
HP Apollo Series 400 Models 400t and 425t Workstations



The Right Desktop Solution for Your Applications

HP Apollo Series 400 Models 400t and 425t deliver up to 22 MIPS and 2.6 MFLOPS of workstation power in a flexible desktop package. The UNIX-based Models 400t and 425t are ideal solutions for engineering applications in electrical engineering and mechanical engineering.

The Series 400 workstations are capable of running either HP-UX or Domain/OS operating systems. Future operating system upgrade paths will ensure your investment protection.

The Model 400t workstation is based on the MC68030 processor, running at 50MHz, while the Model 425t uses the MC68040 processor, running at 25MHz. The new Motorola technology on the Model 425t doubles integer performance and quintuples floating point performance. Cost-effective upgrades are available in accordance with performance requirements. Memory can be configured from 8 up to 64MB of ECC RAM. Expansion for SCSI peripherals and networking capabilities are accommodated by both workstations.

The HP Apollo Series 400 graphics options offer a wide array of 2D and 3D performance capabilities. X Window performance is superb, available for 2D graphics with versatile 8-plane color systems. Vector performance is also excellent. Advanced 3D graphics can be added, providing up to 50,000 triangles/second, with radiosity, ray tracing, and interference checking.

The HP Apollo Series 400 family is designed to provide economical performance, rich applications availability (over 3500 premier solutions), and protection of your workstation investment.

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Technical Specifications

System Processing Unit

	400t	425t
Central Processor:		
	MC68030	MC68040
Clock	50MHz	25MHz
Integer Performance	12MIPS	22.1MIPS*
SPECmark	4.1	11*
Floating Point:		
	MC68030	MC68040
Clock	50MHz	25MHz
Performance	0.5MFLOPS	2.6MFLOPS*†
Cache Memory on Chip:		
Organization	Sep Data & Inst	Sep Data & Inst
Architecture	Logical	Physical
	Write through	copy back
Size	256 Byte Each	4K Byte Each
Transfer Rate	100MB/sec	100MB/sec
Cache Memory External:		
Organization	Com Data & Inst	N/A
Architecture	Physical	N/A
	Write Through	
Size	32KB	
Transfer Rate	67MB/sec	
Wait States	0	
Main Memory:		
Type	ECC	ECC
	(single-bit correct: double bit detected)	
Bus Width to DRAM	64 bits	64 bits
Standard RAM	8MB	8MB
Maximum RAM	32MB	64MB
Maximum Increments	4, 8MB	4, 8, 16MB
Read Rate	37MB/sec	50MB/sec
Peak Write Rate	66MB/sec	80MB/sec
Sustained Write Rate	21MB/sec	50MB/sec
Memory Management Unit:	On MC68030	On MC68040
Virtual Memory HP-UX	4GB/process	4GB/process
Domain/OS	2GB/process	2GB/process
Contexts	84 Default, user settable	84 Default, user settable

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:		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	

*Based upon HP-UX 8.0 compilers and operating system

†Coded BLAS

I/O Specifications

	HP-UX	Domain/OS
LAN Interface: (standard)		
Type	IEEE 802.3, Ethernet 1.0	IEEE 802.3, Ethernet 1.0
Data rate	10Mbits/sec	10Mbits/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 10BASE T requires p/n 28685A	10BASE2 built-in 10BASE5 requires p/n 30241A 10BASE 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	5.0MB/sec synchronous 1.5MB/sec async.	5.0MB/sec synchronous 1.5MB/sec async.
Device limit	7 per interface	7 per interface
Connector	Shielded High Density 50-pin	Shielded High Density 50-pin
Cable	Not included	Not included
Serial Interface: (standard)		
Type	EIA RS-232C, CCITT V.24/V.28 9-wire, 25-pin DTE female [†] convertible to 3 x 7 wire with product no: K2292 25-pin DTE female	EIA RS-232C, CCITT V.24/V.28 9-wire, 25-pin DTE female [†] convertible to 3 x 7 wire with product no: K2292 25-pin DTE female
Data rate	7.03: to 38.4 Kbps 7.05: to 400.8 Kbps with CTS/RTS bidirectional hardware flow control	To 19.2 Kbps
Device limit	1 per connector	1 per connector
Connector	25-pin female Expandable to 3 ports with K2202 adapter [†]	25-pin female Expandable to 3 ports with K2202 adapter
Parallel Interface: (standard)		
Type	Centronics; $\overline{\text{ACK}}$, $\overline{\text{BUSY}}$ and HP ScanJet handshakes	Centronics; $\overline{\text{ACK}}$, $\overline{\text{BUSY}}$ and HP ScanJet handshakes
Data rate	300 + KB/sec with DMA	300 + KB/sec with DMA
Device limit	1 per interface	1 per interface
Connector	25-pin female (PC standard)	25-pin female (PC standard)
Cable	Not included	Not included
HP-IB Interface: (optional)		
Type	IEEE 488-1978, standard speed	NA
Data rate	350KB/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	209MB	420MB
Average Seek Time	14 msec	14 msec
Average Latency	8.3 msec	8.3 msec
Random I/Os per sec	42	42
Read/write Throughput	1300KB/sec	800KB/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.

