HP 3000 Series 947, 957, 967, 987, 987/150 Plus

Technical Data

**HP 3000 Computer
Systems**

The HP 3000 Series 9x7 Plus systems are high performance mid-range members of the HP 3000 family of business computers and are available in two packages--the 9x7RX (four I/O slots) with the 947 through 987/150, and the 9x7SX (twelve I/O slots) with the 947 through 987/150. 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, windows-based OpenView PC console, memory, disk, tape backup, and operating system with selected System Management software and optional Performance Management software comes preinstalled 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.
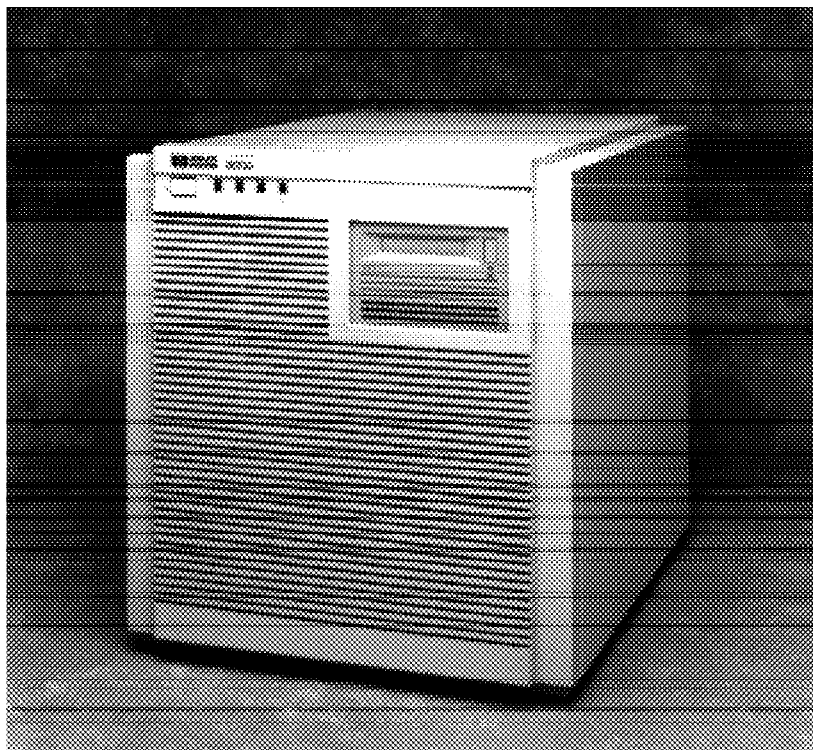
The HP 3000 Series 9x7 Plus family of systems provide bundled system and performance management features at a discounted price.

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. These systems also support from 1.0 Gbyte to 6 Gbytes of next generation high capacity disk drives inside the system package.

Features:

· Single-chip CMOS CPU single-board processor
· ECC memory expandable to   384, 512, or 768 Mbytes
· Up to 250 Gbytes of mass storage with external disk drives
· Integrated Digital Data Storage tape backup unit with 2.0 Gbytes per cassette (uncompressed)
· Battery backup, automatic power fail recovery
· Standard office power and cooling requirements
· 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 an attractive cabinet. 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 four 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.

Memory subsystem

The memory subsystem uses either 1 Mbit, 4 Mbit, or 16 Mbit fast-page mode dynamic RAMs and is expandable in 8, 16, 32, 64, or 128 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.

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.

DDS Tape allows unattended backup

The DDS tape drive offers these features:

· 2.0 Gbyte capacity on a 120-minute (90m) tape (uncompressed)
· 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

Disk storage
The systems take advantage of the state-of-the-art disk storage devices by integrating up to two 3.5-inch disk drive units or from one to three 5.25-inch disk drive units into the system and supporting up to 98 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

