HP 3000 Series 917LX, 927LX, 937LX, 937, 947LX, 947, 957LX, 957, 967LX, 967, 977

Technical Data

HP 3000 Computer Systems

The HP 3000 Series 917LX through Series 977 are high performance entry to mid-range members of the HP 3000 family of business computers. These systems take advantage of HP Precision Architecture-RISC (PA-RISC) and powerful VLSI technology to set new standards for cost effective, high performance. Offering a range of processor performance, packaging, and user license options, the systems allow you to purchase for your needs today yet grow easily. Your investment is protected by the ability to increase computing power through simple processor board upgrades, or increase your I/O capacity via easy chassis upgrades.

Since these systems are compatible with other HP 3000 systems, a multitude of business solutions are available making them ideal computing systems for small to medium sized businesses, departments and remote office locations.

The entire system including CPU, memory, disk, tape backup, and operating system comes preconfigured from the factory in a compact, integrated package which fits into an office environment. The system, along with external peripherals, can also be rack mounted in a compact 1.1 or 1.6 meter cabinet.

By using state of the art technologies, these systems provide a low cost of ownership. A high speed, high capacity integrated Digital Data Storage (DDS) tape drive provides the performance of half-inch magnetic tape backup at a much lower cost. The DDS backup unit allows many system configurations to be backed up on a single cassette, eliminating the need for an operator to be present during backup operations. The eleven systems also support from

1.3 Gbytes to 4 Gbytes of next generation high capacity disk drives inside the system package.

Server versions of these systems combine the HP 3000's strength in transaction processing with client-server applications, services and tools for PC users. The Server versions run all current HP3000 applications. They also offer tools to enhance existing V Plus applications with Microsoft Windows and New Wave PC graphical user interfaces. In addition, the Servers can provide the capabilities to configure and administer PCs, to backup PCs, and allow PC users to share files and peripherals.

Features:

- Single-chip CMOS CPU single-board processor
- ECC memory expandable to 192 or 384 Mbytes
- Up to 66 Gbytes of mass storage with external disk drives
- Integrated Digital Data Storage tape backup unit with 2.0 Gbytes per cassette
- Battery backup, automatic power fail recovery
- Standard office power and cooling requirements
- HP Easytime/XL User Interface pre-loaded on LX versions
- The HP 3000 Operating System and HP subsystem software pre-loaded on all models

HP Precision Architecture-RISC

All HP 3000 900 Series systems use HP Precision Architecture-RISC (PA-RISC) to achieve high performance and reliability at a low cost. PA-RISC is based on the concept of reduced instruction set computing (RISC), a design approach that leads to greatly simplified computers optimized to provide the highest performance for a given integrated circuit technology. In addition to offering higher performance, the inherent simplicity of PA-RISC means lower cost and higher reliability because machines can be implemented with fewer components. At the core of PA-RISC is an instruction set containing 140 carefully selected, fixed format instructions. Because the instruction set is simple, instructions are hardwired directly into the central processing unit (CPU). This eliminates the need for microcode and the necessity to decode complex instructions. PA-RISC utilizes a load/store design to reduce the number of relatively slow memory accesses, as most operations are performed register-to-register. To further enhance performance, optimizing compilers are used to schedule instructions and manage the instruction pipeline. With hardwired control, a load/store design, and optimizing compilers, one instruction is executed with virtually every clock cycle. Single-cycle execution provides much of the performance benefit of PA-RISC over traditional architectures. PA-RISC also incorporates many other extensions to RISC which

greatly enhance its functionality such as extended addressing and memory-mapped I/O.

System packaging

The systems are available in one of two compact, attractive cabinets. Series 917LX through 967LX systems use a small cabinet measuring 0.4 meters high and 0.2 meters wide. The cabinet has been uniquely designed to hold an entire modular system in the space of a desktop personal computer maximizing the efficiency of office or computer room space. It is capable of holding the SPU, a digital data storage device, and one disk drive.

Series 937 through 977 systems use a larger package offering more room for expansion as well as more integrated peripherals. This package measures .4 meters high and .4 meters wide. It is capable of holding the SPU, a digital data storage device, and up to three disk drives in a space smaller than a two drawer filing cabinet.

