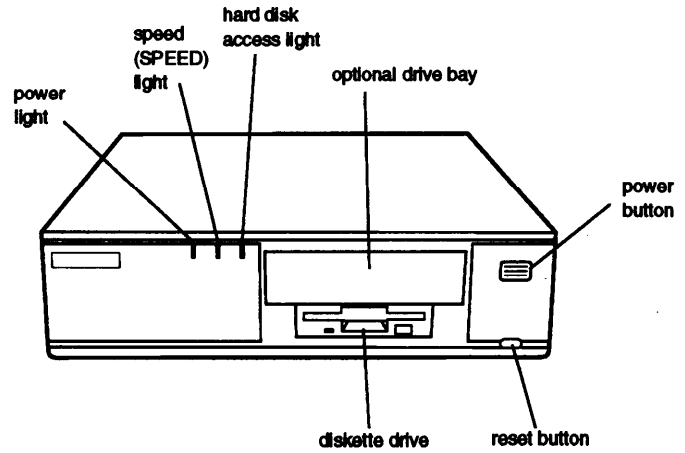
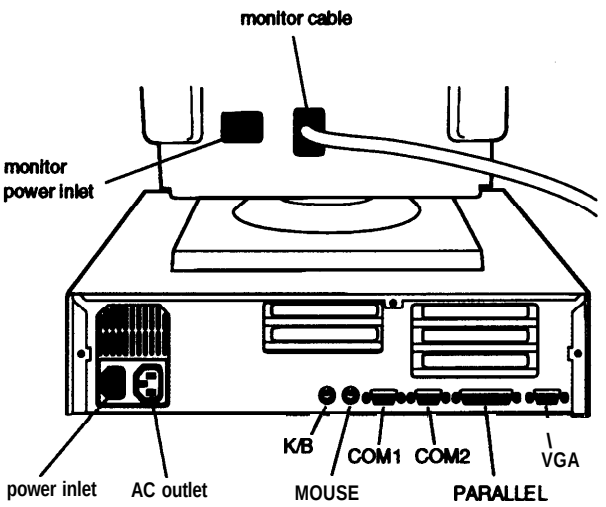
EL 4S/33+ Components

The following diagrams illustrate the outside of the EL 4S/33+ system.





Computer Specifications

CPU and Memory

32-bit CPU	Cyrix® or Texas Instruments® 486SLC, 33 MHz microprocessor with 16-bit data bus
System speed	Fast and slow speeds available; fast speed is 33 MHZ, slow speed is 8 MHz; speed selection through SETUP program and keyboard commands; zero wait state memory access at fast speed; 0 or 1 wait state memory access selectable through SETUP
Memory -	2MB or 4MB RAM standard on SIMMs; expandable to 16MB (maximum) using 256KB, 1MB, and 4MB SIMMs; SIMMs must be 30-pin, 8-bit or 9-bit, fast-page mode type with access speed of 70ns or faster (preferably tin-plated)
ROM	64KB system BIOS and SETUP code located in EPROM on main system board; 32KB video BIOS located in EPROM on main system board
Video RAM	256KB DRAM on main system board; expandable to 512KB or 1024KB 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
Memory relocation	Supports relocation of 256KB of memory from A0000h to BFFFFh and D0000h to EFFFFh to extended memory
Internal cache	1KB built into microprocessor
Math coprocessor	Optional Cx83S87-33 coprocessor available
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
Hard disk	Interface on main system board supports up to two IDE hard disk drives with built-in controllers; BIOS provides hard disk auto-sensing function

