



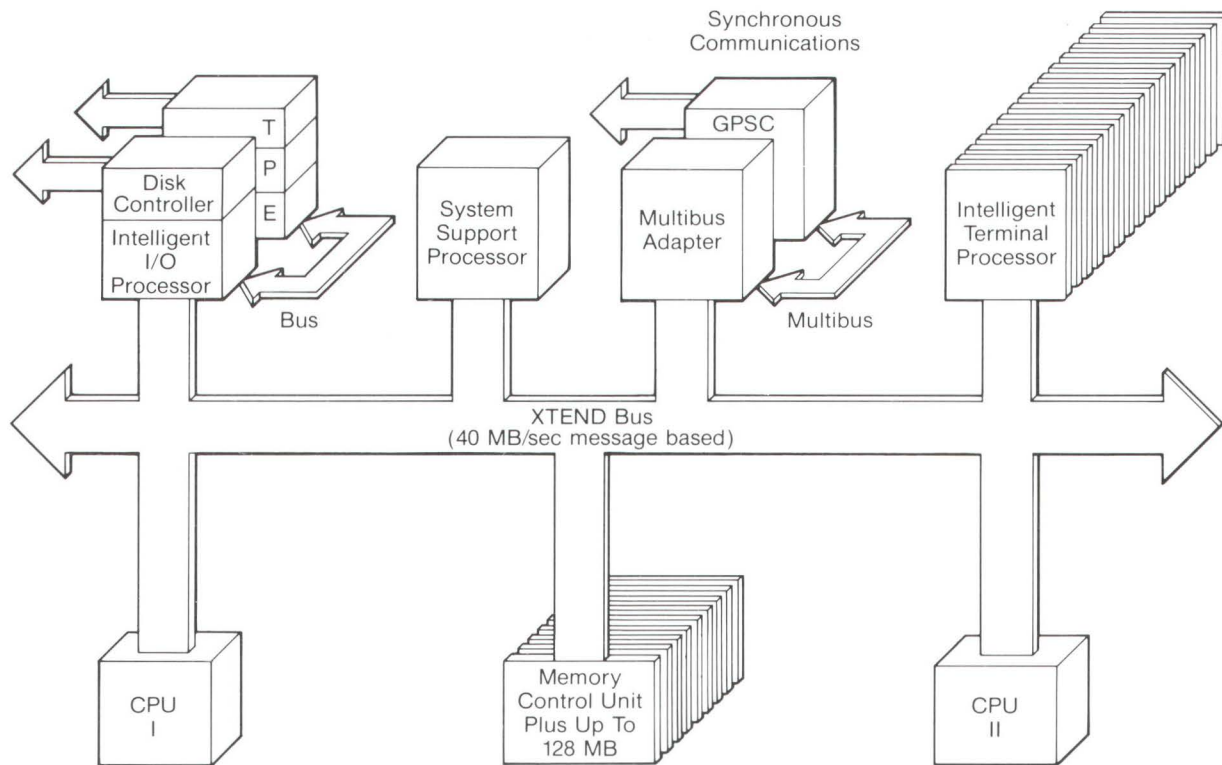
### GENERAL DESCRIPTION

The 9820 is Pyramid Technology's highest performance system for your most demanding database, software development, office automation or network server applications. The 9820 couples dual symmetric RISC processors with a high-speed intelligent I/O subsystem to deliver balanced system throughput to your application. As a result, you do more work faster and support more concurrent users with better response times.

Along with Pyramid Technology's dualPort OSx™ operating system, optimizing compilers, and extensive networking capabilities, the 9820 provides you with the perfect platform for large multiuser, multi-tasking applications. The 9820 adds a new standard of performance to Pyramid's already broad family of fully compatible computer systems.

### FEATURES & BENEFITS

- An advanced RISC Architecture with 528 registers and pipelined execution improves application performance.
- Symmetric dual processors and Intelligent Terminal Processors (ITPs) communicate over a 40MByte/sec message-based bus for fast response times.
- Intelligent I/O Processors (IOPs) support over 15 GB of disk storage using overlapped seeks, rotational position sensing, and virtual disk partitioning to improve database performance.
- A high-speed Tape/Printer/Ethernet (TPE) controller reduces back-up times and provides local area network and printer support standard in every system.
- A broad communications offering including RS-232C, Ethernet™, RJE-HASP, X.25, and Hyperchannel™ connects you with PCs, workstations, mainframes, and public data networks.
- The Network File System (NFS™) permits transparent access to files and directories across a network of systems.
- Pyramid's optimizing C, FORTRAN, Pascal, and COBOL compilers, and EMACS full-screen editor provide a powerful software development environment.
- Pyramid's OSx operating system provides a complete dualPort of both Berkeley 4.2BSD and AT & T System V versions of UNIX® operating systems concurrently.
- A sophisticated System Support Processor provides local and remote diagnostic capabilities for increased serviceability and uptime.
- A one-year warranty backs our commitment to reliability.
- Compact packaging preserves power and floor space, and reduces your cost of ownership.
- The 9820 is available as an economical upgrade from Pyramid 90x, 98xe, 98x, and other Series 9000 systems.



