

OEM MEMORY CARDS

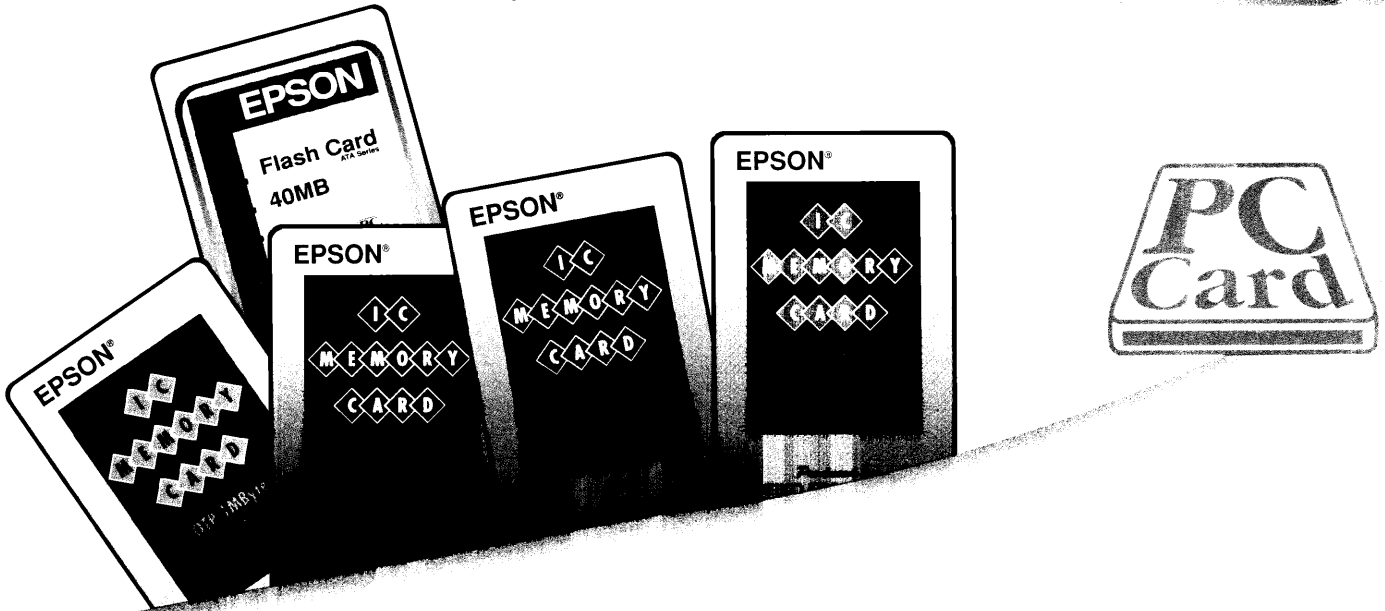
SRAM
64KB - 4MB

OTP
64KB - 1MB

Flash
256KB - 16MB

ATA Flash
2.5MB - 40MB

DRAM
256KB - 16MB



BRANDED MEMORY CARDS

HIGH PERFORMANCE
MOST COMPATIBLE
HIGH SPEED
LOW POWER CONSUMPTION

RETAIL READY PRODUCTS
FOR OEM BUSINESS



EPSON004

CARD EDGE

Shutter Door Mechanism

The shutter door mechanism protects the terminal contacts from dirt, grease, static electricity, etc. The stainless steel shutter door opens when the card is inserted into the host connector and closes when it is removed.

Stainless Steel Protective Panels

The cards are covered by two stainless steel panels to protect the cards from static electricity. The panels also increase mechanical strength by resisting bending and twisting and also provide shielding against noise. Cards with custom panel artwork can be supplied.

