



Industrial M.2 2242 SATA III NGFF SSD

HERMES-G Series

Product Specification

INDUSTRIAL

M.2 2242 SATA III SSD

Version 01V0

Document No. 100-xBMDS-JGTL

April 2015

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Revision History

Revision	Description	Date
1.0	Initial release	2015/04/24

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1. Introduction

APRO M.2 2242 SATA III SSD – HERMES-G Series provides high capacity flash memory Solid State Drive (SSD) that electrically complies with Serial ATA 3.0 (SATA) standard. APRO M.2 2242 SATA III SSD – HERMES-G Series support SATA Gen-III (6.0 Gb/s) with high performance. The main used flash memories are SLC-NAND type flash memory chips. The available disk capacities are 4GB, 8GB, 16GB and 32GB.

The operating temperature grade is optional for Standard grade 0°C ~ 70°C and wide temp grade supports -40°C ~ +85°C. The data transfer performance by sequential read is up to 307.1 MB/sec, and sequential write is up to 133.5 MB/sec.

APRO M.2 2242 SATA III SSD products provide a high level interface to the host computer. This interface allows a host computer to issue commands to M.2 2242 SATA III SSD to read or write blocks of memory. Each sector is protected by a powerful 40 bits per 1024 bytes error correction (ECC). APRO M.2 2242 SATA III SSD HERMES-G Series intelligent controller manages interface protocols, data storage and retrieval as well as ECC, defect handling and diagnostics, power management and clock control.

Figure 1 shows a block diagram of the used high tech M.2 2242 SATA III SSD controller.

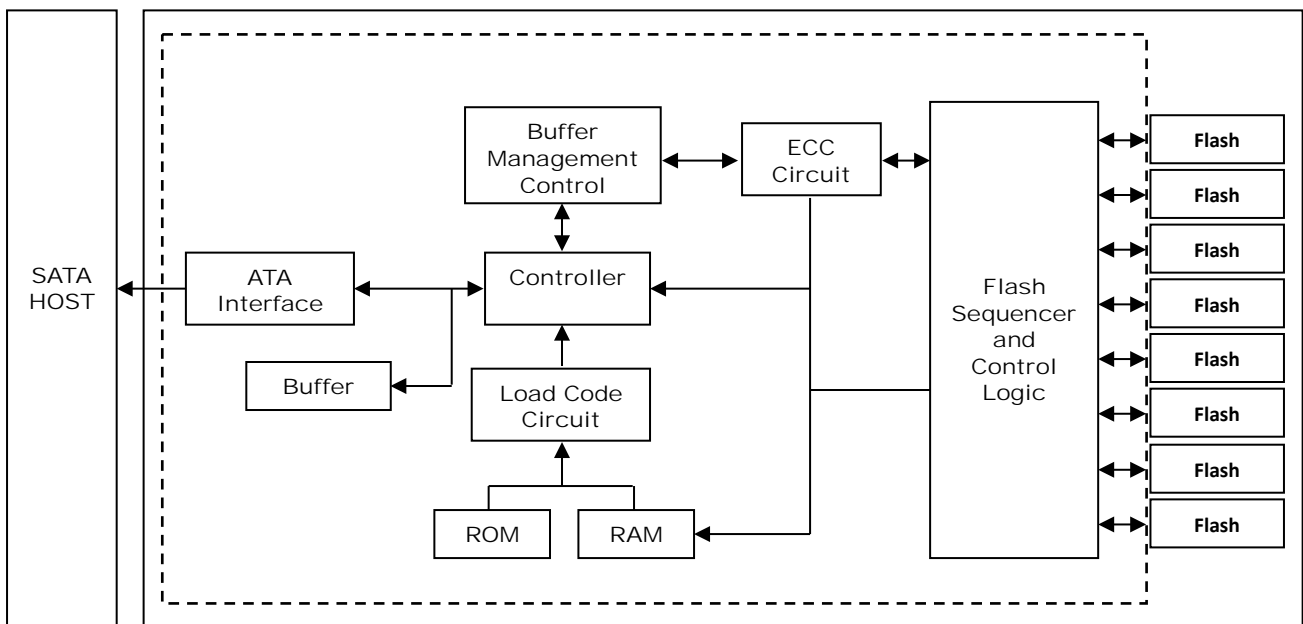


Figure 1: APRO M.2 2242 SATA III SSD HERMES-G Series controller block diagram

1.1. *Scope*

This document describes features, specifications and installation guide of APRO's M.2 2242 SATA III SSDs – HERMES-G Series. In the appendix, there provides order information, warranty policy, RMA/DOA procedure for the most convenient reference.

