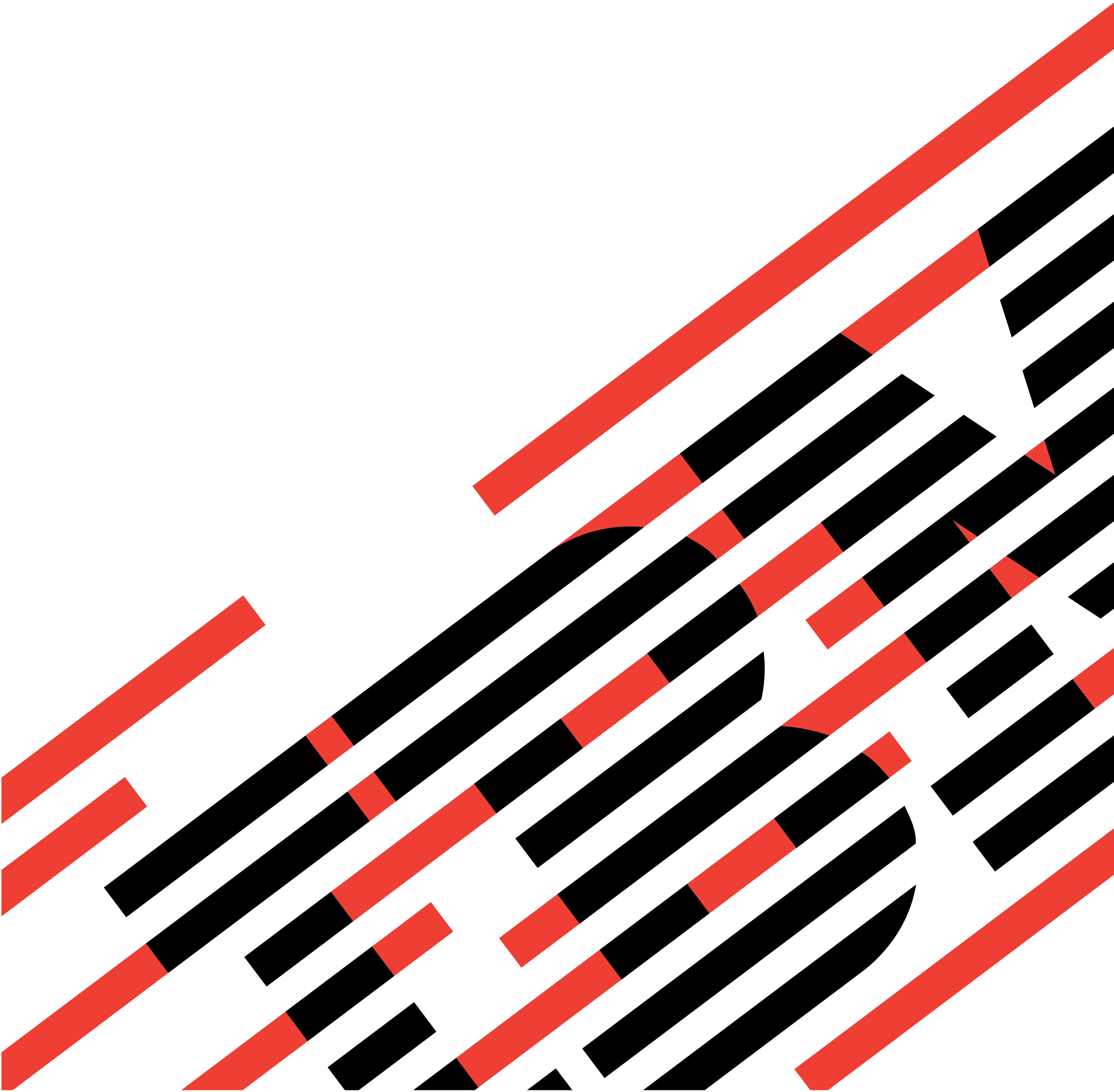
IBM

eserver

BladeCenter Management Module

User’s Guide



IBM

eserver

BladeCenter Management Module

User’s Guide

Note: Before using this information and the product it supports, read the general information in “Notices” on page 29.

Second Edition (June 2003)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1:

⚠ ⚡

DANGER

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

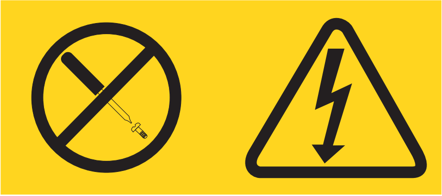
To avoid a shock hazard:

- **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.***

Introducing the BladeCenter management module

This *Management Module User's Guide* contains information about configuring the management module and managing the IBM® *e*server BladeCenter™ unit and blade servers.

Your BladeCenter unit comes with one hot-swap management module in management bay 1. You can add a management module in management bay 2.

Notes:

1. Only one management module will be active, or primary; the second management module, if present, provides redundancy.
2. When two management modules are installed in the BladeCenter unit, both management modules must always have the same level of firmware, which must be a level that supports redundant management modules, to ensure smooth changeover from the active module to the redundant module. Go to the IBM Support Web site at http://www.ibm.com/pc/support/ and obtain the latest level of firmware.

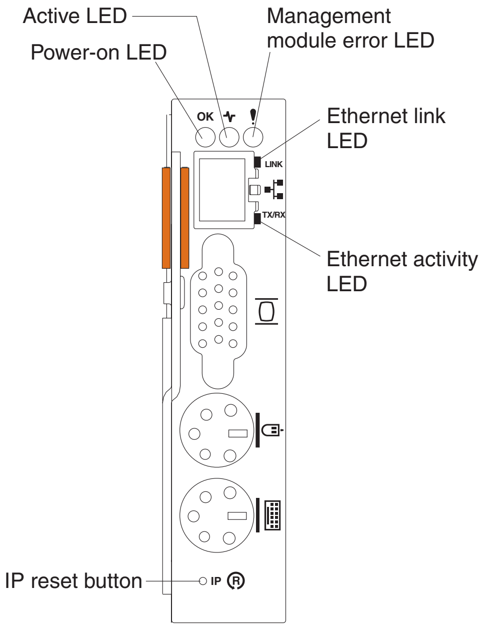
The management module functions as a service processor and a keyboard/video/mouse (KVM) multiplexor for the multiple blade servers. You configure the BladeCenter unit and modules through the management module, configuring such information as the switch IP addresses. The management module provides the following external connections: keyboard, mouse, and video for use by a local console, and one RJ-45 connector for a 10/100 Mbps Ethernet remote management connection.

The service processor in the management module communicates with the service processor in each blade server for such functions as:

- Blade server power-on requests
- Blade server error and event reporting
- Blade server requests for keyboard, mouse, and video
- Blade server requests for diskette drive, CD-ROM drive, and USB port

The management module also communicates with the switch modules, power modules, blower modules, and blade servers in the BladeCenter unit to detect their presence or absence and any error conditions, sending alerts when required.

Management module controls and indicators



Management module LEDs: These LEDs provide status information about the management module and remote management connection. For additional information, see the “Light Path Diagnostics” section in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *BladeCenter Documentation* CD.

- **Power-on:** When this green LED is lit, the management module has power.
- **Active:** When this green LED is lit, it indicates that this management module is actively controlling the BladeCenter unit.

  Note: Only one management module actively controls the BladeCenter unit. If there are two management modules installed in the BladeCenter unit, this LED is lit on only one.
- **Management module error:** When this amber LED is lit, it indicates that an error has been detected somewhere on this management module. When this indicator is lit, the system error LED on each of the BladeCenter system LED panels is also lit.
- **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.

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 need to reconfigure the management module settings (see the information beginning with “Setting up the remote connection” on page 6 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 forth) to the factory defaults and then restart the management module.

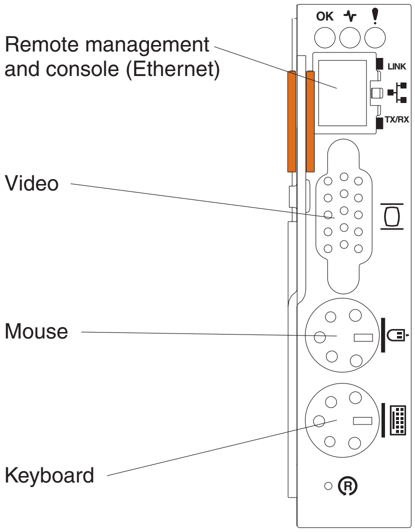
Use a straightened paper clip to press the button.

Management module input/output connectors

The management module has the following I/O connectors:

- One video
- One PS/2® keyboard
- One PS/2 mouse
- One 10/100 Mbps Ethernet for remote console and management

The following illustration shows the I/O connectors on the management module.

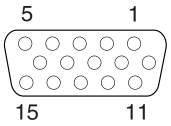


Note: See the *IBM BladeCenter Management Module Installation Guide* for information about how to cable two management modules.

Video connector

Your BladeCenter management 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.

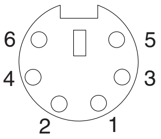
Use this connector to connect a video monitor to the BladeCenter unit.



Keyboard connector

Your BladeCenter management module contains one PS/2-style keyboard connector.

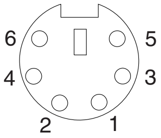
Use this connector to connect a PS/2 keyboard to the BladeCenter unit.



Mouse connector

Your BladeCenter management module contains one PS/2-style mouse connector.

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



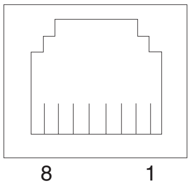
Remote management and console Ethernet connector

Your BladeCenter management module contains one 10/100 Mb Ethernet connector that provides the remote connection to the network management station on the network.

