



PowerFrame Enterprise Server

Tricord's® PowerFrame Enterprise Server is specially designed for large, complex business-critical environments. It delivers sustained performance, even as you add new applications and users. This flexible, single platform supports up to eight 133 MHz Pentium® processors and PCI, providing best-of-class performance for demanding Microsoft® Windows NT™ application serving and high-capacity Novell® NetWare® environments.

The PowerFrame Enterprise Server architecture separates network I/O, disk I/O and processing tasks to deliver superior multi-processing scalability and performance. This design allows I/O operations and CPU-intensive procedures like on-line backup and database processing to run concurrently, without one activity degrading the performance of the other.

To maximize system uptime, the PowerFrame Enterprise Server includes a robust set of high-availability features. Redundant, hot replaceable components protect your business-critical operations. Automatic system recovery from critical failures minimizes system downtime when a fault occurs. With these features, the PowerFrame delivers an availability rating of 99.98 percent, or less than two hours of downtime a year running 24 hours a day, seven days a week. (PC servers can cause 14 times this amount of downtime a year.)

To help manage day-to-day operations, and to maximize system performance and uptime, the PowerFrame Enterprise Server features ServerGuard™. The intelligent subsystem provides performance tuning and capacity planning tools that enable you to keep up with a growing and changing network. Remote console support lets you manage remote systems from a single site. Critical information is always available, regardless of the state of the server or the server's power, because ServerGuard is battery backed.

Since the PowerFrame Enterprise Server is designed for scalability, you can start with one configuration and then add components as required. You can add processors, memory, NICs and SCSI devices, all without losing the performance needed to run your system. The result is high performance at lower total cost.



PowerFrame Enterprise Server Delivers

CPU/Cache Subsystem: Improve Your SMP Application Performance

The CPU/Cache Subsystem with MP Accelerator Technology (MPAT) gives multiprocessing operating systems and applications a performance edge. With MPAT, the PowerFrame delivers sustained performance with up to eight 133 MHz Pentium processors, allowing more users to run more applications on a single platform.

MPAT improves multiprocessing scalability with 2 MBytes of second-level cache dedicated to each processor — four times the industry average. Other MPAT performance-enhancing techniques increase CPU performance and reduce system bus utilization.

Main Memory Subsystem: Increase System Performance With Up to 1.0 GByte of ECC Memory

The Main Memory Subsystem (MMS) provides the primary system storage for applications and operating systems. Memory mapping lets you install dissimilar SIMM capacities to take advantage of new capacities without the expense of replacing the existing RAM.

The MMS uses memory scrubbing and Error Correcting Code (ECC) algorithms to detect single-bit and double-bit errors and correct single-bit errors before they impact users and data.

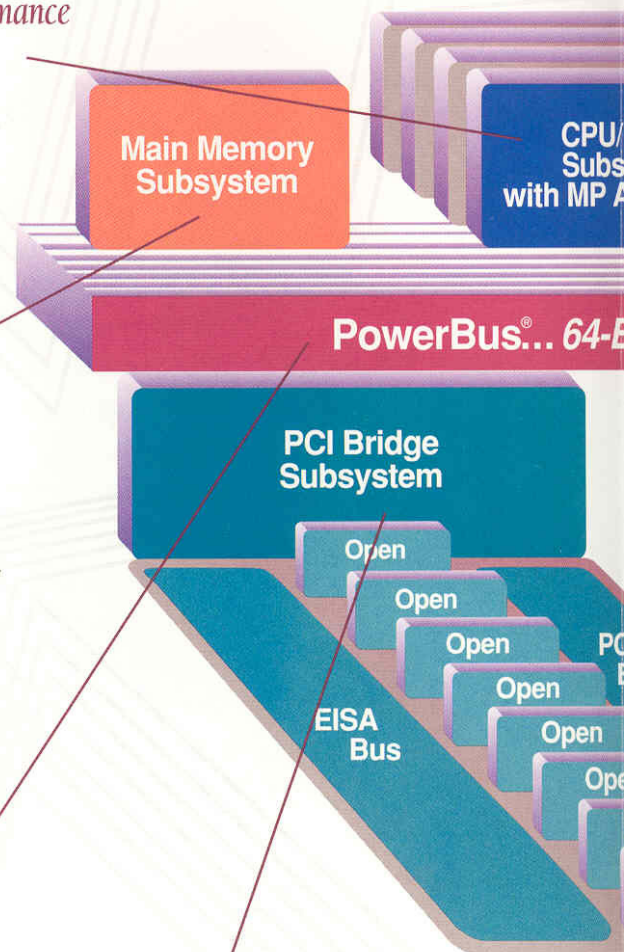
PowerBus®: Optimized for Peak System Throughput

