RoHS Compliant

USB *Flash Drive*

AH322 Specifications

June 4th, 2014

Version 1.4

Apacer
Access the best

Apacer Technology Inc.
1F, No.32, Zhongcheng Rd., Tucheng Dist., New Taipei City, Taiwan, R.O.C
Tel: +886-2-2267-8000 Fax: +886-2-2267-2261
www.apacer.com

FEATURES:

- **USB2.0 High-Speed and USB1.1 Full-Speed compatible interface**
- **Capacity**
  - For SLC: 128, 256, 512 MB
    1, 2, 4, 8, 16, 32 GB
  - For MLC: 4, 8, 16, 32 GB
- **Performance**
  - Sustained read: up to 34 MB/s
  - Sustained write: up to 22 MB/s
- **Intelligent USB Module**
  - Implements advanced wear-leveling algorithms to substantially increase longevity of flash media
  - ECC
- **Temperature ranges**
  - 0℃ to 70℃ (standard)
- **Power consumption (typical)**
  - Active mode: 185 mA
  - Idle mode: 65 mA
  - Operating voltage: 5V
- **RoHS Compliant**
- **Dimensions:** 55.29 x 18.00 x 8.50, unit: mm
- **LED indicator**
- **EMC: CE, FCC**

Notes: the results for performance and power consumption addressed here may vary in real world platforms.

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TABLE OF CONTENTS

1. General Description 3

1.1 Performance-optimized USB Controller 3
1.1.1 Error Correction Code (ECC) 3
1.1.2 Wear-Leveling 3

2. General Specifications 4

2.1 Performance Specifications – SLC 4
2.2 Performance Specifications – MLC 4

3. Electrical Specification 5

4. Physical Dimensions 5

5. Product Ordering Information 6

5.1 Product Code Designation 6
5.2 Valid Combinations 7

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1. General Description

Apacer's USB FLASH Drive (UFD) is a high performance, flash disk drive designed offering portable storage solutions. UFDs can be plugged into a standard USB 2.0 connector commonly found in desktops, portable computers and even enterprise PC systems. Apacer's UFDs have an efficient built-in microcontroller and file management firmware that ensures ideal performance, functionality and reliability. This product is well suited for portable flash storage applications while operating at minimal power consumption.

1.1 Performance-optimized USB Controller

The heart of an UDM is the USB controller, which translates standard USB signals to the flash media and controls the data in/out between the controller itself and the flash media. This proprietary USB controller is specifically designed to attain high data throughput from host to flash.

1.1.1 Error Correction Code (ECC)

The UDM uses BCH Error Detection Code (EDC) and Error Correction Code (ECC) algorithms which correct up to 24 random single-bit errors for each 1024-byte block of data.

1.1.2 Wear-Leveling

Flash memory can be erased a limited number of times. In a typical application, and especially if a file system is used, specific pages are constantly updated (e.g., the page that contains the FAT, registry, etc.). Without any special handling, these pages would wear out more rapidly than other pages, reducing the lifetime of the entire flash. To overcome this inherent deficiency, Apacer's USB-Disk Module (UDM) uses wear-leveling algorithm. This wear-leveling algorithm ensures that consecutive writes of a specific sector are not written physically to the same page in the flash. This distributes flash media usage evenly across all pages, thereby maximizing flash lifetime. The wear-leveling mechanism provides write/erase cycles for reliable data storage over an extended period.

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2. General Specifications

Interface	High-speed USB2.0 compliant; backward compatible with USB 1.1
Performance*	SLC: up to 34 MB/s (read); 22 MB/s (write) MLC: up to 33 MB/s (read); 16 MB/s (write)
Temperature	0 to 70℃
Shock	Half sine wave 40 G, 11ms / Square wave 100 G, 6ms
EMC	FCC, CE
MTBF	2,000,000 hours (SLC) / 1,000,000 (MLC)

*Results may vary from flash configurations or host system settings.

2.1 Performance Specifications – SLC

Table 2-1: SLC Performance Specifications

Capacity / Performance	256 MB	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB	32 GB
Sustained read (MB/s)	31	31	32	34	28	32	34	31
Sustained write (MB/s)	10	15	19	19	21	15	22	21

Note: results may vary depending on flash configurations or host system settings

2.2 Performance Specifications – MLC

Table 2-2: MLC Performance Specifications

Capacity / Performance	4 GB	8 GB	16 GB	32 GB
Sustained read (MB/s)	32	32	33	33
Sustained write (MB/s)	10	10	14	16

