

1.1.1.1 Identify Device – ECh

Bit ->	7	6	5	4	3	2	1	0
Command (7)	ECh							
Device (6)	X	X	X	Drive	X			
LBA High (5)	X							
LBA Mid (4)	X							
LBA Low (3)	X							
Sec Cnt (2)	X							
Feature (1)	X							

Figure 1: Identify Device

The Identify Device command enables the host to receive parameter information from the CompactFlash Storage Card. This command has the same protocol as the Read Sector(s) command. The parameter words in the buffer have the arrangement and meanings defined in Table 1. All reserved bits or words are zero. Hosts should not depend on Obsolete words in Identify Device containing 0. Table 1 specifies each field in the data returned by the Identify Device Command. In Table 1, X indicates a numeric nibble value specific to the card and aaaa indicates an ASCII string specific to the particular drive.

Table 1: Identify Device Information

Word Address	Default Value	Total Bytes	Data Field Type Information
0	848Ah	2	General configuration - signature for the CompactFlash Storage Card
	0XXX	2	General configuration – Bit Significant with ATA-6 definitions.
1	XXXXh	2	Obsolete
2	0000h	2	Reserved
3	00XXh	2	Obsolete
4	0000h	2	Obsolete
5	0000h	2	Obsolete
6	XXXXh	2	Obsolete
7-8	XXXXh	4	Obsolete
9	XXXXh	2	Obsolete
10-19	aaaa	20	Serial number in ASCII (Right Justified)
20	0000h	2	Obsolete
21	0000h	2	Obsolete
22	0004h	2	Obsolete
23-26	aaaa	8	Firmware revision in ASCII. Big Endian Byte Order in Word
27-46	aaaa	40	Model number in ASCII (Left Justified) Big Endian Byte Order in Word
47	XXXXh	2	Maximum number of sectors on Read/Write Multiple command

Deleted: 4

Deleted: Default number of cylinders

Deleted: Default number of heads

Deleted: Default number of sectors per track

Deleted: Number of sectors per card (Word 7 = MSW, Word 8 = LSW)

Deleted: Number of ECC bytes passed on Read/Write Long Commands

Word Address	Default Value	Total Bytes	Data Field Type Information	
48	0000h	2	Reserved	
49	XX00h	2	Capabilities	
50	0000h	2	Reserved	
51	0X00h	2	Obsolete	Deleted: PIO data transfer cycle timing mode
52	0000h	2	Obsolete	
53	000Xh	2	Field Validity	
54	XXXXh	2	Obsolete	Deleted: Current numbers of cylinders
55	XXXXh	2	Obsolete	Deleted: Current numbers of heads
56	XXXXh	2	Obsolete	Deleted: Current sectors per track
57-58	XXXXh	4	Obsolete	Deleted: Current capacity in sectors (LBAs)(Word 57 = LSW, Word 58 = MSW)
59	01XXh	2	Multiple sector setting	
60-61	XXXXh	4	Total number of <u>user addressable</u> sectors.	Deleted: addressable in LBA Mode
62	0000h	2	Obsolete	Deleted: Reserved
63	0X0Xh	2	Multyword DMA transfer. In PC Card modes this value shall be 0h	
64	00XXh	2	Advanced PIO modes supported	
65	XXXXh	2	Minimum Multyword DMA transfer cycle time per word. In PC Card modes this value shall be 0h	
66	XXXXh	2	Recommended Multyword DMA transfer cycle time. In PC Card modes this value shall be 0h	
67	XXXXh	2	Minimum PIO transfer cycle time without flow control	
68	XXXXh	2	Minimum PIO transfer cycle time with IORDY flow control	
69-79	0000h	20	Reserved	
80-81	0000h	4	Reserved – CF cards do not return an ATA version	
82-84	XXXXh	6	Features/command sets supported	
85-87	XXXXh	6	Features/command sets enabled	
88	XXXXh	2	Ultra DMA Mode Supported and Selected	
89	XXXXh	2	Time required for Security erase unit completion	
90	XXXXh	2	Time required for Enhanced security erase unit completion	
91	XXXXh	2	Current Advanced power management value	
92	XXXXh	2	Master Password revision code	
93-99	0000h	14	Reserved	
100-103	xxxxh	8	Maximum user LBA for 48-bit Address feature set	
104-127	0000h	48	Reserved	
128	XXXXh	2	Security status	
129-159	0000h	64	Vendor <u>specific</u>	Deleted: unique bytes
160	XXXXh	2	Power requirement description	
161	0000h	2	Reserved for assignment by the CFA	

Word Address	Default Value	Total Bytes	Data Field Type Information
162	0000h	2	Key management schemes supported
163	XXXXh	2	CF Advanced True IDE Timing Mode Capability and Setting
164	XXXXh	2	CF Advanced PC Card I/O and Memory Timing Mode Capability
165	XXXXh	2	CF Operating Temperature Range
166-175	0000h	6	Reserved for assignment by the CFA
176-255	0000h	158	Reserved

1.1.1.1.1 Word 0: General Configuration

This field indicates the general characteristics of the device. When Word 0 of the Identify drive information is 848Ah then the device is a CompactFlash Storage Card and complies with the CFA specification and CFA command set. It is recommended that PC Card modes of operation report only the 848Ah value as they are always intended as removable devices.

