Panasonic

2000 Vol. 1

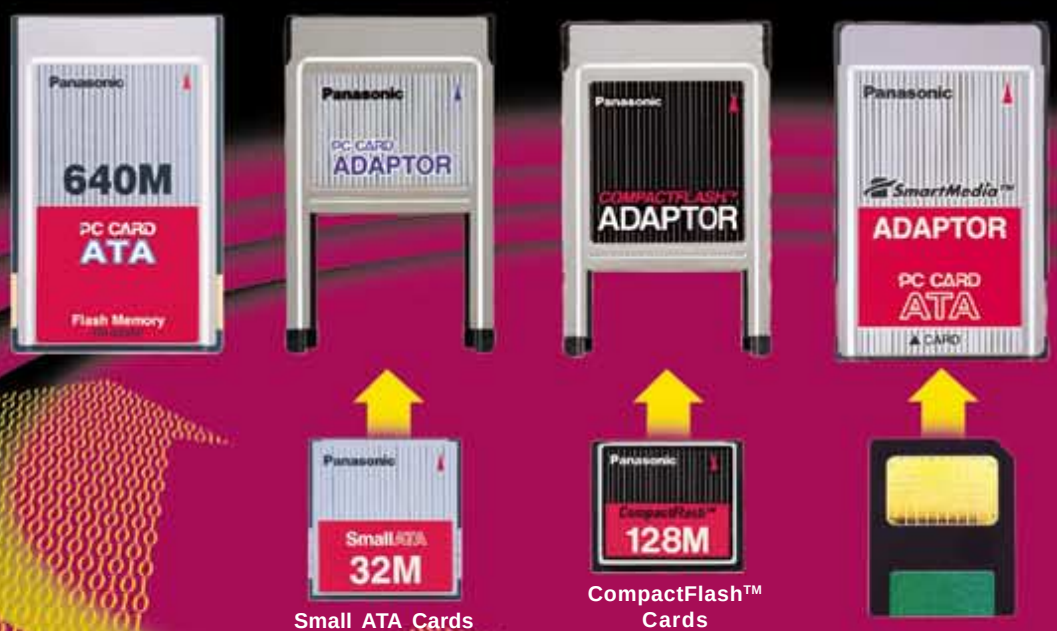
Memory Cards & PC Card Adapters

- ATA Cards, CompactFlash, SRAM Cards, Flash Memory Cards
- Adapters for SmartMedia, CompactFlash, MMC (MultiMediaCard) and Small PC Cards

Panasonic memory cards provide leading edge storage media technology for applications such as mobile communications devices, portable devices and factory automation equipment.

Notebook PCs

I/O Interface



- External data storage media for PCs
- Audio recorders
- POS handy terminals
- Portable scanners
- Medical equipment
- Sequencers (FA program controllers)
- Electrocardiographs

Memory Interface

Full-size SRAM Cards

PC Card Adapter for Small PC Cards

Full-size Flash Memory Cards

Custom Cards* (Made to Order)

* Consult Panasonic for more information.

Small SRAM cards

Small Flash Memory cards

ATA PC Card Adapter for MMC (MultiMediaCard)

MMC (MultiMediaCard) (For Reference Only)

- Test and measurement equipment
- Multimedia projectors
- Factory automation equipment
- Printers
- Vending machines
- Handy terminals
- POS terminals
- Medical equipment
- Sewing machines

- Digital cameras
- Digital video cameras
- Solid-state audio players (MP3 players, etc)
- PDAs
- Electronic musical instruments
- Hand-held PCs, Palmtops

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Realize smaller size, larger capacity PC cards with advanced technology.

(About PC cards…)

"PC Card" is the name standardized by the "PC Cards Standard", a U.S.-Japan industry common standard that was negotiated between PCMCIA(Personal Computer Memory Card International Association) and JEIDA(Japan Electronic Industry Development Association).

In the beginning, PC cards were used as storage media (memory cards) for personal computers, but because of the need for additional functionality PC cards began to be used as I/O devices in notebook PCs. Today, PC card technologies have expanded to include Flash memory cards which are used to transfer and store data from items such as digital cameras, SCSI cards, Modem cards, LAN cards, Audio cards and various combinations of each.

