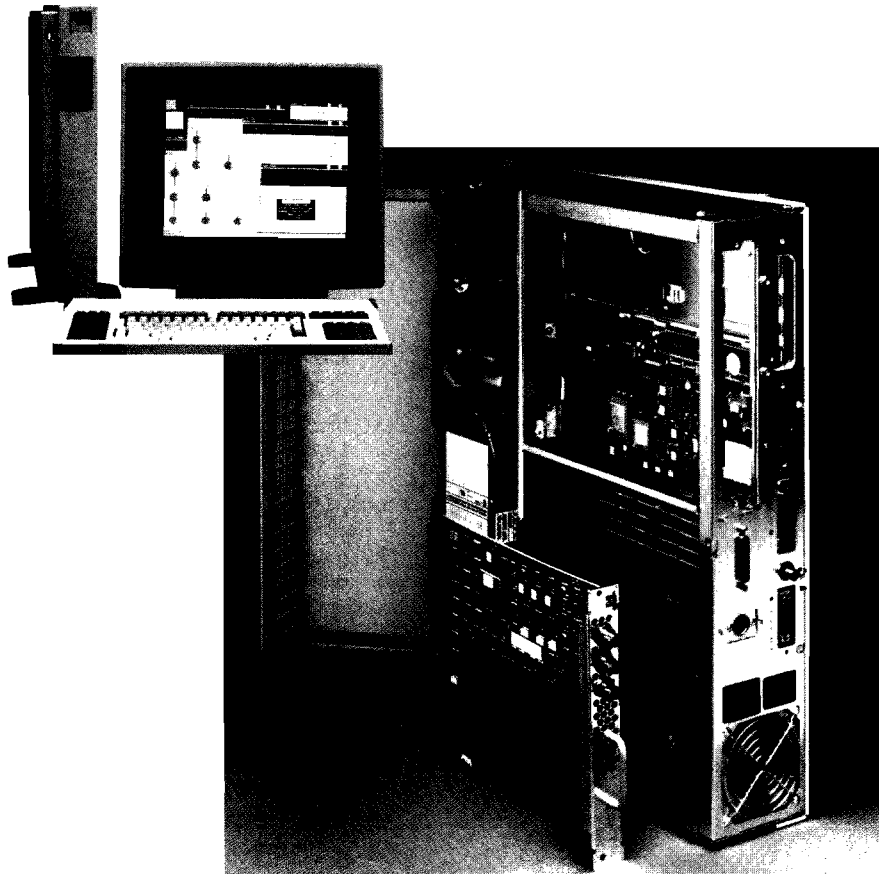


HP Apollo 9000 Model 400t and 425t

Technical Data*



Workstation performance in a desktop package.

HP Apollo 9000 Models 400t and 425t deliver up to 20 MIPS and 3.5 MFLOPS of workstation power in a flexible, desktop package. Part of the new Series 400 family of workstation products, the 400t and 425t are the ideal price/performance solution for engineering applications such as CASE, EE, ME and technical publishing.

The Series 400 workstations are the first to combine the innovation of Apollo with the quality and reliability of HP. Also, they are the first capable of running your choice of either the HP-UX system or the Domain/OS operating system.

Model 400t is an entry-level workstation based on the MC68030 processor running at 50 MHz while the Model 425t incorporates the new MC68040 processor running at 25 Mhz. The MC68040 technology on the Model 425t improves integer

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performance up to 60%, and floating point speed increases up to 7 times over the MC68030 processor. Model 400t buyers can upgrade to the MC68040 processor with no difference in list price from the Model 425t.

Expandable configurations give you the flexibility to tailor each workstation to match specific application requirements. Memory can be configured from 8 to 128 Mbytes of ECC RAM (8 to 32 Mbytes in the Model 400t).

Expansion capability for SCSI peripherals and networking are built-in to both workstations.

HP Apollo 9000 VRX graphics options offer the best X Windows performance available for 2D graphics with versatile 10-plane (8 bit + 2 overlay) color systems. Advanced 3D graphics capability can be added with a high-performance VRX graphics system.

*The perfect
blend of price
+ performance
puts work-
station power
on very team
member's desk.*

* Data subject to change without notice.
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Technical Specifications

