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Cautions

ADE-503-014

Q&A on Hitachi CF and ATA Cards
Application Note

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Preface

This is a technical document in which we respond to technical inquiries received from customers who are designing systems using Hitachi's CompactFlash™ (CF) and PC/ATA (ATA) cards in a question-and-answer format.

Please read this document and the relevant datasheets thoroughly before designing a system in which Hitachi's CF and ATA cards are used.

This document is for system designers who are using Hitachi's CF and ATA cards. Note that some of the descriptions are not intended for the end users of the cards, such as those referring to the delivery specifications.

Abbreviations, terms, and format of descriptions in this document:

Items	Description
CFA	Abbreviation of CompactFlash™ Association.
PCMCIA	Abbreviation of Personal Computer Memory Card International Association.
CF card	Abbreviation of CompactFlash™ card.
ATA card	Abbreviation of PC-card/ATA.
T-IDE	Abbreviation of True IDE, which is defined by the CFA.
B	Byte.
Hexadecimal	H is added as a suffix to hexadecimal numbers, e.g., 0256FH. In memory-dump listings, numbers without this suffix are hexadecimal.
-XX	An active-low signal.
High/low, 1/0	Voltage levels on each of the pins are described as high and low. Values in registers and of data are described as 1 or 0 or in hexadecimal. Throughout this document, the high level is a logical 1 and the low level is a logical 0.
Hi-Z	The high-impedance state.
Word	In this document, two bytes.
Sector	The minimum unit for access to a card. Its size is 512 bytes.
Block	The unit for erasing and writing to the flash memory. Its size is 2 kbytes. One block consists of four sectors.
Cluster	The minimum unit for access to a card through the FAT file system. The size of a cluster differs according to the type of card.
Pin/terminal	Both have the same meaning in this document.
Card	The CF card and ATA card are both referred to as cards in this document.
CE mark	Confirmation that a product satisfies the requirements of the EU directive.
Others	Abbreviations, terms, and descriptive formats other than those given above are based on the datasheets or the CFA standard.

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Contents

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Q & A No.	CA001
Category	**Standard**
Item	**CF Card Standard**

Question:

Which standard do the Hitachi's CF cards conform to?

Answer:

Hitahi's CF cards conform to the CF+ and CompactFlash Specification, Revision 1.4, from the CFA. They have also passed the CFA's compliance test*.

Note: The compliance test is defined by the CFA. Only products that have passed the compliance test are permitted to use the CompactFlash™ logo.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5		HB28xxxxA5
√	HB28xxxxC6		HB28xxxxA6
√	HB28xxxxC8x		HB28xxxxA8H

Q & A No.	CA002
Category	Standard
Item	ATA Card Standard

Question:

Which standard do Hitachi's ATA cards conform to?

Answer:

Hitachi's ATA cards basically conform to the Release 7 of the PCMCIA's PC Card Standard. However, the HB28xxxxC5/A5 and the HB28xxxxC6/A6 Series are not compliant to some of the specifications.

The following table shows the items on which the cards do not conform to the standard.

Item	Symbol	PC Card Standard Release 7			Hitachi's ATA Cards			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Reset setup time	tsu (RESET)	20	—	—	100	—	—	ms
Reset pulse width	ts (Hi-ZRESET)	0	—	—	100	—	—	ms
-CE setup time	tsu (VCC)	20	—	—	100	—	—	ms

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√*	HB28xxxxC5		HB28xxxxA5
√*	HB28xxxxC6		HB28xxxxA6
√	HB28xxxxC8x		HB28xxxxA8H

Note: Applicable when the CF card is in a PC-card adapter.

Q & A No.	CA003
Category	Standard
Item	Qualification for the CE Mark

Question:

Are Hitachi's CF and ATA cards qualified for the CE mark by Hitachi or by an external qualification facility?

Answer:

TUV Rheinland Product Safety GmbH qualifies Hitachi's CF and ATA cards for the CE mark.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA004
Category	Specifications
Item	Limitation on the number of times rewriting is possible

Questions:

1. Is there a limit on the number of times the contents of CF and ATA cards can be rewritten?
2. If so, how many times can the contents of CF and ATA cards be rewritten?
3. What is the definition of the number of times rewriting is possible?

Answers:

1. Yes, there is a limit.
2. For the CF and ATA cards according to Hitachi's standard specifications, rewriting up to 10,0000 times is possible. Note, however, that the actual maximum number of times varies from product to product. Please refer to the delivery specifications and datasheets for the individual products.
    — If the description in the delivery specifications differs from that in the datasheet, the delivery specifications have the correct description.
    — When there is no description in the delivery specifications but there is a description on the datasheet, the datasheet gives the correct description.
3. Please refer to Q & A No. CA102 for the definition of the number of rewriting operations.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA102
Category	Specifications
Item	Definition of the number of rewriting operations (C8x/A8H)

Question:

What is the definition of the number of rewriting operations for the HB28xxxxC8x and the HB28xxxxA8H Series?

