CFast Datasheet

Rev. 1.1

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REVISION HISTORY

Revision	Description	Date
Preliminary	First released	June 2009
Rev 1.0	Update ATA command content	Sep 2009
Rev 1.1	Dual channel performance added	Aug 2010

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1. Product Introduction

1.1 Overview

Unity Digital CFast series supports SATA II standard (3.0Gb/s) interface with good performance and thus performs faster data transfer rate. Sustain read can reach up to 100MB per second (max), and sustain write reach up to 50MB per second (max).

Unity Digital CFast is suitable in industrial field. It effectively reduces the booting time of operation system and the power consumption is less than hard disk drive (HDD). Unity Digital CFast can work under harsh environment. Unity Digital CFast complies with ATA protocol, no additional drives are required, and the SSD can be configured as a boot device or data storage device.

1.2 Product Picture

Figure 1: Unity Digital CFast picture

1.3 Product Features

- Interface: Serial ATA II (3.0Gbps)
- Capacity: 2GB~16GB (SLC)
- Data transfer rate:
  - SLC
    - Quad: Read- 100 MB/sec. (max.), Write- 50MB/sec. (max.)
    - Dual: Read- 50 MB/sec. (max.), Write- 25MB/sec. (max.)

- Compact Design: Build-in VCC Power pin (pin 7)
- Access time: 0.3ms
- Error Correction Function
  - Built-in ECC corrects up to 8-bit per 512-Byte
- Dimension: 42.8x36.4x3.6mm
- Weight: 10g±2g

2. Specifications

2.1 Environmental Specifications

➢ 2.1.1 Temperature Range

- Operating Temperature Range
  - Standard Grade: 0°C to +70°C
  - Industrial Grade: -40°C to +85°C
- Storage Temperature Range
  - Standard / Industrial Grade: -55°C to +95°C

➢ 2.1.2 Humidity

Relative Humidity: 10-95%, non-condensing

➢ 2.1.3 Shock and Vibration

Table 1: Shock/Vibration Testing for Unity Digital CFast

Reliability	Test Conditions
Vibration	7 Hz to 2000 Hz, 20G, 3 axes
Mechanical Shock	Duration: 0.5ms, 1500G, 3 axes

2.2 System Reliability

➢ 2.2.1 ECC Technology

High reliability based on the internal error correct code (ECC) function. Built-in ECC corrects up to 8-bit per 512-Byte.

➢ 2.2.2 Mean Time between Failures (MTBF)

Table 2 summarizes the MTBF prediction results for various Unity Digital CFast configurations. The analysis is performed using a RAM Commander™ failure rate prediction.

- **Failure Rate**: The total number of failures within an item population, divided by the total number of life units expended by that population, during a particular measurement interval under stated condition.
- **Mean Time between Failures (MTBF)**: A basic measure of reliability for repairable items: The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Table 2: Unity DigitalCFast MTBF

Product	Condition	MTBF (Hours)
Unity Digital CFast	Telcordia SR-332 GB, 25°C	> 3,000,000

2.2.3 Transfer Mode

Unity Digital CFast supports the following transfer mode:

- PIO Mode: 0~4
- Multiword DMA: 0~2
- Ultra DMA: 0~6

2.3 Power Requirement

2.3.1 DC Input Voltage

3.3V (±10%) single power supply operation

2.3.2 Power Consumption

Table 3: Unity Digital CFast power consumption

Parameter	***mA***
Sustained Read	110 (max.)
Sustained Write	190 (max.)
IDLE	70 (max.)

2.4 Certificate

- **CE and FCC Compatibility**

  Unity Digital CFast conforms to CE and FCC requirements.

- **RoHS Compliance**

  Unity DigitalCFast is fully compliant with RoHS directive.

3. Theory of operation

3.1 Overview

Figure 2 shows the operation of Unity Digital CFast from the system level, including the major hardware blocks. As the diagram shown, SATA II controller communicates with SATA II host interface directly. Also SATA II controller supports one flash IC.

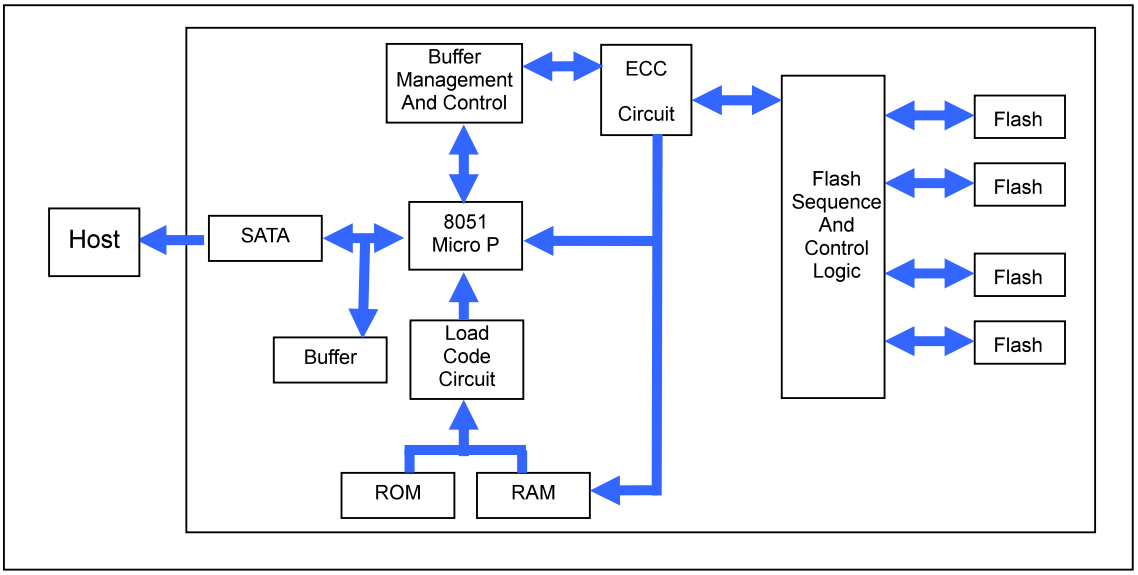

Figure 2: Unity Digital CFast Block Diagram

3.2 SATA II Controller

The SATA II controller is 3.0Gbps, and supports hot-plug. This SATA II controller support four flash IC and communicates with host interface, this SATA II controller can support the flash ICs both for 2kbyte and 4kbyte per page.

3.3 Error Detection and Correction

Highly sophisticated Error Correction Code algorithms are implemented. The ECC unit consists of the Parity Unit (parity-byte generation) and the Syndrome Unit (syndrome-byte computation). This unit implements an algorithm that can correct 8 bits per 512 bytes in an ECC block. Code-byte generation during write operations, as well as error detection during read operation, is implemented on the fly without any speed penalties.

