

Computer Specifications

CPU and Memory

32-bit CPU	Intel 486SX/25, 486SX/33, 486DX/33, 486DX2/50, or 486DX2/66 microprocessor
System speed	Fast and slow speeds available; fast is the speed of the microprocessor, slow is 8 MHz; speed selection through keyboard commands or jumper setting
Memory	4MB RAM standard on a SIMM; expandable to 64MB using 1MB, 2MB, 4MB, 8MB, 16MB, and 32MB SIMMs; SIMMs must be tin-plated, 72-pin, 32-bit or 36bit, fast-page mode type with access speed of 80ns (with 1 wait state) or 70ns or faster (with 0 wait state)

ROM	128KB system BIOS, video BIOS, and SETUP code located in EPROM on main system board
Video RAM	1MB DRAM on main system board; expandable to 2MB using two ZIP chips
Shadow RAM	Supports shadowing of system and video BIOS ROM into RAM
Cache	8KB of internal cache; supports 64KB, 128KB, or 256KB of external cache using 28-pin, 8 x 8, 20ns DIP chips or 28-pin, 32 x 8, 20ns DIP chips
Math coprocessor	On DX and DX2 systems, math coprocessor built into the microprocessor
Clock/calendar	Contained in the 82C491 system controller chip along with 64 bytes of CMOS RAM backed up by a soldered NiCad rechargeable battery

Controllers

Video	Cirrus GD5426 high speed super VGA local bus controller with True Color support; with the standard 1MB of video RAM, supports resolutions up to 1280 x 1024 in 16 colors; with 2MB of video RAM installed, supports resolutions up to 1280 x 1024 in 256 colors
Diskette	Controller on main system board supports up to two diskette drives
Hard disk	High-speed, 32-bit local bus IDE interface on main system board supports up to two IDE hard disk drives with built-in controller; BIOS provides hard disk auto-sensing function

Interfaces

Monitor	VGA interface for fixed or multi-frequency monitor built into system board; 15-pin, D-shell connector
Parallel	One standard &bit parallel interface built into main system board; 25-pin, D-shell connector
Serial	Two RS-232C, programmable, asynchronous interfaces built into main system board; 9-pin, D-shell connectors
Keyboard	PS/2 compatible keyboard interface built into main system board; 6-pin, mini DIN connector
Mouse	PS/2 compatible mouse interface built into main system board; 6-pin mini DIN connector

Epson ActionDesk 4000

Option slots	Three 16-bit, full-length and two 8-bit, half-length I/O expansion slots, ISA compatible, 8.33 MHz bus speed
Speaker	Internal
Mass storage	Internal mounts: Two 3½-inch wide, third-height (one-inch) drives Externally accessible mounts: One 3½-inch wide, third-height drive and one 5¼-inch wide, half-height drive
Diskette drives	3.5-inch diskette drive, 1.44MB (highdensity) storage capacity 5.25-inch diskette drive, 1.2MB (high-density) storage capacity 3.5-inch diskette drive, 720KB (double-density) storage capacity 5.25-inch diskette drive, 360KB (double-density) storage capacity
Hard disk drives	3½-inch form factor hard disk drive(s), up to half-height size; maximum of two drives
Other devices	Half-height tape drive, CD-ROM, or other storage device; 5¼-inch or 3½-inch with mounting frames

Keyboard

Detachable, two-position height; 101 or 102 sculpted keys; country-dependent main typewriter keyboard; numeric /cursor control keypad; four-key cursor control keypad; 12 function keys

SETUP Program

Stored in ROM; accessible by pressing F2 during boot

System Security User and supervisor level passwords (8 characters) available for system boot or diskette access

Physical Characteristics

Width	15.6 inches (396 mm)
Depth	14.5 inches (368 mm)
Height	4.1 inches (104 mm)
Weight	15 lb (6.8 kg), without drives or keyboard

Power Supply

Type	65 Watt, UL listed, fan-cooled
Input ranges	100-240 VAC
Maximum outputs	+5 VDC at 7.5 Amps, -5 VDC at 0.1 Amps, +12 VDC at 2.0 Amps, -12 VDC at 0.2 Amps
Frequency	50/60 Hz
Cables	Two to main system board; four to mass storage devices