Table of Specifications

	947RX	947SX	957RX	957SX	967RX	967SX	987RX	987SX	987/150RX	987/150SX
Processor Type	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Relative Performance	1	1	1.6	1.6	2.0	2.0	3.2	3.2	4.5	4.5
Maximum logged-on users	530	530	850	850	900	900	1200	1500	1700	1700
I/O expansion slots	4	12	4	12	4	12	4	12	4	12
Floating Point Co-processor	Optional	Optional	Optional	Optional	Optional	Optional	Standard	Standard	Standard	Standard
Standard/Maximum memory (MB)	64/384	64/384	64/384	64/384	64/512	64/512	64/768	64/768	64/768	64/768
Cache (KB)	96	96	128	128	512	512	512	512	1024	1024
Standard /Maximum disk (GB)	1.0/68	1.0/98	1.0/68	1.0/98	1.0/68	1.0/98	1.0/68	1.0/98	1.0/68	1.0/98
Maximum embedded disk (GB)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

improve reliability. Key features of the integrated disk drives include:

· High reliability (MTBF over 300,000 hours)
· 1.0 or 2.0 Gbyte 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.

Floating Point coprocessor

A floating point coprocessor is available as an option on all Series 9x7 systems except the 987 and 987/150 where it is integrated onto the CPU. By operating in parallel with the CPU the coprocessor increases performance in applications that utilize floating point.

Instruction Pipelining

|								
Instruction 1	Fetch	Decode	Execute	Condition	Store			
Instruction 2		Fetch	Decode	Execute	Condition	Store		
Instruction 3			Fetch	Decode	Execute	Condition	Store	
Instruction 4				Fetch	Decode	Execute	Condition	Store
Instruction 5					Fetch	Decode	Execute	Condition	Store

Time
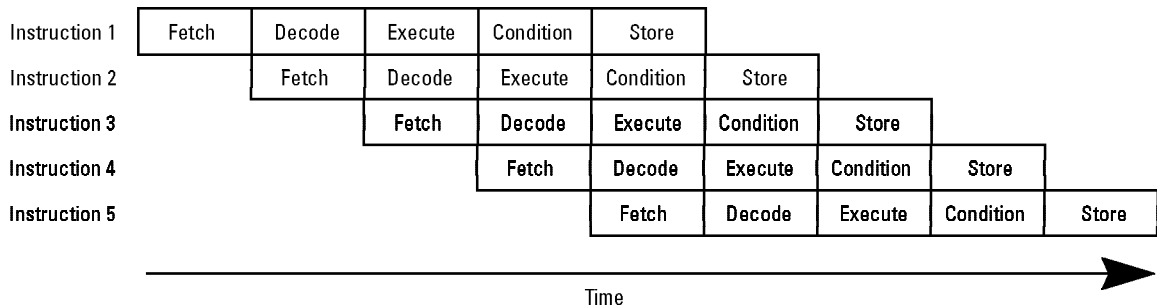
I/O subsystem

HP Precision Bus

The HP Precision Bus supports I/O expansion cards for interfacing to peripheral devices and providing data communications functions.

Peripheral connections

Disks, tapes, and system printers are connected either via an industry standard Small Computer 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 seven peripheral devices. Each additional SCSI channel card supports up to seven peripheral devices while HP-IB channel cards support up to six peripheral devices. External disks can also be connected via HP Fiber Optic Link interfaces (HP-FL). HP-FL interfaces using the PB-FL card support up to eight external disks and are supported on all Series 9x7 systems.
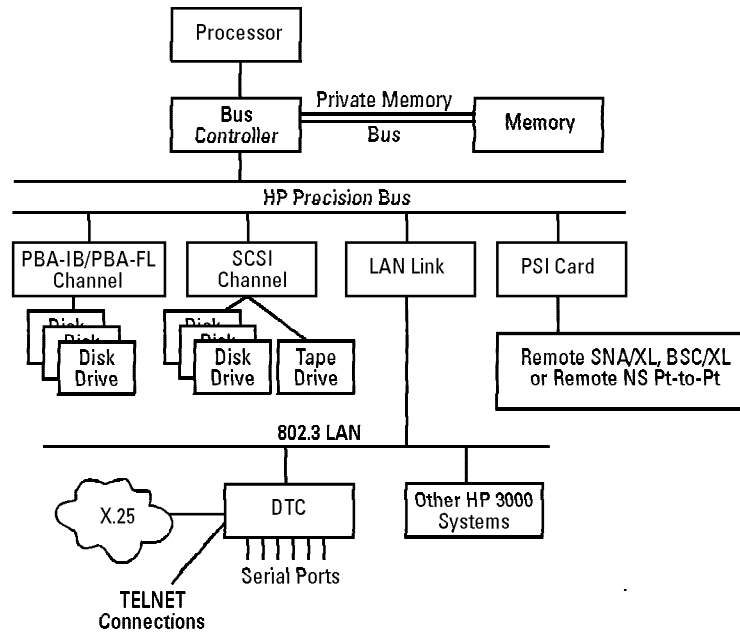
Workstation and serial printer connection

