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BladeCenter T Products FAQ

Hints and Tips

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Hints and Tips

Note: Before using this information and the product it supports, be sure to read the general information in Appendix B, "Notices," on page 49.

Contents

Chapter 1. Introduction

This document is based on technical observations and is intended to supplement the IBM® @server BladeCenter™ T documentation provided with the BladeCenter T products.

The following general types of documents are available for BladeCenter T products. All types of documents are not available for all BladeCenter T products. Some products might also have additional documentation.

- *Installation Guides*

  This documentation contains instructions for setting up and configuring a BladeCenter T product and a description of the product features.

- *User's Guides*

  This documentation contains detailed information about a BladeCenter T product and instructions for its use.

- *Installation and User's Guides*

  This documentation contains general information about a specific BladeCenter T product, including information about features, how to configure the product, and how to get help.

- *Hardware Maintenance Manual and Troubleshooting Guides* (HMMs)

  Some BladeCenter T products have a customized *Hardware Maintenance Manual and Troubleshooting Guide*. This document contains information to help you solve problems yourself, and information for service technicians.

- *IBM @server BladeCenter T Rack Installation Instructions*

  This document contains instructions for installing the BladeCenter T unit in a rack.

In addition to the documentation provided with the BladeCenter T products, other documents are available in Portable Document Format (PDF) on the World Wide Web. These include:

- *IBM @server BladeCenter T Types 8720 and 8730 Planning and Installation Guide* (GA27-4339-00)

  This document is available for download from the IBM Web site at http://www.ibm.com/pc/eserver/bladecenter/. It contains planning information for the IBM BladeCenter T products. It describes the BladeCenter T components, explains deployment and installation considerations, and provides worksheets that you can use to determine your BladeCenter T hardware configuration.

- *IBM @server BladeCenter Systems Management* (REDP3582)

  This document is available for download from the IBM Web site at http://www.ibm.com/redbooks/. It contains an overview of the IBM @server BladeCenter management tools and describes the management module integrated Web GUI.

- *The Cutting Edge: IBM @server BladeCenter* (REDP3581)

  This document is available for download from the IBM Web site at http://www.ibm.com/redbooks/. It contains an introduction to the IBM @server BladeCenter unit and presents the advantages of blade servers. It also looks at the various installation methods that are available and important items to consider before you perform your installation.

- *Deploying Microsoft Exchange on IBM @server BladeCenter* (REDP3585)

  This document is available for download from the IBM Web site at http://www.ibm.com/redbooks/. It describes how to set up and configure Microsoft® Exchange 2000 on the IBM @server BladeCenter unit. It also describes the functionality of the IBM @server BladeCenter unit in this type of environment.

- *Deploying Lotus Domino on IBM @server BladeCenter* (REDP3584)

  This document is available for download from the IBM Web site at http://www.ibm.com/redbooks/. It will help you to set up and configure your IBM @server BladeCenter products to run Lotus® Domino® 6 on Windows® 2000 Advanced Server. It will also help you tune Lotus Domino 6 for better performance while running in an IBM @server BladeCenter environment.

Some of these documents are printed and are provided with the BladeCenter T unit and BladeCenter T components. Most documentation is available in Portable Document Format (PDF) on the IBM *BladeCenter T Documentation* CD and all are available in PDF on the World Wide Web. The latest versions of the documents are available from the IBM web site at http://www.ibm.com/pc/support/.

You can obtain up-to-date information about the BladeCenter T unit, blade servers, and other IBM server products at http://www.ibm.com/eserver/xseries/.

Before you begin

Please read the following before you use the information in this document:

- Review the "Safety information" and "Handling static-sensitive devices" sections in the documentation provided with the BladeCenter T unit. These guidelines will help you work safely while working with the BladeCenter T unit, blade servers, or options.
- Back up all important data before you make changes to disk drives.
- For a list of supported options for the BladeCenter T unit, refer to http://www.ibm.com/pc/us/compat/ on the World Wide Web.

Getting started

After you receive and unpack your BladeCenter T unit, verify the following:

- The BladeCenter T unit is mounted in a rack before you install any blade servers.
- All modules are fully seated.
- All module bays have either a module or a filler module in them.
- All blade bays have a blade server, expansion unit, or filler blade in them.
- All cords and cables are securely connected to the modules.
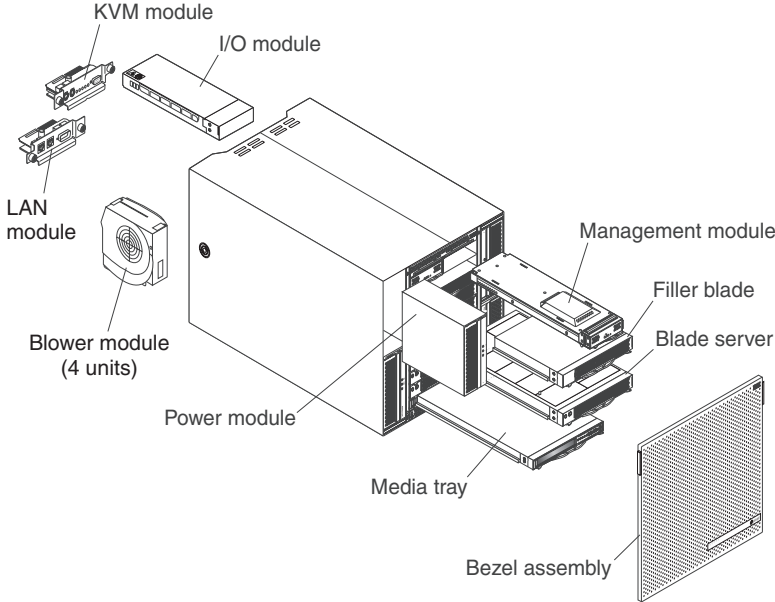
Major components of the BladeCenter T Types 8720 and 8730

The following illustration shows the major components of the BladeCenter T unit.

Note: The illustrations in this document might differ slightly from your hardware.

Features and specifications of the BladeCenter T Type 8720 unit

The following table provides a summary of the features and specifications of the BladeCenter T Type 8720 unit.

Table 1. BladeCenter T Type 8720 features and specifications

Media tray (on front):
- DVD/CD-RW drive: slim IDE
- Two Universal Serial Bus (USB) v1.1 ports
- System-status panel

Module bays (on front):
- Eight hot-swap blade bays
- Four hot-swap power-module bays
- Two hot-swap management-module bays

Module bays (on rear):
- Four hot-swap I/O module bays
- Four hot-swap blower bays
- One hot-swap KVM (keyboard, video, mouse) module
- One hot-swap LAN module

Power modules:
- Standard: Two 1300-watt or greater hot-swap -48 V dc (-48 to -60 V dc) power modules
  - Power modules 1 and 2 supply power to:
    - Blade bays 1 through 4
    - Management modules 1 and 2
    - I/O modules 1 and 2
    - Media tray
    - All KVM, LAN, and alarm interfaces
    - All four blower modules
  - Power modules 1 and 2 provide redundancy to each other
- Maximum: Four 1300-watt or greater hot-swap -48 V dc (-48 to -60 V dc) power modules
  - Power modules 3 and 4 supply power to:
    - Blade bays 5 through 8
    - I/O modules 3 and 4
  - Power modules 3 and 4 provide redundancy to each other
  - Blowers are powered by all four power modules

LAN module:
- Two 10/100 Mb Ethernet remote management connections
- One DSUB 15P alarm connector

KVM module:
- Video port (analog)
- PS/2® keyboard port
- PS/2 mouse port
- System-status panel

I/O modules:
- Standard: None
- Maximum: Four
  - Two hot-swap 1 Gb Ethernet four-port switch modules
  - Two hot-swap switch modules of another network-communication standard, such as Fibre Channel

Management module:
- Standard: One hot-swap management module providing system-management functions for the BladeCenter T unit
- Maximum: Two hot-swap management modules (one active, one redundant)

Redundant cooling:
Four variable-speed hot-swap blowers

Front bezel with changeable filter

Upgradeable microcode:
- Management-module firmware
- I/O-module firmware (not all I/O module types)
- Blade server service processor firmware (BIOS, service processor)

Size (8 U):
- Height: 349.25 mm (13.75 in. or 8 U)
- Depth: 508 mm (20 in.) from front of chassis to rear I/O connector plane Maximum depth: 600 mm (23.62 in.) including bezel, handles, and cable bend radius.
- Width: 442 mm (17.4 in.)
- Weight:
  - Fully configured with modules and blade servers: Approx. 86.64 kg (191 lb)
  - Fully configured without blade servers: Approx. 44.45 kg (98 lb)

Security features:
- Login password for remote connection
- Secure Shell (SSH) for command-line interface
- Secure socket layer (SSL) security for remote Web management access

Predictive Failure Analysis® (PFA) alerts:
- Blowers
- Blade-dependent features
- Power supplies

Declared acoustical noise emission levels for normal operations:
- Sound-power levels (upper-limit): 7.3 bels
- Sound-pressure levels (average), for four one-meter bystander positions: 61.1 dBA

The noise emission levels stated are the declared upper limit sound-power levels, in bels, for a random sample of machines. All measurements made in accordance with ISO 7779 and reported in conformance with ISO 9296.

Environment:
- Air temperature:
  - Altitude: -60 to 1800 m (-197 ft to 6000 ft)
    - BladeCenter T on: 5° to 40°C (41° to 104°F)
    - BladeCenter T on (short term): -5° to 55°C (23° to 131°F)
  - Altitude: 1800 m to 4000 m (6000 ft to 13000 ft)
    - BladeCenter T on: 5° to 30°C (41° to 86°F)
    - BladeCenter T on (short term): -5° to 45°C (23° to 113°F)
  - System unit off: uncontrolled
- Rate of temperature change: 30°C/hour (54°F/hour)
- Humidity:
  - BladeCenter T on: 5% to 85%
  - BladeCenter T on (short term): 5% to 90% not to exceed 0.024 water/kg of dry air
  - BladeCenter T off: uncontrolled

Electrical input:
- dc power
- Input voltage: -48 V dc to -60 V dc

Heat output:
- Input kilovolt-amperes (kVA) approx.
  - Minimum configuration: 0.2 kVA
  - Maximum configuration: 3.3 kVA
- BTU output
  - Ship configuration: 673 Btu/hour (197 watts)
  - Full configuration: 11229 Btu/hour (3291 watts)

Features and specifications of the BladeCenter T Type 8730 unit

The following table provides a summary of the features and specifications of the BladeCenter T Type 8730 unit.