**9820 Architecture**

**DUAL RISC CPUs**

The Pyramid 9820 features two symmetric RISC (Reduced Instruction Set Computing) central processing units. This advanced RISC architecture uses pipelined execution to allow most instructions to execute in a single 100ns cycle. Each RISC CPU contains 528 32-bit registers arranged in a unique windowed register stack. Both CPUs have their own 16 Kilobyte instruction caches and 64 Kilobyte data caches which significantly improve memory access times. Each CPU also includes a high-speed Arithmetic Accelerator Unit (AAU) to speed floating point operations.

**MESSAGE-BASED XTEND™ BUS**

The 9820 RISC CPUs communicate with main memory and intelligent I/O processors over the 40 Megabyte per second, 32-bit XTEND bus.

Because all of Pyramid's I/O and communications controllers have their own intelligent processors, the

XTEND bus transfers only short, high-level messages between the central processing units and controllers. This message-based communication reduces bus activity and prevents I/O bottlenecks.

**INTELLIGENT I/O SUBSYSTEM**

Each Pyramid 9820 contains a proprietary I/O processor (IOP) and Tape/Printer/Ethernet controller (TPE) subsystem. This intelligent I/O subsystem features a 5-MIP AMD 29116 processor and 14 parallel Direct Memory Access (DMA) channels to provide an aggregate I/O throughput of 11 Megabytes per second per subsystem.

The IOP disk controller supports up to 4 Pyramid disk drives with transfer rates up to 2.5 Megabytes per second. Overlapped seeks and rotational position sensing (RPS) allow high transaction rates in multiple drive configurations.

The TPE subsystem includes a high-speed tape interface, a long-line or

short-line printer interface, and one of the industry's fastest Ethernet controllers. Each controller has its own DMA channel which allows simultaneous data transfers without I/O bottlenecks.

The 9820 can also support a variety of other I/O controllers via an intelligent Multibus™ Adapter.

**MEMORY**

Physical memory may be configured from 16 to 128 Megabytes using either 4 or 16 Megabyte modules. All memory arrays come with Error Correcting Code (ECC) logic which corrects single-bit memory errors and detects double-bit errors.

Virtual memory is byte addressable and allows each process to use up to 4 Gigabytes of virtual address space.

**SYMMETRIC MULTIPROCESSING**

The two central processing units in the 9820 are called Isoprocessors™, which means equal processors.

Each processor can handle both system and user tasks, so that the next task in the processing queue always goes to the first available processor. This symmetric approach is much more efficient than master/slave alternatives where one CPU can sit idle even though system tasks are waiting to be processed.

Symmetric multiprocessing in the 9820 is achieved through the use of a proprietary semaphore mechanism which complements standard UNIX process synchronization. The result of this design is an operating system which retains the normal UNIX operating system organization, but where both CPUs share a single copy of the operating system kernel and data structures, and have equal access to all shared resources.

#### **VIRTUAL DISK FACILITY**

The 9820 includes a virtual disk facility which provides a transparent mapping between logical and physical disk volumes. You can combine several physical disk drives into one logical disk, allowing large databases to span multiple spindles (concatenation). You can also increase the performance of your disk I/O by evenly partitioning file access over several physical drives (striping). The virtual disk facility even allows you to allocate a portion of high-speed memory to act as a virtual disk location for often used files or database indices. All of the virtual disk facility features are implemented in a manner transparent to user programs through the use of a virtual disk configuration file.

#### **OSx OPERATING SYSTEM**

The 9820 runs Pyramid Technology's OSx operating system, a unique dualPort implementation of both the 4th Berkeley Software Distribution and AT & T System V versions of UNIX operating systems. DualPort OSx gives you maximum flexibility in developing and executing programs.

You can choose either the Berkeley or AT & T operating system universe as your login environment, and can also switch universes with a single command. In addition, you can call a Berkeley utility from the AT & T universe and vice versa.

#### **NETWORKING AND COMMUNICATIONS**

The 9820 can communicate via a variety of desktop and mainframe protocols. Intelligent Terminal Processors (ITPs) allow you to support up to 256 RS-232C lines while offloading most terminal processing functions from the central processing units.

Each 9820 comes standard with an Ethernet local area network controller, and will also support X.25 (Certified for Telenet and DDN), bisync and Hyperchannel communications. The DARPA (TCP/IP) family of protocols, RJE-HASP, and Ethernet support for the Britton Lee IDM are some of the networking options offered with the 9820.

At the network applications level, Pyramid offers the Network File System which allows users to transparently access files across a network of Pyramids and workstations. Other network applications include mail, remote logins and file transfer programs.

