

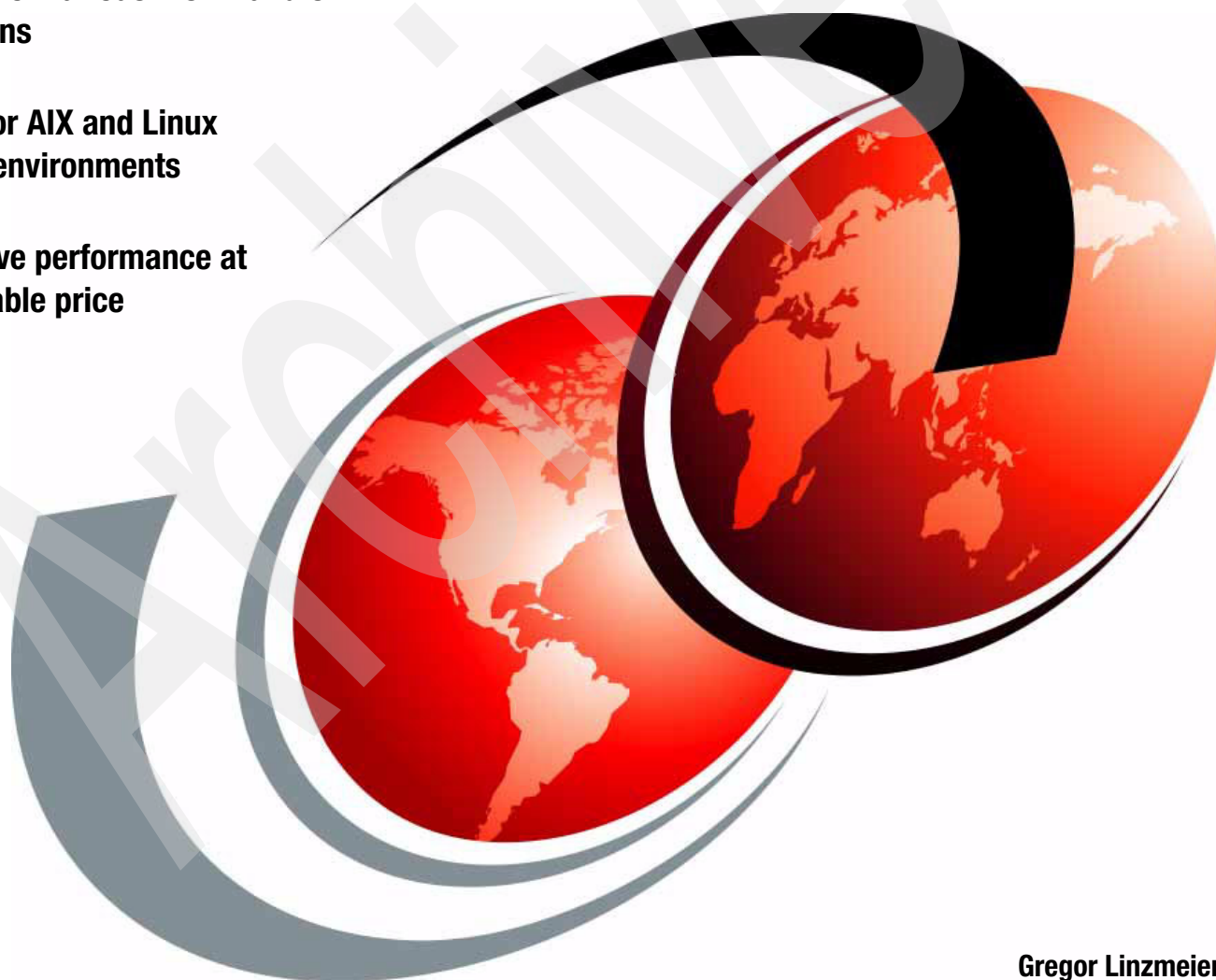
IBM IntelliStation POWER 185

Technical Overview and Introduction

Designed for various MCAD and CAE applications

Enabled for AIX and Linux software environments

Competitive performance at an affordable price



Gregor Linzmeier



International Technical Support Organization

IBM IntelliStation POWER 185 Technical Overview and Introduction

April 2006

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

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First Edition (April 2006)

This edition applies to IBM IntelliStation POWER 185 (7047-185) and IBM AIX 5L Version 5.3, product number 5765-G03.

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Preface

This document is a comprehensive guide that covers the IBM® IntelliStation® POWER™ 185. It introduces major hardware offerings and discusses their prominent functions.

Professionals wishing to acquire a better understanding of IBM IntelliStation POWER 185 product should read this document. The intended audience includes:

- ▶ Clients
- ▶ Sales and marketing professionals
- ▶ Technical support professionals
- ▶ IBM Business Partners
- ▶ Independent software vendors

This document expands the current set of IBM System p™ documentation by providing a desktop reference that offers a detailed technical description of the IBM IntelliStation POWER 185 workstation.

This publication does not replace the latest IBM System p marketing materials and tools. It is intended as an additional source of information that you can use, together with existing sources, to enhance your knowledge of IBM server and workstation solutions.

The team that wrote this Redpaper

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General description

The IBM IntelliStation POWER 185 workstation (7047-185) is designed for CATIA V4 and V5 clients who have outgrown their current workstation. The POWER 185 is a UNIX® workstation that can help improve design engineer productivity at a very affordable price. It is also an excellent choice for software development or support environments and can be used with other MCAD and CAE applications that require advanced 3D graphics.

The POWER 185 workstation comes in a desktide package and is available with either a 1-core or 2-core PowerPC® 970 processor configuration running at 2.5 GHz with 1 MB of L2 cache per processor.

The POWER 185 workstation has a base memory of 512 MB, expandable to 8 GB. The system contains three internal 3.5-inch disk drive bays and two 5.25-inch media bays. The media bays can be configured to contain a DVD-ROM, DVD-RAM, or tape drive.

In addition, the IBM IntelliStation POWER 185 can be installed with a Linux® distribution from Red Hat or Novell SuSE. Targeting ISV application development on AIX 5L™ or Linux environments, the IntelliStation 185 is a flexible and easy to manage system using the processor technology currently used in IBM Blade systems.

IBM Director for pSeries V5.10, a new release of systems management solution from IBM, will be available to IBM System p clients at no additional charge. While maximizing system availability, IBM Director is designed to reduce the cost and complexity of management by providing comprehensive yet easy-to-use administration of the entire environment from a single point of control.

1.1 System specification

Table 1-1 provides the IntelliStation POWER 185 general system specifications.

Table 1-1 IntelliStation POWER 185 specifications

Description	Range
Operating temperature	5 to 35 degrees Celsius (41 to 95 Fahrenheit)
Relative humidity	8% to 80%
Operating voltage	100 to 127 or 200 to 240 V ac (auto-ranging)
Operating frequency	50/60 Hz
Maximum power consumption	450 watts
Maximum thermal output	1.536 BTU/hour ^a
Sound rating	4.7 bels ^b idle, 5.0 bels operating (1-core) 4.9 bels idle, 5.1 bels operating (2-core)

a. British Thermal Unit (BTU)

b. A unit of measurement of the loudness or strength of a signal, named after Alexander Graham Bell.

1.2 Physical packaging

Table 1-2 provides the major physical attributes found on the IntelliStation POWER 185 system. The IntelliStation POWER 185 workstation is available as a deskside version only.

Table 1-2 Physical packaging of IntelliStation POWER 185

Dimension	Range
Height	469 mm (18.5 in.)
Width	216 mm (8.5 in.) 257 mm (10.1 in.) with tip stability feet
Depth without rear cover	491 mm (19.3 in.)
Depth with rear cover	640 mm (25.2 in.)
Weight	
Maximum configuration	25.0 kg (55.0 lb.)

Installed with the noise reduction rear cover, the IntelliStation 185 passes the industry standard quiet office (General Business 2D) requirements.

1.3 IntelliStation POWER 185 workstation

Figure 1-1 shows a view of the IntelliStation POWER 185 workstation with the reduced noise front cover installed.



Figure 1-1 Front three-quarters view of IntelliStation POWER 185

1.4 Minimum and optional features

The IntelliStation POWER 185 system is based on the IBM PowerPC 970 processor technology which is soldered directly to the system planar. The minimum IntelliStation POWER 185 configuration must include a processor, a processor entitlement, memory, hard disk, power supply, a power cord, and a 2D graphics accelerator.

The major features of the IntelliStation POWER 185 are:

- ▶ 1-core or 2-core 2.5 GHz PPC 970 processor with 1 MB L2 cache
- ▶ From 512 MB to 8 GB of total system memory capacity using DDR1 DIMM technology
- ▶ Three Ultra320 SCSI disk drives in a minimum configuration for a total internal storage capacity of 900 GB using 300 GB disk drives
- ▶ Five PCI slots (one short and four long):
 - Two 133 MHz 64-bit PCI-X slots
 - Two 100 MHz 64-bit PCI-X slots
 - One 33 MHz 32-bit PCI slot
- ▶ Two half-high bays for an optional DVD-ROM, DVD-RAM, or tape drive.

The IntelliStation POWER 185 system supports the following native ports:

- ▶ Two 10/100/1000 Ethernet ports
- ▶ Two serial ports
- ▶ Four USB ports (two front / two rear)
 - An optional external USB diskette drive 1.44 (FC 2591)
- ▶ Ultra320 SCSI port

The IntelliStation POWER 185 system features one internal Ultra320 SCSI dual channel controller with an embedded internal connection to the internal disk drives and a 68-pin external port available for external device attachment.

1.4.1 Processor features

The IntelliStation POWER 185 is available in a 1-core or 2-core configuration using the PowerPC 970 microprocessor technology running at 2.5 GHz, both configurations with 1 MB of L2 cache per processor. The initial order of the IntelliStation POWER 185 system must contain the feature code of the desired number of processors, plus it must contain the processor activation code. For a list of available processor and activation features, see Table 1-3 and Table 1-4. IBM Capacity on Demand is not available on the IntelliStation POWER 185.

Table 1-3 Processor and feature codes

Processor feature code	Description
5328	1-core 2.5 GHz PowerPC 970 Processor Card, 0 activated
5325	2-core 2.5 GHz PowerPC 970 Processor Card, 0 activated

Table 1-4 Processor activation feature codes

Activation feature code	Description
7329	Activation of one processor for initial order FC 5328
7302	Activation of one processor entitlement for initial order FC 5325
7302 x 2	Activation of two processor entitlements for initial order FC 5325

Ordering configurations that qualify for Express Offerings, described in the following, allow the use of other, zero-priced entitlement feature codes.

1.4.2 Memory features

The system planar of the IntelliStation POWER 185 system has four sockets for memory DIMMs. The minimum memory requirement is 512 MB, and the maximum capacity is 8 GB. Table 1-5 lists the available memory features.

Table 1-5 Memory sizes and feature codes

Memory feature code	Description
4462	512 MB (2 x 256 MB), DIMMs, 333 MHz DDR-1 SDRAM
4460	1 GB (2 x 512 MB), DIMMs, 333 MHz DDR-1 SDRAM
4661	2 GB (2 x 1048 MB), DIMMs, 333 MHz DDR-1 SDRAM
4463	4 GB (2 x 2048 MB), DIMMs, 333 MHz DDR-1 SDRAM

1.4.3 Disk and media features

The IntelliStation POWER 185 workstation features up to three disk drive bays and two half-height 5.25-inch media bays. The minimum configuration requires at least one disk drive. Table 1-6 shows the disk drive feature codes that each bay can contain. Additional media features limit the number of disk drives that can be configured internally by the number installed. A maximum of three SCSI devices is permitted.

Table 1-6 Disks drives and feature codes

Disk feature code	Description
3579	73.4 GB 10 K RPM Ultra320 SCSI disk drive
3580	146.8 GB 10 K RPM Ultra320 SCSI disk drive
3581	300 GB 10 K RPM Ultra320 SCSI disk drive

For a list of media features, see 2.5.1, “Internal media devices” on page 24.

1.4.4 USB diskette drive

In some situations, an external USB 1.44 MB diskette drive for the IntelliStation POWER 185 system (FC 2591) is helpful. This lightweight USB attached diskette drive takes its power requirements from the USB port. A USB cable is provided. The drive can be attached to the integrated USB ports. A maximum of one USB diskette drive is supported per controller. The same controller can share a USB keyboard and mouse.

1.4.5 USB SpaceMouse and SpaceBall

The IntelliStation POWER 285 system introduces two new USB input devices for the use with graphical applications, as shown in Figure 1-2 on page 6. Equipped with the same functions as the serial products, the SpaceMouse or SpaceBall is connected to a USB port, as described in Table 1-7.