Answer:

The number of times given in the delivery specifications or the datasheet indicates the number of times data can be written to each block is possible. In the case of these devices, "Rewriting times: 300,000 per block" means that rewriting of each block 300,000 times is possible. For writing in sectors, please refer to Q & A No. CA506.

Note: **In CF and ATA cards, the flash memory is erased and written to in units of blocks. One block consists of 2 kbytes or 4 sectors (one sector is 512 bytes).**

Applicability:

Applicable?	Series Name	Applicable?	Series Name
	HB28xxxxC5		HB28xxxxA5
	HB28xxxxC6		HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA103
Category	Specifications
Item	When the number of possible rewriting operations is exceeded

Question:

What happens when the number of rewriting operations exceeds the upper limit?

Answer:

The operation of the card cannot be guaranteed; this includes blocks that were not rewritten. This situation may also lead to the following problems:

- Write errors
- Read errors
- Decreased data-retention time
- Damage to the card and loss of data

Please take care not to exceed this upper limit.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA104
Category	Specifications
Item	-WAIT Signal

Question:

The datasheets of the CF and ATA cards say that the -WAIT signal is always at a high level. Isn't this a violation of the standard?

Answer:

This is not a violation of the standard. The –WAIT signal becomes low when the data (Dout) cannot be output from the card within 125 ns during a read operation where the cycle time is 125 ns or longer. With Hitachi's CF and ATA cards, the data is always output within 125 ns, so the condition where the –WAIT signal should be at its low level never arises; therefore, the –WAIT signal is always left at its high level.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA105
Category	Specifications
Item	PIO Mode and DMA Mode

Question:

Do Hitachi's CF and ATA cards support the PIO and DMA modes?

Answer:

- Mode 1 of the PIO modes is supported.
- The DMA mode is not supported.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA201
Category	State at Shipment
Item	Format and Capacity at Shipment

Questions:

1. What is the format of Hitachi's CF and ATA cards at shipment?
2. What is the capacity at shipment?

Answers:

1. Hitachi's standard specification is for the CF and ATA cards at shipment to be in the MS-DOS format.
2. The available values for capacity of the data area at shipment are listed in the table below. These values apply to both CF and ATA cards according to Hitachi's standard specifications.

Card Type	Capacity of Data Area (Bytes)
12 MB	16,007,168
32 MB	31,950,848
64 MB	63,934,464
128 MB	127,903,744
160 MB	160,043,008
256 MB	255,909,888
384 MB	383,991,808
512 MB	511,148,032
640 MB	639,746,048
1 GB	1,024,655,360
2 GB	2,050,129,920

Notes: 1. A given product series does not necessarily include all of the card types. Also, card types other than those listed above may be included in some of the series.
2. The values for capacity above are for units as shipped by Hitachi. When a card is reformatted with a formatting tool, etc., the capacity may have some value other than those listed above.
3. The values for capacity given above are not guaranteed values and may be subject to change without notice.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA202
Category	State at Shipment
Item	Length of the FAT and Size of Clusters at Shipment

Questions:

What are the length of the FAT and the size of the clusters in an as-shipped CF or ATA card from Hitachi?

Answers:

The length of the FAT and size of the clusters in an as-shipped card vary with the type of card. The values given below are common to both CF and ATA cards.

Card Type	Length of FAT	Size of Cluster
12 MB	12 bits	4 kB
32 MB	16 bits	2 kB
64 MB	16 bits	2 kB
128 MB	16 bits	2 kB
160 MB	16 bits	4 kB
256 MB	16 bits	4 kB
384 MB	16 bits	8 kB
512 MB	16 bits	8 kB
640 MB	16 bits	16 kB
1 GB	16 bits	16 kB
2 GB	16 bits	32 kB

Notes: 1. A given product series does not necessarily include all of the card types. Also, card types other than those listed above may be included in some of the series.
2. The lengths of the FAT and sizes of clusters given above are the values at shipment from Hitachi. After a card has been reformatted with a formatting tool, etc., the values may differ from those given above.
3. The values above are not guaranteed and may be subject to change without notice.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA301
Category	Power Supply
Item	Applying Voltage to the Pins before Supplying Power

Question:

Will a problem arise if a voltage is applied to a pin other than the power-supply pin when power is not being supplied to the card?

Answer:

Yes. Applying a voltage to any pins other than the –CD1, or –CD2 pins before power is supplied to the card may lead to latch-up, and thus to a failure of card functions. A system must be designed so that voltage is not applied to pins other than the power-supply pin, -CD1, and –CD2 pins before power is supplied.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA302
Category	Power Supply
Item	Timing of Power-On

Question:

Does power have to be supplied to the card when both the –CD1 and –CD2 pins are at the low level?

Answer:

Yes. Power must only be supplied to the card after both the –CD1 and –CD2 pins are at the low level. Normally, the –CD1 and –CD2 pins of the connector on the card-slot side are shorter than the other pins, and are used to detect insertion of the card. That is, when the card is inserted such that the other pins are in contact with the connector on the card-slot side, the –CD1 and –CD2 pins are driven low to indicate that the card has been inserted. After that, power is supplied to the card.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA303
Category	Power Supply
Item	Power-Supply Sequence

Question:

What is the procedure for supplying power, reading, and writing?

