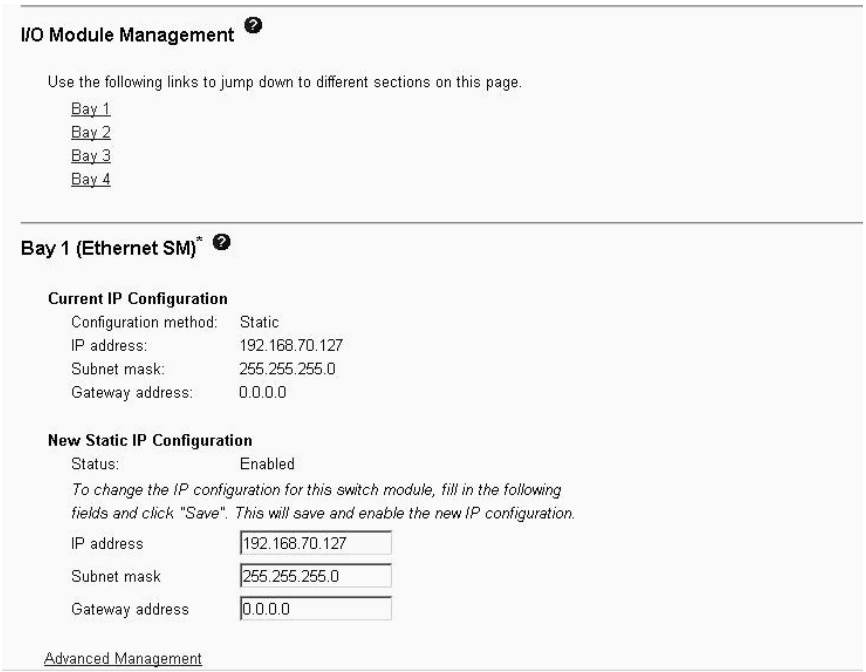
Power/Restart



Select **Power/Restart** to display the power status of the I/O modules and to perform the following actions:

- Turn on or turn off an I/O module
- Reset an I/O module

Management



Select **Management** to view or change the IP configuration of the I/O modules, enable the I/O module ports, enable external management, ping an I/O module, configure other advanced I/O module settings, return an I/O module to the default configuration, and start the configuration and management firmware that might be in an I/O module.

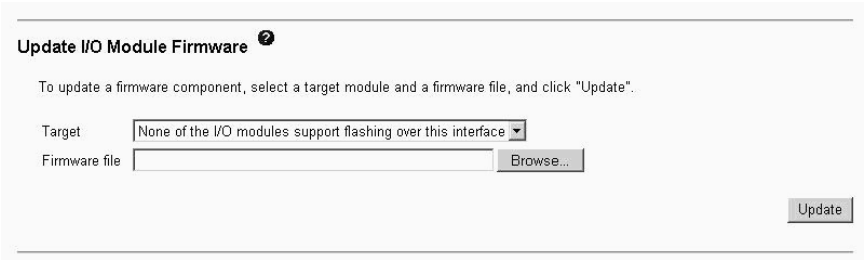
Note: The initial factory-defined user ID and password for the I/O module firmware are as follows:

- User ID: USERID (all capital letters)

- Password: PASSW0RD (note the zero, not O, in PASSW0RD)

See the *Installation and User's Guide* for your BladeCenter T unit for more information about basic I/O-module configuration. See the documentation that comes with the I/O module for details about the configuration and management firmware for the I/O module. Documentation for some I/O modules is on the IBM *BladeCenter T Documentation* CD.

Firmware Update



Select **Firmware Update** to update the firmware in a I/O module. Select the target I/O module and the firmware file to use for the update; then, click **Update**. You can obtain the firmware files from the IBM Support Web site at http://www.ibm.com/pc/support/.

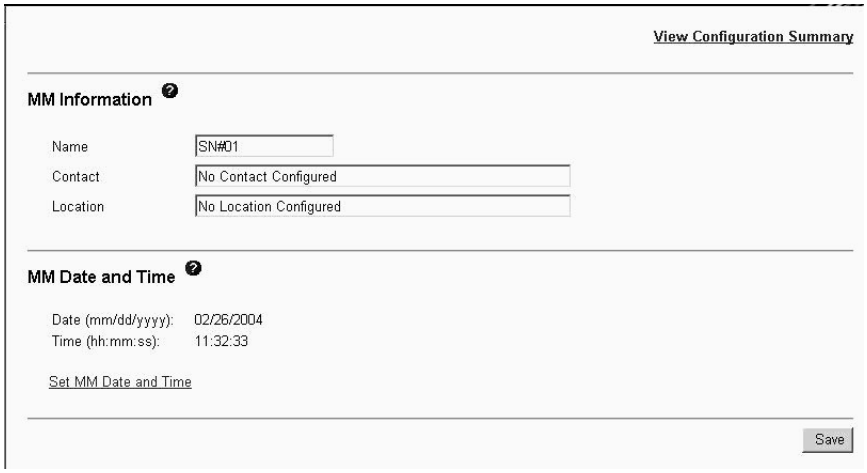
MM Control

Select the choices in the **MM Control** section to view and change the settings or configuration on the management module that you are logged in to (the primary management module) through the management-module Web interface session. If your BladeCenter T unit has redundant management modules, the configuration settings of the primary management module are automatically transferred to the secondary management module.

Management-module configuration includes the following items:
- The name of the management module
- Up to 12 login profiles for logging in to the management module
- Ports used by the management module
- How alerts are handled
- The management module Ethernet connections for remote console and for communicating with the I/O modules
- Settings for the SNMP, DNS, SMTP, and LDAP protocols
- Settings for secure socket layer (SSL) and Secure Shell (SSH) security

This also includes performing the following tasks:
- Backing up and restoring the management-module configuration
- Updating the management-module firmware
- Restoring the default configuration
- Restarting the management module
- Switching from the current active management module to the redundant management module

General Settings

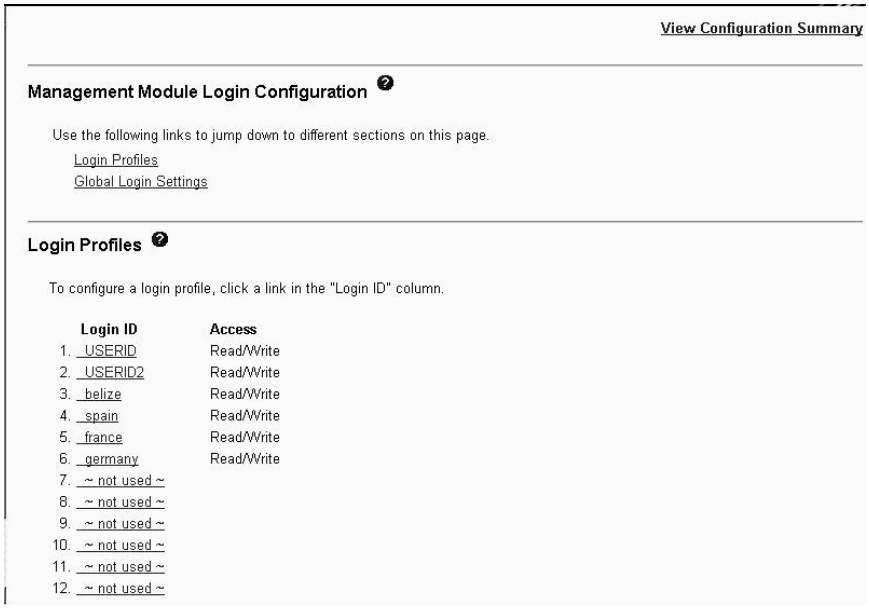


Select **General Settings** to view or change the following settings:

- The name of the management module
- The name of the contact person who is responsible for the management module
- The physical location of the management module
- The real-time clock settings in the management module

Some of the General Settings are used during SNMP and SMTP configuration. See “Configuring SNMP” on page 40 and “Configuring SMTP” on page 42 for additional information.

Login Profiles



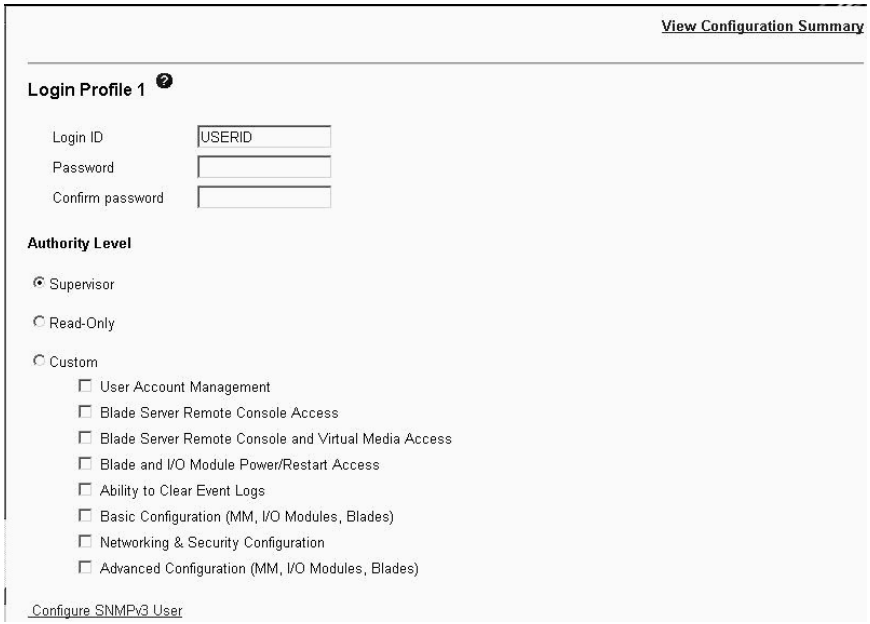
Select **Login Profiles** to configure up to 12 login profiles for logging in to the management module; and to specify the following global login settings:

- User authentication method (local, LDAP, or both)
- How to process users who log in using a modem

- Lockout period after five unsuccessful login attempts

For each user profile, specify the following values:

- Login ID
- Authority level (default is Read-Only)
- Password (requires confirmation)

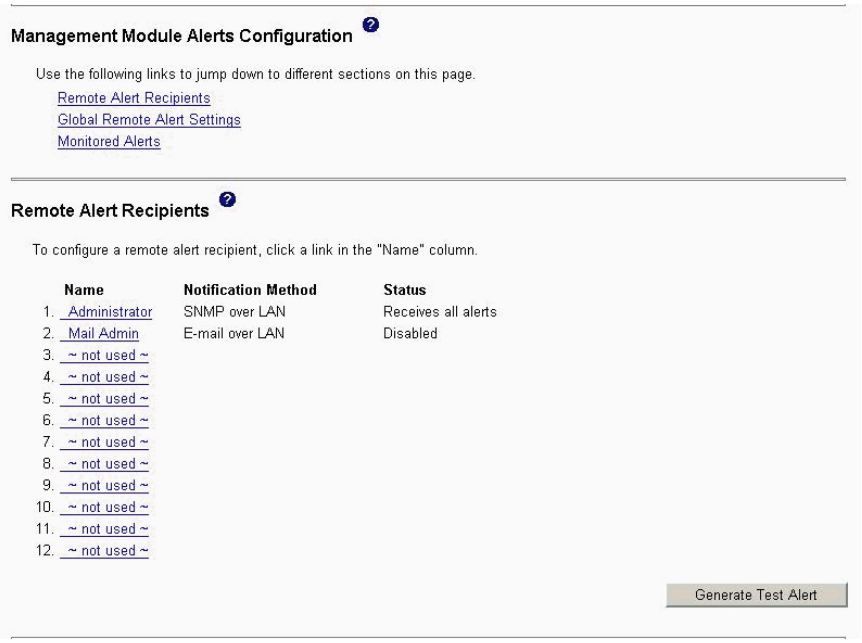


Several authority levels are available, each giving a user write and execute access to different areas of management-module function. Multiple authority levels can be assigned to each user. Users with Supervisor authority have write and execute access to all management-module functions. Users with Read-Only authority can access all management-module functions for viewing only.