Table 2. BladeCenter T Type 8730 features and specifications

Media tray (on front):
• DVD/CD-RW drive: slim IDE
• Two Universal Serial Bus (USB) v1.1 ports
• System-status panel
 	
Module bays (on front):
• Eight hot-swap blade bays
• Four hot-swap power-module bays
• Two hot-swap management-module bays
 	
Module bays (on rear):
• Four hot-swap I/O module bays
• Four hot-swap blower bays
• One hot-swap KVM (keyboard, video, mouse) module
• One hot-swap LAN module
 	
Power modules:
• Standard: Two 1300-watt or greater 220-volt (200-240 V ac) hot-swap power modules
  – Power modules 1 and 2 supply power to:
    - Blade bays 1 through 4
    - Management modules 1 and 2
    - I/O modules 1 and 2
    - Media tray
    - All KVM, LAN, and alarm interfaces
    - All four blower modules
  – Power modules 1 and 2 provide redundancy to each other
• Maximum: Four 1300-watt or greater 220-volt (200-240 V ac) hot-swap power modules
  – Power modules 3 and 4 supply power to:
    - Blade bays 5 through 8
    - I/O modules 3 and 4
  – Power modules 3 and 4 provide redundancy to each other
  – Blowers are powered by all four power modules
 	
LAN module:
• Two 10/100 Mb Ethernet remote management connections
• One DSUB 15P alarm connector
 	
KVM module:
• Video port (analog)
• PS/2 keyboard port
• PS/2 mouse port
• System-status panel
	I/O modules:
	• Standard: None
	• Maximum: Four
	  – Two hot-swap 1 Gb Ethernet four-port switch modules
	  – Two hot-swap switch modules of another network-communication standard, such as Fibre Channel
	
	Management module:
	
	• Standard: One hot-swap management module providing system-management functions for the BladeCenter T unit
	• Maximum: Two hot-swap management modules (one active, one redundant)
	
	Redundant cooling:
	Four variable-speed hot-swap blowers
	
	Front bezel with changeable filter
	
	Upgradeable microcode:
	• Management-module firmware
	• I/O-module firmware (not all I/O module types)
	• Blade server service processor firmware (BIOS, service processor)
	
	Size (8 U):
	• Height: 349.25 mm (13.75 in. or 8 U)
	• Depth: 508 mm (20 in.) from front of chassis to rear I/O connector plane Maximum depth: 600 mm (23.62 in.) including bezel, handles, and cable bend radius.
	• Width: 442 mm (17.4 in.)
	• Weight:
	  – Fully configured with modules and blade servers: Approx. 86.64 kg (191 lb)
	  – Fully configured without blade servers: Approx. 44.45 kg (98 lb)
	
	Security features:
	• Login password for remote connection
	• Secure Shell (SSH) for command-line interface
	• Secure socket layer (SSL) security for remote Web management access
	
	Predictive Failure Analysis (PFA) alerts:
	• Blowers
	• Blade-dependent features
	• Power supplies
		Declared acoustical noise emission levels for normal operations:
		• Sound-power levels (upper-limit): 6.4 bels
		• Sound-pressure levels (average), for four one-meter bystander positions: 56.6 dBA
		
		The noise emission levels stated are the declared upper limit sound-power levels, in bels, for a random sample of machines. All measurements made in accordance with ISO 7779 and reported in conformance with ISO 9296.
		
		Environment:
		• Air temperature:
		  – BladeCenter unit on: 10° to 35°C (50° to 95°F). Altitude: 0 to 914 m (2998.69 ft)
		  – BladeCenter unit on: 10° to 32°C (50° to 89.6°F). Altitude: 914 m to 2134 m (2998.69 ft to 7000 ft)
		  – BladeCenter off: -40° to 60° C (-40° to 140° F).
		• Humidity:
		  – Server on: 8% to 80%
		  – Server off: 8% to 80%
		
		Electrical input:
		• Sine-wave input (50 or 60 Hz single-phase) required
		• Input voltage:
		  – Minimum: 200 V ac
		  – Maximum: 240 V ac
		
		Heat output:
		• Input kilovolt-amperes (kVA) approx.
		  – Minimum configuration: 0.2 kVA
		  – Maximum configuration: 3.1 kVA
		• BTU output
		  – Ship configuration: 673 Btu/hour (197 watts)
		  – Full configuration: 10440 Btu/hour (3060 watts)

Chapter 2. BladeCenter T frequently asked questions

This chapter contains information that is specific to the BladeCenter T unit.

What is NEBS?

Network Equipment-Building System (NEBS) is a trademark of Telcordia Technologies, Inc. NEBS is a general term for a set of generic requirements (GRs) developed by Telcordia to describe the physical and environmental criteria for Central Office (CO) and other telephone facilities buildings and for the equipment used in these facilities. This effort by Telcordia and participating companies resulted from directives within the Telecommunications Act of 1996 to develop industry-wide generic requirements relating to telecommunications equipment.

There are two primary NEBS documents which are referenced:
- *NEBS Requirements: Physical Protection* (GR-63-CORE)
- *Electromagnetic Compatibility and Electrical Safety* (GR-1089-CORE)
  Generic criteria for network telecommunications equipment

Telcordia special report (SR) SR-3580 defines the three NEBS Criteria Levels. The BladeCenter T unit conforms to NEBS Level 3 for equipment operating under the environmental extremes found in a central office.

Many other generic requirements and special reports are available from Telcordia, including *Generic Requirements for the Physical Design and Manufacture of Telecommunications Products and Equipment* (GR-78-CORE). Telcordia packages the most commonly used sets of documents into Family of Requirements (FR) groups. The FR that best relates to BladeCenter T requirements is FR-2063.

Telcordia documents are only available through subscription. The documents can be ordered from the Telcordia SuperStore at http://telecom-info.telcordia.com. The documents can also be ordered by contacting Telcordia at:
> Telcordia Customer Service
> 8 Corporate Place, Room 3A-184
> Piscataway, NJ 08854-4156
> 1.800.521.2673 (USA and Canada)
> + 1.732.699.5800 (worldwide)
> + 1.732.336.2559 (FAX)

Additional information about NEBS can be found in the NEBS FAQ at http://www.nebs-faq.com.

Who uses the Telcordia NEBS documents?

The NEBS documents are based on the directives specified by the Telecommunications Act of 1996. Many of the telecommunications carriers in North America use the Telcordia documents to normalize their requirements for telecommunications equipment. As a result, the checklists that are typically developed by each carrier directly reference the NEBS requirements and objectives.

Checklists are available from the following carriers:

- Verizon: *NEBS Compliance Checklist, Version 4* (http://www.verizonnebs.com)
- SBC: *The SBC TP76200, Issue 5A* (https://ebiznet.sbc.com/sbcnebs/)

  Network equipment power, grounding, environmental, and physical design requirements
- AT&T: *NEDS 4.0* (http://www.nebs-faq.com/files/attneds.pdf)

What is ETSI?

European Telecommunications Standards Institute (ETSI) refers to a set of European telecommunications standards developed by the European Telecommunications Standards Institute (ETSI) Technical Committee Environmental Engineering (EE). These standards were established for the European telecommunications market and are similar to the NEBS documents used by North American carriers. The ETSI documents are composed of the following:

1. *Environmental Engineering (EE); Environmental engineering; Guidance and terminology* (ETSI TR 100 035)
2. *EMC requirements for equipment intended to be used within a telecommunications Network* (ETSI EN 300 386)
3. *Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Classification of environmental conditions* (ETSI EN 300 019-1 (all subparts))
4. *Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Specification of environmental tests* (ETSI EN 300 019-2 (all subparts))

The primary ETSI standards that apply to the BladeCenter T unit are:

- *EMC requirements for Telecom Network Equipment* (ETSI EN 300 386)
- *Part 2-1: Specification of environmental tests; Introduction* (ETSI 300-019-2-0)
- *Part 2-1: Specification of environmental tests; Storage* (ETSI 300-019-2-1)
- *Part 2-2: Specification of environmental tests; Transportation* (ETSI 300-019-2-2)
- *Part 2-3: Specification of environmental tests; Stationary use at weather protected locations* (ETSI 300-019-2-3)
- *Acoustic Noise* (ETSI 753)

The ETSI standards are available from http://webapp.etsi.org/IPR/home.asp. Free downloads are permitted after registering as a user. Individual copies of the current ETSI standard can be downloaded from: http://www.etsi.org. ETSI organization contact information is as follows:

ETSI
650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Which BladeCenter T unit is qualified for NEBS and ETSI?

The BladeCenter T unit is available in two configurations: the Type 8730 that supports AC power inputs and the Type 8720 that supports DC power inputs. Either type of BladeCenter T unit can support an enterprise environment with a maximum ambient temperature of 35°C (95°F). Only the BladeCenter T unit Type 8720 is qualified for use in a NEBS/ETSI environment with a maximum ambient temperature of 5 to 40°C (41 to 104°F), with short-term excursions from -5 to 55°C (23 to 131°F), according to the Telcordia GR-63-CORE specification.

Only certain blade servers and I/O modules are qualified for use in a NEBS environment. Check the compatibility list on the IBM product web site (http://www.ibm.com/servers/eserver/bladecenter) before attempting to operate any blade server or I/O module in a NEBS environment.

Note: To make sure that the BladeCenter T unit installation complies with EMC product regulations for intra-building lightning surges, you must use shielded LAN cables that are grounded at both ends.

BladeCenter unit to BladeCenter T unit comparison

The IBM @server BladeCenter T unit adapts proven BladeCenter architecture, with blade servers and integrated switch technology, to the rigorous environment of the telecommunication industry. The following table compares some of the differences between the BladeCenter and BladeCenter T units.

	BladeCenter	BladeCenter T
		Type 8720 (-48 V dc)
	Type 8677 (220 V ac)	Type 8730 (220 V ac)
Blade server bays	14 (30mm wide, vertically oriented)	8 (30mm high, horizontally oriented)
I/O module bays	4 (vertically oriented)	4 (horizontally oriented)
Management modules	2 (rear of BladeCenter unit)	2 (front of BladeCenter T unit)
Dimensions	• Height: 304.2 mm (12 in. or 7 U) • Depth: 711.2 mm (28 in.) • Width: 444 mm (17.5 in.)	• Height: 349.25 mm (13.75 in. or 8 U) • Maximum depth: 600 mm (23.62 in.) including bezel, handles, and cable bend radius • Width: 442 mm (17.4 in.)
Power and cooling		
Power domains (see "Power modules and power domain organization" on page 13 for more information)	2 x 2000 watts (maximum)	2 x 1300 watts
Power module location	4 (rear of BladeCenter unit)	4 (front of BladeCenter T unit)
Power modules	1400 watts (220 V ac input) 1800 watts (220 V ac input) 2000 watts (220 V ac input)	Type 8720: 1300 watts (-48 V dc input) Type 8730: 1300 watts (220 V ac input)

	BladeCenter	BladeCenter T
		Type 8720 (-48 V dc)
	Type 8677 (220 V ac)	Type 8730 (220 V ac)
Power domain 1 (Power modules 1 and 2)	• Management modules 1 and 2 • Media tray • I/O module bays 1 through 4 • Blade bays 1 through 6	• Management modules 1 and 2 • Media tray • I/O module bays 1 and 2 • Blade bays 1 through 4
Power domain 2 (Power modules 3 and 4)	• Blade bays 7 through 14	• I/O module bays 3 and 4 • Blade bays 5 through 8
Blowers	2	4
Media tray		
Front panel USB ports	1 (USB v1.1)	2 (USB v1.1)
Front panel media	• CD-ROM drive • diskette drive	• CD-RW/DVD drive
Front and rear panel LEDs	The following BladeCenter status LEDs are on the media tray (front of unit) and the rear system LED panel: • Power (green) • Location (blue) • System error (amber) • Information (amber) • Over-temperature (amber)	The following BladeCenter T status LEDs are on the media tray (front of unit) and KVM module (rear of unit): • Power (green) • Location (blue) • Critical (red/amber) • Major (red/amber) • Minor (amber)
Rear panel connectors	The following connectors are on each management module: • Video • Keyboard • Mouse • 10/100 Mb LAN (Ethernet)	The following connectors are on the KVM module and provide an interface with the active management module: • Video • Keyboard • Mouse The following connectors are on the LAN module: • 10/100 Mb LAN (Ethernet) for management module 1 • 10/100 Mb LAN (Ethernet) for management module 2 • Alarms connector (DB-15) that provides contacts for critical, major, and minor alarms
Environmental		
Temperature range (nominal operating)	10° to 32°C (50° to 90°F)	5° to 40°C (41° to 104°F)
Humidity (operating)	8% to 80%	5% to 85%
Temperature range (storage)	1° to 60°C (34° to 140°F)	-40° to 70°C (-40° to 158°F) 95% relative humidity at 45°C (113°F)
EMI – Radiated (Class A)	10 Hz to 1000 kHz	0.01 Hz to 10 GHz
ESD (Direct Contact)	±4 kV	±8 kV
ESD – Air Contact	±8 kV	±15 kV

What is compatible between the BladeCenter and BladeCenter T units?