System Processing Unit

	400t	425t
Central Processor	MC68030	MC68040
Clock	50 MHz	25 MHz
Wait States to Cache	0 internal, 1 external	0 internal, 1 external
Integer Performance	12 MIPS	20 MIPS
Floating Point	MC68882	On MC68040
Clock Frequency	50 MHz	25 MHz
Performance (D.P. Linpack)	0.5 MFLOPS	3.5 MFLOPS
Memory Management Unit:		
Type	On MC68030	On MC68040
Virtual memory	4 Gbytes/process (HP-UX) 2 Gbytes/process (Domain/OS)	4 Gbytes/process (HP-UX) 2 Gbytes/process (Domain/OS)
Contexts	84 default, user settable	84 default, user settable
Cache Memory On Chip	Separate instruction & data	Separate instruction & data
Size	256 Byte each	4Kbyte each
Average cycle time	20 nsec	40 nsec
Cache Memory External	Write through	NA
Size	32 Kbytes	—
Average cycle time	60 nsec	—
Main Memory:		
Type	ECC (single-bit correct; double-bit detect)	ECC (single-bit correct; double-bit detect)
RAM	8 Mbytes standard	8 Mbytes standard
Bus width	32b address, 32b data	32b address, 32b data
System RAM access time	80 nsec/min 140 nsec/max	80 nsec/min 140 nsec/max
Maximum memory	32 Mbytes	128 Mbytes
Memory increments	4 or 8 Mbyte	4, 8, 16, or 32 Mbyte

Clock and Timers

	HP-UX	Domain/OS
Real-time Clock:		
Resolution	10 milliseconds	10 milliseconds
Accuracy	+ 5 seconds/day	+ 5 seconds/day
Battery backup	Lithium, expected life = 1 year	Lithium, expected life = 1 year
Timers:		
Match interrupt	Match on time of day 0.00 to 84,600.00 sec	Periodic 1/60 sec.
Delay interrupt	10 msec to 1.94 days	
Cyclical interrupt	10 msec to 1.94 days	
System timer	4 μ sec resolution accurate to 25 ppm	

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Software

	HP-UX	Domain/OS
Operating System	HP-UX complies with the UNIX System V Interface Definition, X/Open and POSIX Specifications, and will be fully compliant with OSF.	Domain/OS is a single operating system that provides users a choice of UNIX System V Release 3, 4.3 BSD, or Aegis.
Revisions	Model 400t: HP-UX 7.0 or HP-UX 7.03 HP-UX 7.0 may be used for VRX color. Model 425t: HP-UX 7.03 or HP-UX 8.0 and on.	Domain 10.2+ PSK for 400t Domain 10.3+ PSK for 425t
Window Systems	X Window System, Version 11 (X11) Release 4	X Window System, Version 11 (X11) Apollo Domain Display Manager
Languages	C, Pascal, FORTRAN, BASIC, Tech BASIC, Ada, Common LISP	C, Pascal, FORTRAN, Ada, Common LISP, C++
User Interface	HP VUE 2.0	HP VUE 1.0, Apollo DOMAIN Display Manager



Human Interface

	HP-UX	Domain/OS
Keyboard	109-key, low profile, HP-HIL Available in 25 local languages	106-key, 7-pin DIN serial interface Available in 9 local languages
Mouse	3-button, roller ball, HP-HIL	3-button, roller ball, quadrature interface on keyboard
Audio	Three independent time generators controllable over 30db	Piezoelectric beeper in keyboard
Frequency range	81.46 Hz to 83.3 KHz	NA
Resolution	Capable of approximate chromatic scale over five octaves	NA
Duration	.01 sec. to 2.55 second/tone	NA
Interface Specifications:		
Type	HP-HIL, 1.0A	Domain keyboard
Device limit	7 per interface	1 per interface
Connector	AMP SMD	7-pin DIN
Audio Speaker	Built-in	Built-in

(Also available via external jack 250 mW @ 8 ohms)

Networking Options

	HP-UX	Domain/OS
LAN	IEEE 802.3/Ethernet interface with ThinMAU and BNC "T" connector or AUI (jumper selectable)	IEEE 802.3/Ethernet interface with ThinMAU and BNC "T" connector and AUI (jumper selectable). Apollo Token Ring interface with 9-pin D-sub network connector. IBM Token Ring, IEEE 802.5. Industry Standard connectors: RJ connector with built-in media filters for voice-grade twisted pair, or, 9-pin D-sub connector for data-grade shielded twisted pair.
Networking Protocols	X.25, SNA, RJE, TCP-IP, HP Diskless	X.25, SNA, TCP-IP, Domain Network Services