Bits 15-0: CF Standard Configuration Value
Word 0 is 848Ah. This is the recommended value of Word 0.

Some operating systems require a different value. This happens sometimes when a CF card replaces an ATA device. Different values are permitted. See ATA-6 and ATA-8.

1.1.1.1.2 Word 1: Obsolete

1.1.1.1.3 Word 3: Obsolete

1.1.1.1.4 Word 6: Obsolete

1.1.1.1.5 Words 7-8: Number of Sectors per Card

This field contains the number of sectors per CompactFlash Storage Card and its contents are identical to the contents of Word 60-61. This field is being considered to be obsolete in future versions of the CFA specification and should not be used in new host implementations.

1.1.1.1.6 Words 10-19: Serial Number

This field contains the serial number for this CompactFlash Storage Card and is right justified and padded with spaces (20h).

1.1.1.1.7 Word 22: Obsolete

This value shall be set to 0004h.

1.1.1.1.8 Words 23-26: Firmware Revision

This field contains the revision of the firmware for this product.

1.1.1.1.9 Words 27-46: Model Number

This field contains the model number for this product and is left justified and padded with spaces (20h).

Deleted: 165

Deleted: Bit 6 of Word 0 to be set to 1 (Non-removable device) to use the card as the root storage device

Deleted: The Card must be the root storage device when a host completely replaces conventional disk storage with a CompactFlash Card in True IDE mode. To support this requirement and provide capability for any future removable media Cards, alternate handling of Word 0 is permitted.¶
Bits 15-0: CF Preferred Alternate Configuration Values ¶
044Ah: This is the alternate value of Word 0 turns on ATA device and turns off Removable Media and Removable Device while preserving all Retired bits in the word. ¶
0040h: This is the alternate value of Word 0 turns on ATA device and turns off Removable Media and Removable Device while zeroing all Retired bits in the word ¶
Bit 15-12: Configuration Flag ¶
If bits 15:12 are set to 8h then Word 0 shall be 848Ah. ¶
If bits 15:12 are set to 0h then Bits 11:0 are set using the definitions below and the Card is required to support for the CFA command set and report that in bit 2 of Word 83. ¶
Bit 15:12 values other than 8h and 0h are prohibited. ¶
Bits 11-8: Retired ¶
These bits have retired ATA bit definitions. It is recommended that the value of these bits be either the preferred value of 0h or the value of 4h that preserves the corresponding bits from the 848Ah CF signature value. ¶
Bit 7: Removable Media Device ¶
If Bit 7 is set to 1, the Card contains media that can be removed during Card operation. ¶
If Bit 7 is set to 0, the Card contains nonremovable media. ¶

Deleted: Default Number of Cylinders

Deleted: This field contains the number of translated cylinders in the default translation mode. This value will be the same as the number of cylinders. ¶

Deleted: Default Number of Heads

Deleted: This field contains the number of translated heads in the default translation mode. ¶

Formatted: Heading 5

Deleted: Default Number of Sectors per Track

Deleted: ¶
This field contains the number of sectors per track in the default translation mode.

Deleted: This double word value is also the first invalid address in LBA translation mode.

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Deleted: ECC Count

Deleted: This field defines the number of ECC bytes used on each sector in the Read and Write Long commands.

1.1.1.1.10 Word 47: Read/Write Multiple Sector Count

Bits 15-8 shall ~~have~~ the value of 80h. Bits 7-0 of this word define the maximum number of sectors per block that the CompactFlash Storage Card supports for Read/Write Multiple commands.

~~Deleted: be~~
~~Deleted: recommended~~
~~Deleted: or the permitted value of 00h~~

1.1.1.1.11 Word 49: Capabilities

Bit 13: Standby Timer

If bit 13 is set to 1 then the Standby timer is supported as defined by the IDLE command

If bit 13 is set to 0 then the Standby timer operation is defined by the vendor.

Bit 11: IORDY Supported

If bit 11 is set to 1 then this CompactFlash Storage Card supports IORDY operation.

If bit 11 is set to 0 then this CompactFlash Storage Card may support IORDY operation.

Bit 10: IORDY may be disabled

Bit 10 shall be set to 0, indicating that IORDY may not be disabled.

Bit 9: LBA supported

Bit 9 shall be set to 1, indicating that this CompactFlash Storage Card supports LBA mode addressing. CF devices shall support LBA addressing.

Bit 8: DMA Supported

~~Bit 8 shall be set to 1 indicating that~~ Read DMA and Write DMA commands are supported.