Incorrect Insertion Protection

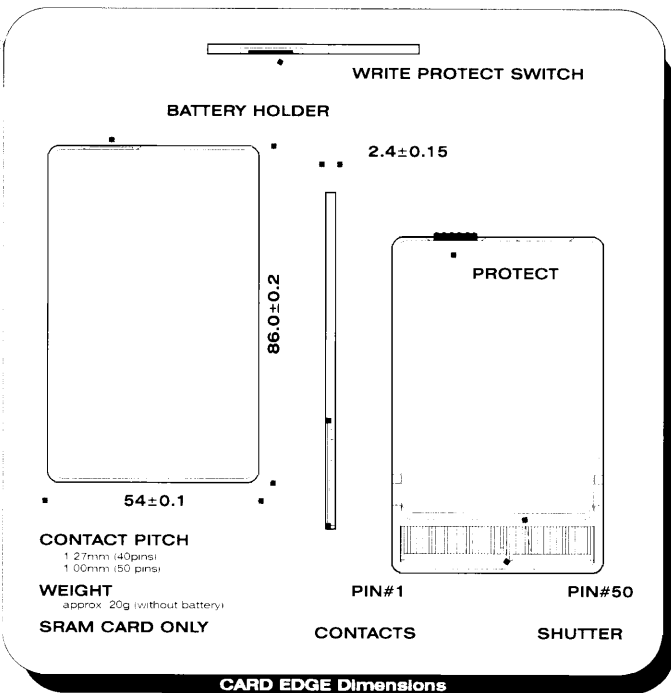
The cards contain a mechanism which prevents the improper insertion of the card into the mating connector. This special keying prevents damage from occurring on the contacts when cards are used with EPSON's exclusive connectors.

Write Protect Switch (SRAM Cards only)

The write protect switch allows or prevents writing to the memory card depending on the switch position: On/Off. The status of this switch can be read through defined pins.

Battery Replacement (SRAM Cards only)

SRAM cards use a lithium battery (CR-2016) to hold data while not plugged into a system that supplies power to the card. Users can easily replace this battery.



40-pin 8-bit bus system type

MEMORY TYPE	STORAGE CAPACITY (bytes)
SRAM	8K ~ 1M
Mask ROM	128K ~ 4M
Flash Memory	32K ~ 1M
OTP ROM	32K ~ 1M
EEPROM	8K ~ 32K

50-pin 16-bit bus system type

MEMORY TYPE	STORAGE CAPACITY (bytes)
SRAM	64K ~ 1M
Mask ROM	256K ~ 4M
Flash Memory	256K ~ 1M
OTP ROM	64K ~ 1M

40-pin 8-bit interface

PIN		DESCRIPTION
Number	Name	
1	VCC	Supply
2	VBB/VPP	Battery voltage output/PROM write supply
3 to 19	A0 to A16	Address inputs
20	WE	Write enable input
21	CE	Chip enable input
22	OE	Output enable input
23 to 30	D0 to D7	Data inputs/outputs
31 to 36	A17 to A22	Address inputs
37	WPOUT	Write protect output, write is enabled when HIGH, disabled when LOW
38	CST	Card present output. High when card is inserted
39	ROM/RAM	Device type output. HIGH when ROM, LOW when RAM
40	GND	Ground

50-pin-16-bit interface

PIN		DESCRIPTION
Number	Name	
1	GND	Ground
2 to 21	A1 to A20	Address inputs
22	NC	No connection
23	WE	Write enable input
24	ROM/RAM	Device type output. HIGH when ROM LOW when RAM
25,26	CE1,CE2	Chip enable inputs
27	WPOUT	Write protect output, write is enable when HIGH, disabled when LOW
28	OE	Output enable input
29	CST	Card present output, HIGH when the card is inserted
30	VBB	Battery voltage output
31,32	VCC	Supply
33	VPP	PROM write supply
34 to 49	D0 to D15	Data inputs/outputs
50	GND	Ground

Connector (40-pin & 50-pin type)

Pin Type	Right angle connector	Straight angle connector	Description
40-pin Type	7508-1110	7508-1100	With tabs
	7508-111A	7508-110A	Without tabs
	7508-1160		Surface mount type
	7508-1200		Surface mount type with eject mechanism
50-pin Type	7508-0980	7508-0990	With tabs

BRANDED PCMCIA

**EPSON OFFERS THE FOLLOWING PCMCIA "PC CARDS"
PRE-PACKAGED FOR "OFF THE SHELF" BUNDLING OR
RESELLING.**

FEATURES

- SHRINK WRAPPED BOX (6 x 6 x 1)
- DETAILED USERS MANUAL
- CLEAR PLASTIC JEWEL CASE
- 2 YEAR LIMITED WARRANTY
- 1-800 "EPSON CONNECTION" TECHNICAL SUPPORT
- BACK-UP BATTERY (SRAM only)
- SYSTEM SOFT CARD & SOCKET SERVICES (Hard Disk Card only)
- REGISTRATION CARD
- UTILITIES DISKETTE (ATA Flash card only)
- RJ11 TO 9PIN CABLE (72") (Fax/Modem only)
- COMIT AND WINFAX LITE
- SOFTWARE (Fax/Modem only)
- COMPRESSION SOFTWARE (ATA Flash card only)