1.1 and 1.6 meter cabinets are also available in which the system, additional external disk storage, tape backup, and a Datacommunications and Terminal Controller (DTC) may be racked to house an entire system configuration.

Field Upgrades

Simple processor and package upgrades are available to allow you to grow from one system to another. Through an easy processor board or chassis swap. you can increase your system performance. expandibility, or both protecting your initial investment.

Memory subsystem

The memory subsystem uses either 1 Mbit or 4 Mbit, fast-page mode dynamic RAMs and is expandable in 8, 16, 32 or 64 Mbyte increments. Refer to the specification table below for specific memory sizes. Main memory has battery backup to ensure that information is maintained for a minimum of 15 minutes in the event of an interruption in AC power.

DDS Tape allows unattended backup

Digital Data Storage

The Digital Data Storage tape backup unit integrated with each system provides high capacity storage on a standard audio DAT cassette, measuring only 73 by 54 by 10.5 mm. With TurboSTORE/XL II data compression, up to 8 Gbytes can be stored on a single cassette. This large capacity storage on a single DAT cassette eliminates the need for operator intervention during backup and offers a convenient and compact storage medium. The DDS tape drive offers these features:

- 2.0 Gbyte capacity on a 120-minute (90m) tape
- Typical transfer rate of 11 Mbytes/minute
- A 512 Kbyte data buffer to maintain host transfer rate
- Automatic error detection and correction
- Three levels of Error Correcting Code (ECC)
- Standard 3.5-inch form factor

Table of Specifications

	S917LX	S927LX	S937LX	S937	S947LX	
Processor Type	CMOS	CMOS	CMOS	CMOS	CMOS	
Relative Performance	1	1	1	1	1	
Maximum logged-on users	8	20	32	32	250	
I/O expansion slots	2	2	2	12	2	
Floating Point Co-processor	N/A	N/A	Optional	Optional	Optional	
Standard/Maximum memory (MB)	24/192	24/192	32/192	32/384	48/192	
Cache (KB)	96	96	96	96	96	
Standard /Maximum disk (GB)	.67/24	.67/24	1.3/24	1.3/66	1.3/24	
Maximum embedded disk (GB)	1.3	1.3	1.3	4.0	1.3	
	S947	S957LX	S957	S967LX	S967	S977
Processor Type	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Relative Performance	1	1.6	1.6	2.3	2.3	2.9
Maximum logged-on users	400	600	600	600	600	>600
I/O expansion slots	12	2	12	2	12	12
Floating Point Co-processor	Optional	Optional	Optional	Optional	Optional	Optional
Standard/Maximum memory (MB)	64/384	64/192	64/384	64/192	64/384	96/384
Cache (KB)	96	128	128	512	512	512
Standard /maximum disk (GB)	1.3/66	1.3/24	1.3/66	1.3/24	1.3/66	1.3/66
Maximum embedded disk (GB)	4.0	1.3	4.0	1.3	4.0	4.0

Computer Museum

HP Computer Museum
www.hpmuseum.net

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Disk storage

The systems take advantage of the state-of-the-art disk storage devices by integrating from one to three 5.25-inch disk drive units into the system and supporting up to 66 Gbytes with external disk storage devices. The storage devices offer reliable, high capacity, high performance, random access mass storage. This is accomplished by the use of advanced electronics which reduce the component count and improve reliability. Key features of the integrated disk drives include:

- High reliability (MTBF over 150,000 hours)
- 673 or 1355 Mbyte formatted disk
- Extensive use of HP's state-of-the-art VLSI processes

System organization

The processor communicates with I/O via the HP Precision Bus. The Precision Bus provides a 32-bit data path and can support data transfer rates of 20 Mbytes/second average or 32 Mbytes/second peak. The Precision Bus supports Programmable Serial Interface (PSI) cards allowing 900 Series HP 3000 systems to be linked to other computers in a distributed computing environment. The Precision Bus also supports I/O interfaces to peripheral devices and local area network links.

System processors

The system processors use a one-board set implemented with advanced VLSI logic functions. With hardwired control, the systems are capable of executing one instruction with every clock cycle. Separate instruction and execution units facilitate pipelining and allow for efficient, parallel use of processor resources.