The BladeCenter T is certified for use with all blade servers, blade expansion options, and I/O modules (switch modules and pass-thru modules). These items are interchangeable between the BladeCenter and BladeCenter T units and can be moved between the two units with two restrictions:

1. Not all blade servers and options are qualified for use in a Network Equipment-Building System (NEBS) environment. See "What is NEBS?" on page 7 for NEBS information.

2. Low-profile handles on the blade servers are required to meet chassis depth requirements. See "Why are there low-profile handles for blade servers?" for more information.

Blade fillers and I/O module fillers are also interchangeable, following these guidelines.

The power modules, power module fillers, blowers, management modules, management-module fillers, and the media tray for the BladeCenter and BladeCenter T units are not compatible and cannot be interchanged.

See the ServerProven® website at http://www.ibm.com/pc/us/compat/ on the World Wide Web for current BladeCenter T component compatibility information and restrictions.

Why is the BladeCenter T chassis shorter?

Design of the BladeCenter T unit uses established BladeCenter architecture that is modified to a shallower chassis depth, allowing the BladeCenter T unit to be mounted in a 2-post rack. The BladeCenter T is certified for telecommunications applications, where a part of the criteria is an ability to operate in Earthquake Zone 4. The chassis depth of the BladeCenter T unit was shortened to pass the earthquake testing criteria for 2-post racks, that specifies a maximum depth dimension of 600 mm (23.62 in.) for telecommunications installations.

Why are there low-profile handles for blade servers?

The BladeCenter T unit meets the 600 mm chassis-depth requirement of the telecommunication industry, as measured from the front of the filter bezel to the rear of the cable-management bend radius. To meet this requirement, low-profile handles (or blade fronts) are used with the BladeCenter T unit to allow the blade servers to fit inside the filtered front bezel and meet the 600 mm depth requirement. Blade servers with the higher-profile handle BladeCenter blade-front design can be securely installed in the BladeCenter T unit, but will exceed the 600 mm depth requirement and will prevent attachment of the filtered front bezel.

With the exception of the HS20 Type 8832 blade servers that have 3.06 GHz and 3.2 GHz microprocessors, blade servers that are shipped with low-profile handles are qualified for use in a NEBS environment. The following table provides information about blade servers designed for use in the BladeCenter T unit.

Blade server	Standard handle models (not NEBS compliant)	Low-profile handles	
		Model	NEBS compliant
HS20 Type 8678	All models	None	No
HS20 Type 8832, Xeon DP 2.4GHz	8832-91X	8832-9TX	Yes

Blade server	Standard handle models (not NEBS compliant)	Low-profile handles	
		Model	NEBS compliant
HS20 Type 8832, Xeon DP 2.8GHz	8832-L1X	8832-LTX	Yes
HS20 Type 8832, Xeon DP 3.2GHz	8832-G1X	8832-GTX	No
HS40 Type 8839, Xeon MP 2.7GHz	8839-61X	8839-6TX	Yes
JS20 Type 8842	All models	None	No

See the IBM product Web site at http://www.ibm.com/servers/eserver/bladecenter/ for the latest blade server compatibility information.

Can I convert a BladeCenter T unit from one power input type to another?

Conversion of a BladeCenter T unit from one power input type to another is not supported.

The BladeCenter and BladeCenter T units use modular construction that allows easy component replacement and reduces system downtime. One of the differences between the BladeCenter and BladeCenter T units is how the power modules are installed and how the power source input connects to the power modules. Power modules are installed in the rear of the BladeCenter unit and the input power cords attach directly to the power modules. The input power source type for the BladeCenter unit is defined by the types of power modules that are installed.

Power modules are installed in the front of the BladeCenter T unit and the power source input (ac or dc) connections are in the rear of the BladeCenter T unit. The BladeCenter T unit provides internal cabling from the power source input to the power modules. Since the power input connections and internal cabling are different for the ac and dc BladeCenter T configurations, two BladeCenter T unit types were created for regulatory purposes: IBM machine types 8720 and 8730. The ability to use ac or dc power as the input power source is defined by the design of the BladeCenter T unit and not the types of power modules that are installed.

While it is mechanically possible to install a dc power module into an ac (Type 8730) BladeCenter T unit or an ac power module into a dc (Type 8720) BladeCenter T unit, the contacts of the internal power module connectors are mutually exclusive. This means that if a dc power module is installed in an ac (Type 8730) BladeCenter T unit, it is not connected to a power source and will not provide any power to BladeCenter T components. The same is true when an ac power module is installed in a dc (Type 8720) BladeCenter T unit.

Weight calculations

There a several ways to specify the weight of a BladeCenter T unit. The two weights that are of primary interest are the weight of the BladeCenter T unit when all items have been removed making it ready for rack installation, and how much the BladeCenter T unit weighs when fully populated.

To prepare the BladeCenter T unit for rack installation, the power modules, blade servers, and blower modules are removed. This reduces the total weight of the BladeCenter T unit, allowing it to be installed using the rack handles. (Other

modules may remain installed in the BladeCenter T unit while installing it in a rack.) The following table shows the worst-case rack installation weight for a BladeCenter T unit.

Rack Installation Weight			
Item	Quantity	Weight	Sub-total
BladeCenter T unit (all bays empty)	1	31.3 kg (69 lb)	31.3 kg (69 lb)
Management module	2	1.5 kg (3.2 lb)	3.0 kg (6.5 lb)
Media tray	1	2.3 kg (5 lb)	2.3 kg (5 lb)
I/O module	4	0.9 kg (2 lb)	3.6 kg (8 lb)
Lift handles	4	0.2 kg (0.4 lb)	0.7 kg (1.6lb)
		Total:	40.9 kg (90.1 lb)

A fully-loaded BladeCenter T unit includes all four power modules, eight (average weight) blades, and four I/O modules. (This weight does not include the weight of rack mounting hardware, since it varies by application.) The following table shows the weight of a fully-populated BladeCenter T unit.

Fully Loaded Weight			
Item	Quantity	Weight	Sub-total
BladeCenter T unit (all bays empty)	1	31.3 kg (69 lb)	31.3 kg (69 lb)
Front bezel	1	1.5 kg (3.4 lb)	1.5 kg (3.4 lb)
Blowers	4	0.6 kg (1.4 lb)	2.5 kg (5.6 lb)
Power supply	4	3.5 kg (7.8 lb)	14.2 kg (31.2 lb)
Management module	2	1.5 kg (3.2 lb)	3.0 kg (6.5 lb)
Media tray	1	2.3 kg (5 lb)	2.3 kg (5 lb)
I/O module	4	0.9 kg (2 lb)	3.6 kg (8 lb)
Blade servers	8	2.9 kg (8.5 lb) (average)	30.8 kg (68 lb)
		Total:	89.2 kg (196.7 lb)

Power modules and power domain organization

The BladeCenter T unit has two power domains. Power domain 1 powers the BladeCenter T management components, the media tray, and the blowers. It also powers the upper half of the BladeCenter T unit: blade bays 1 through 4 and I/O module bays 1 and 2. Power domain 2 is for expansion and supports the bottom half of the BladeCenter T unit: blade bays 5 through 8 and I/O module bays 3 and 4. Power domain 2 also provides power for the blowers.

The following table lists all components that are powered by each BladeCenter T power domain.

Power domain	Components powered
Power domain 1 (power modules 1 and 2)	• Management module 1 • Management module 2 • Media tray • Blade bays 1 through 4 • I/O module bays 1 and 2
Power domain 2 (power modules 3 and 4)	• Blade bays 5 through 8 • I/O module bays 3 and 4
Note: All four blowers are powered by all power modules that are installed in the BladeCenter T unit; at minimum, the power modules of power domain 1.	

Power input types

Depending on the BladeCenter T machine type, it will have one of the following input power requirements:

• Type 8720: –48 V dc at 70 A maximum
• Type 8730: power input is 220 V ac at 16 A maximum

Maximum current and power calculations

In the following table, all voltages and currents are measured at the power module input to the BladeCenter T unit.

Parameter	Type 8730 (ac power)	Type 8720 (dc power)
Power module efficiency	85%	79%
Base BladeCenter T unit includes: • One management module (35W) • Four blowers (75W each) • Media tray (5W)	2.22 A	12 A
For each blade server (250W), add:	+1.63 A	+8.8 A
For each I/O module (45W), add:	+0.30 A	+1.6 A
For each additional management module (35W), add:	+0.24 A	+1.2 A
Total BladeCenter T unit current requirement (at worst-case voltage input)	16.7 A at 180 V ac	90 A at -36 V dc
Maximum power consumption*	3060 W	3291 W
Maximum kVA	3.1 kVA	3.3 kVA
Maximum BTU	10,440 BTU/hour (3058 watts)	11,230 BTU/hour (3289 watts)
* Based on 2 x 1300W power module outputs, adjusted for power module efficiency.		

AC power

The BladeCenter T Type 8730 (ac power) should have one 220 V power cord for each installed power module that is connected to each ac power source and

connected to the BladeCenter T unit power-input connectors. The BladeCenter T unit has a minimum of two power supplies that are provided in a redundant configuration in power domain 1.

The BladeCenter T Type 8730 unit requires 220 V ac, single-phase, 3-wire power. This is the same type of power input that is used by the BladeCenter unit. This 220 V single-phase is measured from line-to-line to get the 220 V ac, as opposed to 110 V ac that is measured from line-to-neutral. The third wire of the 220 V power cord is the safety ground that is required by all ac electrical inputs.

Each ac input connection of the BladeCenter T unit is an IEC320 inlet EMI filter receptacle rated for 10 A RMS maximum. The provided IEC 60320/C13 power cords have an input voltage rating of 180 to 264 V ac at 47 to 63 Hz (200 to 240 V ac at 50 to 60 Hz, nominal).

Total maximum amperage for the BladeCenter T unit is 16 A; however, each of the four ac power inputs is rated at 8 A with paired redundancy. This does not mean the BladeCenter T unit consumes 32 A of current, only that each power input must be capable of carrying 8A to provide redundancy.

Note: The ac power input connectors at the rear of the BladeCenter T unit are numbered to indicate the power module to which they provide power. This one-to-one relationship means that you must connect one ac power cord for each power module.

DC power

The IBM @server BladeCenter T Type 8720 requires customer-supplied dc input power from an approved power source. The dc input power cable size must be 4 AWG and be less than 3 meters (9.8 ft) in length. The power source must have a minimum of 15 A and a maximum of 90 A over-current protection. See the *Installation Guide* for your BladeCenter T unit for detailed information about supplying power to your BladeCenter T unit. Article 240, paragraph 3, of the National Electric Code, Table 310-16, also describes wiring requirements for this type of equipment.

The BladeCenter T Type 8720 (dc power) unit has two dc-power terminal connectors each powering two of the BladeCenter T power modules. When viewed from the rear of the BladeCenter T unit, the left connection supplies power to power-module bays 2 and 4, and the connection on the right supplies power to power-module bays 1 and 3. Each dc terminal has four #M6 (0.25-inch) studs; one for -48 V dc, one for RETURN, and two for connecting the safety ground wire.

The following guidelines should be used for connecting to the -48 V dc power source to the BladeCenter T Type 8720 unit:
- Flexible dc power cable should be used to ease cable management at the rear of the BladeCenter T unit. Use:

  4 AWG (7x7x34/36 TC), 105°C, 300V UL 10198, CSA approved and VW1 rated
- Use ring terminals designed for use with an M6 stud, 4 AWG wire, wire size (circular Mil area) of 33100-52600, and a wire insulation diameter from 12.8 mm to 13.1 mm.
- A two-lug ring terminal is required by NEBS for connecting the single safety-ground wire.
- The dc input voltage range is from -38 V dc to -75 V dc.