Interfaces

Monitor	VGA interface for analog monitor built into system board; 15-pin, D-shell connector
Parallel	One standard 8-bit parallel, bidirectional 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; Num Lock setting selectable through SETUP
Mouse	PS/2 compatible mouse interface built into main system board; 6-pin mini DIN connector
Game port	10-pin game port interface on system board; can control joy-stick functions with the addition of an optional game port connector
Option slots	Three 16-bit, full-length and two 8-bit, half-length I/O expansion slots, ISA compatible, 8 MHz bus speed
Speaker	Internal
Mass storage	Internal mounts: Two 3½-inch wide, one-inch high drives; with three or more option cards installed, the power supply may only support one internal drive 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, 720KB or 1.44MB storage capacity 5.25-inch diskette drive, 360KB or 1.2MB storage capacity
Hard disk drives	3½-inch form factor hard disk drive(s), up to half-height size
Other devices	Half-height tape drive, CD-ROM drive, optical drive, or other storage device; 5¼-inch or 3½-inch with mounting frames
Keyboard	Detachable, two-position height; 101 or 102 sculpted keys; countrydependent 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 S at the MS-DOS prompt

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	90 to 115,230 to 260 VAC
Maximum outputs	+5 VDC at 7.5 Amps, -5 VDC at 0.1 Amps, +12 VDC at 2.0 Amps, -12 VDC at 0.3 Amps
Frequency	50 to 60Hz
Cables	Two to main system board; four to mass storage devices

Option Slot Power Limits

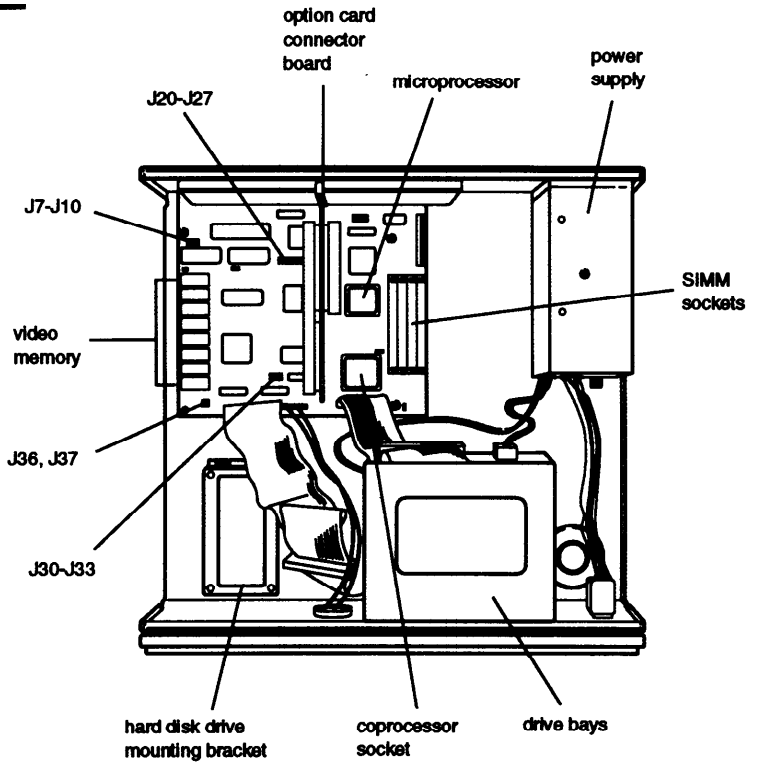
Maximum current	+5 Volts	–5 Volts	+12 Volts	–12 Volts
For all slots*	4.5 Amps	0.1 Amps	1.5 Amps	0.2 Amps

* Based on a system containing one hard disk drive and one diskette drive.