MEMORY TYPE

Solid State Flash EEPROM

DENSITY

2.5, 5.0, 10.0, 20.0MB

SIZE

PCMCIA Type II

COMPATIBILITY

PCMCIA 2.1

DATA TRANSFER RATE

Write Sustained = 75Kbyte/sec
Read Sustained = 625KByte/sec

POWER CONSUMPTION

DC Input Voltage: 5 volts $\pm 10\%$
Maximum Current: Sleep Mode Max 1ma, Typical 0.6ma
Max Operating: Reading 44ma-150ma, Writing 44ma-150ma

ENVIRONMENT CHARACTERISTICS

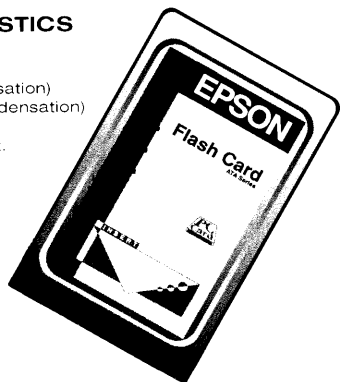
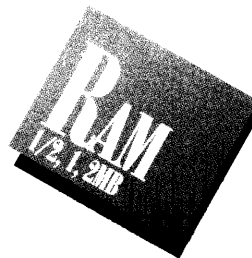
Operating temperature: 0° to 60°C
Non-operating temperature: -20° to 85°C
Operating humidity: 8% - 95% (non condensation)
non operating humidity: 8% - 95% (non condensation)
Shock capacity: 1000 G max.
Vibration capacity: 15 G peak-to-peak max.

SERVICE MAINTENANCE

Covered by standard EPSON
two-year limited warranty

ENDURANCE LIMIT

200,000 programming cycles



MEMORY TYPE

Static Random-Access Memory

DENSITY

1/2, 1, 2MB

SIZE

PCMCIA Type I

ATTRIBUTE MEMORY

2KByte with preloaded CIS for 'hot swapping'

ACCESS TIME

200 Nanoseconds

POWER CONSUMPTION

Active: 35mA Typ.
Standby: 1.1 mA Typ.

DC SUPPLY VOLTAGE

5 volts

ENVIRONMENT CHARACTERISTICS

OPERATING HUMIDITY
10% - 90% relative humidity
(no condensation)

CARD LIFE EXPECTANCY

Over 10,000 insertions or over 10 years

68-pin 8/16-bit bus system type conforming to PCMCIA Rel. 1.0/2.0

PART NO.	Memory type	Storage capacity (bytes)	Access time t_{ACC} (nS)	Current consumption (max.)		Operating temperature range (°C)	Storage temperature range (°C)	Battery B/U time (Year)	Erase units
				Operating (mA)	Stand-by (mA)				
WWB065ES20/40	Mixed CMOS SRAM with Sub Battery	64K	200	140	1.5	0~60	-20~60	10	-
WWB129ES20/40		128K						10	
WWB257ES20/40		256K						7.6	
WWB513ES20/40		512K						3.9	
WWB101ES20/40		1M						1.9	
WWB201ES20/40	Low power Mixed CMOS SRAM	2M	200	140	0.3	0~60	-20~60	1.0	-
LWB065SD20/40		64K						10	
LWB129SD20/40		128K						10	
LWB257SD20/40		256K						7.6	
LWB513SD20/40		512K						3.9	
LWB101SD20/40	1M	1.9							
KWB257SDX0/Y0	CMOS Mask ROM	256K	250	100	1.0	0~60	-20~60	-	-
KWB513SDX0/Y0		512K							
KWB101SDX0/Y0		1M							
KWB201SDX0/Y0		2M							
KWB401SDX0/Y0		4M							
KWB801SDX0/Y0	8M								
HWB257ESX0/Y0	CMOS Flash memory	256K	200	70	1.5	0~60	-20~65	-	Chip
HWB513ESX0/Y0		512K							
HWB101ESX0/Y0		1M							
HWB201ESX0/Y0		2M							
HWB401ESX0/Y0		4M							
HWB201S8X0/Y0		2M	110	-	-	-	-	Block	
HWB401S8X0/Y0		4M							
HWB801S8X0/Y0		8M							
HWB111S8X0/Y0		10M							
HWB161S8X0/Y0		16M							
OWB065SDX0/Y0	(FACTORY PROGRAMMED) CMOS OTP	64K	200	70	1.5	0~60	-20~60	-	-
OWB129SDX0/Y0		128K							
OWB257SDX0/Y0		256K							
OWB513SDX0/Y0		512K							
OWB101SDX0/Y0	1M								
BWB065SDX0/Y0	(UNPROGRAMMED) CMOS OTP	64K	200	70	1.5	0~60	-20~60	-	-
BWB129SDX0/Y0		128K							
BWB257SDX0/Y0		256K							
BWB513SDX0/Y0		512K							
BWB101SDX0/Y0		1M							
ATA202SD11/01	ATA Flash	2.6M*	44 ~ 150	<1	0~60	-20~85	-	Sector	
ATA502SD11/01		5.2M							
ATA112SD11/01		10.4M							
ATA212SD11/01		20.9M							
ATA412SD12/02		40.0M							