The PowerFrame Enterprise Server's performance advantage begins with its high-speed PowerBus. Each independent subsystem connected to the 64-bit PowerBus performs its own function and is capable of bursting data at peak rates to maximize bus throughput. With a bandwidth of 267 MBytes/second, the PowerBus is well equipped to handle the throughput associated with running multiple processors, as well as supporting network I/O and disk I/O throughput.

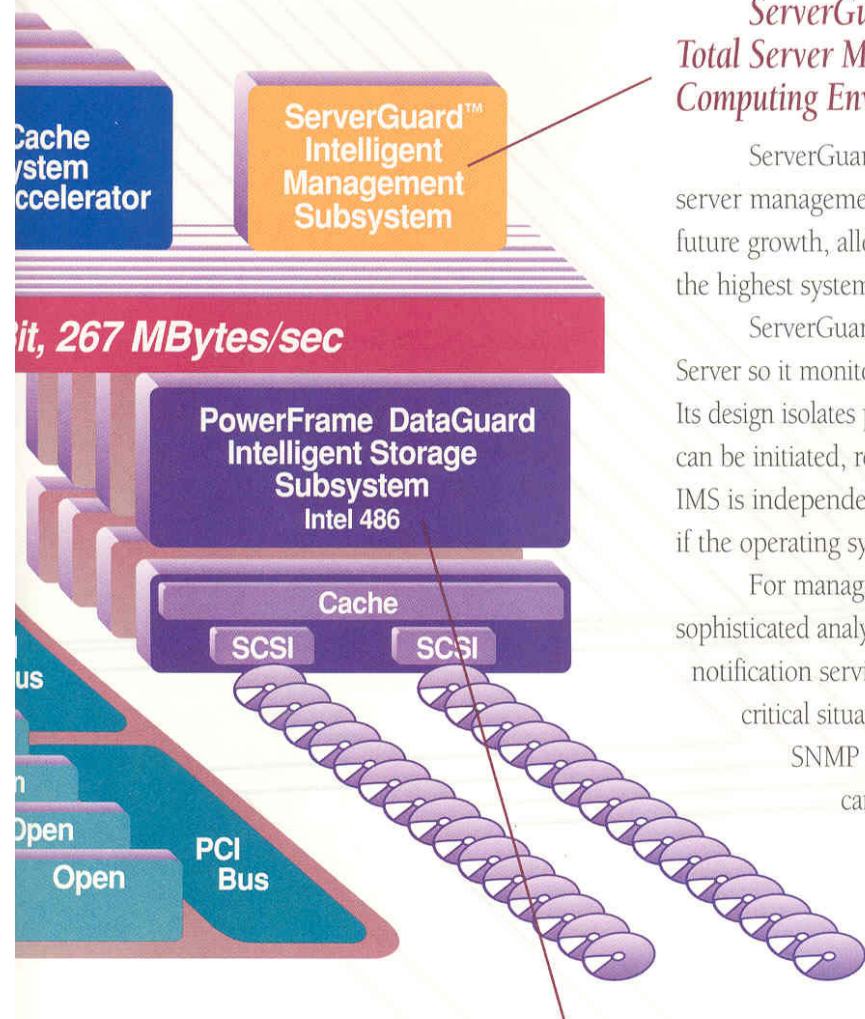
PCI Bridge Subsystem: High-Speed Communication Breaks the I/O Bottleneck

The PCI Bridge Subsystem (PBS) delivers the high-speed network I/O required to give your users instantaneous response. Eight shared bus master slots support PCI and EISA based connections through two PCI buses and one EISA bus. Data buffering and high-speed bursting interfaces allow PCI, EISA and the PowerBus to run concurrently at their peak rates to maintain maximum throughput.

