

***RoHS Compliant***

***Value Added CompactFlash Series 5***

***Specification for Industrial CompactFlash Card***

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**Version 1.3**



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## Features:

- **CompactFlash Association Specification Revision 4.1 Standard Interface**
  - 512 bytes per sector
  - ATA command set compatible
  - ATA transfer mode supports:
    - PIO Mode 6
    - Multiword DMA Mode 4
    - Ultra DMA Mode 5
    - PCMCIA UDMA Mode 5
- **Capacities**
  - Standard:
    - 128, 256, 512 MB
    - 1, 2, 4 GB
  - High Speed:
    - 256, 512 MB
    - 1, 2, 4, 8, 16, 32, 64 GB
- **Standard read/write performance**
  - Sustained read: Up to 29 MB/sec
  - Sustained write: Up to 20 MB/sec
- **High-speed read/write performance**
  - Sustained read: Up to 50 MB/sec
  - Sustained Write: Up to 26 MB/sec
- **Intelligent ATA/IDE module**
  - Embedded Flash File System (FFS)
  - Wear-leveling algorithms to substantially increase longevity of flash media
  - Built-in BCH ECC capable of correcting up to 24 bits in 1,024 byte data
  - Supports S.M.A.R.T commands
- **NAND Flash Type: SLC**
- **Power Management Unit**
  - Immediate disabling of unused circuitry without host intervention
  - Zero wake-up latency
- **Power Smart Design**
  - Automatic sleep and wake-up mechanism to save power
  - Built-in 1.8V Power-On-Reset
  - Built-in 2.6V Voltage detector for power fail protection
  - Supports on-chip and external voltage regulator
- **Temperature ranges**
  - 0°C to 70°C for operation (Standard)
  - -40°C to 85°C for operation (ET\*)
  - -40°C to 100°C for storage
- **Operating voltage for read and write**
  - 3.3 V
  - 5.0 V
- **Power consumption (typical)\*\***
  - Active mode: 180 mA
  - Sleep mode: 6 mA
- **Connector Type**
  - 50 pins female
- **Write Protect by Hardware Switch**
  - Write protect activated/deactivated by a mechanical switch
- **Physical Dimensions**
  - 36.4mm x 42.8mm x 3.3mm
- **RoHS compliant**

\*Extended Temperature

\*\*Power consumption may vary depending on capacities and the flash configuration.

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## 1. General Description

Apacer's value-added Industrial CompactFlash Card offers high performance, high reliability and power-efficient storage. Regarding standard compliance, this CompactFlash Card complies with CompactFlash specification revision 4.1, supporting transfer modes up to Programmed Input Output (PIO) Mode 6, Multi-word Direct Memory Access (DMA) Mode 4, Ultra DMA Mode 5, and PCMCIA Ultra DMA Mode 5.

For power efficiency, this industrial CompactFlash card supports some power smart design mechanisms such as Power-On-Reset, voltage regulator for output voltage adjustments and power failure protection, as well as the automatic sleep and wake-up feature. In terms of security, it comes with a hardware write protect switch.

In terms of data integrity and accuracy, the CompactFlash card is built with on-chip hardware 13/24 bit BCH ECC engine that can correct up to 24-bit errors per 1,024 byte data. The 13-bit is used for 2KB page size with 16 bytes spare region per 512 byte data, while the 24-bit ECC is used for flash with 218 or more bytes, accompanied with 4KB data. The controller of this CompactFlash card is designed to transfer the host data through fast DMA engine and utilize the internal memory buffer in a sufficient way, which greatly minimizes the internal microprocessor's loading and improves performance efficiency.

Apacer's value-added CFC provides complete PCMCIA - ATA functionality and compatibility. Apacer's CompactFlash technology is designed for applications in Point of Sale (POS) terminals, telecom, IP-STB, medical instruments, surveillance systems, industrial PCs and handheld applications such as the new generation of Digital Single Lens Reflex (DSLR) cameras.

### 1.1 Performance-Optimized Controller

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The CompactFlash Card Controller translates standard CF signals into flash media data and control signals.

#### 1.1.1 Power Management Unit (PMU)

The power management unit (PMU) controls the power consumption of the CompactFlash card controller. It reduces the power consumption of the CompactFlash Card Controller by putting circuitry not in operation into sleep mode. The PMU has zero wake-up latency.