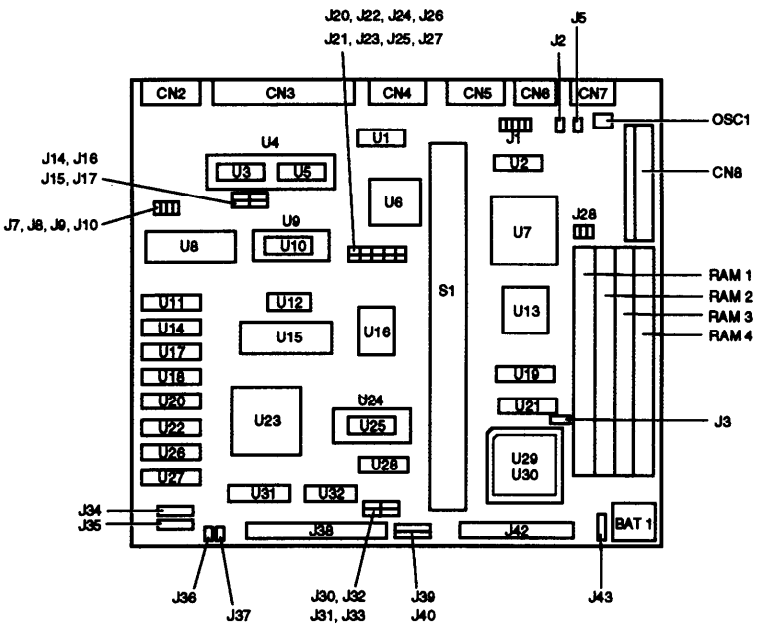
Environmental Requirements

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 3,000 m)	–330 to 39,600 ft (–100 to 12,000 m)	–330 to 39,600 ft (–100 to 12,000 m)
Maximum wet bulb	68° F (20° C)	104° F (40° C)	134° F (57° C)
Accoustical noise	46.2 dB	N/A	N/A

Major Subassemblies



System Board Components



System board components and connectors

Socket	Component
CN2	Video connector; 15-pin, D-shell
CN3	Parallel port; 25-pin, D-shell
CN4	Serial port labeled COM2; 9-pin, D-shell
CN5	Serial port labeled COM1; 9-pin, D-shell
CN6	Mouse; 6-pin, mini-DIN
CN7	Keyboard; PS/2-type, 6-pin, mini-DIN
CN8	Power supply; 12-pin connector
J1	Game connector; 10-pin header
J2	RESET connector; 2-pin header
J3	Coprocessor mode: synchronous or asynchronous
J5	Fan connector; 2-pin header
J34	Speaker connector; 4-pin header
J35	Key lock and power LED connector
J37	Hardware reset connector; 2-pin header
J38	Hard disk drive; 40-pin header
J39	Hard disk drive, drive A, and power LED connector; 6-pin header
J40	Hard disk drive, TURBO, and power LED connector; 6-pin header
J42	Diskette drive connector; 34-pin header
OSC1	Clock generator; 4V to 7V operating supply range, 1ns skew, CMOS or TTL compatible outputs
RAM1, RAM2, RAM3, RAM4	SIMM sockets; 2MB or 4MB standard on SIMMs in RAM1 and RAM2
S1	ISA 120-pin slot connector
U1	IRQ1 and IRQ12 latch for PS/2 mouse and keyboard
U2	Asynchronous clock for coprocessor
U3 (under U4)	Signal buffer for keyboard and mouse
U4	Keyboard and mouse controller
U5 (under U4)	I/O read/write buffer
U6	I/O controller
U7	System controller; integrated system, memory, and cache
U8	VGAQ RAM D.A.C.
U9	Real time clock
U10 (under U9)	Signal control logic
U11, U14, U17, U18, U20, U22, U26, U27	Video DRAM; two chips installed at U11 and U20
U12	32.768K Hz clock generator logic for CMOS RAM
U13	Microprocessor
U15	VGA BIOS
U16	I/O controller; supports up to two diskette drives, two serial ports, and one parallel port
U19	Address buffer
U21	Address buffer
U23	Video controller
U24	Phoenix system BIOS (Dragon BIOS); 150ns, 8-bit operation
U25 (under U24)	Address buffer
U28	Address buffer
U29, U30	Math coprocessor socket
U31	Clock generator for VGA
U32	Master/refresh control logic