Use this port for remote management and remote console.

The network management station, through this port, can access control functions running in the service processor on each blade server or within each switch module. However, it cannot use this port 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 switch modules in the BladeCenter unit.

The following illustration shows the Ethernet connector that is on the management module.



Configuring the management module and BladeCenter 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 or only management module in the BladeCenter unit.

When the BladeCenter unit is started initially, it automatically configures the remote management port on the active (primary) management module, so that you can configure and manage the BladeCenter unit and blade servers. You configure and manage the BladeCenter unit remotely, through the management module, using the Web-based user interface.

Note: You can also configure the switch modules directly through an external switch module port, 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 switch modules in the BladeCenter unit, you will need to configure the IP addresses for the following internal and external ports:

- The external Ethernet (remote management) port on the management module (see the information beginning on page 21 for instructions). 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 unit.
- The internal Ethernet port on the management module for communication with the switch modules (see the information beginning on page 21 for instructions).
- The management port on each switch module, for communication with the management module (see the information beginning on page 19 for instructions). You configure this port by configuring the IP address for the switch module.

  Note: A pass-thru module has no management port.

To communicate with the blade servers for functions such as deploying an operating system or application program, you also will need to configure at least one external (in-band) port on an Ethernet switch module. See the *IBM @server BladeCenter Type 8677 Installation and User's Guide* for information about configuring external ports on Ethernet switch 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 1.4 Plug-In installed.

- Microsoft® Internet Explorer 4.0 (with Service Pack 1), or later
- Netscape Navigator 4.72, or later (version 6.0 is not supported)

Notes:

1. For best results when using the Web browser, set the resolution on your monitor to 800 x 600 pixels or higher and 256 colors.
2. 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 tasks such as:

- Define the login IDs and passwords
- Select recipients for alert notification of specific events
- Monitor the status of the BladeCenter unit and blade servers
- Control the BladeCenter unit and blade servers
- Access the switch modules to configure them
- Change the drive startup sequence in a blade server
- Set the date and time
- Remote control
- Change ownership of the keyboard, video, and mouse
- Change ownership of the CD-ROM drive, diskette drive, and USB port

Note: The IBM Director program is a system-management product that comes with the BladeCenter unit. To configure the remote alert recipients for IBM Director over LAN, the remote alert recipient must be an IBM Director-enabled server.

You also can use the management and configuration program to view some of the blade server configuration settings. See "Using the management and configuration program" on page 8 for more information.

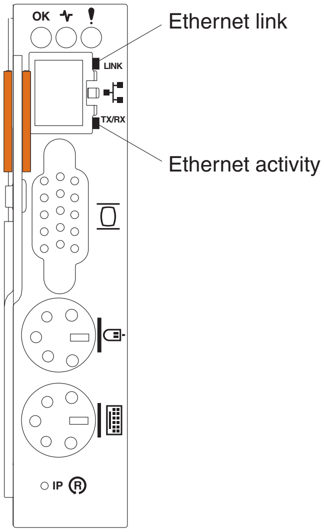
Setting up the remote connection

To configure and manage the BladeCenter unit and blade servers, you must first set up the remote connection through the external Ethernet port on the management module.

Cabling the Ethernet port

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 the Ethernet port on the management module. Connect the other end of the Ethernet cable to the network.
2. Check the Ethernet LEDs to ensure that the network connection is working. The following illustration shows the locations of the Ethernet LEDs.



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:

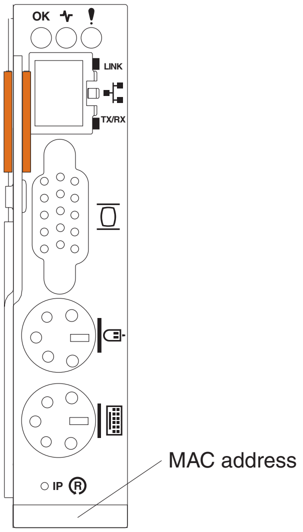
- If you have an accessible, active, and configured dynamic host configuration protocol (DHCP) server on the network, the host name, IP address, gateway address, subnet mask, and DNS server IP address are set automatically.

- If the DHCP server does not respond within 2 minutes after the port is connected, the management module uses the static IP address and 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, and use your Web browser to connect to the management module (see “Starting the management and configuration program” on page 8 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 management module, below the IP reset button.



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.

Communicating with the IBM Director software

The IBM Director program is a system-management product that comes with the BladeCenter unit. The IBM Director software communicates with the BladeCenter unit through the Ethernet port on the active management module.

Note: See the IBM Support Web site at http://www.ibm.com/pc/support/ for the version of IBM Director software that you can use to manage redundant management modules.

To communicate with the BladeCenter unit, the IBM Director software needs a managed object (in the Group Contents pane of the IBM Director Management Console main window) that represents the BladeCenter unit. If the BladeCenter management module IP address is known, the network administrator can create an IBM Director managed object for the unit. If the IP address is not known, the IBM

Director software can automatically discover the BladeCenter unit (out-of-band, using the Ethernet port on the BladeCenter management module) and create a managed object for the unit.

For the IBM Director software to discover the BladeCenter unit, your network must initially provide connectivity from the IBM Director server to the BladeCenter management-module Ethernet port. To establish connectivity, the management module attempts to use DHCP to acquire its initial IP address for the Ethernet port. If the DHCP request fails, the management module uses the static IP address assigned to it. Therefore, the DHCP server (if used) must be on the management LAN for your BladeCenter unit.

Notes:

1. All management modules are preconfigured with the same static IP address. You can use the management module Web interface to assign a new static IP address for each BladeCenter unit. If DHCP is not used and you do not assign a new static IP address for each BladeCenter unit before attempting to communicate with the IBM Director software, only one BladeCenter unit at a time can be added onto the network for discovery. Adding multiple units to the network without a unique IP address assignment for each BladeCenter unit results in IP address conflicts.
2. For switch communication with the IBM Director server through the management module external Ethernet port, the switch module internal network interface and the management module internal and external interfaces must be on the same subnet.

Using the management and configuration program

This section provides instructions for using the management and configuration program in the active management module.

Starting the management and configuration program

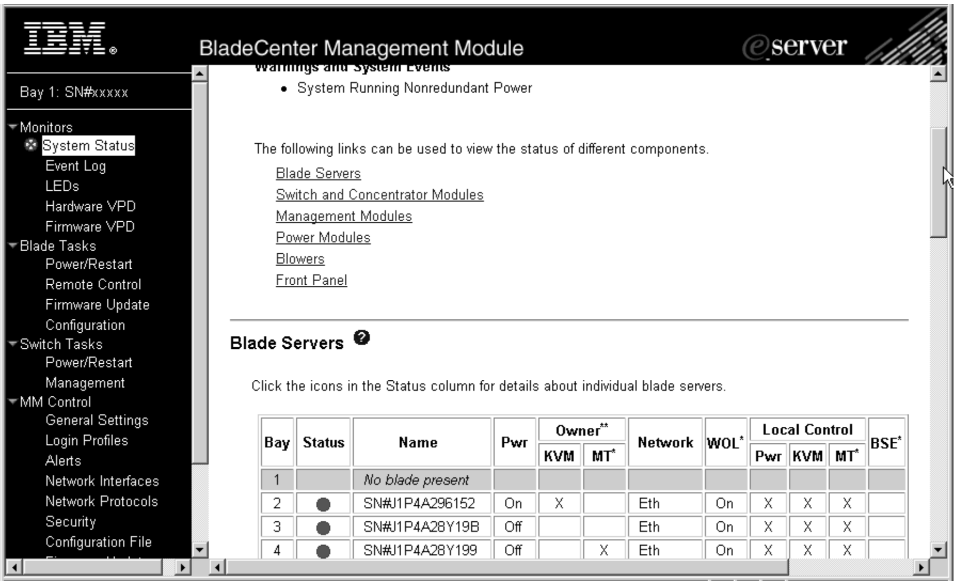
Complete the following steps to start the management and configuration program:

1. Open a Web browser. In the address or URL field, type the IP address or host name assigned for the management module remote connection (see “Configuring the management module for remote access” on page 6 for more details).

   The Enter Network Password window 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 user ID and password for the management module are:
   - User ID: USERID (all capital letters)
   - Password: PASSW0RD (note the zero, not O, in PASSW0RD)
3. Follow the instructions that appear on the screen. Be sure to set the timeout value you want for your Web session.

The BladeCenter management and configuration window opens.



Warnings and System Events

- System Running Nonredundant Power

The following links can be used to view the status of different components.

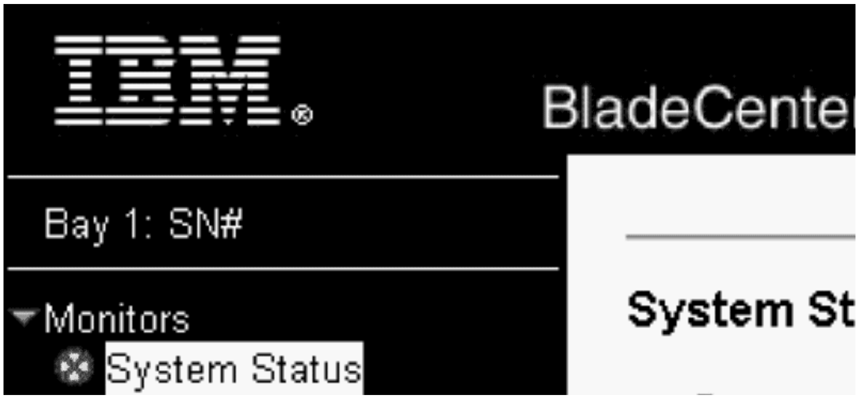
Blade Servers
Switch and Concentrator Modules
Management Modules
Power Modules
Blowers
Front Panel

Blade Servers

Click the icons in the Status column for details about individual blade servers.

