

ShenZhen Renice Technology Co., Ltd

# H1 Plus Compact Flash Card

Datasheet



V1.0

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# CATALOGUE

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# 1. Introduction

## 1.1 Product Overview

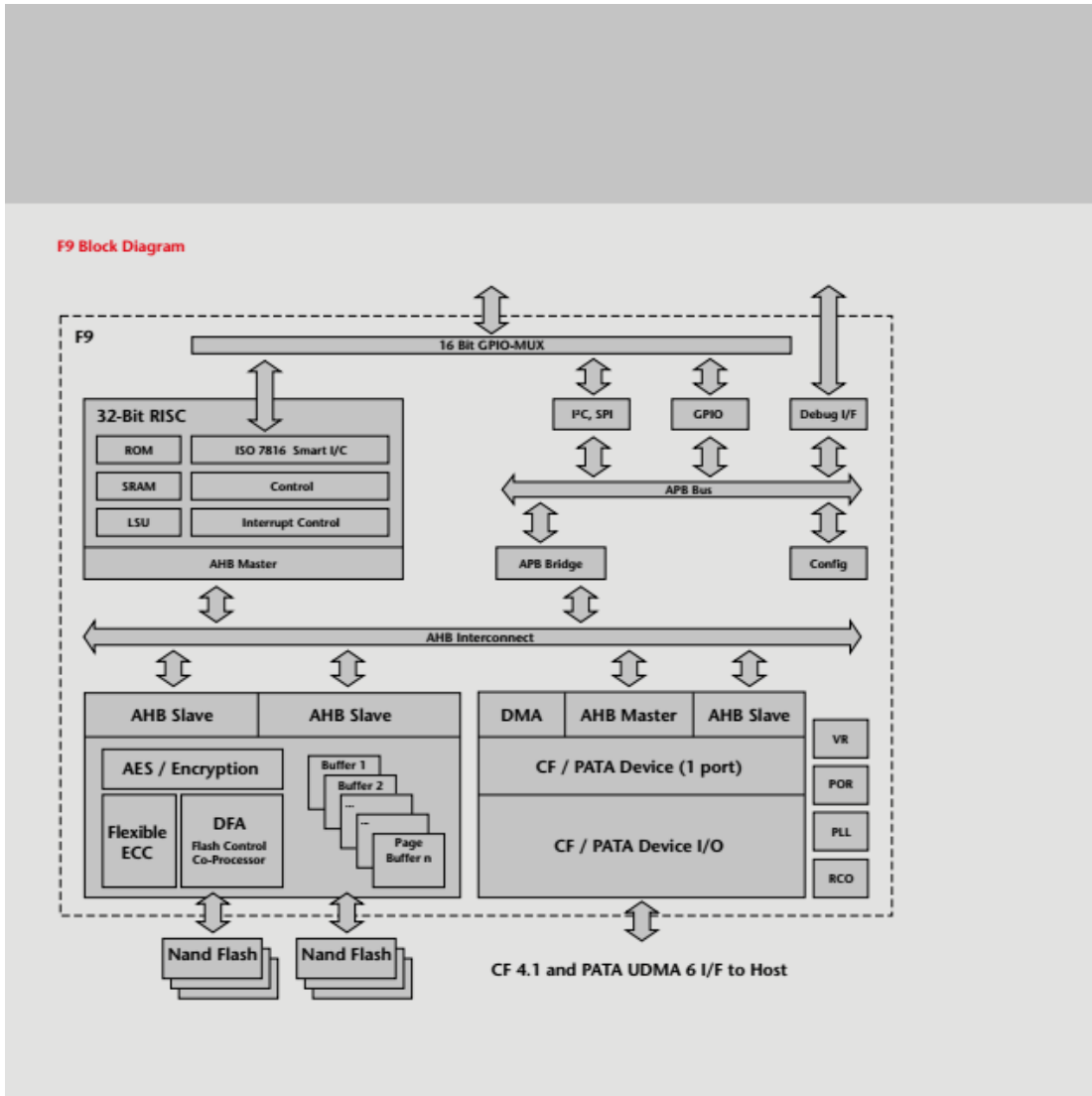
Renice H1 Plus Compact Flash Card SSD fully meets the industrial reliability, endurance and functional requirements, design power-down protection, secure erase and other special features. Advanced write-leveling, data-read immunity management and brown-out management provide the highest levels of stability and durability. Market-oriented groups are mainly in the field of industrial automation, embedded computing, industrial applications, network communications, public safety, military, aerospace, medical and automotive.