Table 1-7 USB SpaceMouse and SpaceBall

Feature code	Description
8424	SpaceBall 3D Input Device (USB)
8425	SpaceMouse Plus 3D Input Device (USB)

Before installing the original SpaceMouse or SpaceBall driver, we highly recommend that you install the following APARs:

- For IBM AIX 5L Version 5.2, install APAR IY73408 (or PTFs U803007 and U478090)
- For IBM AIX 5L Version 5.3, install APAR IY73416 (or PTFs U801713 and U801025)

At the time of writing, the USB SpaceTraveler device from 3Dconnexion is expected to be supported by the same device driver as the SpaceMouse and SpaceBall. IBM does not officially support the use of OEM products.

1.4.6 Serial SpaceMouse and SpaceBall

The IBM IntelliStation POWER 185 provides also two native serial ports for connecting new or existing peripheral devices, such as a SpaceBall or a Magellan SpaceMouse, based on the serial communication protocol.



Figure 1-2 Serial SpaceMouse and SpaceBall

1.5 Express Edition offerings

Express Edition offerings are available on an initial order only. They provide a predefined configuration that is desired to meet typical client requirements. Zero-priced processor activations are available when a system order satisfies specific configuration requirements for the number of processors, total memory, quantity and size of disk drives, presence of a media device, monitor, keyboard, mouse, and audio adapter. When you purchase an Express Edition product offering, you are also entitled to a lower-priced AIX 5L operating system license, or you can choose to purchase the system with no operating system.

Systems with a lower-priced AIX 5L offering are referred to as the System p5 Express, AIX 5L editions. The lower-priced AIX 5L operating system is processed using a feature number on AIX 5L (AIX 5L Edition).

You can make changes to the standard features as needed and still qualify for processor entitlements at no additional charge and a lower-priced AIX 5L operating system license. However, selection of total memory or DASD smaller than the total defined as the minimums disqualifies the order as an Express Edition product offering. For example, the GXT6500P 3D graphics accelerator can be substituted for the GXP4500P. Likewise, the T120 can be substituted for the T191.

Two Express Edition offerings are available for the IntelliStation POWER 185 system, as shown in Table 1-8 and Table 1-9.

Table 1-8 Express edition for the IntelliStation POWER 185 system

Express edition 150W with one processor activation	
Feature code	Description
5328	1-core 2.5 GHz PowerPC 970 processor
4461	2 GB (2 x 1024 MB) DIMMs
3579	73.4 GB 10k disk drive
5764	DVD-ROM
4252	IDE cable
2842	GXT4500P graphics accelerator
3644	T119 Flat Panel Monitor
88xx	Quiet touch keyboard, USB
8841	3-button optical mouse, USB
7168	Acoustic cover set
5171	Power supply, 530 watt
4277	4-drop cable
6470	Power cord
8429	Zero-price processor

Table 1-9 Express edition for the IntelliStation POWER 185

Express edition 250W with one processor activation	
Feature code	Description
5325	2-core 2.5 GHz PowerPC 970 processor
4461 x 2	2 GB (2 x 1024 MB) DIMMs
3579 x 2	73.4 GB 10k disk drive
5764	DVD-ROM
4252	IDE cable
2842	GXT4500P graphics accelerator
3644	T119 Flat Panel Monitor
88xx	Quiet touch keyboard, USB
8841	3-button optical mouse, USB
7168	Acoustic cover set
5171	Power supply, 530 watt
4277	4-drop cable
6470	Power cord
8417	Zero-price processor
7302	One processor entitlement

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The diagram illustrates the HyperTransport system architecture. At the top, two PPC970 processors are shown, each containing a Core Int. Unit, L2 Ctrl., and 1 MB L2. They are connected to a NorthBridge, which includes a Memory Controller and a HyperTransport Bridge. The HyperTransport Bridge is connected to a MUX, which is connected to four DIMMs (DIMM C1, DIMM C2, DIMM C3, DIMM C4). The HyperTransport Bridge is also connected to a Service processor. The HyperTransport Bridge is connected to three HyperTransport Tunnels. The first tunnel is connected to a HyperTransport Bridge, which is connected to a SouthBridge. The SouthBridge contains an IDE, USB, and PCI-X. The second tunnel is connected to a HyperTransport Bridge, which is connected to a SouthBridge. The SouthBridge contains an IDE, USB, and PCI-X. The third tunnel is connected to a HyperTransport Bridge, which is connected to a SouthBridge. The SouthBridge contains an IDE, USB, and PCI-X. The diagram also shows various interfaces and components, including Slot 2 (64-bit, 133 MHz), Slot 4 (64-bit, 100 MHz), Slot 5 (64-bit, 100 MHz), Slot 3 (64-bit, 133 MHz), Slot 1 (32-bit, 33 MHz), Gbit Ethernet, SCSI Ultra 320, Ext. Serial Ctrl., and a Half Height Media bay.

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2.1 The PowerPC 970 processor

The IBM PowerPC 970, reduced instruction set cycle (RISC) processor, is an implementation of technology based on the existing IBM POWER processor development. The PPC 970 processor is a single-chip and dual-core, 64-bit PowerPC processor, with one active core, that operates at a 2.5 GHz clock frequency and a 1 MB L2 cache on-chip per processor, with a vector processing unit using AltiVec technology, which is described in 2.1.2, “AltiVec enhancement” on page 11.

To fulfill a system design that lowers the acoustics, reduces the internal temperature, and provides additional cache, the PowerPC 970 chip is delivered with one active core. A 2-way IBM System p5™ 185 system consists of two PowerPC 970 chips, that are soldered directly to the system planar using a 575-pin ceramic ball grid array (CBGA) package.

In 1991, IBM teamed with Apple Computer and Motorola to define the PowerPC Architecture™ technology. The goals of this new architecture were to:

- ▶ Permit a broad range of implementations, from low-cost controllers to high-performance processors.
- ▶ Be sufficiently simple to permit the design of processors that have a very short cycle time.
- ▶ Minimize the effects that hinder the design of aggressive superscalar implementations.
- ▶ Include multiprocessor features.
- ▶ Define a 64-bit architecture that is a super-set of the 32-bit POWER architecture, providing application binary compatibility for 32-bit applications.

While based on the POWER architecture, the PowerPC Architecture incorporated several modifications to enable it to be more widely applied in a variety of application scenarios. This vision has been subsequently realized with processors that implement PowerPC Architecture technology now installed in desktop, server, and embedded systems across commercial, consumer, industrial, and scientific settings.

To achieve the design goals for the PowerPC Architecture, some features of the original POWER architecture were removed. These features were mostly features that were infrequently used. The PowerPC Architecture defines both 32-bit and 64-bit modes of operation. The primary differences in these two modes of operation are in the effective length of addresses used by the processor, and the availability of extra capabilities to manipulate double word (64-bit) fixed-point operands in 64-bit mode. Floating-point capabilities are the same in both 32-bit and 64-bit modes. The 32-bit PowerPC Architecture implementations only support the 32-bit mode of operation. The 64-bit PowerPC Architecture implementations support both the 32-bit and 64-bit modes of operation. This enables the 64-bit PowerPC Architecture implementations to support the full-speed execution of existing 32-bit applications, alongside 64-bit applications, in the same operating environment.

2.1.1 CMOS, copper, and SOI technology

The PPC 970 processor design is a result of a close collaboration between IBM Systems Group and IBM Microelectronics technologies that enables IBM System p systems to give clients improved performance, and reduced power consumption. The PPC 970 processor chip takes advantage of IBM leadership technology. It is made using IBM 90 μm-lithography complementary metal-oxide semiconductor (CMOS) technology. The PPC 970 processor also uses silicon-on-insulator (SOI) technology designed to allow a higher operating frequency for improved performance yet with reduced power consumption and improved reliability compared to processors not using this technology.

2.1.2 AltiVec enhancement

Freescale Semiconductor's advanced AltiVec technology is designed to enable exceptional general-purpose processing power for high-performance PowerPC processors. This leading-edge technology is engineered to support high-bandwidth data processing and algorithmic-intensive computations, all in a single-chip solution. With its computing power, AltiVec technology also enables high-performance PowerPC processors to address markets and applications in which performance must be balanced with power consumption, system cost, and peripheral integration.

The AltiVec technology is a well known environment for software developers who want to add efficiency and speed to their applications. A 128-bit vector execution unit was added to the architecture. This engine operates concurrently with the existing integer and floating-point units and enables highly parallel operations, up to 16 operations in a single clock cycle. By leveraging AltiVec technology, developers can optimize applications to deliver acceleration in performance-driven, high-bandwidth computing.

The AltiVec technology is not comparable to the IBM POWER5™ processor implementation, using the simultaneous multithreading functionality.

Vector technology review

Vector technology expands the PowerPC architecture technology through the addition of a 128-bit vector execution unit, which operates concurrently with the existing integer- and floating-point units. This new engine provides for highly parallel operations, allowing for the simultaneous execution of up to four 32-bit floating operations or sixteen 8-bit fixed-point operations in one instruction. All Visual Processing Unit (VPU) datapaths and execution units are 128 bits wide and are fully pipelined.

This technology can be thought of as a set of registers and execution units that can be added to the PowerPC architecture technology in a manner analogous to the addition of floating-point units. Floating-point units were added to provide support for high-precision scientific calculations and the vector technology is added to the PowerPC architecture to accelerate the next level of performance-driven, high-bandwidth communications and computing applications.

The basic concept behind vector processing is to enhance the performance of data-intensive applications by providing hardware support for operations that can manipulate an entire vector (or array) of data in a single operation.

Scalar processors perform operations that manipulate single data elements such as fixed-point or floating-point numbers. For example, scalar processors usually have an instruction that adds two integers to produce a single-integer result.

Vector processors perform operations on multiple data elements arranged in groups called vectors (or arrays). For example, as shown in Figure 2-2 on page 12, a vector add operation to add two vectors performs a pairwise addition of each element of one source vector with the corresponding element of the other source vector. It places the result in the corresponding element of the destination vector. Typically, a single vector operation on vectors of length n is equivalent to performing n scalar operations.

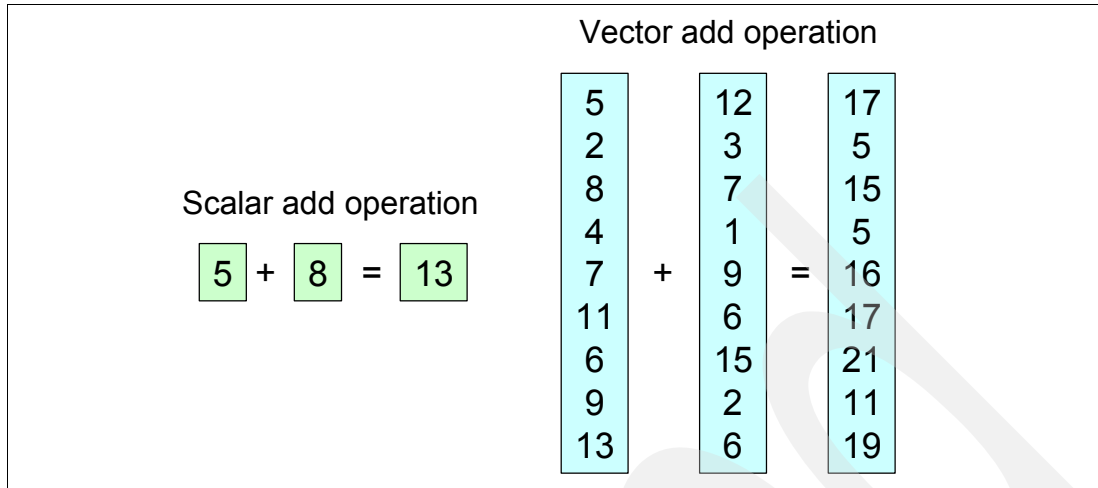


Figure 2-2 Scalar and vector operation

Processor designers are continually looking for ways to improve application performance. The addition of vector operations to a processor architecture is one method that a processor designer can use to make it easier to improve the peak performance of a processor. However, the actual performance improvements that can be obtained for a specific application depend on how well the application can exploit vector operations.

