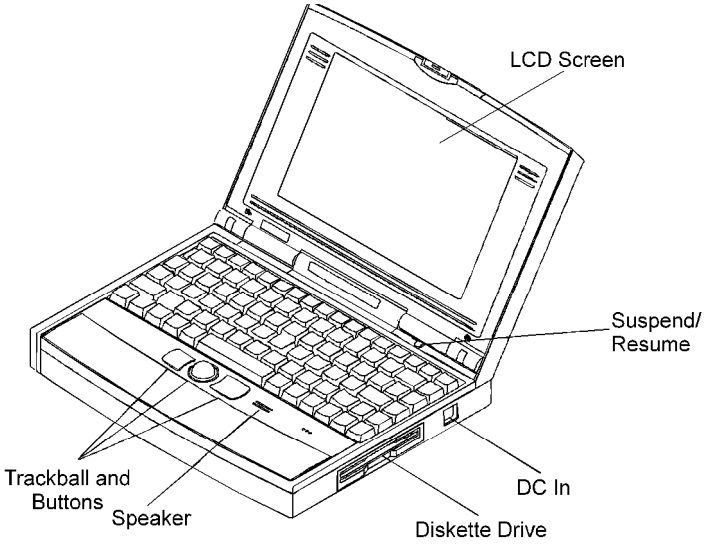
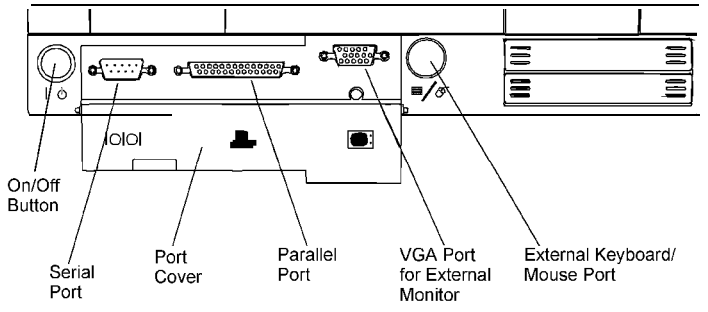
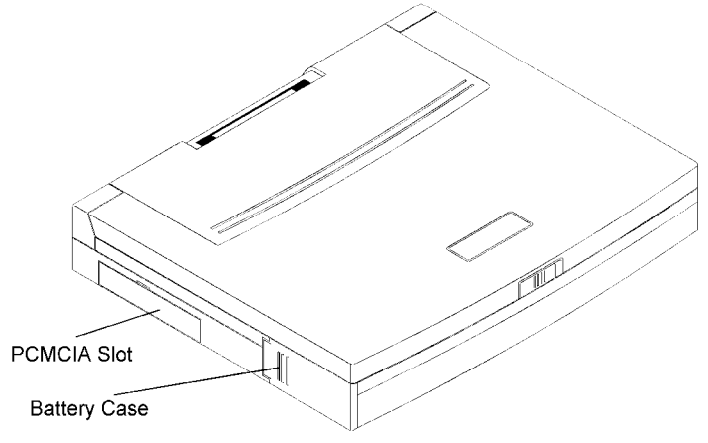






Notebook Specifications

CPU and Memory

CPU	Cyrix SL-enhanced Cx486DX2-50 microprocessor; includes built-in math coprocessor, 8KB of internal cache, and power management features; cache can be enabled or disabled using the SCU
System speed	Maximum speed (50 MHz) and low speed (12 MHz) available; speed selection through keyboard commands
Memory	4MB RAM standard on the system board; expandable to 8MB, 12MB, or 20MB using a 4MB, 8MB, or 16MB memory module
ROM	128KB Flash ROM device containing the system and VGA BIOS and System Configuration utility (SCU) code
Video RAM	512KE DRAM supports resolutions up to **640 x 480** in 256 colors on the color LCD and up to 1024 x 768 in 16 or 800 x 600 in 256 colors on an external monitor
Shadow RAM	Supports shadowing of 128KB of system and video BIOS ROM into RAM
Clock / calendar	Real-time clock, calendar, and CMOS RAM; backed up by internal battery
Video	Chips and Technology® 32-bit local bus interface to the microprocessor; supports enhanced video modes on an external monitor; supports resolutions up to 640 x 480 in 256 colors on the color LCD and up to 1024 x 768 in 16 or 800 x 600 in 256 colors on an external monitor; display mode selectable using the SCU or Fn F12 command
Diskette drive	Built-in super I/O controller for one internal 3.5-inch diskette drive; supports 720KB and 1.44MB formats
Hard disk	Built-in super I/O controller has interface to one 2.5-inch long, 12.5 mm high IDE internal hard disk drive; drive compartment can accommodate drives up to 19 mm high by removing spacer
PCMCIA	Built-in controller for PCMCIA version 2.1, Type I, II, or III cards; supports up to two stacked Type I and Type II cards or one Type III card; JEIDA 4.1 compatible; supports standby and suspend modes; supports hot insertion (including ExCA standards)