Bay	Status	Name	Pwr	Owner**		Network	WOL*	Local Control			BSE*
				KVM	MT*			Pwr	KVM	MT*	
1		*No blade present*									
2	●	SN#J1P4A296152	On	X		Eth	On	X	X	X	
3	●	SN#J1P4A28Y19B	Off			Eth	On	X	X	X	
4	●	SN#J1P4A28Y199	Off		X	Eth	On	X	X	X	

Note: The upper left corner of the management and configuration window shows the location and identity of the active management module.



Management and configuration program options

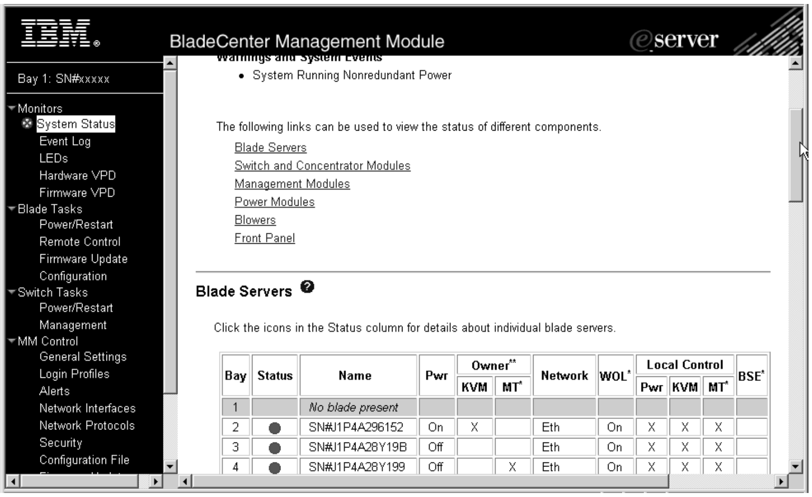
From the management and configuration program main menu, you can select settings that you want to view or change.

The navigation pane (on the left side of the management module window) contains navigational links that you use to manage your BladeCenter unit and check the status of the components (modules and blade servers). Descriptions of the links are as follows:

Monitors

Use the choices in this section to view the status, settings, and other information for components in the BladeCenter unit.

System status



Warnings and System Events

- System Running Nonredundant Power

The following links can be used to view the status of different components.

Blade Servers
Switch and Concentrator Modules
Management Modules
Power Modules
Blowers
Front Panel

Blade Servers

Click the icons in the Status column for details about individual blade servers.

Bay	Status	Name	Pwr	Owner**		Network	WOL*	Local Control			BSE*
				KVM	MT*			Pwr	KVM	MT*	
1		*No blade present*									
2	●	SN#J1P4A296152	On	X		Eth	On	X	X	X	
3	●	SN#J1P4A28Y19B	Off			Eth	On	X	X	X	
4	●	SN#J1P4A28Y199	Off		X	Eth	On	X	X	X	

Select this choice 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 switch modules.

Blade Servers:

- **Bay** - The lowest-number bay 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 resources:
  - **KVM** - Keyboard, video, and mouse.
  - **MT** - The CD-ROM drive, diskette drive, and USB port.
- **Network** - An indication of which network interfaces are on the blade server (Ethernet or Fibre Channel).
- **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 code and cannot be disabled. The BladeCenter 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 unit or a single blade server. Wake on LAN settings made in the management module override the settings in the blade server BIOS code.
- **Local Control** - An indication of whether the following options are enabled:
  - Local power control
  - Local keyboard, video, and mouse switching
  - Local CD-ROM drive, diskette drive, and USB port switching
- **BSE** - An indication of whether a SCSI expansion unit occupies the blade bay.

Switch and concentrator modules:

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

  Note: A pass-thru module has no MAC address nor IP address.
- **IP Address** - The IP address of the switch module.
- **Pwr** - The power state (on or off) of the switch module.
- **Details** - Text information about the status of the switch module.

Management module:

- **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.
- **IP Address** - The IP address of the remote connection (external Ethernet port) on the management module.
- **Primary** - An indication of which management module is the primary, or active, management module.

Power Modules:

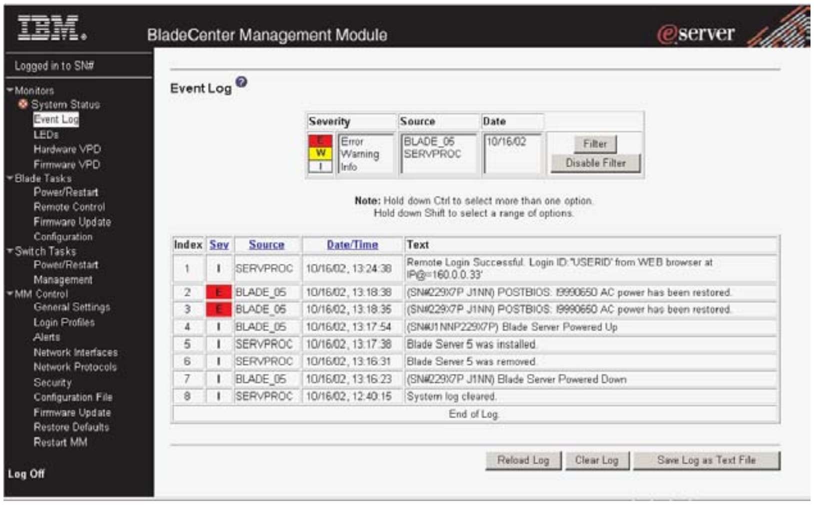
- **Bay** - The number of the bay that the power module occupies.
- **Status** - An icon that indicates good, warning, or critical status for the power module.
- **Details** - Text information about the status of the power module.

Blowers:

- **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 (RPMs). The blower speed varies with the thermal load. An entry of `Offline` indicates that the blower is not functioning.

Front panel: The temperature status for the front of the BladeCenter unit.

Event log



Note: Hold down Ctrl to select more than one option.
Hold down Shift to select a range of options.

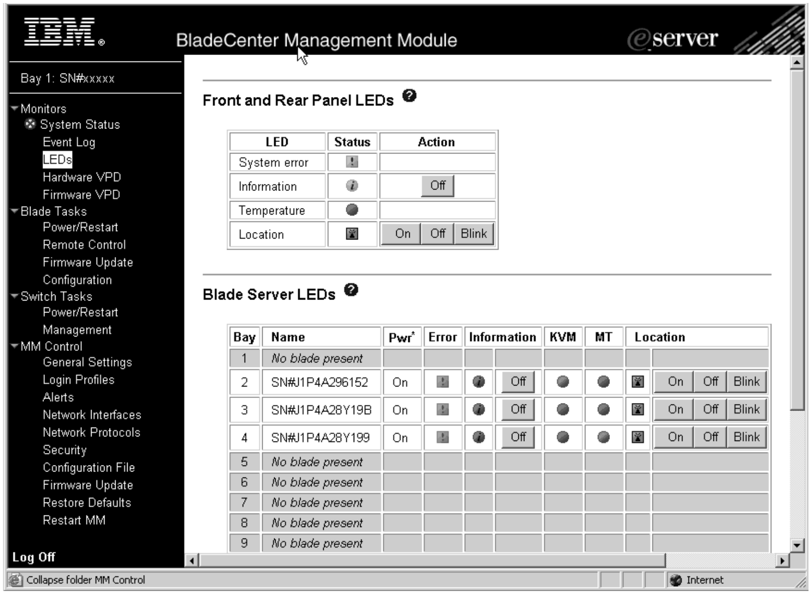
Index	Sev	Source	Date/Time	Text
1	I	SERVPROC	10/16/02, 13:24:38	Remote Login Successful. Login ID:'USERID' from WEB browser at IP@=160.0.0.33'
2	E	BLADE_05	10/16/02, 13:18:38	(SN#229X7P J1NN) POSTBIOS: I9990650 AC power has been restored.
3	E	BLADE_05	10/16/02, 13:18:35	(SN#229X7P J1NN) POSTBIOS: I9990650 AC power has been restored.
4	I	BLADE_05	10/16/02, 13:17:54	(SN#J1NNP229X7P) Blade Server Powered Up
5	I	SERVPROC	10/16/02, 13:17:38	Blade Server 5 was installed.
6	I	SERVPROC	10/16/02, 13:16:31	Blade Server 5 was removed.
7	I	BLADE_05	10/16/02, 13:16:23	(SN#229X7P J1NN) Blade Server Powered Down
8	I	SERVPROC	10/16/02, 12:40:15	System log cleared.
End of Log.				

Select this choice 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 configured to do so.

The maximum capacity of the event log is 750 entries. When the log is 75 percent full, the BladeCenter Information LEDs light. When the log is full, new entries overwrite the oldest entries, and the BladeCenter Error LEDs light.

You can sort and filter entries in the event log.