~~CF devices shall support DMA commands.~~

~~Deleted: If b~~
~~Deleted: is~~
~~Deleted: then~~

1.1.1.1.12 Word 51: ~~Obsolete.~~

~~Deleted: If bit 8 is set to 0, then Read DMA and Write DMA commands are not supported~~

1.1.1.1.13 Word 53: Translation Parameters Valid

~~Bit 0 shall be set to 0 indicating that words 54 to 58 are invalid.~~

If bit 1 of word 53 is set to 1, the values in words 64 through 70 are valid. If this bit is cleared to 0, the values reported in words 64-70 are not valid. Any CompactFlash Storage Card that supports PIO mode 3 or above shall set bit 1 of word 53 to one and support the fields contained in words 64 through 70.

Bit 2 shall be set to 1 indicating that word 88 is valid and reflects the supported True IDE UDMA transfer modes.

~~Deleted: PIO Data Transfer Cycle Timing Mode¶
The PIO transfer timing for each CompactFlash Storage Card falls into modes that have unique parametric timing specifications. The value returned in Bits 15-8 shall be 00h for mode 0, 01h for mode 1, or 02h for mode 2. Values 03h through FFh are reserved~~
~~Deleted: 1~~
~~Deleted: and reflect the current number of cylinders, heads and sectors.~~

1.1.1.1.14 Words 54-56: ~~Obsolete~~

~~Deleted: Current Number of Cylinders, Heads, Sectors/Track~~

1.1.1.1.15 Words 57-58: ~~Obsolete~~

~~Deleted: These fields contains the current number of user addressable Cylinders, Heads, and Sectors/Track in the current translation mode.¶~~

1.1.1.1.16 Word 59: Multiple Sector Setting

Bits 15-9 are reserved and shall be set to 0.

Bit 8 shall be set to 1 indicating that the Multiple Sector Setting is valid.

Bits 7-0 are the current setting for the number of sectors that shall be transferred per interrupt on Read/Write Multiple commands.

~~Deleted: Current Capacity~~
~~Deleted: ¶
This field contains the product of the current cylinders times heads times sectors.~~

1.1.1.1.17 Words 60-61: Total Sectors Addressable in LBA Mode

This field contains the total number of user addressable sectors for the CompactFlash Storage Card.

Deleted: in LBA mode only

1.1.1.1.18 Word 63: Multiword DMA transfer

Bits 15 through 8 of word 63 of the Identify Device parameter information is defined as the Multiword DMA mode selected field. If this field is supported, bit 1 of word 53 shall be set to one. This field is bit significant. Only one of bits may be set to one in this field by the CompactFlash Storage Card to indicate the multiword DMA mode which is currently selected.

Of these bits, bits 15 through 11 are reserved. Bit 8, if set to one, indicates that Multiword DMA mode 0 has been selected. Bit 9, if set to one, indicates that Multiword DMA mode 1 has been selected. Bit 10, if set to one, indicates that Multiword DMA mode 2 has been selected.

Selection of Multiword DMA modes 3 and above, that are specific to CompactFlash, is reported in word 163 as described in section 1.1.1.1.36: Word 163: CF Advanced True IDE Timing Mode Capabilities and Settings.

Bits 7 through 0 of word 63 of the Identify Device parameter information is defined as the Multiword DMA data transfer supported field. If this field is supported, bit 1 of word 53 shall be set to one. This field is bit significant. Any number of bits may be set to one in this field by the CompactFlash Storage Card to indicate the Multiword DMA modes it is capable of supporting.

Of these bits, bits 7 through 2 are reserved. Bit 0, if set to one, indicates that the CompactFlash Storage Card supports Multiword DMA mode 0. Bit 1, if set to one, indicates that the CompactFlash Storage Card supports Multiword DMA modes 1 and 0. Bit 2, if set to one, indicates that the CompactFlash Storage Card supports Multiword DMA modes 2, 1 and 0.

Support for Multiword DMA modes 3 and above, that are specific to CompactFlash, is reported in word 163 as described in section 1.1.1.1.36: Word 163: CF Advanced True IDE Timing Mode Capabilities and Settings.

1.1.1.1.19 Word 64: Advanced PIO transfer modes supported

Bits 7 through 0 of word 64 of the Identify Device parameter information is defined as the advanced PIO data transfer supported field. If this field is supported, bit 1 of word 53 shall be set to one. This field is bit significant. Any number of bits may be set to one in this field by the CompactFlash Storage Card to indicate the advanced PIO modes it is capable of supporting.

Of these bits, bits 7 through 2 are reserved. Bit 0, if set to one, indicates that the CompactFlash Storage Card supports PIO mode 3. Bit 1, if set to one, indicates that the CompactFlash Storage Card supports PIO mode 4.

Support for PIO modes 5 and above are specific to CompactFlash are reported in word 163 as described in section 1.1.1.1.36: Word 163: CF Advanced True IDE Timing Mode Capabilities and Settings.

1.1.1.1.20 Word 65: Minimum Multiword DMA transfer cycle time

Word 65 of the parameter information of the Identify Device command is defined as the minimum Multiword DMA transfer cycle time. This field defines, in nanoseconds, the

minimum cycle time that, if used by the host, the CompactFlash Storage Card guarantees data integrity during the transfer.

