swissbit®

Product fact sheet

**Industrial
CompactFlash™ Card**

C-440 Series
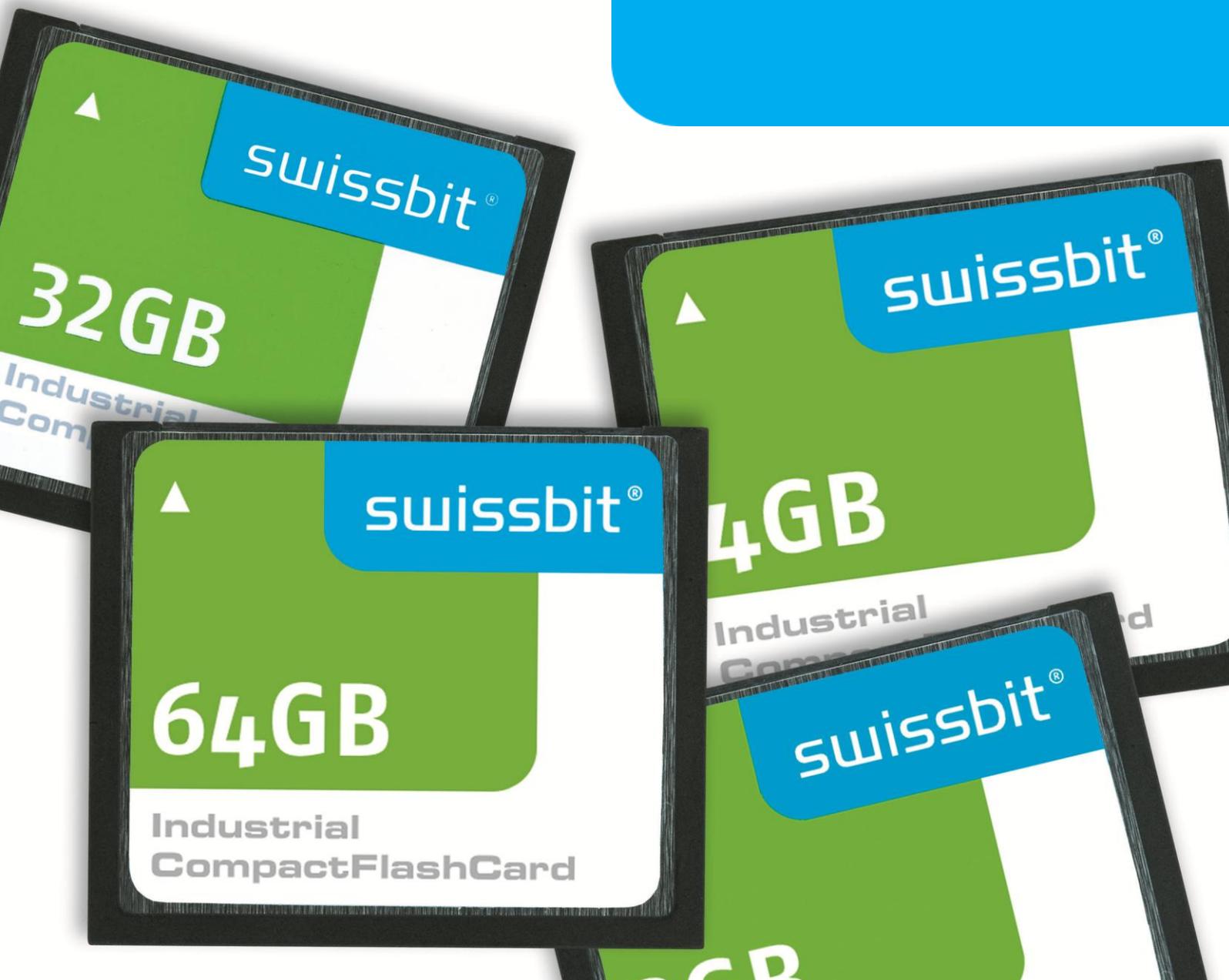**up to UDMA6 / MDMA4 / PIO6**

C-440 Series – Industrial UDMA CompactFlash™ Card, 2GByte up to 64GByte, 3.3/5V Supply