LEDs



Front and Rear Panel LEDs

LED	Status	Action
System error	!	
Information	i	Off
Temperature	●	
Location	▣	On Off Blink

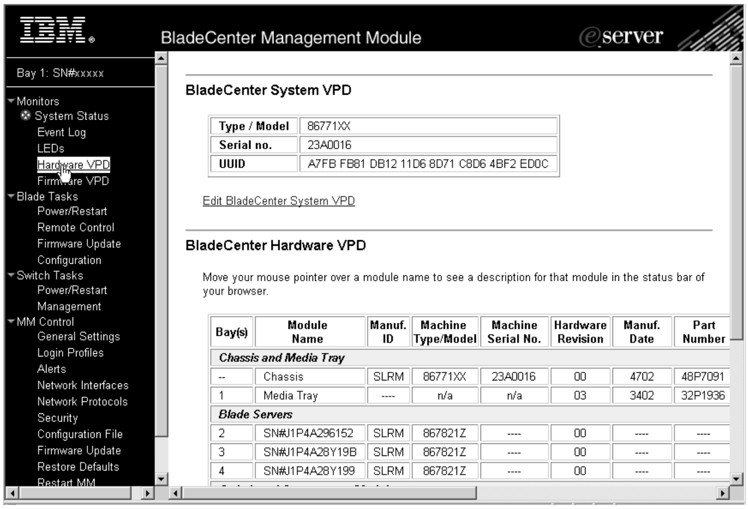
Blade Server LEDs

Bay	Name	Pwr*	Error	Information		KVM	MT	Location	
1	*No blade present*								
2	SN#J1P4A296152	On	!	i	Off	●	●	▣	On Off Blink
3	SN#J1P4A28Y19B	On	!	i	Off	●	●	▣	On Off Blink
4	SN#J1P4A28Y199	On	!	i	Off	●	●	▣	On Off Blink
5	*No blade present*								
6	*No blade present*								
7	*No blade present*								
8	*No blade present*								
9	*No blade present*								

Select this choice to view the state of the BladeCenter system LED panel and blade server control panel LEDs. You also can use this choice to turn off the information LED and turn on, turn off, or blink the location LED on the BladeCenter unit and the blade servers.

- **Front Panel LEDs** - The state of the following LEDs on the BladeCenter system LED panel. You can change the state of the information and location LEDs.
  - System error
  - Information
  - Over temperature
  - Location
- **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, diskette drive, USB port) select
  - Location

Hardware VPD



BladeCenter System VPD

Type / Model	86771XX
Serial no.	23A0016
UUID	A7FB FB81 DB12 11D6 8D71 C8D6 4BF2 ED0C

Edit BladeCenter System VPD

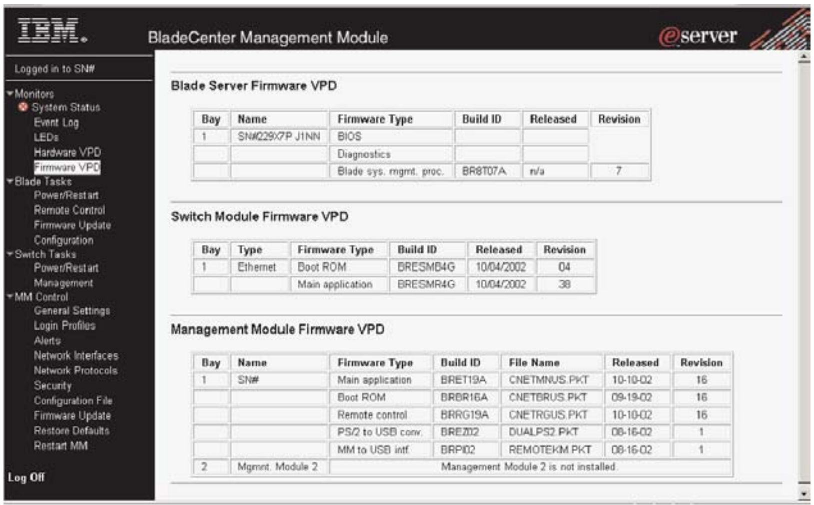
BladeCenter Hardware VPD

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
Chassis and Media Tray							
--	Chassis	SLRM	86771XX	23A0016	00	4702	48P7091
1	Media Tray	----	n/a	n/a	03	3402	32P1936
Blade Servers							
2	SN#J1P4A296152	SLRM	867821Z	----	00	----	----
3	SN#J1P4A28Y19B	SLRM	867821Z	----	00	----	----
4	SN#J1P4A28Y199	SLRM	867821Z	----	00	----	----

Select this choice to view the hardware vital product data (VPD) for the BladeCenter unit. When the BladeCenter 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 unit. You can also view the log of modules inserted or removed from the BladeCenter unit.

Firmware VPD



Blade Server Firmware VPD

Bay	Name	Firmware Type	Build ID	Released	Revision
1	SN#229X7P J1NN	BIOS			
		Diagnostics			
		Blade sys. mgmt. proc.	BR8T07A	n/a	7

Switch Module Firmware VPD

Bay	Type	Firmware Type	Build ID	Released	Revision
1	Ethernet	Boot ROM	BRESMB4G	10/04/2002	04
		Main application	BRESMR4G	10/04/2002	38

Management Module Firmware VPD

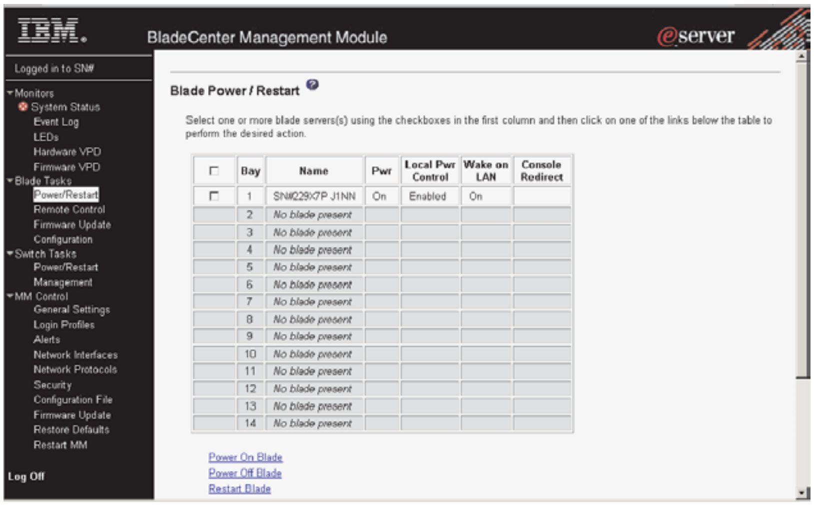
Bay	Name	Firmware Type	Build ID	File Name	Released	Revision
1	SN#	Main application	BRET19A	CNETMNUS.PKT	10-10-02	16
		Boot ROM	BRBR16A	CNETBRUS.PKT	09-19-02	16
		Remote control	BRRG19A	CNETRGUS.PKT	10-10-02	16
		PS/2 to USB conv.	BREZ02	DUALPS2.PKT	08-16-02	1
		MM to USB intf.	BRPI02	REMOTEKM.PKT	08-16-02	1
2	Mgmnt. Module 2	Management Module 2 is not installed.				

Select this choice to view the vital product data (VPD) for the firmware in all blade servers, the switch modules and the management modules in the BladeCenter unit. The firmware VPD identifies the firmware type, build ID, release date, and revision number. The VPD for the firmware in the management modules includes the file name of the firmware components.

Blade tasks

Select the choices in this section to view and change the settings or configurations of blade servers in the BladeCenter unit.

Power/restart



Blade Power / Restart

Select one or more blade servers(s) using the checkboxes in the first column and then click on one of the links below the table to perform the desired action.

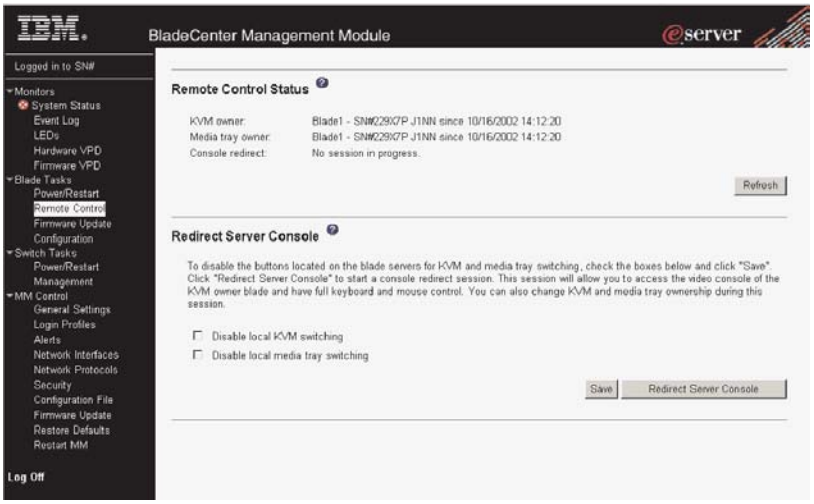
□	Bay	Name	Pwr	Local Pwr Control	Wake on LAN	Console Redirect
□	1	SN#229X7P J1NN	On	Enabled	On	
	2	*No blade present*				
	3	*No blade present*				
	4	*No blade present*				
	5	*No blade present*				
	6	*No blade present*				
	7	*No blade present*				
	8	*No blade present*				
	9	*No blade present*				
	10	*No blade present*				
	11	*No blade present*				
	12	*No blade present*				
	13	*No blade present*				
	14	*No blade present*				

Select this choice to perform the following actions on any blade server in the BladeCenter unit:

- 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.

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

Remote control



Remote Control Status

KVM owner: Blade1 - SN#229X7P J1NN since 10/16/2002 14:12:20
Media tray owner: Blade1 - SN#229X7P J1NN since 10/16/2002 14:12:20
Console redirect: No session in progress.