Interfaces

External VGA	15-pin, D-sub, female connector for analog monitor
Parallel	Centronics® compatible; 25-pin, D-sub, female connector; supports normal (S-bit AT compatible, unidirectional) and bidirectional (16-bit PS/2 compatible) modes

Serial — RS-232C, programmable, asynchronous, 9-pin, D-sub male connector

External keyboard / mouse — Auto-sensing, 6-pin, mini-DIN connector for a PS/2-type external keyboard, keypad, mouse, or other pointing device

Keyboard — 85 / 86 keys; 101/102-key keyboard compatible; embedded keypad; support for hot key commands

Trackball — Built-in 16 mm, PS/2 compatible trackball with two buttons

Mass Storage

Hard disk drive — One internal 2.5 inch long by .5 to .75 inch (12.5 mm to 19 mm) high IDE hard disk drive; SCU automatically detects standard IDE drive types

The following table shows the characteristics for the Toshiba MK1724FCV drive.

Capacity	262MB	Sectors	38
Heads	16	WP Com	0
Cylinders	842	Landing Zone	842

Diskette drive — One internal, 3.5-inch, low power consumption, diskette drive; 720KB or 1.44MB format

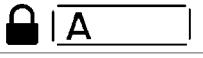
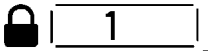
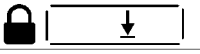
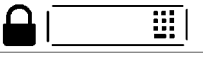
System Configuration Utility — Stored in ROM; accessible by pressing Ctrl Alt S at system startup or at MS-DOS prompt; includes power management features

Software — Latest versions of MS-DOS and Microsoft Windows; Borland SideKick for Windows; ClarisWorks for Windows; trial versions of CompuServe WinCIM, America Online, and OAG FlightDisk; PCMCIA services, drivers, and utilities; on-line Windows and other manuals; video drivers and utilities for Microsoft Windows; power management utilities; all installed on the hard disk drive

LCD Screen — Monochrome: 9.5-inch diagonal, 64 gray shades, 640 x 480, backlit

Dual-scan STN color: 10.3-inch diagonal, 640 x 480 x 256 colors, backlit

LCD Indicator Panel — The ActionNote 650 has the indicators shown in the table below

Icon	Name	Meaning
	Caps Lock	Caps Lock is on.
	Num Lock	Num Lock is on.
	Scroll Lock	Scroll Lock is on.
	Keypad Lock	The embedded keypad is locked.
	Hard Disk Activity	The computer is accessing the hard disk drive.
	Diskette Drive Activity	The computer is accessing the diskette drive.
	PCMCIA Card Activity	The computer is accessing a PCMCIA card.
	Suspend	The system is in suspend mode
	Battery Status	Shows battery charge status by displaying from zero to four vertical bars inside the battery symbol.
	Battery Charging	The AC adapter is charging the battery.
	AC Power	The computer is running on AC power rather than the battery.

Power Sources

AC adapter

Size	5.3" (L) × 2.8" (W) × 1.5" (H) (136 mm [L] × 72 mm W] × 37 mm [H])
Weight	13.5 ounces (380 grams)
AC cable length	6 ft (2 meters)
DC cable length	39 in (1 meter)
Input voltage	100 VAC to 250 VAC, autosensing
Input frequency	40 to 63 Hz
Output voltage	17 VDC with 2 Amp maximum and 20 VDC with 1.05 Amp maximum

Battery — Rechargeable, 12 Volt, 2.6Ah NiMH battery; current regulation and automatic charge stop by thermistor

> Caution
> Use only the adapters and replacement batteries designed for use with the ActionNote 650 series (AC adapter model number TSA3 and battery model number 10HR-4/3AU).

Power Management

You can access the power management features through Setup or by pressing Ctrl Alt P in text mode or Fn Esc in graphics mode.