Answer:

The following flowchart is the general procedure for using Hitachi's CF and ATA cards in in contiguous mode as I/O cards with Vcc of 3.3 V. The error handling when conditions in the table have not been satisfied has been omitted.

Flowchart:

Start
–CD1 = -CD2 = low?
Is operation at Vcc = 3.3 V possible?
Supply Vcc = 3.3 V
Wait for the period tsu (VCC) *1
BSY = 1?
Read CIS
Is entry to the I/O card mode possible?
INDEX bits 5 to 0*2 are 000001
Error processing
Enter the required commands

Descriptions:
Detect insertion of the card
Use the voltages on the –VS1 and –VS2 pins to determine this (this procedure is omitted with Hitachi's cards).
When the BSY bit of the status register is 0, the reset is completed
(this procedure is omitted with Hitachi's cards).
Select I/O card contiguous mode.

Notes: 1. 100 ms for HB28xxxxC5/A5 and HB28xxxxC6/A6
      20 ms for HB28xxxxC8x/A8H
  2. Bits 5 to 0 of the configuration options register

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA304
Category	Power Supply
Item	Switching between 3.3 V and 5 V

Question:

Is it possible to switch the power-supply voltage for the card from 5 V to 3.3 V or from 3.3 V to 5 V without turning off the power?

Answer:

The power must always be turned off before the power-supply voltage is switched. After the voltage has been switched off, turn on the power supply at the new level. Switching the voltage while power is being supplied may damage the card by inducing latch-up.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA305
Category	Power Supply
Item	Resuming Operation from System Suspension

Question:

I am designing a host system in which the supply of power to the card will be turned off in a suspended mode. What is the procedure for accessing the card after resuming normal operation?

Answer:

The procedure is the same as that when power is initially supplied to the card. Please refer to Q & A No. CA303.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA306
Category	Power Supply
Item	Power Shutdowns during Card Access

Question:

Does a problem arise if the card is removed from the slot or the supply of power to the card is cut off during access (read or write) to the card?

Answer:

Yes, problems do arise. A card may be damaged if it is removed from the slot or the power is turned off while the card is in the busy state. Ensure that the status register of the card holds 50H[*1] before removing the card from the slot or turning off the power.

Depending on the degree of the damage, a card that has been damaged by a power-supply shutdown[*2] may be recovered by formatting or writing to the sector which is in the read-error state. However, the data in the sector (block) which was written to and the nearby sectors (blocks) when power-supply shutdown occurred may be lost.

Notes: 1. Indicates the state where the card has no errors and is in the idle state waiting for a command.
2. Indicates a state where the power supply is turned off while the card is in the busy state, lowering the power-supply voltage below the operating range, or the card is removed from the slot or withdrawn from the connector.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA307
Category	**Power Supply**
Item	**Precautions with Regard to Turning Off the Power Supply**

Question:

Are there any precautions with regard to turning off the power supply? Should the hardware be reset before the power supply is turned off?

Answer:

1. Please refer to Q & A No. CA306.
2. A hardware reset before turning off the power is not essential

In a hardware reset, the reset operation starts on the rising edge of the RESET signal and makes the card enter the busy state. The power supply must not be turned off while the card is in the busy state, so you must wait until the reset operation has been completed. The card need not be reset in any way before the power is turned off.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA401
Category	Reset
Item	Differences between the Various Types of Reset

Question:

What are the differences between the power-on, hardware, software, and ATA software resets?

Answer:

The following is a list of the differences between the various types of reset.

Reset Types	Method of Reset	Cancelling the Reset	Range of Reset
Power-on reset	Turning on the power supply	Automatically cancelled on completion of the reset (specific cancellation not required)	• Card operation • All registers
Hardware reset	In memory mode and I/O mode: RESET pin^{*1} = high In T-IDE mode' –RESET pin^{*2} = low	In memory mode and I/O mode: automatically cancelled on completion of reset (specific cancellation not required) In T-IDE mode: –RESET pin^{*2} = high	• Card operation • All registers
Software reset	SRSET bit of the configuration option register = 1	SRSET bit of the configuration option register = 0^{*4}	• Card operation • All registers
ATA software reset	SRST bit of the device control register = 1	SRST bit of the device control register = 0^{*4}	• Card operation • All registers except the configuration registers^{*3}

Notes: 1. Asserted on the rising edge of the RESET signal in memory mode and in I/O mode.
2. Asserted when the –RESET signal is low in the T-IDE mode. In the T-IDE mode, the reset state continues as long as the –RESET signal stays low.
3. Indicates the task-file register.
4. These bits must be cleared to 0 during the reset.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA402
Category	Reset
Item	Description of the Types of Reset

Question:

You mentioned four types of reset in Q & A No. CA401. Could you describe them for me?