1 AWB series (without sub battery) is also available.

2 Battery backup time is a reference value based on typical values at $T_a=25^\circ\text{C}$.

3 Sub battery backup time is 10 minutes at $T_a=25^\circ\text{C}$.

4 Standby current of WWB series is measured when sub battery is fully charged.

5 OWB: factory programmed
BWB: unprogrammed (for users development).

6 ATA cards can be shipped with compression software to approx. double capacity
11&12 = with compression
01&02 = without compression

Connectors 2-piece type (PCMCIA/JEIDA)

Pin type	Part No.	Description
68-pin type	7508-1300	Right angle connector
	7508-1310	Right angle connector with eject mechanism
	7508-1320*	Right angle connector with eject mechanism and grounding terminal
	7508-1330	Right angle connector with eject mechanism. (stand-off type)

*: Under development

Attribute memory

Series name	Part code	Attribute information holding methods
WWB/LWB Series	20	2K bytes EEPROM
	40	Without attribute memory ("FF" output)
KWB/HWB/OWB/BWB Series	X0	2K bytes EEPROM
	Y0	Without attribute memory ("FF" output)

JEIDA/PCMCIA

■ Conforming to PCMCIA and JEIDA

These cards conform to PCMCIA Rel. 1.0 and Rel. 2.0 which correspond to JEIDA version 4.0 and version 4.1 respectively.

■ Attribute Memory

A separate memory area from common memory which is accessed by use of the reg pin. This memory is most commonly used as storage for information about the card such as type of card, access speed, size, manufacturer, date of manufacture, serial number, and many other possible card attributes.

■ Write Protect Switch (SRAM & Flash only)

The write protect switch allows or prevents writing or erasing to the memory card depending on the switch position: On/Off. The status of this switch can be read through defined pins.

■ Battery Replacement (SRAM only)

SRAM cards use a lithium battery (LWB: CR-2025, WWB: BR-2325) to hold data while not plugged into a system that supplies power to the card. Users can easily replace this main battery.

■ Battery Lock (SRAM only)

This mechanism locks the battery holder to prevent it from falling out.

■ Sub Battery (WWB series SRAM only)

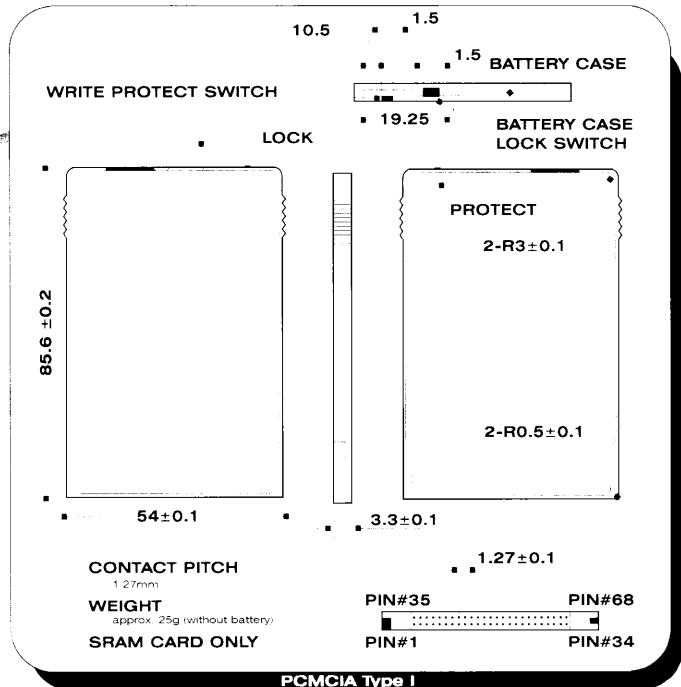
SRAM cards equipped with a sub-battery allow the replacement of the main battery without data loss. The sub-battery is a rechargeable lithium cell that is charged as the card is used in a host system.

