



# Industrial CompactFlash Specification

(CLASSIC II Series, MLC)

Version 1.1

Address: 28 Genting Lane, #09-03/04/05 Platinum 28, Singapore 349585

Tel : +65-6493 5035

Fax : +65-6493 5037

Website: <http://www.flexxon.com>

Email: [flexxon@flexxon.com](mailto:flexxon@flexxon.com)

## TABLE OF CONTENTS

<b>1.</b>	<b>GENERAL DESCRIPTION .....</b>	<b>1</b>
1.1.	Introduction.....	1
1.2.	Product Overview .....	1
<b>2.</b>	<b>PRODUCT SPECIFICATIONS.....</b>	<b>2</b>
2.1.	Performance.....	2
2.2.	Power.....	2
2.3.	TBW (Terabytes Written) .....	3
2.4.	MTBF .....	3
2.5.	Data Retention .....	3
<b>3.</b>	<b>ENVIRONMENTAL SPECIFICATIONS.....</b>	<b>4</b>
<b>4.</b>	<b>ATA COMMANDS.....</b>	<b>5</b>
<b>5.</b>	<b>PIN ASSIGNMENT .....</b>	<b>6</b>
<b>6.</b>	<b>PHYSICAL DIMENSION .....</b>	<b>7</b>
<b>7.</b>	<b>ORDERING INFORMATION.....</b>	<b>8</b>

# 1. GENERAL DESCRIPTION



## 1.1. Introduction

FLEXXON's CLASSIC II CompactFlash supports PCMCIA/IDE interface, and is fully compatible with CompactFlash Specification Version 6.1. It offers wide compatibility, high reliability, low power, great sustain performance & suitable for industrial application under rigorous environment.

## 1.2. Product Overview

- ❖ **Flash**
  - MLC
- ❖ **Capacity**
  - 4GB up to 512GB
- ❖ **Supported Host Interface**
  - Fully compatible with CompactFlash card specification revision 2.0, 3.0, 4.0, 4.1, 5.0, & 6.1
  - Supports PIO Modes 0-6
  - Supports Multi-Word DMA Modes 0-4
  - Supports Ultra DMA Modes 0-6
  - Supports PCMCIA Extended Memory Mode
  - Supports PCMCIA Ultra DMA Modes 0-6
- ❖ **ECC Scheme**
  - Up to 96 bits error in 1K Byte data
- ❖ **AES 128 & 256 bits encryption engine**
- ❖ **Low Power Management**
- ❖ **Static, Dynamic & Global Wear Leveling Algorithm**
- ❖ **Sudden Power Loss Management**
- ❖ **Temperature Range**
  - Operation: -40°C ~ 85°C
  - Storage: -40°C ~ 85°C
- ❖ **RoHS Compliant**

## 2. PRODUCT SPECIFICATIONS



### 2.1. Performance

**Table 2-1 Performance of CLASSIC II CompactFlash**

Sequential	
Max Read (MB/s)	Max Write (MB/s)
86	75

**NOTES:**

1. The performance was measured using CrystalDiskMark.
2. Performance may differ according to flash configuration and platform.

**Table 2-2 Random Performance of CLASSIC II CompactFlash**

Random	
Max Read (IOPS)	Max Write (IOPS)
7200	3000

**NOTES:**

1. The performance was measured using HD Tune Pro.
2. Performance may differ according to flash configuration and platform.

### 2.2. Power

**Table 2-2 Supply Voltage of CLASSIC II CompactFlash**

Parameter	Rating
Operating Voltage	3.3V / 5V

**Table 2-3 Power Consumption of CLASSIC II CompactFlash**

Parameter	Power Consumption
Idle (max.)	0.02 W
Active (max.)	0.36 W

**NOTE:**

1. The operating voltage is 3.3V
2. Power Consumption may differ according to flash configuration and platform.

## 2.3. TBW (Terabytes Written)

Capacity	TBW
4GB	7
8GB	14
16GB	29
32GB	58
64GB	116
128GB	232
256GB	465
512GB	930

### NOTES:

1. TBW may differ according to flash configuration and platform.
2. Samples were tested under JESD218A endurance test method and JESD219A endurance workloads specification.

## 2.4. MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. Its value represents the average time between a repair and the next failure. The predicted result of FLEXON's CLASSIC II CompactFlash is more than 2 million hours.

