

Terabit™

Industrial 50PIN Compact Flash Card 900X/1000X

Data Sheet

Terabit Technology

Revision History

Version	Date	Changes	Note
V001	2015-06-28	Release	3 rd Generation

Terabit Technology

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1. Product Features

Interface	50PIN
Form Factor	IDE/ATA
Dimension	36.4 x 42.8 x 3.3 ±0.2(mm)
Capacity	NAND MLC: 4~128GB NAND SLC: 1~64GB
Performance	1000X: Read up to 150MB/s Write up to 90MB/s 900X: Read up to 135MB/s Write up to 82MB/s
Power Supply	D/C 3.3V ± 5% 5.0V ± 5% (optional)
Operating Temperature	Standard: 0~+70°C Industrial: -20~+70°C Extended: -40~+85°C
Weight	<20g
Storage Temperature	-55~+95°C
Humidity	8%~95%(non-condensing)
Shock	Non-operating 1500G peak, 0.5ms Operating 50G peak, 11ms
Vibration	Jet (Random) Vibration, 10-2000Hz, 16.4G(X, Y, Z)
Burn-in Test	72 Hours
Falling Test	1.1 meter free falling
Max. Power Consumption	Sequential Reading 0.48W Sequential Writing 0.65W Idle 0.22W
MTBF	2,000,000 Hours
Access Time	0.1ms
Features	<ul style="list-style-type: none"> - Enhanced endurance by dynamic/static wear-leveling - Support dynamic power management - Support S.M.A.R.T function - Automatic Bad-block Management - Support TRIM and NCQ (Native Command Queuing) Command - Support BCH ECC 66bits/1024bytes
Data Retention	@25°C : 10 years
Certification	CE/FCC/RoHS

2. Overview

Terabit Compact Flash Card fully consists of semiconductor devices using original NAND Flash and Industrial Controller that provide high reliability and high performance for data storage. Terabit Compact Flash Card has standard 50PIN interfaces, fully conform to the same mechanical and mounting requirements as standard rotating disk drives. This series of products are designed for premium industrial applications that require both strong reliability and high performance such as Industrial Camera, Personal Camera, Outdoor Surveillance, Industrial Systems, Data Recording and Embedded Systems. With up to 128GB capacity, Terabit Compact Flash Card totally goes through a variety of proofing tests such as Shock Test, Vibration Test, Burn-in Test, and Twisting Test. Well proved under -40~+85°C wide temperature and equipped with Power Failure Protect and Over Load Protect, this series of products can work smoothly under severe environments.

3. Interface

Terabit Compact Flash Card complies Compact Flash Standard.

- Support PIO mode 6;
- Support Multi-word DMA Mode 0-4;
- Support Ultra DMA Mode 0-7;
- Support Compact Flash version 6.0;
- Support Firmware in system programming function;

Operating Mode:

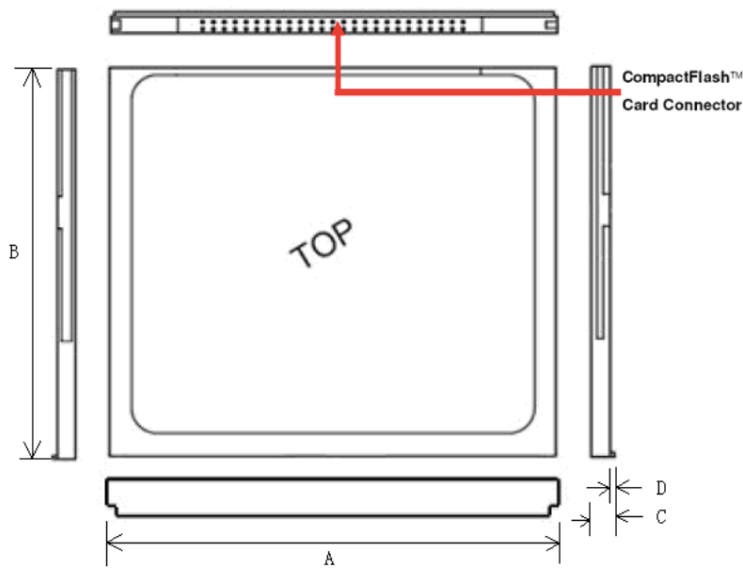
- PC Card Memory Mode
- PC Card I/O Mode
- True-IDE Mode