Attention: If you change the default login profile on the management module, be sure to keep a record of your login ID and password in a safe place. If you forget the management-module login ID and password, you must replace the management module.

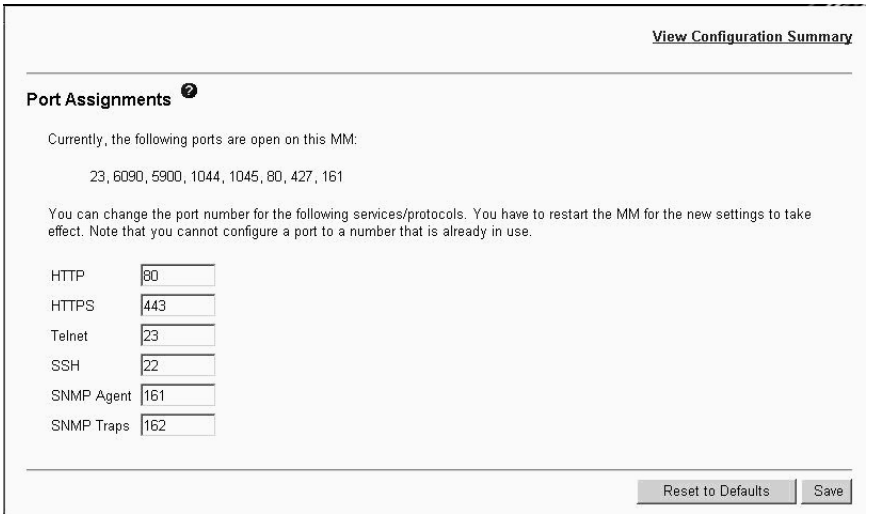
Click **View Configuration Summary** to display the configuration settings for all BladeCenter T users and components.

Alerts



Select **Alerts** to specify which events (from lists of critical, warning, and system alerts) are monitored, which event notifications are sent to whom, how event notifications are sent (SNMP or e-mail), whether to include the event log with the notification, and other alert parameters.

Port Assignments



Select **Port Assignments** to configure some of the ports that are used by the management module. Management-module ports that can be configured on the Port Assignments page are listed in Table 3.

Table 3. User-configurable management-module ports

Port name	Default port number	Description
HTTP	80	Port used for Web server HTTP connection using UDP
HTTPS	443	Port used for SSL connection using TCP

Table 3. User-configurable management-module ports (continued)

Port name	Default port number	Description
Telnet	23	Port used for the Telnet command-line interface connection
SSH	22	Port used for the Secure Shell (SSH) command-line interface connection
SNMP Agent	161	Port used for SNMP get/set commands using UDP
SNMP Traps	162	Port used for SNMP traps using UDP

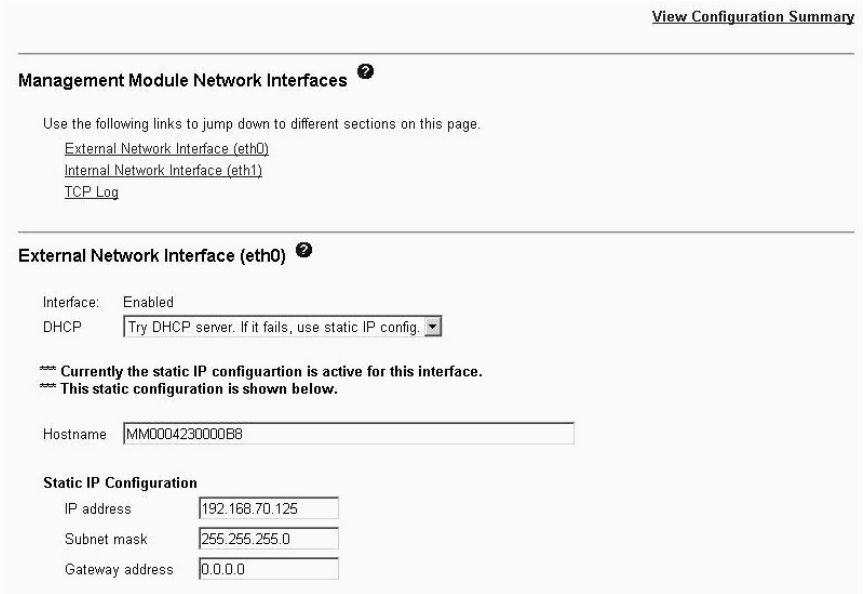
Other ports that are used by the management module are listed in Table 4. These ports are fixed and cannot be modified.

Table 4. Fixed management-module ports

Port number (fixed)	Description
25	Port used for TCP e-mail alerts
53	Port used for the UDP Domain Name Server (DNS) resolver
68	Port used for DHCP client connection using UDP
427	Port used for the UDP Service Location Protocol (SLP) connection
1044	Port used for remote disk function
1045	Port used for persistent remote disk (disk on card)
5900	Port used for the TCP VNC server applet

Click **View Configuration Summary** to display the configuration settings for all BladeCenter T users and components.

Network Interfaces



Select **Network Interfaces** to configure the two management-module Ethernet interfaces: external (remote management and console), and internal (communication with the I/O modules). You can also select this choice to view the TCP log.

When you use the management-module Web interface to update an I/O-module configuration, the management-module firmware writes its settings for the I/O module only to the management-module NVRAM; it does not write its settings for the I/O module to the I/O-module NVRAM.

If the I/O module restarts when the management module is not able to apply the IP address that it has in NVRAM for the I/O module, the I/O module uses whatever IP address that it has in its own NVRAM. If the two IP addresses are not the same, you might not be able to manage the I/O module anymore. The management module cannot apply the I/O module IP address from its NVRAM under any of the following conditions:

- The management module is restarting.
- The management module has failed.
- The management module has been removed from the BladeCenter T unit.

You must use the Telnet interface to log in to the I/O module, change the IP address to match the one that you assigned through the management module, and then save the I/O module settings in the Telnet session (**Basic Setup → Save Changes**).

For I/O-module communication with a remote management station, through the management-module external Ethernet port, the I/O module internal network interface and the management module internal and external interfaces must be on the same subnet.

- When you click **External Network Interface (eth0)**, information about the interface for the remote management and console port is displayed:

  Note: If you plan to use redundant management modules and want both to use the same external IP address, disable DHCP and configure and use a static IP address. (The IP configuration information will be transferred to the redundant management module automatically when needed.)

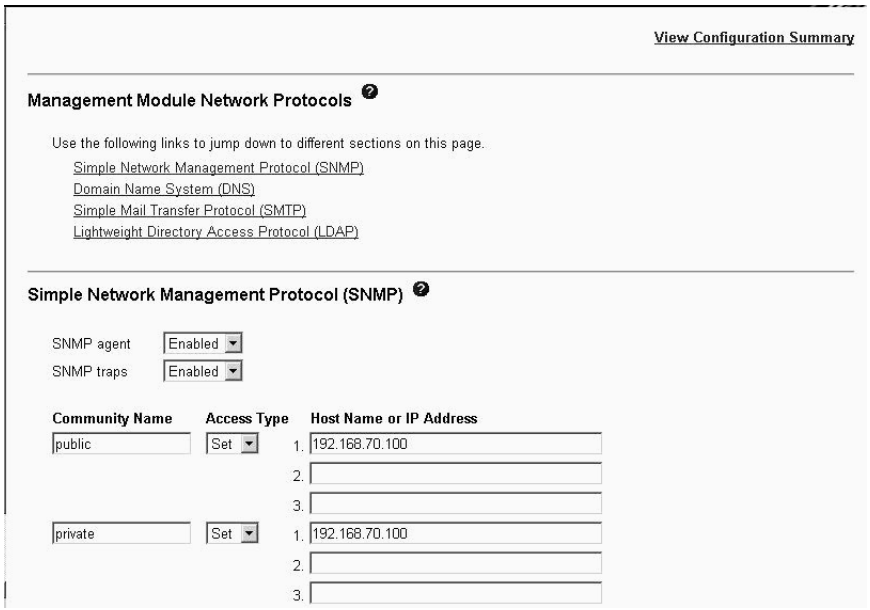
  – **Interface** - The status (Enabled or Disabled) of the Ethernet connection. The default is Enabled.
  – **DHCP** - Select one of the following choices:
    - **Try DHCP server. If it fails, use static IP config.** (the default).
    - **Enabled - Obtain IP config. from DHCP server**
    - **Disabled - Use static IP configuration**
  – **Hostname** - (Optional) This is the IP host name that you want to use for the management module (maximum of 63 characters).
  – **Static IP configuration** - You must configure this information only if DHCP is disabled.
    - **IP address** - The IP address for the management module must contain four integers from 0 through 255, separated by periods, with no spaces or consecutive periods. The default setting is 192.168.70.125.
    - **Subnet mask** - The subnet mask must contain four integers from 0 to 255, separated by periods, with no spaces. The default setting is 255.255.255.0
    - **Gateway address** - The IP address for your network gateway router must contain four integers from 0 through 255, separated by periods, with no spaces.

- When you click **Internal Network Interface (eth1)**, information about the interface that communicates with the network-interface I/O modules, such as an Ethernet I/O module or the Fibre Channel I/O module, is displayed. Use it to perform the following tasks:
  - Specify the IP address to use for this interface. The internal network interface (eth1) and the external network interface (eth0) must be on the same subnet.
  - View the data rate, duplex mode, maximum transmission unit (MTU), locally-administered MAC address, and burned-in MAC address for this interface. You can configure the locally-administered MAC address; the other fields are read-only.
- Click **TCP log** to view entries that are currently stored in the management-module TCP log. This log contains error and warning messages that are generated by the TCP/IP code that is running on the management module; it might be used by a service representative for advanced troubleshooting. The log displays the most recent entries first.

  You can sort and filter entries in the event log.

Click **View Configuration Summary** to display the configuration settings for all BladeCenter T users and components.