I/O Specifications

	HP-UX	Domain/OS
Graphics Bus: (standard)		
Width	32 bits address; 32 data	32 bits address; 32 data
Bandwidth	6 Mbytes/sec.	6 Mbytes/sec.
DMA channels	2, dynamically assigned	2, dynamically assigned
LAN Interface: (standard)		
Type	IEEE 802.3, Ethernet 1.0	IEEE 802.3, Ethernet 1.0
Data rate	10 Mbits/sec.	10 Mbits/sec.
Connectors	15-pin AUI (Attachment Unit Interface) and BNC tee	15-pin AUI (Attachment Unit Interface) and BNC tee
MAUs	10BASE2 built-in 10BASE5 requires p/n 30241A 10 BASE T requires p/n 28685A	10BASE2 built-in 10BASE5 requires p/n 30241A 10 BASE T requires p/n 28685A
SCSI Interface*: (standard)		
Type	SCSI-I (ANSI X3.131-1986), single-ended	SCSI-I (ANSI X3.131-1986), single-ended
Data rate	4.5 Mbytes/sec. synchronous 1.5 Mbytes/sec. async.	4.5 Mbytes/sec. synchronous 1.5 Mbytes/sec. async.
Device limit	7 per interface	7 per interface
Connector	ALT-2 50-pin micro-ribbon	ALT-2 50-pin micro-ribbon
Cable	Not included	Not included
Serial Interface: (standard)		
Type	RS-232C, 9-wire DTE [†]	RS-232c
Data rate	To 38,400 bps	To 19,200 bps
Device limit	1 per interface	1 per interface/expandable to three with product no. K1015
Connector	25-pin D-sub	25-pin D-sub
Parallel Interface: (standard)		
Type	Centronics; $\overline{\text{ACK}}$, BUSY and HP ScanJet handshakes	Centronics; $\overline{\text{ACK}}$, BUSY and HP ScanJet handshakes
Data rate	300+ Kbytes/sec. with DMA	300+ Kbytes/sec. with DMA
Device limit	1 per interface	1 per interface
Connector	25-pin female (PC standard)	25-pin female (PC standard)
Cable	1m included	1m included
HP-IB Interface: (optional)		
Type	IEEE 488-1978, standard speed	NA
Data rate	350 Kbytes/sec.	NA
Device limit	14 per interface, nominal	NA
Connector	24-pin stacking IEEE	NA
Cable	1m included	NA

Internal Mass Storage (up to two)

	400t	425t
Specifications:		
Format	3.5 inch	3.5 inch
Formatted Capacity	200 Mbytes	200 Mbytes
Average Seek Time	18 msec	18 msec
Average Latency	8.3 msec	8.3 msec
Average I/Os per sec	31.5	31.5
Data Rate:		
Internal Burst	11 Mbytes/sec	11 Mbytes/sec
SCSI Burst	1.5 Mbytes/sec	1.5 Mbytes/sec
Read throughput	920 Kbytes/sec	920 Kbytes/sec

- * Support is limited to HP and selected non-HP peripherals listed in the HP 9000 Series 300 Support Matrix. Correct operation of unlisted devices should not be assumed, and support for such devices is strictly limited to consulting on a time-and-materials basis. SCSI interface, disk and serial driver source code is included with HP-UX. SCSI internals documentation is available separately for experienced UNIX driver developers.
- † 2 additional available at HP-UX 8.0

Physical and Environmental Specifications

SPU Power Specifications

Source Consumption	6.3 A @ 100-120 V, 3.3 A @ 200-240 V
Line Frequency	45-65 Hz
Power Consumption:	
Watts maximum	180
BTU/hour	614
Kcal/hour	155

Physical Dimensions

Height	102 mm (4.0 in)
Width	527 mm (20.7 in)
Depth	493 mm (19.4 in)
Net Weight	20.0 Kg (44 lbs)
Shipping Weight	22.7 Kg (50 lbs)

Environmental Range

(Without optional, internal SCSI disk)	
Operating temperature	0°C to +55°C to 2286m (7500 ft.)
Storage temperature	- 40°C to +70°C
Maximum wet bulb temperature	40°C
Humidity:	
Operating 40°C	15% to 95%
Non-operating 65° C	95% R.H.
Altitude:	
Operating	4570m (15,000 ft.) to 47°C
Non-operating	15,240m (50,000 ft.)
EMI	
Conducted and radiated interference meets FCC Class A, VCCI Class 1; VDE 1046/84 Level B	
Regulatory Compliance	
UL478, 5th edition; CSA 22.2 No. 220, M-1986; IEC 950, 1st edition 1986	

(With internal SCSI disk drive)	
Operating temperature	5°C to 40°C
Storage temperature	- 40°C to 70°C
Maximum wet bulb temperature	36°C
Humidity:	
Operating and non-operating 40° C	15% to 80%
Altitude:	
Operating	3,050m (10,000 ft.)
Non-operating	12,190m (40,000 ft.)
EMI	
Conducted and radiated interference meets FCC Class A, VCCI Class 1; VDE 1046/84 Level B	
Additional Regulatory Compliance	
UL478, 5th edition; CSA 22.2 No. 220, M-1986; IEC 950, 1st edition 1986	

2D Graphics Systems

For information on 3D graphics capabilities and performance see the PersonalVRX and TurboVRX data sheets.

The following graphics systems are available on the Models 400t/425t:

HP-UX (Release 7.03)	Domain/OS (SR 10.2 + PSK)
VRX Mono	VRX Mono
VRX Color *	VRX Color
PersonalVRX	Personal VRX

* VRX Color is also supported on HP-UX Release 7.0.

