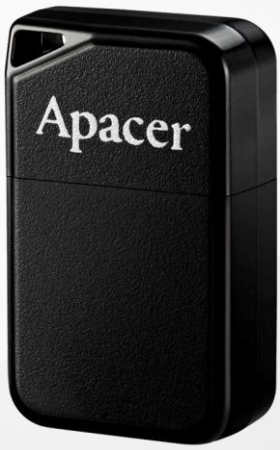
Apacer

RoHS Compliant

USB Flash Drive

EH163-M Product Specifications



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Specifications Overview:

- **Compatible with USB specification revision 3.1 and backward compatible with USB 2.0 and 1.1**
  - USB3.0 max. transfer rate: 5.0 Gbps
  - Backward compatible with 480 Mbps & 12 Mbps
- **Capacity**
  - 8, 16, 32, 64 GB
- **Performance***
  - Sequential read: Up to 225 MB/sec
  - Sequential write: Up to 80 MB/sec
- **Flash Management**
  - Built-in hardware ECC
  - Wear-leveling algorithms
  - Flash bad-block management
  - Power saving implemented
  - S.M.A.R.T.
  - Power Failure Management
- **NAND Flash Type:** MLC
- **MTBF:** >1,000,000 hours
- **Flash Endurance:** 3K P/E cycle**
- **Temperature Range**
  - Operating: 0°C to 70°C
  - Storage: -25°C to 85°C
- **Supply Voltage**
  - 5.0 V ± 5%
- **Power Consumption***
  - Active mode: 190 mA
  - Idle mode: 45 mA
- **OS Support**
  - Windows: WinXP/7 or later
  - Mac: 10.2.8 or later
  - Linux: 2.4.10 or later
- **EMC:** FCC, CE
- **FW Update with Signing Mechanism**
- **Plug & Play**
- **Chip-On-Board Technology**
- **USB Bus-Powered Capability**
- **Dimensions:** 23.10 x 14.25 x 6.90, unit:mm
- **RoHS Compliant**

*Varies from capacities. The values for performances and power consumptions presented are typical and may vary depending on flash configurations or platform settings.
**Specified by NAND flash vendors

Table of Contents

1. General Descriptions

Apacer EH163-M is a super speed USB 3.1 GEN 1 removable flash disk drive with USB 3.1 GEN 1 connection (backward compatible with USB 2.0/1.1) and supports various storage capacities.

Compatible with all USB specifications (USB 1.1/USB 2.0/USB 3.1 GEN 1) and featuring plug-and-play, EH163-M can be easily adopted in any computing system with an available USB port. The device can be automatically detected by the host computer so that users can access data to read, write, copy, or move data between host system drive and EH163-M. Data security-wise, EH163-M is built with the highest durability and ruggedness with a special Chip-On-Board (COB) packaging technology, which allows your precious files to be safely stored and protected against dust, water and shock at all times.

Moreover, no battery, cable, or software driver is required. EH163-M is widely compatible with mainstream computer platforms, no matter desktop or laptops, as long as there is an available USB port. EH163-M makes data transfer easy, fast and handy.

1.1 Performance-Optimized USB Controller

1.1.1 Power Saving Implemented

The internal controller of the USB model is designed with power saving implementations, allowing the device to operate at low power consumption.

1.1.2 Program RAM Architect

The internal Program RAM implementation allows the host to upgrade firmware codes anytime when needed.

1.1.3 Error Correction Code (ECC)

Flash memory cells can deteriorate with use, which might lead to random bit errors in the stored data. Thus, this USB applies the BCH ECC Algorithm, which can detect and correct errors occurring during Read process, ensure data to be read correctly, as well as protect data from corruption. This device can correct up to 39bit/1K data.