*exFAT File system for the CF Card with capacity more than 32GB and up to 2TB

*exFAT32 File system for the CF Card with capacity more than 2GB and up to 32GB

*FAT File system for the CF card with capacity less than 2GB or equal

4. Physical Dimension



Parameter	Value	Unit
A	36.4	mm
B	42.8	mm
C	3.3	mm
D	0.63	mm

- Values for A/B/C are $\pm 0.2\text{mm}$
- Values for D is $\pm 0.07\text{mm}$

5. PIN Description

5.1 PIN Location



5.2 Signal Description

PIN#	Memory card		I/O Card Mode		True IDE mode			
	Signal name	I/O	Signal name	I/O	PIO mode		UDMA mode	
					Signal N	I/O	Signal N	I/O
1	GND	-	GND	-	GND	-	GND	-
2	D3	I/O	D3	I/O	D3	I/O	D3	I/O
3	D4	I/O	D4	I/O	D4	I/O	D4	I/O
4	D5	I/O	D5	I/O	D5	I/O	D5	I/O
5	D6	I/O	D6	I/O	D6	I/O	D6	I/O
6	D7	I/O	D7	I/O	D7	I/O	D7	I/O
7	0		0		-CS0		-CS0	
8	A10		A10		A10		A10	
9	-OE		-OE		-ATASEL		-ATASEL	
10	A9		A9		A9		A9	
11	A8		A8		A8		A8	
12	A7		A7		A7		A7	
13	VCC	--	VCC	--	VCC	--	VCC	--
14	A6		A6		A6		A6	
15	A5		A5		A5		A5	
16	A4		A4		A4		A4	
17	A3		A3		A3		A3	
18	A2		A2		A2		A2	
19	A1		A1		A1		A1	
20	A0		A0		A0		A0	
21	D0	I/O	D0	I/O	D0	I/O	D0	I/O
22	D1	I/O	D1	I/O	D1	I/O	D1	I/O
23	D2	I/O	D2	I/O	D2	I/O	D2	I/O
24	WP	O	-IOIS16	O	-IOIS16	O	-IOIS16	O
25	0	O	0	O	0	O	0	O

26	0	0	0	0	0	0	0	0
27	D11	I/O	D11	I/O	D11	I/O	D11	I/O
28	D12	I/O	D12	I/O	D12	I/O	D12	I/O
29	D13	I/O	D13	I/O	D13	I/O	D13	I/O
30	D14	I/O	D14	I/O	D14	I/O	D14	I/O
31	D15	I/O	D15	I/O	D15	I/O	D15	I/O
32	0		0		0		0	
33	0	0	0	0	0	0	0	0
34	-IORD		-IORD		-IORD		-IORD	
35	-IOWR		-IOWR		-IOWR		-IOWR	
36	-WE		-WE		-WE		-WE	
37	RDY/-BSY	0	IREQ	0	INTRQ	0	INTRQ	0
38	VCC	--	VCC	--	VCC	--	VCC	--
39	-CSEL		-CSEL		-CSEL		-CSEL	
40	0	0	0	0	0	0	0	0
41	RESET		RESET		-RESET		-RESET	
42	-WAIT	0	-WAIT	0	IORDY	0	IORDY	0
43	-INPACK	0	-INPACK	0	RFU	0	DMARQ	0
44	-REG		-REG		RFU		-DMACK	
45	BVD2	I/O	-SPKR	I/O	-DASP	I/O	-DASP	I/O
46	BVD1	I/O	-STSCHG	I/O	-PDIAG	I/O	-PDIAG	I/O
47	D8	I/O	D8	I/O	D8	I/O	D8	I/O
48	D9	I/O	D9	I/O	D9	I/O	D9	I/O
49	D10	I/O	D10	I/O	D10	I/O	D10	I/O
50	GND	--	GND	--	GND	--	GND	--

6. Power Consumption

Capacity	Idle	Read	Write	Unit
01GB	0.18	0.27	0.36	W
02GB	0.18	0.30	0.41	W
04GB	0.18	0.32	0.45	W
08GB	0.20	0.36	0.47	W
16GB	0.20	0.39	0.52	W
32GB	0.22	0.45	0.58	W
64GB	0.22	0.46	0.62	W
128GB	0.22	0.48	0.68	W