1.2. *System Features*

- SLC-NAND type flash technology
- Bootable for O.S. installation
- Dual B + M key
- SATA 1.0a, SATA 2.6 and SATA 3.0 specification compliance
- SMART (Self-Monitoring, Analysis and Reporting Technology) function supported.
- Non-volatile memory and no moving parts
- SLC Flash SSD standard grade capacity from 4GB up to 32GB
- Sequential read performance up to 307.1 MB/sec
- Sequential write performance up to 133.5 MB/sec
- Automatic 40 bits per 1024 bytes error correction (ECC) and retry capabilities
- +3.3V \pm 5% operation
- Shock : 0.5ms, 1500 G, 3 axes
- Vibration : 7 Hz to 2K Hz, 20G, 3 axes
- Very high performance, very low power consumption
- Low weight, Noiseless
- Standard grade supports operating temperature 0°C to +70°C, and Industrial Grade, -40°C to +85°C.

1.3. *Flash Management Technology - Static Wear Leveling*

In order to gain the best management for flash memory, APRO M.2 2242 SATA III SSD HERMES-G Series supports Static Wear-leveling technology to manage the Flash system. The life of flash memory is limited; the management is to increase the life of the flash product.

A static wear-leveling algorithm evenly distributes data over an entire Flash cell array and searches for the least used physical blocks. The identified low cycled sectors are used to write the data to those locations. If blocks are empty, the write occurs normally. If blocks contain static data, it moves that data to a more heavily used location before it moves the newly written data. The static wear leveling maximizes effective endurance Flash array compared to no wear leveling or dynamic wear leveling.

2. Product Specifications

For all the following specifications, values are defined at ambient temperature and nominal supply voltage unless otherwise stated.

2.1. System Environmental Specifications

Table 1: Environmental Specification

APRO M.2 2242 SATA III SSD		Standard Grade	Industrial Grade
HERMES-G Series		SBMDSxxxG-JGCTC-42	WBMDSxxxG-JGITI-42
Temperature	Operating:	0°C ~ +70°C	-40°C ~ +85°C
	Non-operating:	-20°C ~ +80°C	-50°C ~ +95°C
Humidity	Operating & Non-operating:	10% ~ 95% non-condensing	
Vibration	Operating & Non-operating:	7 Hz to 2K Hz, 20G, 3 axes	
Shock	Operating & Non-operating:	0.5ms, 1500 G, 3 axes	

2.2. System Power Requirements

Table 2: Power Requirement

APRO M.2 2242 SATA III SSD		
HERMES-G Series		
DC Input Voltage (VCC) 100mV max. ripple(p-p)		3.3V±5%
+5V Current (Maximum average value)	Reading Mode :	261 (max.)
	Writing Mode :	366 (max.)
	Idle Mode :	125 (max.)

2.3. System Performance

Table 3: System Performances

Data Transfer Mode supporting		Serial ATA Gen-III (6.0Gb/s = 768MB/s)			
Average Access Time		0.1 ms (estimated)			
Maximum Performance	Capacity	4GB	8GB	16GB	32GB
	Sequential Read (MB/s)	231.9	231.9	307.1	307.1
	Sequential Write(MB/s)	60.8	64.6	133.3	133.5

Note:

(1). All values quoted are typically at 25 °C and nominal supply voltage.

(2). Testing of the M.2 2242 SATA III SSD maximum performance was performed under the following platform:

- Computer with Intel i5 3.5GHz processor with Windows 7 Professional operating system

2.4. System Reliability

Table 4: System Reliability

Wear-leveling Algorithms	Static Wear-leveling
Bad Blocks Management	Supportive
ECC Technology	40 bits per 1024 bytes
Endurance	Un-limited Read Cycles Endurance Management enables five years minimal useful life
Data Retention	10 years

2.5. Physical Specifications

Refer to Table 5 and see Figure 3 for M.2 2242 SATA III SSD HERMES-G Series physical specifications and dimensions.

Table 5: Physical Specifications of APRO M.2 2242 SATA III SSD-HERMES-G Series

Length:	42.00 mm
Width:	22.00 mm
Thickness:	3.00 mm
Weight:	8.00 g / 0.28 oz

2.5.1. Conformal coating

Conformal coating is a protective, dielectric coating designed to conform to the surface of an assembled printed circuit board. Commonly used conformal coatings include silicone, acrylic, urethane and epoxy. APRO applies only silicone on APRO storage products upon requested especially by customers. The type of silicone coating features good thermal shock resistance due to flexibility. It is also easy to apply and repair.