#### **SYSTEM EXPANSION AND PERIPHERAL SUPPORT**

The system 9820 will expand with your needs. A wide selection of disk drives, tape drives, terminals and printers can be configured to address your specific requirements. To provide room for expansion, multiple peripheral bays can be attached to the basic two bay system. A maximum system can support over 15 Gigabytes of disk storage along with multiple tape drives and printers.

#### **SOFTWARE SUPPORT**

The 9820 will run all of Pyramid Technology's languages and system

software. This system software offering includes optimizing C, FORTRAN, Pascal, and COBOL compilers, a Franz Lisp interpreter, EMACS screen oriented editor, and GKS graphics package.

A wide range of both commercial and technical applications software, including more than 13 of the industry's most popular databases are available through Pyramid Technology's extensive Referred Independent Software Manufacturers Program (PRISM). Pyramid systems also support a large number of Pick™ applications software packages through the use of uni-Verse™, a UNIX-based Pick operating environment.

#### **SYSTEM SUPPORT PROCESSOR**

The 9820 contains an integral diagnostic and service CPU called the system support processor (SSP). The SSP is an independent microprocessor which performs diagnostic and test functions, downloads microcode for the central and I/O processors, and provides the interface to the operator through the system console.

Using the diagnostic power of the SSP, Pyramid support personnel can either locally or remotely (via an internal modem) diagnose system problems, significantly reducing mean-time-to-repair and increasing uptime of the 9820 system.

#### **COMPATIBLE AND UPGRADABLE FAMILY**

The 9820 is object code compatible with Pyramid's entire family of superminicomputer systems. This family offers excellent price performance with single and multi-processor support for up to 256 users, 128 Megabytes of memory, and over 15 Gigabytes of disk storage.

The 9820 is available as an economical field upgrade from Pyramid 90x, 98xe, 98x, and other Série 9000 systems.

## 9820 SPECIFICATIONS

<b>Processors:</b>	Number of CPUs	2
	Word Length	32 bits
	Cycle time	100ns
	Registers/CPU	528 registers, 32 bits each
	Instruction Cache/CPU	16 Kbytes
	Data Cache/CPU	64 Kbytes
	Floating Point Accelerator	Arithmetic Accelerator Unit (AAU) standard in each CPU
<b>Memory:</b>	Virtual Address Space	4 Gigabytes per process demand-paged 2048 byte page size
	Main Memory Capacity	128 Megabytes in 4MB and 16MB steps
	Memory Access Time	700ns for 1st 32-bit word Up to 7 subsequent words at 100ns each
	Error Correcting Code	7 bit ECC provides single-bit error correction and double-bit error detection
<b>I/O Subsystem:</b>	System Bus	XTEND Bus
	Bandwidth	40 MByte/sec, 32-bit data path, message-based
	Hi-speed Channels	Proprietary, 11 MByte/sec throughput per channel
	Low-speed Channels	Multibus Adapter
	Disk Interface	ESMD (2.5 MByte/sec)
	Tape Interface	Pertec
	Printer Interface	Dataproducts (long or short line)
<b>Communications:</b>	Serial Ports	Intelligent Terminal Processor (ITP) interfaces 16 asynchronous RS-232C lines w/modem control at speeds to 19.2K baud Up to 16 ITPs (256 ports) per system
	Networking	DARPA (TCP/UDP/IP), RJE, Ethernet, X.25 (CCITT 1980) certified for Telenet and DDN standard at 56K bps, Hyperchannel, RS-232C async, Bisync
<b>Peripherals:</b>	Disk	Fixed media drives for expansion to over 15 Gigabytes 300MB removable media drive with cabinet Dual port option available for some drives
	Tape	1600 bpi, 100 ips, 1/2" streaming drive 1600/6250 bpi, 100 ips, 1/2" streaming drive 800/1600/6250 bpi, 45 ips start/stop drive
	Line Printers	600, 1000, and 1500 lpm models
	Operator Console	14" monochrome or color video display terminal
	<b>Software:</b>	Operating System
	Languages	Native C, FORTRAN 77, ANSI Pascal and ANSI 74 COBOL compilers Franz Lisp interpreter/compiler system
	Application Software	Broad range of UNIX and Pick applications available through PRISM
<b>Cabinet: (per bay)</b>	Height	51" (130 cm)
	Width	24" (61 cm)
	Depth	41" (104 cm)
<b>Electrical: (per bay)</b>	AC Current	30 Amps @ 208 volts 50/60 Hz AC (max)
	AC Power	6.0 KW (max)
	Heat Dissipation	18,000 BTU/hour (max)
<b>Warranty:</b>	Base system warranted for one year against defects in materials and workmanship; peripherals and options warranted for ninety days against defects in materials and workmanship; optional maintenance contracts available	

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NFS was originally developed by and is a trademark of Sun Microsystems, Inc.  
Multibus is a registered trademark of Intel Corporation.  
Hyperchannel is a trademark of Network Systems Corporation.  
uni-Verse is a trademark of V Mark Computer Inc.  
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