

Computer Specifications

CPU and Memory

32-bit CPU	Cyrix Cx486SLC, 33 MHz microprocessor with 16-bit data bus
Internal cache	1KB built into microprocessor

System speed High and low speeds available; high speed is 33 MHz, low speed is 8 MHz; speed selection through SETUP program and keyboard commands; 0 or 1 wait state memory access selectable through SETUP

To select low speed, press the **Ctrl, Alt,** and **-** keys simultaneously. To select high speed, press the **Ctrl, Alt,** and **+** keys simultaneously. (Use the **-** or **+** key on the numeric keypad.)

Memory 2MB or 4MB RAM standard on SIMMs; expandable using 256KB, 1MB, or 4MB SIMMs to 16MB (maximum); SIMMs must be 30-pin, fast-page mode type with 70ns (or faster) access speed

ROM Phoenix BIOS A386 V1.03; 64KB system BIOS, video BIOS, and SETUP code located in EPROM on main system board

Video RAM 256KB DRAM on main system board, expandable to 512KB or 1MB using 70ns or 80ns 44256 DIP chips

Shadow RAM 32KB or 64KB, 0 or 1 wait state access speed; system ROM BIOS and video ROM can be copied into RAM

Math coprocessor Socket for Cyrix Cx83S87-33 math coprocessor

Clock/calendar Real-time clock, calendar, and CMOS RAM socketed on main system board with built-in battery backup

Controllers

Video Trident VGA controller on main system board; provides standard VGA resolutions with 256KB memory and extended VGA resolutions up to 1024 x 768 in 16 colors with 512KB memory and 256 colors with 1MB memory

Diskette Controller on main system board supports up to two diskette drives, maximum

Hard disk Interface on main system board supports up to two IDE hard disk drives, maximum, with built-in controllers on the hard disk drive itself

Interfaces

Monitor VGA interface built into main system board for analog or multifrequency VGA monitor; 15-pin, D-shell connector

Parallel One standard B-bit parallel, unidirectional 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

Game One game port interface built into main system board; 15-pin, D-shell connector

Keyboard PS/2 compatible keyboard interface built into main system board; num lock setting selectable through SETUP; 6-pin, mini DIN connector

Option slots Three 16-bit (or 8-bit) full-length and two 8-bit half-length I/O expansion slots, ISA compatible, 8 MHz bus speed

Speaker Internal

Mass Storage Up to four drives (two horizontal mounts and two internal mounts), configurable using the following:

Horizontal mounts Up to two externally-accessible, horizontal mounts; one horizontal bay can accommodate a half-height **5¼-inch** form factor hard disk, diskette, tape, CD-ROM, or other drive; the other horizontal bay can accommodate one third-height (one-inch) **3½-inch** form factor hard disk, diskette, tape, or other device

Internal mount Two internal third-height (one-inch) horizontal mounts; bays can accommodate **3½-inch** form factor hard disk or other drives

Diskette drives 5.25-inch, 1.2MB (high-density)
3.5-inch, 1.44MB (highdensity)
5.25-inch, 360KB (double-density)
3.5-inch, 720KB (doubledensity)

Hard disk drives **3½-inch** form factor hard disk drive(s), third- or half-height size

Other devices Half-height tape drive, CD-ROM drive, or other storage device; **5¼-inch** form factor or **3½-inch** form factor with **5¼-inch** mounting frames attached

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 Ctrl, Alt, and S at the SETUP prompt during boot

Power Supply

Type 65 Watt, fan cooled

Input ranges 100 to 240 VAC

Maximum outputs +5 VDC at 7.5 Amps, +12 VDC at 2.0 Amps, -12 VDC at 0.3 Amps

Frequency 50/60 Hz

Cables One to main system board; four to mass storage devices

Option Slot Power Limits

Maximum current	+5 volts	+12 volts	-12 volts
For all slots	4.6 Amps	1.8 Amps	0.3 Amps

This system does not support older option cards that may require -5 volts.