## 1.2 Feature

- Performance: Max Sequential Data Read/Write: 95MB/75MB/s
- Form factor: 1.0inch (42.8mm x 36.4mm x 3.3mm) LxWxH
- Interface: IDE (50pin)
- Capacities: 1GB~64GB(SLC)  
4GB~512GB(MLC)
- Input voltage:3.3V (±5%)
- Temperature ranges: operating: -40°C ~ +85°C (industrial)  
storage: -40°C ~ +125°C
- Flash Translation Layer (FTL) for high durability
- Flash Memory Management: Static, Dynamic and Global Wear leveling to maximize system write endurance
- Health-Monitoring and S.M.A.R.T. support
- Built-in power protection monitoring, over-voltage protection
- AES-128 and AES-256 support with CBC and XTS modes, high performance on-the-fly encryption/decryption
- Support hardware BCH ECC error correction:96-Bit /1KB
- Direct Flash Memory Access (DFA) co-processor incl. page buffers and interleaving capability
- Management of sudden power-fails
- Write endurance: > 8 years @ 100GB / day erase (32GB SLC SSD)
- read endurance: JESD47 compliant
- Data Retention: JESD47 compliant
- MTBF: 3000000 hours



## 2. Functional Block Diagram

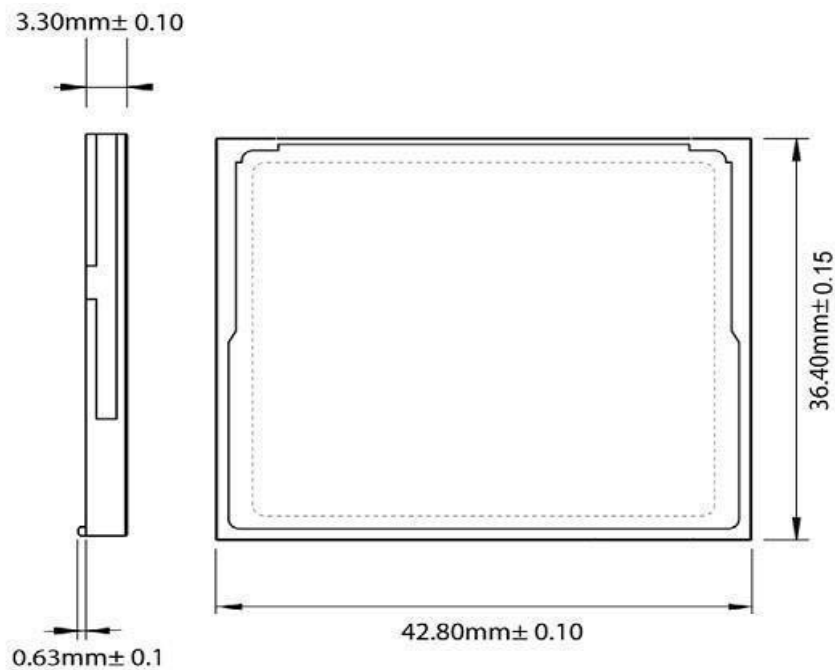




## 3. Product Specifications

### 3.1 Physical Specifications

Form factor	1.0inch	
Dimensions (mm)	Length	42.8±0.10
	Width	36.4±0.15
	Height	3.3±0.10
Weight	12±2g	
Connection	50pin IDE	