Answer:

- Power-on reset: The card incorporates a power-supply-voltage detection IC. This IC resets the whole card when it detects the supply of power to the card. Processing of this reset differs from that of the other types in that the controller is reset by hardware. If the card's operation becomes abnormal, applying a power-on reset by turning the power off and then on often recovers normal operation for the card.

- Hardware reset: When assertion of the RESET or –RESET signal is detected, various operations and registers are reset by the controller. Since the configuration register is also reset, the same processing as for a power-on reset is required after the reset state has been cancelled. Use the hardware reset when the whole system requires a reset.

- Software reset: This is basically the same as the hardware reset, except for the differences in the way the reset is applied and cancelled. This reset is useful when you want to reset the system's software. The software reset is not available in the T-IDE mode.

- ATA software reset: The configuration register is not reset. This is useful for warm starts of the system.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA403
Category	Reset
Item	Checking the Completion of Reset

Question:

How do I check that the resets listed in Q & A No. CA401 are completed?

Answer:

The method differs with the card's mode of operation. Check the level of the RDY/-BSY signal, or the BSY bit of the status register or alternate status register, as indicated in the following table.

Reset Types	Memory Mode	All Modes
Power-on reset	RDY/-BSY changes from high to low	The BSY bit* changes from 1 to 0.
Hardware reset	As above	As above
Software reset	As above	As above
ATA software reset	As above	As above

Note: The BSY bit of the status register.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA404
Category	**Reset**
Item	**Reset during Command Execution**

Question:

What happens when a reset is applied while a command is being executed?

Answer:

- Execution of the command is terminated, and reset processing commences (an error flag is not set.)
    — During the reading of multiple sectors: Enters the busy state on application of the reset, stops reading data, and starts the reset operation.
    — During the writing of data: Transfer of the write data is terminated, and the reset operation starts. Writing to a block to which data was being written on entry to the reset state might not be possible.
- When a HB28xxxxC5/A5 Series device is in use, and a reset is applied during a write operation, the subsequent busy state may continue until the power is turned off.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA405
Category	Reset
Item	Hardware Reset after Power-On Reset

Question:

Hitachi's datasheet seems to indicate that a hardware reset is required after each power-on reset. Is this so?

Answer:

No, a power-on reset does not have to be followed by a hardware reset. Item 4 in the timing chart below indicates the width of the reset pulse when the host applies a hardware reset to the card for some reason.
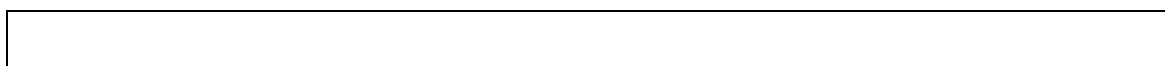
(1) The host places the RESET line in the Hi-Z state. Since the RESET pin is being pulled up to the Vcc level inside the card, the level of the RESET signal rises with the voltage, and the power-on reset starts.

(2) A power-on reset of the system is in progress. The RESET signal must be driven low.

(3) Access to the status register is enabled. During the reset, the BSY bit of the status register is 1. When the status register holds 50H, the reset has been completed. Operation of the card can commence.

(4) Input a hardware reset as required by the host side.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA406
Category	Reset
Item	Timeout of Reset

Question:

I would like to design a system where the BSY bit of the status register is checked polled to detect the completion of a reset. Are there any specifications for timeout? If not, do you have any recommendations?

Answer:

There is no specification for timeout. In using Hitachi's CF and ATA cards in the PC card mode, we recommend that the timeout be no less than 100 ms, regardless of the type of reset.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA501
Category	Card Operation (Common)
Item	Management of Sectors and Files

Question:

The data is written directly from the application software to the sectors of the card.

1. Is the data on this card readable by an MS-DOS system?
2. Are the FAT and directories of the card updated automatically?

Answer:

1. Data on the card is not readable as an MS-DOS file unless file management information has also been written to the card, even if the data for the file are directly written to sectors.
2. The card simply provides storage for data. The FAT and directory entries are not updated automatically. For data to be read as an MS-DOS file, the application software must handle the writing of file-management information, i.e., the FAT and directory entries, to the card.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA502
Category	**Card Operation (Common)**
Item	**Accessing the Data Registers in the Memory-Card Mode**

Question:

How do I use the data register in the memory-card mode?

Answer:

In the memory-card mode, the data registers are assigned to the addresses from 400H to 7FFH in the way shown below.

-REG	A10	A9 to A4	A3	A2	A1	A0	-OE = low	-WE = low
1	0	*	0	0	0	0	Data register	Data register
1	1	*	*	*	*	0	Even data register	Even data register
1	1	*	*	*	*	1	Odd data register	Odd data register

*: Don't care.

In reading from the data register, its address (000H) must be accessed once for every byte of data; for example, in reading two sectors at once, this address must be accessed 1024 times.

There is only one even data register and one odd data register, but since bits A1 to A9 are ignored, these registers are shadowed at alternate locations in the address range from 400H to 7FFH (i.e., over a 1-kbyte range). By using this function, for example in the reading of two sectors, the host can read 1-kbyte of data continuously from the addresses 400H to 7FFH (each address must only be read from once). After the first sector has been read, the status register indicates the BSY state (D0H[*1]); wait until the value in the status register becomes 58H[*2] before reading the next sector.