Main Features

- Highly-integrated memory controller
  - CompactFlash™ specification 4.1, compatible with specification 5.0
  - PCMCIA specification 2.1 & PC Card ATA Interface Specification 8, 7, 6, and 5
  - True IDE mode compatible, up to UDMA6 / MDMA4 / PIO6 supported
  - Fix drive (IDE mode) & removable drive (PC card mode) as default in the same card
  - Hot swappable in PC card modes
  - Signal termination resistors to improve signal quality
  - LBA48 address support (LBA28 limitation on request)
  - Fix drive (IDE mode) & removable drive (PC card mode) as default configuration
- Small form factor
  - CFC Type I: 36.4mm x 42.8mm x 3.3mm
- Low-power CMOS technology
- 3.3V or 5.0V power supply, card drives bus with 3.3V, inputs 5V compatible
- Power saving mode (with automatic wake-up)
- S.M.A.R.T. support and extended vendor information
- Wear Leveling: equal wear leveling of static and dynamic data
  The wear leveling assures that dynamic data as well as static data is balanced evenly across the memory. With that the maximum write endurance of the device is guaranteed.
- Data Retention: 10 year (JESD47)
- Patented power-off reliability
  - No data loss of older sectors
  - Max. 32 sectors data loss (old data kept)
- High reliability
  - MTBF >3,000,000 hours
  - Data reliability: < 1 non-recoverable error per 10^{14} bits read
  - Number of connector insertions/removals: >10,000
  - 24bit per double sector BCH ECC capability
  - Near Miss ECC handling at read (refresh and correct data, if multiple correctable errors detected)
  - Read Disturb Management (RDM, refresh and correct data after a certain number of read commands per block)
- High performance
  - Up to 133MB/s burst transfer rate in UDMA6
  - Sustained Write performance: up to 40MB/s (UDMA6 untrimmed)
  - Sustained Read Performance: up to 65MB/s (UDMA6)
  - Trim command supported to increase random write performance
  - Up to 300 IOPS with Trim Support (4k random write) and up to 32 IOPS untrimmed
- Available densities
  - up to 64GBytes (SLC NAND Flash)
- Operating System support
  - Standard Software Drivers operation CompactFlash™
- 2 Temperature ranges
  - Commercial Temperature range   0 ... +70°C
  - Industrial Temperature range   –40 ... +85°C
- Life Cycle Management
- Controlled BOM
- RoHS compatible

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Revision: 1.01

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System Performance

Parameter		Typ.	Max.	Unit
Sleep to write			5	ms
Sleep to read			5	
Power up to Ready		<500	1000	
Reset to Ready (IDE Master)		200	500	
Data transfer Rate (UDMA6 burst)			133 [1]	MB/s
Sustained Read (measured)		58 [1][2]	65 [1]	
Sustained Write (measured)		31 [1][2]	40 [1]	
Command to DRQ	Read	100	2500000	µs
	Write	30	500	

[1] CFC in UDMA mode 6, cycle time 15ns, write/read file sequential transfer 256 sectors/command.
[2] Sustained Speed depends on flash type and number, file size, and burst speed.

Current Consumption (typ)	3.3V	5V	Unit
Read (UDMA6/max)	110 / 140	110 / 140	mA
Write (UDMA6/max)	90 / 110	85 / 110	
Sleep/Idle Mode (typ/max)	3 / 5	3 / 5	

[1] All values are typical at 25° C and nominal supply voltage and refer to 32GByte CFC.

Physical Dimensions

Parameter	Value	Unit
Width	36.4	mm
Height	42.8	
Thickness	3.3	
Weight (typ.)	10	g

Environmental Specifications

Parameter	Operating	Non Operating
Temperature (commercial)	0 to 70°C	-40 to 85°C
Temperature (industrial)	-40 to 85°C	-50 to 100°C
Humidity (non-condensing)	85% RH 85°C, 1000 hrs (JEDEC JESD22, method A101-B)	
Vibration (peak -to-peak)	20 G peak, 20-2000Hz, 4 per direction (JEDEC JESD22, method B103) 5.35G RMS, 15 min per plane (IEC 68-2-6)	
Shock	1.5k G peak, 0.5ms 5 times (JEDEC JESD22, method B110) 30 G, 11ms 1 time (IEC 68-2-27)	

Density specification

Capacity	cylinders	heads	Sectors/track	Sectors_drive	Total addressable capacity (Byte)
2GB	3,970	16	63	4,001,760	2,048,901,120
4GB	7,964	16	63	8,027,712	4,110,188,544
8GB	15,880	16	63	16,007,040	8,195,604,480
16GB	16,383 [1]	16	63	31,717,728	16,239,476,736
32GB	16,383 [1]	16	63	64,028,160	32,782,417,920
64GB	16,383 [1]	16	63	125,313,024	64,160,268,288

[1] The CHS addressing is limited to about 8GB. Larger drives should be used in LBA mode.

System Reliability

MTBF (at 40°C)	> 3,000,000 hours
Data Reliability	< 1 Non-Recoverable Error per 10^{14} bits Read

Why Swissbit?

Swissbit strives to create innovative technologies for future market opportunities utilizing a highly skilled in-house product research and development team. Swissbit maintains a marketing edge by continuing to manufacture world-class high quality memory products and providing customers with both high value and low cost of ownership achieved through efficient processes and procedures.

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