The cache is a high-speed buffer for the CPU that minimizes the number of relatively slow transactions with main memory. The systems use two high-speed CPU caches, one for data and one for instructions. Both caches use a direct mapped scheme. Data modified in the cache is written to main memory only when the processor requires other data to be in that cache location, or when a direct memory access operation is performed within that data area, or upon a power fail.

Instruction Pipelining

These systems are pipelined at the instruction level such that multiple instructions can be operated on simultaneously. Excluding penalties for cache misses, and branch instructions, the net effect is that one instruction is completed with every clock cycle.

Instruction Pipelining

Instruction 1
Instruction 2
Instruction 3
Instruction 4
Instruction 5

Time
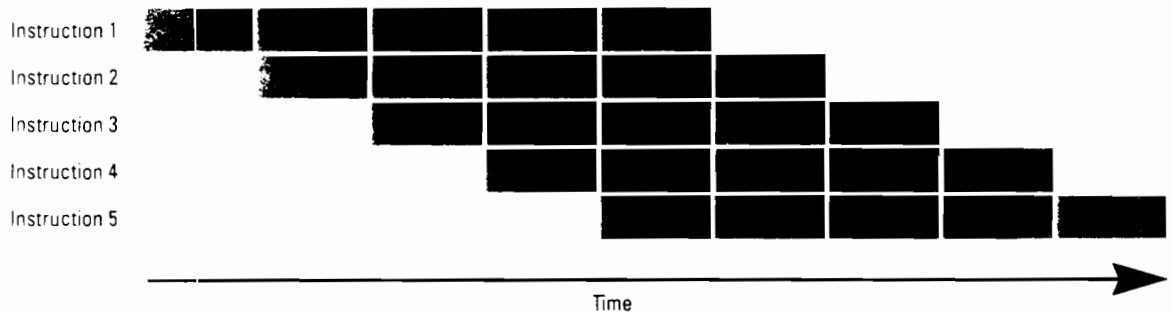
Floating Point coprocessor

A floating point coprocessor is available as an option to the Series 937LX, 937, 947LX, 947, 957LX, 957, 967LX, 967 and 977 systems. By operating in parallel with the CPU the coprocessor increases perfor- mance in applications that utilize floating point. Floating point calculations on the Series 917LX and 927LX are performed by high speed software routines.

I/O subsystem

HP Precision Bus

The HP Precision Bus supports I/O expansion cards for interfac- ing to peripheral devices and providing data communications functions. The Precision Bus runs synchronously with an 8- MHz clock, and can support data transfer rates of up to 20 Mbytes/second average or 32 Mbytes/second peak.

Peripheral connections

Disks, tapes, and system print- ers are connected either via an industry standard Small Com- puter Systems Interconnect (SCSI) channel card or a Hewlett-Packard Interface Bus channel card which supports the 8 bit wide, IEEE-488 standard Hewlett-Packard Interface Bus (HP-IB). One SCSI adapter is

integrated into the system to provide connection for up to five peripheral devices. Each addi- tional SCSI channel card sup- ports up to seven peripheral devices while HP-IB channel cards support up to six peripher- al devices. External disks can also be connected via HP Fiber Optic Link interfaces (HP-FL). HP-FL interfaces support up to eight external disks and are supported on Series 937, 947, 957, 967 and 977 systems.

Workstation and serial printer connection

Connections for workstations, serial printers, and other serial devices are provided via Data- communications and Terminal Controllers (DTCs) that are distributed over an IEEE 802.3 standard Local Area Network (LAN). This flexible connection scheme allows DTCs to be situated in the department that they service, saving the cost and effort of running cables from the system processing unit to each workstation. The DTC48 can support up to 48 directly con- nected ports, or 36 modem ports, or a combination of the two. The DTC16 supports 16 directly connected ports, or 12 modem ports, or a combination of the two.

PC's can also be connected to the HP 3000 through HP LAN Manager and Novell NetWare LANs. Physical connections can be via HP EtherTwist which is a local area networking scheme using unshielded twisted pair (or phone wire).