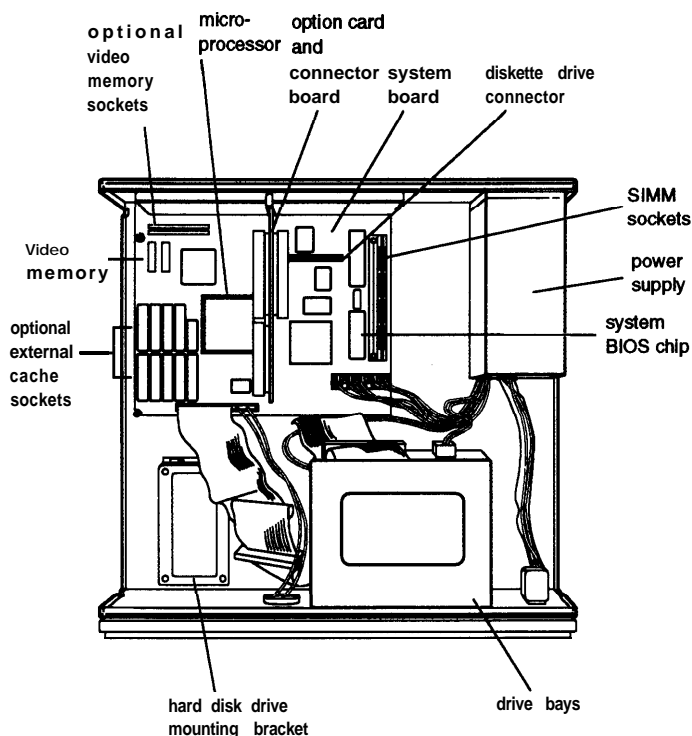
Option Slot Power Limits

Maximum current	+5Volts	-5 volts	+12 volts	-12 volts
For all slots	4.6 Amps	0.1 Amps	1.6 Amps	0.1 Amps

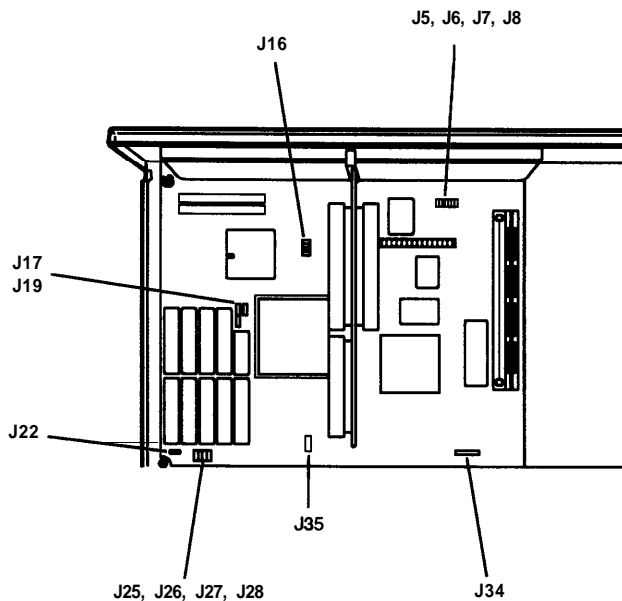
Environmental Requirements

Condition	Operating range	Non-operating range	Storage range
Temperature	41° to 90° F (5° to 32° C)	-4° to 140° F (-20° to 60° C)	-4° to 140° F (-20° to 60° C)
Humidity (non-condensing)	20% to 90%	10% to 90%	10% to 90%
Altitude	-330 to 9,900 n (-100 to 3,000 m)	-330 to 39,600 ft (-100 to 12,000 m)	-330 to 39,600 n (-100 to 12,000 m)