3.4 Wear-Leveling

Flash memory can be erased within a limited number of times. This number is called the ***erase cycle limit*** or ***write endurance limit*** and is defined by the flash array vendor. The erase cycle limit applies to each individual erase block in the flash device.

Unity Digital CFast uses a static wear-leveling algorithm to ensure that consecutive writes of a specific sector are not written physically to the same page and block in the flash. This spreads flash media usage evenly across all pages, thereby extending flash lifetime.

3.5 Bad Blocks Management

Bad Blocks are blocks that contain one or more invalid bits whose reliability are not guaranteed. The Bad Blocks may be presented while the SSD is shipped, or may develop during the life time of the SSD. The Bad Blocks will not exceed more than 6.25% of the total device volume. When the Bad Blocks is detected, it will be flagged, and not be used anymore. The SSD implement Bad Blocks management, Bad Block replacement, Error Correct Code to avoid data error occurred. The functions will be enabled automatically to transfer data from Bad Blocks to spare blocks, and correct error bit.

4. Installation Requirements

4.1 CFast Pin Directions

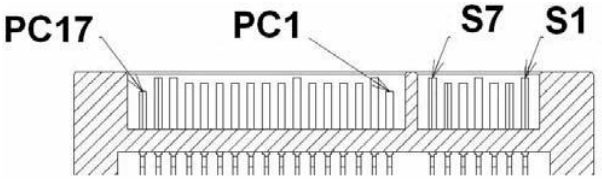

Figure 3: Signal Segment and Power Segment

4.2 Electrical Connections for Unity Digital CFast

A Serial ATA device may be either directly connected to a host or connected to a host through a cable. For connection via cable, the cable should be no longer than 1meter.

The SATA II Interface has a separate connector for the power supply. Please refer to the pin description for further details.

4.3 Device drive

No additional device drivers are required. The Unity Digital CFast can be configured as a boot device.

5. Specifications

5.1 Pin Assignment

Unity Digital CFast is designed within SATA II Interface. Particularly, its built-in power pin enables the device more compactable. Table 4 demonstrates Unity Digital CFast pin assignments.

Table 4: Unity Digital CFast Pin Assignment

Number	Segment	Name	Type	Description	Mate Sequence
S1	SATA	SGND	Signal GND	Ground for signal integrity	1st
S2	SATA	A+	SATA Differential	Signal Pair A	2nd
S3	SATA	A-	SATA Differential		2nd
S4	SATA	SGND	Signal GND	Ground for signal integrity	1st
S5	SATA	B-	SATA Differential	Signal Pair B	2nd
S6	SATA	B+	SATA Differential		2nd
S7	SATA	SGND	Signal GND	Ground for signal integrity	1st
PC1	PWR/CTL	CDI	CMOS Input	Card Detect In	3rd
PC2	PWR/CTL	GND	Device GND		1st
PC3	PWR/CTL	TBD	TBD		2nd
PC4	PWR/CTL	TBD	TBD		2nd
PC5	PWR/CTL	TBD	TBD		2nd
PC6	PWR/CTL	TBD	TBD		2nd
PC7	PWR/CTL	GND	Device GND		1st
PC8	PWR/CTL	LED1	LED Output	LED Output	2nd
PC9	PWR/CTL	LED2	LED Output	LED Output	2nd
PC10	PWR/CTL	IO1	CMOS Input/Output	Reserved Input/Output	2nd
PC11	PWR/CTL	IO2	CMOS	Reserved	2nd

			Input/Output	Input/Output	
PC12	PWR/CTL	IO3	CMOS Input/Output	Reserved Input/Output	2nd
PC13	PWR/CTL	PWR	3.3V	Device Power (3.3V)	2nd
PC14	PWR/CTL	PWR	3.3V	Device Power (3.3V)	2nd
PC15	PWR/CTL	PGND	Device GND	Device Ground	1st
PC16	PWR/CTL	PGND	Device GND	Device Ground	1st
PC17	PWR/CTL	CDO	CMOS Output	Card Detect Out	3rd

5.2 Signal Description

Table 5: Description of SATA Segment Pins

Name	Type	Description
SGND	Signal Ground	These are intended to provide isolation for the high speed differential signals.
A+, A-, B+, B-	SATA Differential	The functionality and electrical characteristics of these pins are defined in the **SATA** reference

Table 6: Description of PWR/CTL Segment Pins

Name	Type	Description
CDI	CMOS Input	This signal is driven by the CFast host, and shall be sampled by the CFast device. This pin shall be shorted on a CFast device to CDO. This signal and CDO provide a mechanism for a CFast host to detect that a CFast device has been fully inserted, and so that power can be applied safely. The host may drive, and the device may sample, this pin to provide signaling to enable CFast Power Management Sleep state.
CDO	CMOS Output	This pin shall be shorted on the CFast device to CDI. It is effectively driven by CDI.
LED1	LED Output	LED Output
LED2	LED Output	LED Output
IO1	CMOS Input/Output	Unassigned Input/Output pin
IO2	CMOS Input/Output	Unassigned Input/Output pin