Network Protocols

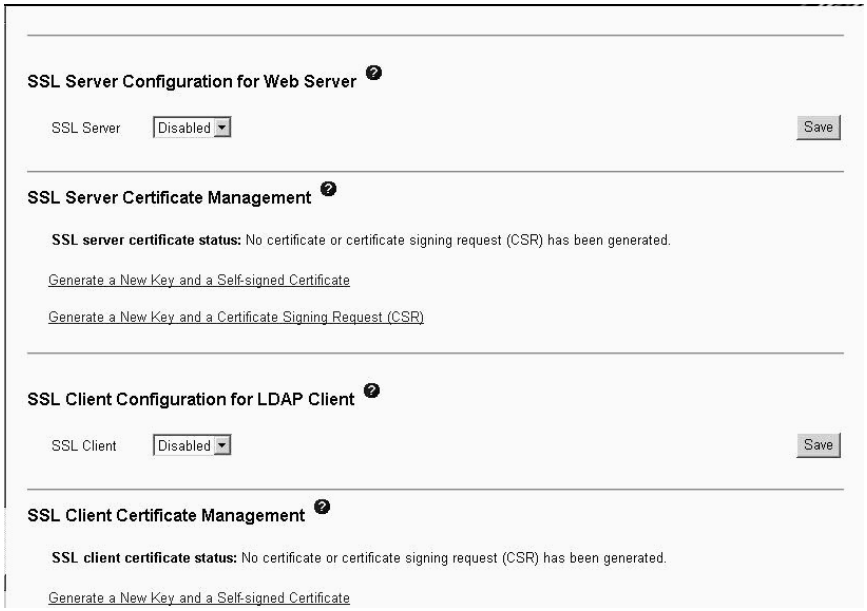


Select **Network Protocols** to view or change the settings for the SNMP, DNS, SMTP, and LDAP protocols.

Click **View Configuration Summary** to display the configuration settings for all BladeCenter T users and components.

Some of the network protocol settings are used during SNMP, SMTP, and LDAP configuration. See “Configuring SNMP” on page 40, “Configuring SMTP” on page 42, and “Configuring LDAP” on page 42 for additional information.

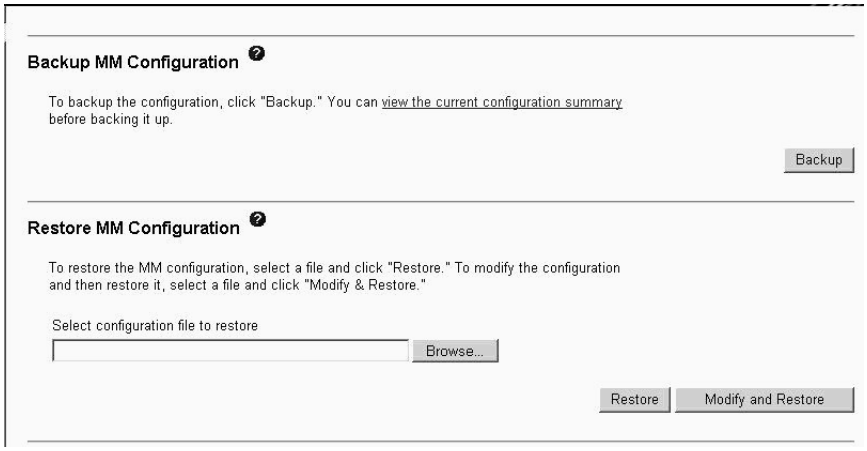
Security



Select **Security** to view or change the secure socket layer (SSL) settings for the Web server and LDAP client, and view or change the Web server Secure Shell (SSH) settings. You can enable or disable (the default) SSL, and choose between self-signed certificates and certificates that are provided by a certificate authority (CA). You can also enable or disable (the default) SSH and generate and manage the SSH server key.

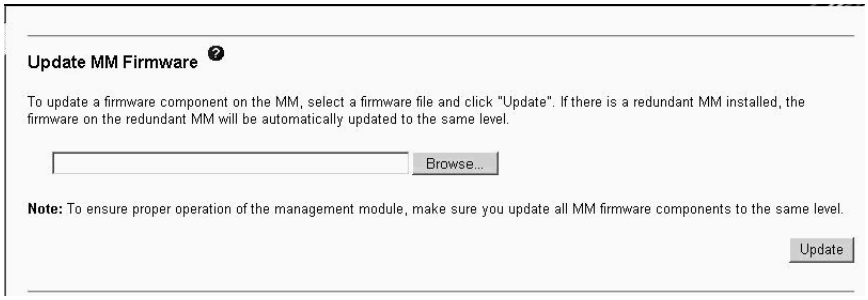
Some of the security settings are used during SSL, LDAP, and SSH configuration. See “Secure Web server and secure LDAP” on page 47 and “Configuring the secure shell server” on page 57 for additional information.

Configuration File



Select **Configuration File** to back up or restore the management-module configuration file. See “Using the configuration file” on page 60 for instructions.

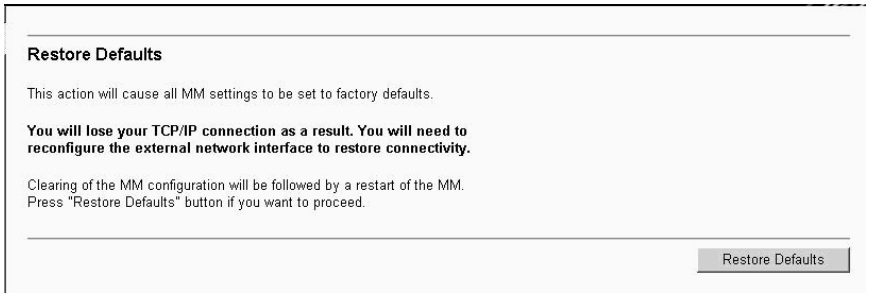
Firmware Update



Select **Firmware Update** to update the management-module firmware; if a second management module is installed, the firmware update will automatically be applied to both management modules. Click **Browse** to locate the firmware file that you want; then, click **Update**.

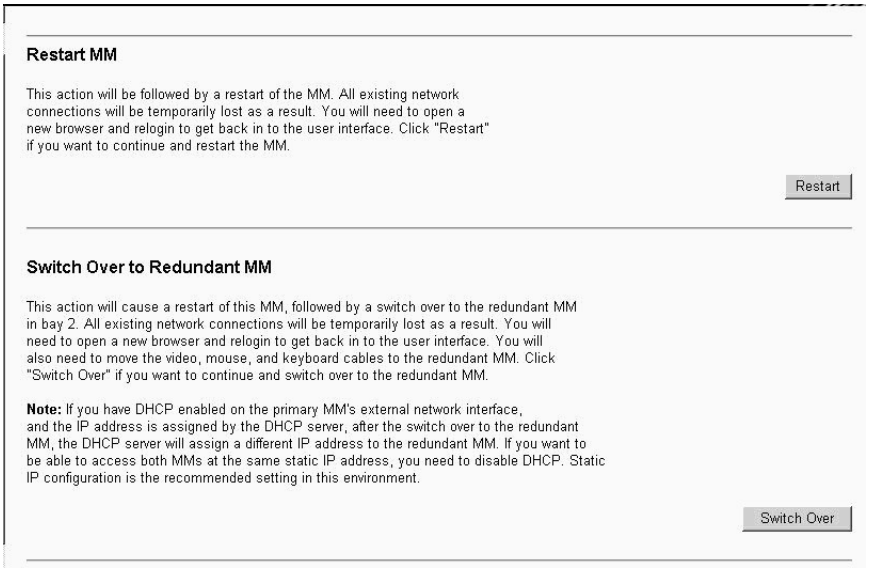
Management-module firmware is in several separate files that are installed independently; you must install all of the firmware update files. You can obtain the firmware files from the IBM Support Web site at http://www.ibm.com/pc/support/.

Restore Defaults



Select **Restore Defaults** to restore the factory default configuration of the management module.

Restart MM



Select **Restart MM** to restart (reset) the management module. If a second management module is present, select this choice to change to the redundant management module.

Network and security configuration

The following sections describe how to configure management-module networking and security parameters for:

- SNMP and DNS (see “Configuring SNMP”)
- SMTP (see “Configuring SMTP” on page 42)
- SSL and LDAP (see “Configuring LDAP” on page 42)
- SSH (see “Configuring the secure shell server” on page 57)

Configuring SNMP

You can query the SNMP agent to collect the sysgroup information and to send configured SNMP alerts to the configured host names or IP addresses.

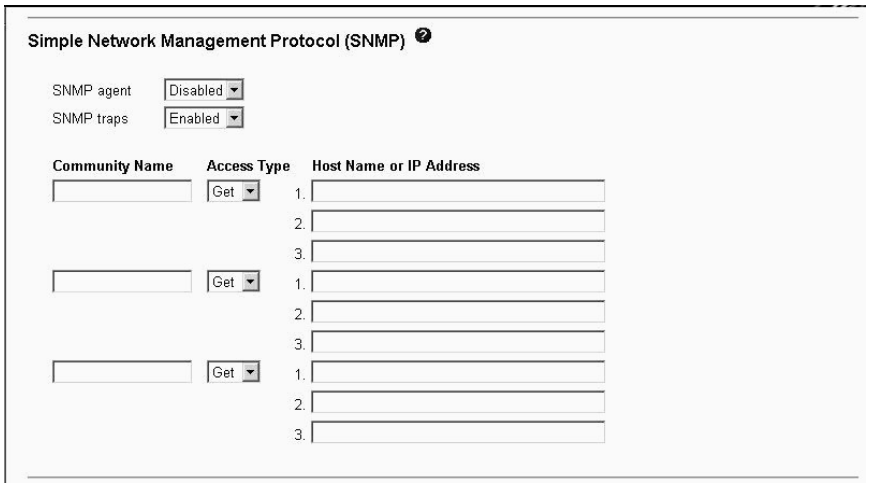
Note: If you plan to configure Simple Network Management Protocol (SNMP) traps on the management module, you must install and compile the management information base (MIB) on your SNMP manager. The MIB supports SNMP traps. The MIB is included in the management-module firmware update package that you downloaded from the IBM Support Web site.

Complete the following steps to configure your SNMP:

1. Log in to the management module where you want to configure SNMP. For more information, see “Starting the management-module Web interface” on page 17
2. In the navigation pane, click **MM Control → General Settings**. In the management-module information page that opens, specify the following information:
   - **Management module name** - The name that you want to use to identify the management module. The name will be included with e-mail and SNMP alert notifications to identify the source of the alert.

- **System contact** - The name and phone number of the person to contact if there is a problem with the BladeCenter T unit.
- **System location** - Sufficient detail to quickly locate the BladeCenter T unit for maintenance or other purposes.

3. Scroll to the bottom of the page and click **Save**.
4. In the navigation pane, click **MM Control → Network Protocols**; then, click the **Simple Network Management Protocol (SNMP)** link. A page similar to the one in the following illustration is displayed.