Power Management Options in Setup

Menu	Option	Value	Description
Controls	Power savings	Always*, Battery, Disable	Always = power management active Battery = active only from battery.
	Battery low	Suspend*, Warn only	Suspend puts computer into suspend mode when battey charge is low.
	Alarm resume	Disable*, Enable	Enable lets you set a time after which the computer will resume full operation after going into Suspend mode.
System	CPU standby	4*, 8, 6, Disable	Sets timeout in seconds before computer slows CPU.
	Global standby	1, 2, 4, 8, 12, 16, Disable	Sets timeout in minutes before computer slows CPU and turns off all devices.
	Auto suspend	1, 5, 1 20, 30, 40, 60, Disable	Sets timeout in minutes before computer enters Suspend mode.
	Disk suspend	Disable*, Enable	Enables Suspend of the hard drive
	Video monitoring	Disable*, Enable	"Enable" causes any screen activity (e.g., a flashing cursor) to prevent the system entering Standby or Suspend mode.
Device	Video	1, 2, 4, 8, 12, 16, Always on	Sets timeout in minutes for screen inactivity before the LCD backlight is turned off.
	Hard disk	1, 8, 12, 16, Always on	Sets timeout in minutes for HDD inactivity before drive is turned off.

Built in Power Management Options

Mode	Entry	Description	Exit
CPU standby	When system is inactive	Reduces CPU clock speed	When CPU is required, full performance returns instantly.
Global Standby	When system is inactive for timeout period set for Global Standby	Reduces CPU speed further; turns off LCD backlight; puts HDD and other components in low-power state.	If there is activity keyboard or pointing device, resumes full performance in a few seconds.
Suspend to memory	When system is inactive for timeout period set for Suspend, or Suspend/ Resume is pressed, or battery is low.	CPU clock stopped; LCD and HDD turned off; other components suspended.	If the Suspend/Resume button is pressed the system resumes.
Suspend to disk	When system is inactive for timeout period set for Suspend, or Suspend/ Resume is pressed, or battery is low.	Saves contents of system and video memory to a file on disk; then turns system off completely	Press power on to start system Full performance 30 seconds.

Environmental Requirements

Condition	Operating	Non-operating
Temperature	42° to 95 F (5° to 35° C)	–4 to 140 F (–20° to 60° C)
Humidity (non-condensing)	30% to 90%	5% to 95%
Altitude	–200 to 12,000 ft (–67 to 4,000 m)	–200 to 30,000 ft (–67 to 10,000 m)

Caution
When traveling by airplane, take the computer into the passenger compartment as carry-on luggage to prevent it from being stored in an unpressurized storage compartment.

Physical Dimensions

Model	Depth		Width		Height		Weight	
	inches	mm	inches	mm	inches	mm	lb	kg
Monochrome	8.6	219	11	279	1.75	44.5	5.8	2.7
STN color	8.6	219	11	279	2.0	51	6.8	3.1

Optional Equipment

- ❑ 4MB, 8MB, and 16MB memory expansion modules
- ❑ External keyboard
- ❑ External numeric keypad
- ❑ Additional NiMH batteries
- ❑ External battery charger
- ❑ Auto adapter
- ❑ Extra AC adapter
- ❑ PCMCIA Type II cards including Flash RAM, SRAM, modem, fax/modem, and LAN cards, etc.

Connector Pin Assignments

LCD Connector 2 (JP201)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	LCDVDD	6	P11	11	DE
2	GND	7	P12	12	GND
3	P8	8	P13	13	GND
4	P9	9	P14	14	GND
5	P10	10	P15	15	GND

LCD Connector 1 (JP202)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	FLM	6	GND	11	P4
2	LP	7	P0	12	P5
3	SHFCLK	8	P1	13	P6
4	DISPOFF	9	P2	14	P7
5	LCDVDD	10	P3		

Line In Connector (JP203)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	NC	3	LINE-IN	5	FOUT
2	GND	4	GND	6	NC

External Keyboard / Mouse Connector (JP204)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	AUX-DATA	3	GND	5	AUX-CLK
2	NC	4	+5 V	6	NC

Trackball / Speaker Connector (JP205)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+5 V	4	GND	7	SPEAKER-OUT
2	RXDA	5	VBBAT	8	MIC-GND
3	RTSA	6	MIC-GND	9	MIC-IN

VGA Connector for an External Monitor (JP206)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	CRTGND	6	P11	11	DE
2	GND	7	P12	12	GND
3	P8	8	P13	13	GND
4	P9	9	P14	14	GND
5	P10	10	P15	15	GND

Status LCD Display Board Connector (JP207)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	3	SW-CLK	5	+5 VDC
2	NC	4	SW-DATA		

Parallel Port Connector (JP208)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	LPT STROBE	10	LPTACK	19	GND
2	LPTD0	11	LPTBUSY	20	GND
3	LPTD1	12	LPTPE	21	GND
4	LPTD2	13	LPTSLCT	22	GND
5	LPTD3	14	LPTAFD	23	GND
6	LPTD4	15	LPTERR	24	FDD/ LPT
7	LPTD5	16	LPTINITI	25	GND
8	LPTD6	17	LPT SLCTIN		
9	LPTD7	18	GND		