Major Subassemblies



Jumper Settings



Jumper settings

Jumper number	Jumper setting	Function
J5	1-2* 2-3	Assigns PARALLEL port as LPT1 Assigns PARALLEL port as LPT2
J6	1-2* 2-3	Assigns COM1 serial port as COM1 Assigns COM1 serial port as COM3 **
J7	1-2* 2-3	Assigns COM2 serial port as COM2 Assigns COM2 serial port as COM4* *
J8	1-2 . 2-3	Enables diskette drive controller Disables diskette drive controller
J16	1-2 . ** 5-6	Selects a CPU dock speed of 33 MHz (486SX/33, 486DX33, 486DX2/66) Selects a CPU dock speed of 25 MHz (486SX/25, 486DX2/50)
J22	Off * On	Selects turbo speed Selects 8 MHz speed
J34	2-3 * 3-4	Selects the system board battery Discharges CMOS memory (this resets the SETUP values to their factory defaults)
J35	1-2 * 2-3	Enables the IDE hard disk drive controller Disables the IDE hard disk drive controller

* Factory setting

** You can use MS-DOS to automatically reassign parallel and serial ports. Check your MS-DOS manual for more information.

. ** Setting depends on CPU

External cache jumper settings*

Cache size	J25	J26	J27	J28
64KB	1-2	1-2	Off	2-3
128KB	2-3	1-2	1-2	1-2
256KB	2-3	2-3	2-3	2-3

. If you have no external cache installed, the position of these jumpers does not matter.

Processor type jumper settings

Processor type	J17	J19
486DX/DX2	1-2, 3-4	1-2
466SX	2-3	off
487SX	1-2,3-4	2-3

SIMM Installation

Your computer comes with 4MB of memory on a SIMM. You can increase the memory up to 64MB by installing 1MB, 2MB, 4MB, 8MB, 16MB, and 32MB SIMMs in the computer's two SIMM sockets. The following table shows the possible SIMM configurations; do not install memory in any other configuration.

SIMM configuration

BANK 0	BANK 1	Total memory
4MB	x	4MB
4MB	1MB	5MB
4MB	2MB	6MB
4MB	4MB	8MB
4MB	8MB	12MB
8MB	x	8MB
8MB	1MB	9MB
8MB	2MB	10MB
8MB	4MB	12MB
8MB	8MB	16MB
16MB	x	16MB
16MB	1MB	17MB
16MB	2MB	18MB
16MB	4MB	20MB
16MB	8MB	24MB
16MB	16MB	32MB
16MB	32MB	48MB
32MB	x	32MB
32MB	1MB	33MB
32MB	2MB	34MB
32MB	4MB	36MB
32MB	8MB	40MB
32MB	16MB	48MB
32MB	32MB	64MB

Use only tin-plated, 32-bit or 36-bit, 72-pin, fast-page mode SIMMs that operate at an access speed of 80ns (nanoseconds) or faster. Be sure all the SIMMs operate at the same speed. SIMMs that are 80ns must operate with 1 wait state; 70ns or faster SIMMs can operate with 0 wait state. (To add a wait state, select the DRAM wait state option from the Advanced Chipset Control option in SETUP.)

Video Memory

The ActionDesk 4000 comes with 1MB of video memory. You can increase the video memory to 2MB by installing two video DRAM, 40-pin, 256KB x 16-bit, ZIP (Zig-zag Inline Package) chips.

For the memory to work properly, you must install one chip in each socket.

External Cache

You can install 64KB, 128KB, or 256KB of external cache on the ActionDesk 4000.

- To install 64KB of external cache, use eight SRAM, 28-pin, 8 x 8, 20ns DIP chips, and one 8 x 8, 20ns tag chip
- To install 128KB of external cache, use four SRAM, 28-pin, 32 x 8, 20ns DIP chips, and one 8 x 8, 20ns tag chip
- To install 256KB of external cache, use eight SRAM, 28-pin, 32 x 8, 20ns DIP chips, and one 32 x 8, 20ns tag chip.

For the cache memory to work properly, you must install chips in the following configuration (each bank contains four cache memory sockets).

Cache memory configurations

BANK 0 U20,21,22,23	BANK 1 U29,30,31,32	Tag SRAM U36	Total cache
8Kx8	8Kx8	8Kx8	64KB
32Kx8	x	8Kx8	128KB
32Kx8	32Kx8	32Kx8	256KB

Microprocessor Upgrades

The computer's processor can be upgraded by replacing the existing microprocessor with a faster one. You can either purchase an upgrade kit from Epson or buy the individual components separately, as listed in the following table.