Notes: *1. The busy state without an error.
*2. The ready for data-transfer state.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA503
Category	Card Operation (Common)
Item	Identifying Cards

Question:

How do I identify individual cards when more than one card is used in a system?

Answer:

The serial number of a CF or ATA card from Hitachi is included in the ID (Identify Drive) field; this is useful since it makes individual cards identifiable. The serial number is recorded in ASCII code from word 10 to word 19 of ID.

You can check whether or not a CF and ATA card is from Hitachi by referring to the CIS (Card Information Structure), where the following hexadecimal data is entered in the Manufacturer Name String of the Version/Product Info Tuple:

48 49 54 41 43 48 49 ("HITACHI" in ASCII code)

In CF and ATA cards from Hitachi, this data is placed in the range between offsets of 034H and 040H from the top of the CIS.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA504
Category	Card Operation (Common)
Item	Formatting under Windows® XP

Question:

When I format a CF or ATA card under Windows® XP, the card becomes unrecognizable by systems other than PCs. Why is that?

Answer:

When a card is formatted under Windows® XP, the FAT32 file system is applied. The FAT12 or FAT16 file system is used in many systems that handle CF and ATA cards; the card is not recognized by such systems.

When a card is for use in a system other than a PC, do not format the card under Windows® XP. If you have done this, reformat the card on the primary system, such as a digital still camera, where the card is to be used.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA505
Category	Card Operation (Common)
Item	Speed in Erasing and Writing and Number of Sectors

Question:

1. Is there any relationship between the speed of erasing and writing and the number of sectors?

2. How can I set the number of sectors to 256?

Answer:

1. Yes. There is a relationship between speed in erasing and writing and the number of sectors, which is shown in the figure below. Set a large number for fast writing.
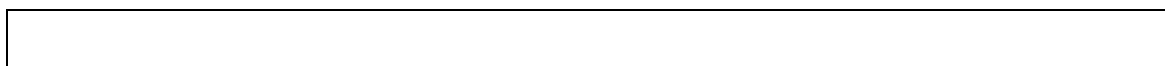
2. To select any sector number from 1 to 255, specify values from 01H to FFH. To set 256, specify 00H.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA506
Category	Card Operation (Common)
Item	Writing in Sector Units

Question:

What precautions should I take when writing in sector units?

Answer:

1. The number of sectors should be a multiple of four. Four sectors make up one block, which is the unit for erasing and writing of the flash memory in Hitachi's CF and ATA cards. Accordingly, in writing to four sectors in one-sector units, the whole block may be erased and written to as many as four times. On the other hand, when writing is in four-sector units, and starts from the top sector of the block, the block is only erased and written to once. If four sectors to be rewritten start from the middle of a block, writing will run across two blocks, but each block will only have to be erased and written to once. The blocks are thus erased and written to fewer times than when writing is in one-sector units.

2. When using the HB28xxxxC5/A5 or HB28xxxxC6/A6, take care to ensure that erasing and writing are not concentrated on specific blocks. Erasing and rewriting should be spread evenly over the blocks of the card.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA507
Category	Card Operation (Common)
Item	Assertion of the –IREQ Signal

Question:

1. Is the –IREQ signal asserted once each time a command is issued?
2. Is the –IREQ signal asserted in response to every command?

Answer:

1. For commands that do not involve the transfer of sectors, the –IREQ signal is asserted once on completion of the command. In reading by sectors, the –IREQ signal is asserted once before the start of each sector transfer. In writing to sectors, the –IREQ signal is asserted once after the completion of each sector transfer.
2. Yes. The –IREQ signal is asserted at least once per command.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA508
Category	**Card Operation (Common)**
Item	**Writing from the Middle of a Sector**

Question:

Is it possible to write data from the middle of a sector (512-byte unit)?

Answer:

No, it is not possible. Writing must be in sector units.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA509
Category	Card Operation (Common)
Item	Erasing before Writing

Question:

Is it necessary to erase a sector before writing data to it?

Answer:

No. In Hitachi's CF and ATA cards, a sector is automatically erased before data is written to it. Use of the Erase Sector command is not required.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA510
Category	Card Operation (Common)
Item	Differences in Access by the CHS and LBA

Question:

Are there any differences in access according to whether the CHS or LBA is used?

Answer:

1. The two forms of access are equivalent on Hitachi's CF and ATA cards.
2. This equation converts a CHS into an LBA:

   $LBA = (C \times (\text{number of heads per cylinder}) + H) \times (\text{number of sectors per track}) + S - 1$

   The numbers of heads per cylinder and of sectors per track vary with the card's types and series. Please refer to the datasheet for the card you are using.
3. This equation converts an LBA into a CHS:

   $C = \text{Quotient of } (LBA)/((\text{number of heads per cylinder}) \times (\text{number of sectors per track}))$

   $H = \text{Modulo of } ((LBA)/(\text{number of sectors per track})) / (\text{number of heads per cylinder})$

   $S = \text{Modulo of } (LBA)/(\text{number of sectors per track}) + 1$
4. No sectors of Hitachi's CF and ATA cards are addressable by the LBA but not by the CHS (i.e., there are no orphan sectors).