Connections for workstations, serial printers, and other serial devices are provided via Datacommunications 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 DTC72MX can support up to 72 directly connected RS-232 or RS-423 ports, or 72 modem ports, or a combination of the three. The DTC16iX supports 16 directly connected RS-232 or RS-423 ports. Direct connect ports can be replaced by modem ports in blocks of 8.

Systems management

The HP 3000 Corporate Business Systems have robust functionality for managing large data center environments. Available from Hewlett-Packard and its third party partners is a wide variety of systems management solutions in the areas of performance management, system accounting and configuration, security, availability, operations control and storage management.

HP OpenView Systems and Network Management

HP OpenView System Manager provides a flexible, integrated approach to systems and network management and a consistent management framework for an organization's entire network of information and computing resources. Through exception-based system management, operators are notified of system events graphically and automatically by the HP OpenView network map. Operators can define which events to report, providing flexibility and eliminating unwanted notifications. The HP OpenView console is a version of HP OpenView System Manager that provides the benefits of OpenView for a single HP 3000 system. Task-based filtering of events lets the operator focus on specific categories of messages all at once, e.g. all tape messages, and an automatic response feature brings the system one step closer to being self-managing. The HP OpenView console is standard on the Series 9x7 Plus systems.

High availability

Unplanned downtime is minimized by AutoRestart/iX which automatically and immediately saves the system state after a software failure, and system availability is further improved by TurboSTORE/iX II, which provides high-speed, unattended, on-line backup. TurboSTORE/iX and AutoRestart/iX are standard on the Series 9x7 Plus systems.

Performance management

HP GlancePlus, a performance monitoring and diagnostic software tool for the HP 3000, provides information on current system resource usage and process activity to help system managers and operators quickly isolate and resolve performance bottlenecks when they occur. HP LaserRX software provides the comprehensive system activity information needed to manage your HP 3000 system for optimal performance, helping to contain costs, streamline data processing operations, and efficiently deliver defined levels of service. RXForecast works with LaserRX to support ongoing capacity planning and to allow you to perform regular system resource forecasting. All three of these performance management tools are optional on the Series 9x7 Plus systems.

Security

Operating system security is an essential component of system management. To protect your system from unauthorized access and data corruption, the HP 3000 provides robust system security. The operating system is designed so that the user capabilities, the account structure, the file system, and system security are integrated. All MPE/iX systems provide Department of Defense (DoD) C2 functionality when combined with a user interface package. Every file and device can optionally have an access control definition (ACD), which specifies which users have access to that file or device. An ACD can restrict read, write,, and append access, and can restrict printing access to a particular device to a specific user or set of users. System security is further augmented with multi-level logon access security and auditing.

Open Systems Functionality

All HP 3000 900 systems provide OLTP performance and functionality while also supporting industry and de facto standards. The HP 3000 provides interoperability networking (ARPA, OSI and IBM SNA services) and application portability through standard application programming interfaces (POSIX, industry and defacto standard languages and relational database management 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 EN55022 Level A. VCC1 Registered

AC Power Input Voltage/Frequency:

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:	2766BTU/hr
Physical Dimensions	Height: 430 mm (16.9 in.) Width: 444 mm (17.4 in.) Depth: 533 mm (21 in.) Weight: 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, maximum wet bulb = 26°C
Altitude (operating):	To 3.0 km (10,000 feet)
Battery Backup Time, Minimum:	15 minutes
Acoustics:	5.8 bels (A) sound power below 30 C

Industry standard networking

HP networking solutions are based on defacto and industry standards. These standards include: Open Systems Interconnect (OSI); Transmission Control Protocol/Internet Protocol (TCP/IP); Systems Network Architecture (SNA), and the Open Software Foundation's Distributed Computing Environment (OSF/DCE). A networking solution based on standards enables effective communication between a variety of computer systems. In addition, it protects your current computer equipment investment and gives you the flexibility to choose the best technologies and applications for your future needs.