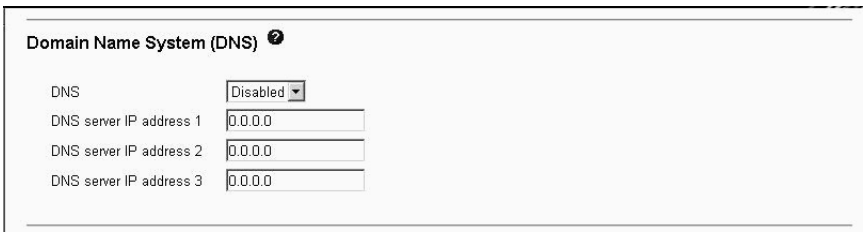
5. Select **Enabled** in the **SNMP agent** and **SNMP traps** fields to forward alerts to SNMP communities on your network. To enable the SNMP agent, the following criteria must be met:
   - System contacts must be specified on the General Settings page.
   - The system location must be specified on the General Settings page.
   - At least one community name must be specified.
   - At least one valid IP address or host name (if DNS is enabled) must be specified for that community.

   Note: Alert recipients whose notification method is SNMP will not receive alerts unless both the SNMP agent and the SNMP traps are enabled.
6. Set up a community to define the administrative relationship between SNMP agents and SNMP managers. You must define at least one community. Each community definition consists of the following parameters:
   - Name
   - IP address

   If either of these parameters is not correct, SNMP management access is not granted.

   Note: If an error message window opens, make the necessary adjustments to the fields that are listed in the error window. Then, scroll to the bottom of the page and click **Save** to save the corrected information. You must configure at least one community to enable this SNMP agent.
7. In the **Community Name** field, enter a name or authentication string to specify the community.
8. In the corresponding **Host Name** or **IP Address** field, enter the host name or IP address of each community manager.

9. If a DNS server is not available on your network, scroll to the bottom of the page and click **Save**.
10. If a DNS server is available on your network, scroll to the **Domain Name System (DNS)** section. A page similar to the one in the following illustration is displayed.



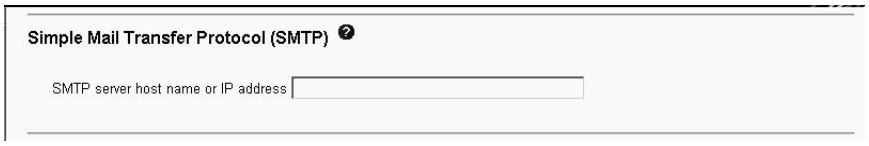
11. If a DNS server (or servers) is available on your network, select **Enabled** in the **DNS** field. The **DNS** field specifies whether you use a DNS server on your network to translate host names into IP addresses.
12. (Optional) If you enabled DNS, in the **DNS server IP address** fields, specify the IP addresses of up to three DNS servers on your network. Each IP address must contain integers from 0 through 255, separated by periods.
13. Scroll to the bottom of the page and click **Save**.
14. In the navigation pane, click **MM Control → Restart MM** to activate the changes.

Configuring SMTP

Complete the following steps to specify the IP address or host name of the Simple Mail Transfer Protocol (SMTP) server.

Note: If you plan to set up an SMTP server for e-mail alert notifications, make sure that the name in the **Name** field in the **MM Information** section of the **MM Control → General Settings** page is valid as part of an e-mail address (for example, there are no spaces).

1. Log in to the management module where you want to configure SMTP. For more information, see “Starting the management-module Web interface” on page 17.
2. In the navigation pane, click **MM Control → Network Protocols** and scroll down to the **Simple Mail Transfer Protocol (SMTP)** section.



3. In the **SMTP Server Host Name or IP Address** field, type the host name of the SMTP server. Use this field to specify the IP address or, if DNS is enabled and configured, the host name of the SMTP server.
4. Scroll to the bottom of the page and click **Save**.

Configuring LDAP

Using a Lightweight Directory Access Protocol (LDAP) server, a management module can authenticate a user by querying or searching an LDAP directory on an LDAP server, instead of going through its local user database. Then, all LDAP clients (BladeCenter T management modules or server remote supervisor adapters) can remotely authenticate any user access through a central LDAP server. This

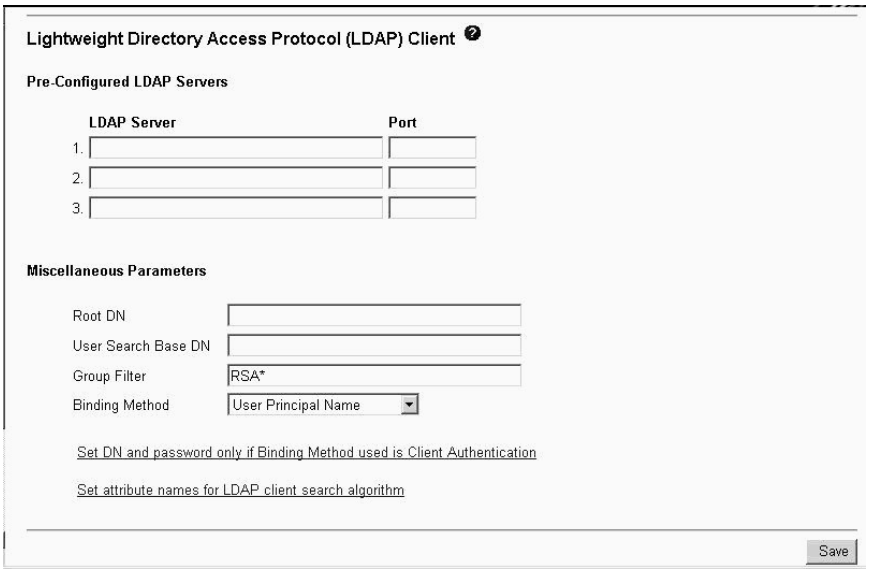
requires LDAP client support on the management module. You can also assign authority levels according to information that is found on the LDAP server.

You can also use LDAP to assign users and management modules to groups and perform group authentication, in addition to the normal user (password check) authentication. For example, a management module can be associated with one or more groups, and a user would pass only group authentication if the user belongs to at least one group that is associated with the management module.

Setting up a client to use the LDAP server

Complete the following steps to set up a client to use the LDAP server:

1. Log in to the management module where you want to set up the client. For more information, see “Starting the management-module Web interface” on page 17.
2. In the navigation pane, click **MM Control → Network Protocols**. Scroll down to the **Lightweight Directory Access Protocol (LDAP) Client** section. A page similar to the one in the following illustration is displayed.



3. Configure the LDAP client using the following information:

LDAP Server

The management module contains a Version 2.0 LDAP client that you can configure to provide authentication through a centrally located LDAP server. You can configure up to three LDAP servers. The port number for each server is optional. If the field is left blank, the default value of 389 is used for nonsecured LDAP connections. For secured connections, the default is 636. You must configure at least one LDAP server.

Root DN

This is the distinguished name for the root entry of the directory tree on the LDAP server (for example, dn=companyABC,dn=com).

User Search Base DN

As part of the user authentication process, the LDAP server must be searched for one or more attributes that are associated with a particular user. Any search request must specify the base distinguished name for the actual search. The **User Search Base DN** field specifies the base distinguished name that is used to search the user directory (for

example, cn=Users,dn=companyABC,dn=com). If this field is left blank, the root distinguished name is used as the search base.

User searches are part of the authentication process. They are carried out to retrieve information about the user such as login permissions, callback number, and group memberships. For Version 2.0 LDAP clients, be sure to configure this parameter; otherwise, a search using the root distinguished name might not succeed (as seen on Microsoft Windows® Server 2003 Active Directory servers).

ASM Group Filter

This parameter is used for group authentication. It specifies the set of groups to which the management module belongs. If this field is left blank, group authentication is disabled. Otherwise, group authentication is performed against this filter. The specified filter can be a specific group name (for example, RSAWest), a wild card with a prefix (for example, RSA*), or a wild card (specified as *). If a specific name is used, the management module belongs only to that group. If a prefix filter is used (for example, RSA*), the management module belongs to any group whose first three letters are RSA. If a wildcard filter (*) is used, the management module belongs to all groups. The default filter is RSA*.

Group authentication is performed after user authentication (where a user ID and password are verified). Group authentication refers to the process of verifying that a user is a member of at least one group that is associated with the management module. For example, if the group filter is set to RSA* and the user belongs to two groups (for example, Engineering and RSAWest), group authentication passes because the user belongs to a group (RSAWest) that matches the filter RSA*. If the groups to which the user belong do not match the filter, group authentication fails, and the user is not allowed to access the management module. Note that if the group filter is *, group authentication will automatically succeed because any group to which the user belongs will match this wildcard.

Binding Method

For initial binds to the LDAP server during user authentication, select one of the following options:

Anonymous authentication. A bind attempt is made without a client distinguished name or password. If the bind is successful, a search will be requested to find an entry on the LDAP server for the user who is attempting to log in. If an entry is found, a second attempt to bind will be attempted, this time with the distinguished name and password of the user. If this succeeds, the user has passed the user authentication phase. Group authentication is then attempted, if it is enabled.

Client authentication. A bind attempt is made with the client distinguished name and password that is specified by this configuration parameter. If the bind is successful, the user authentication phase proceeds as in anonymous authentication.

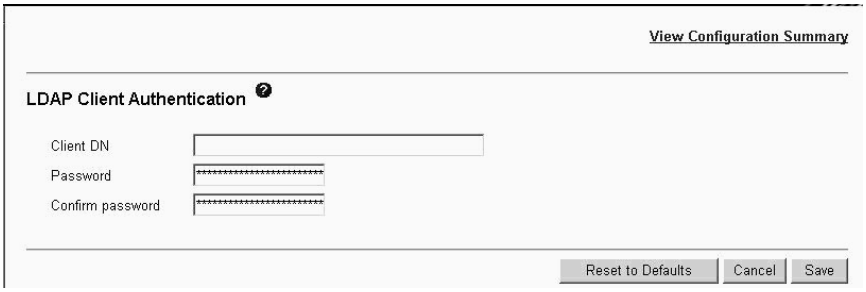
User Principal Name. A bind attempt is made directly with the credentials that were used during the login process. If this succeeds, the user has passed the user authentication phase. The user principal name usually refers to a fully qualified name, such as johndoe@abc.com. However, johndoe would also be acceptable.

Strict User Principal Name. This is similar to the user principal name, except that the user must enter a fully qualified name. That is, johndoe@abc.com would be acceptable, but not johndoe. The name that is entered by the user will be parsed for the @ symbol.

Configuring the LDAP client authentication

Complete the following steps to configure the LDAP client authentication:

1. In the navigation pane, click **MM Control → Network Protocols**.
2. Scroll down to the **Lightweight Directory Access Protocol (LDAP) Client** section and click **Set DN and password for Client Authentication**. A page similar to the one in the following illustration is displayed.