If this field is supported, bit 1 of word 53 shall be set to one. The value in word 65 shall not be less than the minimum cycle time for the fastest DMA mode supported by the device. This field shall be supported by all CompactFlash Storage Cards supporting DMA modes 1 and above.

If bit 1 of word 53 is set to one, but this field is not supported, the Card shall return a value of zero in this field.

1.1.1.1.21 Word 66: Recommended Multiword DMA transfer cycle time

Word 66 of the parameter information of the Identify Device command is defined as the recommended Multiword DMA transfer cycle time. This field defines, in nanoseconds, the cycle time that, if used by the host, may optimize the data transfer from by reducing the probability that the CompactFlash Storage Card will need to negate the DMARQ signal during the transfer of a sector.

If this field is supported, bit 1 of word 53 shall be set to one. The value in word 66 shall not be less than the value in word 65. This field shall be supported by all CompactFlash Storage Cards supporting DMA modes 1 and above.

If bit 1 of word 53 is set to one, but this field is not supported, the Card shall return a value of zero in this field.

1.1.1.1.22 Word 67: Minimum PIO transfer cycle time without flow control

Word 67 of the parameter information of the Identify Device command is defined as the minimum PIO transfer without flow control cycle time. This field defines, in nanoseconds, the minimum cycle time that, if used by the host, the CompactFlash Storage Card guarantees data integrity during the transfer without utilization of flow control.

If this field is supported, Bit 1 of word 53 shall be set to one.

Any CompactFlash Storage Card that supports PIO mode 3 or above shall support this field, and the value in word 67 shall not be less than the value reported in word 68.

If bit 1 of word 53 is set to one because a CompactFlash Storage Card supports a field in words 64-70 other than this field and the CompactFlash Storage Card does not support this field, the CompactFlash Storage Card shall return a value of zero in this field.

1.1.1.1.23 Word 68: Minimum PIO transfer cycle time with IORDY

Word 68 of the parameter information of the Identify Device command is defined as the minimum PIO transfer with IORDY flow control cycle time. This field defines, in nanoseconds, the minimum cycle time that the CompactFlash Storage Card supports while performing data transfers while utilizing IORDY flow control.

If this field is supported, Bit 1 of word 53 shall be set to one.

Any CompactFlash Storage Card that supports PIO mode 3 or above shall support this field, and the value in word 68 shall be the fastest defined PIO mode supported by the CompactFlash Storage Card.

If bit 1 of word 53 is set to one because a CompactFlash Storage Card supports a field in words 64-70 other than this field and the CompactFlash Storage Card does not support this field, the CompactFlash Storage Card shall return a value of zero in this field.

1.1.1.1.24 Words 82-84: Features/command sets supported

Words 82, 83, and 84 shall indicate features/command sets supported. The value 0000h or FFFFh was placed in each of these words by CompactFlash Storage Cards prior to ATA-3 and shall be interpreted by the host as meaning that features/command sets supported are not indicated. Bits 1 through 13 of word 83 and bits 0 through 13 of word 84 are reserved. Bit 14 of word 83 and word 84 shall be set to one and bit 15 of word 83 and word 84 shall be cleared to zero to provide indication that the features/command sets supported words are valid. The values in these words should not be depended on by host implementers.

Bit 0 of word 82 shall be ~~cleared~~ to zero; the SMART feature set is not supported.

Deleted: set

If bit 1 of word 82 is set to one, the Security Mode feature set is supported.

Bit 2 of word 82 shall be ~~cleared~~ to zero; the Removable Media feature set is not supported.

Deleted: set

Bit 3 of word 82 shall be set to one; the Power Management feature set is supported.

Bit 4 of word 82 shall be ~~cleared~~ to zero; the Packet Command feature set is not supported.

Deleted: set

If bit 5 of word 82 is set to one, write cache is supported.

If bit 6 of word 82 is set to one, look-ahead is supported.

Bit 7 of word 82 shall be ~~cleared~~ to zero; release interrupt is not supported.

Deleted: set

Bit 8 of word 82 shall be ~~cleared~~ to zero; Service interrupt is not supported.

Deleted: set

Bit 9 of word 82 shall be ~~cleared~~ to zero; the Device Reset command is not supported.

Deleted: set

Bit 10 of word 82 shall be ~~cleared~~ to zero; the Host Protected Area feature set is not supported.

Deleted: set

Bit 11 of word 82 is obsolete.

Bit 12 of word 82 shall be set to one; the CompactFlash Storage Card supports the Write Buffer command.

Bit 13 of word 82 shall be set to one; the CompactFlash Storage Card supports the Read Buffer command.

Bit 14 of word 82 shall be set to one; the CompactFlash Storage Card supports the NOP command.

Bit 15 of word 82 is obsolete.

Bit 0 of word 83 shall be ~~cleared~~ to zero; the CompactFlash Storage Card does not support the Download Microcode command.

Deleted: set

Bit 1 of word 83 shall be cleared to zero; the CompactFlash Storage Card does not support the Read DMA Queued and Write DMA Queued commands.

Deleted: set to zero

Bit 2 of word 83 shall be set to one; the CompactFlash Storage Card supports the CFA feature set.