IO3	CMOS Input/Output	Unassigned Input/Output pin

5.3 Mechanical Dimensions

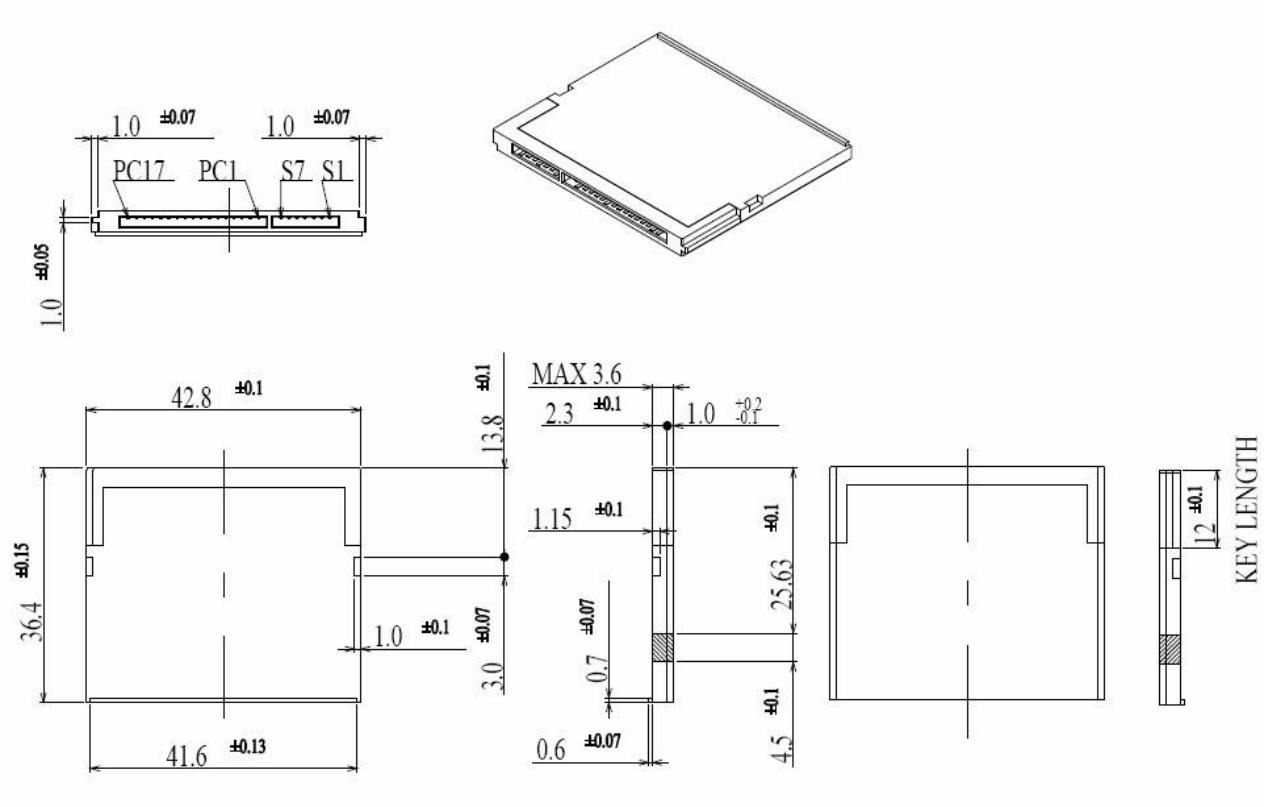

Figure 4: Unity Digital CFast mechanical dimensions

5.4 Performance

A. Burst Speed Rate: 300MB/sec.

B. Data Transfer Rate

SLC:

- Quad:
  - Sustained Read: 100MB/sec (max.)
  - Sustained Write: 50MB/sec (max.)
- Dual:
  - Sustained Read: 50MB/sec (max.)
  - Sustained Write: 25MB/sec (max.)

5.5 Seek Time

Unity Digital CFast is not a magnetic rotating design. There is no seek or rotational latency required.

5.6 NAND Flash Memory

Unity Digital CFast uses Single Level Cell (SLC) NAND and Multi Level Cell (MLC) flash memory, which are non-volatility, high reliability and high speed memory storage. For SLC, there are only two statuses 0 or 1 of one cell. Read or Write data to flash memory for SSD is controlled by micro processor.

5.7 Electrical Specifications

5.7.1 DC Characteristics

Power supply requirement: DC 3.3V± 5%

6. Supported ATA Commands

Unity Digital CFast supports the commands listed in Table 6.

Table 7: Unity Digital CFast ATA Commands

Class	Command	Code	FR	SC	SN	CY	DH	LBA
1	Check Power Mode	98H or E5H	-	-	-	-	D	-
1	Execute Device Diagnostic	90H	-	-	-	-	D	-
1	Erase Sector(s)	C0H	-	Y	Y	Y	Y	Y
2	Format Track	50H	-	Y	-	Y	Y	Y
1	Identify Device	ECH	-	-	-	-	D	-
1	NOP	00H	-	-	-	-	D	-
1	Read Buffer	E4H	-	-	-	-	D	-
1	Read Long Sector	22H or 23H	-	-	Y	Y	Y	Y
1	Read Verify Sector(s)	40H or 41H	-	Y	Y	Y	Y	Y
1	Recalibrate	1XH	-	-	-	-	D	-
1	Seek	7XH	-	-	Y	Y	Y	Y
1	Set Multiple Mode	C6H	-	Y	-	-	D	-
1	Set Sleep Mode	99H or E6H	-	-	-	-	D	-
1	Standby	96H or E2H	-	-	-	-	D	-
1	Standby Immediate	94H or E0H	-	-	-	-	D	-
2	Write Buffer	E8H	-	-	-	-	D	-

Defines:

FR: Feature Register

SC: Sector Count Register

SN: Sector Number Register

CY: Cylinder Registers

DH: Card/Device/Head Register

LBA: LBA Block Address Mode Supported

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6.1 Check power mode – 98H or E5H

Table 8: Check power mode information

Register	7	6	5	4	3	2	1	0
Command(7)	98h or E5h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

This command checks the power mode. If the CompactFlash Storage is in, going to, or recovering from the sleep mode, the CFast sets BSY, sets the Sector Count Register to 00h, clears BSY and generates an interrupt. If the CFast is in idle mode, the CFast sets BSY, sets the Sector Count Register to FFh, clears BSY and generates an interrupt.

6.2 Execute Device Diagnostic – 90H

Table 9: Execute device diagnostic information

Register	7	6	5	4	3	2	1	0
Command(7)	90h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

This command performs the internal diagnostic tests implemented by the CFast. When the diagnostic command is issued in the True IDE Mode, the Drive bit is ignored and the diagnostic command is executed by both the Master and the Slave with the Master responding with status for both devices. The Diagnostic codes are shown in Table 34. Diagnostic Codes are returned in the Error Register at the end of the command.

Table 10: Diagnostic

Code	Error Type
01h	No Error Detected
02h	Formatter Device Error
03h	Sector Buffer Error
04h	ECC Circuitry Error

05h	Controller Microprocessor Error
8Xh	Slave Error in True IDE Mode

6.3 Erase Sector(s) – C0H

Table 11: Erase sector information

Register	7	6	5	4	3	2	1	0
Command(7)	C0h							
C/D/H(6)	1	LBA	1	Drive	Head (LBA 27-24)			
Cylinder High(5)	Cylinder High (LBA 23-16)							
Cylinder Low(4)	Cylinder Low (LBA 15-8)							
Sector Number(3)	Sector Number (LBA 7-0)							
Sector Count(2)	Sector Count							
Feature(1)	X							

This command is used to pre-erase and condition data sectors in advance of a Write without Erase or Write Multiple without Erase command. There is no data transfer associated with this command but a Write Fault error status can occur.