Jumper Settings

Jumper settings

Jumper number	Jumper setting	Function
J7, J8, J9	On, On, On * Off, Off, Off	Enables built-in VGA (interlaced mode) Disables built-in VGA (non-interlaced mode)
J10 **	Off * On	Non-interlaced mode Interlaced mode
J21	1-2 * 2-3	Enables hard disk drive controller Disables hard disk drive controller
J22	1-2 * 2-3	Assigns PARALLEL port as LPT1 Assigns PARALLEL port as LPT2
J23	1-2 * 2-3	Enables PARALLEL port Disables PARALLEL port
J24	1-2 * 2-3	Assigns COM1 serial port as COM1 Assigns COM1 serial port as COM3 ***
J25	1-2 * 2-3	Enables COM1 serial port Disables COM1 serial port
J26	1-2 * 2-3	Assigns COM2 serial port as COM2 Assigns COM2 serial port as COM4 ***
J27	1-2 * 2-3	Enables COM2 serial port Disables COM2 serial port
J28	all open 1-2 3-4 5-6*	80386SX microprocessor 80486SLC microprocessor
J30	1-2 * 2-3	Enables hard disk drive controller Disables hard disk drive controller
J31	1-2 * 2-3	Enables diskette drive controller Disables diskette drive controller

* Factory setting

Use J10 with the built-in VGA adapter only. When J10 is ON, 1024 x 768 mode is interlaced and 800 x 600 mode refreshes at 56Hz. When J1O is OFF, 1024 x 768 is non-interlaced and refresh at 60Hz; 800 x 600 refreshes at 72Hz. (VG 460 x 480 refreshes at 60 Hz regardless of the J10 setting)

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

SIMM Installation

Your computer comes with 2MB or 4MB of memory on SIMMs. You can increase the memory up to 16MB by installing 256KB, 1MB, or 4MB SIMMs in the computer's four SIMM sockets. The following table shows the possible SIMM configurations; do not install memory in any other configuration.

SIMM *configuration*

BANK 0 (RAM1 and RAM2)	BANK 1 (RAM3 and RAM4)	Total memory
256KB	256KB	1MB
1MB	x	2MB
1MB	1MB	4MB
4MB	x	8MB
4MB	4MB	16MB

Use only 30-pin, fast-page mode SIMMs (preferably tin-plated) that operate at an access speed of 70ns (nanoseconds) or faster. Be sure all the SIMMs operate at the same speed.

Video Memory

The computer comes with 256KB of video memory. You can increase the video memory to 512KB or 1024KB by installing 20-pin, 70ns or 80ns, 44256 DIP (Dual Inline Package) chips.

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

Video memory chip configuration

U11, U20	U14, U22	U17, U26	U18, U7	Total memory
Soldered				256KB *
Soldered	Filled			512KB
Soldered	Filled	Filled	Filled	1024KB

** Standard video memory*

Resolutions and colors

Memory	Resolutions	Colors
256KB	640 x 480	16
	800 x 600	16
	1024 x 768	4
512KB	640 x 480	256
	800 x 600	256
	1024 x 768	16
1MB	640 x 480	256
	800 x 600	256
	1024 x 768	256

Math Coprocessor Upgrade

You can enhance your system's performance for some applications by installing a Cx83S87-33 math coprocessor.

Hard Disk Drive Types

The computer comes with a hard disk auto-sensing feature. When you select AUTO DETECT 1 or 2 for your hard disk type in SETUP, the system detects the type of hard disk drive you have installed when you boot and fills in the drive information using values in the following table.

Hard disk drive types

Type no.	Size (in MB)	Cylinders	Heads	Sectors	Landing zone	Precomp.	Drive name
1	85	903	4	46	903	none	CP30084E
2	121	762	8	39	762	none	CP30104H
3	106	1024	12	17	1024	none	
4	65	940	8	17	615	300	
5	49	940	6	17	940	512	
6	170	903	8	46	903	none	CP3017AE
7	171	332	16	63	332	none	
8	213	1024	12	34	1024	none	
9	117	900	15	17	901	none	
10	341	768	14	62	768	none	
11	528	1024	16	63	1024	none	
12	52	855	7	17	855	none	
13	170	1010	6	55	1010	none	AC1170
14	255	1010	9	55	1010	none	AC2250
15							-reserved-
16	341	1010	12	55	1010	none	AC2340
17	212	989	12	35	989	none	AC1210
18	59	977	7	17	977	none	
19	62	1024	7	17	1023	512	
20	31	733	5	17	732	300	
21	127	919	16	17	919	none	ELS127A
22	31	733	5	17	733	300	
23	170	1011	15	22	1011	none	ELS170A
24	245	723	13	51	723	none	LPS240A
25	252	895	10	55	895	none	CP30254
26	343	665	16	63	665	none	CP30344
27	528	1024	16	63	1024	none	
28	42	977	5	17	977	none	
29	131	1002	8	32	1002	none	
30	245	967	16	31	967	none	
31	345	790	15	57	790	none	
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	
46	Auto detect 1						
47	Auto detect 2						
48	User defined 1						
49	User defined 2						