If bit 3 of word 83 is set to one, the CompactFlash Storage Card supports the Advanced Power Management feature set.

Bit 4 of word 83 shall be cleared to zero; it is obsolete.

Deleted: set

Bit 5 of Word 83 shall be cleared to 0; the Power Up in Standbye feature set is not supported.

Deleted: the CompactFlash Storage Card does not support the Removable Media Status feature set

Bit 6 of Word 83 shall be set to 0; Set Features subcommand requirement to spin-up after power-up is not supported.

Bit 7 of Word 83 shall be cleared to 0

Bit 8 of Word 83 shall be set to 0; the SET MAX security extension is not supported.

Bit 9 of Word 83 shall be set to 0; automatic acoustic management is not supported.

Bit 10 of word 83 shall be set to one, the 48-bit Address Feature is supported.

Bit 11 of Word 83 shall be cleared to 0; the DCO feature set is not supported.

Bit 12 of Word 83 shall be set to 1; the Flush Cache command is supported.

Bit 13 of Word 83 shall be set to 1; the Flush Cache Ext command is supported.

Bit 14 of Word 83 shall be set to 1.

Bit 15 of Word 83 shall be cleared to 0.

Bit 0 of Word 84 shall be cleared to 0; SMART error logging is not supported.

Bit 1 of Word 84 shall be cleared to 0; SMART self-test is not supported.

Bit 2 of Word 84 shall be cleared to 0; Media serial number is not supported.

Bit 3 of Word 84 shall be cleared to 0; Media Card Pass Through feature set not supported.

Bit 4 of Word 84 shall be cleared to 0.

Bit 5 of Word 84 shall be set to 1; General Purpose Logging feature set is supported.

Bits 6-13 of Word 84 shall be cleared to 0.

Bit 14 of Word 84 shall be set to 1.

Bit 15 of Word 84 shall be cleared to 0.

1.1.1.1.25 Words 85-87: Features/command sets enabled

Words 85, 86, and 87 shall indicate features/command sets enabled. The value 0000h or FFFFh was placed in each of these words by CompactFlash Storage Cards prior to CFA specification rev. 2 and shall be interpreted by the host as meaning that features/command sets enabled are not indicated. The values in these words should not be depended on by host implementers.

Deleted: ATA-4

Deleted: Bits 1 through 15 of word 86 are reserved. Bits 0-13 of word 87 are reserved. Bit 14 of word 87 shall be set to one and bit 15 of word 87 shall be cleared to zero to provide indication that the features/command sets enabled words are valid.

Bit 0 of word 85 shall be cleared to zero; the SMART feature set is not enabled.

If bit 1 of word 85 is set to one, the Security Mode feature set has been enabled via the Security Set Password command.

Bit 2 of word 85 shall be cleared to zero; the Removable Media feature set is not supported.

Bit 3 of word 85 shall be set to one; the Power Management feature set is supported.

Bit 4 of word 85 shall be cleared to zero; the Packet Command feature set is not enabled.

If bit 5 of word 85 is set to one, write cache is enabled.

If bit 6 of word 85 is set to one, look-ahead is enabled.

Bit 7 of word 85 shall be cleared to zero; release interrupt is not enabled.

Bit 8 of word 85 shall be cleared to zero; Service interrupt is not enabled.

Bit 9 of word 85 shall be cleared to zero; the Device Reset command is not supported.

Bit 10 of word 85 shall be cleared to zero; the Host Protected Area feature set is not supported.

Bit 11 of word 85 is obsolete.

Bit 12 of word 85 shall be set to one; the CompactFlash Storage Card supports the Write Buffer command.

Bit 13 of word 85 shall be set to one; the CompactFlash Storage Card supports the Read Buffer command.

Bit 14 of word 85 shall be set to one; the CompactFlash Storage Card supports the NOP command.

Bit 15 of word 85 is obsolete.

Bit 0 of word 86 shall be cleared to zero; the CompactFlash Storage Card does not support the Download Microcode command.

Bit 1 of word 86 shall be cleared to zero; the CompactFlash Storage Card does not support the Read DMA Queued and Write DMA Queued commands.

Bit 2 of word 86 shall be set to one; the CompactFlash Storage Card supports the CFA feature set.

If bit 3 of word 86 is set to one, the Advanced Power Management feature set has been enabled via the Set Features command.

Bit 4 of word 86 shall be cleared to zero; the CompactFlash Storage Card does not support the Removable Media Status feature set.

Bits 5-9 of word 86 are reserved.

Bit 10 of word 86 is set to one. The 48-bit Address feature set is supported.

Bits 11-15 of word 86 are reserved.

Bit 0 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support SMART error logging.

Bit 1 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support SMART self-test.

Bit 2 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support the media serial number field in words (205:176).

Bit 3 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support the Media Card Pass Through feature.

Bit 4 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support the Streaming feature set.

Bit 5 of word 87 shall be set to one. The CompactFlash Storage Card supports the General Purpose Logging feature set.