6.4 Format Track – 50H

Table 12: Format track information

Register	7	6	5	4	3	2	1	0
Command(7)	50h							
C/D/H(6)	1	LBA	1	Drive	Head (LBA 27-24)			
Cylinder High(5)	Cylinder High (LBA 23-16)							
Cylinder Low(4)	Cylinder Low (LBA 15-8)							
Sector Number(3)	X (LBA 7-0)							
Sector Count(2)	Count(LBA mode only)							
Feature(1)	X							

This command writes the desired head and cylinder of the selected drive with a vendor unique data pattern (typically FFh or 00h). To remain host backward compatible, the CFast expects a sector buffer of data from the host to follow the command with the same protocol as the Write Sector(s) command although the information in the buffer is not used by the CFast. If LBA=1 then the number of sectors to format is taken from the Sec Cnt register (0=256). The use of this command is not recommended.

6.5 Identify Device – ECH

Table 13: Identify device information

Register	7	6	5	4	3	2	1	0
Command(7)	ECh							
C/D/H(6)	X	X	X	Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

The Identify Device command enables the host to receive parameter information from the CFast. 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 35. All reserved bits or words are zero. Hosts should not depend in Obsolete words in Identify Device containing 0. Table 35 specifies each filed in the data returned by the Identify Device Command. In Table 35, X indicates a numeric nibble vale specific to the card and aaaa indicates an ASCII string specific to the particular drive.

Table 14: IDENTIFY DEVICE information

Word	Description	Value
0	General Configuration Bit 15 0=ATA device Bit 14:8 Retired Bit 7:6 Obsolete Bit 5:3 Retired Bit 2 Response incomplete Bit 1 Retired Bit 0 reserved	045Ah
1	Number of logical cylinders	XXXXh
2	Specific configuration	0000h
3	Number of logical heads	16
4-5	Retired	0000h
6	Number of logical sectors per logical track	63
7-8	Number of sectors per card	XXXXh
9	Retired	0000h
10-19	Serial number in 20 ASCII	aaa
20-21	Retired	0002h 0002h
22	Obsolete	0004h

23-26	Firmware revision in 8 ASCII	aaaa
27-46	Model number in 40 ASCII	aaaa
47	15-8: 80 7-0: 00h Reserved 01h-FFh: Maximum number of sectors that shall be transferred per DRQ data block on READ/WRITE Multiple commands	8002h
48	Trusted Computing feature set options 15 shall be cleared to zero 14 shall be set to one 13:1 Reserved for the Trusted Computing Group 0 0 = Trusted Computing feature set is not supported	0000h
49	Capabilities 15-14: Reserved for the IDENTIFY PACKET DEVICE command. 13: 1=Standby timer values as specified in this standard are supported 0:Standby timer values shall be managed by the device 12: Reserved for the IDENTIFY PACKET DEVICE command 11: 1=IORDY supported 0=IORDY may be disabled 10 1: IORDY may be disabled 9 1=LBA supported 8 1=DMA supported. 7-0 Retired	0F00h
50	Capabilities 15: Shell be cleared to zero 14: Shall be set to one 13:2 Reserved 1 Obsolete 0 0	0000h
51	PIO data transfer cycle timing mode	0200h
52	Obsolete	0000h
53	15 Free-fall control Sensitivity 00h: Vendor's recommended setting 7:3 Reserved 2: 1=the fields reported in word 88 are valid 1: 1=the fields reported in words (70:64) are valid 0: Obsolete	0007h

54	Number of current logical cylinders	XXXXh
55	Number of current logical heads	XXXXh
56	Number of current logical sectors per logical track	XXXXh
57-58	Current capacity in sectors	XXXXh
59	15:9 Reserved 8 0:Multiple sector setting is invalid 7:0 Current setting for number of logical sectors that shall be transferred per DRQ data block on READ/WRITE Multi commands	0102h
60-61	Total number of user address sectors(DWord)	XXXXXXXXh
62	Obsolete	0000h
63	Multi-word DMA transfer(Not support)	0007h
64	15-8 Reserved 7-0 PIO modes supported	0003h
65	Minimum Multiword DMA transfer cycle time per word 15-0 Cycle time in nanoseconds	0078h
66	Manufacturer's recommended Multiword DMA transfer cycle time per word 15-0 Cycle time in nanoseconds	0078h
67	Minimum PIO transfer cycle time without flow control 15-0 Cycle time in nanoseconds	0078h
68	Minimum PIO transfer cycle time with IORDY flow control 15-0 Cycle time in nanoseconds	0078h
69-74	Reserved	0000h
75	No DMA QUEUED command supports	0000h
76	Serial ATA Capabilities 15:11 Reserved for Serial ATA 10 1= Supports Phy Event Counters 9 1= Supports receipt of host initiated power management Requests 8 0= No Support native Command Queuing 7:3 Reserved for future SATA signaling speed grades 2 1=Supports SATA Gen2 Signaling Speed (3.0Gb/s) 1 1=Support SATA Gen1 Signaling Speed (1.5Gb/s) 0 Shall be cleared to zero	0000h
77	Reserved for Serial ATA	0000h
78	Serial ATA features supported 15:7 Reserved for Serial ATA	0000h

	6 0=Device not supports Software Settings Preservation 5 Reserved for Serial ATA 4 0= Device not supports in-order data delivery 3 0= Device not supports initiating power management 2 0= Device not supports DMA Setup auto-activation 1 0= Device not supports non-zero buffer offsets 0 Shall be cleared to zero	
79	Serial ATA feature enabled 15:7 Reserved for Serial ATA 6 0=Software Settings Preservation not enabled 5 0=Reserved for Serial ATA 4 0= In-order data delivery not enabled 3 0= Device initiated power management not enabled 2 0= DMA setup auto-activation not enabled 1 0= Non-zero buffer offsets not enabled 0 Shall be cleared to zero	0000h
80-81	ATA Version support (ATA8-ACS)	0020 0000h
82	Command and feature sets supported 15 0 = Obsolete 14 0 = NOP Command not supported 13 0 = READ BUFFER Command not supported 12 0 = WRITE BUFFER Command not supported 11 0 = Obsolete 10 0 = Host Protected Area Feature Set not supported 9 0 = DEVICE RESET Command not supported 8 0 = SERVICE Interrupt not supported 7 0 = RELEASE Interrupt not supported 6 1 = Look-ahead supported 5 1 = Write Cache supported 4 0 = indicate that the PACKET feature set is not supported 3 1 = mandatory Power Management Feature Set supported 2 0 = Obsolete 1 0 = Security Mode Feature Set not supported 0 1 = SMART Feature Set supported	700Ah
83	Command and feature sets supported 15 Shall be cleared to zero 14 Shall be set to one 13 0 = FLUSH CACHE EXT Command not supported	5004h