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 ft (-100 to 3,000m)	-330 to 39,600 ft (-100 to 12,000m)	-330 to 39,600 ft (-100 to 12400m)

Physical Characteristics

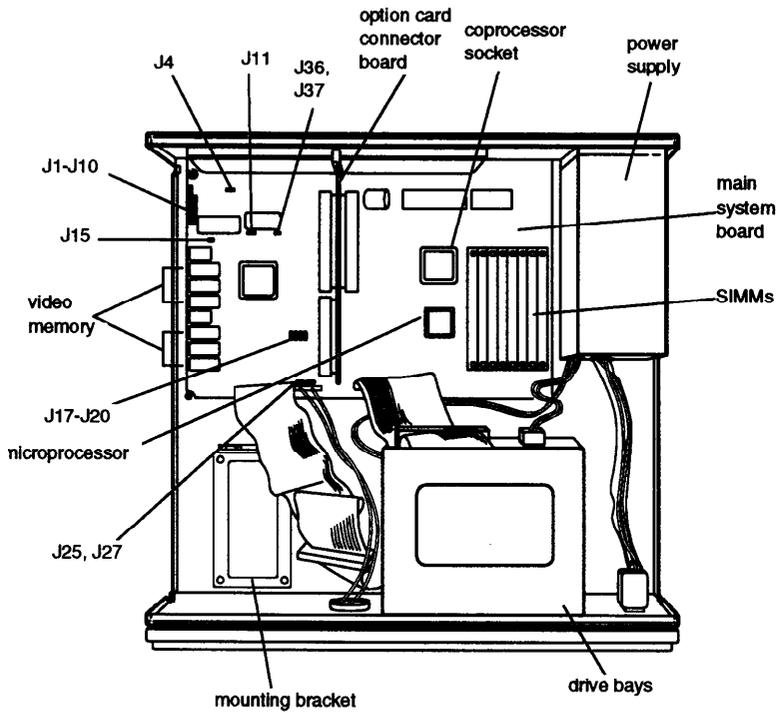
Width 15.6 inches (396 mm)

Depth 14.5 inches (368 mm)

Height 4.1 inches (104 mm)

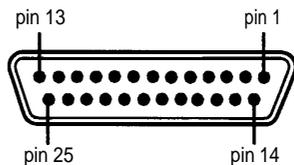
Weight 15 lb (6.8 kg) without drives or keyboard

Major Subassemblies



Connector Pin Assignments

Parallel Port Connector (CN3)

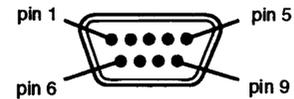


Parallel Port Connector Pin Assignments

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

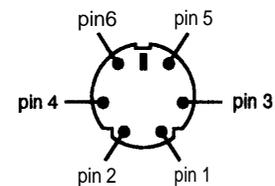
Serial Port Connectors (CN4 and CN5)



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	Not used		

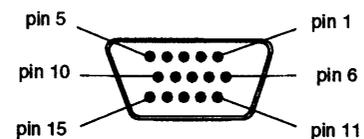
Keyboard Connector (CON1)



Keyboard Connector Pin Assignments

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

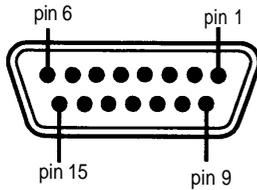
VGA Port Connector (CN2)



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

Game Port Connector (CN1)



Game Port Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	+5 VDC	6	Position 1	11	Position 2
2	Button 4	7	Button 5	12	Signal ground
3	Position 0	8	+5 VDC	13	Position 3
4	Signal ground	9	+5 VDC	14	Button 7
5	Signal ground	10	Button 6	15	+5 VDC