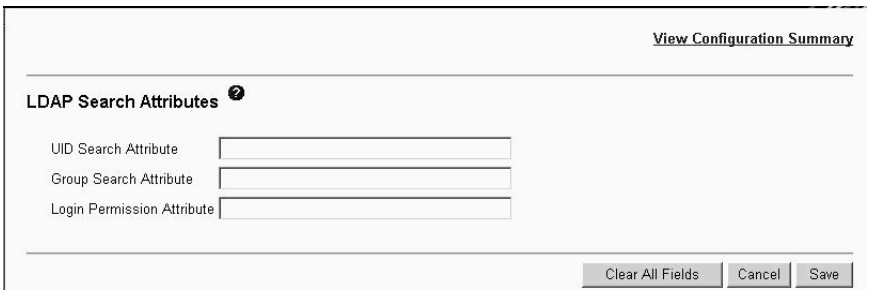


3. Perform the initial bind to the LDAP server during user authentication with anonymous authentication, client-based authentication, or user principle name. To use client-based authentication, in the **Client DN** field, type a client distinguished name. Type a password in the **Password** field or leave it blank.

Configuring the LDAP search attributes

Complete the following steps to configure the LDAP search attributes:

1. In the navigation pane, click **MM Control → Network Protocols**.
2. Scroll down to the **Lightweight Directory Access Protocol (LDAP) Client** section and click **Set search attribute names for LDAP based authentication**. A page similar to the one in the following illustration is displayed.



3. To configure the search attributes, use the following information:

UID Search Attribute

When the selected binding method is anonymous authentication or client authentication, the initial bind to the LDAP server is followed by a search request that is directed at retrieving specific information about the user, including the distinguished name, login permissions, and group ownerships of the user. To retrieve this information, the search request must specify the attribute name that is used to represent user IDs on that server. Specifically, this name is used as a search filter against the login ID that is entered by the user. This attribute name is configured here. If this field is left blank, a default of UID is used during user authentication. For example, on Active Directory servers, the attribute name that is used for user IDs is often sAMAccoutName.

When the selected binding method is user principal name or strict user principal name, the **UID Search Attribute** field defaults automatically to userPrincipalName during user authentication if the user ID that is entered has the form *userid@somedomain*.

Group Search Attribute

When the group filter name is configured, the list of groups to which a user belongs must be retrieved from the LDAP server. This is required to perform group authentication. To retrieve this list, the search filter that is sent to the server must specify the attribute name that is associated with groups. This field specifies this attribute name.

If this field is left blank, the attribute name in the filter defaults to memberOf.

Login Permission Attribute

When a user is successfully authenticated using an LDAP server, the login permissions for the user must be retrieved. To retrieve these permissions, the search filter that is sent to the server must specify the attribute name that is associated with login permissions. This field specifies this attribute name.

If this field is left blank, the user is assigned a default of read-only permissions, assuming user and group authentication passes. When successfully retrieved, the attribute value that is returned by the LDAP server is interpreted according to the following information:

- It must be a bit string that is entered as 12 consecutive zeros or ones, with each bit representing a particular set of functions (for example, 010000000000 or 0000110010000). The bits are numbered according to their positions. The leftmost bit is bit position 0, and the rightmost bit is bit position 11. A value of 1 at a particular position enables the corresponding function. A value of 0 disables that function. The following functions are associated with the 12 bit positions:
  - Deny Always (bit position 0): If this bit is set, a user will always fail authentication. This function can be used to block a particular user or users who are associated with a particular group.
  - Supervisor Access (bit position 1): If this bit is set, a user is given administrator privileges. The user has read and write access to every function. When this bit is set, bits 2 through 12 do not have to be set individually.
  - Read Only Access (bit position 2): If this bit is set, a user has read-only access and cannot perform any maintenance

procedures (for example, restart, remote actions, and firmware updates), and nothing can be modified (using the save, clear, or restore functions). Note that read-only and all other bits are mutually exclusive, with bit position 2 having the lowest precedence. That is, if any other bit is set, this bit will be ignored.

  - Networking and Security (bit position 3): If this bit is set, a user can modify the settings in the Security, Network Protocols, and Network Interface pages for MM Control. If this bit is set, a user can also modify the settings in the Management page for I/O Module Tasks.
  - User Account Management (bit position 4): If this bit is set, a user can add, modify, and delete users and change the Global Login Settings in the Login Profiles page.
  - Blade server Remote Console Access (bit position 5): If this bit is set, a user can access the remote server console.
  - Blade server Remote Console and Virtual Media Access (bit position 6): If this bit is set, a user can access the remote server console and the virtual media functions for the remote server.
  - Blade and I/O Module Power/Restart Access (bit position 7): If this bit is set, a user can access the power-on and restart functions for the remote blades servers and I/O modules. These functions are available in the Power/Restart pages.
  - Basic Configuration (MM, I/O Modules, Blades) (bit position 8): If this bit is set, a user can modify the General Settings and Alerts pages for MM Control and the Configuration page for Blade Tasks.
  - Ability to Clear Event Logs (bit position 9): If this bit is set, a user can clear the event logs. Everyone can look at the event logs, but this particular permission is required to clear the logs.
  - Advanced Configuration (MM, I/O Modules, Blades (bit position 10): If this bit is set, a user has no restrictions when configuring the management module, blade servers, I/O modules, and VPD. The user can also perform firmware upgrades on the management module or blade servers, restore the management module to its factory default settings, modify and restore the management-module configuration from a configuration file, and restart or reset the management module.
  - Reserved (bit position 11): This bit is reserved for future use.

- If none of the bits are set, the default is read-only for the user.
- Priority is given to login permissions that are retrieved directly from the user record. If the user record does not have the login permission attribute, an attempt will be made to retrieve the permissions from the groups to which the user belongs. This is done as part of the group authentication phase. The user will be assigned the inclusive OR of all the bits for all of the groups. The Browser Only bit is set only if all the other bits are set to zero. If the Deny Always bit is set for any of the groups, the user will be refused access. The Deny Always bit always has precedence over every other bit.

Secure Web server and secure LDAP

Secure Sockets Layer (SSL) is a security protocol that provides communication privacy. SSL enables applications to communicate in a way that is designed to prevent eavesdropping, tampering, and message forgery.

You can configure the management module to use SSL support for two types of connections: secure Web server (HTTPS) and secure LDAP connection (LDAPS). The management module takes on the role of SSL client or SSL server, depending on the type of connection. The following table shows that the management module acts as an SSL server for secure Web server connections. The management module acts as an SSL client for secure LDAP connections.

Table 5. Management-module SSL connection support

Connection type	SSL client	SSL server
Secure Web server (HTTPS)	Web browser of the user (for example, Microsoft Internet Explorer)	Management-module Web server
Secure LDAP connection (LDAPS)	Management-module LDAP client	An LDAP server

You can view or change the Secure Sockets Layer (SSL) settings from the **MM Control → Security** page. You can enable or disable SSL and manage the certificates that are required for SSL.

Configuring security

Use the general procedure in this section to configure security for the management-module Web server and to configure security for the connection between the management module and an LDAP server. If you are not familiar with the use of SSL certificates, read the information in “SSL certificate overview” on page 49.

The content of the Security Web page is context-sensitive. The selections that are available on the page change when certificates or certificate-signing requests are generated, when certificates are imported or removed, and when SSL is enabled or disabled for the client or the server.

Use the following general tasks list to configure the security for the management module:

1. Configure the secure Web server:
   a. Disable the SSL server. Use the **SSL Server Configuration for Web Server** section on the **MM Control → Security** page.
   b. Generate or import a certificate. Use the **SSL Server Certificate Management** section on the **MM Control → Security** page. (See “SSL server certificate management” on page 49.)
   c. Enable the SSL server. Use the **SSL Server Configuration for Web Server** section on the **MM Control → Security** page. (See “Enabling SSL for the secure Web server” on page 55.)
2. Configure SSL security for LDAP connections:
   a. Disable the SSL client. Use the **SSL Client Configuration for LDAP Client** section on the **MM Control → Security** page.
   b. Generate or import a certificate. Use the **SSL Client Certificate Management** section on the **MM Control → Security** page. (See “SSL client certificate management” on page 55.)
   c. Import one or more trusted certificates. Use the **SSL Client Trusted Certificate Management** section on the **MM Control → Security** page. (See “SSL client trusted certificate management” on page 55.)

d. Enable the SSL client. Use the **SSL Client Configuration for LDAP Client** section on the **MM Control → Security** page. (See “Enabling SSL for the LDAP client” on page 57.)

3. Restart the management module for SSL server configuration changes to take effect. For more information, see “Restart MM” on page 40.

   Note: Changes to the SSL client configuration take effect immediately and do not require a restart of the management module.

SSL certificate overview

You can use SSL with either a self-signed certificate or with a certificate that is signed by a third-party certificate authority. Using a self-signed certificate is the simplest method for using SSL, but it does create a small security risk. The risk arises because the SSL client has no way of validating the identity of the SSL server for the first connection that is attempted between the client and server. It is possible that a third party could impersonate the server and intercept data flowing between the management module and the Web browser. If, at the time of the initial connection between the browser and the management module, the self-signed certificate is imported into the certificate store of the browser, all future communications will be secure for that browser (assuming that the initial connection was not compromised by an attack).

For more complete security, you can use a certificate that is signed by a certificate authority. To obtain a signed certificate, use the SSL Certificate Management page to generate a certificate-signing request. You must then send the certificate-signing request to a certificate authority and make arrangements to procure a certificate. When the certificate is received, it is then imported into the management module using the **Import a Signed Certificate** link, and you can enable SSL.

The function of the certificate authority is to verify the identity of the management module. A certificate contains digital signatures for the certificate authority and the management module. If a well-known certificate authority issues the certificate or if the certificate of the certificate authority has already been imported into the Web browser, the browser will be able to validate the certificate and positively identify the management-module Web server.

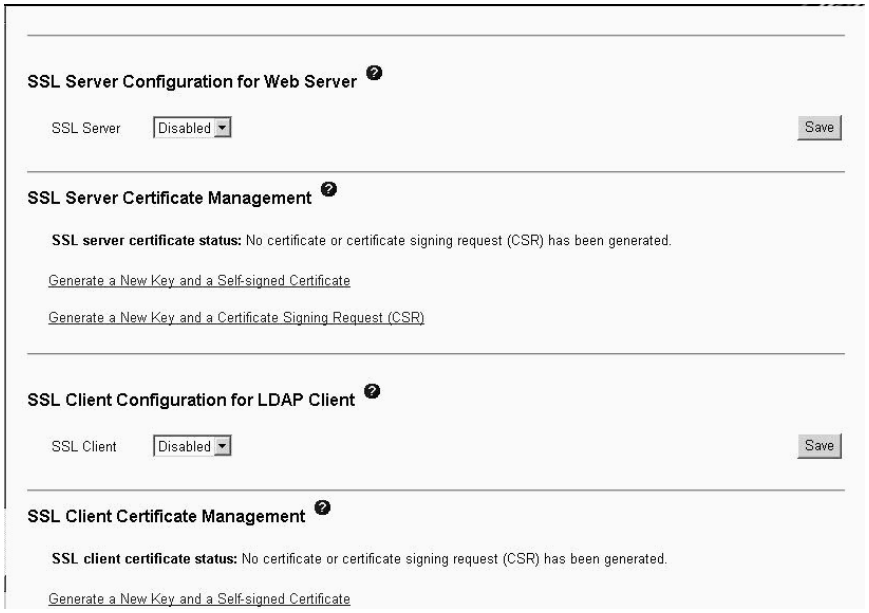
The management module requires a certificate for the secure Web server and one for the secure LDAP client. Also, the secure LDAP client requires one or more trusted certificates. The trusted certificate is used by the secure LDAP client to positively identify the LDAP server. The trusted certificate is the certificate of the certificate authority that signed the certificate of the LDAP server. If the LDAP server uses self-signed certificates, the trusted certificate can be the certificate of the LDAP server itself. Additional trusted certificates can be imported if more than one LDAP server is used in your configuration.