PC cards also have expanded to include more functionality in a smaller form for use with mobile devices. Panasonic can satisfy the demands of next generation mobile devices with our large capacity, high speed and high performance line-up of small PC cards, memory cards and adapter cards.

(Overview…)

ATA Flash cards

ATA flash cards use Flash memory as the memory media and are a recognized PC Card standard by PCMCIA/JEIDA. Because of the ATA format, a hard disk interface for PC-AT type computers, ATA cards use existing IDE/ESDI hard disk controller drivers allowing for easy MS Windows compatibility and making them useful for data transfer from items such as digital cameras. Because the product does not have any mechanically moving parts like a hard disk, it is highly resistant to vibration or shock and provides high-speed access with low power consumption.

SRAM cards

SRAM cards are re-writable and are best for applications that need high read/write speed. SRAM cards contain back-up batteries.

Flash memory cards

Flash memory cards contain linear flash memory and have no need for any back-up batteries. Flash memory can be deleted instantly and is re-writable so these cards are best suited for applications that do not need high read/write speeds and may require re-write functionality.

PC Card Adapters

PC Card Adapters provide portable PC connectivity for various small-sized removable storage media cards by allowing them to be used in full-size PC card (PCMCIA) slots.

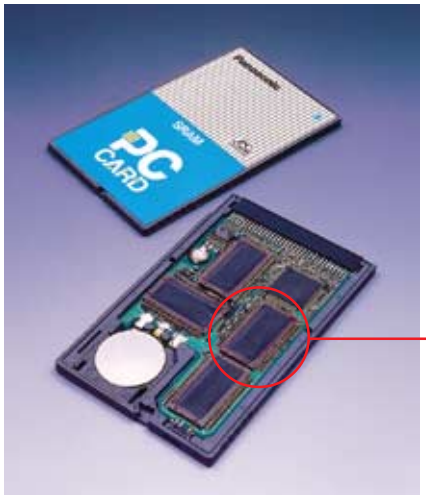
Characteristics of Panasonic PC Cards

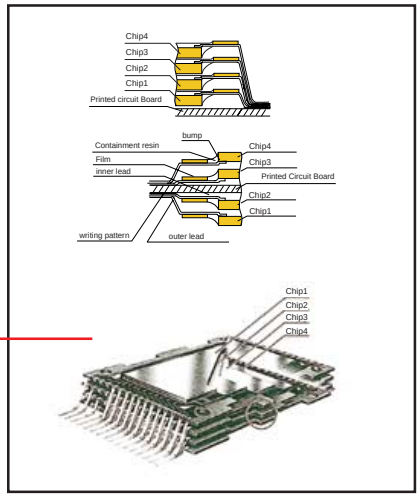
Using our original MB(Multi-Layer Bonding) methods to expand the memory size!

The MB method is our original technology which uses the TAB system to bond the memory chips to the film carrier and then stacks them on the printed circuit board. MB technology provides a mounting density 4 times that of conventional SOP(*1) mounting and twice that of TSOP(*2) mounting.