Non-redundant power operation

Non-redundant power is not supported in BladeCenter T products. Power modules must always be present in power bays 1 and 2. When any blade server or option is in blade bays 5 through 8 or I/O-module bays 3 or 4, power modules must be present in power bays 1 and 2, *and* power modules must be present in power bays 3 and 4.

The BladeCenter T unit can operate with power modules present in only power bays 1 and 4; however, power modules should be installed in power bays 2 and 3 as soon as possible to regain redundant power operation.

See the *IBM @server BladeCenter T AC Power Supply Modules* and the *IBM @server BladeCenter T DC Power Supply Modules* option documentation and the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* for more information.

Redundant power

To provide true redundant power, BladeCenter T power modules 1 and 3 must connect to a different power source than power modules 2 and 4. Connect BladeCenter T power modules 1 and 3 to a different PDU than power modules 2 and 4; then, connect each PDU to a power source (building power source or service entrance) that is controlled by a separate circuit breaker.

See the *IBM @server BladeCenter T Types 8720 and 8730 Planning and Installation Guide* for more information.

BladeCenter T unit cooling

Maintaining operational temperatures inside a BladeCenter T unit that is installed in a NEBS environment is a critical function. Air movement in a BladeCenter T unit is done using blowers, as in a BladeCenter unit. Airflow through both BladeCenter T unit and BladeCenter unit is in the same direction through the blade servers and I/O modules: cool air is drawn in the through the front of the BladeCenter unit and exhausted out of the rear. The BladeCenter T unit adds a replaceable air filter covering the entire front of the BladeCenter T unit. BladeCenter T management-module firmware controls blower speed and provides fouled filter detection that advises when the filter becomes dirty.

The BladeCenter T unit has four blowers instead of the two blowers that are in the BladeCenter unit. These four blowers are controlled in pairs: the top two blowers are set to the same speed as each other and the bottom two blowers are set to the same speed as each other. All four blowers are required for redundant operation. If one blower fails, the BladeCenter T unit is no longer redundant, but will continue to function.

Switch modules in BladeCenter T unit are provided fresh air at the switch module air intakes, as compared with the BladeCenter unit where preheated air is fed to the switch module bays. Fresh air intake reduces the air temperature into the switch module bays by 15 - 20° C (59 - 68° F).

The BladeCenter T unit is split into an upper half and a lower half for blower management purposes:

- The top two blowers provide cooling for the top two I/O modules (I/O modules 1 and 2), both management modules, and the top four blade servers (blade servers 1 through 4). Some airflow is also directed to provide additional cooling for blade servers 5 through 8.
- The bottom two blowers cool the bottom two I/O modules (I/O modules 3 and 4), the media tray, and the bottom four blade servers (blade servers 5 through 8). Some airflow is also directed to provide additional cooling for blade servers 1 through 4.

Note: The BladeCenter T power modules have their own internal fans that are independent of the BladeCenter T unit blowers. The power module blowers exhaust past the corner of each blower that is directly behind them in the BladeCenter T unit.

See "Blower Management" on page 19 for additional information about blower management.

Performance

The following illustration shows the airflow performance curve for the BladeCenter T, in cubic feet per minute (CFM). It shows the amount of suction developed, in inches of water (H_2O), for various levels of airflow.
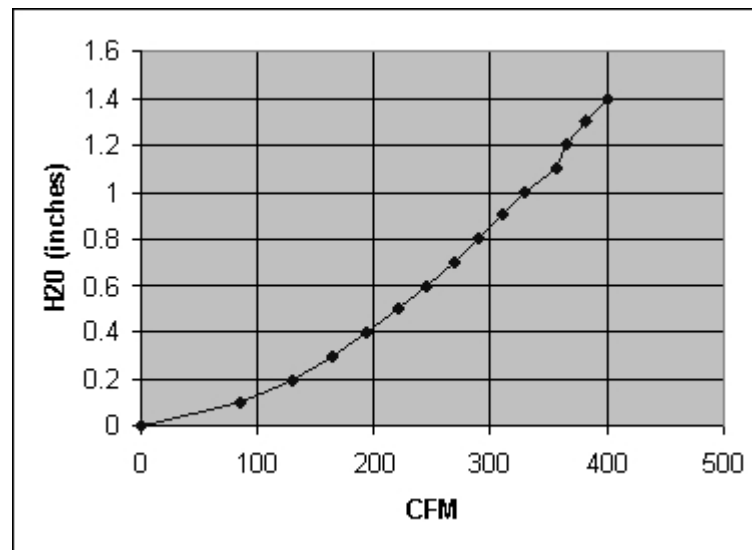
Management-module connectors

Keyboard, video, mouse

Management modules are installed in the front of the BladeCenter T unit. All management module I/O connectors are in the back of the BladeCenter T unit. There is only one set of keyboard, video, and mouse (KVM) connectors on BladeCenter T unit: the Type 8677 BladeCenter unit has a dedicated set of KVM connections for each management module. On the BladeCenter T unit, the shared KVM connections are automatically switched to the primary management module so that no cable reconnection is required after a failover.

Local area network

There are two LAN connectors on the back of the BladeCenter T unit, one for each management module. These connectors are hard-wired to the management module bays (MM 1 and MM 2). During a failover, the LAN port of the failing primary management module will become inactive and the LAN port of the redundant management module will become active, making it the primary management module. The IP addresses of the two management modules are identical if they were configured for redundancy and the external management network will not be disturbed by the failover. The MAC addresses of the two management modules can be configured to be the same to reduce failover time.

Firmware features

Telco alarm management

BladeCenter T events are mapped to the following telco alarm levels:
- Information: Minor (amber)
- Fault: Major (amber or red, based on management module user setting)
- Critical Fault: Critical (amber or red, based on management module user setting)

The BladeCenter unit has three system status LEDs: Information, Fault, and Overtemp. The BladeCenter T unit has front and rear system status LEDs of Critical, Major, and Minor to match the telecommunications industry alarm conventions. The BladeCenter T also has a rear panel connector for wiring these alarm levels to an alarm panel (see "Media tray" on page 20 for more information).

The Telco Alarm Manager (TAM) extends the event processing function of the BladeCenter unit for the BladeCenter T unit. The BladeCenter management module manages the alerts using alert classifications such as Critical, Warning, and System Level. The TAM has three severity classifications: Minor, Major, and Critical. These classifications map to the BladeCenter T telco alarm panel LEDs. Software such as IBM Director, Web Based System Management, SNMP Agent, Command Line Interface (CLI), and Service Processor Commands (SPC) have enhanced user interfaces that support the BladeCenter T alarm functions.

Management module failover

The BladeCenter T architecture contains many redundancy features, including primary (active) and secondary (standby) management modules. Redundant management of the BladeCenter T unit requires a common storage of static configuration information and a method for transferring temporary configuration information between the active and standby management modules if a failover occurs. This is accomplished by storing the configuration information in the backplane of the BladeCenter unit.

When the primary management module fails, the standby management module reads configuration information stored in the BladeCenter T backplane and becomes active. The active management module is indicated by an LED on the front panel of each management module. Any changes to the configuration information in the NVRAM of the active management module are written back out to the backplane and stored for any subsequent failover or management module replacement.

Events that occur during normal operation are logged in the active management module and are simultaneously passed from the active management module to

standby management module over the RS-485 bus between the two management modules. In this way, temporary event information is kept synchronized between the active and standby management modules.

Blower Management

Typical behavior

Blower management firmware adjusts blower speed based on: ambient temperature, blade server microprocessor temperature diode readings, and thermal warning events from the I/O modules, blade expansion units, or blade servers that are not explicitly supported by the BladeCenter T unit management module firmware. Ambient temperature increases raise the base operating speed of all blowers; other conditions will speed up the blowers only in their respective cooling domains.

If blade servers in slots 1 through 4 or I/O modules 1 or 2 heat up, the top two blowers will increase their speed as a team to cool down the blade servers or I/O modules. Once the blade servers are cooled, or the I/O modules thermal warning resets, the blowers will slowly begin lowering their speed until they have reached an equilibrium with the thermal demands of the BladeCenter T unit. The blowers will reduce their speed at a much slower rate than when they speed up, as this behavior better matches the typical thermal profile of a microprocessor, which heats up quickly and cools off slowly.

The bottom pair of blowers may not speed up at all if the bottom half of the BladeCenter T unit is unoccupied or has blade servers that are not turned on or are under utilized. By speeding up only the blowers that are needed, the BladeCenter T unit reduces power consumption and minimizes acoustic noise.

As a result, you may observe that the blowers seem to be running very slowly, with small volumes of air being exhausted. If you are in a lab environment where the ambient temperature is between 22° and 25° C (71.6° and 77° F) and the blade servers are not being heavily utilized, the blowers will not run any faster than is necessary to keep the management modules and I/O modules cool.

Failure modes

If any one blower fails, the other blower in its pair will speed up to compensate, typically reaching its maximum RPM speed. Blowers in the other half of the BladeCenter T unit will speed up slightly, but not to their full speed. Once the failed blower is replaced, both blowers in the restored blower pair will operate at their maximum speed until all excess heat is removed from the BladeCenter T unit, then they will return to their normal RPM level. It may take 3 to 5 minutes for the restored blowers to reduce their speed to normal levels.

The BladeCenter T design tolerates only one blower failure at a time. While the other blower in the pair does speed up to compensate, this represents a loss of redundancy. If more than one blower fails or is removed from the BladeCenter T unit, the management-module firmware will begin powering down blade servers and I/O modules to protect against hardware damage.

All blower management described above is part of the management-module firmware. If there is only one management module installed in the BladeCenter T unit and this management module fails or is removed, the blowers will automatically increase to full speed regardless of environmental conditions or blade server and I/O module thermal requirements.

Fouled filter detection

The BladeCenter T unit is equipped with an air filter that meets the criteria for NEBS GR-63, Section 4.5 compliance. It has a minimum dust arrestance of 80% that represents a low efficiency 10 to 15% dust spot rating for the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE).

Air filtration is a NEBS requirement that reduces that number of airborne particles in the BladeCenter T unit that would reduce cooling efficiency if they were left to accumulate on the internal heat sinks or on other components such as memory. The filter will become covered with airborne particles over time, restricting the airflow to the blowers and reducing their efficiency. Detection of a dirty (fouled) filter is required, since this will protect cooling efficiency better than filter replacement at regular service intervals.

The method for detecting a fouled filter starts by characterizing the nominal blower speeds required to cool a given type of blade server or other modules within the unit at a given ambient temperature. By establishing the nominal blower requirements for a system with a clean filter, a method can then be developed for detecting the condition of a fouled filter.

The primary blower management firmware attempts to maintain an environment for the blade servers that keeps the microprocessor temperatures below their specified limits. As the temperature readings for a blade server microprocessor approach their limit, the BladeCenter T management module firmware increases blower speeds to increase the amount of airflow through the blade server to help lower the microprocessor temperature. The blower subsystem performance establishes a nominal blower speed for a given ambient temperature for the installed blade server types. The blower management process increases blower speed to maintain the correct microprocessor temperatures regardless of ambient conditions.

Filter monitoring firmware compares the nominal blower speed required at the existing ambient temperature with the blower speeds set by the primary blower management process. If the blower speed set by the primary blower management process is unusually high when compared to the nominal established for the existing ambient temperature, it is assumed that the higher blower speed requirement is due to restricted airflow to the blowers due to a fouled filter. The filter monitoring process creates Major and, eventually, Critical alerts based on the severity of the high blower speeds that were set by the primary blower management process.

A Minor alert is set by the filter monitoring process to notify the operator that a regular filter inspection period has elapsed. This alert does not indicate that the filter needs to be replaced. See the *IBM @server BladeCenter T Management Module User's Guide* for information.