	12 1 = mandatory FLUSH CACHE Command supported 11 0 = Device Configuration Overlay feature set not supported 10 0 = 48-Bit Address feature set not supported 9 0 = Automatic Acoustic Management feature set not supported 8 0 = SET MAX security extension not supported 7 0 = See Address Offset Reserved Area Boot, INCITS TR27:2001 6 0 = SET FEATURES subcommand not required to spin-up after power-up 5 0 = Power-Up in Standby feature set supported 4 0 = Removable Media Status Notification feature set not supported 3 0 = Advanced Power Management feature set not supported 2 0 = CFA feature set not supported 1 0 = READ/WRITE DMA QUEUED not supported 0 1 = DOWNLOAD MICROCODE Command supported	
84	Command Set/Feature Supported Extension 15 Shall be cleared to zero 14 Shall be set to one 13-6 Reserved 5 0 = General Purpose Logging feature set not supported 4 reserved 3 0 = Media Card Pass Through Command feature set not supported 2 0 = Media Serial Number not supported 1 0 = SMART self-test not supported 0 1 = SMART Error Logging not supported	4000h
85	Command and feature sets supported or enabled 15 0 = Obsolete 14 0 = NOP Command not enabled 13 0 = READ BUFFER Command not enabled 12 0 = WRITE BUFFER Command not enabled 11 Obsolete 10 0 = Host Protected Area feature set not enabled 9 0 = DEVICE RESET Command not enabled 8 0 = SERVICE Interrupt not enabled	7008

	7 0 = RELEASE Interrupt not enabled 6 0 = Look-ahead not enabled 5 0 = Write Cache not enabled 4 Shall be cleared to zero to indicate that the PACKET Command feature set is not supported. 3 1 = Power Management Feature Set enabled 2 0 = Removable Media feature set not enabled 1 0 = Security Mode Feature Set not enabled 0 0 = SMART Feature Set not enabled	
86	Command set/feature enabled 15-14 0 = Reserved 13 0 = FLUSH CACHE EXT Command not supported 12 1 = FLUSH CACHE Command supported 11 0 = Device Configuration Overlay not supported 10 0 = 48-Bit Address features set not supported 9 0 = Automatic Acoustic Management feature set not enabled 8 0 = SET MAX security extension not enabled by SET MAX SETPASSWORD 7 0 = Reserved 6 0 = SET FEATURES subcommand required to spin-up after power-up not enabled 5 0 = Power-Up in Standby feature set not enabled 4 0 = Obsolete 3 1 = Advanced Power Management feature set enabled 2 0 = CFA feature set not supported 1 0 = READ/WRITE DMA QUEUED Command not supported 0 1 = DOWNLOAD MICROCODE Command supported	1004h
87	Command and feature sets supported or enabled 15 Shall be cleared to zero 14 Shall be set to one 13 1 = IDLE IMMEDIATE with UNLOAD FEATURE supported 12 0 = Reserved for Technical Report, INCITS TR-37-2004 11 0 = Reserved for Technical Report, INCITS TR-37-2004 10:9 0 = Obsolete 8 0 = 64-Bit World Wide Name not supported 7 0 = WRITE DMA QUEUED FUA EXT Command not supported 6 0 = WRITE DMA FUA EXT and WRITE MULTIPLE FUA EXT	4000h

	commands not supported 5 0 = General Purpose Logging feature set not supported 4 0 = Obsolete 3 0 = Media Card Pass Through Command feature set not supported 2 0 = Media Serial Number is not valid 1 0 = SMART Self-Test not supported 0 0 = SMART Error-Logging not supported	
88	Ultra DMA modes 15 Reserved 14 0 = Ultra DMA mode 6 is not supported 13 1= Ultra DMA mode 5 is selected 0= Ultra DMA mode 5 is not selected 12 1= Ultra DMA mode 4 is selected 0= Ultra DMA mode 4 is not selected 11 1= Ultra DMA mode 3 is selected 0= Ultra DMA mode 3 is not selected 10 1= Ultra DMA mode 2 is selected 0= Ultra DMA mode 2 is not selected 9 1= Ultra DMA mode 1 is selected 0= Ultra DMA mode 1 is not selected 8 1= Ultra DMA mode 0 is selected 0= Ultra DMA mode 0 is not selected 7 Reserved 6 0= Ultra DMA mode 6 is not supported 5 1= Ultra DMA mode 5 and below are supported 4 1= Ultra DMA mode 4 and below are supported 3 1= Ultra DMA mode 3 and below are supported 2 1= Ultra DMA mode 2 and below are supported 1 1= Ultra DMA mode 1 and below are supported 0 1= Ultra DMA mode 0 is supported	X01Fh
89	Time required for Normal Erase mode SECURITY ERASE UNIT command	0000h
90	Time required for Enhanced erase mode SECURITY ERASE UNIT command	0000h
91	Current advanced power management level value	0000h
92	Master Password Identifier	0000h
93	Hardware reset result	XXXXh

94	Current automatic acoustic management value 15:8 Vendor's recommended acoustic management value. 7:0 Current automatic acoustic management value.	0000h
95-126	Reserved	0000h
127	Obsolete	0000h
128	Security Status 15:9 Reserved 8 Security level 0 = high, 1 = Maximum 7:6 Reserved 5 1= Enhanced security erase supported 4 1= Security count expired 3 0= Security frozen. 2 0 = Security not locked 1 0= Security not enabled 0 0= Security not supported	0000h
129-159	Vendor specific	0000h
160	CFA power mode 1	0000h
161-175	Reserved	0000h
176-205	Current media serial number	0000h
206-254	Reserved	0000h
255	Integrity word 15:8 Check Sum 7:0 Signature	XXXXh

6.6 NOP – 00H

Table 15: NOP information

Register	7	6	5	4	3	2	1	0
Command(7)	00h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

This command always fails with the CFast returning command aborted.

6.7 Read Buffer - E4H

Table 16: Read buffer information

Register	7	6	5	4	3	2	1	0
Command(7)	E4h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

The Read Buffer command enables the host to read the current contents of the CFast's sector buffer. This command has the same protocol as the Read Sector(s) command.

6.8 Read Long Sector - 22H or 23H

Table 17: Read long sector information

Register	7	6	5	4	3	2	1	0
Command(7)	22h or 23h							
C/D/H(6)	1	LBA	1	Drive	Head (LBA 27-24)			
Cylinder High(5)	Cylinder High (LBA 23-16)							
Cylinder Low(4)	Cylinder Low (LBA 15-8)							
Sector Number(3)	Sector Number (LBA 7-0)							
Sector Count(2)	X							
Feature(1)	X							

The Read Long command performs similarly to the Read Sector(s) command except that is returns 516 bytes of data instead of 512 bytes. During a Read Long command, the CFast does not check the ECC bytes to determine if there consists of 512 bytes of data transferred in word mode followed by 4 bytes of ECC data transferred in byte mode. This command has the same protocol as the Read Sector(s) command. Use of this command is not recommended.