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

Some older or preformated drives do not support the auto-sensing feature. If the parame ters displayed do not match the parameter of your hard disk drive, you can define your own drive type in SETUP.

Drive Option Information

*Hard disk drive options for 1-inch IDE drives***

Parameters	Connor					Quantum		Western Digital		
	CP-38034E	CP-30104H	CP-30174E	CP-30254	CP-30344	ELS170AT	LPS240AT	AC1170	AC2250	AC2340
Formatted capacity (MG)	85	120	170	250	340	170	245	170	240	340
Size, width x height (in)	4 x 1	4 x 1	4 x 1	4 x 1	4 x 1	4 x 1	4 x 1	3.5 x 1	3.5 x 1	3.5 x 1
Weight (lbs)	1.3	1.3	1.3	1.2	1.2	0.91	1.05	1.12	1.12	1.12
Cylinders	1806	1524	1806	1895	2116	1536	1818	2233	2233	2233
Disks	1	2	2	2	2	2	2	1	2	2
Heads	2	4	4	4	4	4	4	2	3	4
Sectors per track	46	39	46	62	63-95	54	44-87	56-96	56-96	56-96
Rotational speed (RPM)	3822	3399	3833	4542	4500	3663	4306	3322	3322	3322
Buffer size (KB)	32	32	32	64	64	32	256	64	64	128
Average seek time (ms)	17	<19	17	14	13	17	16	<13	<13	<13
Encoding method	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7
Power dissipation (seek)	3.75 W	3.9 W	3.75 W	3.75 W	3.75 W	4.0 W	4.9 W	5.2 W	5.2 W	5.2 W
Logical parameters										
Cylinders	903	762	903	895	655	1011	723	1010	1010	1010
Heads	4	8	8	10	16	15	13	6	9	12
Precomp zone	0	0	0	0	0	none*	none*	1011	1011	1011
Landing zone	903	762	903	895	655	1011	723	1011	1011	1011
Sectors	46	39	46	55	63	22	51	55	55	55

* Select 1 or none for the precomp value. If neither of these options are available, select the maximum available precomp value.

** Actual hard disk drive installed is subject to availability.

IDE hard disk drive jumper settings

Model number	Single drive	Master drive	Slave drive
Conner CP30084E	C/D jumpered	C/D jumpered	No jumpers
Conner CP30104H	C/D jumpered	C/D, DSP jumpered	No jumpers
Conner CP30174E	C/D jumpered	C/D jumpered	No jumpers
Conner CP30254	C/D jumpered	C/D jumpered	No jumpers
Conner CP30344	C/D jumpered	C/D jumpered	No jumpers
Conner CP30544	C/D jumpered	C/D jumpered	No jumpers
Quantum ELS170AT	DS jumpered	DS, SP jumpered or DS jumpered	No jumpers
Quantum LPS240AT	DS jumpered*	DS jumpered	No jumpers
Western Digital AC1170	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2250	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2340	No jumpers	5-6 jumpered	3-4 jumpered

Standard diskette drive specifications

Parameters	3.5" 1.44MB Seiko Epson SMD-349
Storage capacity	1474KB (formatted)
Size, width x height (in)	3.5 x 1
Cylinders	80
Heads	2
Tracks	160
Track density	135 TPI
Power on ready time	<0.5 secs.
Setting time	15 ms
Average latency time	100 ms