Redirect Server Console

To disable the buttons located on the blade servers for KVM and media tray switching, check the boxes below and click "Save". Click "Redirect Server Console" to start a console redirect session. This session will allow you to access the video console of the KVM owner blade and have full keyboard and mouse control. You can also change KVM and media tray ownership during this session.

□ Disable local KVM switching
□ Disable local media tray switching

Select this choice to:

- View the current owners of the keyboard, monitor, and mouse (KVM), and of the CD-ROM drive, diskette drive, and USB port (Media tray).

- View the details of any remote control session currently active (user ID, client IP address, start time).
- Redirect a blade server console to the remote console. On the remote console, you can:
  - 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 tasks.
  - Change the owner of the KVM and of the media tray.
  - 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.

Notes:

1. 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.
2. The timeout value for a remote control session is the same as the timeout value that you set for the Web session when you logged in.
3. 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 unit. Note that the changes require root privileges.
   a. Enter the following commands:

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

      `rmmod mousedev` (Unload the mouse device driver)

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

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

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

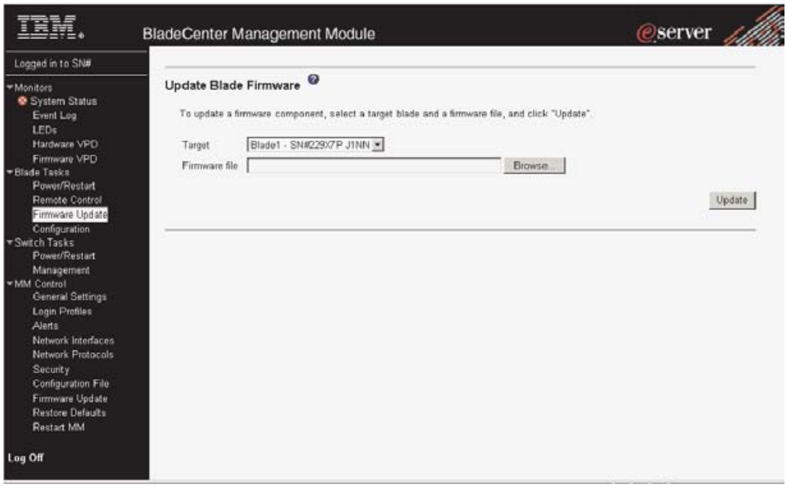
      `options mousedev xres=`*`x`* `yres=`*`y`* (Notify the mouse device driver of the video resolution) where *x* and y specify the video resolution

   d. Enter the following commands:

      `insmod mousedev` (Reload the mouse device driver)

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

Firmware update



Update Blade Firmware

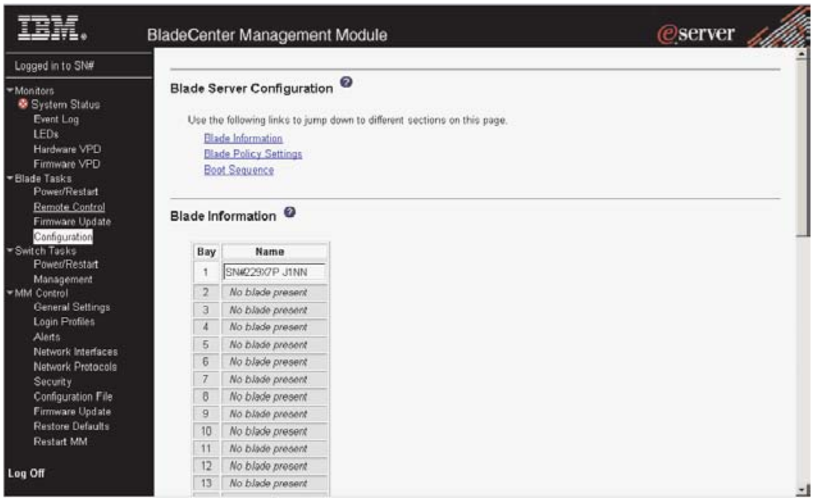
To update a firmware component, select a target blade and a firmware file, and click "Update".

Target: Blade1 - SN#229X7P J1NN

Firmware file:

Select this choice 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



Blade Server Configuration

Use the following links to jump down to different sections on this page.

Blade Information
Blade Policy Settings
Boot Sequence

Blade Information

Bay	Name
1	SN#229X7P J1NN
2	*No blade present*
3	*No blade present*
4	*No blade present*
5	*No blade present*
6	*No blade present*
7	*No blade present*
8	*No blade present*
9	*No blade present*
10	*No blade present*
11	*No blade present*
12	*No blade present*
13	*No blade present*

Select this choice to:

- Define a name for a blade server.
- Enable or disable the following items on all blade servers in the BladeCenter 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:
  - IDE drive 1 (HDD1)

- IDE drive 2 (HDD2)
- CD-ROM
- Diskette
- Network
  - **PXE** - Attempt a PXE/DHCP network startup the next time the selected blade server is turned on or restarted.

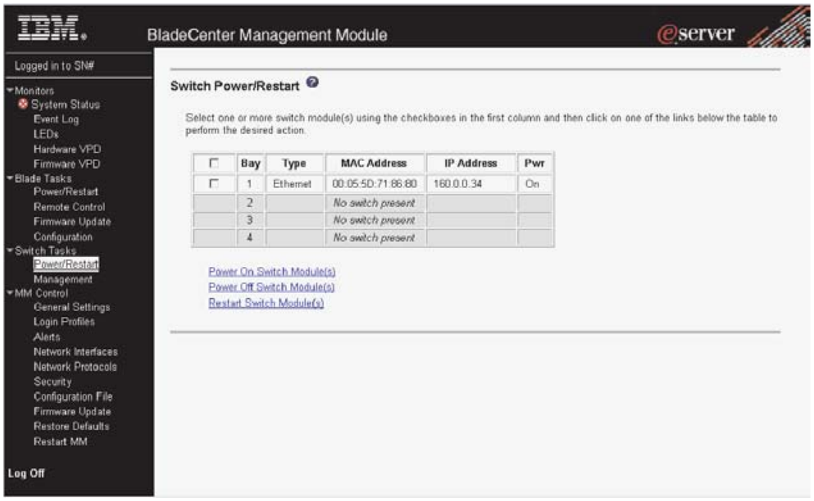
Note: To use the CD-ROM drive or diskette drive as a boot-record source for a blade server, the blade server must have been designated as the owner of the CD-ROM drive, diskette drive, and USB port. You set ownership either by pressing the CD/diskette/USB select button on the blade server or through the **Remote Control** choice described on page 15.

Switch Tasks

Select the choices in this section to view and change the settings or configuration on network-interface switch modules in the BladeCenter unit.

Note: Some choices do not apply to, and are not available for, pass-thru modules.

Power/Restart



Switch Power/Restart

Select one or more switch module(s) using the checkboxes in the first column and then click on one of the links below the table to perform the desired action.

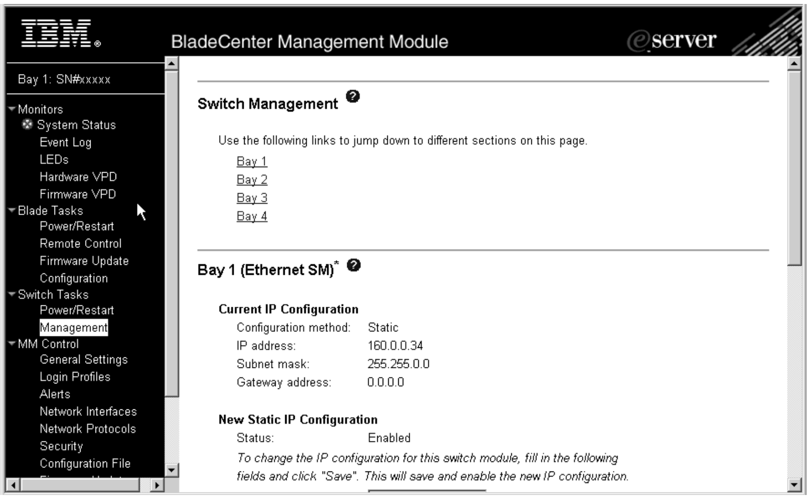
□	Bay	Type	MAC Address	IP Address	Pwr
□	1	Ethernet	00:05:5D:71:86:80	160.0.0.34	On
	2		*No switch present*		
	3		*No switch present*		
	4		*No switch present*		

Power On Switch Module(s)
Power Off Switch Module(s)
Restart Switch Module(s)

Select this choice to display the power status of the switch modules and perform the following actions:

- Turn on or turn off a switch module
- Reset a switch module

Management



Switch Management

Use the following links to jump down to different sections on this page.

Bay 1
Bay 2
Bay 3
Bay 4

Bay 1 (Ethernet SM)*

Current IP Configuration

Configuration method: Static
IP address: 160.0.0.34
Subnet mask: 255.255.0.0
Gateway address: 0.0.0.0

New Static IP Configuration

Status: Enabled

To change the IP configuration for this switch module, fill in the following fields and click "Save". This will save and enable the new IP configuration.

Select this choice to view or change the IP configuration of the Ethernet or Fibre Channel switch modules, ping a switch module, return a switch module to the default configuration, and start the configuration and management firmware that is in the switch module.

Note: The initial user ID and password for the switch module firmware are:

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

See the *IBM @server BladeCenter Type 8677 Installation and User's Guide* for more information about basic configuration of the Ethernet switch module that is required for the BladeCenter unit.