Media tray

System LEDs

The media tray provides external media I/O connections (optical drive and USB ports) for the blade servers that are installed in the BladeCenter T unit. The media tray also provides system status LEDs for the BladeCenter T unit. The media tray status LEDs, as described in "Telco alarm management" on page 18, are Critical, Major, and Minor. The other two LEDs on the media tray:

• indicate that the BladeCenter T unit is powered on (green LED)

- provide a location identifier that makes it easier to locate the BladeCenter T unit for service (blue LED).

All of the system LEDs are also on the rear of the BladeCenter T unit.

Alarm relays

The media tray also provides dry-contact relays for the Critical, Major, and Minor telco alarms. These relay contacts are typically wired to a rack alarm panel. This alarm panel is usually wired to an alarm panel for the equipment aisle, that is then wired to the central alarm panel for the facility. Through this hierarchical method of alarm wiring, a failing BladeCenter T unit can be quickly located.

The telco alarm relay interface is a DB15 connector that is on the rear of the BladeCenter T unit. The connections provide normally-open (N.O.) and normally-closed (N.C.) contacts for each alarm level, along with a differential-reset input for the Major and Minor alarms. A 10-foot (3-meter), 15-pin cable with stripped and tinned wire ends is provided with each BladeCenter T unit. The cable comes with a tag that provides alarm-connector pinout information about the color-coded wires.

When resetting the telco alarms, pay attention to the following:

1. Resetting the alarms through the telco alarm input only resets the respective relay, but does not acknowledge or clear the alarm within the management module.
2. Resetting the alarms through the management module interface using the CLEAR function will reset the alarm relay as well as the status LED and the software event.
3. Resetting the alarms through the management module interface using the ACK (acknowledge) function resets the alarm relay and the status LED, but does not clear the actual event to the system management application.

Important: Since the alarm relays are part of the media tray, removing the media tray from the BladeCenter T unit breaks all connections between the alarm relays and the telco alarm panel. If the alarm panel is wired to trip the alarm on a transition from a closed to an open connection, all alarms (Critical, Major, and Minor) will be tripped if the media tray is removed from the BladeCenter T unit.

Environmental specifications

BladeCenter T unit comes in two models, the Type 8730 that supports ac power inputs and the Type 8720 that supports dc power inputs. Either type of BladeCenter T unit can be used in an "Enterprise" environment with a maximum ambient temperature of 35°C (95°F), but only the Type 8720 BladeCenter T unit is qualified for a NEBS environment with a maximum ambient temperature range of 5 to 40°C (41 to 104°F), with short-term excursions from -5 to 55°C (23 to 131°F), according to Telcordia GR-63-CORE.

Only certain blade servers and I/O modules have been qualified for use in the NEBS environment. Check the compatibility list on the IBM product Web site at http://www.ibm.com/servers/eserver/bladecenter before attempting to operate any blade server or I/O module in a NEBS environment.

Chapter 3. Additional hints and tips

This chapter contains some installation and troubleshooting hints and tips related to the @server BladeCenter T products. This information is intended to supplement the existing IBM @server BladeCenter T documentation (listed on page 1).

BladeCenter T unit

Blade bays must all be occupied at all times

To help ensure proper cooling, performance, and system reliability, make sure that each of the blade bays on the front of the BladeCenter T unit has a blade server, expansion unit, or filler blade installed.

Important: When replacing a blade server or installing an expansion unit, do not operate the BladeCenter T unit for more than 20 minutes without either a blade server, an expansion unit, or a filler blade installed in each blade bay.

CD-RW/DVD drive and keyboard are seen as Universal Serial Bus (USB) devices

The CD-RW/DVD drive and keyboard in the BladeCenter T unit are viewed as USB devices by the blade server operating system.

Connecting to the default management module IP address on a new BladeCenter T unit

Description: A newly-installed (out-of-the-box) BladeCenter T unit tries to locate a DHCP server on the management network before it will default to the factory-configured static IP address in the management module. This is the initial configuration setting. When there is no DHCP server on the network the BladeCenter T unit is connected to, it takes two minutes before the management module uses the default (static) IP address.

Solution: When the DHCP search times out and the management module uses the static IP address, you can change the management module configuration so that it will not attempt to locate a DHCP server (**MM Control → Network Interfaces → External Network Interface → DHCP**, select **Static only**).

See "Assigning the IP address to the management module" on page 35 for the default IP address of the management module and "Identifying the IP address assigned to the management module" on page 36 for how to identify the actual management module IP address. See the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* for information on connecting to and configuring the BladeCenter T management module.

BladeCenter T blade server

Blade server configuration tied to blade bay

Some blade server configuration information and update options are established according to bay number. Reinstalling a blade server into a different bay than the one from which it was removed could have unintended consequences and you might need to reconfigure the blade server.

See the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* and the *Installation and User's Guide* for your blade server for more information.

Blade servers turn off for no apparent reason

Description: Blade servers turn off for no apparent reason.

Solution: Ensure that all blade bays have a blade server, expansion unit, or filler blade in them. Blade bays that do not have these items installed, or have them installed improperly, disturb airflow in the BladeCenter T unit with an adverse effect on BladeCenter T unit cooling. If the BladeCenter T unit begins to overheat, blade server processors will begin to slow down and will eventually turn off the system.

Do not change ownership of the shared CD-RW/DVD drive while they are in use

Do not switch control of the shared CD-RW/DVD drive to another blade server until the activity light on the CD-RW/DVD drive is off, indicating that no read or write operations are in progress.

Ethernet controllers in blade servers

The Ethernet controllers are integrated on each blade server system board. The Ethernet controllers provide 1-Gbps full-duplex capability only, which enables simultaneous transmission and reception of data to the external ports on the Ethernet switches. You do not need to set any jumpers or configure the controllers for the blade server operating system. However, you must install a device driver in the blade server to enable the blade server operating system to address the Ethernet controllers. See the IBM Support Website (http://www.ibm.com/pc/support/) for the latest Ethernet controller device drivers, firmware, and configuration information for your blade server.

Improper blade server shutdown disables Wake on LAN

Description: Improper shutdown of a blade server will not allow that blade server to be restarted using Wake on LAN®.

Workaround: Complete the following steps to reset the blade server power state and re-enable its previously programmed Wake on LAN capability:
1. Turn off the blade server.
2. Unlatch and slide the blade server partially out of the BladeCenter T unit.
3. Reinstall the blade server.

Time delay when switching control of shared BladeCenter T resources

It can take approximately 20 seconds for the operating system in the switched-to blade server to recognize the CD-RW/DVD drive and USB port, or the keyboard, video, and mouse.

Notes:

1. The system-error LED might light, and a KVM allocation error might be logged, if the change in ownership for the CD-RW/DVD drive and USB port, or the keyboard, video, and mouse takes more than 8 seconds. The system-error LED will go off after the ownership change is complete.

2. It can take up to 48 seconds after a blade server is initially turned on before you can attempt to switch KVM control to that blade server.

See the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* and the *Installation and User's Guide* for your blade server for more information.

Turn off blade servers before removal

Before you remove a hot-swap blade server from the BladeCenter T unit, you must shut down the operating system and turn off the blade server. You do not have to shut down the BladeCenter T unit itself.

See the *Installation and User's Guide* for your blade server type for more information.

Wake on LAN enabled by default

The Wake on LAN (WOL) feature is enabled permanently in the blade server BIOS code. The WOL enabled/disabled setting for each blade server slot is stored in the management module NVRAM. The default setting for each blade server slot is enabled. To disable WOL for one or more blade servers, use the management module Web interface.

Blowers

Blowers operate at full speed

Description: Blower modules operate at full speed with no regulation.

Workaround: Blower modules run at full speed to compensate for a failed blower. Check for the following conditions:

- Make sure that all blower modules are functioning (none have failed).
- Swap blowers in pairs (top to bottom or side to side) to determine if a blower has failed or if a blower bay has failed. If a working blower is installed in a blower bay and fails to start, the problem is within the BladeCenter T unit or with the active management module.
- If a blower bay appears to have a problem and you have redundant management modules installed, remove the active management module to cause failover to the redundant management module. Wait at least 2 minutes for the redundant management module to assume full control of the blower speeds; then, recheck the blower status. If management-module failover returns the blower speeds to normal, the management module that was removed is defective. Call for service.

- If relocating a blower to a known good blower bay fails to start the blower, the blower module has failed and needs to be replaced as soon as possible. Call for service.

Important: To maintain correct airflow, leave a failed blower in the BladeCenter T unit until it can be replaced. The blower, even if defective, blocks air from being pulled into the BladeCenter T unit from the open blower bay, which would cause improper cooling of other components in the BladeCenter T unit.

Drives

CD-RW/DVD drive

Related topics
- The hints and tips in "Media tray" on page 38
- "Linux does not install from the BladeCenter T CD-RW/DVD drive, or will not start afterward" on page 42

CD-RW/DVD drive is seen as /dev/sr0 by SUSE

Description: If the SUSE Linux operating system is installed remotely onto a blade server that is not the current owner of the media tray (CD-RW/DVD drive and USB port), SUSE sees the CD-RW/DVD drive as /dev/sr0 instead of /dev/cdrom.

Workaround: Establish a link between /dev/sr0 and /dev/cdrom as follows:

1. Enter the following command:

    `rm /dev/cdrom; ln -s /dev/sr0 /dev/cdrom`

2. Insert the following line in the /etc/fstab file:

    `/dev/cdrom  /media/cdrom  auto  ro,noauto,user,exec  0 0`

CD-RW/DVD drive is not recognized after being switched back to blade server running Windows 2000 Advanced Server with SP3 applied

Description: When the CD-RW/DVD drive owned by blade server *x* is switched to another blade server, then is switched back to blade server *x*, the operating system in blade server *x* no longer recognizes the CD-RW/DVD drive. This happens when you have not safely stopped the drives before switching ownership of the CD-RW/DVD drive and USB port (media tray).

Note: Because the BladeCenter T unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device.

Solution: Before switching ownership of the CD-RW/DVD drive (media tray) to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows:

1. Double-click the **Unplug or Eject Hardware** icon in the Windows taskbar at the bottom right of the screen.
2. Select **USB Mass Storage Device** and click **Stop**.
3. If an external USB device such as an external diskette drive is connected to the USB port on the media tray, select it and click **Stop**.
4. Click **Close**.

You can now safely switch ownership of the media tray to another blade server.

External USB diskette drive

> **Related topics**
> - The hints and tips in "Media tray" on page 38

Diskette drive is seen as /dev/sd*x* by Red Hat Linux 7.3 and SUSE version 8.0

Description: Both Red Hat Linux and SUSE Linux see the external USB diskette drive as /dev/sd*x* (where *x* is the last SCSI device in the line) instead of /dev/fd0. When you try to mount the drive as fd0, the Linux operating system does not recognize the device ("not a valid block device").

Workaround: There are two options:

- **For SUSE Linux version 8.0**

  Modify the /etc/fstab file to include the following line:

  ```
  /dev/sdx  /media/floppy  auto  noauto,user,sync  0 0
  ```

  where *x* is the letter that was assigned to the diskette drive.

- **For Red Hat Linux 7.3**

  1. Modify the /etc/fstab file to include the following line:

     ```
     /dev/sdx   /mnt/floppy   auto  noauto,user 0 0
     ```

     where *x* is the letter that was assigned to the diskette drive.

  2. Create a directory for the diskette drive under /mnt by running:

     ```
     mkdir /mnt/floppy
     ```

  3. Mount the diskette drive by typing:

     ```
     mount /mnt/floppy
     ```

Note: When running Linux, you must unmount the diskette drive before changing ownership of the media tray. See ""Media not found″ error message and other file system errors occur on a blade server running Linux or DOS" on page 38 for additional information.