Bit 6 of word 87 shall be set to one. The CompactFlash Storage Card supports the WRITE DMA FUA EXT and WRITE MULTIPLE FUA EXT commands.

Bit 7 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support the WRITE DMA QUEUED FUA EXT command.

Bit 8 of word 87 shall be set to 0. The CompactFlash Storage Card does not support a world wide name.

Bit 9 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support the Streaming feature set.

Bit 10 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support the Streaming feature set.

Bit 11 of word 87 is reserved.

Bit 12 of word 87 is reserved.

Bit 13 of word 87 shall be cleared to 0. The CompactFlash Storage Card does not support IDLE IMMEDIATE with UNLOAD FEATURE.

Bit 14 of word 87 shall be set to one and bit 15 of word 87 shall be cleared to zero to provide indication that the features/command sets enabled words are valid.

1.1.1.1.26 Word 88: True IDE Ultra DMA Modes Supported and Selected

Word 88 identifies the Ultra DMA transfer modes supported by the device and indicates the mode that is currently selected. Only one DMA mode shall be selected at any given time. If an Ultra DMA mode is selected, then no Multiword DMA mode shall be selected. If a Multiword DMA mode is selected, then no Ultra DMA mode shall be selected. Support of this word is mandatory if Ultra DMA is supported. Word 88 shall return a value of 0 if the device is not in True IDE mode or if it does not support UDMA in True IDE Mode.

Bit 15: Reserved

Bit 14: 1 = Ultra DMA mode 6 is selected 0 = Ultra DMA mode 6 is not selected

Bit 13: 1 = Ultra DMA mode 5 is selected 0 = Ultra DMA mode 5 is not selected

Bit 12: 1 = Ultra DMA mode 4 is selected 0 = Ultra DMA mode 4 is not selected

Bit 11: 1 = Ultra DMA mode 3 is selected 0 = Ultra DMA mode 3 is not selected

Bit 10: 1 = Ultra DMA mode 2 is selected 0 = Ultra DMA mode 2 is not selected

Bit 9: 1 = Ultra DMA mode 1 is selected 0 = Ultra DMA mode 1 is not selected

Bit 8: 1 = Ultra DMA mode 0 is selected 0 = Ultra DMA mode 0 is not selected

Bit 7: Reserved

Bit 6: 1 = Ultra DMA mode 6 and below are supported. Bits 0-5 Shall be set to 1.

Bit 5: 1 = Ultra DMA mode 5 and below are supported. Bits 0-4 Shall be set to 1.

Bit 4: 1 = Ultra DMA mode 4 and below are supported. Bits 0-3 Shall be set to 1.

Bit 3: 1 = Ultra DMA mode 3 and below are supported. Bits 0-2 Shall be set to 1.

Bit 2: 1 = Ultra DMA mode 2 and below are supported. Bits 0-1 Shall be set to 1.

Bit 1: 1 = Ultra DMA mode 1 and below are supported. Bit 0 Shall be set to 1.

Bit 0: 1 = Ultra DMA mode 0 is supported

1.1.1.1.27 Word 89: Time required for Security erase unit completion

Word 89 specifies the time required for the Security Erase Unit command to complete. This command shall be supported on CompactFlash Storage Cards that support security.

Value	Time
0	Value not specified
1-254	(Value * 2) minutes
255	>508 minutes

1.1.1.1.28 Word 90: Time required for Enhanced security erase unit completion

Word 90 specifies the time required for the Enhanced Security Erase Unit command to complete. This command shall be supported on CompactFlash Storage Cards that support security.

Value	Time
0	Value not specified
1-254	(Value * 2) minutes
255	>508 minutes

1.1.1.1.29 Word 91: Advanced power management level value

Bits 7-0 of word 91 contain the current Advanced Power Management level setting.

1.1.1.1.30 Words 100-103: Maximum user LBA for 48-bit address feature set

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Words (103-100) contain a value that is one greater than the maximum LBA in user addressable space when the 48-bit Addressing feature set is supported. The maximum value that shall be placed in this field is 0000FFFFFFFFFh. Support of these words is mandatory if the 48-bit Address feature set is supported.

1.1.1.1.31 Word 92: Master Password Revision Code

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Word 92 contains the value of the Master Password Revision Code set when the Master Password was last changed. Valid values are 0001h through FFFh. A value of 0000h or FFFh indicates that the Master Password Revision is not supported. Support of this word is mandatory if the Security feature set is supported.

1.1.1.1.32 Words (103:100): Maximum user LBA for 48-bit Address feature set

Words (103:100) contain a value that is one greater than the maximum LBA in user accessible space when the 48-bit Addressing feature set is supported. The maximum value that shall be placed in this field is 0000FFFFFFFFFh. Support of these words is mandatory if the 48-bit Address feature set is supported.

1.1.1.1.33 Word 128: Security Status

Bit 8: Security Level

If set to 1, indicates that security mode is enabled and the security level is maximum.
If set to 0 and security mode is enabled, indicates that the security level is high.

Bit 5: Enhanced security erase unit feature supported

If set to 1, indicates that the Enhanced security erase unit feature set is supported.