Regarding power protection, this product is engineered with intelligent power failure management mechanism. For more, please refer to section 6.2.

#### 1.1.2 SRAM Buffer

The CompactFlash Card Controller performs as an SRAM buffer to optimize the host's data transfer to and from the flash media.

#### 1.1.3 Embedded Flash File System

The embedded Flash File System (FFS) is an integral part of the CompactFlash controller. It contains the MCU firmware to perform the following tasks:

1. Translate host side signals into flash media writes and reads
2. Provide dynamic data flash media wear leveling to spread the flash writes across all unused memory address space to increase the longevity of flash media
3. Keep track of data file structures

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### **1.1.4 Error Correction Code (ECC)**

The CompactFlash card is programmed with BCH Error Detection Code (EDC) and Error Correction Code (ECC) algorithms capable of correcting up to 24 random bits in 1,024 bytes data. This built-in hardware ECC performs parity generation and error detection/correction.

### **1.2 Power Smart Design**

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The CompactFlash card controller adopts a Power-On-Reset circuit that provides a reset signal for core logic after power on. The built-in 5V/3.3V and 3.3V/1.8V voltage regulators supply voltage for flash memory and the core logic for the controller. An accurate internal oscillators runs the system clock and the frequency can be programmed to fit different NAND flash timings. There is a flexibility design implemented for using external voltage regulator and external voltage detector for power fail detection. For general statistical information about the Power-On-Reset, oscillators and voltage detectors, please see section 7.1.1.

## 2. Functional Block

The CompactFlash Card (CFC) includes a controller and flash media, as well as the CompactFlash standard interface. Figure 2-1 shows the functional block diagram.

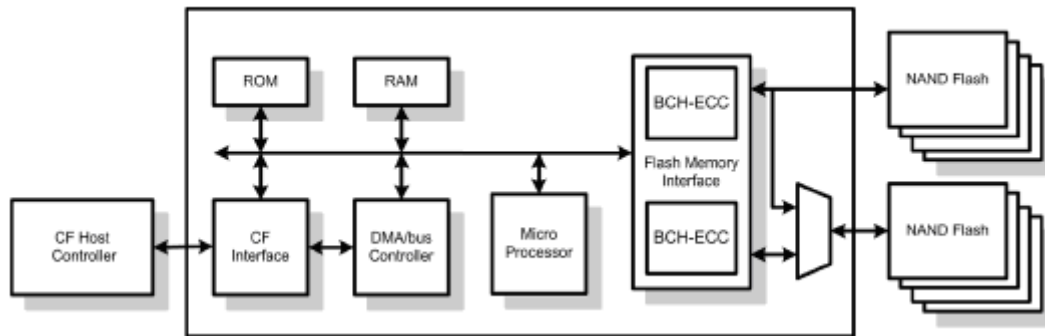


Figure 2-1: Functional block diagram

### 3. Pin Assignments

Table 3-1 lists the pin assignments with respective signal names for the 50-pin configuration. A “#” suffix indicates the active low signal. The pin type can be input, output or input/output.