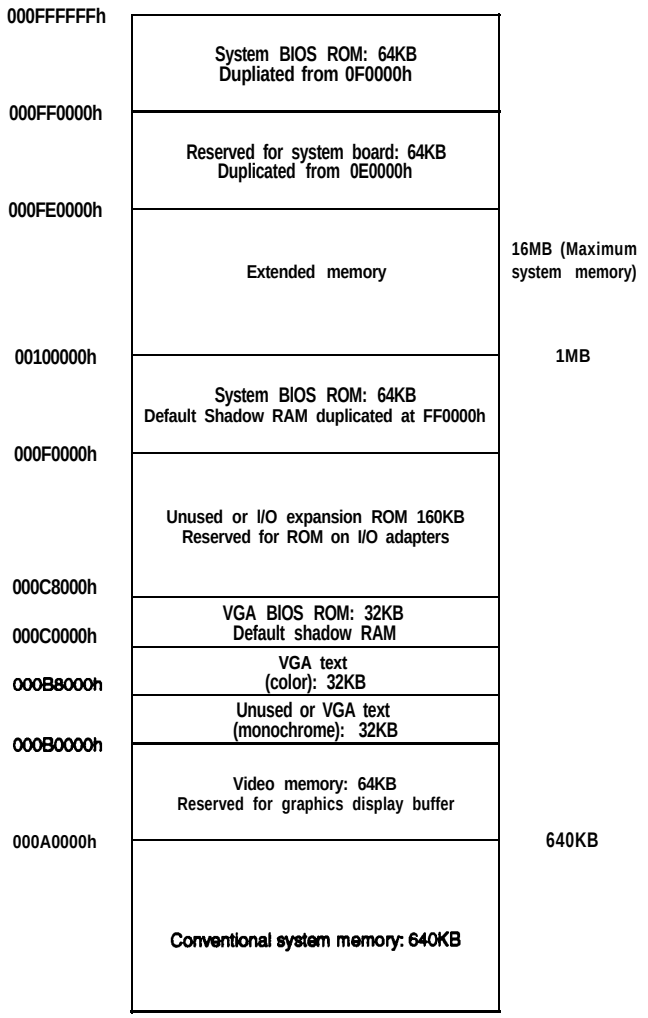
DMA Assignments

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 (16-bit)
DMA6	Reserved (16-bit)
DMA7	Reserved (16-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



System I/O Address Map

Hex address	Assigned device
000 - 01F	DMA controller 1, 8237A-5
020 - 03F	Interrupt controller 1, 8259A, master
022 - 024	Chip set configuration register
040 - 05F	Timer, 8254-2
060 - 06F	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, 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	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	Diskette drive 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)

Connector Pin Assignments

Parallel port connector pin assignments (CN3)

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 connector pin assignments (CN4 and CN5)

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 connector pin assignments (CN7 and CN6)

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

VGA port connector pin assignments (CN2)

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

Power supply connector pin assignments (CN8)

Pin	Signal	Pin	Signal
1	Power good	7	Ground
2	+5 VDC	8	Ground
3	+12 VDC	9	–5 VDC
4	–12 VDC	10	+5 VDC
5	Ground	11	+5 VDC
6	Ground	12	+5 VDC

*Diskette drive connector pin assignments (J42)**

Pin	Signal	Pin	Signal
2	No connect	20	STEP
4	No connect	22	Write data
6	No connect	24	Write enable
8	INDEX	26	Track 00
10	MotorA	28	Write protect
12	DriveB	30	Read data
14	DriveA	32	Select head
16	MotorB	34	Disk change
18	Direction		

*All odd=numbered pins are grounds

Hard disk drive connector pin assignments (J38)

Pin	Signal	Pin	Signal	Pin	Signal
1	RESET*	15	D1	29	NC
2	Ground	16	D14	30	Ground
3	D7	17	D0	31	Interrupt
4	D8	18	D15	32	IOCS16*
5	D6	19	Ground	33	A1
6	D9	20	NC	34	NC
7	D5	21	NC	35	A0
8	D10	22	Ground	36	A2
9	D4	23	IOW*	37	CS0*
10	D11	24	Ground	38	CS1*
11	D3	25	IOR*	39	Active*
12	D12	26	Ground	40	Ground
13	D2	27	Ready*		
14	D13	28	BALE		