Conformal coating offers protection of circuitry from moisture, fungus, dust and corrosion caused by extreme environments. It also prevents damage from those Flash storages handling during construction, installation and use, and reduces mechanical stress on components and protects from thermal shock. The greatest advantage of conformal coating is to allow greater component density due to increased dielectric strength between conductors.

APRO uses MIL-I-46058C silicon conformal coating

3. Interface Description

3.1. APRO M.2 2242 SATA III SSD interface

APRO M.2 2242 SATA III SSD is equipped dual B + M key



Figure 3 : The connectors of M.2 2242 SATA III SSD

3.2. Pin Assignments


Table 7 - Pin Assignments

Pin #	Signal Name	Pin #	Signal Name
1	GND		
3	GND	2	3.3V
5	NC	4	3.3V
7	NC	6	NC
9	NC	8	NC
11	NC	10	DAS/DSS
13	NOTCH	12	NOTCH
15	NOTCH	14	NOTCH
17	NOTCH	16	NOTCH
19	NOTCH	18	NOTCH
21	GND	20	NC
23	NC	22	NC
25	NC	24	NC
27	GND	26	NC
29	NC	28	NC
31	NC	30	NC
33	GND	32	NC
35	NC	34	NC
37	NC	36	NC
39	GND	38	DEVSLP
41	TX+	40	NC
43	TX-	42	NC
45	GND	44	NC
47	RX-	46	NC
49	RX+	48	NC
51	GND	50	NC
53	NC	52	NC
55	NC	54	NC
57	GND	56	Reserved/MFG Data
		58	Reserved/MFG Clock
59	NOTCH	60	NOTCH
61	NOTCH	62	NOTCH
63	NOTCH	64	NOTCH
65	NOTCH	66	NOTCH
67	NC	68	SUSCLK
69	GND	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

Appendix A: Ordering Information

1. Part Number List

◆ APRO M.2 2242 SATA III SSD – HERMES-G Series

Product Picture	Grade	Standard grade (0°C ~ 70°C)	Industrial Grade (-40°C ~ +85°C)
	4GB	SBMDS004G-JGCTC-42(/C)	WBMD5004G-JGITI-42(/C)
	8GB	SBMDS008G-JGCTC-42(/C)	WBMD5008G-JGITI-42(/C)
	16GB	SBMDS016G-JGCTC-42(/C)	WBMD5016G-JGITI-42(/C)
	32GB	SBMDS032G-JGCTC-42(/C)	WBMD5032G-JGITI-42(/C)

2. Part Number Decoder:

X1 X2 X3 X4 X5 X6 X7 X8 X9 – **X11 X12 X13 X14 X15** – **Z1 Z2** – **C**

X1 : Grade

S: Standard Grade – operating temp. 0° C ~ 70 ° C

W: Wide Temp Grade- operating temp. -40° C ~ +85 ° C

X2 : The material of case

B : Bare

X3 X4 X5 : Product category

MDS : M.2 NGFF SSD

X6 X7 X8 X9 : Capacity

004G: 4GB **032G:** 32GB

008G: 8GB

016G: 16GB

X11 : Controller

J : JMicron (HERMES-G Series)

X12 : Controller version

A, B, C.....

X13 : Controller Grade

C : Commercial grade

I : Industrial grade

X14 : Flash IC

T : Toshiba SLC-NAND Flash IC

X15 : Flash IC grade / Type

C : Commercial grade

I : Industrial grade

Z1 Z2 : Form Factor Type

42 : 2242 form factor

C : Reserved for specific requirement

C : Conformal-coating

Appendix B: Limited Warranty

APRO warrants your M.2 2242 SATA III SSD against defects in material and workmanship for the life of the drive. The warranty is void in the case of misuse, accident, alteration, improper installation, misapplication or the result of unauthorized service or repair. The implied warranties of merchantability and fitness for a particular purpose, and all other warranties, expressed or implied, except as set forth in this warranty, shall not apply to the products delivered. In no event shall APRO be liable for any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, this product.

BEFORE RETURNING PRODUCT, A RETURN MATERIAL AUTHORIZATION (RMA) MUST BE OBTAINED FROM APRO.

Product shall be returned to APRO with shipping prepaid. If the product fails to conform based on customers' purchasing orders, APRO will reimburse customers for the transportation charges incurred.

WARRANTY PERIOD:

- SLC (Standard grade) 3 years / Within 60K Erasing Counts
- SLC (Industrial grade) 5 years / Within 60K Erasing Counts

The warranty period is able to extend. Please contact APRO and/or Your APRO distributors for more information.