Monitors

Physical Characteristics	19" (98774A) Monochrome
Monitor Screen Refresh	72 Hz
Video Signals	RS-343 format (composite video)
Monitor Dimensions:	
Height	445mm (17.5 in)
Width	478mm (18.8 in)
Depth	430mm (16.9 in)
Net weight	21.3 kg (47 lbs)
Shipping weight	24.1 kg (53 lbs)

Physical Characteristics	16" (98789A) Color
Monitor Screen Refresh	60 Hz
Video Signals	RS-343
Monitor Dimensions:	
Height	380mm (15 in)
Width	406mm (16 in)
Depth	450 mm (17.7 in)
Net weight	26.5 kg (58.3 lbs)
Shipping weight	28 kg (62 lbs)

Physical Characteristics	19" (98754A) Color
Monitor Screen Refresh	60 Hz
Video Signals	RS-343
Monitor Dimensions:	
Height	431mm (17 in)
Width	480mm (18.9 in)
Depth	533 mm (19.9 in)
Net weight	30 kg (66.5 lbs)
Shipping weight	41.5 kg (91.3 lbs)

Capabilities

The VRX Color and VRX Mono graphics are highly capable systems which provide high performance for a wide variety of applications. The following capabilities are available in these graphics products:

	VRX Mono	VRX Color
Specifications:		
Screen Resolution	1280 x 1024	1280 x 1024
Screen Refresh Rate	72 Hz	60 Hz
Color Planes	1	8 (256 colors)
Overlay Planes	0	2 (4 colors)
Frame Buffer	VRAM 2K x 1K	VRAM 2K x 1K
Form Factor	1 DIO-II slot	1 DIO-II slot
Monitor Sizes	19"	16" & 19"
Other		
	Fast bit-per-pixel addressing	Color palette (16.7M colors)
	Fast X performance:	3-operand bit block transfer (AND, OR, XOR)
	Motif interface	Pattern area fill
	DDX driver	Bit/byte-per-pixel addressing
	R4 server (HP-UX)	Double buffering (4/4-plane)
		Pixel clipping for window support
		PHIGS support:
		PHIGS 2.0 (Domain)
		3rd party PHIGS (HP-UX)
		Fast X performance:
		Motif interface
		DDX driver
		R4 server (HP-UX)

Performance

Performance shown below has been measured on the HP Apollo 9000 Model 400t is based on the Motorola 68030 50MHz

processor. The Model 425t (based on the 68040 processor) will perform at higher levels, but are not shown.

Performance through graphics application performance interfaces:				VRX Mono	VRX Color
Starbase (HP-UX) and GSR (Domain)					
2D Vectors/Sec (Peak performance, floating point, DC)				40K	130K
2D Vectors/Sec (10 pixel, random orientation, floating point, DC)				20K	100K
Screen Clear (1280 x 1024) in seconds					
				(Starbase)	0.036
				(GSR)	0.017
					0.025
					0.011
Block Transfer Rates					
(1280 x 1024, peak performance, main memory to frame buffer)					
				Bit/Pixel	Pixel/sec
				33M	13M
				Byte/pixel	Pixel/sec
				2M	2M
X Window System performance (X11perf version 1.2)					
Rectangles	(100x100 opaque stippled)	Pixels/sec		11M	41M
Lines	(10 pixel line)	Lines/sec		25K	56K
Lines	(100x10 wide line)	Lines/sec		662	615
Circles	(100-pixel solid circle)	Polygons/sec		713	783
Text	(characters in 80-character image line: 6x13)	Characters/sec		20K	34K
Scroll	(100x100 pixels)	Pixels/sec		7M	21M
Copy	(100x100 from window to window)	Pixels/sec		5M	20M
Window operations	(create & map subwindows – 25 kids)	Ops/sec		1600	1830

X Terminals

The HP 700/X family of X Window graphics terminals provide cost-effective, online access to centralized files and applications.

Description	Product No.
X Window Terminal base unit with keyboard and cable, 3-button mouse and video monitor cable	C2301A
Monochrome X Window Terminal (17-inch 1024 x 768)	C2302A
Color X Window Terminal (14-inch 640 x 480)	C2303A
Color X Window Terminal (16-inch 1024 x 768)	C2304A

Support Services

A wide range of hardware and software support services are available worldwide for all HP Apollo 9000 workstations. Contact your HP sales representative for details on available support services.

Warranty Information

The warranty covering a specific system is determined by the HP WARRANTY AND INSTALLATION TERMS in effect at the time of purchase. These terms are specified in HP Pub. No. 5954-1617(D) for the United States and in similar documents for other countries.

For more information, call
1-800-752-0900 for the location
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