**Table 3-1:** Pin assignments (1 of 2)

Pin No.	Memory card mode		I/O card mode		True IDE mode	
	Signal name	Pin I/O type	Signal name	Pin I/O type	Signal name	Pin I/O type
1	GND	-	GND	-	GND	-
2	D3	I/O	D3	I/O	D3	I/O
3	D4	I/O	D4	I/O	D4	I/O
4	D5	I/O	D5	I/O	D5	I/O
5	D6	I/O	D6	I/O	D6	I/O
6	D7	I/O	D7	I/O	D7	I/O
7	#CE1	I	#CE1	I	#CS0	I
8	A10	I	A10	I	A10 <sup>1</sup>	I
9	#OE	I	#OE	I	#ATA SEL	I
10	A9	I	A9	I	A9 <sup>1</sup>	I
11	A8	I	A8	I	A8 <sup>1</sup>	I
12	A7	I	A7	I	A7 <sup>1</sup>	I
13	VCC	-	VCC	-	VCC	-
14	A6	I	A6	I	A6 <sup>1</sup>	I
15	A5	I	A5	I	A5 <sup>1</sup>	I
16	A4	I	A4	I	A4 <sup>1</sup>	I
17	A3	I	A3	I	A3 <sup>1</sup>	I
18	A2	I	A2	I	A2	I
19	A1	I	A1	I	A1	I
20	A0	I	A0	I	A0	I
21	D0	I/O	D0	I/O	D0	I/O
22	D1	I/O	D1	I/O	D1	I/O
23	D2	I/O	D2	I/O	D2	I/O
24	WP	O	#IOIS16	O	#IOCS16	O
25	#CD2	O	#CD2	O	#CD2	O
26	#CD1	O	#CD1	O	#CD1	O
27	D11	I/O	D11	I/O	D11	I/O
28	D12	I/O	D12	I/O	D12	I/O
29	D13	I/O	D13	I/O	D13	I/O
30	D14	I/O	D14	I/O	D14	I/O
31	D15	I/O	D15	I/O	D15	I/O
32	#CE2	I	#CE2	I	#CS1	I
33	#VS1	O	#VS1	O	#VS1	O
34	#IORD	I	#IORD	I	#IORD	I
35	#IOWR	I	#IOWR	I	#IOWR	I
36	#WE	I	#WE	I	#WE	I
37	RDY/-BSY	O	#IREQ	O	INTRQ	O
38	VCC	-	VCC	-	VCC	-
39	#CSEL	I	#CSEL	I	#CSEL	I
40	#VS2	O	#VS2	O	#VS2	O
41	RESET	I	RESET	I	#RESET	I

# Compact Flash 5 series

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**Table 3-1:** Pin assignments (2 of 2)

Pin No.	Memory card mode		I/O card mode		True IDE mode	
	Signal name	Pin I/O type	Signal name	Pin I/O type	Signal name	Pin I/O type
42	#WAIT	O	#WAIT	O	IORDY	O
43	#INPACK	O	#INPACK	O	DMARQ <sup>2</sup>	O
44	#REG	I	#REG	I	DMACK <sup>2</sup>	I
45	BVD2	O	#SPKR	O	#DASP	I/O
46	BVD1	O	#STSCHG	O	#PDIAG	I/O
47	D8	I/O	D8	I/O	D8	I/O
48	D9	I/O	D9	I/O	D9	I/O
49	D10	I/O	D10	I/O	D10	I/O
50	GND	-	GND	-	GND	-

1. The signal should be grounded by the host.
2. Connection required when UDMA is in use.



## 4. Capacity Specification

Capacity specification of the Compact Flash Card series (CFC) is available as shown in Table 4-1. It lists the specific capacity and the default numbers of heads, sectors and cylinders for each product line.

**Table 4-1: Capacity specifications**

Capacity	Total bytes <sup>1</sup>	Cylinders	Heads	Sectors	Max LBA
128 MB	128,450,560	980	8	32	250,880
256 MB	256,901,120	980	16	32	501,760
512 MB	512,483,328	993	16	63	1,000,944
1GB	1,024,966,656	1,986	16	63	2,001,888
2GB	2,048,901,120	3,970	16	63	4,001,760
4GB	4,110,188,544	7,964	16	63	8,027,712
8GB	8,195,604,480	15,880	16	63	16,007,040
16GB	16,391,340,032	16,383 <sup>2</sup>	16	63	32,014,336
32GB	32,019,316,736	16,383	16	63	62,537,728
64GB	64,030,244,864	16,383	16	63	125,059,072

1. Display of total bytes varies from operating systems.

2. Cylinders, heads or sectors are not applicable for these capacities. Only LBA addressing applies

### 4.1 Performance Specification

Performances of the Standard and High Speed ATA-Flash Disk are listed in Table 4-2 and Table 4-3.

**Table 4-2: Standard Performance specifications**

Capacity	128 MB	256 MB	512 MB	1 GB	2 GB	4 GB
<b>Performance</b>						
<b>Sustained read (MB/s)</b>	21	21	25	25	25	29
<b>Sustained write (MB/s)</b>	6	5	10	9	19	20

**Table 4-3: High Speed Performance specifications (256MB to 4GB)**

Capacity	256 MB	512 MB	1GB	2 GB	4 GB
<b>Performance</b>					
<b>Sustained read (MB/s)</b>	42	41	48	48	48
<b>Sustained write (MB/s)</b>	11	11	19	19	30

**Table 4-4:** High Speed Performance specifications (8GB to 64GB)

Capacity \ Performance	8 GB	16 GB	32 GB	64 GB
Sustained read (MB/s)	48	50	50	50
Sustained write (MB/s)	30	26	26	26

Notes: performance may vary depending on flash configurations.