[†]Require HP-UX 8.0 or Domain O/S SR10.3 PSKQ3_91

Graphics System

Characteristics	VRX Mono	GRX*	VRX Color	CRX*	PVRX (P2)	PVRX (P3)
Screen Resolution	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024
Screen Refresh	72Hz	72Hz	60Hz	72Hz	60Hz	60Hz
Image Planes	1	8	8	8	8	8
Overlay Planes	0	0	2	0	4	4
Double-Buffering	None	8 + 8	4 + 4	8 + 8	8 + 8	8 + 8
Z-Buffer	None	None	None	None	None	16 bit
Graphics Accelerators	None	None	None	None	Single i860 (33MHz)	Single i860 (33MHz)
Graphics Processors	NA	NA	NA	NA	80 MFLOPS	80 MFLOPS
Monitor Screen Size	19 inch	19 inch	16 or 19 inch	19 inch	16 or 19 inch	16 or 19 inch
Frame Buffer Size	2048 x 1024	1280 x 1024	2048 x 1024	1280 x 1024	2048 x 1024	2048 x 1024
Color Palette	Black & White	16.7 M (gray)	16.7 M	16.7 M	16.7 M	16.7 M
Independent Color Maps	0	1	1	1	1	1

X11 Windows Performance (ops/sec)**	VRX Mono	GRX*	VRX Color	CRX*
X11 Perf 1.2 (overall) – geometric mean	1644	3095	2198	3095
Dots (1-pixel "vectors")	102K	367K	151K	367K
10 pixel line	34K	355K	144K	355K
10 x 10 rectangle	21K	223K	63K	223K
Characters in 80 character line	33K	111K	44K	111K
Create & Map Subwindow (50 kids)	1,540	1,730	1,570	1,730
Scroll Text (100 x 100 pixels)	878	2,670	2,440	2,670

GPC Benchmarks†	VRX Mono	GRX*	VRX Color	CRX*	PVRX (P2)	PVRX (P3)
2D ECAD	NA	NA	4.43	NA	8.96	8.96
3D Wireframe	NA	NA	2.65	NA	7.18	7.18
3D Solids	NA	NA	NA	NA	NA	15.43

Starbase Graphics Library** (Sustained performance)	VRX Mono	GRX*	VRX Color	CRX*	PVRX (P2)	PVRX (P3)
DC Vectors (10 pixel random)/sec	30K	500K	100K	500K	NA	NA
WC 2D Vectors (10 pixel random)/sec	20K	75K	50K	75K	NA	NA
WC 3D Vectors (10 pixel random)/sec	20K	55K	35K	55K	185K	185K
WC 3D Vectors (10 pixel, anti-aliased)	NA	NA	NA	NA	NA	NA
WC 3D Polygons (50 x 50 triangle strip)/sec	NA	NA	NA	NA	30K	30K
WC 3D Polygons (10 x 10 quad mesh)/sec	NA	NA	NA	NA	25K	25K
Full Screen Clear Mpixels/sec	38	111	75	111	60	60
DC Block Write (byte/pixel)	.4	10.1	1.7	10.1	2.8	2.8
DC Block Write (bit/pixel)	34.1	49.0	13.0	49.0	11.2	11.2
(Peak performance)						
DC Vectors (10 pixel random)/sec	40K	NA	130K	NA	NA	NA
WC 3D Vectors (10 pixel random)/sec	NA	NA	NA	NA	270K	270K
WC 3D Vectors (10 pixel, anti-aliased)	NA	NA	NA	NA	NA	NA
WC 3D Polygons (50 x 50 triangle strip)/sec	NA	NA	NA	NA	50K	50K
WC 3D Polygons (10 x 10 quad mesh)/sec	NA	NA	NA	NA	20K	20K

Monitors

	16" Color (98789A)	19" Color (98754A)	19" Grey (98774A)	19" Color (A1097A)
Screen resolution	1024 x 768	1280 x 1024	1280 x 1024	1280 x 1024
Refresh rate	60Hz	60Hz	72Hz	72Hz
Raster size	295mm x 236mm	343mm x 274mm	343mm x 274mm	343mm x 274mm
Brightness (Adj up to)	35 Foot lamberts	27 Foot lamberts	27 Foot lamberts	29 Foot lamberts
Video Signal	RS-343	RS-343	RS-343	RS-343
Scan rate	63.3KHz	63.3KHz	78.1KHz	78.1KHz
Tube Phosphor	p22	p22	p22	p22
Mask	Aperture Grill	Aperture Grill	Aperture Grill	Invar Shadow Mask