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA601
Category	Card Operation (T-IDE)
Item	Precautions to be Taken when Operating in the T-IDE Mode

Question:

What precautions should I take when operating a card in the T-IDE mode?

Answer:

1. Please refer to Q & A Nos. CA603 and CA605.

2. A reset takes longer (400 to 450 ms) in the T-IDE mode than in other modes (100 ms or shorter). The hardware and software on the host side must be designed to allow sufficient time until the first access after a reset.

3. When the card is used as a stand-alone master, the –DASP and –PDIAG pins must be pulled up to Vcc.

4. The output on the card side is at CMOS levels. When a high level is output and there is no load, the voltage is close to Vcc (5 V). Select an ATA interface IC on the host side that has an input withstanding voltage of at least 5 V.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA602
Category	Card Operation (T-IDE)
Item	Master and Slave Operation

Question:

Is it possible to connect Hitachi's CF and ATA cards to the ATA interface as either master or slave devices?

Answer:

Yes. Hitachi's CF and ATA cards can be used as either master or slave devices. When the –CSEL signal is at the GND level, the card acts as a master, and when the –CSEL pin is open-circuit, the card acts as a slave. For details on the settings, refer to the datasheet.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA603
Category	Card Operation (T-IDE)
Item	Fixing the –OE Pin

Question:

In the T-IDE mode, when and for how long must the value on the –OE pin be fixed?

Answer:

In the T-IDE mode, the –OE pin must be fixed to GND throughout the card's period of operation, i.e., from the time power is first supplied until the time it is turned off.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA604
Category	Card Operation (T-IDE)
Item	Operation and Handling of the –IOIS16 Pin

Question:

What does the –IOIS16 pin do and how should it be handled?

Answer:

The –IOIS16 signal goes low in word mode.

1. Currently, switching between the byte and word modes is handled by the host, so the signal is essentially unnecessary.
2. Since the signal is on an open-drain terminal, the –IOIS16 pin's output may be unstable. We recommend that you do not use this pin, since the signal was defined in old standards and has been omitted from standards subsequent to ATA-3.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA605
Category	Card Operation (T-IDE)
Item	Inserting and Removing Live Lines

Question:

Is it possible to insert or remove a live line in the T-IDE mode?

Answer:

No. The card may be damaged if a live line is inserted or removed in the T-IDE mode.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA606
Category	Card Operation (T-IDE)
Item	Difference between the IDE and the T-IDE

Question:

What is the difference between the IDE (ATA) and T-IDE interfaces?

Answer:

The T-IDE mode of operation was defined by the CFA. The signals specified for the T-IDE mode are equivalent to those for the IDE interface. Accordingly, fixing the –OE signal to the low level and turning on the power supply puts the device in an operating mode similar to the IDE. Note however, that in connection to an IDE interface, a conversion adapter is required to make the connection between the ATA card (68 pins) and the ATA interface (40 pins).

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA607
Category	Card Operation (T-IDE)
Item	8-Bit Access

Question:

How do I select the 8-bit-access mode and what is the order of data-readout in this mode?

Answer:

1. The cards enter the 8-bit access mode when the Set Feature command (EFH) is used to set the feature register to 01H.
2. Input and output is on pins D0 to D7; data from even and then odd addresses is placed on these pins.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA608
Category	Card Operation (T-IDE)
Item	Countermeasures against Noise

Question:

What countermeasures against malfunctions due to noise should I apply to the ATA interface cable?

Answer:

1. Take the impedance of the cable into consideration, and insert damping resistors on the host and card sides of the cable. Ensure that the values of these resistors are within a range such that the signals are not degraded. The following table is a list of signal lines where such damping resistors should be inserted and reference values for the damping resistor to be attached where the line is terminated on the card side. Do not insert damping resistors for the other signals. Adjust the resistance values to suit the driving ability of the driver and the impedance of the board's wiring.

2. Using an 80-core or flat cable instead of a 40-core cable is a further effective measure.

Signal Name	End of the Card Side
-IORD	82 Ω
-IOWR	82 Ω
-CE1, -CE2	82 Ω
A0 to A2	82 Ω
-REG	82 Ω
D0 to D15	33 Ω
-INPACK	22 Ω
INTRQ	22 Ω
IORDY	22 Ω
-RESET	82 Ω

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA609
Category	Card Operation (T-IDE)
Item	Example of Connection with the ATA Interface

Question:

Can you give me an example of the connection of a Hitachi CF or ATA card in the T-IDE mode to replace a 3.5-inch HDD?

Answer:

The connections between the ATA card in the T-IDE mode and the host side are listed in the following table. The signal names of a CF card are the same as those of an ATA card but the pin numbers are different. Please refer to the circuit diagram if you intend to connect a CF card in this way.