Bit 4: Expire

If set to 1, indicates that the security count has expired and Security Unlock and Security Erase Unit are command aborted until a power-on reset or hard reset.

Bit 3: Freeze

If set to 1, indicates that the security is Frozen.

Bit 2: Lock

If set to 1, indicates that the security is locked.

Bit 1: Enable/Disable

If set to 1, indicates that the security is enabled.
If set to 0, indicates that the security is disabled.

Bit 0: Capability

If set to 1, indicates that CompactFlash Storage Card supports security mode feature set.

If set to 0, indicates that CompactFlash Storage Card does not support security mode feature set.

1.1.1.1.34 Word 160: Power Requirement Description

This word is required for CompactFlash Storage Cards that support power mode 1.

Bit 15: VLD

If set to 1, indicates that this word contains a valid power requirement description.

If set to 0, indicates that this word does not contain a power requirement description.

Bit 14: -PL2

If set to 1, indicates that CompactFlash Storage Card does not have Power Level 2 commands.

If set to 0, indicates that CompactFlash Storage Card supports Power Level 2 commands.

When this bit is set to 0, bit 13 (-XP) shall also be set to 0.

Deleted: Bit 14: RSV¶
This bit is reserved and shall be 0.

Bit 13: -XP

If set to 1, indicates that the CompactFlash Storage Card does not have Power Level 1 commands.

If set to 0, indicates that the CompactFlash Storage Card has Power Level 1 commands

Bit 12: -XE

If set to 1, indicates that Power Level 1 commands are disabled.

If set to 0, indicates that Power Level 1 commands are enabled.

Bit 0-11: Maximum current

This field contains the CompactFlash Storage Card's maximum current in mA.

1.1.1.1.35 Word 162: Key Management Schemes Supported

Bit 0: CPRM support

If set to 1, the device supports CPRM Scheme (Content Protection for Recordable Media)

If set to 0, the device does not support CPRM.

Bits 1-15 are reserved for future additional Key Management schemes.

1.1.1.1.36 Word 163: CF Advanced True IDE Timing Mode Capabilities and Settings

This word describes the capabilities and current settings for CFA defined advanced timing modes using the True IDE interface.

Notice! The use of True IDE PIO Modes 5 and above or of Multiword DMA Modes 3 and above impose significant restrictions on the implementation of the host as indicated in section Error! Reference source not found.: Error! Reference source not found..

There are four separate fields defined that describe support and selection of Advanced PIO timing modes and Advanced Multiword DMA timing modes. The older modes are reported in words 63 and 64 as described in sections 1.1.1.1.18: Word 63: Multiword DMA transfer and 1.1.1.1.19: Word 64: Advanced PIO transfer modes supported.

Bits 2-0: Advanced True IDE PIO Mode Support
Indicates the maximum True IDE PIO mode supported by the card.

Value	Maximum PIO mode timing supported
0	Specified in word 64
1	PIO Mode 5
2	PIO Mode 6
3-7	Reserved

Bits 5-3: Advanced True IDE Multiword DMA Mode Support
Indicates the maximum True IDE Multiword DMA mode supported by the card.

Value	Maximum Multiword DMA timing mode supported
0	Specified in word 63
1	Multiword DMA Mode 3
2	Multiword DMA Mode 4
3-7	Reserved

Bits 8-6: Advanced True IDE PIO Mode Selected
Indicates the current True IDE PIO mode selected on the card.

Value	Current PIO timing mode selected
0	Specified in word 64
1	PIO Mode 5
2	PIO Mode 6
3-7	Reserved

Bits 11-9: Advanced True IDE Multiword DMA Mode Selected
Indicates the current True IDE Multiword DMA Mode Selected on the card.

Value	Current Multiword DMA timing mode selected
0	Specified in word 63
1	Multiword DMA Mode 3
2	Multiword DMA Mode 4
3-7	Reserved

Bits 15-12 are reserved.

1.1.1.1.37 Word 164: CF Advanced PC Card I/O and Memory Timing Modes Capabilities and Settings

This word describes the capabilities and current settings for CFA defined advanced timing modes using the Memory and PC Card I/O interface.

Notice! The use of PC Card I/O or Memory modes that are 100ns or faster impose significant restrictions on the implementation of the host as indicated in section Error! Reference source not found.: Error! Reference source not found..

Bits 2-0: Maximum Advanced PC Card I/O Mode Support
Indicates the maximum I/O timing mode supported by the card.

Value	Maximum PC Card IO timing mode supported
0	255 ns Cycle PC Card I/O Mode
1	120 ns Cycle PC Card I/O Mode
2	100 ns Cycle PC Card I/O Mode
3	80 ns Cycle PC Card I/O Mode
4-7	Reserved

Bits 5-3: Maximum Memory timing mode supported
Indicates the Maximum Memory timing mode supported by the card.