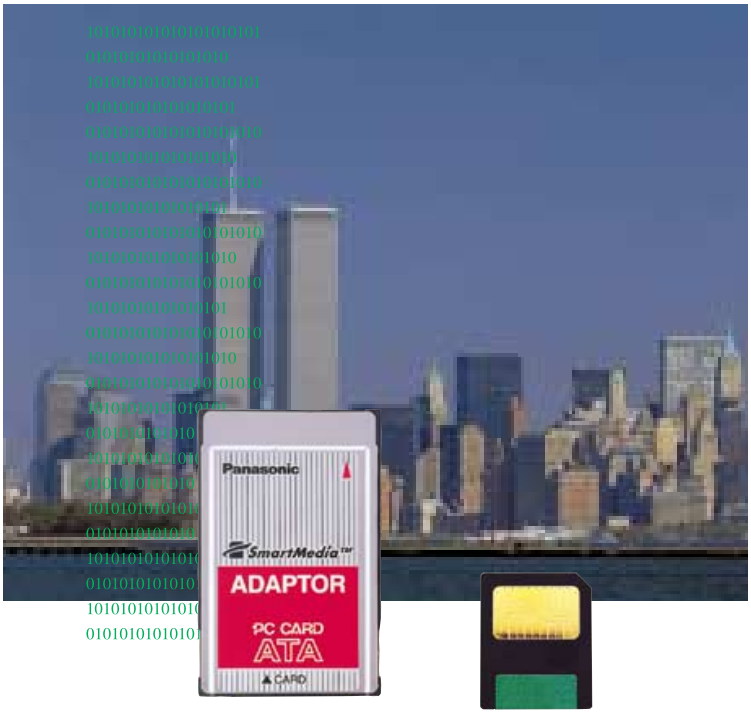
*1 SOP : Small Outline Package

*2 TSOP : Thin Small Outline Package





ATA PC Card Adapter for SmartMedia™



BN-FDAD (For Reference Only)

Full-size ATA PC card adapter provides portable PC connectivity for the super compact SmartMedia™ memory card.

Features

1. Complies with PC card ATA standards.
2. PC card type II.
3. 5V operating voltage.
4. High speed read/write operation. (see Interface Characteristics.)
5. Low power consumption. (see Power Supply Characteristics.)
6. Built-in eject button.
7. Automatic SmartMedia voltage detection function(3.3V to 5V).

Specification Table

Part No.	SmartMedia™ Type		Dimensions (mm)	Number of Pins
	Operating Voltage	Memory Capacity (bytes)		
BN-FDAD	5V	2M, 4M	PC Card TYPE II 85.6x54.0x5.0	68
	3.3V	2M, 4M, 8M, 16M, 32M, 64M, (128M)*		

* Electrically and physically designed to be ready for next generation 128MB card. Further compatibility tests will follow upon future release of this card.

Power Supply Characteristics

	Symbol	Conditions	Min.	Typ.	Max.
DC Input Voltage (V)	V_{CC}		4.5	5.0	5.5
Operating Power Current (mA) At Read At Write	 I_{CCR} I_{CCW}			 10 20	 15 35
Stand-by Current (mA)	I_{SB}	$V_{IH}=V_{CC}$ $V_{IL}=0V$		0.55	

Operating Environment

	Min.	Max.
Operating Temperature (°C)	0	60
Storage Temperature (°C)	-20	70
Humidity (R.H.%)	5	95
Vibration (G)		15
Impact (G)		50

Interface Characteristics

	Characteristics
Read Data Transfer Rate (Card » Host)	3.5 Mbytes/sec
Write Data Transfer Rate (Host » Card)	0.65 Mbytes/sec

SmartMedia™ and logos are trademarks of Toshiba Corporation.

ATA PC Card Adapter for MultiMediaCard

BN-MMAB (For Reference Only)

Full-size ATA PC card adapter provides portable PC connectivity for the stamp-size MultiMediaCard.

Features

1. Complies with PC card ATA standards.
2. PC card type II.
3. 5V operating voltage.
4. Built-in eject button.
5. Low power consumption. (see Power Supply Characteristics.)
6. High speed read/write operation. (see Interface Characteristics.)

Specification Table

Part No.	MultiMediaCard Type Memory Capacity (bytes)	Dimensions (mm)	Number of Pins
BN-MMAB	4M, 8M, 16M, 32M	PC Card TYPE II 85.6x54.0x5.0	68

Power Supply Characteristics

	Symbol	Conditions	Min.	Typ.	Max.
DC Input Voltage (V)	V_{CC}		4.5	5.0	5.5
Operating Power Current (mA) At Read At Write	 I_{CCR} I_{CCW}			 75 85	 110 120
Stand-by Current (mA)	I_{SB}	$V_{IH}=V_{CC}$ $V_{IL}=0V$		15	

* Using 4M bytes MMC made by SanDisk.