Note: results may vary depending on flash configurations or host system settings

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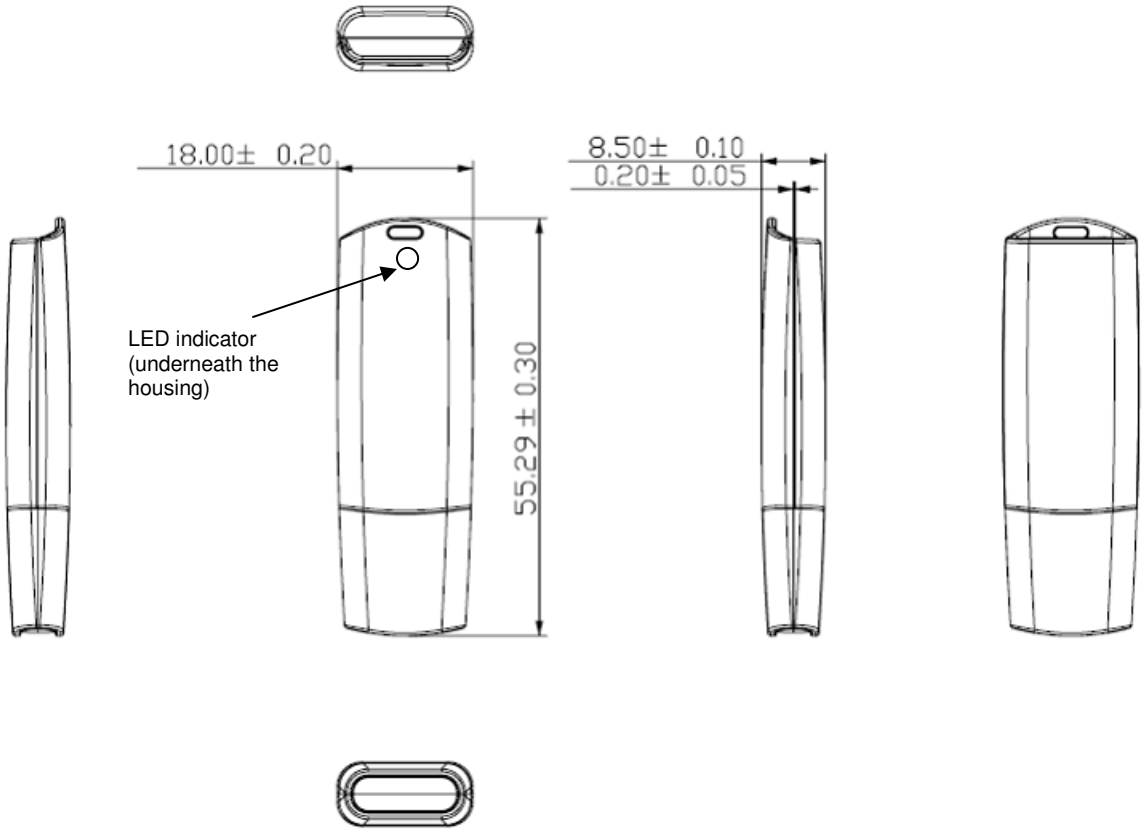
3. Electrical Specification

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: Absolute Stress Rating

Parameters	Conditions
Ambient temperature	0 to 70℃
Required power supply	4.5-5.5V
Input power (V_{DD})	-0.3V (min.) to 5.5V (max.)
Voltage on any pin except V_{DD} with respect to GND	-0.3V (min.) to V_{DD} + 0.3V (max.)