DMA Assignments

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

Hardware Interrupts

IRQ no.	Function
IRQ0	Timer output
IRQ1	Keyboard
IRQ2	Cascade to IRQ controller 2
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Parallel port 2 (Available)
IRQ6	FDD controller
IRQ7	Parallel port 1
IRQ8	Real-time clock
IRQ9	Available
IRQ10	Available
IRQ11	Available
IRQ12	Available
IRQ13	Math coprocessor
IRQ14	HDD controller
IRQ15	Avaiiable

System Memory Map

000FFFFFFh	System BIOS ROM: 64KB Duplicated from 0F0000h	
000FF0000h	Reserved for system board: 64KB Duplicated from 0E0000h	16MB
000FE0000h	Extended memory	(Maximum system Memory)
00100000h	System BIOS ROM: 64KB Default Shadow RAM duplicated at FF0000h	1MB
000F0000h	Unused or I/O expansion ROM: 160KB Resewed for ROM on I/O adapters	
000C8000h	VGA BIOS ROM: 32KB Default Shadow RAM	
000C0000h	VGA text (color): 32KB	
000B8000h	Unused or VGA text (monochrome): 32KB	
000B0000h	video memory: 64KB Resewed for graphics display buffer	640KB
000A0000h	Conventional system memory: 640KB	
00000000h		

System I/O Address Map

Hex address	Assigned device
000 - 01F	DMA controller 1, 8237A-5
020 - 03F	Interrupt controller 1, 8259A, master
022 - 023	Chip set configuration register
040 - 05F	Timer, 8254-2
060 - 06F	8042 (Keyboard)
070 - 07F (CMOS)	Real-time clock NMI (non-maskable interrupt) mask
080 - 09F	DMA page register, 74LS612
0A0 - 0BF	Interrupt controller 2, 8259A
0C0 - 0DF	DMA controller 2, 8237A-5
0F0	Clear math coprocessor busy
0F1	Reset math coprocessor
0F8 - 0FF	Math coprocessor
1F0 - 1F8	Hard disk
200 - 207	Game I/O
278 - 27F	Parallel printer port 2
2B0 - 2DF	Alternate enhanced graphics adapter
2E1	GPIO (adapter 0)
2E2 and 2E3	Data acquisition (adapter 0)
2F8 - 2FF	Serial port 2
300 - 31F	Prototype card
360 - 36F	Reserved
378 - 37F	Parallel printer port 1
380 - 38F	SDL, bisync 2
390 - 393	Cluster
3A0 - 3AF	Bisynchronous 1
3B0 - 3BF	Monochrome display and printer adapter
3C0 - 3CF	Reserved
3D0 - 3DF	Color/graphics monitor adapter
3F0 - 3F7	FDD controller
3F8 - 3FF	Serial port 1
6E2 and 6E3	Data acquisition (adapter 1)
790 - 793	Cluster (adapter 1)
AE2 and AE3	Data acquisition (adapter 2)
B90 - B93	Cluster (adapter 2)
EE2 - EE3	Data acquisition (adapter 3)
1390 - 1393	Cluster (adapter 3)
22E1	GPIO (adapter 1)
2390 - 2393	Cluster (adapter 4)
42E1	GPIO (adapter 2)
62E1	GPIO (adapter 3)
82E1	GPIO (adapter 4)
A2E1	GPIO (adapter 5)
C2E1	GPIO (adapter 6)
E2E1	GPIO (adapter 7)

Jumper Settings

Port Jumper Settings

Jumper number	Jumper setting	Function
J2	1-2* 2-3	Enables the serial port labeled COM2 Disables the serial port labeled COM2
J3	1-2* 2-3	Assigns the serial port labeled COM2 as COM2 Assigns the serial port labeled COM2 as COM4**
J4	1-2* 2-3	Enables game port Disables game port
J7	1-2* 2-3	Enables parallel port Disables parallel port
J8	1-2* 2-3	Enables the serial port labeled COM1 Disables the serial port labeled COM1
J9	1-2* 2-3	Assigns parallel port as LPT1 Assigns parallel port as LPT2**
J10	1-2* 2-3	Assigns the serial port labeled COM1 as COM1 Assigns the serial port labeled COM1 as COM3**
J11	1-2* 2-3	Color VGA display adapter Monochrome display adapter
J15***	On Off*	Interlaced mode Non-interlaced mode
J27	1-2* 2-3	Enables diskette drive controller Disables diskette drive controller