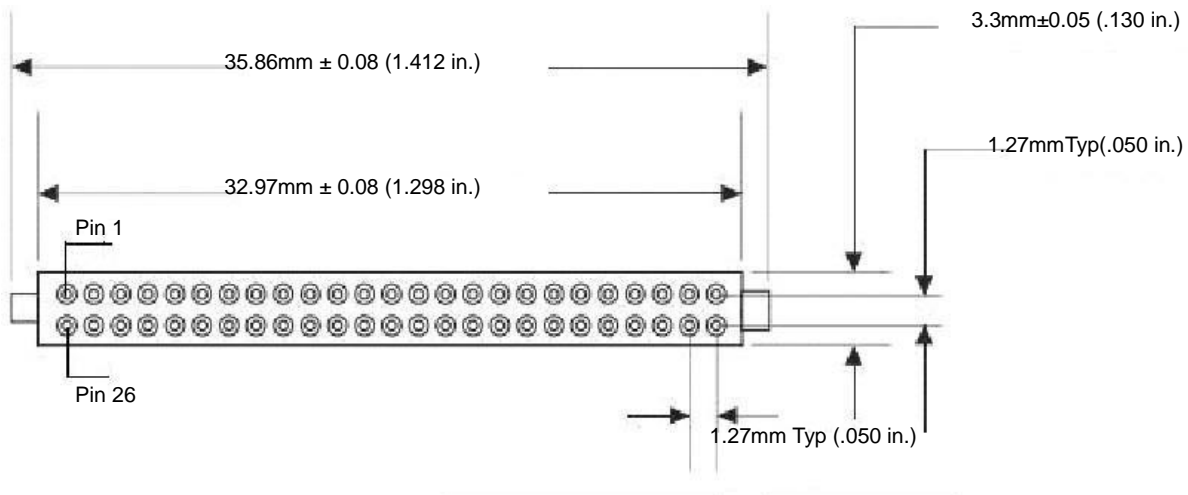
### 3.2 Host Interface

- PC-Card 8.0 (PC-Card ATA), CF 6.1 standard compatible
- 5V tolerant host interface I/O
- Automatic sensing of PC-Card host interface mode
- 256 Byte PC-Card Attribute Memory
- Compatible to PCMCIA specification version 2.1
- Automatic sensing of PC-Card or True-IDE host interface mode



## 4. Interface Description

### 4.1 Pin Assignment



### 4.2 Pin Description

Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	GND	14	A6	27	D11	40	NC
2	D3	15	A5	28	D12	41	RESET
3	D4	16	A4	29	D13	42	WAIT#
4	D5	17	A3	30	D14	43	INPACK#
5	D6	18	A2	31	D15	44	REQ#
6	D7	19	A1	32	CE#2	45	SPKR#
7	CE#1	20	A0	33	GND	46	STSCHG #
8	A10	21	D0	34	IORD#	47	D8
9	OE#	22	D1	35	IOWR#	48	D9
10	A9	23	D2	36	WE#	49	D10
11	A8	24	IOIS16#	37	IREQ#	50	GND
12	A7	25	GND	38	3.3V		
13	3.3v	26	GND	39	CSEL#		



## 5. Power Specifications

This chapter contains only preliminary information and can be updated in subsequent releases.

### 5.1 Operating voltage

3.3V ( $\pm 5\%$ )

### 5.2 Power Consumption (typical)

Operation (Read/Write): 110mA/90mA (UDMA6)

Idle: 5mA

Sleep (Partial/Slumber): 5mA/7mA (typ. /max.)

## 6. Reliability Specification

Item	Features	
Temperature	Industrial	-40°C~+85°C
Humidity	5-95%	
Vibration	16.4G(10-2000HZ)	
Shock	1500G(@0.5ms Half-sine wave, 1 time / axis ) 50G(@11ms Half-sine wave, 3 times / axis)	

### 6.1 Wear-leveling

The Renice H1 Plus CF SSD supports both dynamic and static wear and global write balancing. These algorithms ensure that all flash writes are comparable and extend the life of the flash.

### 6.2 Endurance

Flash Translation Layer (FTL) offering second to none random write performance, minimal write amplification, and consequently highest endurance for random access heavy usage profiles (e.g. JEDEC Enterprise).



Write endurance: > 8 years @ 100GB / day erase (32GB)

Read endurance: JESD47 compliant

## 6.3 Hardware ECC error correction

Supports hardware BCH ECC engine: 96-Bit/ 1KB

## 6.4 MTBF

Renice H1 Plus CFMTBF (Mean Time between Failures): 3000000 hours

Data Retention (25°C): not less than 10 years

## 6.5 Overvoltage overcurrent protection

The over-voltage and in-rush current protection of the Renice H1 Plus CF SSD is integrated into the device's power supply to protect the circuit. Once the current or voltage exceeds it, it will pull down to normal in a short time to protect the SSD.

## 6.6 Encryption mechanism

AES-128 and AES-256 support with CBC and XTS modes, high performance on-the-fly encryption/decryption.