## 2.5. Data Retention

- 10 years if > 90% life remaining (@25C)
- 1 year if < 10% life remaining (@25C)

### 3. ENVIRONMENTAL SPECIFICATIONS



Test Items	Test Conditions
Storage Temperature	-40°C ~ 85°C
Operating Temperature	-40°C ~ 85°C
Storage Humidity	55°C, 95% RH
Operating Humidity	55°C, 95% RH
Shock	1500G, Half Sin Pulse Duration 0.5ms
Vibration	80Hz ~ 2000Hz/20G, 20Hz ~ 80Hz/1.52mm, 3 axis/60min
Drop	110cm free fall, 6 face of each unit, 2 times each
Bending	≥ 50N, Hold 1 min/3 times
ESD	23.4°C, 57% RH, +/-4KV

FLEXXON CONFIDENTIAL

## 4. ATA COMMANDS



Table 4-1 Supported ATA Command Set

No	Command set	Code	FR	SC	SN	CY	DH	LBA
1	Check power mode	E5H, 98H	—	—	—	—	Y	—
2	Execute drive diagnostic	90H	—	—	—	—	Y	—
3	Erase sector(s)	C0H	—	Y	Y	Y	Y	Y
4	Flush Cache	E7H	—	—	—	—	Y	—
5	Format track	50H	—	Y	—	Y	Y	Y
6	Identify Device	ECH	—	—	—	—	Y	—
7	Idle	E3H, 97H	—	Y	—	—	Y	—
8	Idle Immediate	E1H, 95H	—	—	—	—	Y	—
9	Initialize drive parameters	91H	—	Y	—	—	Y	—
10	Key Management Structure Read	B9 (Feature 0-127)	Y	Y	Y	Y		—
11	Key Management Read Keying Material	B9 (Feature 80)	Y	Y	Y	Y	Y	—
12	Key Management Change Key Management Value	B9 (Feature 81)	Y	Y	Y	Y	Y	—
13	NOP	00H	—	—	—	—	Y	—
14	Read Buffer	E4H	—	—	—	—	Y	—
15	Read DMA	C8H	—	Y	Y	Y	Y	Y
16	Read multiple	C4H	—	—	Y	Y	Y	Y
17	Read long	22H, 23H	—	Y	Y	Y	Y	Y
18	Read sector(s)	20H, 21H	—	Y	Y	Y	Y	Y
19	Read verify sector(s)	40H, 41H	—	Y	Y	Y	Y	Y
20	Recalibrate	1XH	—	—	—	—	Y	—
21	Request sense	03H	—	—	—	—	Y	—
22	Seek	7XH	—	—	Y	Y	Y	Y
23	Set features	EFH	Y	—	—	—	Y	—
24	Set multiple mode	C6H	—	Y	—	—	Y	—
25	Set sleep mode	E6H, 99H	—	—	—	—	Y	—
26	Stand by	E2H, 96H	—	—	—	—	Y	—
27	Stand by immediate	E0H, 94H	—	—	—	—	Y	—
28	Translate sector	87H	—	Y	Y	Y	Y	Y
29	Wear level	F5H	—	—	—	—	Y	—
30	Write buffer	E8H	—	—	—	—	Y	—
31	Write DMA	CAH	—	Y	Y	Y	Y	Y
32	Write long	32H, 33H	—	—	Y	Y	Y	Y
33	Write multiple	C5H	—	Y	Y	Y	Y	Y
34	Write multiple w/o erase	CDH	—	Y	Y	Y	Y	Y
35	Write sector(s)	30H, 31H	—	Y	Y	Y	Y	Y
36	Write sector(s) w/o erase	38H	—	Y	Y	Y	Y	Y
37	Write verify	3CH	—	Y	Y	Y	Y	Y

### NOTES:

FR: Feature Register

SC: Sector Count register (00H to FFH, 00H means 256 sectors)