*Active low logic

Speaker connector pin assignments (J34)

Pin	Signal
1	+5 VDC
2	NC
3	NC
4	Speaker

Optional game port connector pin assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	VCC	6	Position 1	11	NC
2	Button 0	7	Button 1	12	NC
3	Position 0	8	VCC	13	NC
4	Ground	9	VCC	14	NC
5	Ground	10	NC	15	NC

Optional game port interface pin assignments (J1)

Pin	Signal	Pin	Signal
1	VCC	6	Position 1
2	Button 0	7	Button 1
3	Position 0	8	VCC
4	Ground	9	VCC
5	Ground	10	NC

Option card riser board connector pin assignments (S1)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	+12 VDC	A31	SA3	B1	+12 VDC	B31	BALE
A2	Ground	A32	SA2	B2	+5 VDC	B32	+5 VDC
A3	Ground	A33	SA1	B3	Ground	B33	OSC
A4	IOCHCK*	A34	SA0	B4	Ground	B34	Ground
A5	SD7	A35	Ground	B5	RESETDRV	B35	Ground
A6	SD6	A36	Ground	B6	+5 VDC	B36	+5 VDC
A7	SD5	A37	+5 VDC	B7	IRQ9	B37	+5 VDC
A8	SD4	A38	SBHE*	B8	–5 VDC	B38	MEMCS16*
A9	SD3	A39	LA23	B9	DRQ2	B39	IOCS16*
A10	SD2	A40	LA22	B10	–12 VDC	B40	IRQ10
A11	SD1	A41	LA21	B11	OWS*	B41	IRQ11
A12	SD0	A42	LA20	B12	+12 VDC	B42	IRQ12
A13	IOCHRDY	A43	LA19	B13	Ground	B43	IRQ13
A14	AEN	A44	LA18	B14	SMEMW*	B44	IRQ14
A15	SA19	A45	LA17	B15	SMEMR*	B45	DACK0*
A16	SA18	A46	MEMR*	B16	IOW*	B46	DRQ0
A17	SA17	A47	MEMW*	B17	IOR*	B47	DACK5*
A18	SA16	A48	SD8	B18	DACK3*	B48	DRQ5
A19	SA15	A49	SD9	B19	DRQ3	B49	DACK6*

Option card riser hard connector pin assignments (S1) (continued)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A20	SA14	A50	SD10	B20	DACK1*	B50	DRQ6
A21	SA13	A51	SD11	B21	DRQ1	B51	DACK7*
A22	SA12	A52	SD12	B22	REFRESH*	B52	DRQ7
A23	SA11	A53	SD13	B23	SYSCLK	B53	+5 VDC
A24	SA10	A54	SD14	B24	IRQ7	B54	MASTER*
A25	SA9	A55	SD15	B25	IRQ6	B55	Ground
A26	SA8	A56	Ground	B26	IRQ5	B56	Ground
A27	SA7	A57	Ground	B27	IRQ4	B57	Ground
A28	SA6	A58	Ground	B28	IRQ3	B58	Ground
A29	SA5	A59	+5 VDC	B29	DACK2#	B59	+5 VDC
A30	SA4	A60	+5 VDC	B30	TC	B60	+5 VDC