4. Physical Dimensions



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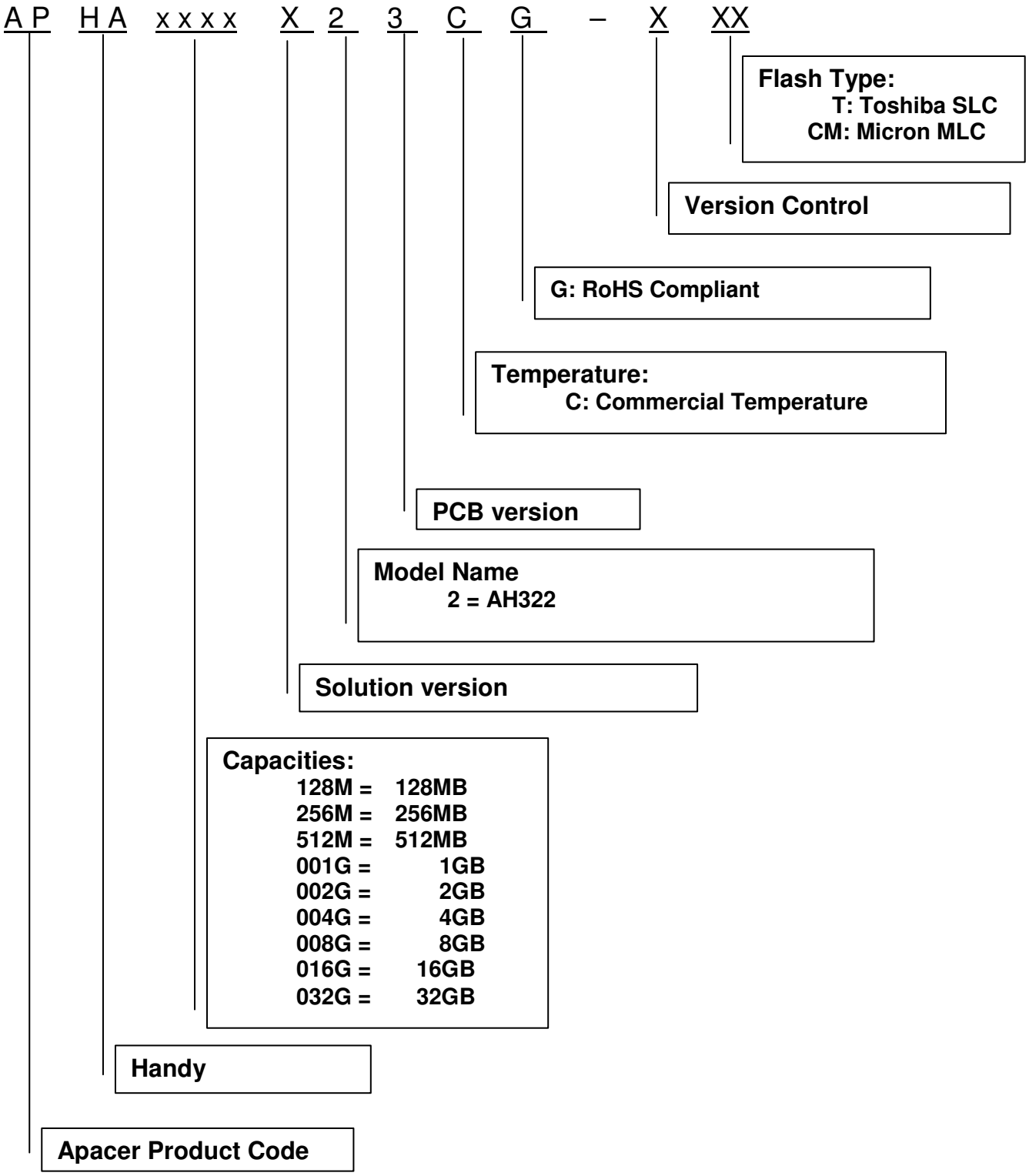
5. Product Ordering Information

5.1 Product Code Designation



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5.2 Valid Combinations

5.2.1 AH322 (SLC)

Capacity	Standard
128MB	APHA128MR23CG-2T
256MB	APHA256MR23CG-2T
512MB	APHA512MR23CG-2T
1GB	APHA001GR23CG-2T
2GB	APHA002GR23CG-2T
4GB	APHA004GR23CG-2T
8GB	APHA008GR23CG-2T
16GB	APHA016GR23CG-2T
32GB	APHA032GR23CG-2T

5.2.2 AH322 (MLC)

Capacity	Standard
4GB	APHA004GR23CG-CM
8GB	APHA008GR23CG-CM
16GB	APHA016GR23CG-CM
32GB	APHA032GR23CG-CM

Note: For availability or customized requests, please consult with Apacer sales representatives.

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Revision History

Revision	Description	Date
1.0	Official Release	August 11th, 2011
1.1	Updated Product Ordering Information	June 20th, 2012
1.2	Updated Product Ordering Information - contents relating to extended temperature are removed	July 2nd, 2012
1.3	Updated read/write performance due to change in NAND flash use Updated addresses of Taiwan headquarter and the office in India	August 6th, 2013
1.4	Added performance tables	June 4th, 2014

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Global Presence

Taiwan (Headquarters)

Apacer Technology Inc.
Apacer Technology Inc.
1F., No.32, Zhongcheng Rd., Tucheng Dist.,
New Taipei City 236, Taiwan R.O.C.
Tel: 886-2-2267-8000
Fax: 886-2-2267-2261
amtsales@apacer.com

U.S.A.

Apacer Memory America, Inc.
386 Fairview Way, Suite102,
Milpitas, CA 95035
Tel: 1-408-586-1291
Fax: 1-408-935-9611
sa@apacerus.com

Japan

Apacer Technology Corp.
5F, Matsura Bldg., Shiba, Minato-Ku
Tokyo, 105-0014, Japan
Tel: 81-3-5419-2668
Fax: 81-3-5419-0018
jpservices@apacer.com

Europe

Apacer Technology B.V.
Science Park Eindhoven 5051 5692 EB Son,
The Netherlands
Tel: 31-40-267-0000
Fax: 31-40-267-0000#6199
sales@apacer.nl

China

Apacer Electronic (Shanghai) Co., Ltd
1301, No.251,Xiaomuqiao Road, Shanghai,
200032, China
Tel: 86-21-5529-0222
Fax: 86-21-5206-6939
sales@apacer.com.cn

India

Apacer Technologies Pvt. Ltd.
535, 1st Floor, 8th cross, JP Nagar 3rd Phase,
Bangalore – 560078, India
Tel: 91-80-4152-9061
sales_india@apacer.com

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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331