## 7. SMART Information

### 7.1 Supported ATA Commands

No.	Command name	Code	FR	SC	SN	CY	DR	HD	LBA
1	Check power mode	E5h, 98h	—	—	—	—	Y	—	—
2	Data Set Management	06h	—	Y	—	—	Y	—	—
3	Download Microcode	92h	Y	Y	Y	—	Y	—	—
4	Download Microcode DMA	93h	Y	Y	Y	—	Y	—	—
5	Erase sector(s)	C0h	—	Y	Y	Y	Y	Y	Y
6	Execute drive diagnostic	90h	—	—	—	—	—	—	—
7	Flush Cache	E7h	—	—	—	—	Y	—	—
8	Flush Cache Ext	EAh	—	—	—	—	Y	—	—
9	Format track	50h	—	Y	—	Y	Y	Y	Y
10	Identify Device	ECh	—	—	—	—	Y	—	—
11	Idle	E3h, 97h	—	Y	—	—	Y	—	—
12	Idle immediate	E1h, 95h	—	—	—	—	Y	—	—
13	Initialize drive parameters	91h	—	Y	—	—	Y	Y	—
14	Media Lock	DEh	—	—	—	—	Y	—	—
15	Media Unlock	DFh	—	—	—	—	Y	—	—
16	NOP	00h	—	—	—	—	Y	—	—
17	Read buffer	E4h	—	—	—	—	Y	—	—



No.	Command name	Code	FR	SC	SN	CY	DR	HD	LBA
18	Read DMA	C8h, C9h	—	Y	Y	Y	Y	Y	Y
19	Read DMA Ext	25h	—	Y	Y	Y	Y	Y	Y
20	Read Log Ext	2Fh	—	Y	Y	Y	Y	—	Y
21	Read Log DMA Ext	47h	—	Y	Y	Y	Y	—	Y
22	Read Multiple	C4h	—	Y	Y	Y	Y	Y	Y
23	Read Multiple Ext	29h	—	Y	Y	Y	Y	Y	Y
24	Read native max address	F8h	—	—	—	—	Y	—	—
25	Read native max addr Ext	27h	—	—	—	—	Y	—	—
26	Read sector(s)	20h, 21h	—	Y	Y	Y	Y	Y	Y
27	Read sector(s) Ext	24h	—	Y	Y	Y	Y	Y	Y
28	Read verify sector(s)	40h, 41h	—	Y	Y	Y	Y	Y	Y
29	Read verify sector(s) Ext	42h	—	Y	Y	Y	Y	Y	Y
30	Recalibrate	1Xh	—	—	—	—	Y	—	—
31	Request sense	03h	—	—	—	—	Y	—	—
32	Security Disable Password	F6h	—	—	—	—	Y	—	—
33	Security Erase Prepare	F3h	—	—	—	—	Y	—	—
34	Security Erase Unit	F4h	—	—	—	—	Y	—	—
35	Security Freeze Lock	F5h	—	—	—	—	Y	—	—
36	Security Set Password	F1h	—	—	—	—	Y	—	—
37	Security Unlock	F2h	—	—	—	—	Y	Y	—
38	Seek	7Xh	—	—	Y	Y	Y	Y	Y
39	Set features	EFh	Y	—	—	—	Y	—	—
40	Set max address	F9h	—	Y	Y	Y	Y	Y	Y
41	Set max address Ext	37h	—	Y	Y	Y	Y	—	Y
42	Set multiple mode	C6h	—	Y	—	—	Y	—	—
43	Set sleep mode	E6h, 99h	—	—	—	—	Y	—	—
44	SMART	B0h	Y	Y	—	Y	Y	—	—
45	Stand by	E2h, 96h	—	Y	—	—	Y	—	—
46	Stand by immediate	E0h, 94h	—	—	—	—	Y	—	—
47	Translate sector	87h	—	Y	Y	Y	Y	Y	Y
48	Write buffer	E8h	—	—	—	—	Y	—	—
49	Write DMA	CAh, CBh	—	Y	Y	Y	Y	Y	Y
50	Write DMA Ext	35h	—	Y	Y	Y	Y	Y	Y
51	Write DMA FUA Ext	3Dh	—	Y	Y	Y	Y	Y	Y
52	Write Log Ext	3Fh	—	Y	Y	Y	Y	—	Y
53	Write Log DMA Ext	57h	—	Y	Y	Y	Y	—	Y
54	Write Multiple	C5h	—	Y	Y	Y	Y	Y	Y
55	Write Multiple Ext	39h	—	Y	Y	Y	Y	Y	Y
56	Write Multiple FUA Ext	CEh	—	Y	Y	Y	Y	Y	Y
57	Write Multiple w/o erase	CDh	—	Y	Y	Y	Y	Y	Y
58	Write sector(s)	30h, 31h	—	Y	Y	Y	Y	Y	Y
59	Write sector(s) Ext	34h	—	Y	Y	Y	Y	Y	Y
60	Write sector(s) w/o erase	38h	—	Y	Y	Y	Y	Y	Y
61	Write verify	3Ch	—	Y	Y	Y	Y	Y	Y