*Available only on MC68040

**Based on MC68040 and HP-UX operating systems

†Full-performance PHIGS available on PVRX

Software

	HP-UX	Domain/OS
Operating System	HP-UX complies with the UNIX System V interface Definition X/Open and POSIX Specifications.	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 or HP-UX 7.03 Model 425t: HP-UX 7.05 Model 425t with CRX or GRX HP-UX 8.0	Domain/OS SR 10.2 PSK 7 for 400t Domain/OS SR 10.3 PSK 8 for 425t Domain/OS SR 10.3 PSK Q3_91 for 425t with CRX or GRX
Window Systems	X Window System Version 11 (X11) Release 4	X Window System Version 11 (X11) Release 4 or Apollo Domain Display Manager/X Shared Mode
Languages	C, Pascal, FORTRAN, Ada, Common LISP, C + +	C, Pascal, FORTRAN, Ada, Common LISP, C + +
User Interfaces	HP VUE 2.0 or later	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	81.46Hz to 83.3KHz	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 and 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

System Electrical Specifications

Component	Line Voltage	Voltage Tolerance	Line Frequency	Max Current	Power Consup
Model 400t/425t	115 V	88-135 VAC	45-65Hz	6.3 A	180 Watts
	230 V	193-269 VAC		3.3 A	614 BTU/hour
PVRX	115 V	88-135 VAC	48-66Hz	4.0 A	241 Watts
	230 V	176-269 VAC		2.5 A	822 BTU/hour
16" Color Monitor (HP98789A) 60Hz	120 V	90-125 VAC	48-66Hz	2.6 A	200 Watts
	240 V	198-250 VAC		1.5 A	680 BTU/hour
19" Color Monitor (HP98754A) 60Hz	120 V	90-132 VAC	48-63Hz	3.5 A	250 Watts max
	240 V	198-264 VAC		1.8 A	
19" Gray Monitor (HP98774A) 72Hz	120 V	88-135 VAC	47-63Hz	1.6 A	100 Watts max
	240 V	193-269 VAC			
19-inch Color Monitor (HPA1097A) 72Hz	120 V	88-135 VAC	47-63Hz	2.7 A	175 Watts max
	240 V	193-269 VAC			

System Environmental Characteristics

Component	Temp. Oper/Non-Oper	Humd Oper.	Max. Alt Oper/Non-Oper
Model 400t/425t	0°C to + 55°C/ - 40°C to + 70°C	15-95%	4570m/15,240m
Model 400t/425t w/int. disk	5°C to 40°C/ - 40°C to 70°C	15-80%	3,050m/12,190m
PVRX	0°C to 55°C/ - 40°C to 70°C	10-90%	3352m/15,240m
16" Color Monitor (HP98789A) 60Hz	10°C to 40°C/ - 40°C to 65°C	10-80%	3352m/15,240m
19" Color Monitor (HP98754A) 60Hz	10°C to 40°C/ - 40°C to 65°C	15-95%	4570m/15,240m
19" Gray Monitor (HP98774A) 72Hz	10°C to 40°C/ - 40°C to 71°C	15-95%	4570m/15,240m
19" Color Monitor (HPA1097A) 72Hz	0°C to 40°C/ - 40°C to 71°C	15-95%	4570m/15,240m

System Regulatory Compliance

Characteristics	VDE level	FCC class	VCCI class	Safety
Model 400t/425t	B	A	1	UL, CSA, M, IEC
Model 400t/425t w/disk	B	A	1	UL, CSA, IEC
PVRX	B	A	1	UL, CSA, IEC
16" Color Monitor (HP98789A) 60Hz	B	A	1	UL, CSA, IEC
19" Color Monitor (HP98754A) 60Hz	B	A	1	UL, CSA, IEC
19" Gray Monitor (HP98774A) 72Hz	B	A	2	UL, CSA, IEC 950, EN60, 950/6-88, DHHS 21
19" Color Monitor (HPA1097A) 72Hz	B	A	1	UL, CSA, IEC 950, EN60, 950/6-88, DHHS 21

System Physical

Characteristics	Height	Width	Depth	Weight
Model 400t/425t	102mm (4 in)	527mm (20.7 in)	493mm (19.4 in)	20Kg (44 lbs)
PVRX	100mm (3.9 in)	325mm (12.8 in)	455mm (17.5 in)	9.1Kg (20 lbs)
16" Color Monitor (HP98789A) 60Hz	380mm (15 in)	406mm (16 in)	450mm (17.7 in)	26.5Kg (58.3 lbs)
19" Color Monitor (HP98754A) 60Hz	431mm (17.0 in)	480mm (18.9 in)	533mm (19.9 in)	30Kg (66.5 lbs)
19" Gray Monitor (HP98774A) 72Hz	471mm* (18.6 in)	500mm (20 in)	505mm (20.2 in)	30Kg (66.5 lbs)
19" Color Monitor (HPA1097A) 72Hz	471mm* (18.6 in)	500mm (20 in)	505mm (20.2 in)	29Kg (64.3 lbs)

*includes tilt/swivel base

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