6.9 Read Sector(s) - 20H or 21H

Table 18: Read sector information

Register	7	6	5	4	3	2	1	0
Command(7)	20h or 21h							
C/D/H(6)	1	LBA	1	Drive	Head (LBA 27-24)			
Cylinder High(5)	Cylinder High (LBA 23-16)							
Cylinder Low(4)	Cylinder Low (LBA 15-8)							

Sector Number(3)	Sector Number (LBA 7-0)
Sector Count(2)	Sector Count
Feature(1)	X

This command reads from 1 to 256 sectors as specified in the Sector Count Register. A sector count of 0 requests 256 sectors. The transfer begins at the sector specified in the Sector Number Register. When this command is issued and after each sector of data (except the last one) has buffer, sets DRQ, cleats BSY, and generates an interrupt. The host then reads the 512 bytes of data from the buffer.

At command completion, the Command Block Registers contain the cylinder, head and sector number of the last sector read. If an error occurs, the read terminates at the sector where the error occurred. The command Block Registers contain the cylinder head, and sector number of the sector 2where the error occurred. The flawed data is pending in the sector buffer.

6.10 Read Verify Sector(s) - 40H or 41H

Table 19: Read verify sector information

Register	7	6	5	4	3	2	1	0
Command(7)	40h or 41h							
C/D/H(6)	1	LBA	1	Drive	Head (LBA 27-24)			
Cylinder High(5)	Cylinder High (LBA 23-16)							
Cylinder Low(4)	Cylinder Low (LBA 15-8)							
Sector Number(3)	Sector Number (LBA 7-0)							
Sector Count(2)	Sector Count							
Feature(1)	X							

This command is identical to the Read Sectors command, except that DRQ is never set and no data is transferred to the host. When the command is accepted, the CFast sets BSY. When the requested sectors have been verified, the CFast clears BSY and generates an interrupt. Upon command completion, the Command Block Registers contain the cylinder, head, and sector number of the last sector verified. If an error occurs, the Read Verify Command terminates at the sector where the error occurs. The Command Block Registers contain the cylinder, head and sector number of the sector where the error occurred. The Sector Count Register contains the number of sectors not yet verified.

6.11 Recalibrate - 1XH

Table 20: Recalibrate information

Register	7	6	5	4	3	2	1	0
Command(7)	1Xh							
C/D/H(6)	1	LBA	1	Drive	X			
Cylinder High(5)	X							

Cylinder Low(4)	X
Sector Number(3)	X
Sector Count(2)	X
Feature(1)	X

This command is effectively a NOP command to the CFast and is provided for compatibility.

6.12 Seek - 7XH

Table 21: Seek information

Register	7	6	5	4	3	2	1	0
Command(7)	7Xh							
C/D/H(6)	1	LBA	1	Drive	Head (LBA 27-24)			
Cylinder High(5)	Cylinder High (LBA 23-16)							
Cylinder Low(4)	Cylinder Low (LBA 15-8)							
Sector Number(3)	X (LBA 7-0)							
Sector Count(2)	X							
Feature(1)	X							

This command is effectively a NOP command to the CFast although it does perform a range check of cylinder and head or LBA address and returns an error if the address is out of range.

6.13 Set Multiple Mode - C6H

Table 22: Set multiple mode information

Register	7	6	5	4	3	2	1	0
Command(7)	C6h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	Sector Count							
Feature(1)	X							

This command enables the CFast to perform Read and Write Multiple operations and establishes the block count for these commands. The Sector Count Register is loaded with the number of sectors per block. Upon receipt of the command, the CFast sets BSY to 1 and checks the Sector Count Register. If the Sector Count Register contains a valid value and the block count is supported, the value is loaded and execution is enabled for all subsequent Read Multiple and Write Multiple commands. If the Sector Count Register contains 0 when the command is issued, Read and Write Multiple commands are disabled. At power on, or after a hardware or (unless disabled by a Set Feature command) software reset, the default mode is Read and Write multiple disabled.

6.14 Set Sleep Mode - 99H or E6H

Table 23: Set sleep mode information

Register	7	6	5	4	3	2	1	0
Command(7)	99h or E6h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

This command causes the CFast to set BSY, enter the Sleep mode, clear BSY and generate an interrupt. Recovery from sleep mode is accomplished by simply issuing another command (a reset is permitted but not required). Sleep mode is also entered when internal timers expire so the host does not need to issue this command except when it wishes to enter Sleep mode immediately. The default value for the timer is 5 milliseconds.

6.15 Standby - 96H or E2H

Table 24: Standby information

Register	7	6	5	4	3	2	1	0
Command(7)	96h or E2h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

This command causes the CFast to set BSY, enter the Sleep mode, cleat BSY and return interrupt immediately. Recovery from sleep mode is accomplished by simply issuing another command (a reset is not required).

6.16 Standby Immediate - 94H or E0H

Table 25: Standby immediate information

Register	7	6	5	4	3	2	1	0
Command(7)	94h or E0h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							

Sector Number(3)	X
Sector Count(2)	X
Feature(1)	X

This command causes the CFast to set BSY, enter the Sleep mode, clear BSY and return the interrupt immediately. Recovery from sleep mode is accomplished by simply issuing another command (a reset is not required).

6.17 Write Buffer - E8H

Table 26: Write buffer information

Register	7	6	5	4	3	2	1	0
Command(7)	E8h							
C/D/H(6)	X			Drive	X			
Cylinder High(5)	X							
Cylinder Low(4)	X							
Sector Number(3)	X							
Sector Count(2)	X							
Feature(1)	X							

The Write Buffer command enables the host to overwrite contents of the CFast's sector buffer with any data pattern desired. This command has the same protocol as the Write Sector(s) command and transfer 512 bytes.

6.18 Security

6.18.1 Security Set Password

6.18.1.1 Command Code

F1h

6.18.1.2 Feature Set

Security Mode feature set

6.18.1.3 Protocol

PIO data-out

6.18.1.4 Inputs

Table 27: Security set password command for inputs information

Register	7	6	5	4	3	2	1	0
Features	Na							
Sector Count	Na							

LBA Low	Na				
LBA Mid	Na				
LBA High	Na				
Device	obs	Na	obs	Na	Na
Command	F1h				

Device –

DEV shall specify the selected device.

Normal Outputs

Table 28: Security set password command for normal outputs information

Register	7	6	5	4	3	2	1	0
Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) will be set to zero.

DRQ will be cleared to zero

ERR will be set to zero.

6.18.1.5 Error Outputs

Table 29: Security set password command for error outputs information

Register	7	6	5	4	3	2	1	0
Error	Na	Na	Na	Na	Na	ABRT	Na	Na
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Error Register

ABRT may be set to one if the device is not able to complete the action requested by the command

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) should be set to one if a device fault has occurred.