1.1.4 Flash Block Management

Current production technology is unable to guarantee total reliability of NAND flash memory array. When a flash memory device leaves factory, it comes with a minimal number of initial bad blocks during production or out-of-factory as there is no currently known technology that produce flash chips free of bad blocks. In addition, bad blocks may develop during program/erase cycles. When host performs program/erase command on a block, bad block may appear in Status Register. Since bad blocks are inevitable, the solution is to keep them in control. Apacer flash devices are programmed with ECC and block mapping technique to reduce invalidity or error. Once bad blocks are detected, data in those blocks will be transferred to free blocks and error will be corrected by designated algorithms.

1.1.5 Wear-Leveling Algorithms

Flash memory devices differ from Hard Disk Drives (HDDs) in terms of how blocks are utilized. For HDDs, when a change is made to stored data, like erase or update, the controller mechanism on HDDs will perform overwrites on blocks. Unlike HDDs, flash blocks cannot be overwritten and each P/E cycle wears down the lifespan of blocks gradually. Repeatedly program/erase cycles performed on the same memory cells will eventually cause some blocks to age faster than others. This would bring flash storages to their end of service term sooner. Wear leveling is an important mechanism that level out the wearing of blocks so that the wearing-down of blocks can be almost evenly distributed. This will increase the lifespan of flash drives. Commonly used wear leveling types are Static and Dynamic.

1.1.6 S.M.A.R.T.

S.M.A.R.T. is an abbreviation for Self-Monitoring, Analysis and Reporting Technology, a self-monitoring system that provides indicators of drive health as well as potential disk problems. It serves as a warning for users from unscheduled downtime by monitoring and displaying critical drive information. Ideally, this should allow taking proactive actions to prevent drive failure and make use of S.M.A.R.T. information for future product development reference.

1.1.7 Power Failure Management

Power disruption may occur when users are storing data into the SSD. In this urgent situation, the controller would protect firmware table and the data written to flash from data loss in the event of power off. Apacer power failure management maintains data correctness and increases the reliability of the data stored in the NAND Flash memory.

2. Product Specifications

2.1 Performance

Performance of EH163-M is listed below in Table 2-1.

Table 2-1 Performance Specifications

Performance \ Capacity	8 GB	16 GB	32 GB	64 GB
Sequential Read* (MB/s)	225	225	225	225
Sequential Write* (MB/s)	29	20	47	80

Note:
Results may differ from various flash configurations or host system setting.
*Sequential performance is based on CrystalDiskMark 5.2.1 with file size 1,000MB.

3. Environmental Specifications

3.1 Environmental Specifications

Environmental specifications of EH163-M product are shown in Table 3-1.

Table 3-1 Environmental Specifications

Environment		Specifications
Temperature	Operating	0°C to 70°C
	Storage	-25°C to 85°C
Vibration	Operating	50(G)/11(ms)/half sine
	Non-operating	1,500(G)/0.5(ms)/half sine
Shock	Operating	7.69(Grms), 20~2000(Hz)/random (complies with MIL-STD-810G)
	Non-operating	4.02(Grms), 15~2000(Hz)/random (complies with MIL-STD-810G)
ESD		CE compliance (Criteria B)

Note: Shock and Vibration specifications are subject to change without notice.

4. Electrical Specifications

4.1 Operating Voltage

Table 4-1 lists the supply voltage for EH163-M.

Table 4-1 Operating Range

Item	Range
Supply Voltage	5V ± 5% (4.75-5.25V)