2.1.3 Available processor speeds

The IntelliStation POWER 185 operates at a processor clock rate of 2.5 GHz for 1-core and 2-core systems. To determine the processor characteristics on a running system, use one of the following AIX 5L commands:

► **lsattr -El procX**

In this command, *X* is the number of the processors. For example, proc0 is the first processor in the system. The output from the command would be similar to the following output (False, as used in this output, signifies that the value cannot be changed through an AIX 5L command interface):

```
type PowerPC_970MP      Processor type False
frequency 2519967993    Processor Speed False
smt_enabled true        Processor SMT enabled False
smt_threads 1           Processor SMT threads False
state enable            Processor state False
```

► **pmcycles -m**

This command uses the performance monitor cycle counter and the processor real-time clock to measure the actual processor clock speed in MHz. The following output is from a 1-core IntelliStation POWER 185 system running at 2.5 GHz:

This machine runs at 2520 MHz

Note: The **pmcycles** command is part of the bos.pmapi fileset. When you use this command, first check whether that component is installed using the **ls1pp -l bos.pmapi** command.

2.1.4 System bus

HyperTransport technology (HT) is a high-speed, low latency, point-to-point link designed to increase the communication speed between integrated circuits in computers, servers, embedded systems, and networking and telecommunications equipment up to 48 times faster than some existing technologies.

HyperTransport technology helps reduce the number of buses in a system, which can reduce system bottlenecks and enable today's faster microprocessors to use system memory more efficiently as provided as a functional overview in Figure 2-3.

HyperTransport technology is used to connect the NorthBridge chip to the integrated PCI-X I/O bridge chips, along to the SouthBridge chip. HyperTransport technology provides a high-speed, high-performance, point-to-point link for interconnecting integrated circuits on a board, with a top signaling of 1.6 GBps on each wire pair.

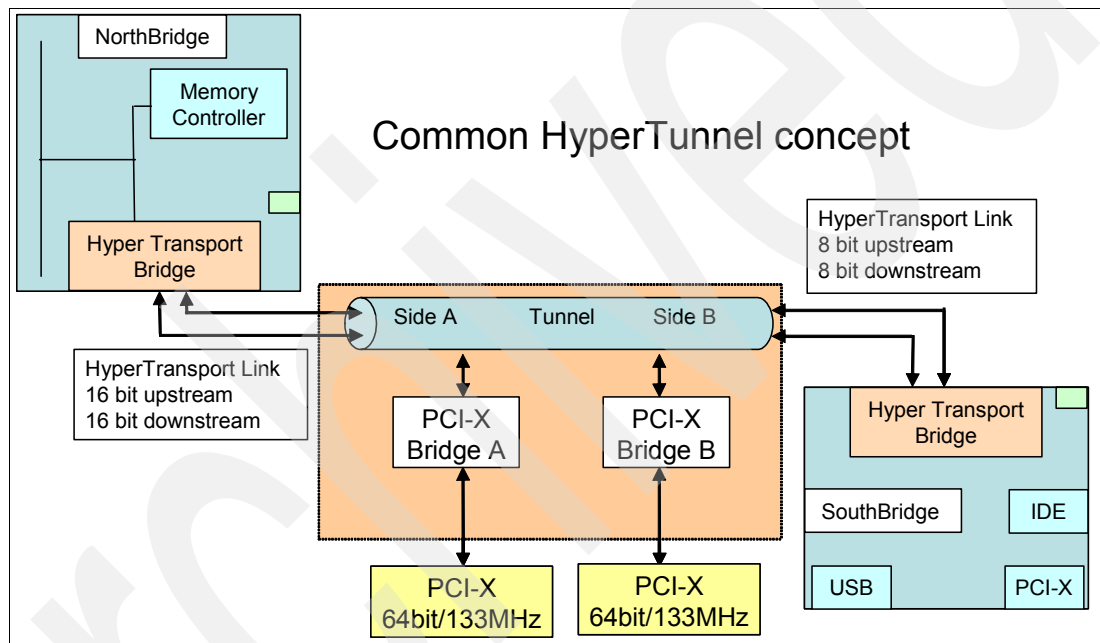


Figure 2-3 Basic concept of HyperTunnel implementation

2.2 Memory subsystem

The IntelliStation POWER 185 system offers pluggable DIMMs for memory. The minimum memory for a 1-core or 2-core processor system is 512 MB and 8 GB as the maximum installable memory option. Table 1-5 on page 4 shows the offerings and memory slots available.

2.2.1 Memory placement rules

Figure 2-4 on page 14 lists the memory features that were available at the time of writing for the IntelliStation POWER 185 system. Memory must be inserted in pairs, as required by the feature codes.

Memory is installed in the following order:

- ▶ The first pair is installed in C1 and C4
- ▶ The second pair is installed in C2 and C3

The service information label, located on the side cover of the system, provides memory DIMMs slot location information. Figure 2-4 illustrates the memory placement rules.

Note: A pair must consist of a single feature (that is made of identical DIMMs). Mixed DIMM capacities in a pair results in reduced RAS.

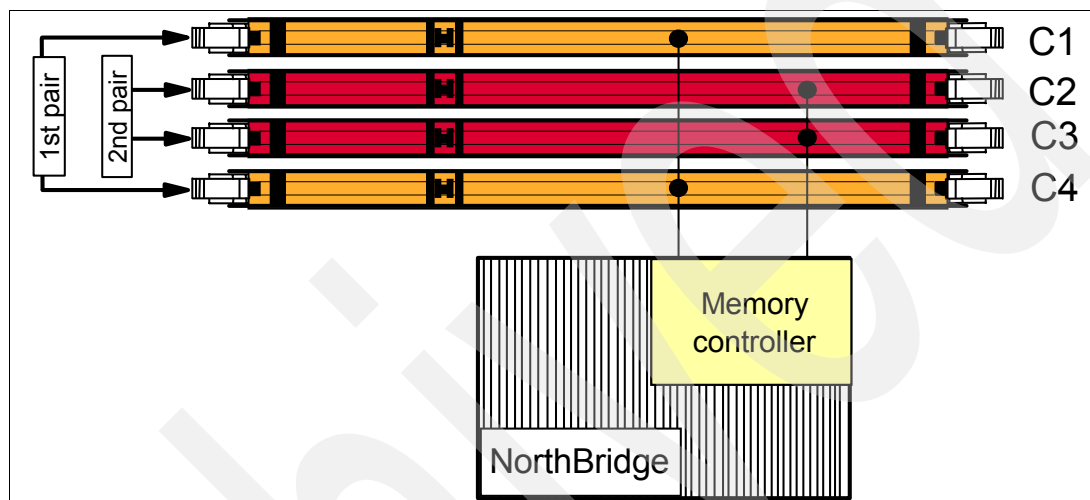


Figure 2-4 Memory placement rules for the IntelliStation POWER 185

2.2.2 Memory restrictions

The IntelliStation POWER 185 system does not support OEM memory, and there is no exception to this rule. OEM memory is never certified for the use in IBM @server® pSeries and the new IBM System p5 systems. If the IntelliStation POWER 185 system is populated with OEM memory, you might experience unexpected and unpredictable behavior.

All IBM memory is identified by an IBM logo and a white label printed with a barcode on the top and an alphanumeric string on the bottom, created according to the rule reported in Figure 2-5.

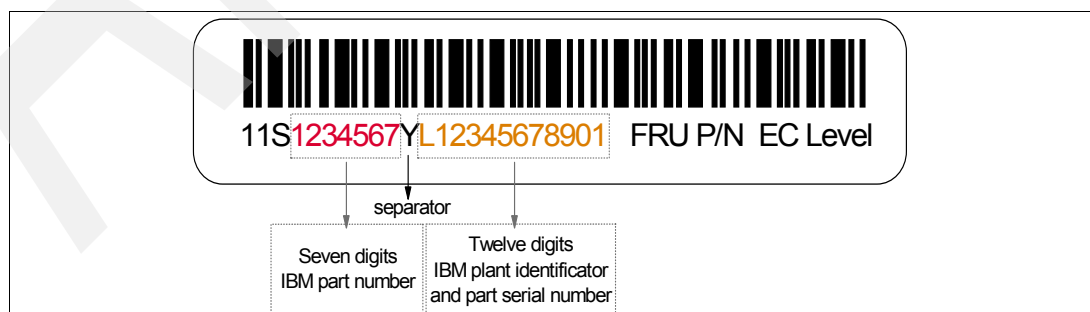


Figure 2-5 IBM memory certification label

Sometimes, OEM vendors put a label reporting the IBM memory part number but not the barcode or the alphanumeric string, or both, on their DIMMs.

In case of system failure caused by OEM memory installed in the system, the first thing to do is to replace the suspected memory with IBM memory and check whether the problem is corrected. Contact your IBM representative for further assistance if needed.

2.2.3 Memory throughput

The IBM IntelliStation POWER 185 supports four physical DDR1 slots and memory DIMMs in sizes from 256 MB up to 2 GB. Each PPC 970 processor is interfaced with two unidirectional buses, running at 625 MHz and a total of 9.7 GBps throughput, to the NorthBridge subsystem, with the integrated memory controller.

The integrated NorthBridge memory controller is interfaced to the four available memory slots, using a 72-bit (64-bit data plus 8-bit for ECC) wide interconnection.

The DIMMs are DDR1 operating at 333 MHz through four 8-byte paths. Read and write operations share these paths. There must be at least four DIMMs installed to effectively use each path. In this case, the throughput between the NorthBridge and the DIMMs is (8 x 4 x 333 MHz) or 10.6 GBps.

These values are maximum theoretical throughputs for comparison purposes only.

2.3 Internal I/O subsystem

The internal I/O subsystem and the service processor resides on the system planar. The system planar contains the NorthBridge chip, HT Tunnel PCI-X bridge chips, and the SouthBridge chip to connect the integrated I/O packaged on the system planar. The system planar provides five non-hot-pluggable PCI slots and several integrated PCI devices that interface the two HT Tunnel PCI-X bridges to the slots and devices. Slots (Slot 2 to Slot 5) accept either short or long adapters. Slot 1 accepts only short adapters.

2.3.1 PCI-X and PCI slots, and adapters

PCI-X, where the X stands for extended, is an enhanced PCI bus, delivering a bandwidth of up to 1 GBps, running a 64-bit bus at 133 MHz. PCI-X is backward compatible, so the IntelliStation POWER 185 system can support existing 3.3 volt PCI adapters.

The slots have the following attributes:

- ▶ Two 133 MHz 64-bit PCI-X slots, full length and full height
- ▶ Two 100 MHz 64-bit PCI-X slots, full length and full height
- ▶ One 33 MHz 32-bit PCI slot, half length and full height

Note: Adapter in Slot 5 can operate at 133 MHz if slot 4 is empty. Otherwise, Slot 5 operates at 100 MHz if Slot 4 is occupied. Slot 4, operates at 100 Mhz only.

64-bit and 32-bit adapters

IBM offers 64-bit adapter options for the IntelliStation POWER 185 system, as well as 32-bit adapters. Higher-speed adapters use 64-bit slots because they can transfer 64 bits of data for each data transfer phase. Generally, 32-bit adapters can function in 64-bit PCI-X slots; however, some 64-bit adapters cannot be used in 32-bit slots. For a full list of the adapters that are supported on the IntelliStation POWER 185 system and for important information regarding adapter placement, see the IBM System Hardware Information Center.

2.3.2 LAN adapters

When an IntelliStation POWER 185 system is connected to a local area network (LAN), you can use the internal dual port 10/100/1000 Mbps RJ-45 Ethernet controller, integrated on the system planar.

See Table 2-1 for the list of additional LAN adapters that are available at the time of writing. IBM supports an installation with Network Installation Management (NIM) using Ethernet adapters (CHRP¹ is the platform type).

Table 2-1 Available LAN adapters

Feature	Description	Slot	Size	Max
1978	IBM Gigabit Ethernet-SX PCI-X Adapter	64	Short	4
1979	IBM 10/100/1000 Base-TX Ethernet PCI-X Adapter	64	Short	4
1983	IBM 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	64	Short	4
1984	IBM 2-Port Gigabit Ethernet-SX PCI-X Adapter	64	Short	4
1954	IBM 4-Port 10/100/1000 Base-TX PCI-X Adapter	64	Short	2

2.3.3 iSCSI adapters

The IBM IntelliStation POWER 185 provides end-to-end iSCSI support when using the new System p5 iSCSI HBAs to create a low-cost storage area network in conjunction with System Storage™ N3000 line. New iSCSI adapters in IBM System p5 systems provide advantage of the increased bandwidth to the System Storage N series as the first of a whole new generation of iSCSI enabled storage products.

The 1 Gigabit iSCSI TOE PCI-X adapters support hardware encapsulation of SCSI commands and data into TCP and transports over the Ethernet via IP packets. The adapter operates as an iSCSI TOE (TCP/IP Offload Engine). This offload function eliminates host protocol processing and reduces CPU interrupts. Adapter uses Small form factor LC type fiber optic connector or copper RJ45 connector. Table 2-2 shows the iSCSI adapters that you can order.