## 4.2 Environmental Specifications

Environmental specification of the Compact Flash Card series (CFC) which follows the MIL-STD-810F standards is available as shown in Table 4-4.

**Table 4-4:** Environmental specifications

Environment		Specification
Temperature	Operation	0°C to 70°C (standard); -40°C to 85°C (Extended Temperature)
	Storage	-40°C to 100°C
Humidity		5% to 95% RH (Non-condensing)
Vibration (Non-Operation)		Sine wave: 10~2000Hz, 15G (X, Y, Z axes)
Shock (Non-Operation)		Half sine wave, Peak acceleration 50 G, 11 ms (X, Y, Z ; All 6 axes)

## 5. Software Interface

### 5.1 CF-ATA Command Set

Table 5-1 summarizes the CF-ATA command set with the paragraphs that follow describing the individual commands and the task file for each.

**Table 5-1:** CFC-ATA command set

Command	Code	FR <sup>1</sup>	SC <sup>2</sup>	SN <sup>3</sup>	CY <sup>4</sup>	DH <sup>5</sup>	LBA <sup>6</sup>
Check-Power-Mode	E5H or 98H	—	—	—	—	D <sup>8</sup>	—
Execute-Drive-Diagnostic	90H	—	—	—	—	D	—
Erase-Sector(s)	C0H	—	Y <sup>7</sup>	Y	Y	Y <sup>8</sup>	Y
Flush-Cache	E7H	—	—	—	—	D	—
Format-Track	50H	—	Y	—	Y	Y	Y
Identify-Drive	ECH	—	—	—	—	D	—
Idle	E3H or 97H	—	Y	—	—	D	—
Idle-Immediate	E1H or 95H	—	—	—	—	D	—
Initialize-Drive-Parameters	91H	—	Y	—	—	Y	—
NOP	00H	—	—	—	—	D	—
Read-Buffer	E4H	—	—	—	—	D	—
Read-Multiple	C4H	—	Y	Y	Y	Y	Y
Read-Sector(s)	20H or 21H	—	Y	Y	Y	Y	Y
Read-Verify-Sector(s)	40H or 41H	—	Y	Y	Y	Y	Y
Recalibrate	1XH	—	—	—	—	D	—
Request-Sense	03H	—	—	—	—	D	—
Seek	7XH	—	—	Y	Y	Y	Y
Set-Features	EFH	Y	—	—	—	D	—
Set-Multiple-mode	C6H	-	Y	-	-	D	-
Set-Sleep-Mode	E6H or 99H	—	—	—	—	D	—
Standby	E2H or 96H	—	—	—	—	D	—
Standby-Immediate	E0H or 94H	—	—	—	—	D	—
Translate-Sector	87H	—	Y	Y	Y	Y	Y
Write-Buffer	E8H	—	—	—	—	D	—
Write-Multiple	C5H	—	Y <sup>7</sup>	Y	Y	Y	Y
Write-Multiple-Without-Erase	CDH	—	Y	Y	Y	Y	Y
Write-Sector(s)	30H or 31H	—	Y	Y	Y	Y	Y
Write-Sector(s)-Without-Erase	38H	—	Y	Y	Y	Y	Y

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Write-Verify	3CH	–	Y	Y	Y	Y	Y
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1. FR - Features register
2. SC - Sector Count register
3. SN - Sector Number register
4. CY - Cylinder registers
5. DH - Drive/Head register
6. LBA - Logical Block Address mode supported
7. Y - The register contains a valid parameter for this command
8. For the Drive/Head register:
  - Y means both the CompactFlash card and head parameters are used;
  - D means only the CompactFlash card parameter is valid and not the head parameter

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## **6. Flash Management**

### **6.1 Intelligent Endurance Design**

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#### **6.1.1 Advanced wear-leveling algorithms**

The NAND flash devices are limited by a certain number of write cycles. When using a file system, frequent file table updates is mandatory. If some area on the flash wears out faster than others, it would significantly reduce the lifetime of the whole device, even if the erase counts of others are far from the write cycle limit. Thus, if the write cycles can be distributed evenly across the media, the lifetime of the media can be prolonged significantly. The scheme is achieved both via buffer management and Apacer-specific advanced wear leveling to ensure that the lifetime of the flash media can be increased, and the disk access performance is optimized as well.