The PBS features a fault-resilient design that isolates its buses from each other so that a NIC failure on one of the buses will not affect the other two buses. This dual architecture lets you configure redundant PCI cards when used with the appropriate software. With its open design, the PBS will take you well into the future, supporting the latest PCI NICs as they become available.



ers Through Architectural Advantage



ServerGuard™ Intelligent Management Subsystem: Total Server Management for Today's Sophisticated Computing Environments

ServerGuard Intelligent Management Subsystem (IMS) is a robust server management solution for managing day-to-day operations and future growth, allowing you to maximize system performance and ensure the highest system uptime.

ServerGuard IMS is fully integrated into the PowerFrame Enterprise Server so it monitors all components without affecting system performance. Its design isolates problems to specific subsystems, and subsystem diagnostics can be initiated, regardless of the state of the other subsystems. Since the IMS is independent of the operating system, it diagnoses problems even if the operating system is down.

For managing performance and growth, ServerGuard IMS provides sophisticated analysis tools for system tuning and capacity planning. Flexible notification services ensure you stay on top of potential problems and critical situations through local and remote console support, pagers and SNMP management packages. With pre-failure notification, you can react to minor faults before they cause a major problem.

PowerFrame DataGuard Intelligent Storage Subsystem: Improves Performance, Scalability and Availability for Demanding Applications

The PowerFrame DataGuard Intelligent Storage Subsystem (ISS) delivers the high performance your complex applications require and the storage capacity to support them. The ISS features a processor dedicated to handling storage I/O processing tasks. This design off-loads 90 percent of the I/O transaction tasks typically managed by the CPU and operating system in other server architectures.

DataGuard boosts your disk I/O performance by 25 percent or more with fault-tolerant cache. This optional 8 MByte cache module improves overall server performance by providing immediate acknowledgment of disk writes and supporting read back from cache. And since the cache is enabled per logical device, you can tune your PowerFrame by dedicating the cache to write-intensive application storage.

DataGuard protects your information assets with high-availability features including mirrored, battery-backed swappable ECC memory. If system power is lost, the cache holds data for up to eight days and writes it to disk when the power is restored. If an ISS fails, you can remove the cache module and install it on a different ISS with the data intact.

PRODUCT SUMMARY

CPU/CACHE SUBSYSTEM	CCS	CCS WITH MPAT
Processor	Pentium® 100 MHz with 512 KBytes second-level cache	Dual Pentium 133 MHz each with 2 MBytes second-level cache
Number supported	1 to 6	1 to 4 for a total of 1 to 8 processors
MAIN MEMORY SUBSYSTEM		
ECC Memory	64 MBytes to 1.0 GByte	
INTELLIGENT STORAGE SUBSYSTEM	POWERFRAME DATAGUARD ISS	FOUR-CHANNEL ISS
Number of SCSI channels	2	4
8 MBytes fault-tolerant cache	Optional	N/A
Number supported	1 to 4	1 to 6
Internal Fast/Wide SCSI devices	9	9
Fast/Wide SCSI devices with PowerFile expansion cabinets	96	201
NETWORK AND PERIPHERAL SUPPORT	EISA BRIDGE SUBSYSTEM	PCI BRIDGE SUBSYSTEM
NICs supported	EISA	PCI and EISA
Number of NIC slots	8	8
Keyboard and mouse	Standard	Standard
VGA controller	Standard	Standard (integrated)
Available half-height peripheral slots	1	1
3.5" floppy and CD-ROM drive	Standard	Standard
SERVERGUARD INTELLIGENT MANAGEMENT SUBSYSTEM		
IMS	Standard	
POWER AND COOLING SUBSYSTEM		
Main cabinet power supplies	1000W redundant (3 x 500W)	
PowerFile expansion cabinet power supplies	500W redundant (2 x 500W)	
HIGH AVAILABILITY FEATURES		
RAID 0, 1, 4, 5 and 10	Standard	
Passive backplane	Standard	
ECC memory	Standard	
Disk hot sparing	Standard	
Disk hot replacement	Standard	
NIC Balance and Redundancy for NetWare	Standard with NetWare ordered through Tricord	
Redundant power supplies	Standard	
Power supply hot replacement	Standard	
Redundant CPU with auto recovery capability	Standard	