Microprocessor upgrade components

Part	Manufacturer	Manufacturer's part number
486SX/33 processor	Intel	A80486SX-33
486DX/33 processor	Intel	A80486DX-33
486DX2/50 processor	Intel	A80486DX2-50
486DX2/66 processor	Intel	A80486DX2-66
Heat sink*	Tennmax Trading Corp.	HS-486DX33-9
Heat sink with fan**	Tennmax Trading Corp.	897-4545-061

* For the DX/33 processor

** For the DX2/50 and the DX2/66 processor

DX/33, DX2/50, and DX2/66 processor upgrades require a heat sink. If the fan is mounted on the heat sink for the DX2/50 and DX2/66 processors, you cannot use the last option slot. Also, make sure jumpers J16, J17, and J19 are set correctly for the new processor. (See page 3.)

Hard Disk Drive Types

The ActionDesk 4000 comes with a hard disk auto-sensing feature. When you press Enter with the cursor positioned on the Autotype Fixed Disk option in SETUP, the system detects the type of hard disk drive you have installed and fills in the drive information using values in the following table.

Hard disk drive types

Type	Size* (MB)	Cylinders	Heads	Sectors/Track	Landing Zone	Write Precomp
1	10	306	4	17	305	128
2	21	615	4	17	615	300
3	32	615	6	17	615	300
4	65	940	8	17	940	512
5	49	940	6	17	940	512
6	21	615	4	17	615	None
7	32	462	8	17	511	256
8	31	733	5	17	733	None
9	117	900	15	17	901	None
10	21	820	3	17	820	None
11	37	855	5	17	855	None
12	52	855	7	17	855	None
13	21	306	8	17	319	128
14	44	733	7	17	733	None
16	21	612	4	17	633	0
17	42	977	5	17	977	300
18	59	977	7	17	977	None
19	62	1024	7	17	1023	512
20	31	733	5	17	732	300
21	44	733	7	17	732	300
22	31	733	5	17	733	300
23	10	306	4	17	336	0
24	21	612	4	17	633	305
25	10	612	2	17	612	300
26	21	614	4	17	614	None
27	42	820	6	17	820	None
28	42	977	5	17	977	None
29	336	1218	15	36	1218	None
30	159	1224	15	17	1224	None
31	71	823	10	17	823	512
32	42	809	6	17	809	128
33	50	830	7	17	830	None
34	72	830	10	17	830	None
35	44	1024	5	17	1024	None
36	71	1024	8	17	1024	None
37	42	615	8	17	615	128
38	109	1024	8	26	1024	None
39	72	925	9	17	925	None
40	80	1024	9	17	1023	None
41	119	918	15	17	917	None
42	133	1024	15	17	1023	None
43	143	823	10	34	822	None
44	84	969	5	34	968	None
45	118	969	7	34	968	None

* Actual formatted size may be slightly different than size on drive label; you cannot change this value.

Some older or preformatted drives do not support the auto-sensing feature. If the parameters displayed do not match the parameters of your hard disk drive, you can define your own drive type in SETUP. Use the following values for Epson-supplied hard disk drives.

Epson-supplied hard disk drive types

Epson drive options	Cyl	Hd	Pre	LZ	Sec	Size* (MB)
80MB (Conner CP30084E)	903	4	0	903	46	81
120MB (Conner CP30104H)	762	8	0	762	39	115
170MB (Conner CP30174E)	903	8	0	903	46	162
170MB (Quantum ELS170AT)	1011	15	-1	1011	22	170
240MB (Quantum LPS240AT)	723	13	-1	723	51	234
250MB (Conner CP30254)	895	10	0	895	55	254
340MB (Conner CP30344)	655	16	0	655	63	343

* Actual formatted size may be slightly different than size on drive label.

Installation/Support Tips

Installing Diskette Drives

Make sure that the drive type has been correctly selected in the SETUP program.