See the documentation that comes with the switch module for details about the configuration and management firmware for the switch module. Documentation for the Ethernet switch module is on the IBM *BladeCenter Documentation* CD.

MM Control

Select the choices in this section to view and change the settings or configuration on the management module whose Web interface you are logged into. This includes configuring the following items:

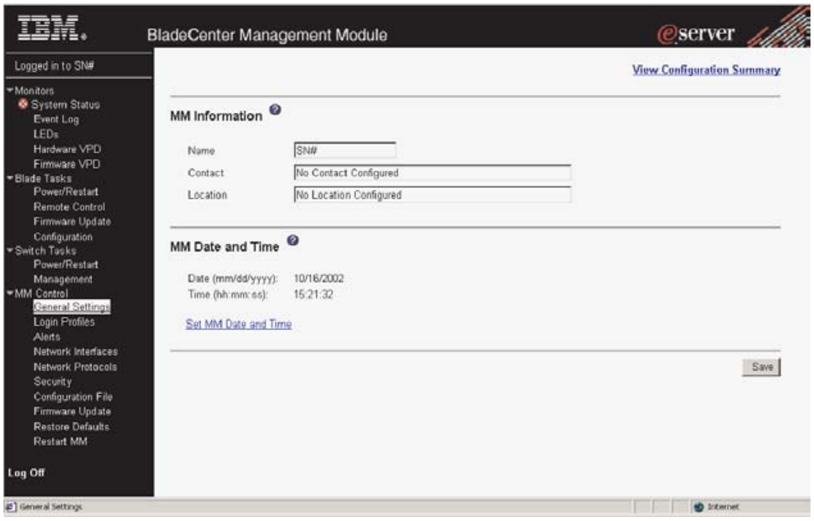
- The name of the management module
- Up to 12 login profiles for logging in to the management module
- How alerts are handled
- The management module Ethernet connections for remote console and for communicating with the switch modules
- Settings for the SNMP, SMTP, and DNS protocols
- Settings for secure socket layer (SSL) 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



MM Information

Name	SN#
Contact	No Contact Configured
Location	No Location Configured

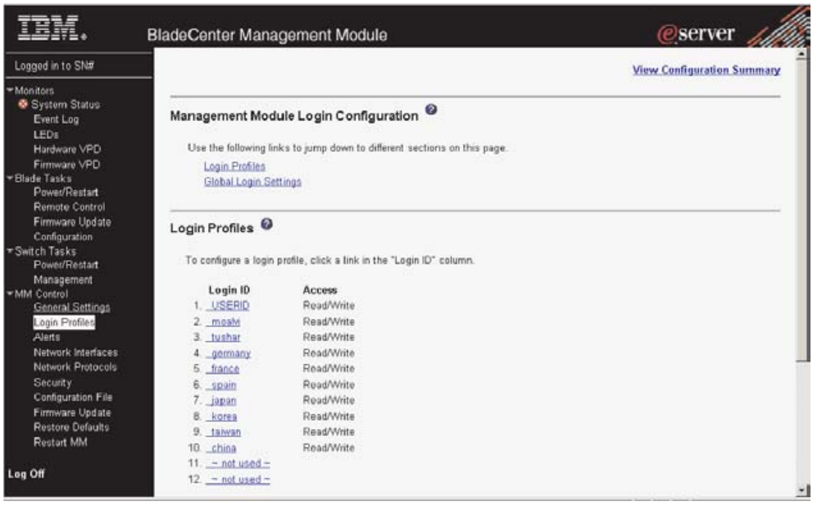
MM Date and Time

Date (mm/dd/yyyy): 10/16/2002
Time (hh:mm:ss): 15:21:32

Select this choice to view or change the following settings:

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

Login Profiles



Management Module Login Configuration

Use the following links to jump down to different sections on this page.

Login Profiles
Global Login Settings

Login Profiles

To configure a login profile, click a link in the "Login ID" column.

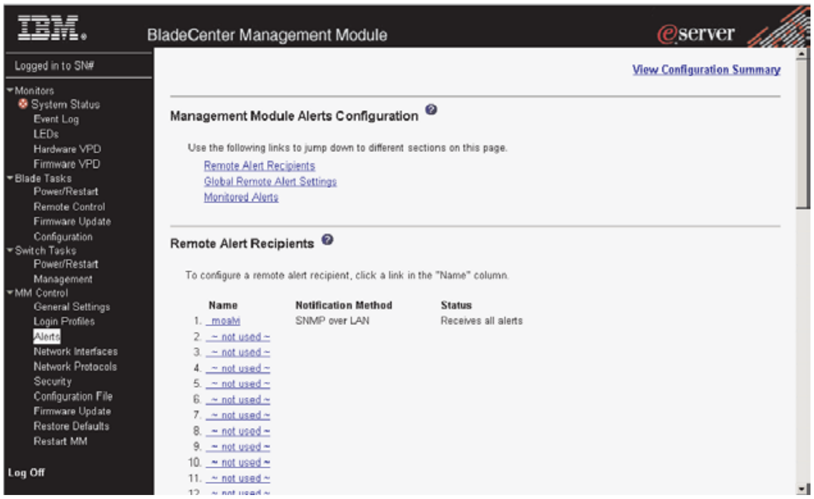
	Login ID	Access
1.	USERID	Read/Write
2.	moalvi	Read/Write
3.	tushar	Read/Write
4.	germany	Read/Write
5.	france	Read/Write
6.	spain	Read/Write
7.	japan	Read/Write
8.	korea	Read/Write
9.	taiwan	Read/Write
10.	china	Read/Write
11.	~ not used ~	
12.	~ not used ~	

Select this choice to configure up to 12 login profiles for logging in to the management module, and to specify the lockout period after five unsuccessful login attempts. For each profile, specify the following values:

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

Attention: If you change the default login profile on your 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.

Alerts



Management Module Alerts Configuration

Use the following links to jump down to different sections on this page.

Remote Alert Recipients
Global Remote Alert Settings
Monitored Alerts

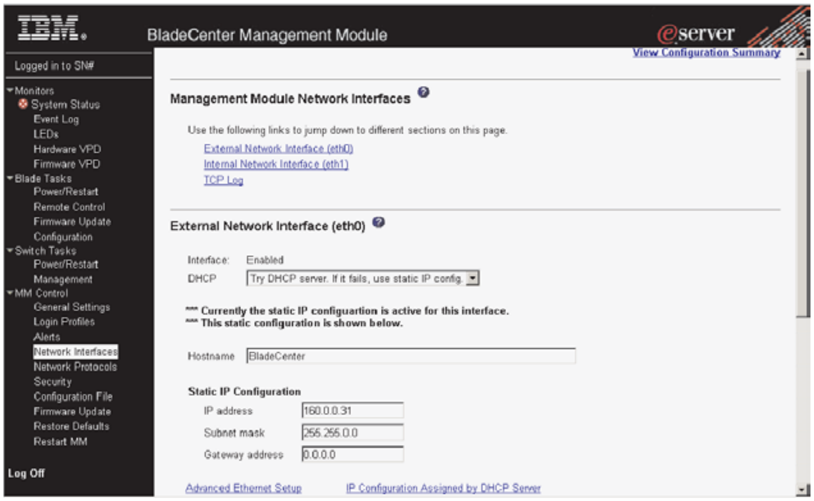
Remote Alert Recipients

To configure a remote alert recipient, click a link in the "Name" column.

	Name	Notification Method	Status
1.	moaM	SNMP over LAN	Receives all alerts
2.	~ not used ~		
3.	~ not used ~		
4.	~ not used ~		
5.	~ not used ~		
6.	~ not used ~		
7.	~ not used ~		
8.	~ not used ~		
9.	~ not used ~		
10.	~ not used ~		
11.	~ not used ~		
12.	~ not used ~		

Select this choice to specify which alerts (from lists of Critical, Warning, and System alerts) are monitored, which alert notifications are sent to whom, how alert notifications are sent (SNMP, e-mail, IBM Director), whether to include the event log with the notification, and other alert parameters.

Network Interfaces



Management Module Network Interfaces

Use the following links to jump down to different sections on this page.

External Network Interface (eth0)
Internal Network Interface (eth1)
TCP Log

External Network Interface (eth0)

Interface: Enabled
DHCP: Try DHCP server. If it fails, use static IP config.

*** Currently the static IP configuartion is active for this interface.
*** This static configuration is shown below.

Hostname: BladeCenter

Static IP Configuration
IP address: 160.0.0.31
Subnet mask: 255.255.0.0
Gateway address: 0.0.0.0

Advanced Ethernet Setup   IP Configuration Assigned by DHCP Server

Select this choice to configure the two Ethernet interfaces: external (remote management and console), and internal (communication with the switch modules). You can also select this choice to view the TCP log.

Notes:

1. When you use the management module Web interface to update the Ethernet or Fibre Channel switch module configuration, the management module firmware writes its

settings for the switch module only to the management module NVRAM; it does not write its settings for the switch module to the switch module NVRAM.

   If the switch module restarts when the management module is not able to apply the IP address it has in NVRAM for the switch module, the switch module will use whatever IP address it has in its own NVRAM. If the two IP addresses are not the same, you might not be able to manage the Ethernet switch module any more.