SSL server certificate management

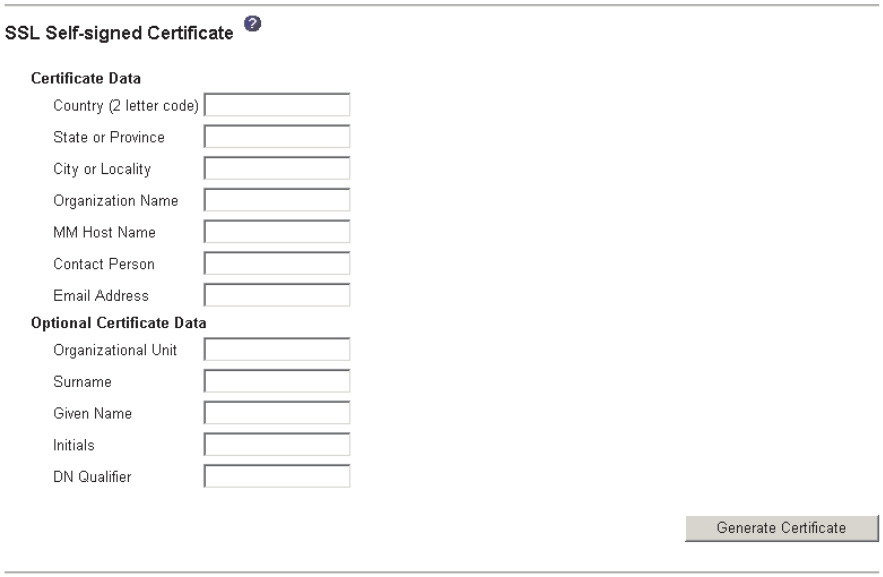
The SSL server requires that a valid certificate and corresponding private encryption key be installed before SSL is enabled. Two methods are available for generating the private key and required certificate: using a self-signed certificate and using a certificate that is signed by a certificate authority. If you want to use a self-signed certificate for the SSL server, see “Generating a self-signed certificate” on page 50. If you want to use a certificate-authority-signed certificate for the SSL server, see “Generating a certificate signing request” on page 51.

Generating a self-signed certificate: Complete the following steps to generate a new private encryption key and self-signed certificate:

1. In the navigation plane, click **MM Control → Security**. A page similar to the one in the following illustration is displayed.



2. In the **SSL Server Configuration for Web Server** section, make sure that the SSL server is disabled. If it is not disabled, select **Disabled** in the **SSL Server** field and then click **Save**.
3. In the **SSL Server Certificate Management** section, select **Generate a New Key and a Self-signed Certificate**. A page similar to the one in the following illustration is displayed.



4. Type the information in the required fields and any optional fields that apply to your configuration. For a description of the fields, see “Required certificate data” on page 51. After you finish typing the information, click **Generate Certificate**. Your new encryption keys and certificate are generated. This process might take several minutes.

A page similar to the one in the following illustration is displayed, it shows that a self-signed certificate is installed.

Generating a certificate signing request: Complete the following steps to generate a new private encryption key and certificate-signing request:

1. In the navigation pane, click **MM Control → Security**.
2. In the **SSL Server Configuration for Web Server** section, make sure that the SSL server is disabled. If it is not disabled, select **Disabled** in the **SSL Server** field and then click **Save**.
3. In the **SSL Server Certificate Management** section, select **Generate a New Key and a Certificate Signing Request**. A page similar to the one in the following illustration is displayed.

4. Type the information in the required fields and any optional fields that apply to your configuration. The fields are the same as the self-signed certificate with some additions.

   The following sections describe each of the common fields.

   Required certificate data

   The following user-input fields are required for generating a self-signed certificate or a certificate-signing request:

   Country

   Use this field to indicate the country in which the management module is located. This field must contain the 2-character country code.

State or Province

Use this field to indicate the state or province in which the management module is located. This field can contain a maximum of 30 characters.

City or Locality

Use this field to indicate the city or locality in which the management module is located. This field can contain a maximum of 50 characters.

Organization Name

Use this field to indicate the company or organization that owns the management module. When this information is used to generate a certificate-signing request, the issuing certificate authority can verify that the organization that is requesting the certificate is legally entitled to claim ownership of the given company or organization name. This field can contain a maximum of 60 characters.

MM Host Name

Use this field to indicate the management module host name that currently appears in the browser Web address bar.

Make sure that the value that you typed in the **MM host name** field exactly matches the host name as it is known by the Web browser. The browser compares the host name in the resolved Web address to the name that appears in the certificate. To prevent certificate warnings from the browser, the value that is used in this field must match the host name that is used by the browser to connect to the management module. For example, if the Web address in the address field currently is http://mm11.xyz.com/private/main.ssi, the value that is used for the **MM Host Name** field must be mm11.xyz.com. If the Web address is http://mm11/private/main.ssi, the value that is used must be mm11. If the Web address is http://192.168.70.2/private/main.ssi, the value that is used must be 192.168.70.2.

This certificate attribute is generally referred to as the common name.

This field can contain a maximum of 60 characters.

Contact Person

Use this field to indicate the name of a contact person who is responsible for the management module. This field can contain a maximum of 60 characters.

Email Address

Use this field to indicate the e-mail address of a contact person who is responsible for the management module. This field can contain a maximum of 60 characters.

Optional certificate data

The following user-input fields are optional for generating a self-signed certificate or a certificate-signing request:

Organizational Unit

Use this field to indicate the unit within the company or organization that owns the management module. This field can contain a maximum of 60 characters.

Surname

Use this field for additional information, such as the surname of a person who is responsible for the management module. This field can contain a maximum of 60 characters

Given Name

Use this field for additional information, such as the given name of a person who is responsible for the management module. This field can contain a maximum of 60 characters.

Initials

Use this field for additional information, such as the initials of a person who is responsible for the management module. This field can contain a maximum of 20 characters.

DN Qualifier

Use this field for additional information, such as a distinguished name qualifier for the management module. This field can contain a maximum of 60 characters.

Certificate-signing request attributes

The following fields are optional unless they are required by your selected certificate authority:

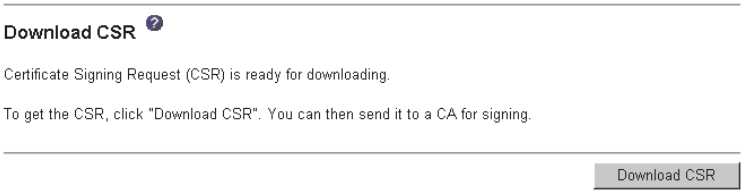
Challenge Password

Use this field to assign a password to the certificate-signing request. This field can contain a maximum of 30 characters.

Unstructured Name

Use this field for additional information, such as an unstructured name that is assigned to the management module. This field can contain a maximum of 60 characters.

5. After completing the information, click **Generate CSR**. The new encryption keys and certificate are generated. This process might take several minutes. A page similar to the one in the following illustration is displayed when the process is completed.



6. Click **Download CSR** and then click **Save** to save the file to your workstation. The file that is produced when you create a certificate-signing request is in DER format. If your certificate authority expects the data in some other format, such as PEM, you can convert the file using a tool such as OpenSSL (http://www.openssl.org). If the certificate authority asks you to copy the contents of the certificate-signing request file into a Web page, PEM format is usually expected.

The command for converting a certificate-signing request from DER to PEM format using OpenSSL is similar to the following command:

```
openssl req -in csr.der -inform DER -out csr.pem -outform PEM
```

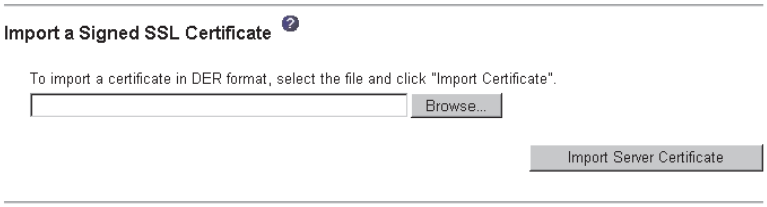
7. Send the certificate signing request to your certificate authority. When the certificate authority returns your signed certificate, you might have to convert the certificate to DER format. (If you received the certificate as text in an e-mail or a Web page, it is probably in PEM format.) You can change the format using a tool that is provided by your certificate authority or using a tool such as OpenSSL (http://www.openssl.org). The command for converting a certificate from PEM to DER format is similar to the following command:

   ```
   openssl x509 -in cert.pem -inform PEM -out cert.der -outform DER
   ```

   Go to step 8 after the signed certificate is returned from the certificate authority.

8. In the navigation pane, click **MM Control → Security**. Scroll to the SSL Server Certificate Management section, which looks similar to the page in the following illustration.

9. Select **Import a Signed Certificate**. A page similar to the one in the following illustration is displayed.



10. Click **Browse**.
11. Click the certificate file that you want and then click **Open**. The file name (including the full path) is displayed in the field next to the **Browse** button.
12. Click **Import Server Certificate** to begin the process. A progress indicator is displayed as the file is transferred to storage on the management module. Continue displaying this page until the transfer is completed.

Enabling SSL for the secure Web server

Note: To enable SSL, you must have a valid SSL certificate installed.

Complete the following steps to enable the secure Web server:

1. In the navigation pane, click **MM Control → Security**. The page that is displayed is similar to the one in the following illustration and shows that a valid SSL server certificate is installed. If the SSL server certificate status does not show that a valid SSL certificate is installed, go to "SSL server certificate management" on page 49.

2. Scroll to the SSL Server Configuration for Web Server section and select **Enabled** in the **SSL Client** field and then click **Save**. The selected value takes effect the next time the management module is restarted.

SSL client certificate management

The SSL client requires that a valid certificate and corresponding private encryption key is installed before SSL is enabled. Two methods are available for generating the private key and required certificate: using a self-signed certificate and using a certificate that is signed by a certificate authority.

The procedure for generating the private encryption key and certificate for the SSL client is the same as the procedure for the SSL server, except that you use the **SSL Client Certificate Management** section of the Security Web page instead of the **SSL Server Certificate Management** section. If you want to use a self-signed certificate for the SSL client, see "Generating a self-signed certificate" on page 50. If you want to use a certificate-authority-signed certificate for the SSL client, see "Generating a certificate signing request" on page 51.