DRQ will be cleared to zero

ERR will be set to one if an Error register bit is set to one.

6.18.1.6 Prerequisites

DRDY set to one.

6.18.1.7 Description

This command transfer 512 byte of data from the host. Table 10 defines the content of this information. The data transferred controls the function of this command. Table 11 defines the interaction of the identifier and security level bits.

The revision code field shall be returned in the IDENTIFY DEVICE word 92. The valid revision codes are 0001h through FFFEh. A value of 0000h or FFFFh indicates that the Master Password Revision Code is not supported.

Table 30: Security set password command's data content

Word	Content
0	Control Word Bit 0 Identifier 0=set User password 1=set Master password Bits (7:1) Reserved Bit(8) Security level 0=High 1=Maximum Bits(15:9) Reserved
1-16	Password(32 bytes)
17	Master Password Revision Code()
18-255	Reserved

Table 31: Security Set password command's identifier and security level bit interaction

Identifier	Level	Command result
User	High	The password supplied with the command shall be saved as the new User password. The Lock mode shall be enabled from the

		next power-on or hardware reset. The device shall than be unlocked by either the User password it the previously set Master password.
User	Maximum	The password supplied with the command shall be saved as the new User password. The lock mode shall be enabled from the next power-on or hardware reset. The device shall then be unlocked by only the User password. The Master password previously set is still stored in the device but shall not be unlock
Master	High or Maximum	This combination shall set a Master password but shall not enable or disable the Lock mode. The security level is not changed. Master password revision code set to the value in Master Password Revision Code field.

6.18.2 Security Unlock

6.18.2.3 Command Code

F2h

6.18.2.4 Feature Set

Security Mode feature set

6.18.2.5 Protocol

PIO data-out

6.18.2.6 Inputs

Table 32: Security unlock command for inputs information

Register	7	6	5	4	3	2	1	0
Features	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	Na	Na			
Command	F2h							

Device register–

DEV shall specify the selected device.

Normal Outputs

Table 33: Security unlock command for inputs information

Register	7	6	5	4	3	2	1	0
Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) will be set to zero.

DRQ will be cleared to zero

ERR will be set to zero.

6.18.2.7 Error Outputs

The device shall return aborted if the device is in Frozen mode.

Table 34: Security unlock command for inputs information

Register	7	6	5	4	3	2	1	0
Error	Na	Na	Na	Na	Na	ABRT	Na	Na
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Error Register

ABRT may be set to one if the device is not able to complete the action requested by the command

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) should be set to one if a device fault has occurred.

DRQ will be cleared to zero

ERR will be set to one if an Error register bit is set to one.

6.18.2.8 Prerequisites

DRDY set to one.

6.18.2.9 Description

This command transfers 512 bytes of data from the host. Table13 defines the content of this information. If the Identifier bit is set to Master and the device is in high security level, then the password supplied shall be compared with the stored Master password. If the device is in maximum security level then the unlock shall be rejected.

If the Identifier bit is set to user then the device shall compare the supplied password with the stored User password. If the password compare fails then the device shall return command aborted to the host and decrements the unlock counter. This counter shall be initially set to five and shall decremented for each password mismatch when SECURITY UNLOCK and SECURITY ERASE UNIT commands shall be command aborted until a power-on reset or a hardware reset. SECURITY UNLOCK commands issued when the device is unlocked have no effect on the unlock counter.

6.18.3 Security Erase Prepare

6.18.3.3 Command Code

F3h

6.18.3.4 Feature Set

Security Mode feature set

6.18.3.5 Protocol

Non-data

6.18.3.6 Inputs

Table 35: Security erase prepare command for inputs information

Register	7	6	5	4	3	2	1	0
Features	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	Na	Na			
Command	F3h							

Device register–

DEV shall specify the selected device.

Normal Outputs

Table 36: Security erase prepare command for normal outputs information

Register	7	6	5	4	3	2	1	0
Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na	Na	Na	Na
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) will be set to zero.

DRQ will be cleared to zero

ERR will be set to zero.

6.18.3.7 Error Outputs

The device shall return aborted if the device is in Frozen mode.

Table 37: Security erase prepare command for error outputs information

Register	7	6	5	4	3	2	1	0
Error	Na	Na	Na	Na	Na	ABRT	Na	Na
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Error Register

ABRT shall be set to one if the device is in Frozen mode. ABRT may be set to one if the device is not able to complete the action requested by the command

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) should be set to one if a device fault has occurred.

DRQ will be cleared to zero

ERR will be set to one if an Error register bit is set to one.

6.18.3.8 Prerequisites

DRDY set to one.

6.18.3.9 Description

The SECURITY ERASE PREPARE command shall be issued immediately before the SECURITY ERASE UNIT command to enable device erasing and unlocking. This command prevents accidental loss of data on the device.

6.18.4 Security Erase Unit

6.18.4.3 Command Code

F4h

6.18.4.4 Feature Set

Security Mode feature set

6.18.4.5 Protocol

PIO data-out.

6.18.4.6 Inputs

Table 38: Security erase unit command for inputs information

Register	7	6	5	4	3	2	1	0
Features	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	Na	Na	Na	Na	Na
Command	F4h							

Device register–

DEV shall specify the selected device.

Normal Outputs

Table 39: Security erase unit command for normal outputs information

Register	7	6	5	4	3	2	1	0
Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na	Na	Na	Na
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Device register

DEV shall indicate the selected device.

Status register

BSY shall be cleared to zero indicating command completion

DRDY shall be set to one.

DF (Device Fault) will be set to zero.

DRQ shall be cleared to zero

ERR shall be cleared to zero.

6.18.4.7 Error Outputs

The device shall return aborted if the device is in Frozen mode, not preceded by a SECURITY ERASE PREPARE command, if Enhance Erase is specified but not supported, or if the data area is not successfully overwritten.

Table 40: Security erase unit command for error outputs information

Register	7	6	5	4	3	2	1	0
Error	Na	Na	Na	Na	Na	ABRT	Na	Na
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Error Register

ABRT shall be set to one if the device is in Frozen mode, not preceded by a SECURITY ERASE PREPARE command, or if the data area is not successfully overwritten. ABRT may be set to one if the device is not able to complete the action requested by the command.

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) should be set to one if a device fault has occurred.

DRQ will be cleared to zero

ERR will be set to one if an Error register bit is set to one.

6.18.4.8 Prerequisites

DRDY set to one. This command shall be immediately preceded by a SECURITY ERASE PREPARE command.

6.18.4.9 Description

This command transfer 512 bytes of data from the host. Table12 defines the content of this information. If the password does not match the password previously saved by the device, the device shall reject the command with command aborted.