7. Product Reliability

NAND MLC Flash:

Capacity	Endurance Total Bytes Written	Data Retention	MTBF	Warranty
04GB	Up to 8TB	@25°C >10 Years	2 Million Hours	3 Years Limited
08GB	Up to 16TB			
16GB	Up to 32TB			
32GB	Up to 65TB			
64GB	Up to 130TB			
128GB	Up to 260TB			

NAND SLC Flash:

Capacity	Endurance Total Bytes Written	Data Retention	MTBF	Warranty
01GB	Up to 55TB	@25°C >10 Years	2 Million Hours	5 Years Limited
02GB	Up to 110TB			
04GB	Up to 225TB			
08GB	Up to 450TB			
16GB	Up to 900TB			
32GB	Up to 1800TB			
64GB	Up to 3600TB			

*Total Bytes Written= 【(Flash P/E cycle) x (number of bits in drive)】 /WAI

WAI=1.428704724

7.1 Wear-Leveling

Terabit Compact Flash Card supports both static and dynamic wear-leveling technology. These two algorithms guarantee each block of flash memory at same level of erase cycles to improve lifetime limitation of NAND based storage.

7.2 ECC

ECC (Error Correction Code): Enhanced configurable BCH ECC engine. Terabit Compact Flash Card implements the BCH ECC Algorithm, which is one of the most powerful ECC algorithms in the industry. This algorithm can correct up to 12 random bit errors in each 512 bytes.

7.3 MTBF

Mean time between failures (MTBFs) for the SSD can be predicted based on the component reliability data using the methods referenced from reliability prediction procedures for electronic equipment, the prediction result for this SSD is more than 2,000,000 hours.

7.4 Bad-block Management

Terabit implements an efficient bad block management algorithm into the SSD to detect factory produced bad blocks as well as those that develop over the lifetime of the device. This process is completely transparent to the user through the use of S.M.A.R.T. command tools, i.e., the user will not be aware of the existence of the bad blocks during operation.

7.5 S.M.A.R.T Function

S.M.A.R.T stands for Self-Monitoring, Analysis and Reporting Technology. This technology enables the PC to predict the future failure of hard disk drives. Through the S.M.A.R.T. system, Terabit Compact Flash Card incorporates a suite of advanced diagnostics that monitor the internal operation of the drive and provide an early warning for many types of potential problems. When a potential problem is detected, the SSD can be repaired or replaced before any data is lost or damaged.

7.6 TRIM Function

Terabit Solid State Drive equips built-in TRIM function, it helps remark, collect and clean data garbage when the system in an idle situation, which keeps the system in a high performance status even after long-term using.

8. Performance

Capacity	Sequential Read	Sequential Write	IOPS Read	IOPS Write
01GB	29 MB/s	16 MB/s	2200	1800
02GB	33 MB/s	20 MB/s	2300	1900
04GB	46 MB/s	24 MB/s	2600	2200
08GB	61 MB/s	37 MB/s	2800	2500
16GB	88 MB/s	54 MB/s	3000	2700
32GB	106 MB/s	73 MB/s	3500	2800
64GB	142 MB/s	80 MB/s	3700	3000
128GB	150 MB/s	90 MB/s	4000	3100