■ Wide Operation Temp. Range

EPSON's IC Memory cards are designed and guaranteed for a wide operating and storage temperature range.

■ Data Compression

Available with ATA Flash cards, to approx. double capacity.



■ 68-pin two-piece type (PCMCIA Rel. 1.0/2.0)

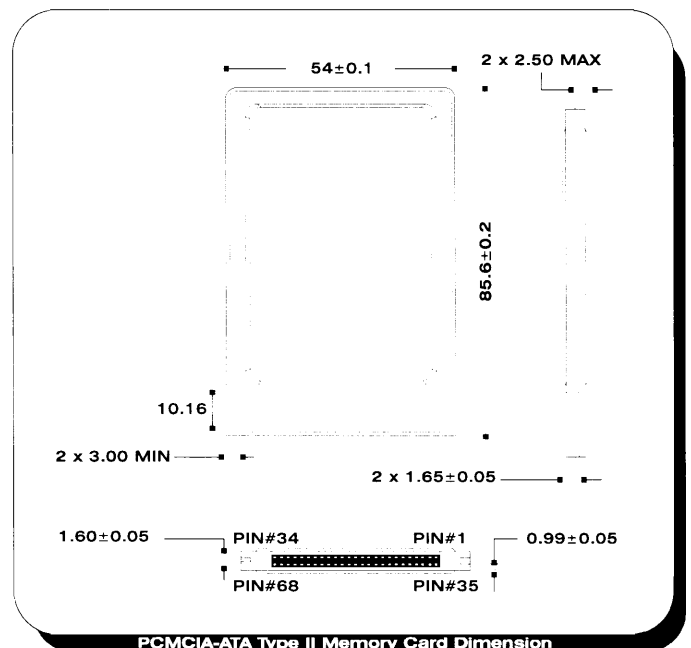
Memory type	Storage capacity (bytes)	Attribute storage cap. (bytes)
SRAM w/sub battery	64K ~ 2M (4M)	2K/none("FF" output)
Low power SRAM	64K ~ 1M	2K/none("FF" output)
Mask ROM	256K ~ 16M	2K/none("FF" output)
Flash memory	256K ~ 16M	2K/none("FF" output)
OTP ROM	64K ~ 1M (2M)	2K/none("FF" output)
ATA Flash	2.5M ~ 40M*	Read only

*Capacity measured w/out compression

■ 68-pin 8/16-bit interface

PIN		DESCRIPTION
Number	Name	
1	GND	Ground
2 to 6	D3 to D7	Data inputs/outputs
7	CE1	Chip enable input for even bytes (D0 to D7)
8	A10	Address input
9	OE	Output enable input
10 to 14	A11, A9, A8, A13, A14	Address inputs
15	WE/PGM	Write enable/program when PROM (EEPROM)
16	RDY/BSY/REQ	Supply
17	VCC	PROM write supply
18	VPP1	Address inputs
19 to 21	A16, A15, A12	Address inputs
22 to 29	A7 to A0	Data inputs/outputs
30 to 32	D0 to D2	Write protect output. Write is enabled when LOW, disabled When HIGH
33	WP/IOIS16	Ground
34,35	GND	Card detect output. Conn. to ground int.
36	CD1	Data inputs/outputs
37 to 41	D11 to D15	Chip en. input for odd bytes (D8 to D15)
42	CE2	(Pseudo-static RAM)
43	RFSH	No connection
44, 45	NC	Address inputs
46 to 50	A17 to A21	Supply
51	VCC	PROM write supply
52	VPP2	Address inputs
53 to 56	A22 to A25	No connection
57 to 60	NC	Register select input
61	REG	Battery voltage detect 2
62	BVD2	Battery Voltage detect 1
63	BVD1	Data inputs/outputs
64 to 66	D8 to D10	Card det. output. Conn. to ground int.
67	CD2	Ground
68	GND	

PCMCIA-ATA requires additional pin definition, not shown.