Operating Environment

	Min.	Max.
Operating Temperature (°C)	0	70
Storage Temperature (°C)	-20	70
Humidity (R.H.%)	5	95
Vibration (G)		15
Impact (G)		50

Interface Characteristics

	Characteristics
Read Data Transfer Rate (Card » Host)	3.5 Mbytes/sec
Write Data Transfer Rate (Host » Card)	0.65 Mbytes/sec

CompactFlash™ & PC Card Adapter for CompactFlash™

BN-C128AB-P

BN-CFADP PC Card
PC Card Type II
(85.6 x 54.0 x 5.0mm)

Ideal for digital cameras and PDAs. Connects to notebook PCs with full-size card adapters.

Features

1. Low power consumption. (see Power Supply Characteristics.)
2. High speed read/write operation. (see Interface Characteristics.)
3. Read/write up to 1 million times.
4. Either 3.3V or 5V operating voltage.
5. Converts to PC card type II with card adapter BN-CFADP.

CompactFlash™ Cards

Specification Table

Part No.	Memory Capacity (bytes)	Number of Cylinders	Number of Heads	Number of Sectors/Tracks	Number of Sectors	Dimensions (mm)	Number of Pins
BN-C008AB-T	8,192,000	125	8	16	16,000	36.4x42.8x3.3	50
BN-C016AB-T	16,384,000	250	8	16	32,000		
BN-C024AB-T	24,576,000	375	8	16	48,000		
BN-C032AB-T	32,768,000	500	8	16	64,000		
BN-C064AB-P	Under Development						
BN-C128AB-P							

Power Supply Characteristics

	Symbol	3.3V			5.0V		
		Min.	Typ.	Max.	Min.	Typ.	Max.
DC Input Voltage (V)	V_{CC}	3.0	3.3	3.6	4.5	5.0	5.5
Operating Power Current (mA)							
At Read	I_{CCR}		31			45	
At Write	I_{CCW}		34			52	
Stand-by current (mA)	I_{SB}		0.03			0.03	

Interface Characteristics

	Characteristics
Read Data Transfer Rate (Card » Host)	3.5 Mbytes/sec
Write Data Transfer Rate (Host » Card)	1.2 Mbytes/sec

Operating Environment

	Min.	Max.
Operating Temperature (°C)	0	60
Storage Temperature (°C)	-20	85
Humidity (R.H.%)	5	95
Vibration (G)		15
Impact (G)		1000

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Full-size/small-size

For Small ATA Cards

ATA Flash Memory Cards & PC Card Adapter

BN-640AC-P BN-S032AC-S BN-SPCADP

PC Card Type II
(85.6 x 54.0 x 5.0mm)

Full-size ATA Cards

Specification Table

Part No.	Memory Capacity (bytes)	Number of Cylinders	Number of Heads	Number of Sectors/Tracks	Number of Sectors	Dimensions (mm)	Number of Pins
BN-008AB-M	8,192,000	250	4	16	16,000	PC Card TYPEII 85.6 x 54.0 x 5.0	68
BN-016AB-M	16,384,000	500	4	16	32,000		
BN-024AB-M	24,576,000	375	8	16	48,000		
BN-040AB-M	40,960,000	625	8	16	80,000		
BN-080AB-M	81,920,000	625	8	32	160,000		
BN-096AB-M	98,304,000	375	16	32	192,000		
BN-160AB-M	163,840,000	625	16	32	320,000		
BN-320AC-P	327,680,000	1,000	16	40	640,000		
BN-640AC-P	655,360,000	2,000	16	40	1,280,000		

Power Supply Characteristics

	Symbol	Conditions	3.3V			5.0V		
			Min.	Typ.	Max.	Min.	Typ.	Max.
DC Input Voltage (V)	V_{CC}		3.0	3.3	3.6	4.5	5.0	5.5
Operating Power Current (mA)								
At Read	I_{CCR}			20	35		25	40
At Write	I_{CCW}			25	35		30	40
Stand by current (mA)	I_{SB}	$V_{IH}=V_{CC}$ $V_{IL}=0V$		0.25			0.30	

Interface Characteristics

	Characteristics
Read Data Transfer Rate (Card » Host)	3.5 Mbytes/sec
Write Data Transfer Rate (Host » Card)	0.65 Mbytes/sec

Operating Environment

	Min.	Max.
Operating Temperature (°C)	0	70
Storage Temperature (°C)	-30	80
Humidity (R.H.%)	5	95
Vibration (G)		15
Impact (G)		1000

Storage media for portable information equipment.