Hard disk drives (IDE and SCSI)

Hot-swap drive bay fillers

To ensure proper cooling and system reliability, make sure that each of the SCSI hard disk drive bays on the SCSI storage expansion unit contains either a hot-swap SCSI hard disk drive or a filler panel.

Second IDE drive cannot be used when installing an I/O expansion option

Do not install a drive into IDE connector 2 on the blade server if you intend to also install an I/O expansion option. The I/O expansion option occupies the same area as the second IDE drive.

See the *IBM @server BladeCenter HS20 IDE Hard Disk Drive* option documentation, the *IBM @server BladeCenter HS20 I/O Expansion Module* option documentation, the *IBM @server BladeCenter HS20 Type 8832 Installation and User's Guide*, and the *IBM @server BladeCenter HS40 Type 8839 Installation and User's Guide* for more information.

RAID with IDE drives

Two IDE drives can be used to implement and manage RAID level-1 under both the Linux and Microsoft Windows 2000 operating systems. Details of the implementation for Microsoft Windows 2000 can be found at http://support.microsoft.com/default.aspx?scid=kb;EN-US;q302969 on the World Wide Web.

Important: To avoid potential performance and reliability problems when configuring or replacing drives in a mirrored configuration, ensure that the storage capacities and speeds of the drives are identical.

See the *Installation and User's Guide* for your blade server for more information.

RAID with SCSI drives

The SCSI controller in the SCSI storage expansion unit supports RAID level-1 (embedded mirroring).

Important: To avoid potential performance and reliability problems when configuring or replacing drives in a mirrored configuration, ensure that the storage capacities and speeds of the drives are identical.

See the *IBM @server BladeCenter SCSI Storage Expansion Unit* option documentation for more information.

Ethernet

Controllers

Operating systems number Ethernet controllers differently

Description: Enumeration of the Ethernet controllers in a blade server is operating-system dependent. For example, the Ethernet controller located nearer the top of the blade server, whose communications are routed through Ethernet switch module 1, is designated as the first connection (or Local Area Connection) by Microsoft Windows 2000, but is designated as the second connection (or eth1) by Red Hat Linux Version 7.3. The Ethernet controller located nearer the bottom of the blade server, whose communications are routed through Ethernet switch module 2, is designated as the second connection (or Local Area Connection 2) by Microsoft Windows 2000 but is designated as the first connection (or eth0) by Red Hat Linux Version 7.3. In the blade server Configuration/Setup Utility program, the Ethernet port designated as Planar Ethernet 1 is routed to Ethernet switch module 2 and the Ethernet port designated as Planar Ethernet 2 is routed to Ethernet switch module 1.

Solution: You can verify the designations through your operating system settings or by completing the following steps:

1. Install only one switch module, in switch bay 1.
2. Enable only one of the Ethernet controllers on the blade server. Make note of the designation the blade server operating system has for the controller.
3. Ping an external computer on the network connected to the switch module.

If you can ping the external computer, the Ethernet controller you enabled is the upper controller in the blade server and is associated with Ethernet switch 1.

Fibre channel switch module and I/O expansion card

Inter-Switch Link (ISL) support

The fibre channel switch module will support ISL links to other fibre channel switches.

See the *IBM @server BladeCenter 2-Port Fibre Channel Switch Module Management User's Guide* for more information.

Firmware updates

IBM will periodically make firmware updates available for the BladeCenter T management module, Ethernet switch module, fibre channel switch module, and blade servers. Use the following table to determine the methods you can use to install these firmware updates.

Note: Update*X*press packages are available from http://www.ibm.com/pc/support/ that provide support for blade server BIOS and ISMP firmware.

Important: To avoid problems and to maintain proper system performance, always ensure that the:
- Blade server BIOS, ISMP, and diagnostic firmware levels are consistent for all blade servers within the same BladeCenter T unit.
- Ethernet switch module firmware level is consistent for all Ethernet switch modules within the same BladeCenter T unit.
- Fibre channel switch module firmware level is consistent for all fibre channel switch modules within the same BladeCenter T unit.

Firmware	Update diskette	RDM	Management module Web interface	Switch module Web interface	Switch module Telnet interface
BladeCenter T Ethernet switch module	No	No	No	Yes [2]	Yes
BladeCenter T 2-port fibre channel switch module	No	No	Yes	No	Yes
BladeCenter T management module	No	No	Yes	No	No
Blade server BIOS code	Yes	Yes	No	No	No
Blade server diagnostic code	Yes	Yes [1]	No	No	No
Blade server ISMP code	Yes	Yes	Yes	Yes	No
1. User must set up a Custom Task.					
2. Requires an external TFTP server.					

Flash drive considerations

What is a flash drive?

Flash drives are non-volatile flash memory storage that is packaged as a drop-in replacement for standard magnetic hard disk drives, with some usage restrictions. Connection between a flash drive and the blade server uses a standard IDE interface. No additional BIOS or operating system drivers are required to support

reading or writing data to a flash drive. Flash drives are currently available in 1 GB, 2 GB, and 4 GB capacities that follow the standard 2.5-inch IDE hard disk drive mechanical form factor.

Flash drives perform well in extreme environmental environments where heat, contaminants, and vibration can be a concern for magnetic hard disk drives.

Flash drive usage limitations

Flash drives do not have any restrictions on the number of read cycles from any specific memory location. As a result, flash drives are ideal for situations where applications and data need to be read from a non-volatile source. Examples of such applications include the operating system and application binary images that are required at system start up and any file system or data structures that are read repeatedly.

Flash drives have restrictions on the number of write cycles to a specific memory location. Typically, a flash memory module can support 100,000 write cycles to each specific location. Flash drives extend this capability to over 1 million write cycles by using several techniques that include write leveling within the drive and bit error correction across blocks. Due to this write cycle limitation, flash drives should not be used for write intensive applications such as operating system paging, file system journaling, or application journaling.

To use flash drives effectively in spite of their write limitations, several measures can be taken. These measures include:

- Eliminating operating-system paging to disk during standard operating-system operation. Paging to disk can be reduced or eliminated by making sure that there is sufficient memory installed in the blade server to contain the operating system and applications that you intend to run.
- Eliminating the need to write journal or user data to the flash drives. This data should be redirected to other types of nonvolatile storage, including IDE drives installed on the blade server (if supported), a BladeCenter T storage expansion unit that contains magnetic hard disk drives, or fibre channel or iSCSI external storage expansion options that contain magnetic hard disk drives outside of the BladeCenter T unit.

Installing flash drives in a blade server

Flash drives can be installed in place of the 2.5-inch magnetic IDE hard disk drives that are used on blade servers. The configuration restrictions that apply to IDE magnetic hard disk drives also apply to the flash drives.

Flash drives are marginally wider than magnetic IDE hard disk drives. The plastic drive trays that are installed on the blade server to retain the magnetic hard disk drives make installation and removal of a flash drive slightly difficult. The flash drives are shipped with an updated drive tray that is designed to accommodate either the flash drive or the magnetic hard disk drive, eliminating the problem for new drive installations. Replace the old drive tray with the new drive tray when installing a flash drive in a blade server where a magnetic IDE hard disk drive was previously installed.

Only one flash drive can be installed when using an I/O Expansion Option

When an I/O expansion card option is installed in a blade server to add additional connectivity, only one flash drive can be installed. The I/O expansion card is

installed in the first IDE drive bay on a blade server. The I/O Expansion Option occupies the second IDE drive bay where the second flash drive would be installed.

RAID with flash drives

Since flash drives are a transparent drop-in replacement for IDE magnetic drives, a RAID 1 array across two flash drives (when an I/O expansion card is not installed) can be implemented.

Given the write limitations of flash drives, the main benefit of RAID 1 across two flash drives is to enhance the availability and reliability of the binary images that the flash drives contain. As with RAID for IDE drives, the size of the drives should be identical for best performance. Configuring a RAID array for flash drives and magnetic hard disk drives follows the same process. See the documentation for your blade server type for information about configuring IDE RAID arrays.

I/O expansion card option

I/O expansion card option and switch modules must be for same interface

When you add an I/O expansion card option to a blade server, you must make sure that the switch modules in switch module bays 3 and 4 on the BladeCenter T unit are the same type of interface. For example, if you add the IBM HS20 Fibre Channel Expansion Card option to the blade server, the modules in switch module bays 3 and 4 on the BladeCenter T unit must be fibre channel switches, such as the IBM BladeCenter 2-Port Fibre Channel Switch Module, and all other I/O expansion options installed on other blade servers in the BladeCenter T unit must also be fibre channel interfaces.

If the switch modules in switch module bays 3 and 4 on the BladeCenter T unit are *not* the same type of interface as the I/O expansion card option installed in a blade server, the blade server might not turn on.

See the *IBM @server BladeCenter PCI I/O Expansion Module* option documentation and the *Installation and User's Guide* for your blade server for more information.

Keyboard, video, and mouse (KVM)

Related topics
- The hints and tips for your operating system, for KVM-related issues.
- See "Linux" on page 40 for more Linux-related hints and tips.
- See "Windows" on page 45 for more Windows-related hints and tips.

Caps, Num, or Scroll Lock key state not retained when switching between blade servers running a Linux operating system

Description: The Caps Lock, Num Lock, and Scroll Lock states are not retained when switching KVM control between blade servers that are running a Linux operating system. In addition, the Num Lock, Caps Lock, and Scroll Lock LEDs might not reflect their current state. For example, when switching the KVM control from a blade server running Windows 2000 with its Caps Lock function enabled to a

blade server running Linux, the Caps Lock LED might remain lit, indicating that it is still enabled, but when you type, the letters appear in lower case.

Workaround: Press the Num Lock, Caps Lock, or Scroll Lock key once to synchronize the state of its LED and function; then, press each key as required to obtain the desired state for each of these functions.

Configure the mouse as USB

Description: Some operating systems permit you to select the type of mouse being used. If offered this choice, select USB instead of PS/2. Although the mouse is a PS/2-style device, communication with the mouse is through an internal USB bus in the BladeCenter T unit; therefore, the operating system in the blade server must recognize the mouse as a USB device.

Known configuration affected: Red Hat Linux 7.3

See the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* and the *Installation and User's Guide* for your blade server type for more information.

Key sequence to switch KVM control between blade servers

Press keyboard keys in the following sequence to switch KVM control between blade servers:

NumLock NumLock *<blade server number>* **Enter**

Where <blade server number> is the one-digit number for the blade bay in which the blade server is installed.

You will need to press the **Shift** key to switch KVM control when using the 28L3644 (37L0888) keyboard. If the above key sequence does not switch KVM control, do the following steps:

1. Press and hold the **Shift** key.
2. Press keyboard keys in the following sequence:

    NumLock NumLock *<blade server number>* **Enter**
3. Release the **Shift** key.

Keyboard and mouse take longer to switch than video

Sometimes when switching ownership of the KVM to a blade server, the video for the blade server appears almost immediately, but it takes up to 10 or 20 seconds for the mouse and keyboard to be usable.

Keyboard is very slow when using an operating system that does not have USB drivers

Although the keyboard attached to the BladeCenter T unit is a PS/2-style keyboard, communication with it is through a USB bus. When you are running an operating system that does not have USB drivers, such as in the following instances, the keyboard responds very slowly.
- Running the blade server integrated diagnostics
- Running a BIOS update diskette on a blade server
- Updating the diagnostics on a blade server
- Running the Broadcom firmware CD for a blade server

Monitor displays video for blade server 8 during management module restart

The monitor attached to the BladeCenter T management module normally shows the video output from the blade server that is the current owner of the keyboard, video, and mouse (KVM). When there is no actively selected video from any blade server, the video from blade server 8 is routed to the management module. While the management module is restarting, there is temporarily no current KVM owner. The video from blade server 8 displays on the monitor briefly until the management module uses its NVRAM values to reestablish ownership of the KVM and media tray (CD-RW/DVD drive and USB ports). After that, the video from the blade server that is the current KVM owner displays on the monitor.