DENSITY

170MB

COMPATIBILITY

PCMCIA2.1

SIZE

PCMCIA Type III

FUNCTIONAL

Formatted Capacity
Sector Size
Disks
Heads
Data Surfaces
Track Density
Flux Density
Recording Density
Recording Method

170.8 MBytes
512 Bytes
2
4
4
3,800 TPI
63,000 FCI
84,000 BPI
1,7 RLL Code

COMPATIBILITY

PCMCIA 2.1

MODELS

EFM-144:
14,400 bps send/receive fax operation
14,400 bps data transmission
EFM-96:
9,600 bps send/receive fax operation
2,400 bps data transmission

SIZE

PCMCIA Type II

COMMUNICATIONS COMPATIBILITY

Standards:
Hayes AT command set
MNP levels 1-5
CCITT V.42
CCITT V.42bis

Protocols:
Bell 103
Bell 212A
CCITT V.21
CCITT V.22
CCITT V.22bis
CCITT V.22 A & B
CCITT V.23
CCITT V.32 (EFM-144)
CCITT V.32bis (EFM-144)

Fax Compatibility:
CCITT V.17 (EFM-144)
CCITT V.21 Channel 2
CCITT V.27ter
CCITT V.29
CCITT Group III
EIA Class II (EFM-96)
EIA Class I & II (EFM-144)

OPERATING MODES

Asynchronous, Full duplex, Automatic and manual call originate, Automatic and manual answer, Cellular-ready (interface optional)

SERVICE MAINTENANCE

Covered by standard EPSON two-year limited warranty



PERFORMANCE

Media Transfer Rate
Interface Transfer Rate
Rational Speed
Latency
Average Seek Time
Track to Track Seek Time
Maximum Seek Time
Start Time (Typical)
Buffer Size
Interface

Up to 3.5MB/sec.
Up to 12.0MB/sec.
4,500 RPM
6.67 ms
12 ms
2 ms
20 ms
1.4 sec.
32 Kbytes
PCMCIA-ATA



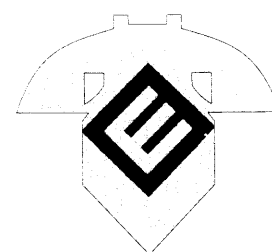
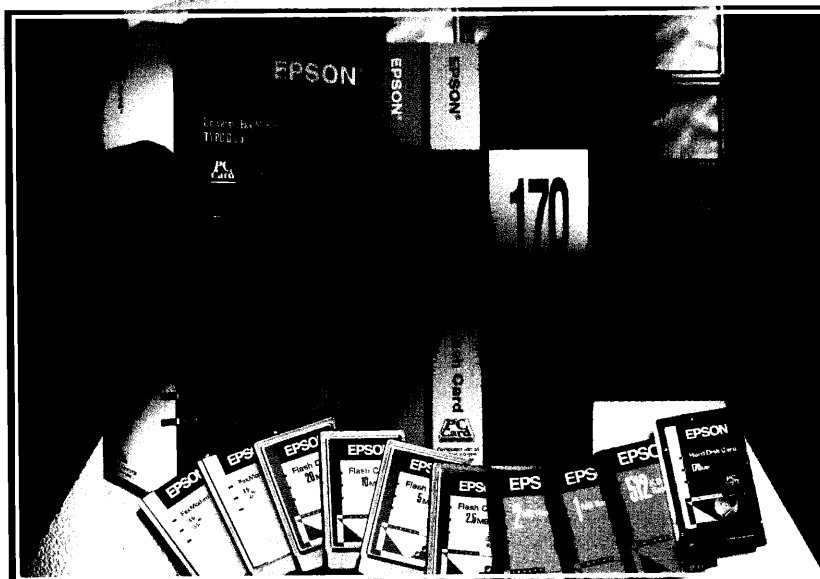
POWER

Voltage
Maximum Currents
Typical Power Dissipation
Sign Up
Idle
Read/Write
Seek
Standby Mode
Sleep Mode

+5 VDC ± 5%
0.8 amps
2.0 watts
0.5 watts
1.9 watts
1.4 watts
0.005 watts
0.005 watts



2 YEAR LIMITED WARRANTY



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