Secure Encrypting mSATA SLC NAND Flash Solid State Drive (SSD)

Model MM3XXX

The Mercury MM3XXX series of micro SSDs form a complete secure SATA storage system packaged in the industry standard 52-pin MO-300 mSATA form-factor. Incorporating the Mercury Armor® III processor, the devices feature enhanced AES-256 XTS encryption and a multitude security features not available in traditional mSATA SSDs. Perfect for single board computer boot devices and embedded defense applications where a full sized 2.5" SSD is too large, the Mercury mSATA series of micro SSDs combines the Mercury designed Armor III flash controller with the latest in small geometry SLC NAND flash, multiple power supplies, and security features including encryption, isolated key fill, key management options, blazing fast secure erase, 256-bit challenge/response authentication, ATA passwords, Pass-Phrase capability, RNG, anti-tamper features, as well as self-destruct into a single compact PCB. The MM3XXX mSATA SSDs are available with an initial raw capacity 64 GB1 and planned capacities of 32 and 128 GB. The devices are compliant to SATA 2.6, and are compatible with SATA speeds of 1.5 Gb/s, 3.0 Gb/s and 6 Gb/s3 will be offered in TRRUST-Stor® and ASURRE-Stor® models.

Features

- Raw Storage Capacity:
  - 32 GB MM30321,4
  - 64 GB MM30641
  - 128 GB MM31281,4
- Single supply operation: 3.3 to 5.0 V
- TRRUST-Purge®: AES key purge in 30 ms

- FIPS-197 Certified AES-256 XTS encryption
- Media erase in < 8 seconds with external trigger pin option
- Key fill options:
  - Self-Generated
  - Customer defined via SATA SMART command
  - Isolated RS-232 Simple Key Fill Port
  - Isolated RS-485 DS-101 key fill port (CYZ-10, SKL compatible) (ASURRE-Stor version)
- DEVSLP low power standby mode
- FIPS-140-2 (ASURRE-Stor version)
- Includes all standard military sanitize protocols
- Features available from the RS-232 COM security port
  - Challenge/Response authentication
  - SHA-256 Pass-Phrase based Authentication
  - Temperature rate of change, Hi/Low limits
  - Self-destruct (ASURRE-Stor version)
- Robust Single Level Cell (SLC) NAND flash
- 12-bit BCH ECC correction
- Uncorrectable bit error rate (UBER): 10-18
- Sustained sequential R/W 128 KiB performance: 55 MB/s
- Operational temperature range of -40º C to +85º C, Storage Temperature: -55º C to +125º C2
- "Silent error" protection with per sector CRC
- Over and under voltage detection and protection
- Write protect option for read-only applications
- Field upgradable firmware using SATA interface

Mercury Systems is a leading commercial provider of secure sensor and safety-critical processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.

ACQUIRE DIGITIZE PROCESS STORAGE EXPLOIT DISSEMINATE

Applications

- Single Board Computer Boot device
- Ruggedized mobile defense systems
- Battlefield robotics
- Data recorders and digital maps
- Industrial automation
- Transportation systems
- Mobile secure medical products

Optional Features (Contact Factory)

- Rugged enclosure option
- Extended temperature screening
- Custom form factors including BGA

NOTES:
One Gigabyte (GB) = 1,000,000,000 bytes.
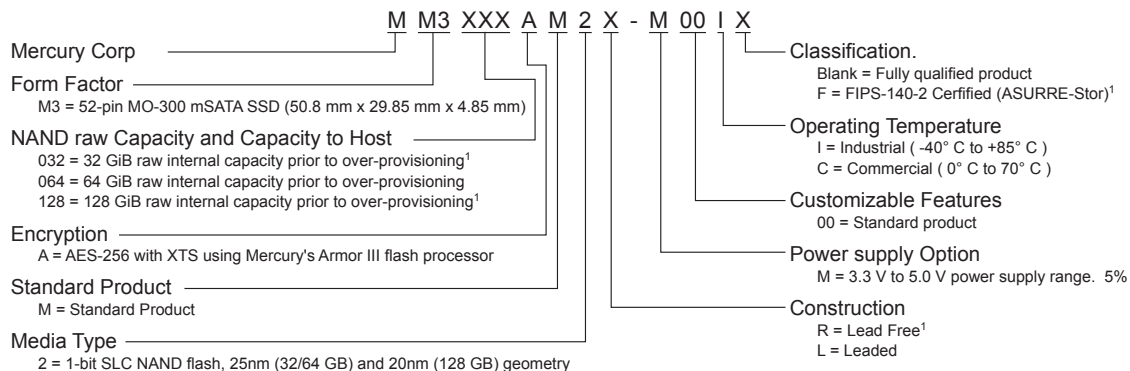Data retention may diminish with extended storage at temperatures above 90ºC.
6 Gb/s (contact factory for availability).
Contact factory for availability.