The SECURITY ERASE PREPARE command shall be completed immediately prior to the SECURITY ERASE UNIT command. If the device receives a SECURITY ERASE UNIT command without an immediately prior SECURITY ERASE PREPARE command, the device shall command abort the SECURITY ERASE UNIT command.

When Normal Erase mode is specified, the SECURITY ERASE UNIT command shall write binary zeroes to all user data areas. The Enhanced Erase mode is optional. When Enhanced Erase Mode is specified, the device shall write predetermined data patterns to all user areas. In Enhanced Erase mode, all previously written user data shall be overwritten, including sectors that are no longer in use due to reallocation.

This command shall disable the device Lock mode, however, the Master password shall still be stored internally within the device and may be reactivated later a new User password is set.

Table 41: Security erase unit password information

Word	Content
0	Control Word Bit 0 Identifier 0=Compare User password 1= Compare Master password Bit 1 Erase mode 0=Normal Erase 1=Enhanced Erase Bit(15:2) Reserved
1-16	Password (32 Bytes)
17-255	Reserved

6.18.5 Security Freeze Lock

6.18.5.3 Command Code

F5h

6.18.5.4 Feature Set

Security Mode feature set

6.18.5.5 Protocol

Non-data.

6.18.5.6 Inputs

Table 42: Security freeze lock for inputs information

Register	7	6	5	4	3	2	1	0
Features	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	Obs	Na	obs	Na	Na	Na	Na	Na
Command	F5h							

Device register–

DEV shall specify the selected device.

Normal Outputs

Table 43: Security freeze lock for normal outputs information

Register	7	6	5	4	3	2	1	0
Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	Obs	Na	obs	DEV	Na	Na	Na	Na
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Device register

DEV shall indicate the selected device.

Status register

BSY shall be cleared to zero indicating command completion

DRDY shall be set to one.

DF (Device Fault) will be set to zero.

DRQ shall be cleared to zero

ERR shall be cleared to zero.

6.18.5.7 Error Outputs

The device shall return aborted if the device is in Frozen mode, not preceded by a SECURITY ERASE PREPARE command, if Enhance Erase is specified but not supported, or if the data area is not successfully overwritten.

Table 44: Security freeze lock for error outputs information

Register	7	6	5	4	3	2	1	0
Error	Na	Na	Na	Na	Na	ABRT	Na	Na
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	Obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Error Register

ABRT shall be set to one if the device is in locked mode. ABRT may be set to one if the device is not able to complete the action requested by the command.

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) should be set to one if a device fault has occurred.

DRQ will be cleared to zero

ERR will be set to one if an Error register bit is set to one.

6.18.5.8 Prerequisites

DRDY set to one.

6.18.5.9 Description

The SECURITY FREEZE LOCK command shall set the device to Frozen mode. After command completion any other commands that update the device Lock mode shall be command aborted. Frozen mode shall be disabled by power-off or hardware reset. If SECURITY FREEZE LOCK shall be issued when the device in Frozen mode, the command executes and the device shall remain in Frozen mode.

Command disabled by SECURITY FREEZE LOCK are:

- SECUIRTY SET PASSWORD
- SECURITY UNLOCK
- SECURITY DISABLE PASSWORD
- SECURITY ERASE PREPARE
- SECURITY ERASE UNIT

6.18.6 Security Disable Password

6.18.6.3 Command Code

F6h

6.18.6.4 Feature Set

Security Mode feature set

6.18.6.5 Protocol

PIO data-out.

6.18.6.6 Inputs

Table 45: Security disable password command for inputs information

Register	7	6	5	4	3	2	1	0
Features	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	Na	Na	Na	Na	Na
Command	F6h							

Device register–

DEV shall specify the selected device.

Normal Outputs

Table 46: Security disable password command for normal outputs information

Register	7	6	5	4	3	2	1	0
Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na	Na	Na	Na
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Device register

DEV shall indicate the selected device.

Status register

BSY shall be cleared to zero indicating command completion

DRDY shall be set to one.

DF (Device Fault) will be set to zero.

DRQ shall be cleared to zero

ERR shall be cleared to zero.

6.18.6.7 Error Outputs

The device shall return aborted if the device is in Locked mode, or device is in Frozen mode.

Table 47: Security disable password command for error outputs information

Register	7	6	5	4	3	2	1	0
Error	Na	Na	Na	Na	Na	ABRT	Na	Na
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	Na	obs	DEV	Na			
Status	BSY	DRDY	DF	Na	DRQ	Na	Na	ERR

Error Register

ABRT may be set to one if the device is not able to complete the action requested by the command.

Device register

DEV shall indicate the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) should be set to one if a device fault has occurred.

DRQ will be cleared to zero

ERR will be set to one if an Error register bit is set to one.

6.18.6.8 Prerequisites

DRDY set to one. Device shall be in Unlocked mode.

6.18.6.9 Description

The SECURITY DISABLE PASSWORD command transfer 512 bytes of data from the host. Table 13 defines the content of this information. If the password selected by word 0 matches the password previously saved by the device, the device shall disable the Lock mode. This command shall not change the Master password. The Master

password shall be reactivated when a User password if set.

Table 48: Security disable password command content

Word	Content
0	Control Word Bit 0 Identifier 0=Compare User password 1= Compare Master password Bit(15:1) Reserved
1-16	Password (32 Bytes)
17-255	Reserved

7. Device Parameters

Unity Digital CFast device parameters listed in Table 48.

Table 49: Unity Digital CFast Device parameters

Capacity	Cylinders	Heads	Sectors	LBA
512MB	975	16	63	983,040
1GB	1950	16	63	1,966,080
2GB	3900	16	63	3,932,160
4GB	7801	16	63	7,864,320
8GB	15,603	16	63	15,728,640
16GB	16,383	16	63	31,457,280

ORDERING INFORMATION:

PART NUMBER	DESCRIPTION
UCFST002GBSFMP	2GB SLC CFast Fixed
UCFST004GBSFMP	4GB SLC CFast Fixed
UCFST008GBSFMP	8GB SLC CFast Fixed
UCFST016GBSFMP	16GB SLC CFast Fixed
UCFST032GBSFMP	32GB SLC CFast Fixed
UCFST064GBSFMP	64GB SLC CFast Fixed
UCFST002GBSRMP	2GB SLC CFast Removable
UCFST004GBSRMP	4GB SLC CFast Removable
UCFST008GBSRMP	8GB SLC CFast Removable
UCFST016GBSRMP	16GB SLC CFast Removable
UCFST032GBSRMP	32GB SLC CFast Removable
UCFST064GBSRMP	64GB SLC CFast Removable