Installing Hard Disk Drives

- It is recommended that a 16-bit, AT-type hard disk controller be used if you are installing a drive that cannot use the embedded IDE interface. If you install a non-IDE hard disk drive and controller card, you need to disable the built-in IDE hard disk drive interface by moving jumper J35 to position 2-3.
- To take advantage of the local bus IDE interface, your hard disk drive must support a 32-bit data path that uses double-word I/O.
- When installing a hard disk drive, see the hard disk drive type tables on pages 4 and 5 and use the auto-sensing feature in SETUP to select the correct type number for the drive. If the auto-sensing feature does not produce a match for the drive, you can define your own drive type by selecting User as the type and entering the drive's exact parameters. Also make sure you have installed the IDE drivers on your hard disk and that the CONFIG.SYS file loads the drivers.

- If you plan to install two hard disk drives in the internal bays, you must use flat-head screws (#6-32UNC x 8 FH,M,+) to secure the top drive to the mounting bracket.
- If you are going to install NetWare 286, version 2.2, and you plan to assign a userdefined drive type, install two NetWare IDE drivers (IDE.DSK and IDE.OBJ) available by downloading IDE286.ZIP from Netware on CompuServe. Alternatively, assign the predefined hard disk drive type that most closely matches the drive you are installing.
- If you are installing an ESDI hard disk drive, make sure you disable the built-in IDE hard disk drive interface by moving jumper J35 to position 2-3. Also be sure to remove the hard disk drive ribbon connector from the system board.

Software Problems

- When installing a copy-protected software package, first try the installation at high speed. If this does not work properly, select low speed by pressing the Ctrl and Alt keys and the - key on the numeric keypad simultaneously. Try loading the program at low speed and then switching to high speed, if possible.
- When using a software package that uses a key disk as its copy-protection method, try loading it at high speed. If this does not work, load it at low speed.

Installing Option Cards

Although the ActionDesk 4000 will support most full-length option cards, option cards with an I/F connector on the back may not fit into the option slot.

Make sure the power requirements of the option cards you install do not exceed the power supply limitations.

Note that the ActionDesk 4000 system does not support video display adapter cards.

COM Port Assignment

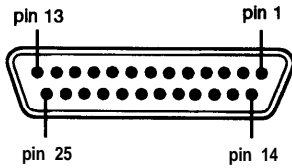
If you want to assign COM1 as COM3, you must set jumper J6 to position 2-3. If you want to assign COM2 as COM4, you must set jumper J7 to position 2-3.

Booting Sequence

If you cannot boot the computer from the hard disk, make sure the booting sequence in SETUP is set to **A: then c : .** Then boot the computer from a system diskette in Drive A.

Connector Pin Assignments

Parallel Port Connector (CN3)



Parallel port connector pin assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Strobe	10	ACK *	19	Signal ground
2	Data 0	11	Busy	20	Signal ground
3	Data 1	12	PE	21	Signal ground
4	Data 2	13	Select	22	Signal ground
5	Data 3	14	Auto *	23	Signal ground
6	Data 4	15	Error *	24	Signal ground
7	Data 5	16	Init *	25	Signal ground
8	Data 6	17	Selectin *		
9	Data 7	18	Signal ground		

*Active low logic

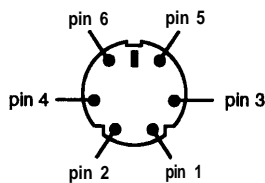
Serial Port Connectors (CN4 and CN5)



Serial port connector pin assignments

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Ground		

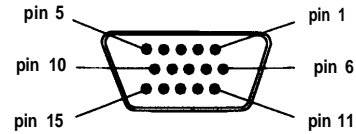
Keyboard and Mouse Connectors (CN7 and CN6)



Keyboard and mouse connector pin assignments

Pin	Signal	Pin	Signal
1	Data	4	+5 VDC
2	Reserved	5	Clock
3	Ground	6	Reserved

VGA Port Connector (CN2)



VGA port connector pin assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Red ground	11	NC
2	Green	7	Green ground	12	Monitor detect
3	Blue	8	Blue ground	13	Horizontal sync
4	NC	9	NC	14	Vertical sync
5	Ground	10	GND	15	NC