FEATURES AND SPECIFICATIONS

BASE CABINET DIMENSIONS	EXPANSION CABINET DIMENSIONS	HUMIDITY
Height 37 in (94 cm)	Height 35 in (89 cm)	Operating 20 to 80 percent (non-condensing)
Width 22 in (56 cm)	Width 22 in (56 cm)	Non-Operating 8 to 90 percent (non-condensing)
Depth 34 in (86 cm)	Depth 33 in (84 cm)	
Weight 250 lbs (113 kg) w/o SCSI devices	Weight 125 lbs (56.5 kg) w/o SCSI devices	
Power Outlet Type	Power Outlet Type	POWER INPUT RATINGS
100-220 VAC (US) NEMA L5-20R	100-220 VAC (US) IEC 302	UL 100-120 VAC/10 A/60 Hz 220-240 VAC/5 A/60 Hz
220-240 VAC (US) NEMA L6-20R	Miscellaneous Power	CSA 100-120 VAC/10 A/60 Hz 220-240 VAC/5 A/60 Hz
220-240 VAC International IEC 309	Maximum Power 600W (with 2 500W power supplies)	TUV 220-240 VAC/5 A/50 Hz
220-240 VAC International without plug for special installation.	Heat Generated 2047 BTU/hour	
Miscellaneous Power	TEMPERATURE	PHYSICAL LOCATION REQUIREMENTS
Maximum Power 1200W (with 3 500W power supplies)	Operating 50 F (10 C) to 93 F (34 C)	• 30 inches clearance front and back of all cabinets for door swing and maintenance
Heat Generated 4096 BTU/hour	Non-Operating -40 F (-40 C) to 140 F (60 C)	• 6 inches minimum to wall on sides for air flow



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PowerFrame Enterprise Server Options

The PowerFrame Enterprise Server fulfills a wide range of network computing requirements. Tricord offers the PowerFrame in four performance packages or it may be custom configured.

- The Entry Package provides value and scalable performance. It supports up to six Intel Pentium 100 MHz processors and features the PowerFrame DataGuard Intelligent Storage Subsystem (ISS) for exceptional disk I/O performance. For Ethernet, Token Ring and FDDI support, the Entry Package includes the EISA Bridge Subsystem.
- The Network Performance Package features the PCI Bridge Subsystem for high-performance network serving. With the four-channel ISS, the Network Performance Package is designed for high-growth environments with large storage capacity requirements.
- For high-performance symmetric multiprocessing, the Application Performance Package features Tricord's MP Accelerator Technology. The Application Performance Package includes the PowerFrame DataGuard Intelligent Storage Subsystem (ISS) with a fault-tolerant cache module for high-performance SCSI I/O and data protection, supporting up to 96 SCSI devices. For high-performance networking, the Application Performance Package includes the PCI Bridge Subsystem.
- The Enterprise Performance Package offers all the features required for high-performance enterprise computing. It supports up to eight 133 MHz Pentium processors with MPAT and up to 201 SCSI devices. The PCI Bridge Subsystem maximizes network performance and availability.

All PowerFrame Enterprise Server configurations include fault-tolerance features throughout their design to protect data and give continued access to critical applications. ServerGuard Intelligent Management Subsystem (IMS) is standard on all systems to provide Windows-based fault, configuration, and performance management tools similar to those traditionally found only on mainframe computers.

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