Table 2-2 Available iSCSI adapters

Feature	Description	Slot	Size	Max
1986	1 Gigabit iSCSI TOE PCI-X on Copper Media Adapter	64	Short	3
1987	1 Gigabit iSCSI TOE PCI-X on Optical Media Adapter	64	Short	3

¹ CHRP stands for Common Hardware Reference Platform, a specification for IBM PowerPC-based systems that can run multiple operating systems.

2.3.4 Graphics accelerators

This section provides additional information that is related to graphics accelerators that are available for the IntelliStation POWER 185.

Note: When using Linux on the IntelliStation POWER 185 the only supported graphic accelerator is the GXT135P.

GXT135P

The POWER GXT135P is a low-priced 2D graphics accelerator for workstations and servers. The IntelliStation POWER 185 system supports up to four enhanced POWER GXT135P (FC 1980) 2D graphics accelerators. It can be configured to operate in either 8-bit or 24-bit color modes, running at 60 Hz to 85 Hz. This adapter supports both analog and digital monitors. The adapter requires one short 32-bit or 64-bit PCI-X slot. Figure 2-6 show the adapter card, which has the following features and specifications:

- ▶ Hardware description:
 - 128-bit graphics processor
 - 8-bit color lookup table or 24-bit true color
 - 16 MB SDRAM
 - 32-bit PCI interface
 - Universal PCI (5.0v or 3.3v)
 - 1 hardware color map
- ▶ Features supported:
 - Up to approximately 16.7 million colors
 - Rectangular clipping
 - Two analog monitor outputs at up to 1280 x 1024 resolution
 - One analog monitor output at up to 2048 x 1536 resolution
 - One digital monitor output at up to 1600 x 1200 resolution
 - 60 to 85 Hz refresh rates (ISO 9241, Part 3)
- ▶ APIs supported:
 - X Windows® System
 - Motif
- ▶ Software requirement:
 - IBM AIX 5L Version 5.2, or later
 - SUSE Linux Enterprise Server 9, or later
 - Red Hat Enterprise Linux AS 4, or later

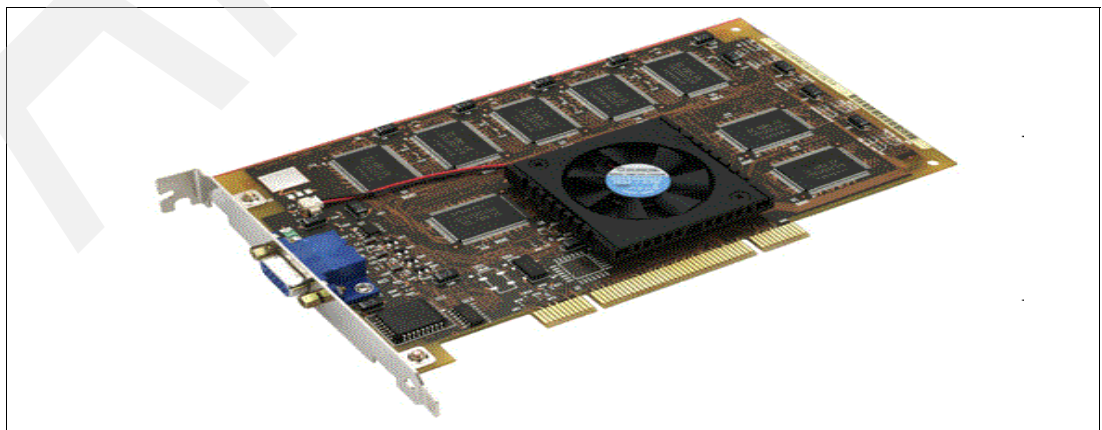


Figure 2-6 The GXT135P graphics accelerator

GXT4500P

The GXT4500P Graphics Accelerator (FC 2842) is a 64-bit entry 3D PCI graphics adapter. The graphics subsystems provide excellent functionality and performance for demanding graphics applications in:

- ▶ Mechanical Computer Aided Design (MCAD) and Engineering (MCAE) for automotive and aerospace
- ▶ Petroleum exploration and production
- ▶ Scientific visualization
- ▶ Other technical design and visualization

This adapter has the following base features (shown in Figure 2-7 on page 19):

- ▶ 128 MB unified frame buffer:
 - 24-bit double buffered up to 2048 x 1536
 - 24-bit double buffered stereo up to 1280 x 1024
 - 24-bit Z-Buffer
 - 4/8-bit overlay
 - 8-bit Double Buffered Alpha
 - 8-bit Stencil
 - Eight windows ID bits
 - Four clipping planes
- ▶ Scissor registers
- ▶ Five hardware rectangular clippers
- ▶ Texture mapping:
 - Up to 110 MB texture memory (1280 x 1024)
 - Dual texture
 - 3D texture
- ▶ Four hardware color maps
- ▶ API support - X11, graPHIGS, OpenGL 1.2
- ▶ Monitor support:
 - Resolutions supported: 8/16/24 bit (up to 2048 x 1536 at 60 Hz)
 - Digital monitor support
 - DDC2B support
 - ISO 9241 compliant
- ▶ Software requirement:
 - AIX 5L Version 5.2, or later

Note: Linux (Red Hat or SuSE) does not support the GXT4500P graphics accelerator.



Figure 2-7 The GXT4500P graphics accelerator

Note: For performance-critical applications, install the adapter in PCI-X slot 2 or slot 3.

GXT6500P

The GXT6500P Graphics Accelerator (FC 2843) is a 64-bit 3D PCI Graphics adapter. The graphics subsystems provide excellent functionality and performance for demanding graphics applications in:

- ▶ Mechanical Computer Aided Design (MCAD) and Engineering (MCAE) for automotive and aerospace
- ▶ Petroleum exploration and production
- ▶ Scientific visualization
- ▶ LifeScience visualization
- ▶ Other technical design and visualization

This adapter has the following base features (shown in Figure 2-8 on page 20):

- ▶ 128 MB unified frame buffer:
 - 24-bit double buffered up to 2048 x 1536
 - 24-bit double buffered stereo up to 1280 x 1024
 - 24-bit Z-Buffer
 - 4/8-bit overlay
 - 8-bit double buffered alpha
 - 8 bit stencil
 - Eight windows ID bits
 - Four clipping planes
- ▶ Texture mapping:
 - Up to 110 MB texture memory (1280 x 1024)
 - Dual texture
 - 3D texture
- ▶ Four hardware color maps
- ▶ Full OpenGL, graPHIGS Geometry Accelerator

- ▶ API support - X11, graPHIGS, OpenGL 1.2.1
- ▶ Monitor support:
 - Resolutions supported: 8/24 bit (up to 2048 x 1536 at 60 Hz)
 - Digital monitor support (up to 1600 x 1200 at 60 Hz)
 - DDC2B support
 - ISO 9241 compliant
- ▶ Software requirement:
 - AIX 5L Version 5.2, or later

Note: Linux (Red Hat or SuSE) will not support the GXT6500P graphic accelerator

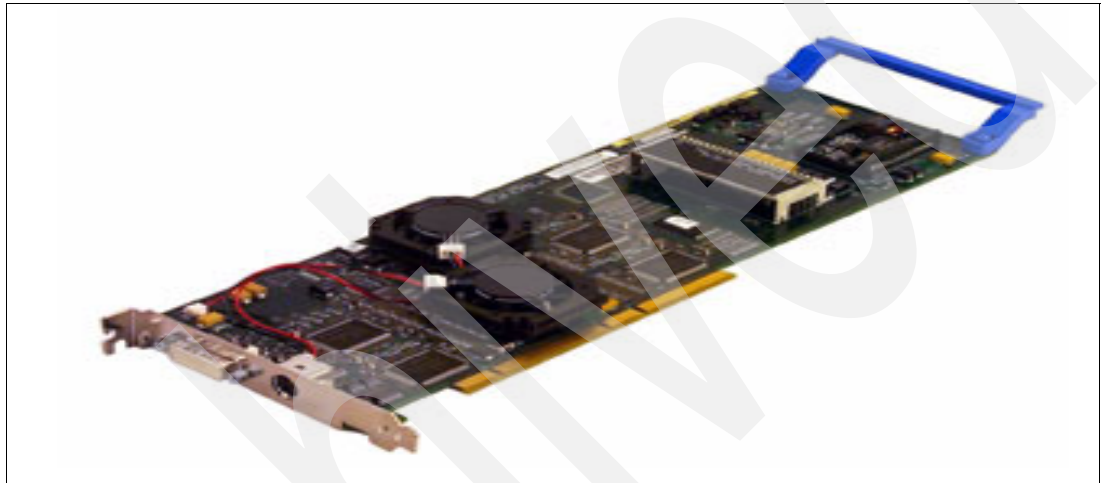


Figure 2-8 The GXT6500P graphics accelerator

Note: For performance-critical applications, install the adapter in PCI-X slot 2.

2.3.5 Flat panel monitors

This desktide workstation, combined with a graphics accelerator, can be equipped with an efficient and powerful monitor. The following sections describe the four flat panel monitors supported on a POWER 185 using the GXT135P, GXT4500P, or GXT6500P graphics accelerators.

T115 Flat Panel Monitor (FC 3641)

The IBM T115 LCD flat-panel monitor has the following general characteristics:

- ▶ Supported only by the GXT135P
- ▶ 15.0-inch LCD digital screen with a viewable image size of 381 mm (15.0 inches)
- ▶ Maximum resolution of 1024 x 768 (XGA)
- ▶ Video inputs: 15-pin D
- ▶ Brightness: 250cd/m² (typical)
- ▶ Contrast ratio: 400:1 (typical)
- ▶ Depth (w/stand): 144 mm (6.67 in.)
- ▶ Height (max w/stand): 361 mm (14.2 in.)
- ▶ Width: 362 mm (14.2 in.)
- ▶ Weight: 2.9 kg (6.4 lb.)

T117 Flat Panel Monitor (FC 3645)

The IBM T117 LCD flat-panel monitor has the following general characteristics:

- ▶ 17.0-inch LCD digital screen with a viewable image size of 432 mm (17.0 inches)
- ▶ Maximum resolution of 1280 x 1024 (SXGA)
- ▶ Video inputs: 15-pin D / DVI-D
- ▶ Brightness: 300cd/m2 (typical)
- ▶ Contrast ratio: 500:1 (typical)
- ▶ Depth (w/stand): 246 mm (9.7 in.)
- ▶ Height (max w/stand): 395.5 mm (15.6 in.)
- ▶ Width: 375.4 mm (14.8 in.)
- ▶ Weight: 5.8 kg (12.8 lb.)

T119 Flat Panel Monitor (FC 3644)

The IBM T119 LCD flat-panel monitor has the following general characteristics:

- ▶ 19.0-inch LCD digital screen with a viewable image size of 483 mm (19.0 inches)
- ▶ Maximum resolution of 1280 x 1024 (SXGA)
- ▶ Video inputs: 15-pin D / DVI-D
- ▶ Brightness: 250cd/m2 (typical)
- ▶ Contrast ratio: 550:1 (typical)
- ▶ Depth (w/stand): 246 mm (9.7 in.)
- ▶ Height (max w/stand): 443.6 mm (17.5 in.)
- ▶ Width: 418 mm (16.5 in.)
- ▶ Weight: 7.4 kg (16.3 lb.)

T120 Flat Panel Monitor (FC 3643)

The IBM T120 LCD flat-panel monitor has the following general characteristics:

- ▶ 20.1-inch LCD digital screen with a viewable image size of 511 mm (20.1 inches)
- ▶ Maximum resolution of 1600 x 1200 (UXGA)
- ▶ Video inputs: 15-pin D / DVI-D
- ▶ Brightness: 300cd/m2 (typical)
- ▶ Contrast ratio: 700:1 (typical)
- ▶ Depth (w/stand): 246 mm (9.7 in.)
- ▶ Height (max w/stand): 416.6 mm (16.5 in.)
- ▶ Width: 445.6 mm (17.5 in.)
- ▶ Weight: 7.5 kg (16.5 lb.)

2.3.6 Audio adapter

The IntelliStation POWER 185 system supports a PCI audio adapter (FC 8244). It is a 3.3 volt, 32-bit PCI adapter that runs at 33 MHz and requires one short 32-bit or 64-bit PCI-X slot. The adapter provides external jacks for headphones, speaker output, line input, microphone input, and an internal connector for CD or DVD drive audio input (Figure 2-9 on page 22).