SN: Sector Number register

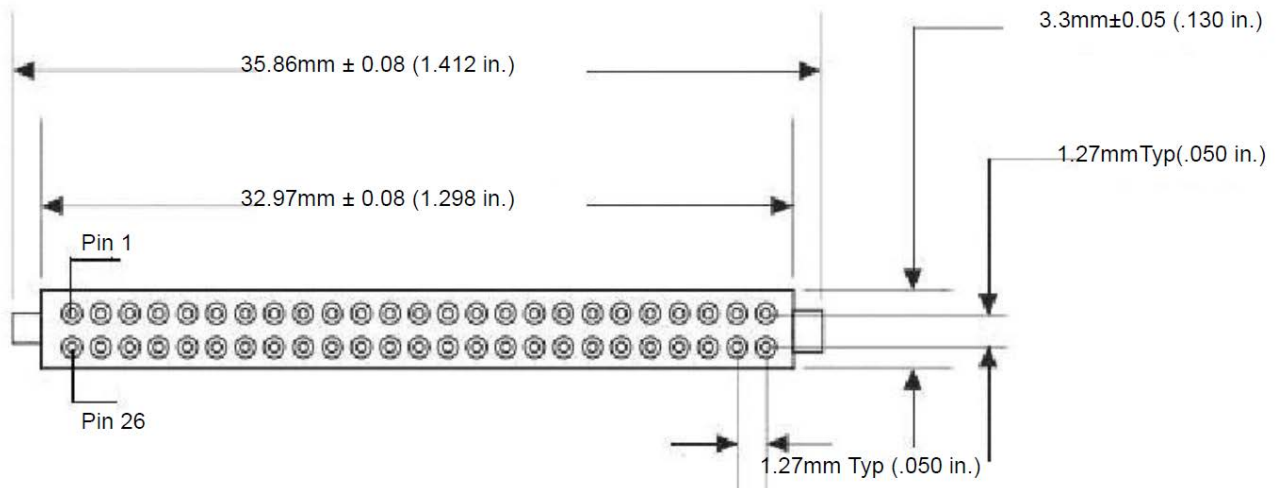
CY: Cylinder Low/High register

DH: Head No. (0 to 15) of Drive/Head register

Y: Used for command

—: Not used for the command

# 5. PIN ASSIGNMENT



**Table 5-1 CompactFlash Interface Pin Assignments**

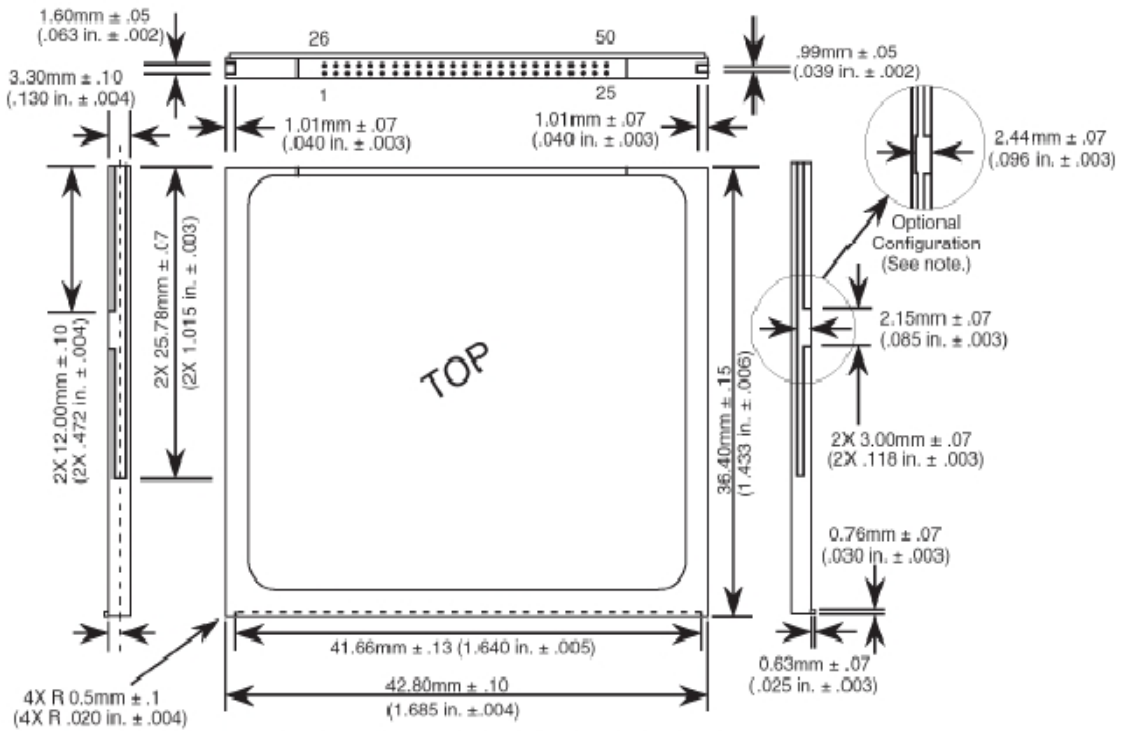
Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	GND	14	A6	27	D11	40	NC
2	D3	15	A5	28	D12	41	RESET
3	D4	16	A4	29	D13	42	WAIT#
4	D5	17	A3	30	D14	43	INPACK#
5	D6	18	A2	31	D15	44	REQ#
6	D7	19	A1	32	CE#2	45	SPKR#
7	CE#1	20	A0	33	GND	46	STSCHG #
8	A10	21	D0	34	IORD#	47	D8
9	OE#	22	D1	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	VCC		
13	VCC	26	GND	39	CSEL#		



## 6. PHYSICAL DIMENSION



Dimension: 36.4mm (L) x 42.8mm (W) x 3.3mm (H)



Note: The optional notched configuration was shown in the CF Specification Rev. 1.0. In specification Rev. 1.2, the notch was removed for ease of tooling. This optional configuration can be used but it is not recommended.

FLEXION

## 7. ORDERING INFORMATION



Capacity	MPN
4GB	FPCF004GME-H700
8GB	FPCF008GME-H700
16GB	FPCF016GME-H700
32GB	FPCF032GME-H700
64GB	FPCF064GME-H700
128GB	FPCF128GME-H700
256GB	FPCF256GME-H700
512GB	FPCF512GME-H700

FLEXION CONFIDENTIAL

## Revision History

Revision	Release Date	History
1.0	2019/09	First release
1.1	2019/10	Update logo

FLEXXON CONFIDENTIAL