

UD info Corp.

Industrial M.2 2280 SATA Drive

FIPS 140-2

M2S-80DA Series

Product DataSheet



© 2021 UD INFO Corp. All right reserved.

Specifications are subject to change without prior notice.

UD info CORP.

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

E-mail: sales@UDinfo.com.tw

1.	Introduction	5
1.1.	General Description	5
1.2.	Block Diagram	5
2.	Product Specifications.....	6
3.	Environmental Specifications	9
3.1.	Environmental Conditions	9
3.1.1.	Temperature and Humidity	9
3.1.2.	Shock.....	10
3.1.3.	Vibration.....	10
3.1.4.	Drop	10
3.1.5.	Bending	10
3.1.6.	Durability	10
3.1.7.	Electrostatic Discharge (ESD)	10
3.1.8.	EMI Compliance	11
3.2.	MTBF.....	11
3.3.	Certification & Compliance	11
4.	Electrical Specifications	12
4.1.	Supply Voltage.....	12
4.2.	Power Consumption.....	12
5.	Interface.....	13
5.1.	Pin Assignment and Descriptions	13
6.	Supported Commands.....	16
6.1.	ATA Command List.....	16
6.2.	Identify Device Data	21
7.	Physical Dimension	25
8.	Barcode Description	27
9.	Ordering Information.....	27

Revision History

Revision	Draft Date	History	Author
1.0	2021/7/8	New release	Golden Lee
1.1	2021/10/22	Update Product picture	Golden Lee



Product Overview

- **Capacity**
 - 128GB up to 2TB
- **Form Factor**
 - M.2 2280-D2-B-M
- **SATA Interface**
 - SATA Revision 3.2
- **Flash Interface**
 - Flash Type: 3D TLC
 - Up to 4pcs of BGA132 flash
- **Performance**
 - Read up to 550 MB/s
 - Write up to 530 MB/s
- **Power Consumption^{Note1}**
 - Active mode: < 2,000 mW
 - Idle mode: < 105 mW
- **Reliability**
 - MTBF 2,000,000 hours
 - Uncorrectable Bit Error Rate (UBER)
< 1 sector per 10¹⁶ bits read
- **Advanced Flash Management**
 - Advanced Wear Leveling
 - Bad Block Management
 - TRIM
 - SMART
 - Over-Provision
- **Temperature Range**
 - Operation: 0°C ~ 70°C
 - Storage: -40°C ~ 85°C
- **Compliant**
 - RoHS
- **Features Support List:**
 - End to end data path protection
 - Thermal throttling
 - SmartECC™
 - SmartRefresh™
 - TCG OPAL
 - FIPS 140-2 Level 2 certified:
Certificate number #3940

Notes:

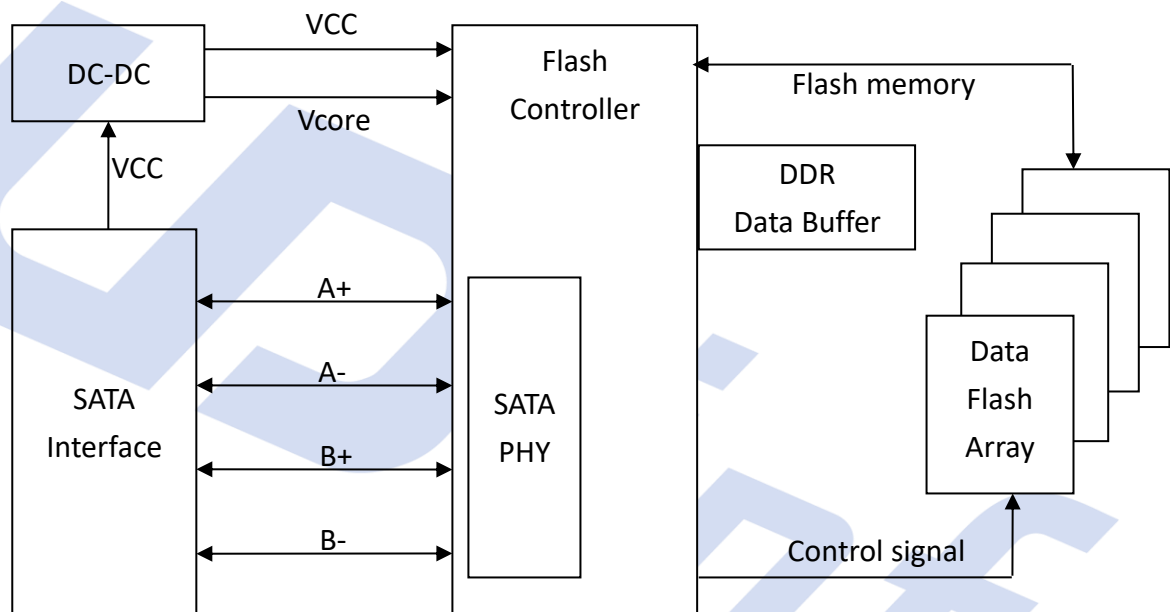
1. Please see "Power Consumption" for details.