Note: This adapter is not orderable with the POWER 185. However, it is supported if the client has an existing adapter to migrate from an existing workstation.

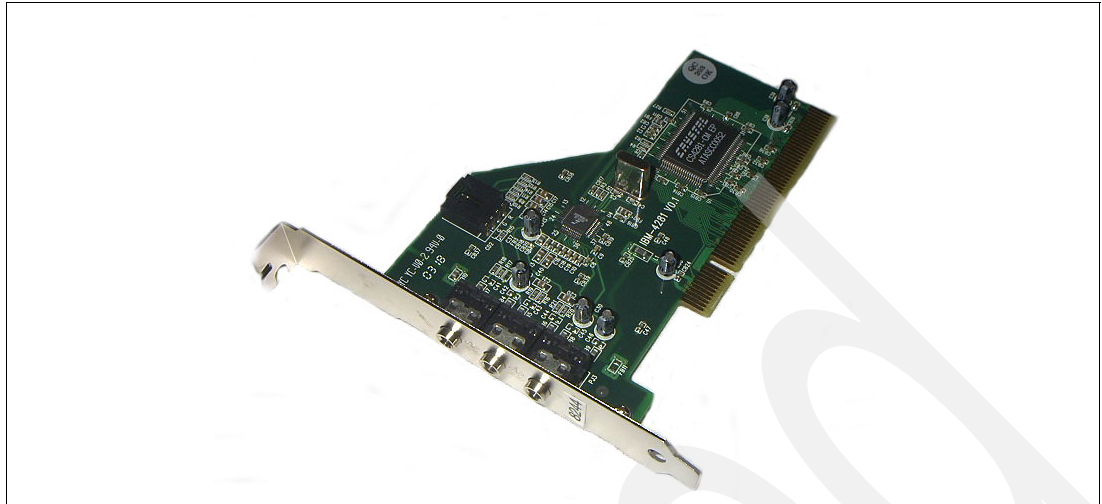


Figure 2-9 PCI audio adapter

2.3.7 SCSI adapters

To connect to additional external SCSI devices, the adapters provided in Table 2-3 are available, at the time of writing, to be used in the IntelliStation POWER 185 system.

Table 2-3 Orderable SCSI adapters

Feature	Description	Slot	Size	Max
1912	PCI-X DDR Dual Channel Ultra320 LVD SCSI Adapter	64	Short	4
1913	PCI-X DDR Dual Channel Ultra320 LVD SCSI RAID Adapter	64	Short	4

Note: The IntelliStation POWER 185 provides one external SCSI port with an associated connector on the rear side of the system. No additional PCI-X slot is required.

2.3.8 Fibre Channel adapter

The IntelliStation POWER 185 supports up to three 2 Gigabit Fibre Channel PCI-X adapters (FC 1977). The PCI-X adapter is a 64-bit, short form factor adapter with an LC type external fibre connector that provides single or dual initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage. Distances of up to 500 meters running at 1 Gbps data rate and up to 300 meters running at 2 Gbps data rate are supported between the adapter and an attaching device or switch. When used with IBM supported Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1 Gbps or 2 Gbps data rates.

The 2 Gigabit Fibre Channel PCI-X Adapter can be used to attach devices either directly, or using the supported Fibre Channel Switches. If attaching a device or switch with an SC type fibre connector, also the LC-SC 50 Micron Fiber Converter Cable (FC 2456) or a LC-SC 62.5 Micron Fiber Converter Cable (FC 2459) is required.

2.3.9 Additional support for owned PCI-X adapters

The lists of the major PCI-X adapters that can be configured in a IntelliStation POWER 185 when an initial configuration order is going to be built are described in the previous sections. However, the list of all the supported PCI-X adapters, with the related support for additional external devices, is more extended. Clients that would like to use owned PCI-X adapters can contact the IBM service representative to verify whether those adapters are supported.

2.4 Peripheral ports

The IBM IntelliStation POWER 185 supports two native serial ports, four USB ports to connect peripheral devices, such as SpaceBall or SpaceMouse, to the system, a SCSI port, and two Ethernet ports.

2.4.1 Serial ports

The serial ports S1 and S2 at the rear of the system are always available if the system is up and running. To provide additional serial ports to a system, select from the list of features as described in Table 2-4.

Table 2-4 Orderable serial adapters

Feature	Description	Slot	Size	Max
5723	2-port Asynchronous IEA-232 Adapter	64	Short	2
2943	8-port Asynchronous IEA-232/RS-422 Adapter	64	Short	2

2.4.2 USB ports

To provide an alternative method to connect peripheral devices to the system, four USB ports are provided on the IntelliStation POWER 185. The current USB implementation supports two USB ports at the front and two USB ports at the rear side of the system using the USB 1.1 standard protocol. These ports can all be used at the same time.

2.4.3 SCSI port

A SCSI port is provided for SCSI attached external storage.

2.4.4 Ethernet ports

The two built-in Ethernet ports provide 10/100/1000 Mbps connectivity over CAT-5 cable for up to 100 meters. Table 2-5 lists the attributes for the LEDs that are visible on the side of the jack.

Table 2-5 Ethernet LED descriptions

LED	Light	Description
Link speed	Off Green Orange	10 Mbps 100 Mbps 1000 Mbps
Link	Green Off Blinking	Working link No link; could indicate a bad cable, not selected, or configuration error. Data activity

2.5 Internal storage

There is one dual channel Ultra320 SCSI controller integrated into the system planar. One port is an external port used to attach external devices as described in 2.4.3, “SCSI port” on page 23. The other port is used to drive the internal disk drives. Up to three internal drives are installable in a disk drive mounting cage.

2.5.1 Internal media devices

The IntelliStation POWER 185 system provides a half-height media bay for an optional DVD-ROM or an optional DVD-RAM and one media bay for a tape drive, as listed in Table 2-6 and Table 2-7.

Table 2-6 Available DVD devices

Feature	Description	Media bay
5763	IDE DVD-RAM Drive, Half-High	1
5764	IDE DVD-ROM Drive, Half-High	1

Table 2-7 Available tape devices

Feature	Description	Media bay
1892	VXA-320 160/320 GB Internal Tape Drive	1
1991	IBM 36/72 GB 4 mm Internal Tape Drive	1
1992	IBM 80/160 GB Internal Tape Drive with VXA Technology	1
1997	IBM 200/400 GB half height Ultrium 2 Tape Drive	1

2.5.2 Internal SCSI disks

The IntelliStation POWER 185 system can have up to three disk drives installed in the internal disk drive cage. See Table 2-8 for the available disk drive capacities. A system cannot be configured with more than three SCSI devices.

Table 2-8 Disk drive options

Feature code	Description
3579	73.4 GB 10K RPM Ultra320 SCSI disk drive, bolt-in
3580	146.8 GB 10K RPM Ultra320 SCSI disk drive, bolt-in
3581	300 GB 10K RPM Ultra320 SCSI disk drive, bolt-in

2.6 RAID options

Internal hardware RAID is not available on the IntelliStation POWER 185 system. If RAID functionality is needed, you can install an additional RAID adapter card to support an external RAID device, as shown in Table 2-9.

Table 2-9 Raid adapter options

Feature code	Description
1913	PCI-X DDR Dual Channel Ultra320 SCSI RAID Adapter

2.7 Operating system requirements

This section provides information about your optional choice to choose the appropriate operating system version to suit your IT requirements.

2.7.1 AIX 5L

The AIX 5L operating system has been specifically developed and enhanced to exploit and support the extensive RAS features on IBM System p systems. At the time of writing, IBM AIX 5L Version 5.2 and Version 5.3 is supported on the IntelliStation POWER 185 system.

The increased capacity of DVD means fewer media to handle when installing from DVD media. If you want to receive the AIX 5L software on DVD media, order the DVD preference feature FC 3435.

The IntelliStation POWER 185 system requires AIX 5L Version 5.3 Maintenance Package 5300-04 (IY77270) or AIX 5L Version 5.2 Maintenance Package 5200-08 (IY77273) or later.

The system requires the following media:

- ▶ AIX 5L for POWER Version 5.2 5765-E62, (CD# LCD4-1133-08) or later
- ▶ AIX 5L for POWER Version 5.2 5765-E62, (DVD# LCD4-7549-01)
- ▶ AIX 5L for POWER Version 5.3 5765-G03, (CD# LCD4-7463-05) or later
- ▶ AIX 5L for POWER Version 5.3 5765-G03, (DVD# LCD4-7544-01)

IBM periodically releases maintenance packages for the AIX 5L operating system. These packages are available on CD-ROM (FC 0907), or you can download them from the Internet at:

<http://techsupport.services.ibm.com/server/fixes>

You can also get individual operating system fixes and information about obtaining AIX 5L service at this site. In AIX 5L Version 5.3, the `suma` command is also available to help the administrator automate the task of checking and downloading operating system downloads. For more information about the `suma` command, see 3.2.4, “Service Update Management Assistant” on page 34.

If you have problems downloading the latest maintenance level, ask your IBM Business Partner or IBM representative for assistance.

2.7.2 Linux

Linux is one of the world's fastest-growing operating system. IBM is a strong supporter of Linux as a way to promote open standards. Open standards allow the interoperability of various applications, technologies, and computer devices, providing clients with a wider choice and flexibility to deploy applications. Because of this, Linux is a key player in the on demand strategy from IBM, because it provides a flexible computing environment.

The IntelliStation POWER 185 supports the AIX 5L and Linux operating system. At the time of writing, Red Hat Enterprise Linux and SUSE Linux Enterprise Server (SLES) are the supported Linux operating systems on the IntelliStation POWER 185 system.

For the IntelliStation POWER 185, Linux distributions were available through Novell SUSE and Red Hat at the time this publication was written. The IBM IntelliStation POWR 185 workstation requires the following version of Linux distributions:

- ▶ Red Hat Enterprise Linux AS 4 U3 for POWER, or later
- ▶ SUSE Linux Enterprise Server 9 SP3 for POWER, or later

You can find information about features and external devices supported by Linux on the IntelliStation POWER 185 at:

<http://www.ibm.com/servers/eserver/pseries/linux/>

You can find information about SUSE Linux Enterprise Server 9 at:

<http://www.novell.com/products/linuxenterpriseserver/>

For information about Red Hat Enterprise Linux AS for pSeries from Red Hat, see:

<http://www.redhat.com/software/rhel/details/>

For the latest in IBM Linux news, subscribe to the Linux Line at:

<https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?source=linuxline>

Many of the features described in this document are operating system dependant and might not be available on Linux. For more information, see:

http://www.ibm.com/servers/eserver/linux/power/whitepapers/linux_overview.html

Note: The GXT4500P (FC 2842) and GXT6500P (FC 2843) are not supported by SUSE Linux Enterprise Server 9 SP3 for POWER, or later, or Red Hat Enterprise Linux AS 4 U3 for POWER, or later.

2.8 Service processor

The service processor is a specialized device that is situated on the system board and provides a number of different functions, as follows:

- ▶ Immediately after power on, a function of the service processor controls the powering up of all devices needed during the boot process. When the service processor has completed its tasks, it checks for CPU and memory resources and then tests them. After the CPU and memory tests have completed, the service processor then hands the rest of the boot process over to system firmware. This changeover occurs when the 9xxx LED codes become Exxx codes.
- ▶ With AIX 5L or Linux in control of the machine, the service processor is still working and checking the system for errors. Also, the surveillance function of the service processor is monitoring AIX 5L or Linux to check that it is still running and has not stalled.

2.8.1 Operator control panel

The service processor provides an interface to the control panel that is used to display server status and diagnostic information. The IntelliStation POWER 185 control panel is packaged so that it fits into a smaller space. In the normal position, the control panel is seated inside the chassis on the left side below the front door, as shown in Figure 1-1 on page 3. The LCD display is invisible from the front. To read the LCD display, the client or engineer needs to pull the operator panel out toward the front.

Accessing the operator panel

To access the operator panel:

1. Press inward on the spring-loaded tab, located on the right side of the control panel, so that it pops out slightly.
2. Pull out the control panel toward the front of the server until it can be pivoted downward on its hinge.

3. To move the control panel back into the device enclosure, lift the control panel up to align it with the opening and push it into place until you feel the tab lock.

Primary control panel functions

The primary control panel functions are defined as functions 01 to 22, including options to view and manipulate IPL modes, server operating modes, IPL speed, and IPL type.