Features

1. Complies with PC card ATA standards.
2. Operates with IDE mode.
3. PC card type II. (Full-size ATA cards.)
4. Grounding clips for EMI protection.
5. Low power consumption. (See Power Supply Characteristics.)
6. Either 3.3V or 5V operating voltage.
7. High speed read/write operation. (See Interface Characteristics.)
8. Excellent reliability against vibration and shock. (See Operating Environment.)
9. Read/write up to 1 million times.
10. Built-in ECC. (Error Correcting Codes.)
11. Small ATA cards convert to PC card type II with the card adapter BN-SPCADP.

Small ATA Cards

Specification Table

Part No.	Memory Capacity (bytes)	Number of Cylinders	Number of Heads	Number of Sectors/Tracks	Number of Sectors	Dimensions (mm)	Number of Pins
BN-S008AC-S	8,192,000	250	4	16	16,000	SPC TYPEI 45.0 x 42.8 x 3.3	68
BN-S016AC-S	16,384,000	500	4	16	32,000		
BN-S024AC-S	24,576,000	375	8	16	48,000		
BN-S032AC-S	32,766,000	500	8	16	64,000		

Power Supply Characteristics

	Symbol	Conditions	3.3V			5.0V		
			Min.	Typ.	Max.	Min.	Typ.	Max.
DC Input Voltage (V)	V_{CC}		3.0	3.3	3.6	4.5	5.0	5.5
Operating Power Current (mA) At Read At Write	 I_{CCR} I_{CCW}			 20 21			 25 27	
Stand-by current (mA)	I_{SB}	$V_{IH}=V_{CC}$ $V_{IL}=0V$		0.05	0.1		0.05	0.1

Interface Characteristics

	Characteristics
Read Data Transfer Rate (Card » Host)	3.5 Mbytes/sec
Write Data Transfer Rate (Host » Card)	0.65 Mbytes/sec

Operating Environment

	Min.	Max.
Operating Temperature (°C)	0	70
Storage Temperature (°C)	-30	80
Humidity (R.H.%)	5	95
Vibration (G)		15
Impact (G)		1000

Full-size/small-size For Small SRAM Cards

SRAM Cards & PC Card Adapter

BN-08MHSR BN-S02MSR BN-SPCADP
PC Card Type II
(85.6 x 54.0 x 5.0mm)

For applications that need speed.

Features

1. High capacity types available with Panasonic's MB technology. (Realizes 8M bytes with Type I.)
2. TTL input level (VIH(min.) = 2.2V).
3. Low stand-by current mode (Typical 100 µA).
4. "Snap-in" type battery holder with lock switch for easy battery replacement.
5. Conventional CR2025 lithium battery for memory backup.
6. 5V±0.5V operating voltage.
7. Small SRAM converts to PC card type II with the card adapter BN-SPCADP.
8. Small SRAM available in 2 types : Built-in battery type which uses a rechargeable lithium battery, and battery replaceable type which uses a lithium BR1225 primary battery.

Full-size SRAM Cards

Add C to the end of the part number to order cards with attribute memory (EEPROM).