1. INTRODUCTION

1.1. General Description

UDinfo's M.2 2280 FIPS SATA Drive delivers all the advantages of Flash Disk technology with the Serial ATA I/II/III interface and is fully compliant with the standard *Next Generation Form Factor* (NGFF) called M.2 Card Format, which is generated by Intel. Its capacity could provide a wide range up to 2TB. Moreover, it can reach up to 550MB/s read as well as 530MB/s write high performance based on 3D TLC NAND flash.

1.2. Block Diagram



M.2 2280 SSD Block Diagram

2. PRODUCT SPECIFICATIONS



- **Capacity**
 - 128GB up to 2TB
- **Electrical/Physical Interface**
 - Compliant with SATA Revision 3.2
 - Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
 - Support power management
 - Support expanded register for SATA protocol 48 bits addressing mode
- **Supported NAND Flash**
 - Support up to 32 Flash Chip Enables (CE) within single design
 - Support 4pcs BGA132 flash
 - Support OFNI 4.0 & Toggle 3.0 interface
 - Support Kioxia 3D TLC
- **ECC Scheme**
 - Applies the LDPC (Low Density Parity Check) of ECC algorithm
- **UART / GPIO function**
- **Support SMART and TRIM commands**
- **Security features**
 - FIPS 140-2 Level 2 certified: when used in FIPS approved mode (When installed, initialized and configured as specified in the Security Rules Section of the UDinfo FIPS 140-2 non-proprietary Security Policy)
 - Full disk AES-XTS 256bit hardware encryption to protect user data storage
 - RSA-2048 Digital Signature Verification for secure boot and secure firmware update
 - On-chip Deterministic Random Number Generator used for key generation
 - Tamper-Evidence Protection
 - Support of TCG OPAL SSC 2.0

● Capacity Information

Capacity	Cylinders	Heads	Sectors	Total Sectors	User Data Size
128GB	16,383	16	63	250,069,680	Depended on file management
256GB	16,383	16	63	500,118,192	
512GB	16,383	16	63	1,000,215,216	
1TB	16,383	16	63	2,000,409,264	
2TB	16,383	16	63	4,000,797,360	

● Performance

Capacity	Flash Structure	Sequential		Random	
		Read (MB/s)	Write (MB/s)	Read (IOPS)	Write (IOPS)
128GB	64GB x2, BGA, 256Gb DDP	550	530	94K	90K
256GB	64GB x4, BGA, 256Gb DDP	550	530	98K	90K
512GB	128GB x4, BGA, 256Gb QDP	550	530	98K	91K
1TB	256GB x4, BGA, 256Gb ODP	550	530	98K	90K
2TB	512GB x4, BGA, 512Gb ODP	550	530	98K	90K

Notes:

1. The performance was estimated based on Kioxia 3D TLC NAND flash.
2. Performance may differ according to flash configuration and platform.
3. The table above is for reference only. Any criteria for accepting goods shall be discussed based on different flash configuration.
4. Performance is measured with the following conditions
 - (a) CrystalDiskMark 6.0.0, 1GB range, QD32
 - (b) IO Meter, 1GB range, 4K datasize, QD32

● TBW (Terabytes Written)

Capacity	Flash Structure	TBW
128GB	64GB x2, BGA, 256Gb DDP	120
256GB	64GB x4, BGA, 256Gb DDP	280
512GB	128GB x4, BGA, 256Gb QDP	605
1024GB	256GB x4, BGA, 256Gb ODP	1275
2048GB	512GB x4, BGA, 512Gb ODP	3465

Notes:

1. Samples were built using Kioxia 3D TLC NAND flash.

2. The test followed JEDEC219A client endurance workload.
3. TBW may differ according to flash configuration and platform.
4. The endurance of SSD could be estimated based on user behavior, NAND endurance cycles, and write amplification factor. It is not guaranteed by flash vendor.



3. ENVIRONMENTAL SPECIFICATIONS



3.1. Environmental Conditions

3.1.1. Temperature and Humidity

- Temperature:
 - ◆ Storage: -40°C to 85°C
 - ◆ Operational: 0°C to 70°C

■ High Temperature Test Condition

	Temperature	Humidity
Operation	70°C	0% RH
Storage	85°C	0% RH

■ Low Temperature Test Condition

	Temperature	Humidity
Operation	0°C	0% RH
Storage	-40°C	0% RH

■ High Humidity Test Condition

	Temperature	Humidity
Operation (Standard)	40°C	90% RH
Storage (Standard)	40°C	93% RH

■ Temperature Cycle Test

	Temperature
Operation	0°C
	70°C ^{Note1}
Storage	-40°C
	85°C

Notes:

1. Operation temperature is measured by device temperature sensor. Airflow is suggested and it will allow device to be operated at appropriate temperature for each component during heavy workloads environment.

3.1.2. Shock

■ Shock Specification

	Acceleration Force	Number of Shock
Non-operational	1500G	6 faces of each unit 3 times for each face

3.1.3. Vibration

■ Vibration Specification

	Condition	
	Frequency/Displacement	Frequency/Acceleration
Non-operational	20Hz~80Hz/1.52mm	80Hz~2000Hz/20G

3.1.4. Drop

■ Drop Specification

	Height of Drop	Number of Drop
Non-operational	80cm free fall	6 face of each unit

3.1.5. Bending

■ Bending Specification

	Force	Action
Non-operational	≥ 20N	Hold 1min/5times

3.1.6. Durability

■ Durability Specification

	Condition
Operational	1000 mating cycles

3.1.7. Electrostatic Discharge (ESD)

■ Contact ESD Specification

Device	Temperature	Relative Humidity	+/- 4KV
M.2 2280	25.0°C	50% (RH)	Device functions are affected, but EUT will be back to its normal or operational state automatically.

3.1.8. EMI Compliance

Specification
EN 55032, CISPR 32 (CE)
ANSI C63.4 (FCC)
VCCI-CISPR 32 (VCCI)
CNS 13438 (BSMI)

3.2. MTBF

MTBF, Mean Time Between Failures, is a measure of reliability of a device. Its value represents the average time between a repair and the next failure. The unit of MTBF is in hours. The higher the MTBF value, the higher the reliability of the device.

Our MTBF result is based on simulation software (Relex7.3). Please note that a lower MTBF should be expected for higher capacity drives, and we apply the lowest MTBF for all capacities.