   The management module cannot apply the switch IP address from its NVRAM if:

   - The management module is restarting
   - The management module has failed
   - The management module has been removed from the chassis

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

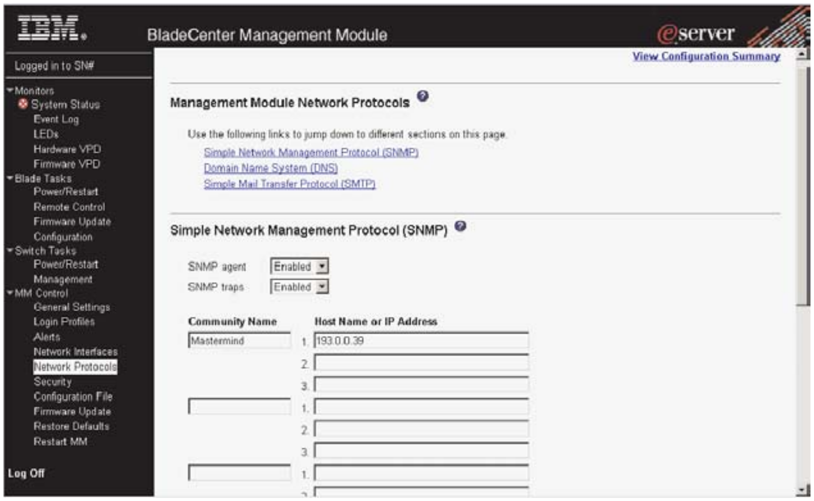
2. For switch communication with a remote management station, such as the IBM Director server, through the management module external Ethernet port, the switch module internal network interface and the management module internal and external interfaces must be on the same subnet.

- **External Network Interface (eth0)** - This is the interface for the remote management and console port.
  - **Interface** - Select **Enabled** (the default) to use the Ethernet connection.
  - **DHCP** - Select one of the following choices:
    - **DHCP with rollover to static** (this is the default).
    - **DHCP only**
    - **Static only**
  - **Hostname** - (Optional) This is the IP host name you want to use for the management module (maximum of 63 characters).
  - **Static IP configuration** - You need to configure this information only if DHCP is disabled.
    - **IP address** - The IP address for the management module. The IP address must contain four integers from 0 to 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. The gateway address must contain four integers from 0 to 255, separated by periods, with no spaces.
- **Internal Network Interface (eth1)** - This interface communicates with the network-interface switch modules, such as Ethernet or Fibre Channel.

  - Specify the IP address to use for this interface. The subnet mask must be the same as the subnet mask in the external network interface (eth0).
  - 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.
- **TCP log** - Select this choice to view entries that are currently stored in the management module TCP log. This log contains error and warning messages generated by the TCP/IP code running on the management module, and might be used by your service representative for advanced troubleshooting. The log displays the most recent entries first.

  You can sort and filter entries in the event log.

Network Protocols



Management Module Network Protocols

Use the following links to jump down to different sections on this page.

Simple Network Management Protocol (SNMP)
Domain Name System (DNS)
Simple Mail Transfer Protocol (SMTP)

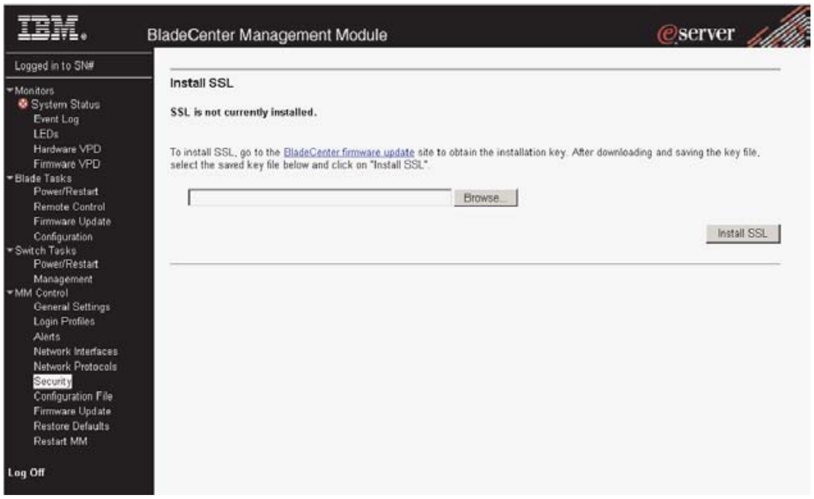
Simple Network Management Protocol (SNMP)

SNMP agent: Enabled
SNMP traps: Enabled

Community Name		Host Name or IP Address
Mastermind	1.	193.0.0.39
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	

Select this choice to view or change the settings for the SNMP, SMTP, and DNS protocols.

Security



Install SSL

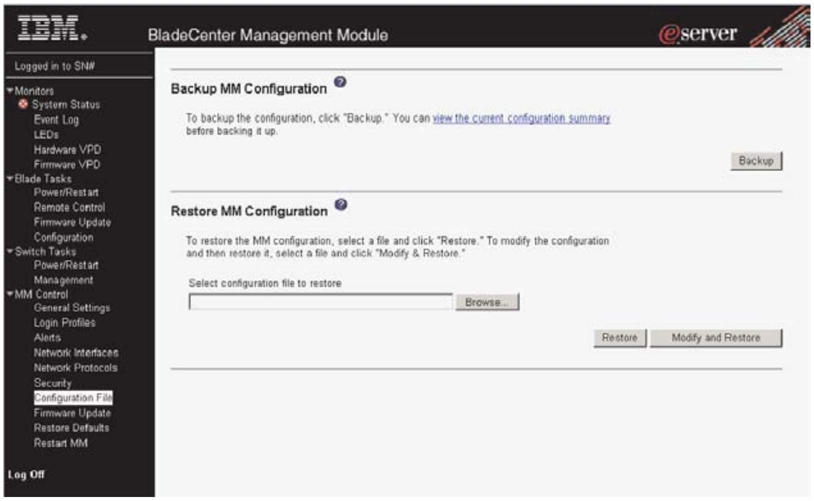
SSL is not currently installed.

To install SSL, go to the BladeCenter firmware update site to obtain the installation key. After downloading and saving the key file, select the saved key file below and click on "Install SSL".

Select this choice to view or change the secure socket layer (SSL) settings. You can enable or disable (the default) SSL, and choose between self-signed certificates and certificates provided by a certificate authority (CA).

Note: The first time you select **Security**, you are directed to an IBM Web page for downloading the SSL installation key. After you load the key, the **Security** choice functions as described.

Configuration File



Backup MM Configuration

To backup the configuration, click "Backup." You can view the current configuration summary before backing it up.

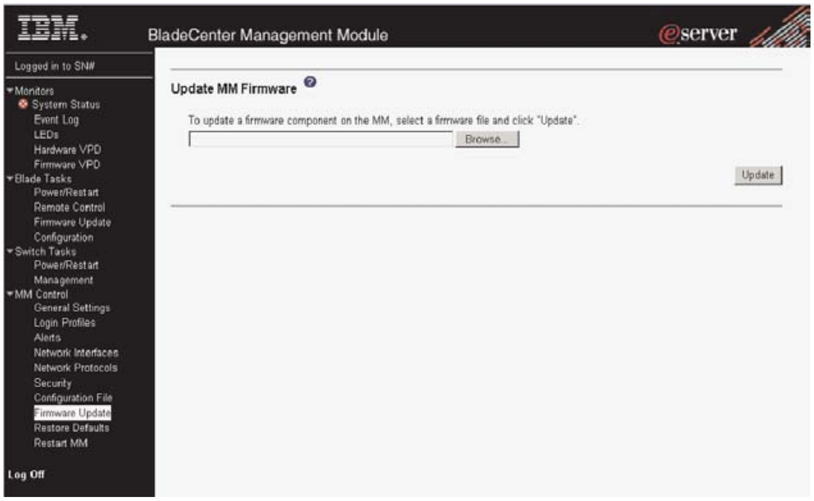
Restore MM Configuration

To restore the MM configuration, select a file and click "Restore." To modify the configuration and then restore it, select a file and click "Modify & Restore."

Select configuration file to restore

Select this choice to back up or restore the management-module configuration file.

Firmware Update



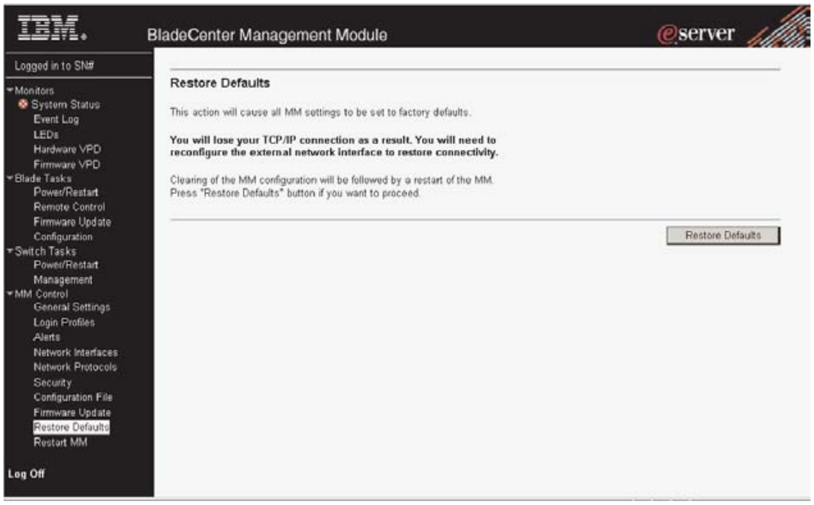
Update MM Firmware

To update a firmware component on the MM, select a firmware file and click "Update".

Select this choice to update the management-module firmware; if a second management module is installed, you can choose to apply the firmware update only to the active management module. Click **Browse** to locate the firmware file you want; then, click **Update**.

You can obtain the firmware files from the IBM Support Web site at http://www.ibm.com/pc/support/.