#### **6.1.2 S.M.A.R.T. Technology**

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure. Apacer SMART feature adopts the standard SMART command B0h to read data from the drive. When the Apacer SMART Utility running on the host, it analyzes and reports the disk status to the host before the device is in critical condition.

#### **6.1.3 Built-in Hardware ECC**

The ECC bit encoding takes places when host/OS writes data to the SSD. This step is simpler and quick. On the other hand, the ECC bit decoding is processed when host/OS reads data from the SSD. In this step, the ECC codes will be in progress for detecting, comparing and detecting potential error. Thus, the power of the ECC lies mostly in the read data side.

This ATA CompactFlash card employs BCH Error Correction Code (ECC) algorithms. This on-chip hardware BCH-ECC engines is 13/24 bit programmed that can correct up to 24-bit errors per 1,024 byte data. This built-in hardware ECC performs parity generation and error detection/correction for data integrity.

#### **6.1.4 Enhanced Data Integrity**

The properties of NAND flash memory make it ideal for applications that require high integrity while operating in challenging environments. The integrity of data to NAND flash memory is generally maintained through ECC algorithms and bad block management. Flash controllers can support ECC capability for accuracy of data transactions, and bad block management is a preventive mechanism from loss of data by retiring unusable media blocks and relocating the data to the other blocks, along with the integration of advanced wear leveling algorithms, so that the lifespan of device can be expanded.

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## **6.2 Intelligent Power Failure Recovery**

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The Low Power Detection on the controller initiates cached data saving before the power supply to the device is too low. In other words, if the supplied voltage is below a certain percentage of the specific voltage, this mechanism will flush all the data in the cache into storage area of the flash memory to keep from data incompleteness. This feature ensures data integrity during an unexpected blackout or a sudden crash on the device. In general, power failure recovery management is jointly by the hardware and the firmware mechanisms. Hardware wise, the controller is accompanied by a detector IC component that can provide signals to the controller when the power supply is running at a voltage below the specifically required for operation. Then the firmware will communicate the controller to trigger the process of writing data into the storage area of flash. This will prevent data incompleteness from sudden blackout or power disruptions. However, if the power is totally cut before cached data is written back into flash, the data will lost. Thus, the crucial part lies in the strength of the capacitor of the SSD. The capacitor must be able to hold up some milliseconds of remaining time for the urgent write-back-into-flash operations to complete.

## 7. Electrical Specification

**Caution: Absolute Maximum Stress Ratings** – Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.

**Table 7-1:** Operating range

Range	Ambient Temperature	3.3V	5V
Standard	0°C to +70°C	3.135-3.465V	4.75-5.25V
Extended Temperature	-40°C to +85°C		

**Table 7-2:** Absolute maximum power pin stress ratings

Parameter	Symbol	Conditions
Input Power	V <sub>DD</sub>	-0.3V min. to 6.5V max.
Voltage on any pin except V <sub>DD</sub> with respect to GND	V	-0.5V min. to V <sub>DD</sub> + 0.5V max.

**Table 7-3:** Recommended system power-up timing

Symbol	Parameter	Typical	Maximum	Units
T <sub>PU-READY</sub> <sup>1</sup>	Power-up to Ready Operation	200	1000	ms
T <sub>PU-WRITE</sub> <sup>1</sup>	Power-up to Write Operation	200	1000	ms

1. This parameter is measured only for initial qualification and after a design or process change that could affect this parameter.

## 8. Physical Characteristics

### 8.1 Dimensions

TABLE 8-1: Type I CFC physical specification

Length:	36.40 +/- 0.15mm (1.433+/- 0.06 in.)
Width:	42.80 +/- 0.10mm (1.685+/- 0.04 in.)
Thickness (Including Label Area):	3.3mm+/-0.10mm (0.130+/-0.04in.)