Mouse function lost during Red Hat installation

Description: If, while installing Red Hat Linux 7.3 to a blade server, you or someone else selects a different blade server as owner of the keyboard, video, and monitor (KVM), you might lose mouse function for the installation process.

Solution: Do not switch KVM owners until the installation process begins to install the packages (after the 'About to Install' window).

See "Linux" on page 40 for more Linux-related hints and tips.

Possible one-time long delay when switching KVM to a blade server running Windows 2000

Description: If you install Microsoft Windows 2000 on a blade server while the blade server is not the current owner of the keyboard, video, and mouse (KVM), a delay of up to one minute occurs the first time you switch the keyboard, video, and mouse to the blade server. During this one-time-only delay, the blade server Device Manager enumerates the keyboard, video, and mouse and loads the device drivers. All subsequent switching takes place in the normal keyboard-video-mouse switching time frame.

Solution: Make sure the blade server on which you plan to install Windows 2000 is the owner of the KVM before you begin the installation.

See "Windows" on page 45 for more Windows-related hints and tips.

Supported video resolutions and refresh rates

Description: When using the remote console to access a blade server, the desktop displays properly for some operating systems but will not display properly for other operating systems. The system might also display a video error message.

Solution: 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
640x480	60 Hz
640x480	72 Hz
640x480	75 Hz
640x480	85 Hz

Resolution	Refresh rate
800x600	60 Hz
800x600	72 Hz
800x600	75 Hz
800x600	85 Hz
1024x768	60 Hz
1024x768	75 Hz

Switching KVM control between blade servers gives USB device error

Description: If a blade server is under heavy load, it can take several minutes before it enumerates the USB devices connected to it. If control of the KVM and media tray is switched away from the blade server before this enumeration is complete, a USB device installation error might be received.

Solution: Do not switch KVM control between blade servers until the mouse and keyboard are both working on the blade server that has control of the KVM and media tray.

Management module

> **Related topics**
> • "Connecting to the default management module IP address on a new BladeCenter T unit" on page 23

Accessing the management module with a laptop

Set your laptop to have an address with the same subnet as the management module; then, enter the address of the management module in your web browser.

See the *IBM @server BladeCenter T Management Module User's Guide* for more information.

Assigning the IP address to the management module

By default, the BladeCenter T unit looks for a DHCP server to assign it an IP address. If it cannot find one, it will time-out and use the factory assigned static IP address of 192.168.70.125 and subnet mask of 255.255.255.0, which are printed on the management module label.

Blank management module default internal gateway address is invalid

Description: A "blank" management module internal gateway address is invalid. If you set the default internal gateway in the management module web interface to "blank", a "Gateway Address: invalid input, is not a valid IP address " error message will appear.

Solution: Use the 0.0.0.0 address to indicate that a gateway is not required. Setting the default internal gateway management module address to 0.0.0.0 indicates that a gateway is not required and will render the management module unable to communicate beyond the local network.

Default management module user ID and password

The default user ID and password for the management module are:

- User ID = USERID
- Password = PASSW0RD (All capitals with a "0" (numeric zero) used for the "O" in PASSW0RD.)

Important: If the management module password is forgotten, it cannot be overridden and the management module will need to be replaced. This replacement is not covered under warranty.

For more information: See the *IBM @server BladeCenter T Management Module User's Guide.*

Identifying the IP address assigned to the management module

Description: There is no discovery mechanism to identify the IP address assigned by DHCP to the management module.

Solution: You need to be a DHCP administrator. If you are not one, give your DHCP administrator the management module MAC address (from the label on the module), and ask them to tell you the IP address that DHCP assigned to your management module.

IP reset button

Do not press the IP reset 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.

Note: Pressing the IP reset button does not reset the password.

See the *IBM @server BladeCenter T Management Module User's Guide* and the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* for more information.

Management module password cannot be reset if forgotten

Important: If you forget the management module password, you will not be able to access the BladeCenter T management module. The management module password cannot be overridden and the management module will need to be replaced. This replacement is not covered under warranty.

Media tray access is lost temporarily during management module restart

Description: When the BladeCenter T management module is restarted, use of the media tray (CD-RW/DVD drive and USB port) is lost temporarily. If you or a failure condition initiates a management module restart while I/O activity is taking place on the media tray, the disruption can interrupt reads to the CD-RW/DVD drive or lose data being written to the CD-RW/DVD drive or an external USB diskette drive.

Note: You can restart the management module through the Web interface to the management module or from a network management station such as the IBM Director console. Some failures on the BladeCenter T unit can result in the management module restarting automatically.

Solution: Make sure there is no I/O activity on the media tray before you restart the management module.

Refreshing Firmware Vital Product Data (VPD) information takes 3 to 4 minutes

Selecting Firmware VPD in the BladeCenter T management module takes 3 to 4 minutes to refresh and display information. Users are advised that the operation will take some time to complete and are given the option to continue or cancel. If they choose to continue, no information appears to indicate progress, other than the standard status information at the bottom of the browser window.

Some components do not report environmental information (temperature, voltage)

The green status indication for a component, shown by the management module Web interface, is not automatically a link to environmental information (temperature and voltage) for the component. Only the management module and blade servers have environmental information, and only the green status indication for those components contains a link to environmental information.

Updating the Ethernet switch module configuration through the management module does not save to the switch NVRAM

Description: When you use the management module Web interface to update the Ethernet 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 BladeCenter T unit.

Solution: Telnet 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**).

Wake on LAN is controlled through the management module, not through blade server BIOS code

The Wake on LAN feature is enabled by default in blade server BIOS code and cannot be disabled. The BladeCenter T management module provides a single point of control for the Wake on LAN feature, allowing the settings to be controlled for either the entire BladeCenter T unit or a single blade server. Wake on LAN settings made in the management module override the settings in the blade server BIOS code.

Media tray

The media tray contains the CD-RW/DVD drive and two USB ports. Some problems may arise as a result of switching ownership of the media tray to another blade server inappropriately.

> **Related topics**
> - The hints and tips in "Drives" on page 26
> - "Media tray access is lost temporarily during management module restart" on page 36
> - "CD-RW/DVD drive is not recognized after being switched back to blade server running Windows 2000 Advanced Server with SP3 applied" on page 26

"Media not found" error message and other file system errors occur on a blade server running Linux or DOS

Description: Attempting to access the mounted CD-RW/DVD drive or an external USB diskette drive after it has been switched to another blade server results in I/O errors, even if the media tray has been switched back.

Note: Because the BladeCenter T unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device.

- If a blade server tries to access the CD-RW/DVD after it has been switched to another blade server, a "Media not found" error occurs.
- If a blade server is running a DOS environment, such as when updating firmware on the blade server, the firmware can be interrupted or corrupted when the media tray is switched away; you might need to call for service on the blade server.
- If a file handle was left open by switching the media tray away, the system administrator will not be able to do a clean unmount (umount command) unless the unmount is forced by umount command parameters (see the online manual entry for the umount command for information).
- If the system administrator is sharing out the CD-RW/DVD drive for multiple users, that network share is broken.

Solution: Before switching ownership of the media tray to another blade server, ensure that the CD-RW/DVD drive or external USB device are not mounted for the current blade server owner (check for open file handles and sharing out). If a firmware update is taking place on the blade server, DO NOT switch the media tray to another blade server.

Complete the following steps to disable local switching of media tray control:

1. In the management module Web interface, click **Blade Tasks → Remote Control**.
2. Under **Redirect Server Console** put a check mark in the check box next to "Disable local media tray switching".
3. Click **Save**.

"Unsafe Removal of Device" error message appears on blade server running Microsoft Windows 2000

Description: An "Unsafe Removal of Device" error dialog might display when control of the CD-RW/DVD drive or external USB-attached device is switched to

another blade server. You also get this message if the management module restarts the blade server. To continue, click the **OK** button at the bottom of the error dialog.

Note: Because the BladeCenter T unit uses a USB bus to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as unplugging a USB device.

Solution: Before switching ownership of the media tray to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows:

1. Double-click the **Unplug or Eject Hardware** icon in the Windows taskbar at the bottom right of the screen.
2. Select **USB Floppy** and click **Stop**.
3. Select **USB Mass Storage Device** and click **Stop**.
4. If an external USB device is connected to the USB port on the media tray, select it and click **Stop**.
5. Click **Close**.

You can now safely switch ownership of the media tray to another blade server.

Microprocessors

Mismatched microprocessors

Description: After you install the second microprocessor option or after you replace a failed microprocessor in a two-way blade server, the blade server does not power up, the amber system-error and blade-error LEDs on the BladeCenter T unit LED panel are lit, and the system error log contains the following message: "CPUs Mismatched". These symptoms can occur when the microprocessor with the higher feature set and stepping level is installed in the Microprocessor 1 socket. The Microprocessor 1 socket must always contain the microprocessor with the lowest feature set and stepping level.

Networking

Related topics
- "Fibre channel switch module and I/O expansion card" on page 29

Network environments supported

The BladeCenter T unit supports Gb Ethernet switch modules for blade server communication with the network. Each switch module provides one internal connection to each blade server, up to 8 internal connections per switch module. The BladeCenter T unit also supports additional I/O modules. The I/O modules in I/O module bays 3 and 4 support the network interface on the optional I/O expansion card installed on one or more blade servers in the BladeCenter T unit.

Note: The two additional I/O modules must have the same I/O type, such as fibre channel, and must match the network interface on the optional I/O expansion cards in the blade servers.

Each of the additional I/O modules provides one internal connection to the optional I/O expansion card, up to 8 internal connections per switch module.

See the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide*, the *IBM @server BladeCenter 4-Port Gb Ethernet Switch Module Installation and User's Guide*, the *IBM @server BladeCenter 2-Port Fibre Channel Switch Module Management User's Guide*, and the *IBM @server BladeCenter T 4-Port Gb Ethernet Switch Module User's Guide* for more information.

Operating systems

Instructions for installing an operating system on a blade server can be found at http://www.ibm.com/pc/support/ on the World Wide Web. Operating systems and versions that are officially supported for the blade servers are listed on the ServerProven website at http://www.ibm.com/pc/us/compat/ on the World Wide Web.

Linux

Related topics

- "CD-RW/DVD drive is seen as /dev/sr0 by SUSE" on page 26
- "Diskette drive is seen as /dev/sd*x* by Red Hat Linux 7.3 and SUSE version 8.0" on page 27
- "Mouse function lost during Red Hat installation" on page 34
- ""Media not found" error message and other file system errors occur on a blade server running Linux or DOS" on page 38

Blade server does not turn off during Red Hat Linux 7.3 shutdown

Description: Issuing any of the Linux shutdown commands shuts down the operating system, but does not turn off the blade server. The blade server shuts down to the point where a message is displayed on the management module saying that the blade server is off, but the blade server power-on LED remains lit.

Known configuration affected: Red Hat Linux 7.3

Workaround:

Complete the instructions provided for Red Hat Linux in "Enabling Wake on LAN for Red Hat Linux 7.3 and SUSE Linux 8.0" on page 41 to enable Wake On LAN for both onboard Broadcom integrated Ethernet controllers. This will allow the blade server to restart using Wake on LAN even if the Linux shutdown is incomplete and the blade server does not turn off.

Forcing a blade server to turn off

To turn off a blade server after an incomplete Linux shutdown, manually press the power-control button on the front of the blade server (behind the control panel door) to turn off the blade server. Turning off the blade server in this way is considered an improper shutdown by the Wake on LAN feature, which will not allow the Wake on LAN feature to restart the blade server. Unlatch and slide the blade server partially out of the BladeCenter T unit; then, reinstall it to reset the blade server power state and re-enable its previously programmed Wake on LAN capability.