System-to-system communications

For system-to-system communications, the HP 3000 has a complete offering of local and wide-area networking services. ARPA Services, NFS, and NCS allow for transparent file access, file transfer, and sharing of resources in a TCP/IP environment. In OSI networks, FTAM allows users to transfer files between different vendor computers. In addition, the HP 3000's X.400 product, based on the industry standard OSI model, lets users send and receive electronic mail messages across a multivendor environment. For HP 3000 to HP 3000 communication, HP Network services provides virtual terminal and file transfer capabilities.

Desktop integration

The HP 3000's family of PC Networking products (Novell Netware and LAN Manager) enable PC users to access enterprise-wide information and computing resources. This provides users with the best of both worlds: access to PC applications plus access to the power and resources of the HP 3000.

Networking foundation

HP 3000 Networking Services and PC Networking products are supported over industry standard links: Ethernet/802.3, and Token Ring for local-area communication and X.25 for wide-area connection. NS Point-to-Point is also supported for a direct connection between HP 3000 systems.

IBM coexistence

For seamless integration into an IBM computing environment, the HP 3000 offers a complete array of SNA and BSC connectivity products, including: interactive communication products SNA IMF for 3270 emulation and SNA DHCF for IBM 3270 access to the HP 3000; batch communication products SNA/RJE and BSC RJE; LU 6.2 PU 2.1 API for program-to-program communications; and electronic mail communications through either SNADs or X.400. SNA/SDLC Link, BSC Link and SNA/X.25 provide the link for HP-to-IBM communication in SNA and Bisync environments.

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 IMAGE/SQL is a networked database management system with your choice of a standard TurboIMAGE or SQL interface 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.

Learning products

All 9x7 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 HP 3000 products. Contact your HP sales representative for details on available support services.

Ordering information

These HP 3000 systems include 64 Mbytes of main memory, one 1.0 Gbyte embedded disk drive, one 2.0 Gbyte DDS embedded tape drive, one windows-based OpenView PC console, one integrated SCSI/LAN/Console interface card, one blank DDS cassette tape, and one cleaning tape. Systems are available with two database choices: Preconfigured (with IMAGE/SQL and ALLBASE/SQL) or IMAGE/SQL 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. Return credit product numbers are available when upgrading from other HP 3000 systems to these systems.

Installation is included standard on all 9x7 systems.

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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
5161 Lankershim Blvd.
No. Hollywood, CA 91601
(818) 505-5600

Hewlett-Packard Company
2015 South Park Place
Atlanta, GA 30339
(404) 955-1500

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6877 Goreway Drive
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Latin American Region Headquarters
Monte Pelvoux No. 111
Lomas de Chapultepec
11000 Mexico, D.F. Mexico
(525) 202-0155

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Austria, East Central Europe, and Yugoslavia:
43/222 2500 0

Belgium and Luxembourg:
Customer Information Center
32/2 7783111

Denmark:
45/45 991000

Italy:
39/2 921991

Finland:
358/0 88721

Netherlands:
31/20 5476911

France:
33/1 69826060

Norway:
47/2 879700

Germany:
49/6172 16 0

Poland:
48/22 368300

Greece:
30/1 6828811

Portugal:
35/1 13017330

Hungary:
38/61 558472

Russia:
007/95 9235001

Iceland:
354/1 671000

Slovenia:
38/61 558472

Ireland:
253/12 883399

Spain:
34/1 6261600

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47/8 7502000

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41/57 313111 (Head Office)
41/22 7804111 (Suisse Romande)

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44/344 360000

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