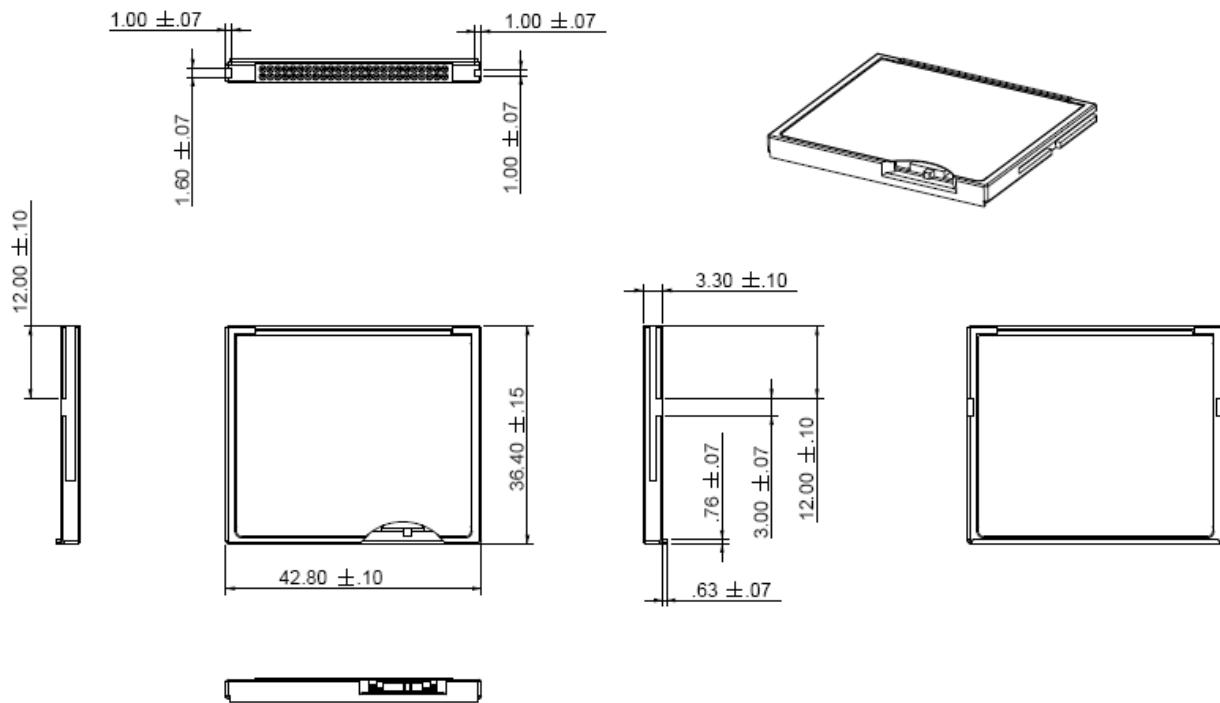


FIGURE 8-1: Physical dimension

Unit: mm

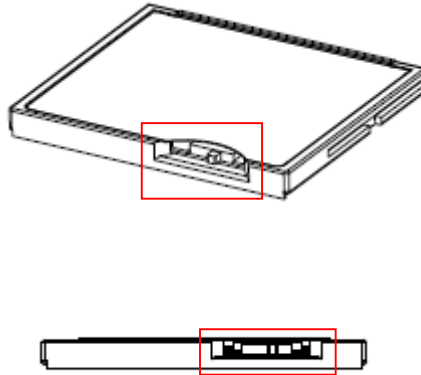


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## 8.2 Write Protect by Hardware Switch

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This industrial CompactFlash comes with write protect function enabled by a hardware mechanical switch. Users can activate/deactivate the write protection with it. Please refer to the illustration below for locating the switch.



## 9. Product Ordering Information

### 9.1 Product Code Designations

**A P - C F x x x x K 7 X S - X X X X X X**

**Specification**  
 RM: Removable  
 NR: Non-Removable  
 ET: Extended Temperature  
 NDRM: Non-DMA + Removable  
 NDNR: Non-DMA + Non-Removable  
 ETRM: Ext. Temp. + Removable  
 ETNR: Ext. Temp. + Non-Removable  
 ETNDRM: Ext. Temp + Non-DMA + Removable  
 ETNDNR: Ext. Temp + Non-DMA + Non-Removable