* Factory setting

** DOS automatically reassigns parallel and serial ports. Check your DOS manual for more information.

***Two pin jumper

Drive Assignment Jumper Settings

Drive assignment	J17	J18	J19	J20
Upper drive is A	2-3	2-3	2-3	2-3
Lower drive is A	1-2*	1-2*	1-2*	1-2*

* Factory setting

Hard Disk Drive Controller Jumper Settings

Hard disk controller	J25	J22**
Enable	1-2*	On*
Disable	2-3	off

* Factory setting

** Two-pin jumper

Built-in VGA Jumper Settings

Built-in VGA	J36**	J37**
Enable	On*	On*
Disable	Off	Off

* Factory setting

** Two-pin jumper

To use an external display adapter in an expansion slot, you must disable the built-in VGA adapter.

Processor Chips

You can install a Cyrix Cx83S87-33 math coprocessor on the main system board.

SIMM Installation

The computer comes with 2MB or 4MB of memory installed on SIMMs. To increase the amount of memory in the computer up to 16MB, you can install 30-pin, fast-page mode SIMMs that operate at an access speed of 70ns or faster, with a capacity of 256KB, 1MB, or 4MB.

The following table shows the possible SIMM configurations; do not install memory in any other configuration. Make sure that all SIMMs operate at the same speed.

SIMM Configurations

Bank 0 (RAM5 and RAM6)	Bank 1 (RAM7 and RAM8)	Bank 2 (RAM1 and RAM2)	Bank 3 (RAM3 and RAM4)	Total memory
256KB	256KB	256KB	256KB	2MB
1MB				2MB*
256KB	1MB	256KB		3MB
1MB	1MB			4MB
256KB	1MB	256KB	1MB	5MB
1MB	1MB	1MB		6MB
4MB				8MB
1MB	4MB	1MB		12MB
4MB	4MB			16MB

* Standard memory configuration

Video Memory

Your computer has 256KB of video memory. You can install four or six video DRAM, 20-pin, 70ns or 80ns, 44256 DIP (Dual Inline Package) chips to increase the video memory to 512KB or 1MB. The following table lists possible video memory configurations.

Video Memo y Chip Configuration

Bank 0	Bank 1	Bank 2	Bank 3	Total memory
Soldered				256KB*
soldered	Filed			512KB
Soldered	Filed	Filed	Filled	1024KB

* Standard video memory

Video Memo y and Supported Resolutions

Memory	Resolutions	Colors
256KB	640 × 480	16
	800 × 600	16
512KB	640 × 480	256
	800 × 600	256
	1024 × 768	16
1MB	640 × 480	256
	800 × 600	256
	1024 × 768	256

Hard Disk Drive Types

The table below lists types of hard disk drives you can use in the computer. Check this table and your hard disk manual to find the correct type number(s) for the hard disk drive(s) installed in the computer. You need to enter the type number(s) when you set the hard disk drive configuration in the SETUP program.