System Structure
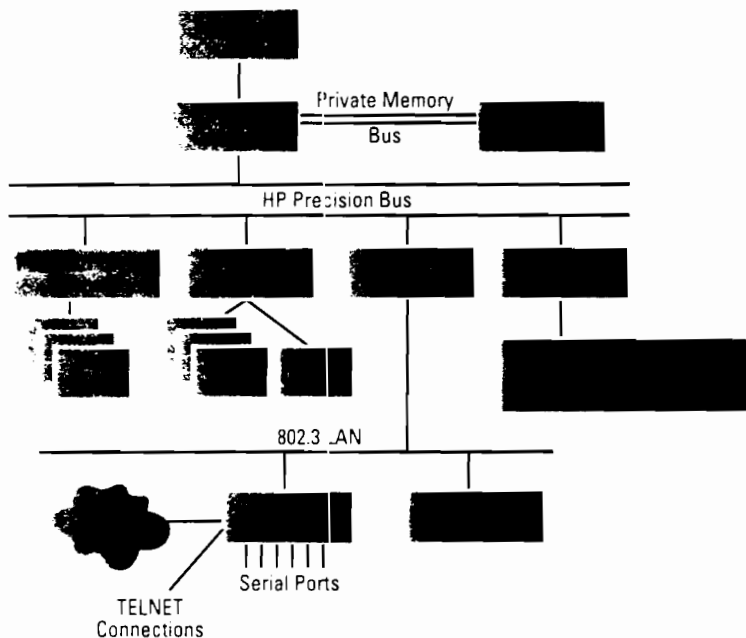
Both workstations that are connected via a DTC, and PCs that are connected via a LAN can communicate with HP 3000 systems and servers sharing the same LAN.

Terminal connections are not supported on the standard Server versions. Instead al' PC workstations are connected to the server via a LAN. Terminal connections can be added to the Servers by purchasing an additional terminal connection software product.

Open Systems Functionality

The HP 3000 900 Series systems provide OLTP performance and functionality while supporting industry and de facto standards. The HP 3000 supports X/Open's open systems definition by providing interoperable networking (ARPA, OSI and IBM SNA services) and application portability through application programming interfaces (AFIs). In addition, the HP 3000 supports de facto market standards such as Microsoft's LAN Manager and Novell's NetWare for PC Integration, as well as SQL Access for interoperable relational databases.

System-to-system datacommunications

HP NS XL Network Services provide virtual terminal, network file transfer, remote file and data base access, network interprocess communication, and remote process management between HP 3000s on an IEEE 802.3 Local Area Network using HP LAN Link/XL; or over wide areas using the HP DTC X.25 Network Link or the HP NS Point-to-Point Link.

HP SNA/SDLC Link/XL and HP BSC Link/XL are provided for HP-to-IBM system communication in SNA and Bisync environments respectively. Network services over these links include HP SNA IMF/XL for SNA 3270 emulation; HP SNA NRJE/XL for SNA remote job entry; HP LU 6.2 API/XL, an LU 6.2 program-to-program application interface; HP SNA Distributed Host Command Facility/XL (HP SNA DHCF/XL) for IBM 3270/ PC access to the HP 3000; and BSC RJE/XL for Bisync remote job entry.

Information management

The HP 3000 has several database management products for information storage. HP ALLBASE/SQL is HP's strategic relational database management system (RDMS) for HP 3000 900 Series systems. This database is based on the industry standard, SQL. In addition, leading third party relational database management solutions are also supported. HP TurboIMAGE is a networked database management system that provides the best DBMS performance on HP 3000 systems. Software developers are provided with a rich selection of programming languages and CASE tools that support these databases. Reporting and presentation tools are available to allow access to the stored data without programming.

HP EasyTime/XL

LX versions are provided standard with HP EasyTime/XL, a simple-to-use interface to commonly performed system management functions. HP EasyTime/XL provides novice system managers and end-users with limited computer experience access to common system management utilities while shielding them from operating system commands.

Learning Products

Series 917LX through Series 967LX systems ship with a streamlined manual set covering installation and basic system operation and maintenance. Series 937 through Series 977 systems are shipped with an expanded set of manuals covering a wider range of system operation and management tasks to aid in efficient operation of the system.