ATA-Card Side		Host Side			ATA-Card Side		Host Side		
Pin	Signal	Pin	Signal	Note	Pin	Signal	Pin	Signal	Note
1	GND	—	—		18	NC	—	—	
2	D3	11	DD3		19	NC	—	—	
3	D4	9	DD4		20	NC	—	—	
4	D5	7	DD5		21	NC	—	—	
5	D6	5	DD6		22	A7	—	—	
6	D7	3	DD7		23	A6	—	—	*1
7	-CE1	37	-CS0		24	A5	—	—	*1
8	A10	—	—	*1	25	A4	—	—	*1
9	-ATASEL	—	—	*1	26	A3	—	—	*1
10	NC	—	—		27	A2	26	DA2	*1
11	A9	—	—	*1	28	A1	22	DA1	
12	A8	—	—	*1	29	A0	25	DA0	
13	NC	—	—		30	D0	17	DD0	
14	NC	—	—		31	D1	15	DD1	
15	-WE	—	—	*2	32	D2	13	DD2	
16	INTRQ	31	INTRQ		33	-IOIS16	32	-IOIS16	
17	Vcc	—	—		34	GND	—	—	

Notes: 1. Fixed to a low level on the card side.
2. Pull the signal up to Vcc on the card side.

ATA-Card Side		Host Side		Note	ATA-Card Side		Host Side		Note
Pin	Signal	Pin	Signal		Pin	Signal	Pin	Signal	
35	GND	—	—		52	—	—	—	
36	-CD1	—	—		53	—	—	—	
37	D11	10	DD11		54	—	—	—	
38	D12	12	DD12		55	—	—	—	
39	D13	14	DD13		56	-CSEL	28	CSEL	*1, *2
40	D14	16	DD14		57	-VS2	—		
41	D15	18	DD15		58	-RESET		RESET	
42	-CE2	38	-CS1		59	IORDY		IORDY	
43	-VS1	—	—		60	-INPACK		DMARQ	
44	-IORD	25	-DIOR		61	-REG		-DMACK	
45	-IOWR	23	-DIOW		62	-DASP	—	—	*2
46	—	—	—		63	-PDIAG		-PDIAG	*2
47	—	—	—		64	D8		DD8	
48	—	—	—		65	D9		DD9	
49	—	—	—		66	D10		DD10	
50	—	—	—		67	-CD2	—	—	
51	Vcc	—	—		68	GND	—	—	

Notes: 1. We recommend that a jumper which allows selection from among Vcc, GND, and CABLE be included.
2. Use a 10-kΩ resistor to pull this signal up to Vcc.

An example of the circuit for a conversion adapter that connects an ATA cable with the card is given on the next page. The jumpers in the diagram (terminals A to D of the ATA cable connector) allow the selection of master-slave operation for the CF or ATA cards.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Notes: 1. For the damping resistors of this circuit, refer to Q & A No. CA608.

2. This circuit diagram is a typical example of the connection of CF and ATA cards with the ATA interface, but the circuit's operation is not guaranteed. If the circuit is applied, its operation with the actual system must be confirmed.

3. This circuit diagram does not guarantee or give the right to implement patent or any other rights, such as intellectual property rights, held by Hitachi or any third party.

Q & A No.	CA610
Category	Card Operation (T-IDE)
Item	INTRQ Operation

Question:

When the card is read multiple times, the INTRQ signal becomes active (high) for 0.8-μs periods. What is this interrupt signal used for?

Answer:

The number of sectors which is set in the sector-count register can be read with a single read command. For example, when the sector-count register is set to 3 and the read command is set in the command register, the host must carry out three one-sector-unit (256-word) read operations.

When the data is ready in the card, 58H is set in the status register, and an interrupt is output to indicate this to the host. On receiving this interrupt, the host checks the status register, finds the value 58H, and starts to read the data register. While the data register is being read (256 words), the value in the status register remains at 58H. When the reading of one sector of data is complete, the value in the status register changes to D0H until the next data is ready. Therefore, the value in the status register changes in the following way, and the interrupt is generated at the three points where the value changes from D0 to 58H.

$50H \rightarrow \underline{D0H \rightarrow 58H} \rightarrow \underline{D0 \rightarrow 58} \rightarrow \underline{D0H \rightarrow 58H} \rightarrow 50H$

When the write command is used, the same interrupt signal is generated after data or a command has been transmitted and processed, indicating that the card is ready to accept the next command or data. When the number of sectors is 3, the value in the status register changes in the following way, and the interrupt is generated at the three points where D0H changes to 58H or 50H.

$50H \rightarrow 58H \rightarrow \underline{D0H \rightarrow 58H} \rightarrow \underline{D0H \rightarrow 58H} \rightarrow \underline{D0H \rightarrow 50H}$

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA701
Category	Command
Item	Procedure for Setting the Registers when a Command Is Issued

Question:

When issuing a command, in what order should I set the related registers?

Answer:

Start by setting, in any order, the registers other than the command register which are necessary for execution of the command. Set the command register last.