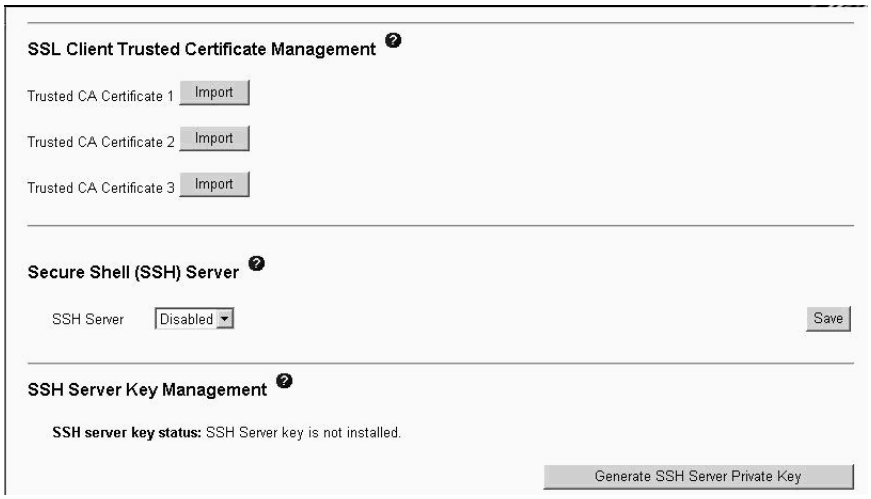
SSL client trusted certificate management

The secure SSL client (LDAP client) uses trusted certificates to positively identify the LDAP server. A trusted certificate can be the certificate of the certificate authority that signed the certificate of the LDAP server, or it can be the actual certificate of the LDAP server. At least one certificate must be imported to the management module before the SSL client is enabled. You can import up to three trusted certificates.

Complete the following steps to import a trusted certificate:

1. In the navigation pane, select **MM Control → Security**.
2. In the SSL Client Configuration for LDAP Client section, make sure that the SSL client is disabled. If it is not disabled, select **Disabled** in the **SSL Client** field and then click **Save**.

3. Scroll to the **SSL Client Trusted Certificate Management** section. A page similar to the one in the following illustration is displayed.



4. Click **Import** next to one of the **Trusted CA Certificate 1** fields. A page similar to the one in the following illustration is displayed.

5. Click **Browse**.
6. Select the certificate file that you want and click **Open**. The file name (including the full path) is displayed in the box next to the **Browse** button.
7. To begin the import process, click **Import Certificate**. A progress indicator is displayed as the file is transferred to storage on the management module. Continue displaying this page until the transfer is completed.

The SSL Client Trusted Certificate Management section of the **MM Control** → **Security** page will now look similar to the one in the following illustration.

The **Remove** button is now available for the Trusted CA Certificate 1 option. If you want to remove a trusted certificate, click the corresponding **Remove** button.

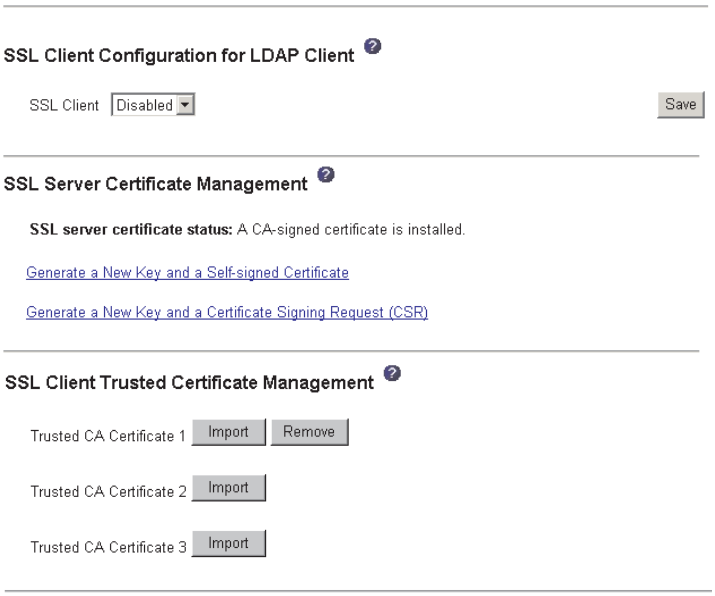
You can import other trusted certificates using the Trusted CA Certificate 2 and the Trusted CA Certificate 3 **Import** buttons.

Enabling SSL for the LDAP client

Use the SSL Client Configuration for LDAP Client section of the Security page to enable or disable SSL for the LDAP Client. To enable SSL, you must install a valid SSL client certificate and at least one trusted certificate.

Complete the following steps to enable SSL for the client:

1. In the navigation pane, click **MM Control → Security**. A page similar to the one in the following illustration is displayed.



   The MM Control → Security page shows an installed SSL client certificate and Trusted CA Certificate 1.
2. On the SSL Client Configuration for LDAP Client page, select **Enabled** in the **SSL Client** field.
3. Click **Save**. The selected value takes effect immediately.

Configuring the secure shell server

The Secure Shell (SSH) feature provides secure access to the command-line interface and the Serial over LAN (text console) redirect features of the management module.

Secure Shell users are authenticated by exchanging user ID and password. The password and user ID are sent after the encryption channel is established. The user ID and password pair can be one of the 12 locally stored user IDs and passwords, or they can be stored on an LDAP server. Public key authentication is not supported.

Generating a Secure Shell server key

A Secure Shell server key is used to authenticate the identity of the Secure Shell server to the client. Secure Shell must be disabled before you create a new Secure Shell server private key. You must create a server key before enabling the Secure Shell server.

When you request a new server key, both a Rivest, Shamir, and Adelman (RSA) key and a DSA key are created to allow access to the management module from

either an SSH version 1.5 or SSH version 2 client. For security, the Secure Shell server private key is not backed up during a configuration save and restore operation.

The following SSH clients are available. Although some SSH clients have been tested, support or nonsupport of any particular SSH client is not implied.

- The SSH clients that are distributed with operating systems such as Linux, AIX®, and UNIX® (see your operating-system documentation for information). The SSH client of Red Hat Linux 7.3 was used to test the command-line interface.
- The SSH client of cygwin (see http://www.cygwin.com for information).

The following table shows the types of encryption algorithms that are supported by the SSH version 1.5 and version 2.0.

Algorithm	SSH version 1.5 clients	SSH version 2.0 clients
Public key exchange	SSH 1-key exchange algorithm	Diffie-Hellman-group 1-sha-1
Host key type	RSA (1024-bit)	DSA (1024-bit)
Bulk cipher algorithms	3-des	3-des-cbc or blowfish-cbc
MAC algorithms	32-bit crc	Hmac-sha1

Complete the following steps to create a new Secure Shell server key:

1. In the navigation pane, click **MM Control → Security**.
2. Scroll to the **Secure Shell (SSH) Server** section and make sure that the Secure Shell server is disabled. If it is not disabled, select **Disabled** in the **SSH Server** field and then click **Save**.
3. Scroll to the SSH Server Key Management section. A page similar to the one in the following illustration is displayed.

4. Click **Generate SSH Server Private Key**. A progress page is displayed. Wait for the operation to finish. This step might take several minutes to complete.

Enabling the Secure Shell server

From the Security page, you can enable or disable the Secure Shell server. The selection that you make takes effect only after the management module is restarted. The value that is displayed on the screen (Enabled or Disabled) is the last selected value and is the value that is used when the management module is restarted.

Note: You can enable the Secure Shell server only if a valid Secure Shell server private key is installed.

Complete the following steps to enable the Secure Shell server:

1. In the navigation pane, click **Security**.
2. Scroll to the **Secure Shell (SSH) Server** section. A page similar to the one in the following illustration is displayed.

3. Click **Enabled** in the **SSH Server** field.
4. In the navigation pane, click **Restart ASM** to restart the management module.

Using the Secure Shell server

If you are using the Secure Shell client that is included in Red Hat Linux version 7.3, to start a Secure Shell session to a management module with network address 192.168.70.2, type a command similar to the following example:

```
ssh -x -l USERID 192.168.70.2
```

where -x indicates no X Window System forwarding and -l indicates that the session is to use the user ID USERID.

Configuring Wake on LAN

Complete the following steps to configure the Wake on LAN feature in the BladeCenter T unit:

1. Write down the MAC address of the integrated Ethernet controllers in each blade server. You can find this information using the Configuration/Setup Utility program for each blade server (**Devices and I/O Ports → System MAC Addresses**) or by reading the bar code label that is on the bottom of each blade server enclosure. Each blade server might also have a loose label that has the MAC addresses printed on it. The MAC addresses are needed to configure a remote system to start the blade servers using the Wake on LAN feature: the remote system issues the Wake on LAN command (a Magic Packet frame) by sending it to a MAC address.
2. Make sure that the Wake on LAN feature is enabled in the BladeCenter T management module (**Blade Tasks → Power/Restart** and **Blade Tasks → Configuration** in the management module Web interface).
3. Make sure that the external ports of the Ethernet switch modules or pass-thru modules in I/O-module bays 1 and 2 are enabled (**I/O Tasks → Management → Advanced Management** in the management module Web interface). If the external ports are not enabled, blade servers in the BladeCenter T unit will not be able to communicate with the external network.

Verifying the Wake on LAN configuration

Complete the following steps to verify that the Wake on LAN feature was correctly configured and is functioning:

1. Start the blade server operating system.
2. Attempt to ping the remote computer that will issue the Wake on LAN command (the Magic Packet frame). A successful ping verifies network connectivity.
3. Make sure that the blade server is the current owner of the keyboard, video, and mouse (KVM).
4. Shut down the blade server, insert a DOS startable diskette into a USB attached diskette drive, and then restart the blade server.
5. When the A:\ prompt appears, turn off the blade server using the power-control button.

6. Issue the Wake on LAN command (the Magic Packet frame) from the remote computer.

   If the Wake on LAN feature was correctly configured and is functioning, the single blade server will wake up. This is a good procedure to determine whether there is a single blade or BladeCenter T configuration problem or a device-driver problem within the operating system.

Linux-specific configuration

Complete the following steps when configuring the Wake on LAN feature for Red Hat or SUSE LINUX:

1. Type the following command:

   ```
   insmod bcm5700.o enable_wol=1,1
   ```

   The switch `enable_wol=1,1` parameter instructs the device driver to enable the Wake on LAN feature for both Broadcom controllers on board a single blade. Because there are two Broadcom controllers, you must issue a `1` for each of them.

2. Recompile the device driver for your Linux image. For example, a device driver compiled in Red Hat Linux is not guaranteed to function for SUSE LINUX. See the documentation that comes with your operating system for information about compiling device drivers.

   To compile the Broadcom device drivers successfully in Red Hat Linux, a default installation is not sufficient because all files that are required for a successful compilation are not included. A custom installation of Red Hat Linux, in which the packages for software and kernel development are selected, includes the files that are required for successful compilation of the device drivers.

Using the configuration file

In the management-module Web interface, click **MM Control → Configuration File** to back up and restore the management-module configuration.

Note: If you cannot communicate with a replacement management module through the Web interface, the IP address might be different from the IP address of the management module that you removed. Press the IP reset button to set the management module to the factory default IP addresses; then, access the management module using the factory IP address (see “Configuring the

management module for remote access" on page 13 for the factory IP addresses) and configure the management module or load the saved configuration file.