Internal Keyboard Connector (JP209)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	KSO0	9	KSO8	17	KSI0
2	KSO1	10	KSO9	18	KSI1
3	KSO2	11	KSO10	19	KSI2
4	KSO3	12	KSO11	20	KSI3
5	KSO4	13	KSO12	21	KSI4
6	KSO5	14	KSO13	22	KSI5
7	KSO6	15	KSO14	23	KSI6
8	KSO7	16	KSO15	24	KSI7

Serial Port Connector (JP211)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	DCD	4	DTR	7	RTS
2	RXD	5	GND	8	CTS
3	TXD	6	DSR	9	RI

On / Off Button Connector (JP213)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	2	On/Off BTN	3	NC

Battery Connector (JP215)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	BATT+	3	GND	5	NC
2	BATT+	4	GND	6	TEMP_S

Phone Jack (JP218)

Pin No.	Signal	Pin No.	Signal
1	GND	3	SPEAKER-OUT
2	OUT	4	OUT

PCMCIA Socket B Connector (JP219)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	24	B-A5	47	B-A18
2	B-D3	25	B-A4	48	B-A19
3	B-D4	26	B-A3	49	B-A20
4	B-D5	27	B-A2	50	B-A21
5	B-D6	28	B-A1	51	BSVCC
6	B-D7	29	B-A0	52	B-VPP
7	B-CE1	30	B-D0	53	B-A22
8	B-A10	31	B-D1	54	B-A23
9	B-0E	32	B-D2	55	B-A24
10	B-A11	33	B-WP-IO16	56	B-A25
11	B-A9	34	GND	57	B-5VDET
12	B-A8	35	GND	58	B-RST
13	B-A13	36	B-CD1	59	B-WAIT
14	B-A14	37	B-D11	60	B-INPK
15	B-WE	38	B-D12	61	B-REG
16	B-RDY/IRQ	39	B-D13	62	B-BV2/SPK
17	B-VCC	40	B-D14	63	B-BV1/STC
18	B-VPP	41	B-D15	64	B-D8
19	B-A16	42	B-CE2	65	B-D9
20	B-A15	43	NC	66	B-D10
21	B-A12	44	B-IORD	67	B-CD2
22	B-A7	45	B-IOWR	68	GND
23	B-A6	46	B-A17		

Hard Disk Drive Connector (JP220)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	RSTIDE	16	HD14	31	IRQ14
2	GND	17	HD0	32	IOSC16
3	IDED7	18	HD15	33	SA1
4	HD8	19	GND	34	NC
5	HD6	20	NC	35	SA0
6	HD9	21	NC	36	SA2
7	HD5	22	GND	37	HDCS0
8	HD10	23	IOW	38	HDCS1
9	HD4	24	GND	39	HDDLED
10	HD11	25	IOR	40	GND
11	HD3	26	GND	41	+5 V
12	HD12	27	NC	42	+5 V
13	HD2	28	NC	43	GND
14	HD13	29	NC	44	+5 V
15	HD1	30	GND		

Memory Connector 1 (JP221)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+5 V SUS	15	D12	29	D23
2	D0	16	D13	30	GND
3	D1	17	D14	31	D24
4	D2	18	D15	32	D25
5	D3	19	+5 V SUS	33	D26
6	D4	20	MA10	34	D27
7	D5	21	GND	35	D28
8	D6	22	D16	36	D29
9	D7	23	D17	37	D30
10	+5 V SUS	24	D18	38	D31
11	D8	25	D19	39	GND
12	D9	26	D20	40	RAS#1
13	D10	27	D21	41	RAS#2
14	D11	28	D22		

Memory Connector 2

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	10	CAS#2	19	MA5
2	CAS#0	11	CAS#3	20	MA6
3	CAS#1	12	GND	21	MA7
4	CAS#2	13	+5 V SUS	22	MA8
5	CAS#3	14	MA0	23	MA9
6	DRAMWE	15	MA1	24	DRAMWE
7	DRAMWE	16	MA2	25	DRAMWE
8	CAS#0	17	MA3		
9	CAS#1	18	MA4		

FDD Connector (JP223)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+5 V	8	FDDIR	15	TRACK0
2	INDEX	9	STEP	16	GND
3	+5 V	10	GND	17	WP
4	DRV0	11	WDATA	18	GND
5	DSKCHG	12	GND	19	RDATA
6	DENSEL	13	WGATE	20	HDSEL
7	MTRO	14	GND		