Blade server does not turn off during SUSE Linux 8.0 shutdown

Description: Issuing any of the Linux shutdown commands shuts down the operating system, but does not turn off the blade server. The blade server shuts down to the point where a message is displayed on the management module saying that the blade server is off, but the blade server power-on LED remains lit.

Known configuration affected: SUSE Linux 8.0

Solution:

A blade server running SUSE Linux 8.0 will not turn off during shutdown if ACPI is not enabled. Complete the following steps to enable ACPI:

1. Type the following command: `modprobe ospm_system`
2. Type the following command to save this setting upon subsequent reboots: `echo "/sbin/modprobe ospm_system" >> /etc/init.d/boot.local`

Enabling Wake on LAN for Red Hat Linux 7.3 and SUSE Linux 8.0

Complete the following steps to enable Wake On LAN for both onboard Broadcom integrated Ethernet controllers. This will allow the blade server to restart using Wake on LAN even if the Linux shutdown is incomplete and the blade server does not turn off.

- For SUSE Linux:
    1. Type the following command to enable ACPI: `modprobe ospm_system`
    2. Type the following command to save this setting upon subsequent reboots: `echo "/sbin/modprobe ospm_system" >> /etc/init.d/boot.local`
    3. Enable Wake on LAN:
        - Enter the following command to immediately enable Wake on LAN on the blade server in a running system:

          `insmod bcm5700.o enable_wol=1,1`
        - Edit the /etc/modules.conf file and add the following lines to enable Wake on LAN automatically every time the blade server starts:

          ```
          alias eth0 bcm5700
          alias eth1 bcm5700
          options eth0 enable_wol=1
          options eth1 enable_wol=1
          ```
- For Red Hat Linux:
    - Enter the following command to immediately enable Wake on LAN on the blade server in a running system:

      `insmod bcm5700.o enable_wol=1,1`

– Edit the /etc/modules.conf file and add the following lines to enable Wake on LAN automatically every time the blade server starts:

```
alias eth0 bcm5700
alias eth1 bcm5700
options eth0 enable_wol=1
options eth1 enable_wol=1
```

Recompile the driver for your Linux image. See the documentation that comes with your operating system for information about compiling drivers.

To compile the Broadcom drivers successfully in Red Hat Linux or SUSE Linux, a default installation is not sufficient because all files needed to compile successfully are not included. A custom installation of RedHat Linux or SUSE Linux, in which the packages for software and kernel development are chosen, will include the files required for successful compilation of the drivers.

IBM Director console does not show WOL for blade server running Red Hat Linux 7.3

Description: After you install the IBM Director agent on a blade server running Red Hat 7.3 and start the IBM Director service, Blade with Agent does appear on the IBM Director console, but the Wake on LAN (WOL) feature does not appear.

Solution: Enable WOL in the IBM Director Agent on the blade server and in the Ethernet controllers on the blade server.

Complete the following steps to enable Wake on LAN:

1. Stop IBM Director Agent. To do this, type the following command and press Enter:

   `/opt/IBM/director/bin/twgstop`

2. Open an ASCII text editor and edit the ServiceNodeLocal.properties file. This file is located in /opt/IBM/director/data.

3. Modify the value of ipc.wakeonlan to read as follows:

   `ipc.wakeonlan=1`

4. Save and close the ServiceNodeLocal.properties file.

5. Start IBM Director Agent. Type the following command and press Enter:

   `/opt/IBM/director/bin/twgstart`

To enable Wake on LAN in the Ethernet controllers:

- Enter the following command to immediately enable Wake on LAN on the blade server in a running system:

  `insmod bcm5700.o enable_wol=1,1`

- Edit the /etc/modules.conf file and add the following lines to enable Wake on LAN automatically every time the blade server starts:

  ```
  alias eth0 bcm5700
  alias eth1 bcm5700
  options eth0 enable_wol=1
  options eth1 enable_wol=1
  ```

Linux does not install from the BladeCenter T CD-RW/DVD drive, or will not start afterward

Description: Neither Red Hat Linux 7.3 nor SUSE Linux version 8.0 will install locally, although Red Hat Linux might appear to install.

- If you try to install Red Hat Linux to the blade server IDE drive, Linux does not install.

- If you try to install Red Hat Linux to the SCSI drive on a blade server expansion unit, Linux appears to install but the operating system will not start properly.
- If you try to install SUSE Linux, Linux does not install.

Workaround: Download the latest operating system installation instructions for your operating system from the IBM Support Web page at http://www.ibm.com/pc/support/. The necessary workaround is described in the instructions for your operating system.

Linux installation instructions
Download the latest instructions for installing a Linux operating system on a blade server from the IBM Support Web page at: http://www.ibm.com/pc/support/ on the World Wide Web. Each set of instructions specifies everything you need to perform the installation.

Mouse is not detected during SUSE installation
Description: The installation of the SUSE Linux version 8.0 operating system does not detect the mouse.

Solution: You need to select the mouse manually. Download the latest operating system installation instructions for your operating system from the IBM Support Web page at http://www.ibm.com/pc/support/. The steps for selecting the mouse are described in the instructions for your operating system.

Mouse offset problems occur when using remote console and running an X Window
Description: When you are using the remote console on a blade server that is running an X Window in Red Hat Linux 7.3 or SUSE Linux version 8.0, you see two cursor arrows on the screen, widely spaced, one white and one black.

Solution: Configure Linux and the X Window for accurate mouse tracking. See the online help information in the management module configuration and management software for instructions (**Blade Tasks → Remote Control**, click the circled question mark next to **Redirect Server Console**, read the section titled **Notes on mouse support under Linux**).

Red Hat 7.3 hangs in GNOME
Description: Red Hat Linux 7.3 running on a blade server hangs when running the GNOME X Window and you switch ownership of the media tray to the blade server. The hang generally occurs within 30 minutes of switching ownership to the blade server.

Solution: Remove the magicdev package. To do this, enter the command: `rpm -e magicdev`; then, restart the blade server.

Remote console does not work with default SUSE Linux, version 8.0, display settings
Description: The remote console requires a display setting of 1024x768@60Hz in the blade server operating system. The default resolution in SUSE is 1024x768, but the default refresh rate falls somewhere between 50Hz and 60Hz. The remote console does not work for a blade server running SUSE with a display refresh rate other than exactly 60Hz. The message "eServer/No video available" displays.

Other operating systems do not exhibit the problem.

Workaround: Set the refresh rate in the XF86Config file to exactly 60Hz.

There are two methods.

- **Method 1 (unattended network install, prevent the problem):** Modify the AutoYaST control file to specify 1024x768@60Hz.

    1. Run the graphical interface to the AutoYaST control file to set the VESA video mode to 1040x768@60Hz. The graphical interface creates the AutoYaST control file.

    2. Edit the resulting AutoYaST control file to set the value for min_vsync to 60.

    During an unattended network install, the YaST program uses the AutoYaST control file to modify the XF86Config file (/etc/X11/XF86Config); these changes will cause XF86Config to set the display resolution to 1040x768 with a refresh rate of 60Hz.

    -- OR --

- **Method 2 (situation has already occurred):** Modify the xF86Config file.

    1. In the Monitor section of the /etc/X11/XF86Config file, change the value of VertRefresh to 60, as shown in these sample lines.

    ```
    Section "Monitor"
      Option      "CalcAlgorithm" "IteratePrecisely"
          HorizSync   31-48
      Identifier  "Monitor[0]"
          ModelName   "AutoDetected"
      Option      "DPMS"
      VendorName  "AutoDetected"
          VertRefresh  60
          UseModes     "Modes[0]"
        EndSection
    ```

    2. Shut down the X Window; then, restart it.

Unhandled exception error during Red Hat Linux 7.3 installation

Description: An unhandled exception error is received while installing Red Hat Linux 7.3 from the second operating system installation CD and the installation terminates.

Known configuration affected: Red Hat Linux 7.3

Solution:

Restart the installation and perform the following steps:

1. At the Package Group Selection window, select **Select individual packages**.
2. At the Individual Package Selection window, select **Applications** and then select **Internet**; then, deselect all the Mozilla packages that are listed.
3. After you finish installing the Red Hat Linux operating system, install the latest Mozilla packages listed at https://rhn.redhat.com/errata/rh73-errata.html on the World Wide Web.

X Window does not start in Red Hat 7.3 when the blade server does not own the KVM

Description: For Red Hat Linux 7.3 with kernel prior to 2.4.18-17.7.x, the X Window does not start in a blade server if the blade server is not the current owner of the keyboard, video, and mouse (KVM). Because the blade server does not own the KVM, the X Window cannot find the mouse.

Solution: Do one of the following:

- Install the 2.4.18-17.7.x or later kernel errata, available from https://rhn.redhat.com/errata/rh73-errata.html.

  -- OR --

- Add the following line to the /etc/modules.conf file.

      alias char-major-13 mousedev

Windows

> **Related topics**
> - "CD-RW/DVD drive is not recognized after being switched back to blade server running Windows 2000 Advanced Server with SP3 applied" on page 26

Installing Windows 2000 using the BladeCenter T CD-RW/DVD drive requires an integrated CD with SP3 applied

Description: When the Microsoft Windows 2000 Install CD is inserted in the CD-RW/DVD drive on the BladeCenter T unit, the blade server that owns the CD-RW/DVD drive begins to start from the CD-RW/DVD, but then ceases to respond. Windows 2000 is not installed onto the blade server.

Solution: You need to use an integrated Windows 2000 Install CD with Service Pack 3 applied. Download the latest operating system installation instructions for Windows 2000 from the IBM Support Web page at http://www.ibm.com/pc/support/. The steps for obtaining and using an integrated CD are described in the instructions.

Ethernet disconnect notice will not appear when running Windows 2000

Description: If an Ethernet cable is accidentally removed from the back of the BladeCenter T unit, the small red X (disconnect notice) that normally would appear to indicate that the cable was disconnected will not appear in the bottom right of the screen. The disconnect notice does not appear because the blade server Ethernet controller connects to the Ethernet switch module through integrated circuitry inside the BladeCenter T unit.

Solution: When troubleshooting Ethernet-related problems, ensure that the Ethernet cables on the back of the BladeCenter T unit are connected properly.

PCI I/O Expansion Unit

Does the PCI I/O Expansion Unit option support Wake on LAN?

The IBM @server Peripheral Card Interface (PCI) Input/Output (I/O) Expansion Unit option does not support Wake on LAN (WOL).

The PCI I/O Expansion Unit is architected as a PCI bridge off the host blade server. It receives power from Power Domain 2 of the host blade server and there is no way for packets from a PCI adapter to get to the blade management controller if the blade server is turned off.

Remote console

Related topics

- "Remote console does not work with default SUSE Linux, version 8.0, display settings" on page 43
- "Mouse offset problems occur when using remote console and running an X Window" on page 43

Supported options

List of supported options

For a list of supported options for the BladeCenter T unit and blade servers, go to http://www.ibm.com/pc/us/compat/ on the World Wide Web.

Switch module

Related topics

See "Fibre channel switch module and I/O expansion card" on page 29,.

Troubleshooting

Light Path Diagnostics feature

On the BladeCenter T unit, the Light Path Diagnostics feature consists of the LEDs on the front and rear of the BladeCenter T unit and on the front of the modules and blade servers.

See the *IBM @server BladeCenter T Types 8720 and 8730 Installation and User's Guide* and the *IBM @server BladeCenter T Types 8720 and 8730 Hardware Maintenance Manual and Troubleshooting Guide* for more information.

Support telephone numbers

View support telephone numbers at http://www.ibm.com/planetwide/ on the World Wide Web.

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 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/.

You can find service information for your IBM products, including supported options, at http://www.ibm.com/pc/support/.

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.

Appendix B. Notices

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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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