Backing up your current configuration

You can download a copy of your current management-module configuration to the client computer that is running the management-module Web interface. Use this backup copy to restore your management-module configuration if it is accidentally changed or damaged. Use it as a base that you can modify to configure multiple management modules with similar configurations.

Complete the following steps to back up your current configuration:

1. Log in to the management module for which you want to back up the current configuration. For more information, see "Starting the management-module Web interface" on page 17.
2. In the navigation pane, click **MM Control → Configuration File**.
3. In the **Backup MM Configuration** section, click **view the current configuration summary**.

   Note: The security settings on the Security page are not backed up.
4. Verify the settings and then click **Close**.
5. To back up the configuration, click **Backup**.
6. Type a name for the backup, select the location where the file will be saved, and then click **Save**.
   - In Netscape Navigator, click **Save File**.
   - In Microsoft Internet Explorer, select **Save this file to disk**, and then click **OK**.

Restoring and modifying your ASM configuration

You can restore a saved configuration in full, or you can modify key fields in the saved configuration before restoring the configuration to your management module. Modifying the configuration file before restoring it helps you set up multiple management modules with similar configurations. You can quickly specify parameters that require unique values such as names and IP addresses, without having to enter common, shared information.

Complete the following steps to restore or modify your current configuration:

1. Log in to the management module for which you want to restore the configuration. For more information, see "Starting the management-module Web interface" on page 17.
2. In the navigation pane, click **MM Control → Configuration File**.
3. In the **Restore MM Configuration** section, click **Browse**.
4. Click the configuration file that you want; then, click **Open**. The file (including the full path) appears in the box next to **Browse**.
5. If you do not want to make changes to the configuration file, click **Restore**. A new window opens with the management-module configuration information. Verify that this is the configuration that you want to restore. If it is not the correct configuration, click **Cancel**.

   If you want to make changes to the configuration file before restoring, click **Modify and Restore** to open an editable configuration summary window.

Initially, only the fields that allow changes appear. To change between this view and the complete configuration summary view, click the **Toggle View** button at the top or bottom of the window.

Note: When you click **Restore** or **Modify and Restore**, an alert window might open if the configuration file that you are attempting to restore was created by a management module with older firmware (and, therefore, less functionality). This alert message includes a list of system-management functions that you must configure after the restoration is complete. Some functions require configurations on more than one window.

6. To proceed with restoring this file to the management module, click **Restore Configuration**. A progress indicator appears as the firmware on the management module is updated. A confirmation window opens to verify whether the update was successful.

   Note: The security settings on the Security page are not restored with the restore operation. To modify security settings, see "Secure Web server and secure LDAP" on page 47.
7. After receiving a confirmation that the restore process is complete, in the navigation pane, click **MM Control → Restart MM**; then, click **Restart**.
8. Click **OK** to confirm that you want to restart the management module.
9. Click **OK** to close the browser window.
10. To log in to the management module again, start the browser, and follow your login process.

Using the remote disk feature

From the Remote Control window (see "Remote Control" on page 25), you can assign, or mount, a CD-ROM drive or diskette drive that is on the remote client computer to a blade server. Using this window, you can also specify a disk image or CD image on the remote client computer for the blade server to use.

You can use the remote disk for functions such as restarting the blade server, updating firmware, installing new software on the blade server, and installing or updating the operating system on the blade server. After you assign the remote disk, use the remote console function to access it. The remote disk appears as a USB drive on the blade server.

Your operating system must have USB support to use the remote disk feature. The following operating systems provide USB support:

- Microsoft Windows Server 2003
- Microsoft Windows 2000 with Service Pack 4 or later
- Red Hat Linux version 7.3
- SUSE LINUX version 8.0

In addition, the client (remote) system must have Microsoft Windows 2000 or later and must have the Java 1.4 or later Plug-in installed. The client system must also have an Intel™ Pentium® III or later microprocessor operating at 700 MHz or faster (or an equivalent microprocessor).

Complete the following steps to mount a disk drive or disk image on a remote client computer to a blade server:

1. Start the management-module Web interface (see “Starting the management-module Web interface” on page 17).
2. In the navigation pane, click **Blade Tasks → Remote Control**.
3. In the **Start Remote Control** section, click **Start Remote Control**.
4. In the **Remote Disk** section, select the hard disk drives or images to make available for mounting from the left side of the remote disk drive selector; then, click **>>** to finalize the selection and move them to the right side of the remote disk drive selector. To deselect items, select them in the right side of the remote disk drive selector and then click **<<**.

   When you select a diskette drive or an image file and move it to the right side of the drive selector, you are given the option to save the disk image in the management-module random access memory (RAM). This enables the disk image to remain mounted on the blade server so that you can access the disk image later, even if the Web interface session is terminated. Mounted drives that are not saved to the management module will be unmounted when the remote-control window is closed.

   A maximum of one diskette drive or drive image can be stored on the management module. The size of the drive or image contents must be 1.44 MB or less.

   Important: The disk image is lost when the management module is restarted or when the management-module firmware is updated. To use the mounted disk, use the Remote Console function. The mounted disk appears as a USB disk drive that is attached to the server.
5. Click **Write Protect** to prevent data from being written to the mounted drives.
6. In the right side of the remote disk drive selector, select one or more drives or images to mount; then, click **Mount Drive**.

   The mounted drive or disk image functions as a USB device that is connected to the blade server. To refresh the list of available drives on the remote client computer, click **Refresh List**.

When you have finished using a drive or disk image, complete the following steps to close and unmount it:

1. Complete any procedures that are required by your operating system to close and unmount a remote disk or image. See the documentation for your operating system for information and instructions.

   For the Microsoft Windows operating system, complete one of the following procedures to close and unmount a drive or drive image:

   - If there is an unplug or eject hardware icon in the Windows taskbar, complete the following steps:
     a. Double-click the unplug or eject hardware icon.
     b. Select **USB Mass Storage Device** and click **Stop**.
     c. Click **Close**.
   - If there is no unplug or eject hardware icon in the Windows taskbar, complete the following steps:
     a. In the Microsoft Windows Control Panel, click **Add/Remove Hardware**; then, click **Next**.
     b. Select **Uninstall/Unplug a device**; then, click **Next**.
     c. Click **Unplug/Eject a device**; then, click **Next**.

2. In the **Remote Disk** section of the Remote Control window of the management-module Web interface, click **Unmount Drive**.

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 appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your xSeries®, BladeCenter, or IntelliStation® 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 is 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 *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *xSeries Documentation* CD or in the IntelliStation *Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at http://www.ibm.com/pc/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 publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, 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/pc/support/ and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at
http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

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 xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is http://www.ibm.com/eserver/xseries/. The address for IBM IntelliStation information is http://www.ibm.com/pc/intellistation/.

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Software service and support

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

For more information about Support Line and other IBM services, go to http://www.ibm.com/services/, or go to 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. Go to 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.

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

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 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 may 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 available from IBM.

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Index

A

algorithms, encryption 58
authentication, LDAP 32
authority, user 15

B

blade server
  firmware update 27
BladeCenter T unit
  configuring 9

C

cabling, remote connection Ethernet port 11
Class A electronic emission notice 70
configuration file
  restoring 60
  saving 60
Configuration/Setup Utility program 15
configuring
  DNS 42
  LDAP 42
  LDAP client authentication 45
  LDAP search attributes 45
  secure shell server 57
  SMTP 42
  SNMP 40
  Wake on LAN 59
  Wake on LAN (Linux) 60
connector
  Ethernet 6
  input/output 6
  keyboard 5
  KVM module 5
  PS/2 mouse 5
  remote management 6
  remote management and console 6
  telco alarms 6
  video 5

D

difficulty communicating with replacement module 60
DNS 37
DNS, configuring 42

E

electronic emission Class A notice 70
encryption algorithms 58
error log.
  See event log
Ethernet
  activity LED 12
  configuring remote connection 13
Ethernet *(continued)*
  connectors 6
  Ethernet connector, remote management and console 6
  Ethernet-activity LED 6
  Ethernet-link status LED 6
  link status LED 12
  port, cabling 11
event log 21
event log in alerts 34
event log, viewing 21

F

FCC Class A notice 70
firmware update
  blade server 27
  I/O module 31
  management module 39

H

help 18

I

I/O module
  firmware update 31
IP reset button 60
IP reset button, management module 4

K

keyboard connector 5
KVM module
  connectors
    keyboard 5
    mouse 5
    video 5
  LEDs
    critical telco alarm 4
    location 4
    major telco alarm 4
    minor telco alarm 4
    power 4

L

LAN module
  function 6
  LEDs
    Ethernet activity 6
    Ethernet link 6
LDAP 37
  configuring client authentication 45
  configuring search attributes 45
  overview 42

LDAP *(continued)*
setting up client 43
LDAP authentication 32
LEDs
alarm 4
critical 4
major 5
minor 5
Ethernet activity 6, 12
Ethernet-link status 6, 12
KVM module 4
system-status panel 4, 5
LAN module 6
Ethernet activity 6
power 6
management module 3
active 3
error 3
power 3
set color 22
system-status panel
location 4
power 4

M

management module
firmware update 39
IP reset button 4
LEDs 3
active 3
error 3
power 3
redundant
manual changeover 40
management-module Web interface
starting 17
mounting remote drive or image 62
mouse connector 5

N

network
connecting 11
network protocols
configuring DNS 42
configuring LDAP 42
configuring SMTP 42
configuring SNMP 40
configuring SSL 47
notes, important 68
notices
electronic emission 70
FCC, Class A 70

O

online documentation 2

P

port
See connector
port assignments 34
ports 34
power LED
KVM module 6
management module 3
protocols
DNS 42
SMTP 42
SNMP 40
SSL 47

R

remote connection 11
remote console 26
remote control 26
remote disk 26, 62
remote management connector 6
replacement module, difficulty communicating with 60
restoring configuration file 60

S

saving configuration file 60
Secure Shell connection clients 58
secure shell server
enabling 58
generating private key 57
overview 57
secure Web server and secure LDAP
configuring security 48
enabling SSL for LDAP client 57
enabling SSL for secure Web server 55
overview 47
SSL certificate overview 49
SSL client certificate management 55
SSL client trusted certificate management 55
SSL server certificate management 49
security 37, 38
security, configuring 48
serial over LAN 29
setting up LDAP client 43
SMTP 37
SMTP, configuring 42
SNMP 37
SNMP, configuring 40
SOL 29
SSH 38
SSH clients 58
SSL certificate overview 49
SSL client certificate management 55
SSL client trusted certificate management 55
SSL security protocol 47
SSL server certificate management 49
SSL, enabling
for LDAP client 57
for secure Web server 55

SSL,LDAP 38

T

TCP log 37
TCP log, viewing 37
telco alarms connector 6
trademarks 68

U

United States electronic emission Class A notice 70
United States FCC Class A notice 70
use authority 15
utility, Configuration/Setup 15

V

video connector 5

W

Wake on LAN
  configuration 59
  Linux configuration 60
  verify configuration 59
Web browsers, supported 9

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