After the command register has been set, the card starts to execute the command. The set of registers for which settings are required varies with the command. Please refer to the datasheet.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA702
Category	Command
Item	Operation of the Format Track and Wear Level Commands

Question:

Is it possible to use the Format Track command or the Wear Level command with Hitachi's CF and ATA cards? What are the card's operations in response to these commands?

Answer:

While Hitachi's CF and ATA cards accept the Format Track command and the sector data, the cards don't actually do anything in response. Data is not written over the existing sectors. The cards also do nothing in response to the Wear Level command. The value 00H is returned in the sector-count register .

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA703
Category	Command
Item	When a Write Command Is Issued During Write Operation

Question:

What is the card's operation when a further write command is issued (ignoring the busy state) while the card is executing a write command?

Answer:

The write command which is in progress is terminated. The data in the sectors (blocks) that were being written to are not guaranteed. The new write command is valid.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA704
Category	Command
Item	Read Long Sector and Write Long Sector

Question:

1. What is the difference between the Read Long Sector and Read Sector commands?
2. What is the difference between the Write Long Sector and Write Sector commands?

Answer:

1. In response to a Read Sector command, 512 bytes of data are transferred; with a Read Long Sector command, 4 bytes of ECC data are added to the 512 bytes of data, and 516 bytes are transferred to the host. However, the 4 bytes of ECC data from our cards are not a valid ECC. So, ignore these 4 bytes on the host side. An ECC check is carried out inside the cards, so you don't need to use the Read Long Sector command.
2. In response to a Write Sector command, 512 bytes of data are transferred; with a Write Long Sector command, 4 bytes of ECC data are added to the 512 bytes of data, and 516 bytes are transferred to the host. However, the 4 bytes of ECC data are ignored and not recorded by Hitachi's CF and ATA cards. An ECC check is carried out inside the cards, so you don't need to use the Write Long Sector command.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA801
Category	Others
Item	Using an OS other than MS-DOS

Question:

Is it possible to use Hitachi's CF and ATA cards with an operating system other than MS-DOS?

Answer:

Yes. The combinations of model and compatible OS are given at the following URL on Hitachi's website:

http://www.hitachisemiconductor.com/sic/jsp/japan/jpn/PRODUCTS/FLASHCARD/index.html

If you do not find the information at the above URL, search from Hitachi's homepage at the URL given below.

http://www.hitachi.co.jp

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA802
Category	Others
Item	Restrictions on Using the Card in the T-IDE Mode in a Linux System

Question:

What are the restrictions on using the Hitachi's CF and ATA cards in T-IDE mode in place of a HDD (connected via an ATA interface) on a Linux system?

Answer:

1. A CF or ATA card from Hitachi can be connected as the primary or secondary master device when no other device is present. However, if a CF card, ATA card, or any other drive is connected on the slave side, the system may not boot-up normally. This is because the Linux kernel does not permit master-slave operation where the combination includes removable media.

2. The parameters for the kernel can be changed to allow the use of Hitachi's CF and ATA as master or slave devices. For details on this, contact your nearest Hitachi sales office.

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA803
Category	Others
Item	PCs and Other Systems for which Operation has been Confirmed

Question:

With which systems has correct operation of Hitachi's CF and ATA cards been confirmed?

Answer:

Yes. The combinations of model and compatible OS are given at the following URL on Hitachi's website:

http://www.hitachisemiconductor.com/sic/jsp/japan/jpn/PRODUCTS/FLASHCARD/index.html

If you do not find the information at the above URL, search from Hitachi's homepage at the URL given below.

http://www.hitachi.co.jp

Applicability:

Applicable?	Series Name	Applicable?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

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Q & A No.	CA804
Category	Others
Item	Applying FDISK to the Card when Inserted in a PC-Card Slot

Question:

Is it possible to apply FDISK to a card which is inserted in a PC card slot?

Answer:

It depends on the PC. Please contact the PC manufacturer.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q & A No.	CA805
Category	Others
Item	Processing for Pins that are Not Used

Question:

How should I treat pins that are not used?

Answer:

Take the following steps with pins that are not used.

1. Leave pins that are pulled up to Vcc or connected to GND inside the card unconnected.

   These pins are pulled up inside the card: -CE1, -CE2, -OE/-ATASEL, -WE, -IORD, -IOWR, -REG, RESET/-RESET, -CSEL, BVD1/-STSCHG/-PDIAG, and BVD2/-SPKR/-DASP.

   These pins are connected to GND inside the card: -VS1, -CD1, and –CD2.

2. Connect the address pins to GND.

3. Pull down the data pins.

4. Leave the –VS2 pin unconnected or connect it to GND.

5. Handle the other pins as follows.
   (a) Fix the levels on input-only pins and I/O pins by pulling them up (active-low pins) or down (active-high pins).
   (b) Leave the output-only pins unconnected.

Applicability:

Applica ble?	Series Name	Applica ble?	Series Name
√	HB28xxxxC5	√	HB28xxxxA5
√	HB28xxxxC6	√	HB28xxxxA6
√	HB28xxxxC8x	√	HB28xxxxA8H

Q8A on Hitachi CF and ATA Card Application Note