Value	Maximum Memory timing mode Supported
0	250 ns Cycle Memory Mode
1	120 ns Cycle Memory Mode
2	100 ns Cycle Memory Mode
3	80 ns Cycle Memory Mode
4-7	Reserved

Bits 8-6: Maximum PC Card I/O UDMA timing mode supported
Indicates the Maximum PC Card I/O UDMA timing mode supported by the card when bit 15 is set.

Value	Maximum PC Card I/O UDMA timing mode Supported
0	PC Card I/O UDMA mode 0 supported
1	PC Card I/O UDMA mode 1 supported
2	PC Card I/O UDMA mode 2 supported
3	PC Card I/O UDMA mode 3 supported
4	PC Card I/O UDMA mode 4 supported
5	PC Card I/O UDMA mode 5 supported
6	PC Card I/O UDMA mode 6 supported
7	Reserved

Bits 11-9: Maximum PC Card Memory UDMA timing mode supported
Indicates the Maximum PC Card Memory UDMA timing mode supported by the card when bit 15 is set.

Value	Maximum PC Card Memory UDMA timing mode Supported
0	PC Card Memory UDMA mode 0 supported
1	PC Card Memory UDMA mode 1 supported
2	PC Card Memory UDMA mode 2 supported
3	PC Card Memory UDMA mode 3 supported
4	PC Card Memory UDMA mode 4 supported
5	PC Card Memory UDMA mode 5 supported
6	PC Card Memory UDMA mode 6 supported
7	Reserved

Bits 14-12: PC Card Memory or I/O UDMA timing mode selected
Indicates the PC Card Memory or I/O UDMA timing mode selected by the card.

Value	PC Card Memory or I/O UDMA timing mode Selected
0	PC Card I/O UDMA mode 0 selected
1	PC Card I/O UDMA mode 1 selected
2	PC Card I/O UDMA mode 2 selected
3	PC Card I/O UDMA mode 3 selected
4	PC Card I/O UDMA mode 4 selected
5	PC Card I/O UDMA mode 5 selected
6	PC Card I/O UDMA mode 6 selected
7	Reserved

Bit 15: PC Card Memory and IO Modes Supported

This bit, when set, indicates that the PC Card UDMA support values in bits 11-6 are valid. When this bit is cleared, PC Card Memory and IO Modes are not supported by the device.

1.1.1.1.38 Word 165: CF Operating Temperature Range

This word is used for devices that were designed to exceed the standard CompactFlash card temperature range of 0°C to 60°C. The temperature range can be extended only.

Bit 15

If set to 1, indicates that this word contains a valid temperature range description.

If set to 0, indicates that this word does not contain a valid temperature range description.

Bits 7-4

Maximum temperature. 0x0 indicates 60°C. A 4 bit value in this location multiplied by 5°C indicates by how many degrees Celsius the maximum range has been extended. The maximum extension is 0xF, which translates to 15*5=75°C extension beyond 60°C, indicating a maximum temperature of 135°C.

Bits 3-0

Minimum temperature. 0x0 indicates 0°C. A 4 bit value in this location multiplied by -5°C indicates by how many degrees Celsius the minimum range has been extended. The maximum extension is 0xF, which translates to 15*5=75°C extension below 0°C, indicating a minimum temperature of -75°C.

The Card must be the root storage device when a host completely replaces conventional disk storage with a CompactFlash Card in True IDE mode. To support this requirement and provide capability for any future removable media Cards, alternate handling of Word 0 is permitted.

Bits 15-0: CF Preferred Alternate Configuration Values

044Ah: This is the alternate value of Word 0 turns on ATA device and turns off Removable Media and Removable Device while preserving all Retired bits in the word.

0040h: This is the alternate value of Word 0 turns on ATA device and turns off Removable Media and Removable Device while zeroing all Retired bits in the word

Bit 15-12: Configuration Flag

If bits 15:12 are set to 8h then Word 0 shall be 848Ah.

If bits 15:12 are set to 0h then Bits 11:0 are set using the definitions below and the Card is required to support for the CFA command set and report that in bit 2 of Word 83.

Bit 15:12 values other than 8h and 0h are prohibited.

Bits 11-8: Retired

These bits have retired ATA bit definitions. It is recommended that the value of these bits be either the preferred value of 0h or the value of 4h that preserves the corresponding bits from the 848Ah CF signature value.

Bit 7: Removable Media Device

If Bit 7 is set to 1, the Card contains media that can be removed during Card operation.

If Bit 7 is set to 0, the Card contains nonremovable media.

Bit 6: Not Removable Controller and/or Device

Alert! This bit will be considered for obsolescence in a future revision of this standard.

If Bit 6 is set to 1, the Card is intended to be nonremovable during operation.

If Bit 6 is set to 0, the Card is intended to be removable during operation.

Bits 5-0: Retired/Reserved

Alert! Bit 2 will be considered for definition in a future revision of this standard and shall be 0 at this time.

Bits 5-1 have retired ATA bit definitions.

Bit 2 shall be 0.

Bit 0 is Reserved and shall be 0.

It is recommended that the value of bits 5-0 be either the preferred value of 00h or the value of 0Ah that preserves the corresponding bits from the 848Ah CF signature value.