**Halogen Free Compliant**

**Configuration**  
 E : Single Channel  
 F : Dual Channel

**CTL Type**

**CFC Type**

**Capacities:**

128M	128MB
256M	256MB
512M	512MB
001G:	1GB
002G	2GB
004G:	4GB
008G	8GB
016G	16GB
032G	32GB
064G	64GB

**Model Name**

**Apacer Product Code**

## 9.2 Valid Combinations

### 9.2.1 Standard Temperature

#### 9.2.1.1 Non-Removable

##### Standard

<i>Capacity</i>	<i>AP/N</i>
128MB	AP-CF128MK7ES-NR
256MB	AP-CF256MK7ES-NR
512MB	AP-CF512MK7ES-NR
1GB	AP-CF001GK7ES-NR
2GB	AP-CF002GK7ES-NR
4GB	AP-CF004GK7ES-NR

##### High Speed

<i>Capacity</i>	<i>AP/N</i>
256MB	AP-CF256MK7FS-NR
512MB	AP-CF512MK7FS-NR
1GB	AP-CF001GK7FS-NR
2GB	AP-CF002GK7FS-NR
4GB	AP-CF004GK7FS-NR
8GB	AP-CF008GK7FS-NR
16GB	AP-CF016GK7FS-NR
32GB	AP-CF032GK7FS-NR
64GB	AP-CF064GK7FS-NR

#### 9.2.1.2 Removable

##### Standard

<i>Capacity</i>	<i>AP/N</i>
128MB	AP-CF128MK7ES-RM
256MB	AP-CF256MK7ES-RM
512MB	AP-CF512MK7ES-RM
1GB	AP-CF001GK7ES-RM
2GB	AP-CF002GK7ES-RM
4GB	AP-CF004GK7ES-RM

##### High Speed

<i>Capacity</i>	<i>AP/N</i>
256MB	AP-CF256MK7FS-RM
512MB	AP-CF512MK7FS-RM
1GB	AP-CF001GK7FS-RM
2GB	AP-CF002GK7FS-RM
4GB	AP-CF004GK7FS-RM
8GB	AP-CF008GK7FS-RM
16GB	AP-CF016GK7FS-RM
32GB	AP-CF032GK7FS-RM
64GB	AP-CF064GK7FS-RM

**Note:** Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

**9.2.1.3 Non-DMA + Removable**

**Standard**

<i>Capacity</i>	<i>AP/N</i>
128MB	AP-CF128MK7ES-NDRM
256MB	AP-CF256MK7ES-NDRM
512MB	AP-CF512MK7ES-NDRM
1GB	AP-CF001GK7ES-NDRM
2GB	AP-CF002GK7ES-NDRM
4GB	AP-CF004GK7ES-NDRM

**High Speed**

<i>Capacity</i>	<i>AP/N</i>
256MB	AP-CF256MK7FS-NDRM
512MB	AP-CF512MK7FS-NDRM
1GB	AP-CF001GK7FS-NDRM
2GB	AP-CF002GK7FS-NDRM
4GB	AP-CF004GK7FS-NDRM
8GB	AP-CF008GK7FS-NDRM
16GB	AP-CF016GK7FS-NDRM
32GB	AP-CF032GK7FS-NDRM
64GB	AP-CF064GK7FS-NDRM

**9.2.1.4 Non-DMA + Non-Removable**

**Standard**

<i>Capacity</i>	<i>AP/N</i>
128MB	AP-CF128MK7ES-NDNR
256MB	AP-CF256MK7ES-NDNR
512MB	AP-CF512MK7ES-NDNR
1GB	AP-CF001GK7ES-NDNR
2GB	AP-CF002GK7ES-NDNR
4GB	AP-CF004GK7ES-NDNR

**High Speed**

<i>Capacity</i>	<i>AP/N</i>
256MB	AP-CF256MK7FS-NDNR
512MB	AP-CF512MK7FS-NDNR
1GB	AP-CF001GK7FS-NDNR
2GB	AP-CF002GK7FS-NDNR
4GB	AP-CF004GK7FS-NDNR
8GB	AP-CF008GK7FS-NDNR
16GB	AP-CF016GK7FS-NDNR
32GB	AP-CF032GK7FS-NDNR
64GB	AP-CF064GK7FS-NDNR

**Note:** Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

## 9.2.2 Extended Temperature

### 9.2.2.1 Ext. Temp. + Non-Removable

#### Standard

<b>Capacity</b>	<b>AP/N</b>
128MB	AP-CF128MK7ES-ETNR
256MB	AP-CF256MK7ES-ETNR
512MB	AP-CF512MK7ES-ETNR
1GB	AP-CF001GK7ES-ETNR
2GB	AP-CF002GK7ES-ETNR
4GB	AP-CF004GK7ES-ETNR