The following list describes all of the available primary functions:

- ▶ Function 01: Display selected IPL type, system operating mode, and IPL speed
- ▶ Function 02: Select IPL type, IPL speed override, and system operating mode
- ▶ Function 03: Start
- ▶ Function 04: Lamp Test
- ▶ Function 05: Reserved
- ▶ Function 06: Reserved
- ▶ Function 07: SPCN functions
- ▶ Function 08: Fast Power Off
- ▶ Functions 09 to 10: Reserved
- ▶ Functions 11 to 19: System Reference Code
- ▶ Function 20: System type, model, feature code, and IPL type

For detailed information about each control panel function and the available values, select **Service provider information** → **Reference information** → **Service functions** → **Control panel functions** from the IBM Systems Hardware Information Center Web site at:

<http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp?lang=en>

Archived

RAS and manageability

The reliability, availability, and serviceability (RAS) philosophy of IBM employs a reasoned and organized architectural approach that is designed to:

- ▶ Avoid problems where possible with a well-engineered design.
- ▶ Attempt to recover or to retry the operation if a problem occurs.
- ▶ Diagnose the problem and to reconfigure the system as needed.
- ▶ Initiate a repair and call for service automatically.

As a result, IBM servers are designed for reliable, robust operation in a wide variety of demanding environments.

This chapter provides more detailed information about the IBM IntelliStation POWER 185 system's reliability, availability, and serviceability features. It discusses several features about the benefits that are available when using IBM AIX 5L.

3.1 Reliability, fault tolerance, and data integrity

The reliability of the IntelliStation POWER 185 system begins with components, devices, and subsystems that are designed to be fault-tolerant. During the design and development process, subsystems go through rigorous verification and integration testing processes. During system manufacturing, systems go through a thorough testing process that is designed to help ensure the highest level of product quality.

The features that are designed to provide fault tolerance and ensure data integrity include:

- ▶ Double-bit memory error detection by error checking and correcting (ECC) that helps protect data integrity in the event of a double-bit memory failure.
- ▶ Disk mirroring and disk controller duplexing by the AIX 5L operating system.
- ▶ File system consistency maintained by the journaled file system, which reduces the likelihood of data loss when the system is halted abnormally due to a power failure.

3.1.1 Memory error correction extensions

There are several levels of memory protection that are implemented on the IntelliStation POWER 185 workstation. From the internal L1 caches to the main memory, several features are implemented to assure data integrity and data recovery in case of memory failures, including:

- ▶ The IntelliStation POWER 185 workstation uses ECC circuitry for memory reliability, fault tolerance, and integrity.
- ▶ Memory has single-error-correct and double-error-detect ECC circuitry that is designed to correct single-bit memory failures. The *double-bit* detection is designed to help maintain data integrity by detecting and reporting multiple errors beyond what the ECC circuitry can correct.

3.1.2 First-failure data capture

Diagnosing problems in a computer is a critical requirement for autonomic computing. The first step to producing a computer that truly has the ability to self-heal is to create a highly accurate way to identify and isolate hardware errors.

IBM has implemented a server design that builds in hardware error-check stations that capture and help to identify error conditions within the server. Each of these checkers is viewed as a diagnostic probe into the server and, when coupled with extensive diagnostic firmware routines, enables quick and accurate assessment of hardware error conditions at run time.

First-failure data capture (FFDC) provides the following key functions:

- ▶ FFDC check stations are carefully positioned within the server logic and data paths to help ensure that potential errors can be identified quickly and tracked accurately to an individual field replaceable unit (FRU).
- ▶ These checkers are collected in a series of fault-isolation registers (FIRs), where they can be accessed easily by the service processor.
- ▶ All communication between the service processor and the FIR is accomplished *out of band*. That is, operation of the error-detection mechanism is transparent to an operating system. This entire structure is *below the architecture* and is not seen, nor accessed, by system-level activities.

3.1.3 Service processor

The service processor included in the IntelliStation POWER 185 workstation is designed for an immediate means to diagnose, check the status, and sense the operational conditions. The service processor includes the following features:

- ▶ The service processor enables firmware and operating system surveillance, several environmental monitoring, reset, boot features, remote maintenance, and diagnostic activities, including console mirroring.
- ▶ The service processor can place calls to report surveillance failures, critical environmental faults, and critical processing faults.

3.1.4 Fault monitoring functions

A few of the fault monitoring systems in the IntelliStation POWER 185 workstation include:

- ▶ Built-in self-test (BIST) and power-on self-test (POST) check the processor, L3 cache, memory, and associated hardware required for proper booting of the operating system every time the system is powered on. If a noncritical error is detected or if the errors occur in resources that can be removed from the system configuration, the booting process is designed to proceed to completion. The errors are logged in the system nonvolatile RAM (NVRAM).
- ▶ Disk drive fault tracking can alert the system administrator of an impending disk failure before it impacts client operation.
- ▶ The AIX 5L log (where hardware and software failures are recorded and analyzed by the Error Log Analysis, ELA, routine) warns the system administrator about the causes of system problems. This also enables IBM service representatives to bring along probable replacement hardware components when a service call is placed, thus minimizing system repair time.

3.1.5 Environmental monitoring functions

Some of the environmental monitoring functions that are available for the IntelliStation POWER 185 workstation include:

- ▶ Temperature monitoring, which increases the fan speed rotation when the ambient temperature is above the normal operating range.
Temperature monitoring warns the system administrator of potential environmental-related problems (for example, air conditioning and air circulation around the system) so that appropriate corrective actions can be taken before a critical failure threshold is reached. It also performs an orderly system shutdown when the operating temperature exceeds the critical level.
- ▶ Fan speed monitoring, which provides a warning and an orderly system shutdown when the speed is out of the operational specification.
- ▶ Voltage monitoring, which provides a warning and an orderly system shutdown when the voltages are out of the operational specification.

3.1.6 Error handling and reporting

In the unlikely event of a system hardware or environmentally-induced failure, the system runtime error capture capability systematically analyzes the hardware error signature to determine the cause of failure. The error capture capability includes the following functions:

- ▶ The analysis is stored in the system NVRAM. When the system can be rebooted successfully, either manually or automatically, the error is reported to the AIX 5L operating system.
- ▶ Error Log Analysis (ELA) can be used to display the failure cause and the physical location of failing hardware.
- ▶ A hardware fault also turns on the Attention Indicator (one located on the front of the system unit and one on each light strip) to alert the user of an internal hardware problem. The indicator can also be turned on by the operator as a tool to allow system identification. For identification, the indicators flashes while the indicator is on solid when an error condition occurs.

3.1.7 Availability enhancement functions

The system auto-restart (reboot) option, when enabled, can reboot the system automatically following an unrecoverable software error, software hang, hardware failure, or environmentally-induced (ac power) failure.

3.2 Serviceability

The IntelliStation POWER 185 workstation is designed for customer setup (CSU) of the machine and for subsequent addition of most features (adapters/devices). The serviceability features include:

- ▶ The diagnostics consist of stand-alone diagnostics, which are loaded from the DVD-ROM drive, and online diagnostics.
- ▶ Online diagnostics, when installed, are resident with AIX 5L on the disk or system. They can be booted in single-user mode (service mode), run in maintenance mode, or run concurrently (concurrent mode) with other applications. They have access to the AIX 5L error log and the AIX 5L configuration data.
 - Service mode enables the checking of system devices and features.
 - Concurrent mode enables the normal system functions to continue while selected resources are being checked.
 - Maintenance mode enables the checking of most system resources.
- ▶ The System Management Services (SMS) error log is accessible from the SMS menu for tests performed through SMS programs. For results of service processor tests, access the error log from the service processor menu.

Increasing service productivity means that the system is up and running for a longer time. The IntelliStation POWER 185 workstation improves service productivity by providing the functions as described in the following sections.

Error indication and LED indicators

The IntelliStation POWER 185 workstation is designed for client setup of the machine and for the subsequent addition of most hardware features. The IntelliStation POWER 185 workstation also enables clients to replace service parts (customer-replaceable unit). To accomplish this, the IntelliStation POWER 185 workstation provides internal LED diagnostics

that identify parts that require service. Attenuation of the error is provided through a series of light attention signals, starting on the exterior of the system (system attention LED) located on the front of the system, and ending with an LED near the failing field replaceable unit (FRU).

For more information about customer-replaceable units, including videos, see:

<http://publib.boulder.ibm.com/eserver>

System attention LED

The attention indicator is represented externally by an amber LED on the operator panel and the back of the system unit. It is used to indicate that the system is in one of the following states:

- ▶ Normal state: LED is off.
- ▶ Fault state: LED is on solid.
- ▶ Identify state: LED is blinking.

Additional LEDs on I/O components, such as PCI-X slots and disk drives, provide status information, such as power, hot-swap, and need for service.

3.2.1 Service Agent

Service Agent is available at no additional charge. When installed on an IntelliStation POWER 185 workstation or an IBM System p5 system, the Service Agent can enhance the ability of IBM to provide the system with maintenance service.

The Service Agent:

- ▶ Monitors and analyzes system errors, and if needed, places a call to IBM Service automatically, without client intervention.
- ▶ Helps reduce the effect of business disruptions due to unplanned system outages and failures.
- ▶ Performs problem analysis on a subset of hardware-related problems and, with client authorization, can report the results to IBM Service automatically.

3.2.2 IBM Director

IBM Director for pSeries V5.10, a major new release the proven systems management solution from IBM, is available to IBM System p clients at no additional charge. While maximizing system availability, Director is designed to reduce the cost and complexity of management by providing comprehensive yet easy-to-use administration of the entire environment from a single point of control. It features an open, integrated toolset with new functions and improved ease of use that help you get started faster and be more productive.

With IBM Director, administrators can view, update, and track the configuration of remote systems; monitor usage and performance of critical components such as processors, disks, and memory; issue commands; and configure automatic responses to system conditions or problems. IBM Director also complements and integrates with higher-level management software such as Tivoli® and high-performance computing management software such as IBM Cluster Systems Management (CSM).

IBM Director's open design and support for industry standards enable heterogeneous hardware management with broad platform and operating system support, protecting clients' IT investment. IBM Director enables monitoring and event management across a heterogeneous IT environment, including Intel®, and IBM POWER systems that support AIX 5L, Linux, i5/OS®, and Windows from a single Java™-based user interface. From one central

console, users can monitor system resources, inventory, and events; manage tasks; and issue corrective actions, distributed commands, and hardware control for both servers and storage.

A redesigned version of IBM Director focuses on ease-of-use and delivers an even more open, integrated toolset to simplify system administration across all IBM System p platforms and several operating systems. IBM Director V5.10 includes:

- ▶ Broader platform coverage for use in a heterogeneous environment that includes IBM System p5, IBM @server p5, IBM @server i5, and IBM @server pSeries
- ▶ A new streamlined interface to boost productivity
- ▶ A new command-line interface, in addition to the graphical interface
- ▶ Lightweight agents for easy deployment

For more information, visit the following Web site at:

<http://www-03.ibm.com/servers/eserver/about/virtualization/systems/pseries.html>

3.2.3 IBM customer-managed microcode

The IBM System p customer-managed microcode is a methodology that enables you to manage and to install microcode updates on systems and associated I/O adapters. For more information, see the IBM microcode update Web site at:

<http://techsupport.services.ibm.com/server/mdownload>

IBM provides service tools that can assist you in determining microcode levels and updating systems with the latest available microcode. To determine which tool to use in a specific environment, visit:

<http://techsupport.services.ibm.com/server/mdownload/mcodetools.html>

3.2.4 Service Update Management Assistant

The Service Update Management Assistant (SUMA) helps system administrators retrieve maintenance updates from the Web. SUMA offers flexible options that let clients set up policies to automate the download of fixes to their systems. SUMA policies can be scheduled to periodically check the availability of specific new fixes (APAR, PTF, or fileset), critical or security fixes, or an entire maintenance level. A notification e-mail can be sent that details the updates that are needed when comparing available fixes to installed software, a fix repository, or a maintenance level. SUMA provides the following benefits:

- ▶ Moves administrators away from the task of manually retrieving maintenance updates from the Web.
- ▶ Optionally schedules policy to run periodically, for example, to download the latest critical fixes weekly.
- ▶ Compares fixes needed against software inventory, fix repository, or a maintenance level.
- ▶ Sends mail notification after a fileset preview or download operation.
- ▶ Allows for FTP, HTTP, or secure HTTPS transfers.
- ▶ Provides the same requisite checking as the IBM fix distribution Web site.

SUMA is available through SMIT menus (**smitty suma**) or a command line interface.

Workstation hints and tips

This chapter contains an introduction to CATIA and several administration aids that are related to the IBM IntelliStation POWER 185 workstation. You should test and modify the scripts before you place them into production. We provide these scripts to give you an idea of the types of customization that are possible.