*Active low logic

Option slot connector pin assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	IOCHCK*	A26	SA5	B20	SYSCLK	C14	SD11
A2	SD7	A27	SA4	B21	IRQ7	C15	SD12
A3	SD6	A28	SA3	B22	IRQ6	C16	SD13
A4	SD5	A29	SA2	B23	IRQ5	C17	SD14
A5	SD4	A30	SA1	B24	IRQ4	C18	SD15
A6	SD3	A31	SA0	B25	IRQ3	D1	MEMCS16*
A7	SD2	B1	Ground	B26	DACK2*	D2	IOCS16*
A8	SD1	B2	RESET	B27	T/C	D3	IRQ10
A9	SD0	B3	+5 VDC	B28	BALE	D4	IRQ11
A10	IORDY	B4	IRQ9	B29	+5 VDC	D5	IRQ12
A11	AEN	B5	–5 VDC	B30	OSC	D6	IRQ15
A12	SA19	B6	DRQ2	B31	Ground	D7	IRQ14
A13	SA18	B7	–12 VDC	C1	SBHE*	D8	DACK0*
A14	SA17	B8	OWS*	C2	LA23	D9	DRQ0
A15	SA16	B9	+12 VDC	C3	LA22	D10	DACK5*
A16	SA15	B10	Ground	C4	LA21	D11	DRQ5
A17	SA14	B11	SMEMW*	C5	LA20	D12	DACK6*
A18	SA13	B12	SMEMR*	C6	LA19	D13	DRQ6
A19	SA12	B13	IOW*	C7	LA18	D14	DACK7*
A20	SA11	B14	IOR*	C8	LA17	D15	DRQ7
A21	SA10	B15	DACK3*	C9	MEMR*	D16	+5 VDC
A22	SA9	B16	DRQ3	C10	MEMR*	D17	MASTER*
A23	SA8	B17	DACK1*	C11	SD8	D18	Ground
A24	SA7	B18	DRQ1	C12	SD9		
A25	SA6	B19	REFRESH*	C13	SD10		

*Active low logic

SIMM sockets (RAM1, RAM2, RAM3, RAM4)

Pin	Signal	Pin	Signal
1	VCC	16	D4
2	CSA	17	A8
3	D0	18	A9
4	A0	19	A10
5	A1	20	D5
6	D1	21	WR
7	A2	22	Ground
8	A3	23	D6
9	Ground	24	NC
10	D2	25	D7
11	A4	26	PO
12	A5	27	RAS
13	D3	28	PCAS
14	A6	29	PI
15	A7	30	VCC

Use only 30-pin, 8-bit or 9-bit, fast-page mode SIMMs (preferably tin-plated) that operate at an access speed of 70ns (nanoseconds) or faster. SIMMs must operate at the same speed.

Installation/Support Tips

Installing Diskette Drives

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

Installing Hard Disk Drives

- **When installing a hard disk drive, see the hard disk drive type tables on pages 5 and 6 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 Def 1 or 2 as the type and entering the drive's exact parameters.**
- **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 J21 and J30 to position 2-3.**
- **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 installing an ESDI hard disk drive, make sure you disable the built-in IDE hard disk drive interface by moving jumpers J21 and J30 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 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.
- Make sum the power requirements of the option cards you install do not exceed the power supply limitations.
- If the computer locks up, the power supply may be overloaded. On a system with three or more option cards, the installation of a second hard disk drive may overload the power supply.
- If you are installing a video adapter card, make sure you disable the built-in VGA by changing jumpers J7, J8, and J9 to the Off position.

COM Port Assignment

If you want to assign COM1 as COM3, you must set jumper J24 to position 2-3. If you want to assign COM2 as COM4, you must set jumper J26 to position 2-3.

System Problems

- Do not attempt to install OS/2, version 2.1, from CD-ROM.
- Do not use this computer as a server in a multi-LAN environment.
- When using SCO UNIX, the CMOS settings may be lost when you boot the system. Also, keyboard input is not accepted unless the Cyrix cache is disabled or the slow refresh is set.
- You cannot use an external hard disk drive with this computer.
- When an extended memory test is run on QAFE, the system hangs. This is a problem with the way QAFE handles Cyrix memory.

Information Reference List

Engineering Change Notices

None.

Technical Information Bulletins

None.

Product Support Bulletins

None.

Related Documentation

TM-EL3/4S33	Epson EL 3S/33 and 4S/33 Service Manual
EL4S33+ADD	Epson EL 4S/33+ Service Manual Addendum
PL-EL4S33+	Epson EL 4S/33+ Parts Price List
400275000	Epson EL 4S/33+ User's Guide