4.2 Power Consumption

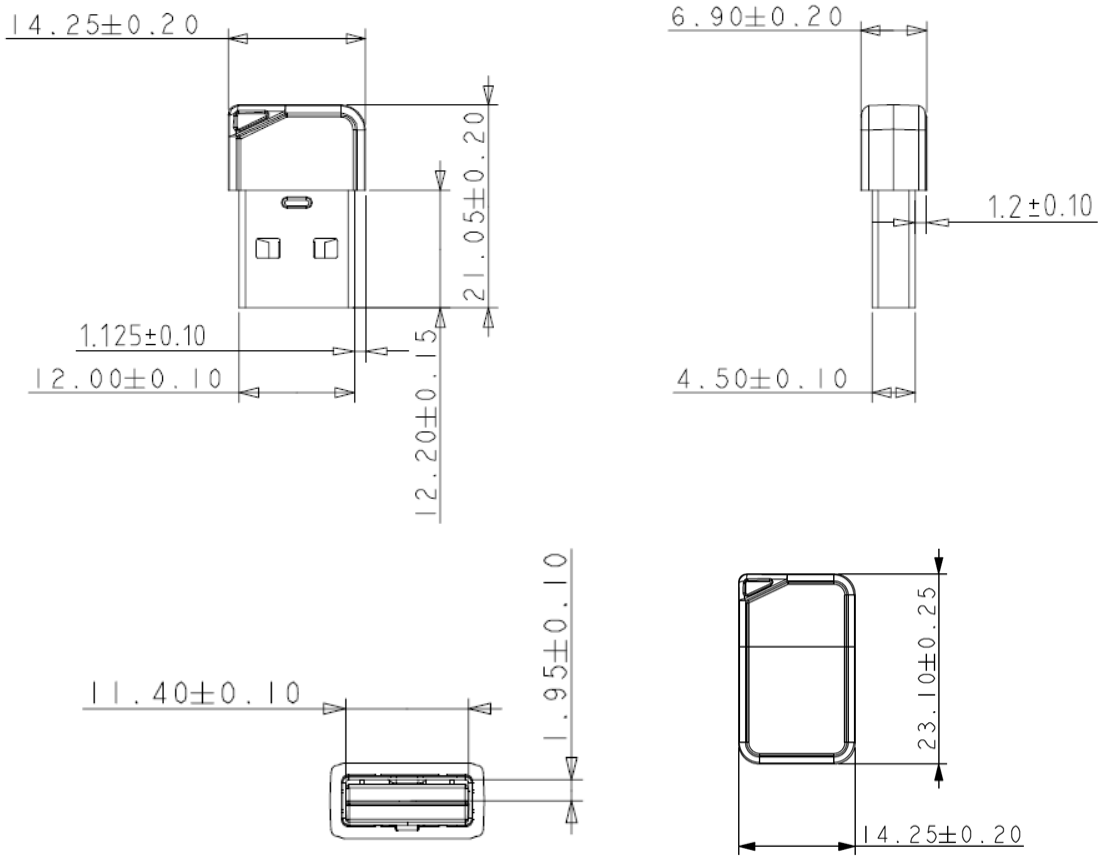
Table 4-2 lists the power consumption for EH163-M.

Table 4-2 Power Consumption

Capacity / Mode	8 GB	16 GB	32 GB	64 GB
Active (mA)	135	130	135	190
Idle (mA)	45	45	45	45

Note:
*All values are typical and may vary depending on flash configurations or host system settings.
**Active power is an average power measurement performed using CrystalDiskMark with 128KB sequential read/write transfers.