MM3XXX mSATA Pin Description

Pin #	Signal and Description	Pin #	Description
1	ERASE_TRIGGER: High true erase trigger	2	3.3V
3	RS232_RX_SKF: Simple Key Fill Port Rx	4	GND
5	RS232_RX_SKF: Simple Key Fill Port Tx	6	USB_VIN: 5 v (Keyboard option only)
7	WRITE_PROTECT_N: Low true	8	TAMPER1_N: Tamper input 1
9	GND	10	USB_ID (Optional)
11	WP_LED_N: Write protect LED, Low true	12	MCK_WAKE_N: MCK wake (Optional)
13	KEY_LED_N: Low true	14	TAMPER2_N: Tamper input 2
15	ERASE_GND_N: Secure Erase Return	16	NC
17	ERASE_TRIGGER_N: Low true erase	18	GND
19	SELF_DESTRUCT: Self-Destruct option	20	DEVSLP: SATA DEVSLP signal
21	GND	22	NC
23	SATA_TX_P (output from SSD to Host)	24	3.3V
25	SATA_TX_M (output from SSD to Host)	26	GND
27	SPOOF_TPR: SATA Anti-Spoof or GND (ASURRE-Stor)	28	BATTERY_VOLTAGE: Key Keeper
29	GND	30	USB_VBUS: USB 5 V (Keyboard Option)
31	SATA_RX_M (input from Host to SSD)	32	USB_VBUS: USB 5 V (Keyboard Option)
33	SATA_RX_P (input from Host to SSD)	34	GND
35	GND	36	USB_DM
37	GND	38	USB_DP
39	3.3V	40	GND
41	3.3V	42	RS-485+ (DS-101+)
43	NC (Grounded as an option)	44	RS-485- (DS-101-)
45	MON_RX_PORT: RS-232 Security port Rx	46	AUTH: Authentication IO
47	MON_TX_PORT: RS-232 Security port Tx	48	USB_VIN: 5 V (Keyboard option only)
49	DAS	50	GND
51	GND presence detect (SSD drives this pin low)	52	3.3V

Pin descriptions highlighted in yellow *are NC or Reserved pins in the mSATA specification that have been re-purposed as security functions in the MM30xx*

M M3 XXX A M 2 X - M 00 I X

Mercury Corp

Form Factor
M3 = 52-pin MO-300 mSATA SSD (50.8 mm x 29.85 mm x 4.85 mm)

NAND raw Capacity and Capacity to Host
032 = 32 GiB raw internal capacity prior to over-provisioning[1]
064 = 64 GiB raw internal capacity prior to over-provisioning[1]
128 = 128 GiB raw internal capacity prior to over-provisioning[1]

Encryption
A = AES-256 with XTS using Mercury's Armor III flash processor

Standard Product
M = Standard Product

Media Type
2 = 1-bit SLC NAND flash, 25nm (32/64 GB) and 20nm (128 GB) geometry

Classification.
Blank = Fully qualified product
F = FIPS-140-2 Cerfified (ASURRE-Stor)[1]

Operating Temperature
I = Industrial (-40° C to +85° C)
C = Commercial (0° C to 70° C)

Customizable Features
00 = Standard product

Power supply Option
M = 3.3 V to 5.0 V power supply range. 5%

Construction
R = Lead Free[1]
L = Leaded

Example part Number: MM3064AM2R-M00I

(1) Contact factory for availability

3199.02E-0318-ds-SSD-mm3xxx

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