Note: Based on 1000X version. UDMA7 mode>160MB/s

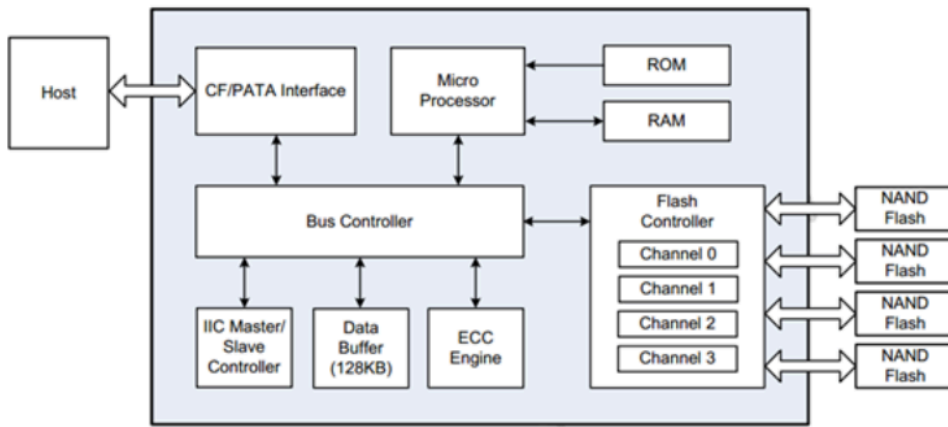
9. Cache

Cache	DDR2	DDR3	Capacity
Support	/	/	/

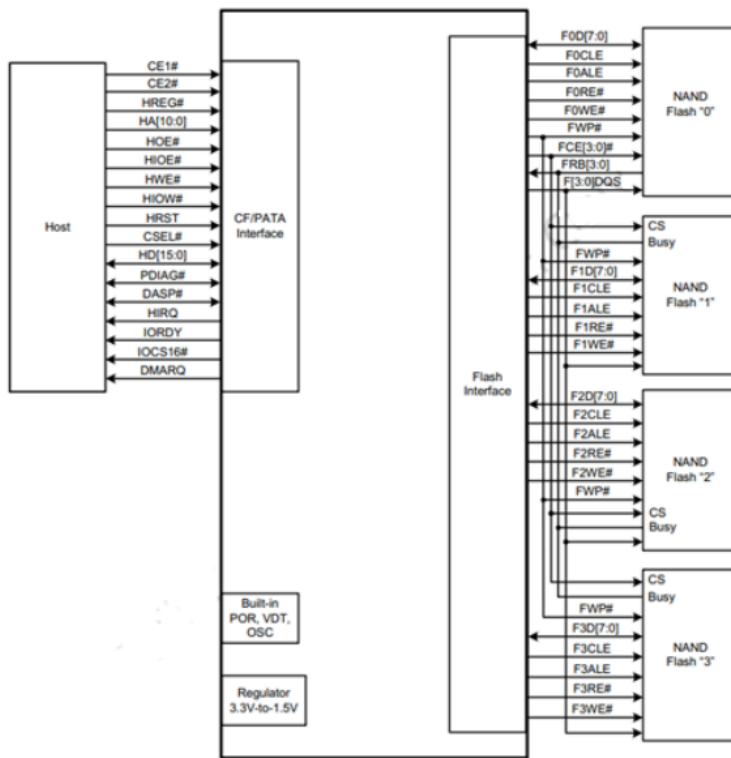
10. Thermal Sensor

Temperature Sensor	Yes	No
	Support	/

11. Block Diagram



1. Block diagram of Compact Flash Card



2. Diagram of Compact Flash Card Controller

12. Certifications



EN 55022:2010

EN: 55024:2010

EN 61000-3-2:2013

EN 61000-3-3:2014

47 CFR, Part2, Part15, CISPR PUB.22

With reference to RoHS Directive 2011/65/EU recasting 2002/95/EC

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13. Ordering information

Series	*Model Name	Capacity	Flash	Fixed or Removable
Compact Flash Card	TCFXTMLC-04G	04GB	NAND MLC	Optional
	TCFXTMLC-08G	08GB	NAND MLC	Optional
	TCFXTMLC-16G	16GB	NAND MLC	Optional
	TCFXTMLC-32G	32GB	NAND MLC	Optional
	TCFXTMLC-64G	64GB	NAND MLC	Optional

Series	Model Name	Capacity	Flash	Fixed or Removable
Compact Flash Card	TCFXTSLC-01G	01GB	NAND SLC	Optional
	TCFXTSLC-02G	02GB	NAND SLC	Optional
	TCFXTSLC-04G	04GB	NAND SLC	Optional
	TCFXTSLC-08G	08GB	NAND SLC	Optional
	TCFXTSLC-16G	16GB	NAND SLC	Optional
	TCFXTSLC-32G	32GB	NAND SLC	Optional
	TCFXTSLC-64G	64GB	NAND SLC	Optional

*XT refers to temperature range, ST refers to standard temperature, CT refers to industrial temperature, KT refers to extended temperature.

14. Contact Information

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