Restore Defaults



Restore Defaults

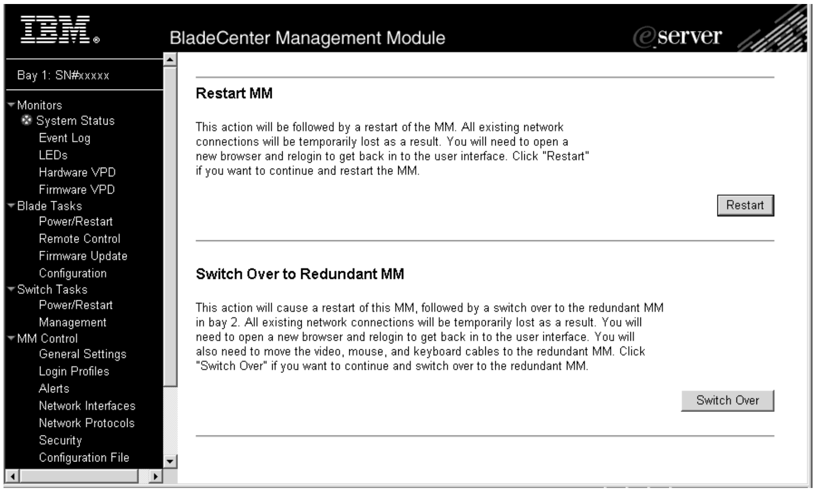
This action will cause all MM settings to be set to factory defaults.

You will lose your TCP/IP connection as a result. You will need to reconfigure the external network interface to restore connectivity.

Clearing of the MM configuration will be followed by a restart of the MM. Press "Restore Defaults" button if you want to proceed.

Select this choice to restore the factory default configuration of the management module.

Restart MM



Restart MM

This action will be followed by a restart of the MM. All existing network connections will be temporarily lost as a result. You will need to open a new browser and relogin to get back in to the user interface. Click "Restart" if you want to continue and restart the MM.

Switch Over to Redundant MM

This action will cause a restart of this MM, followed by a switch over to the redundant MM in bay 2. All existing network connections will be temporarily lost as a result. You will need to open a new browser and relogin to get back in to the user interface. You will also need to move the video, mouse, and keyboard cables to the redundant MM. Click "Switch Over" if you want to continue and switch over to the redundant MM.

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

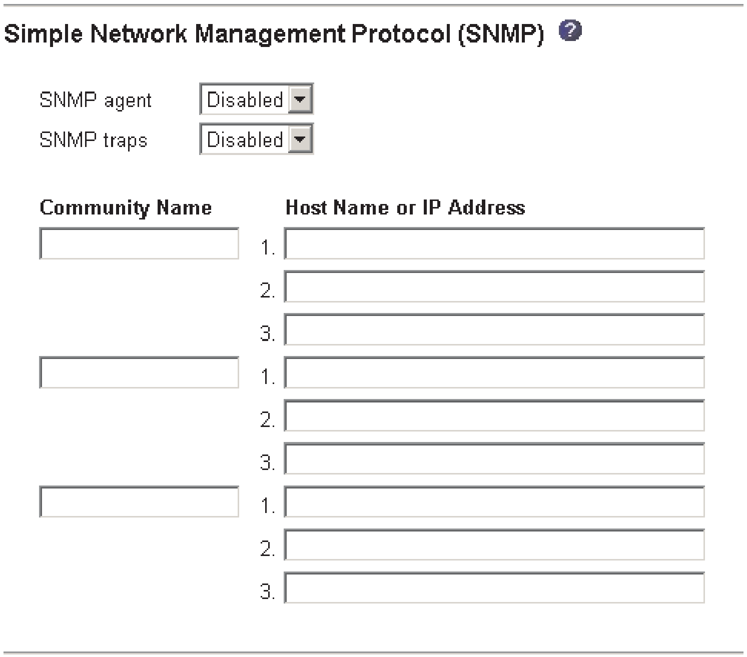
Configuring SNMP

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 and configuration program” on page 8
2. In the navigation pane, click **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 unit.
   - **System location** - Sufficient detail to quickly locate the BladeCenter unit for maintenance or other purposes.
3. Scroll to the bottom of the page and click **Save**.
4. In the navigation pane, click **Network Protocols**; then, click the **Simple Network Management Protocol (SNMP)** link. A page similar to the one in the following illustration is displayed.



Simple Network Management Protocol (SNMP)

SNMP agent: Disabled

SNMP traps: Disabled

Community Name	Host Name or IP Address
	1.
	2.
	3.
	1.
	2.
	3.
	1.
	2.
	3.

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.

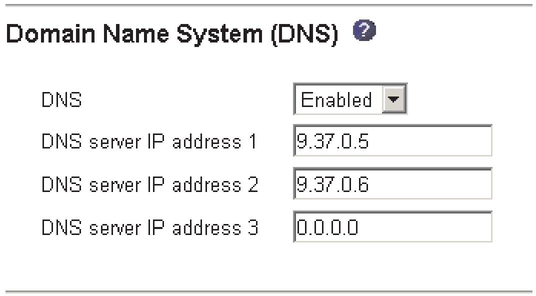
   Note: Alert recipients whose notification method is SNMP will not receive alerts unless both the SNMP agent and the SNMP traps are enabled.

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 listed in the error window. Then, scroll to the bottom of the page and click **Save** to save your 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 addresses 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.



Domain Name System (DNS)

DNS: Enabled

DNS server IP address 1: 9.37.0.5

DNS server IP address 2: 9.37.0.6

DNS server IP address 3: 0.0.0.0

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. If you enabled DNS, in the **DNS server IP address** fields, you can specify the IP addresses of up to three DNS servers on your network. Each IP address should 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 **Restart MM** to activate the changes.

Saving and restoring the configuration file

After you have configured the active management module, you can save the configuration file to a diskette or other external media. Then, if the configuration in the active management module becomes damaged or the only management module is replaced, you can restore the saved configuration file to the management module. Use the management-module Web interface to save and restore the configuration file (**MM Control → Configuration File**).

Note: If you cannot communicate with a replacement management module through the Web interface or the IBM Director programs, the IP address might be different from the IP address of the management module just 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 6 for the factory IP addresses) and configure the management module or load the saved configuration file.

Notices

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

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

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

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

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

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

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

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

Edition notice

Note to U.S. Government Users Restricted Rights — Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

Active Memory
Active PCI
Active PCI-X
Alert on LAN
BladeCenter
C2T Interconnect
Chipkill
EtherJet
e-business logo
FlashCopy
IBM
IntelliStation
Light Path Diagnostics
NetBAY
Netfinity
NetView
OS/2 WARP
Predictive Failure Analysis
PS/2
ServeRAID
ServerGuide
ServerProven
TechConnect
Tivoli
Tivoli Enterprise
Update Connector
Wake on LAN
XA-32
XA-64
X-Architecture
XceL4
XpandOnDemand
xSeries

Lotus, Lotus Notes, SmartSuite, and Domino are trademarks of Lotus Development Corporation and/or IBM Corporation in the United States, other countries, or both.

ActionMedia, LANDesk, MMX, Pentium, and ProShare are trademarks of Intel Corporation in the United States, other countries, or both.

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

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

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

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

Important notes

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.

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

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

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

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

Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

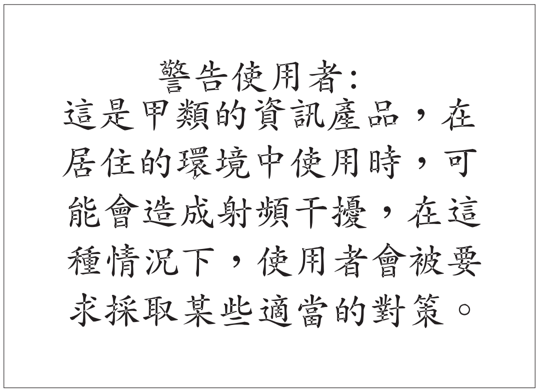
European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

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

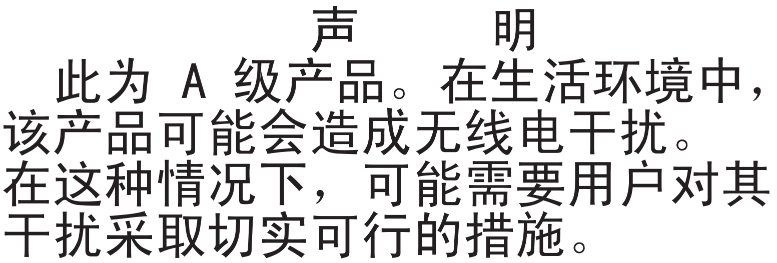
Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese Class A warning statement



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

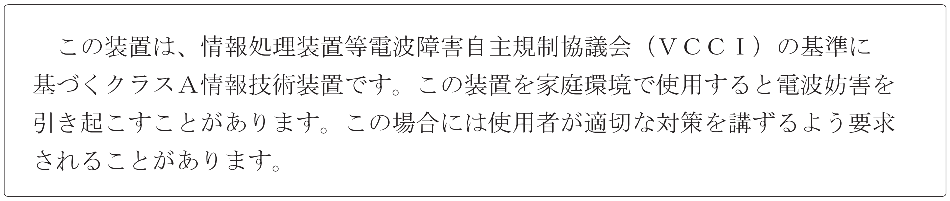
Chinese Class A warning statement



声　明

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

Japanese Voluntary Control Council for Interference (VCCI) statement



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

Index

Part Number: 59P6569

Printed in U.S.A.

(1P) P/N: 59P6569