Part No.	Memory Capacity (bytes)	Access Time	Current Consumption	Battery Life Lithium Battery (CR2025) 25°C	Sub Battery	Operating Temperature	Storage Temperature	Dimensions (mm)	Number of Pins
BN-064HSR	64K	200ns	150mA (Max)	5 years	Built-in	0°C~60°C	-20°C~70°C	PC Card TYPE I 85.6x54.0x3.3	68
BN-128HSR	128K								
BN-256HSR	256K								
BN-512HSR	512K								
BN-01MHSR	1M								
BN-02MHSR	2M			3 years					
BN-04MHSR	4M			1 year					
BN-08MHSR	8M			6 months					

Built-In Battery Type Small SRAM Cards

Part No.	Memory Capacity (bytes)	Access Time	Current Consumption	Back Up Time* Rechargable Lithium Battery (VL 621)	Operating Temperature	Storage Temperature	Dimensions (mm)	Number of Pins
BN-S256SR	256K	200ns	150mA (Max)	3 months	0°C~60°C	-20°C~70°C	SPC TYPE I 45.0x42.8x3.3	68
BN-S512SR	512K			2 months				
BN-S01MSR	1M			8 months				
BN-S02MSR	2M			4 months				

* Back up time from fully charged, using at 25°C.

Battery Replaceable Type Small SRAM Cards

Part No.	Memory Capacity (bytes)	Access Time	Current Consumption	Battery Life Lithium Battery (BR1225) 25°C	Operating Temperature	Storage Temperature	Dimensions (mm)	Number of Pins
BN-S01MMC	1M	200ns	150mA(max)	3 years	0°C~60°C	-20°C~70°C	SPC TYPE I 45.0x42.8x3.3	68

Full-size/small-size For Small Flash Memory Cards

Flash Memory Cards & PC Card Adapter

BN-28MHFCCK2 BN-S08MFCC BN-SPCADP
PC Card type II
(85.6 x 54.0 x 5.0mm)

Ideal for storing re-writable functions.

Features

1. Either 8 bit or 16 bit can be selected in the same card.
2. Various types are available depending on the application.
3. High capacity. (up to 28M bytes.)
4. Both single power and dual power supplies are available.
5. Write protection switch.
6. Small flash memory cards convert to PC card type II with the card adapter BN-SPCADP.

Full-size Flash Memory Cards

Power Supply	Memory Capacity (bytes)	Part No.	Common Memory (bytes)	Attribute Memory (EEPROM) (bytes)	Access Time	Current Consumption	Operating Temperature	Storage Temperature	Dimensions (mm)	Number of Pins
Single Power Supply (5V	Using 8M bit chips	BN-02MHFCCK2	2M	2K	250ns	150mA (Max)	0°C~60°C	-30°C~80°C	PC Card TYPE I 85.6x54.0x3.3	68
	Using 16M bit chips	BN-04MHFCCK2	4M							
		BN-08MHFCCK2	8M							
		BN-12MHFCCK2	12M							
		BN-16MHFCCK2	16M							
		BN-20MHFCCK2	20M							
		BN-24MHFCCK2	24M							
		BN-28MHFCCK2	28M							

Small Flash Memory Cards

Part No.	Memory Capacity (bytes)	Access Time	Current Consumption	Operating Temperature	Storage Temperature	Dimensions (mm)	Number of Pins
BN-S02MFCC	2M	250ns	150mA (Max)	0°C~70°C	-30°C~80°C	SPC TYPE I 45.0x42.8x3.3	68
BN-S04MFCC	4M						
BN-S08MFCC	8M						

uses Flash Memory made by Fujitsu(AMD).

⚠ Safety Instructions

Please read operating instructions carefully before use.

⚠ Caution

- Do not disassemble or modify the product, otherwise, it may cause the product to ignite, cause electrical shock or damage the main device.
- Immediately discontinue use of the product if, while using, the product emits smoke or an unusual smell, makes a strange noise, gets liquid or any kind of material inside of it, gets dropped or damaged.
- Do not misuse coin type lithium batteries which are used as back-up batteries for IC memory cards (SRAM cards), otherwise, it may cause batteries to generate heat, explode or ignite.
- Do not install the product into a slot unless you confirm it is a standard PC card slot (PCMCIA).
- Do not install the product into the PC card slot if it is wet, otherwise, it may damage the main device.

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*Photos of some products in this catalog are different from actual design.
*Specifications are subject to change without notice for further improvement.
*Some products have operating instructions on the back.

Contents valid as of May 2000.

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