5. Physical Characteristics

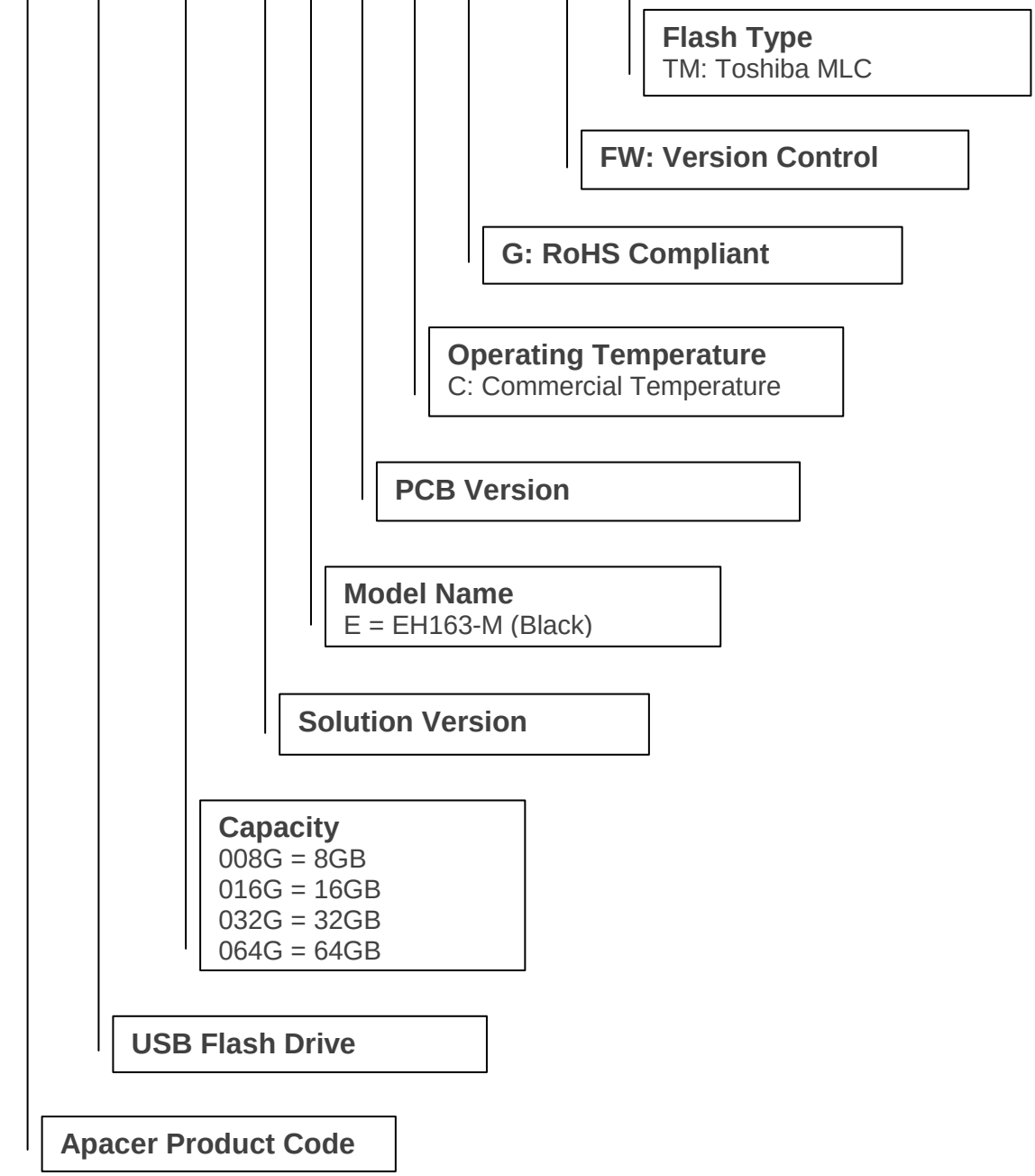


Unit: mm
Tolerance: ± 0.2

6. Product Ordering Information

6.1 Product Code Designations

AP HA xxxG 3 E A C G – A TM



6.2 Valid Combinations

Capacity	Part Number
8GB	APHA008G3EACG-ATM
16GB	APHA016G3EACG-ATM
32GB	APHA032G3EACG-ATM
64GB	APHA064G3EACG-ATM

Note: Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

Revision History

Revision	Description	Date
1.0	Official release	3/21/2016
1.1	Added shock and vibration test specifications	3/25/2016
1.2	Revised performance and power consumption values for 16GB	7/5/2016
1.3	Added S.M.A.R.T. and Power Failure Management to Features	9/29/2016
1.4	- Updated the spec sheet format - Updated mechanical specifications	11/8/2016
1.5	Updated Dimensions on Specifications Overview page	4/24/2019

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