4.1 64-bit CATIA

This section provides an introduction to CATIA. Figure 4-1 shows the IntelliStation POWER 185 workstation set up as a CATIA workstation.



Figure 4-1 *IntelliStation POWER 185 workstation with input devices*

Overview

CATIA Version 5 Release 16 builds upon V5 R15, where most CATIA V5 and ENOVIA DMU products support 64-bit mode when executing on IBM workstations running AIX 5L. With Version 5 Release 16, the 64-bit support has been enhanced, adding support for many CATIA V5 applications and extending ENOVIA DMU application support in 64-bit mode when running on pSeries or IntelliStation POWER workstations with AIX 5L V5.1 Maintenance Level 4, AIX 5L V5.2 Maintenance Level 2, and AIX 5L V5.3 Maintenance Level 3.

Dassault Systemes announced on 26 January 2006 the official support of IBM IntelliStation POWER 285 system using AIX 5L V5.3 Maintenance Level 3. For more information about this announcement, see:

<http://www.3ds.com/implementation/technology/certification-support-announcement/ibm-power5-workstation-p285-support-on-aix-version-53-m103/>

As of this writing, the IBM IntelliStation POWER 185 certification is still in progress. Results will be published when the final tests are complete.

Capitalizing on the investments that clients have already made on IBM platforms running AIX 5L, clients can benefit from the advanced capabilities of the latest ENOVIA DMU and CATIA V5 software to handle designs and digital mock-ups of full product configurations with the level of detail needed.

The addition of native 64-bit capability brings significant performance enhancements of CATIA V5 and ENOVIA DMU Navigator. Initial benchmarks indicate that for memory-intensive operations, such as analysis of large models, global performance is significantly increased. In addition, improvements to clash analysis greatly reduces processing times for analysis of large assemblies.

Installation tips for 64-bit CATIA V5

The installation process of 64-bit CATIA V5 is identical to previous versions of CATIA. The 64-bit CATIA V5 version does not overwrite the existing implementation. The entire executable code is installed in a unique file system that is created for it. This unique file system is independent of the file system in which CATIA is installed.

Near the end of the installation process, a configuration window opens and requests that you enter the current CATIA configuration environment location. At this point in the process, you should specify the environment path. Then, the installation process is finished, and you are ready to execute CATIA V5 64-bit.

To have the complete CATIA V5 64-bit function, the AIX 5L kernel should be also on 64-bit. In the remaining sections, you can check the current AIX 5L environment and change it to 64-bit if necessary.

Note: The 64-bit CATIA V5 will run without an error message even when AIX 5L is running the 32-bit kernel.

4.1.1 Checking the AIX 5L kernel mode

To take the most advantage of the 64-bit support, install the 64-bit kernel (fileset bos.mp64). To ensure that the 64-bit kernel is running as expected, follow these steps:

1. Log in as the root user.
2. Enter the **bootinfo -K** command.

If the kernel is running in 64-bit mode, the output of this command is 64.

4.1.2 Changing from a 32-bit to a 64-bit kernel

If the system is not running the 64-bit kernel, perform the following steps:

1. Log in as the root user.
2. Enter the **cd /** command.
3. Enter the **ln -fs /usr/lib/boot/unix_64 unix** command.
4. Enter the **cd /usr/lib/boot** command.
5. Enter the **ln -fs /usr/lib/boot/unix_64 unix** command.
6. Enter the **bosboot -ad /dev/ipldevice** command.
7. Enter the **sync;sync;sync** commands.
8. Enter the **shutdown -Fr** command to reboot the 64-bit kernel.

4.2 Network Installation Management

Network Installation Management (NIM) is an excellent feature of the AIX 5L operating system and is important for teams or companies that have a need to install or upgrade many systems with the same images at the same time.

Some of the benefits of NIM are:

- ▶ **Manageability:** NIM enables central localization of software installation images, thus making backup and administration easier.
- ▶ **Central administration:** Administrators can install remote AIX 5L machines without having to physically attend them.
- ▶ **Scalability:** You can install more than one machine at a time, implement a group strategy of machines and resources, and choose how many machines to install at a time.
- ▶ **Non-prompted installation:** NIM provides a function to install systems without having to go to the machine, thus avoiding the manual machine-by-machine method.
- ▶ **Convenient installations:** Installations can be initiated by either the client or master at a convenient time. For example, if a client is unavailable at the time of the installation, you can initiate an installation when it is back online, or if there is less traffic on your network at a certain time, you can initiate the installations to occur then.

In previous versions of AIX 5L, NIM used the `rsh` and `rcmd` commands to perform the remote execution of commands on clients. These `r-` commands were a potential security exposure when running on an untrusted network.

AIX 5L Version 5.3 is enhanced by the *nimsh* environment that is part of the `bos.sysmgt.nim.client` fileset. It enables the following two remote execution environments:

- ▶ NIM service handler for client communication: Basic `nimsh`
- ▶ NIM cryptographic authentication: `OpenSSL`

While the basic `nimsh` is an easy to use solution with sufficient security, `OpenSSL` provides additional up-to-date cryptographic security.

The original `rsh` or `rcmd` command environments are still supported in Version 5.3 because of compatibility and ease of use reasons.

NIM scripts

To manage many machines, NIM scripting is helpful for administrators to establish a NIM-based inventory environment. Example 4-1 provides a sample script for a specific client to examine the machine topology and store the result in HTML format.

Example 4-1 NIM collect script

```
*****
IBM DOES NOT WARRANT OR REPRESENT THAT THE CODE PROVIDED IS COMPLETE OR
UP-TO-DATE. IBM DOES NOT WARRANT, REPRESENT OR IMPLY RELIABILITY, SERVICEABILITY
OR FUNCTION OF THE CODE. IBM IS UNDER NO OBLIGATION TO UPDATE CONTENT NOR PROVIDE
FURTHER SUPPORT. ALL CODE IS PROVIDED "AS IS," WITH NO WARRANTIES OR GUARANTEES
WHATSOEVER.
*****

#!/bin/ksh
# Created by Gregor Linzmeier, IBM Deutschland GmbH
#           pSeries Technical Support Workstation and entry Server
#           Systems and Technology Group - Northeast Europe - IMT
#####
# Define outfiles
#####
OUTFILEL=/home/v4/linzi/LISTE".out"
OUTFILEH=/home/v4/linzi/LISTE".htm"
#####
# Define Functions
#####
function Check_Disks
{
    for i in `lsdev -C|grep hdi`
    do
        echo $i|grep hdi |awk '{print $1}'
    done
}
#####
# Check single or multi processor
#####
if [ `bootinfo -z` -gt 0 ]
then
    MULTI="mp"
else
    MULTI="up"
fi
#####
# Check system information
#####
HOSTNAME=`hostname`
MODEL=`lsattr -l sys0 -E|grep modelname|cut -d, -f2|awk '{print $1}'`
UNAME=`uname -m`
PROC=`lsdev -C|grep -i processor|wc|awk '{print $1}'`
SYSID=`lsattr -l sys0 -E|grep systemid|cut -d, -f2|awk '{print $1}'`
MCODE=`lsattr -l sys0 -E|grep fwversion|cut -d, -f2|awk '{print $1}'`
MEM=`lsattr -l mem0 -E|tail -1|awk '{print $2}'`
IPADDR=`lsattr -l en0 -E|grep "netaddr "|awk '{print $2}'`
MAC=`lscfg -v -l ent0|grep Netw|rp1 "\." " " | awk '{ print $3 }'`
NETMASK=`lsattr -l en0 -E|grep "netmask "|awk '{print $2}'`
DUPLEX=`lsattr -l ent0 -E|grep "media_speed"|awk '{print $2}'`
OSLEVEL=`oslevel`
BOSLVL=`lspp -L | grep bos.$MULTI|awk '{print $2}'`
GRAPHIC=`lsdev -C|grep -i gxt|awk '{print $4}'`
DISKS=`Check_Disks`
```

```
#####
# Create a HTML Table Data
#####
echo "<TR><TD NOWRAP>"$HOSTNAME"</TD>" >> $OUTFILEH
if [ `echo $MODEL | grep 150` ]
then
    echo "<TD NOWRAP BGCOLOR='ORANGE'>"$MODEL"</TD BGCOLOR='WHITE'>" >> $OUTFILEH
else
    echo "<TD NOWRAP>"$MODEL"</TD>" >> $OUTFILEH
fi
echo "<TD NOWRAP><CENTER>"$MULTI"</CENTER></TD>" >> $OUTFILEH
echo "<TD NOWRAP><CENTER>"$PROC"</CENTER></TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$UNAME"</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$SYSID"</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$MCODE"</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$MEM" MB</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$IPADDR"</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$MAC"</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$NETMASK"</TD>" >> $OUTFILEH
echo "<TD NOWRAP>"$DUPLEX"</TD>" >> $OUTFILEH
if [ `echo $OSLEVEL | grep 4.3.2` ]
then
    echo "<TD NOWRAP BGCOLOR='YELLOW'>"$OSLEVEL"</TD BGCOLOR='WHITE'>" >> $OUTFILEH
else
    echo "<TD NOWRAP>"$OSLEVEL"</TD>" >> $OUTFILEH
fi
echo "<TD NOWRAP>"$BOSLVL"</TD>" >> $OUTFILEH
if [ `echo $GRAPHIC | grep 2000` ]
then
    echo "<TD NOWRAP BGCOLOR='LIGHTGREEN'>"$GRAPHIC"</TD BGCOLOR='WHITE'>" >>
$OUTFILEH
else
    echo "<TD NOWRAP>"$GRAPHIC"</TD>" >> $OUTFILEH
fi
echo "<TD NOWRAP>"$DISKS"</TD></TR>" >> $OUTFILEH
#####
# Create a simple ascii list
#####
echo $HOSTNAME":\c" >> $OUTFILEL
echo $MODEL":\c" >> $OUTFILEL
echo $MULTI":\c" >> $OUTFILEL
echo $PROC":\c" >> $OUTFILEL
echo $UNAME":\c" >> $OUTFILEL
echo $SYSID":\c" >> $OUTFILEL
echo $MCODE":\c" >> $OUTFILEL
echo $MEM" MB:\c" >> $OUTFILEL
echo $IPADDR":\c" >> $OUTFILEL
echo $MAC":\c" >> $OUTFILEL
echo $NETMASK":\c" >> $OUTFILEL
echo $DUPLEX":\c" >> $OUTFILEL
echo $OSLEVEL":\c" >> $OUTFILEL
echo $BOSLVL":\c" >> $OUTFILEL
echo $GRAPHIC":\c" >> $OUTFILEL
echo $DISKS >> $OUTFILEL
```

An advantage of NIM scripts is that the communication between the client and server is accomplished by the NIM protocol. Example 4-1 is one example of a collection of scripts for different purposes.

4.3 Wake on LAN

The service processor (SP) provides an additional functionality to the IntelliStation POWER 185 system. In some situations, it is very helpful to power on a system without physically pushing the white button on the operator control panel.

Wake on LAN® is implemented on the integrated Gigabit Ethernet only and interfaced to the SP. The Ethernet controller supports both Advanced Power Management™ (APM) wake up and Advanced Configuration and Power Interface (ACPI) wake up. The APM wake up uses the APM_WAKEUP signal to wake up the system.

Note: Beginning with AIX 5L V5.2 ML4, the `wo1` command is integrated in the AIX 5L operating system.

4.4 Optical mouse acceleration

Sometimes the mouse acceleration is not synchronized to the actual system settings, especially when the previous mouse based on trackball functionality is replaced by an optical mouse. The behavior using a new optical mouse is more sensitive and needs a modification of the current settings.

To modify the current settings of the mouse behavior:

1. Select the Style Manager icon on the CDE menu, as shown in Figure 4-2.



Figure 4-2 CDE Toolbar

2. In the Style Manager window, select the mouse icon, as shown in Figure 4-3.



Figure 4-3 Style Manager

3. To modify the acceleration on the mouse behavior move the acceleration slider to a higher value (Figure 4-4). Depending on your needs the mouse sensitivity could be changed from a small moving area to a large moving area.