**Notes:** FR: Feature Register

SC: Sector Count register



SN: Sector Number register  
 CY: Cylinder Low/High register  
 DR: Drive bit of Drive/Head register  
 HD: Head No. (0 to 15) of Drive/Head register  
 Y: Used for the command  
 —: Not used for the command

## 7.2 ATA SMART commands

Value	Command	Value	Command
D0h	SMART Read Data	D8h	SMART Enable Operations
D1h	SMART Read Attribute Threshold	D9h	SMART Disable Operations
D2h	SMART Enable/Disable Attribute Autosave	DAh	SMART Return Status
D5h	SMART Read Log	E0h	SMART F9 Read Remap Data
D6h	SMART Write Log	DAh	SMART F9 Wear Level Data

## 7.3 S.M.A.R.T. data structure

Offset	Value	Description
0..1	0010h	SMART structure version
2..361		Attribute entries 1 to 30 (12 bytes each)
362	00h	Off-line data collection status (no off-line data collection)
363	00h	Self-test execution status byte (self-test completed)
364..365	0000h	Total time to complete off-line data collection
366	00h	—
367	00h	Off-line data collection capability (no off-line data collection)
368..369	0003h	SMART capabilities
370	00h	Error logging capability (no error logging)
371	00h	—
372	00h	Short self-test routine recommended polling time
373	00h	Extended self-test routine recommended polling time
374..385	00h	Reserved
386..387	0004h	SMART Hyperstone Structure Version
388..391		F9 Firmware “Commit” counter
392..395		F9 Firmware Wear Level Threshold



396	01h	Global Wear Leveling active
397	01h	Global Bad Block Management active
398..401		Average Flash Block Erase Count
402..405		Number of Flash Blocks involved into the Wear Leveling
406..409		Number of total ECC errors during firmware initialization
410..413		Number of correctable ECC errors during firmware initialization
414..510	00h	—
511		Data structure checksum

## 7.4 The ID information of PC-Card mode

In PC-Card mode, the following words will be different:

Word address	Default value	Bytes	Data field type information
0	848AH	2	General configuration bit-significant information (-id1)
93	0000H	2	Hardware Reset Result not supported

When firmware feature bit 24 is set, the following words will be different:

Word address	Default value	Bytes	Data field type information
83	7509H	2	Command set: FLUSH CACHE, FLUSH CACHE EXT, LBA48, Set Max Security Extension, Advanced Power Management, DOWNLOAD MICROCODE
86	B409H	2	Command set enabled: FLUSH CACHE, FLUSH CACHE EXT, LBA48, DOWNLOAD MICROCODE, words 119 and 120 supported
160 to 167	0000H	16	Reserved



## 8. Ordering Information

Capacities/Flash type	Industrial model
4GB/MLC	RIM004-PH1C
8GB/MLC	RIM008-PH1C
16GB/MLC	RIM016-PH1C
32GB/MLC	RIM032-PH1C
64GB/MLC	RIM064-PH1C
128GB/MLC	RIM128-PH1C
256GB/MLC	RIM256-PH1C
512GB/MLC	RIM512-PH1C
1GB/SLC	RIS001-PH1C
2GB/SLC	RIS002-PH1C
4GB/SLC	RIS004-PH1C
8GB/SLC	RIS008-PH1C
16GB/SLC	RIS016-PH1C
32GB/SLC	RIS032-PH1C
64GB/SLC	RIS064-PH1C



# 9. Part Number Naming Rule