3.3. Certification & Compliance

- RoHS
- WHQL
- SATA III (SATA Rev. 3.2)

4. ELECTRICAL SPECIFICATIONS



4.1. Supply Voltage

Parameter	Rating
Operating Voltage	3.3V $\pm$ 5% Min = 3.14V Max = 3.47V
Rise Time (Max/Min)	100ms / 0.1ms
Fall Time (Max/Min)	5s / 1ms
Min. off Time	1s

4.2. Power Consumption

Capacity	Flash Structure	Read	Write	Partial	Slumber	Idle	DevsIp
128GB	64GB x2, BGA, 256Gb DDP	1,900	1,800	25	20	105	5
256GB	64GB x4, BGA, 256Gb DDP	1,900	1,800	25	20	100	5
512GB	128GB x4, BGA, 256Gb QDP	1,900	1,800	25	20	100	5
1TB	256GB x4, BGA, 256Gb ODP	2,000	1,900	27	20	105	5
2TB	512GB x4, BGA, 512Gb ODP	2,000	1,900	27	20	100	5

Unit: mW

Notes:

- Based on SCPU1xxx-series under ambient temperature.
- The measured power voltage is 3.3V.
- Use CrystalDiskMark 6.0.0 with the setting of 1000MB. Sequentially read and write the disk for 5 times, and measure power consumption during sequential Read [1/5]~[5/5] or sequential Write [1/5]~[5/5]
- Power Consumption may differ according to flash configuration and platform.

5. INTERFACE



5.1. Pin Assignment and Descriptions

The follow table defines the signal assignment of the internal NGFF connector for SSD usage, described in the PCI Express M.2 Specification version 1.0 of the PCI-SIG.

Pin #	SATA Pin	Description
1	CONFIG_3 = GND	Ground
2	3.3V	Supply pin
3	GND	Ground
4	3.3V	Supply pin
5	N/C	No Connect
6	N/C	No Connect
7	N/C	No Connect
8	N/C	No Connect
9	N/C or GND ^{Note}	No Connect or Ground
10	DAS/DSS# (O) (OD)	Status indicators via LED devices that will be provided by the system Active Low. A pulled-up LED with series current limiting resistor should allow for 9mA when On.
11	N/C	No Connect
12	Module Key	
13	Module Key	
14	Module Key	
15	Module Key	
16	Module Key	
17	Module Key	
18	Module Key	
19	Module Key	
20	N/C	No Connect
21	CONFIG_0 = GND	Ground
22	N/C	No Connect
23	N/C	No Connect
24	N/C	No Connect
25	N/C	No Connect
26	N/C	No Connect
27	GND	Ground
28	N/C	No Connect

UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

Pin #	SATA Pin	Description
29	N/C	No Connect
30	N/C	No Connect
31	N/C	No Connect
32	N/C	No Connect
33	GND	Ground
34	N/C	No Connect
35	N/C	No Connect
36	N/C	No Connect
37	N/C	No Connect
38	DEVSLP (I) (0/3.3V)	Device Sleep, Input. When driven high the host is informing the SSD to enter a low power state
39	GND	Ground
40	N/C	No Connect
41	SATA-B+	SATA differential signals in the SATA specification
42	N/C	No Connect
43	SATA-B-	SATA differential signals in the SATA specification
44	N/C	No Connect
45	GND	Ground
46	N/C	No Connect
47	SATA-A-	SATA differential signals in the SATA specification
48	N/C	No Connect
49	SATA-A+	SATA differential signals in the SATA specification
50	N/C	No Connect
51	GND	Ground
52	N/C	No Connect
53	N/C	No Connect
54	N/C	No Connect
55	N/C	No Connect
56	Reserved for MFG Data	No Connect
57	GND	Ground
58	Reserved for MFG Clock	No Connect
59	Module Key	
60	Module Key	

UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

Pin #	SATA Pin	Description
61	Module Key	
62	Module Key	
63	Module Key	
64	Module Key	
65	Module Key	
66	Module Key	
67	N/C	No Connect
68	SUSCLK (I) (0/3.3V)	No Connect
69	CONFIG_1 = GND	Ground
70	3.3V	Supply pin
71	GND	Ground
72	3.3V	Supply pin
73	GND	Ground
74	3.3V	Supply pin
75	CONFIG_2 = GND	Ground

Note: N/C for Socket 2, and GND for Socket 3.