CPU Selection Connector (JP224)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+5 V	15	IRQ15	29	EGSMIADS
2	+5 V	16	EGSMIRDY	30	CPUSMI
3	+5 V	17	+5 V	31	SRESET
4	+5 V	18	NC	32	EGNMI
5	GND	19	STPCLK /NC	33	GND
6	GND	20	NC	34	EGIGNNE
7	JSCLK20	21	CPUVDD	35	SMIACT
8	CPUPOK	22	CPUVDD	36	M6SMI
9	FLUSH	23	CPUVDD	37	EGFERR
10	+5 V SUS	24	CPUVDD	38	WM-RST
11	IIBEN	25	GND	39	FERR
12	NC	26	GND	40	NMI/NC
13	INVL/NC	27	CPUFLUSH	41	IG/NMI
14	JMA10	28	PMI		

PCMCIA Socket A Connector (JP225)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	24	A-A5	47	A-A18
2	A-D3	25	A-A4	48	A-A19
3	A-D4	26	A-A3	49	A-A20
4	A-D5	27	A-A2	50	A-A21
5	A-D6	28	A-A1	51	ASVCC
6	A-D7	29	A-A0	52	A-VPP
7	A-CE1	30	A-D0	53	A-A22
8	A-A10	31	A-D1	54	A-A23
9	A-OE	32	A-D2	55	A-A24
10	A-A11	33	A-WPIO16	56	A-A25
11	A-A9	34	GND	57	A-5VDET
12	A-A8	35	GND	58	A-RST
13	A-A13	36	A-CD1	59	A-WAIT
14	A-A14	37	A-D11	60	A-INPR
15	A-WE	38	A-D12	61	A-REG
16	A-RDY/ IRQ	39	A-D13	62	A-BV2/SPK
17	ASVCC	40	A-D14	63	A-BV1/ STC
18	A-VPP	41	A-D15	64	A-D8
19	A-A16	42	A-CE2	65	A-D9
20	A-A15	43	NC	66	A-D10
21	A-A12	44	A-IORD	67	A-CD2
22	A-A7	45	A-IOWR	68	GND
23	A-A6	46	A-A17		

AC Adapter Input Connector (P1)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+20 V	2	GND	3	CURR: 2.1A/1.05A current source

Inverter Connector (P2)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	5	LCDVDD	9	FPVEE
2	GND	6	B+	10	LCK
3	GND	7	B+	11	LDA
4	BKLOFF	8	B+	12	ADRST

System I/O Addresses, DMA Assignments, and Hardware Interrupts

I/O Addresses

Hex Address	Device	Hex Address	Device	Hex Address	Device
000-020	DMA con-troller 1	0F0-0F1	Clear math co-processor busy	27F-2F8	Reserved
020-040	Interrupt controller	0F1-0F8	Reset math co-processor	2F8-2FF	Serial port 2
040-060	Timer/ counter	0F8	Math co-processor	2FF-3B0	Reserved
060-070	Keyboard controller	100-1F0	Reserved	3B0-3F0	Video system
070-080	RTC NMI	1F0-200	Hard disk drive	3BC-3BE 3	Parallel port 1
080-0A0	DMA page register	200-208	Game port	3F0-3F8	Diskette drive controller
0A0-0C0	Interrupt controller 2	208-278	Reserved	3F8-3FF	Serial port 1
0C0-0F0	DMA con-troller 2	240-24F	PCMCIA controller		

DMA Assignments

Level	Device	Level	Device	Level	Device
DMA0	Available	DMA3	ECP	DMA6	Available
DMA1	Available	DMA4	Cascade for Ctrl 1	DMA7	Available
DMA2	Diskette Controller	DMA5	Available		

Hardware Interrupts

Interrupt	Function	Interrupt	Function	Interrupt	Function
IRQ0	Timer	IRQ6	Diskette controller	IRQ12	Available
IRQ1	Keyboard	IRQ7	LPT1	IRQ13	Reserved for coprocessor
IRQ2	Cascade	IRQ8	Clock/ calendar	IRQ14	HDD controller
IRQ3	COM2 (2F8H)	IRQ9	Available	IRQ15	Available
IRQ4	COM1 (3F8H)	IRQ10	Available		
IRQ5	Available	IRQ11	PCMCIA controller		

Related Documents

Engineering Change Notices

None.

Technical Information Bulletins

None.

Product Support Bulletins

None.

Related Documentation

400387400	EPSON ActionNote 600 Series User's Guide
400390500	For Software Support
PL-AN650	EPSON ActionNote 650 Parts Price List
TM-AN650T	EPSONActionNote 600 Series Service Manual