DMA Assignments

Level	Assigned device
DMA0	Reserved (8-bit)
DMA1	Reserved (8-bit)
DMA2	FDD controller (8-bit)
DMA3	Reserved (8-bit)
DMA4	Cascade for DMA controller 1
DMA5	Reserved (N-bit)
DMA6	Reserved (16-bit)
DMA7	Reserved (W-bit)

Hardware Interrupts

IRQ no.	Function
IRQ0	Timer output
IRQ1	Keyboard
IRQ2	Cascade from IRQ controller 2
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Parallel port 2
IRQ6	FDD controller
IRQ7	Parallel port 1
IRQ8	Real-time clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 mouse
IRQ13	Math coprocessor
IRQ14	HDD controller
IRQ15	Reserved

System Memory Map

000FFFFFFh	<p>System BIOS ROM: 84KB Duplicated from 0F0000h</p> <p>Resewed for system board: 84KB Duplicated from 0E0000h</p> <p>Extended memory</p> <p>System BIOS ROM: 84KB Default Shadow RAM duplicated at FFO000h</p> <p>Unused or I/O expansion ROM: 160KB Reserved for ROM on I/O adapters</p> <p>VGA BIOS ROM: 32KB Default Shadow RAM</p> <p>VGA text (color): 32KB</p> <p>Unused or VGA text (monochrome): 32KB</p> <p>Video memory: 64KB Reserved for graphics display buffer</p> <p>Conventional system memory: 640KB</p>	<p>64MB (Maximum system memory)</p> <p>1MB</p> <p>640KB</p>
000FF0000h		
000FE0000h		
00100000h		
000F0000h		
000C8000h		
000C0000h		
000B8000h		
000B0000h		
000A0000h		
00000000h		

System I/O address map (continued)

Hex address	Assigned device
1F0 - 1F8	Hard disk
200 - 207	Game I/O
278 - 27F	Parallel printer port 2
280 - 2DF	Alternate enhanced graphics adapter
2E1	GPIB (adapter 0)
2E2, 2E3	Data acquisition (adapter 0)
2F8 - 2FF	Serial port 2
300 - 31F	Prototype card
360 - 363	PC network (low address)
368 - 36B	PC network (high address)
378 - 37F	Parallel printer port 1
380 - 38F	SDLC, bisynchronous 2
390 - 393	Cluster
3A0 - 3AF	SDLC, bisynchronous 1
3B0 - 3BF	Monochrome display and printer adapter
3C0 - 3CF	Enhanced graphics adapter
3D0 - 3DF	Color graphics monitor adapter
3F0 - 3F7	FDD controller
3F8 - 3FF	Serial port 1
6E2, 6E3	Data acquisition (adapter 1)
790 - 793	Cluster (adapter 1)
AE2, AE3	Data acquisition (adapter 2)
B90, B93	Cluster (adapter 2)
EE2, EE3	Data acquisition (adapter 3)
1390 - 1393	Cluster (adapter 3)
22E1	GPIB (adapter 1)
2390 - 2393	Cluster (adapter 4)
42E1	GPIB (adapter 2)
62E1	GPIB (adapter 3)
82E1	GPIB (adapter 4)
A2E1	GPIB (adapter 5)
C2E1	GPIB (adapter 6)
E2E1	GPIB (adapter 7)

Information Reference List

Engineering Change Notices

None.

Technical Information Bulletins

None.

Product Support Bulletins

None.

Related Documentation

TM-ACTD4	Epson ActionDesk 4000 Service Manual
PL-ACTD4	Epson ActionDesk 4000 Parts Price List
4002497	Epson ActionDesk 4000 User's Guide

System I/O Address Map

Hex address	Assigned device
000-01F	DMA controller 1,8237
020 - 03F	Interrupt controller 1,8259, master
022 - 024	Chip set configuration register
040 - 05F	Timer, 8254
080-08F	Keyboard controller, 8042
070 - 07F (CMOS)	Real-time clock NMI (non-maskable Interrupt) mask
080 - 09F	DMA page register, 74LS612
0A0-0BF	Interrupt controller 2,825QA
084, 0BB	AD12 control register
0BC	AD12 control register
0C0 - 0DF	DMA controller 2,8237
0F0	Clear math coprocessor busy
0F1	Reset math coprocessor
0F8 - 0FF	Math coprocessor