Additional manual sets covering more advanced system management functions, administration tasks, HP 3000 programming environments, and other topics are available and must be ordered separately.

System software and supported peripherals

For a list of supported system software and peripherals, refer to the "900 Series HP 3000 Supported Products Listing."

Support services

A wide range of hardware and software support services are available worldwide for all HP3000 products. Contact your HP sales representative for details on available support services.

Ordering information

These HP 3000 systems include 24, 32, 64 or 96 Mbytes of main memory, one 670 Mbyte or 1.3 Gbyte embedded disk drive, 2.0 Gbyte DDS embedded tape drive, one HP 700/92 console with cable, one integrated SCSI LAN/Console interface card, one blank DDS cassette tape, and one cleaning tape. Systems are available with a variety of database choices: Preconfigured (with TurboIMAGE and ALLBASE/SQL), TurboIMAGE only, ALLBASE/SQL only, and the operating system only. The HP 3000 operating system and any HP subsystem software or database management product that is ordered will be installed on the integrated disk prior to shipment. The LX versions are also pre-loaded with HP Easy-Time/XL. Return credits are available when upgrading from other HP 3000 systems to these systems.

HP 3000 Server versions include the fundamental operating system without terminal support, NewWave System Services, server networking software and MS-Windows-based user interface tools for V/Plus.

Series 917LX, 927LX, and 937LX systems are customer installable and do not include HP installation. Hewlett-Packard installation services are available for customers desiring installation assistance. Installation is included standard on Series 937, 947LX, 947, 957LX, 957, 967LX, 967 and 977 systems.

Environmental specifications

Regulatory Compliance:	UL Listed, ETL listed, CSA Certified, compliant with EN 60950. Contact local HP Sales representative for European Datacom license numbers.
Electromagnetic Interference:	Complies with FCC Rules and Regulations, Part 15, Subpart J, as a Class A computing device. Manufacturer's Declaration to German FTZ 1046. VCCI Registered

AC Power Input Voltage/Frequency: **917LX-967LX:**

Nominal	Range	Rated Current
100-120V, 50/60Hz	90-132 VAC/47-63 Hz	6.5A
220-240V, 50/60Hz	180-264 VAC/47-63 Hz	3.5A

937-977:

Nominal	Range	Rated Current
100-120V, 50/60Hz	90-132 VAC/47-63 Hz	12A
220-240V, 50/60Hz	180-264 VAC/47-63 Hz	6A

Power Dissipation:	**917LX - 967LX:** 1383 BTU/hr
	937 - 977: 2766BTU/hr

Physical Dimensions

	917LX - 967LX	937 - 977
Height:	430 mm (16.9 in.)	430 mm (16.9 in.)
Width:	222 mm (8.7 in.)	444 mm (17.4 in.)
Depth:	533 mm (21 in.)	533 mm (21 in.)
Weight:	31.8 kg (70 lbs)	50 kg (110 lbs)

Temperature:	Operating: +5 to +40 C (41 to 104 F)
	Non-operating: -40 to +65 C (-40 to 149 F)
	Non-operating (with tape media):-40 to +45 C (-40 to 113 F)
Relative Humidity:	Operating: 20% to 80%, non-condensing
	Non-operating: 5% to 80%, non-condensing
Altitude (operating):	To 3.0 km (10,000 feet)
Battery Backup Time, Minimum:	15 minutes
Acoustics:	**917LX - 967LX:** 5.7 bels (A) sound power below 30 C
	937 - 977: 6.2 bels (A) sound power below 30 C

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For more information, call your local HP sales office listed in your telephone directory or an HP regional office listed below for the location of your nearest sales office.

United States:
Hewlett-Packard Company
4 Choke Cherry Road
Rockville, MD 20850
(301) 670-4300

Hewlett-Packard Company
5201 Tollview Drive
Rolling Meadows, IL 60008
(312) 255-9800

Hewlett-Packard Company
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No. Hollywood, CA 91601
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Atlanta, GA 30339
(404) 955-1500

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(0222) 2500 0

Belgium and Luxembourg:
Customer Information Center
(02) 761 34 00

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(1) 69 82 60 60	(020) 547 6666
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