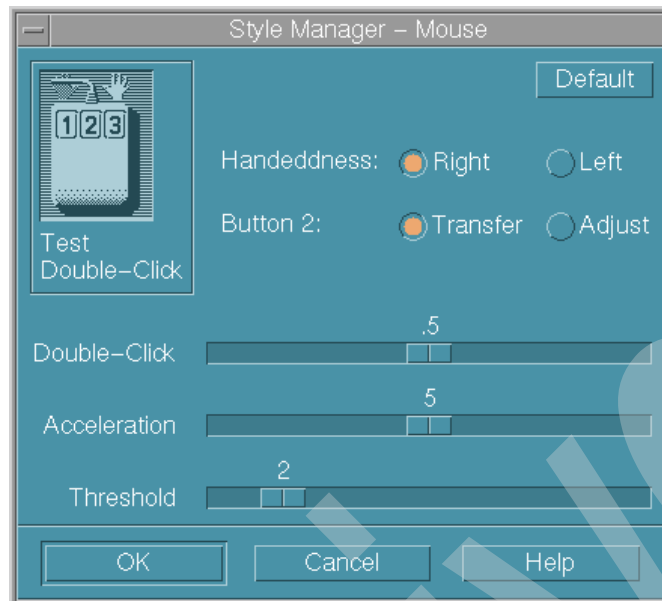


Figure 4-4 Style Manager - Mouse

4. To make your changes permanent, select **Return to Home session** and select **Set Home Session**, as shown in Figure 4-5. All new settings are stored in the .dt directory in your home directory.

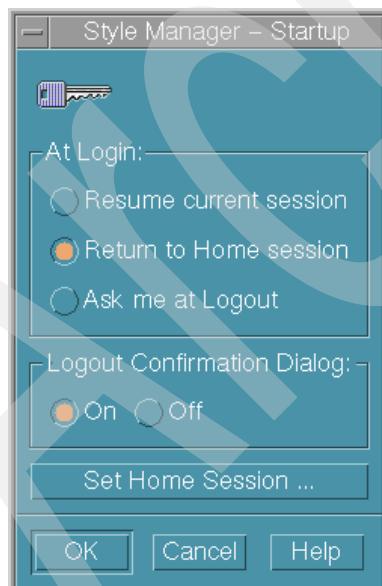


Figure 4-5 Style Manager - Setup

4.5 AIX Toolbox for Linux

The AIX 5L platform is the premier operating system from IBM for IBM System p systems. In order to enhance interoperability between Linux and AIX 5L, IBM has ported a collection of open source software (OSS) tools and bundled them into a toolbox for users of AIX 5L: The AIX Toolbox for Linux Applications. Figure 4-6 shows the media.

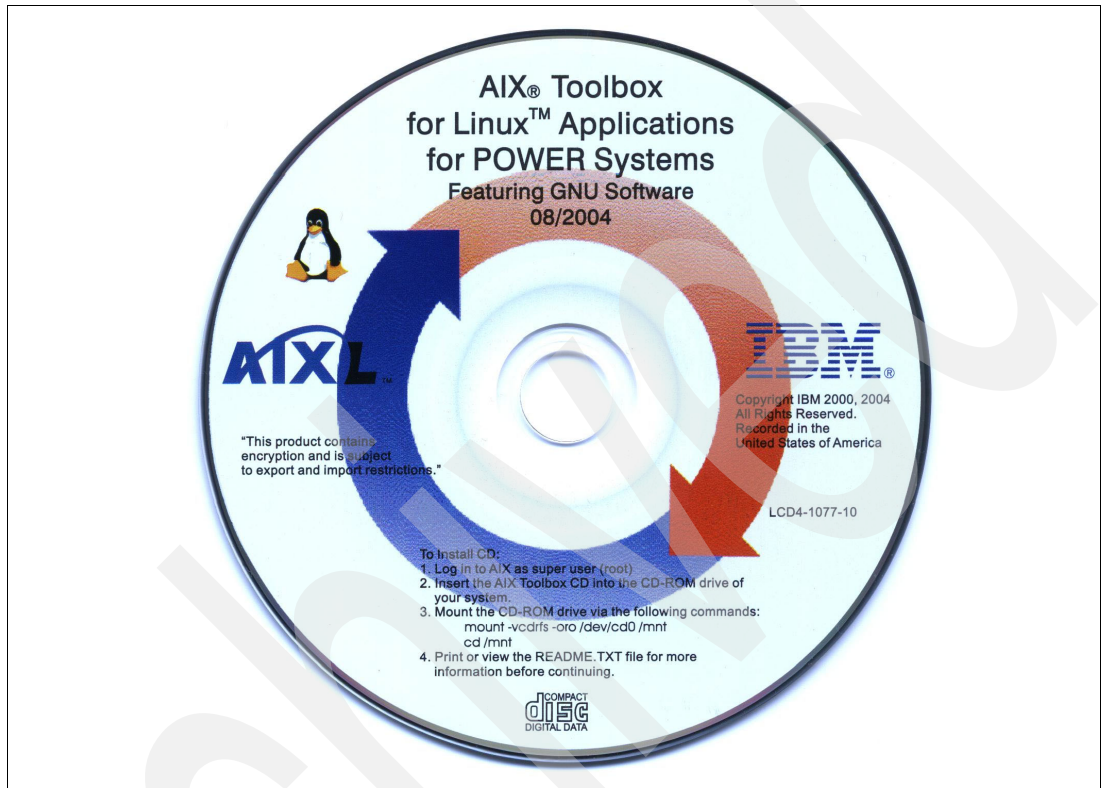


Figure 4-6 AIX Toolbox media

The Toolbox contains a collection of open source software that works with both AIX Version 4.3.3 and AIX 5L. For UNIX and Linux developers and users, it introduces a way to expand the target systems for applications on AIX 5L. The goal of the AIX Toolbox for Linux Applications is to provide ready-to-run, installable open software tools and facilitate recompilation of open source software, without modifications, on AIX 5L systems.

You can order the AIX Toolbox with an initial order of AIX 5L by selecting the AIX Toolbox option or through the Web using the following link:

<http://www.ibm.com/servers/aix/products/aixos/linux>

We recommend the IBM Redbook *Linux Applications on pSeries*, SG24-6033, to understand the intention and the use of the IBM AIX Toolbox.

4.6 Licence Use Management Version 4.6.8

The AIX 5L *preferred* Licence Use Management (LUM) target ID is only compatible with License Use Management Version 4.6.6 or later. If you need a license to be installed on an earlier license server, or a nodelock license for an application enabled with an older License

Use Management toolkit, request the license using the LUM target ID shown second in the output of the **i4target -01** command.

The *preferred* target ID was introduced in LUM V4.6.6 to solve cases of duplicated IDs returned by the **uname -m** command and by the previous **i4target** command and must be used in all the cases where it is applicable. The other target ID is maintained only for compatibility reasons and will be removed in the future.

The **i4target** command is the only valid generator of LUM target IDs for CATIA V5 products in a nodelock or concurrent environment. When using CATIA V4 products in a nodelock or concurrent environment, the **uname -m** command delivers the correct processor ID, as shown in Table 4-1.

Table 4-1 Obtaining the correct processor ID

Version	Command
CATIA V4 configurations/products	uname -m
CATIA V5 configurations/products	i4targetid -01

When using partitionable systems or systems with non-hexadecimal serial numbers, the **uname -m** output will not resemble a valid LUM target ID (as it does with the previous target IDs) and trying to create licenses from the **uname -m** command results in licenses not accepted by LUM code. Figure 4-7 shows a command for obtaining the correct target ID for your server or nodelocked workstation using CATIA V5 products.

```

#
# ./i4target -01
i4target Version 4.6.8 AIX -- LUM Target ID Tool
(c) Copyright 1995-2004, IBM Corporation, All Rights Reserved
US Government Users Restricted Rights - Use, duplication or disclosure
restricted by GSA ADP Schedule Contract with IBM Corp.
(c) Copyright 1991-1998 Gradient Technologies Inc., All Rights Reserved
(c) Copyright 1991,1992,1993, Hewlett-Packard Company, All Rights Reserved

PREFERRED LUM TARGET ID
-----
cfcbf4e aix CPU Planar ID
#
  
```

Figure 4-7 Output for the **i4target** command

For additional information, visit:

<http://www.ibm.com/software/awdtools/lum>

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics that are covered in this Redpaper.

IBM Redbooks

For information about ordering these publications, see “How to get IBM Redbooks” on page 47. Note that some of the documents that are referenced here might be available in softcopy only.

- ▶ *Advanced POWER Virtualization on IBM System p5*, SG24-7940
- ▶ *Virtual I/O Server Integrated Virtualization Manager*, SG24-4061
- ▶ *Partitioning Implementations for IBM @server p5 Servers*, SG24-7039
- ▶ *Advanced POWER Virtualization on IBM @server p5 Servers: Architecture and Performance Considerations*, SG24-5768
- ▶ *IBM @server pSeries Sizing and Capacity Planning: A Practical Guide*, SG24-7071
- ▶ *IBM @server p5 590 and 595 System Handbook*, SG24-9119
- ▶ *IBM @server p5 590 and 595 Technical Overview and Introduction*, REDP-4024
- ▶ *IBM @server p5 510 Technical Overview and Introduction*, REDP-4001
- ▶ *IBM @server p5 520 Technical Overview and Introduction*, REDP-9111
- ▶ *IBM @server p5 550 Technical Overview and Introduction*, REDP-9113
- ▶ *IBM @server p5 570 Technical Overview and Introduction*, REDP-9117
- ▶ *IBM System p5 505 Express Technical Overview and Introduction*, REDP-4079
- ▶ *IBM System p5 510 and 510Q Technical Overview and Introduction*, REDP-4136
- ▶ *IBM System p5 520 and 520Q Technical Overview and Introduction*, REDP-4137
- ▶ *IBM System p5 550 and 550Q Technical Overview and Introduction*, REDP-4138
- ▶ *IBM System p5 560Q Technical Overview and Introduction*, REDP-4139

Other publications

These publications are also relevant as further information sources:

- ▶ *7014 Series Model T00 and T42 Rack Installation and Service Guide*, SA38-0577, includes information regarding the 7014 Model T00 and T42 Rack, in which this server can be installed.
- ▶ *7316-TF3 17-Inch Flat Panel Rack-Mounted Monitor and Keyboard Installation and Maintenance Guide*, SA38-0643, includes information regarding the 7316-TF3 Flat Panel Display, which can be installed in your rack to manage your system units.
- ▶ *IBM @server Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590, provides information to operators and system administrators on how to use a IBM Hardware Management Console for pSeries (HMC) to manage a system. It also discusses the issues that are associated with logical partitioning planning and implementation.

- ▶ *Planning for Partitioned-System Operations*, SA38-0626, provides information to planners, system administrators, and operators about how to plan for installing and using a partitioned server. It also discusses some issues associated with the planning and implementing of partitioning.
- ▶ *RS/6000 and @server pSeries Diagnostics Information for Multiple Bus Systems*, SA38-0509, includes diagnostic information, service request numbers (SRNs), and failing function codes (FFCs).
- ▶ *System p5, @server p5 Customer service support and troubleshooting*, SA38-0538, includes information regarding slot restrictions for adapters that can be used in this system.
- ▶ *System Unit Safety Information*, SA23-2652, includes translations of safety information used throughout the system documentation.

Online resources

These Web sites and URLs are also relevant as further information sources:

- ▶ AIX 5L operating system maintenance packages downloads
<http://www.ibm.com/servers/eserver/support/unixservers/aixfixes.html>
- ▶ Autonomic computing on IBM @server pSeries servers
<http://www.ibm.com/autonomic/index.shtml>
- ▶ Ceramic Column Grid Array (CCGA), see IBM Chip Packaging
<http://www.ibm.com/chips/micronews>
- ▶ Copper circuitry
<http://domino.research.ibm.com/comm/pr.nsf/pages/rsc.copper.html>
- ▶ IBM @server p5 Hardware documentation
http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/
- ▶ IBM System p5 Information Centers
<http://publib.boulder.ibm.com/eserver/>
- ▶ IBM System p5, @server p5, pSeries and RS/6000 microcode update
<http://techsupport.services.ibm.com/server/mdownload2/download.html>
- ▶ IBM System p5, @server p5 and pSeries support
<http://www.ibm.com/servers/eserver/support/unixservers/index.html>
- ▶ IBM @server support: Tips for AIX 5L administrators
<http://techsupport.services.ibm.com/server/aix.srchBroker>
- ▶ IBM online sales manual
<http://www.ibm.link.ibm.com>
- ▶ Linux for IBM System p5
<http://www.ibm.com/systems/p/linux/>
- ▶ Microcode Discovery Service
<http://techsupport.services.ibm.com/server/aix.invsoutMDS>
- ▶ The LVT is a PC based tool that is intended to assist you in logical partitioning
<http://www.ibm.com/servers/eserver/series/lpar/systemdesign.htm>

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