#### High Speed

<b>Capacity</b>	<b>AP/N</b>
256MB	AP-CF256MK7FS-ETNR
512MB	AP-CF512MK7FS-ETNR
1GB	AP-CF001GK7FS-ETNR
2GB	AP-CF002GK7FS-ETNR
4GB	AP-CF004GK7FS-ETNR
8GB	AP-CF008GK7FS-ETNR
16GB	AP-CF016GK7FS-ETNR
32GB	AP-CF032GK7FS-ETNR
64GB	AP-CF064GK7FS-ETNR

### 9.2.2.2 Ext. Temp. + Removable

#### Standard

<b>Capacity</b>	<b>AP/N</b>
128MB	AP-CF128MK7ES-ETRM
256MB	AP-CF256MK7ES-ETRM
512MB	AP-CF512MK7ES-ETRM
1GB	AP-CF001GK7ES-ETRM
2GB	AP-CF002GK7ES-ETRM
4GB	AP-CF004GK7ES-ETRM

#### High Speed

<b>Capacity</b>	<b>AP/N</b>
256MB	AP-CF256MK7FS-ETRM
512MB	AP-CF512MK7FS-ETRM
1GB	AP-CF001GK7FS-ETRM
2GB	AP-CF002GK7FS-ETRM
4GB	AP-CF004GK7FS-ETRM
8GB	AP-CF008GK7FS-ETRM
16GB	AP-CF016GK7FS-ETRM
32GB	AP-CF032GK7FS-ETRM
64GB	AP-CF064GK7FS-ETRM

**Note:** Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

**9.2.2.3 Non-DMA + Removable**

**Standard**

<i>Capacity</i>	<i>AP/N</i>
128MB	AP-CF128MK7ES-ETNDRM
256MB	AP-CF256MK7ES-ETNDRM
512MB	AP-CF512MK7ES-ETNDRM
1GB	AP-CF001GK7ES-ETNDRM
2GB	AP-CF002GK7ES-ETNDRM
4GB	AP-CF004GK7ES-ETNDRM

**High Speed**

<i>Capacity</i>	<i>AP/N</i>
256MB	AP-CF256MK7FS-ETNDRM
512MB	AP-CF512MK7FS-ETNDRM
1GB	AP-CF001GK7FS-ETNDRM
2GB	AP-CF002GK7FS-ETNDRM
4GB	AP-CF004GK7FS-ETNDRM
8GB	AP-CF008GK7FS-ETNDRM
16GB	AP-CF016GK7FS-ETNDRM
32GB	AP-CF032GK7FS-ETNDRM
64GB	AP-CF064GK7FS-ETNDRM

**9.2.2.4 Non-DMA + Non-Removable**

**Standard**

<i>Capacity</i>	<i>AP/N</i>
128MB	AP-CF128MK7ES-ETNDNR
256MB	AP-CF256MK7ES-ETNDNR
512MB	AP-CF512MK7ES-ETNDNR
1GB	AP-CF001GK7ES-ETNDNR
2GB	AP-CF002GK7ES-ETNDNR
4GB	AP-CF004GK7ES-ETNDNR

**High Speed**

<i>Capacity</i>	<i>AP/N</i>
256MB	AP-CF256MK7FS-ETNDNR
512MB	AP-CF512MK7FS-ETNDNR
1GB	AP-CF001GK7FS-ETNDNR
2GB	AP-CF002GK7FS-ETNDNR
4GB	AP-CF004GK7FS-ETNDNR
8GB	AP-CF008GK7FS-ETNDNR
16GB	AP-CF016GK7FS-ETNDNR
32GB	AP-CF032GK7FS-ETNDNR
64GB	AP-CF064GK7FS-ETNDNR

**Note:** Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

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## Revision History

Revision	Date	Description	Remark
0.1	08/17/2011	Preliminary	
1.0	09/27/2011	Official release	
1.1	11/15/2011	Added Flash Management features	
1.2	02/15/2016	Updated PCMCIA UDMA mode due to hardware changes	
1.3	04/02/2012	Added 32 GB & 64 GB specifications	

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