Hard Disk Drive Types

Type	Cyl	Heads	Precomp	LZ	Sec	Size* (MB)
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	30
4	940	8	512	940	17	62
5	940	6	512	940	17	46
6	615	4	-1	615	17	20
7	462	8	256	511	17	30
8	733	5	-1	733	17	30
9	900	15	-1	901	17	112
10	820	3	-1	820	17	20
11	855	5	-1	855	17	35
12	855	7	-1	855	17	49
13	306	8	128	319	17	20
14	733	7	-1	733	17	42
16	612	4	0	663	17	20
17	977	5	300	977	17	40
18	977	7	-1	977	17	56
19	1024	7	512	1023	17	59
20	733	5	300	732	17	30
21	733	7	300	732	17	42
22	733	5	300	733	17	30
23	306	4	0	336	17	10
24	Drive table entry unused					
25	615	4	0	615	17	20
26	1024	4	-1	1023	17	34
27	1024	5	-1	1023	17	42
28	1024	8	-1	1023	17	68
29	512	8	256	512	17	34
30	615	2	615	615	17	10
31	989	5	0	989	17	41
32	1020	15	-1	1024	17	127
33	615	4	-1	615	26	31
34	820	6	-1	820	26	62
35	1024	9	1024	1024	17	76
36	1024	5	512	1024	17	42
37	1024	5	512	1024	26	65
38	823	10	256	824	17	68
39	615	4	128	664	17	20
40	615	8	128	664	17	40
41	917	15	-1	918	17	114
42	1023	15	-1	1024	17	127
43	823	10	512	823	17	68
44	820	6	-1	820	17	40
45	1024	5	-1	1023	17	42
46	925	9	-1	925	17	69
47	699	7	256	700	17	40
48, 49	User-defined drive type					

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

If the computer has an Epson-supplied hard disk drive, select a user-defined drive type and enter the appropriate information from the table below using the SETUP program.

Epson-supplied Hard Disk Drive Types

Epson drive options	Cyl	Heads	Precomp	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	170
170MB (Quantum ELS170AT)	1011	15	None	1011	22	170
240MB (Quantum LPS240AT)	723	13	None	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 jumpers J25 to position 2-3 and J22 to the Off position.
- ❑ When installing a hard disk drive, see the hard disk drive type tables on page 7 and use the SETUP program to select the correct type number for the drive. You can select a type number that matches the parameters for the drive or a type number with parameters having lesser values, as long as they do not exceed the maximum capacity (in MB) of the drive. If there is no match for the drive, you can select a user-defined drive type (48 or 49) and enter the drive's exact parameters.
- ❑ If you are going to install NetWare 286, version 2.2, install the IDE.OBJ and IDE.DSK drivers contained within the IDE286.ZIP file available from Netware on CompuServe. Alternatively, assign the pre-defined hard disk drive type that most closely matches the drive you are installing rather than assigning a user-defined drive type.
- ❑ If you are installing an ESDI hard disk drive, make sure you disable the built-in IDE hard disk drive interface by moving jumpers J25 to position 2-3 and J22 to the Off position. Also be sure to remove the hard disk drive ribbon connector from the system board.
- ❑ If you install two hard disk drives in the internal drive bays, you must use flat-head screws (#6-32UNC x8 FH,M,+) to secure the top drive to the mounting bracket. You must also replace the existing 65 Watt power supply with an 85 Watt power supply.

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 EL 4S/33 will support most full-length option cards, option cards with an I/F connector on the back may not fit into the option slot.

Note that the EL 4S/33 system does not support older option cards requiring -5 VDC.

COM Port Assignment

If you want to assign COM1 as COM3, you must set jumper J10 to position 2-3. You also need to install a special driver available from Epson technical support.

Using IBM 3270/PC 3270 Emulation

If you are using the IBM 3270/PC 3270 Emulation Entry software, version 2.2, you may see only half the font when you switch from a terminal emulation session to DOS. Install the patch program available from the Epson Bulletin Board at (310) 782-4531.

Game Port Problems

Some joysticks may not calibrate properly with certain game software applications that accept joystick input. If the joystick connected to the built-in game port does not work with the game software you are using, try repositioning the trim knobs on the joystick. If that doesn't work, you may want to purchase a joystick option card. If you do, make sure you set jumper J4 to position 2-3 to disable the built-in game port.

Information Reference List

Engineering Change Notices

None.

Technical Information Bulletins

None.

Product Support Bulletins

None.

Related Documentation

400251400	EPSON EL 4S/33 User's Guide
TM-EL3/4S33	EPSON EL 3S/33 and EL 4S/33 Service Manual
PL-EL4S33	EPSONEL 4S/33 Parts Price List