6. SUPPORTED COMMANDS



6.1. ATA Command List

Op Code	Support	Description	Op Code		Support	Description
00h	Y	NOP	B6h	12h	-	NV Cache: QUERY NV CACHE PINNED SET DMA EXT
03h	-	CFA REQUEST EXTENDED ERROR	B6h	13h	-	NV Cache: QUERY NV CACHE MISSES DMA EXT
06h	Y	DATA SET MANAGEMENT	B6h	14h	-	NV Cache: FLUSH NV CACHE
08h	-	DEVICE RESET	C4h		Y	READ MULTIPLE
0Bh	-	REQUEST SENSE DATA EXT	C5h		Y	WRITE MULTIPLE
10h	Y	RECALIBRATE	C6h		Y	SET MULTIPLE MODE
11h-1Fh	-	RECALIBRATE	C7h		-	READ DMA QUEUED
20h	Y	READ SECTOR(S)	C8h		Y	READ DMA
21h	Y	READ SECTOR(S) WITHOUT RETRY	C9h		Y	READ DMA WITHOUT RETRY
22h	-	READ LONG	CAh		Y	WRITE DMA
23h	-	READ LONG WITHOUT RETRY	CBh		Y	WRITE DMA WITHOUT RETRY
24h	Y	READ SECTOR(S) EXT	CCh		-	WRITE DMA QUEUED
25h	Y	READ DMA EXT	CDh		-	CFA WRITE MULTIPLE WITHOUT ERASE
26h	-	READ DMA QUEUED EXT	CEh		Y	WRITE MULTIPLE FUA EXT
27h	Y	READ NATIVE MAX ADDRESS EXT	D1h		-	CHECK MEDIA CARD TYPE
29h	Y	READ MULTIPLE EXT	DAh		-	GET MEDIA STATUS
2Ah	-	READ STREAM DMA EXT	DEh		-	MEDIA LOCK
2Bh	-	READ STREAM EXT	DFh		-	MEDIA UNLOCK
2Fh	Y	READ LOG EXT	E0h		Y	STANDBY IMMEDIATE
30h	Y	WRITE SECTOR(S)	E1h		Y	IDLE IMMEDIATE
31h	Y	WRITE SECTOR(S) WITHOUT RETRY	E2h		Y	STANDBY
32h	-	WRITE LONG	E3h		Y	IDLE
33h	-	WRITE LONG WITHOUT RETRY	E4h		Y	READ BUFFER
34h	Y	WRITE SECTOR(S) EXT	E5h		Y	CHECK POWER MODE
35h	Y	WRITE DMA EXT	E6h		Y	SLEEP
36h	-	WRITE DMA QUEUED EXT	E7h		Y	FLUSH CACHE
37h	Y	SET MAX ADDRESS EXT	E8h		Y	WRITE BUFFER

UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

Op Code	Support	Description	Op Code		Support	Description	
38h	-	CFA WRITE SECTORS WITHOUT ERASE	E9h		Y	READ BUFFER DMA	
39h	Y	WRITE MULTIPLE EXT	EAh		Y	FLUSH CACHE EXT	
3Ah	-	WRITE STREAM DMA EXT	EBh		Y	WRITE BUFFER DMA	
3Bh	-	WRITE STREAM EXT	ECh		Y	IDENTIFY DEVICE	
3Ch	-	WRITE VERIFY	EDh		-	MEDIA EJECT	
3Dh	Y	WRITE DMA FUA EXT	EEh		-	IDENTIFY DEVICE DMA	
3Eh	-	WRITE DMA QUEUED FUA EXT	EFh	01h	-	SET FEATURES: Enable 8-bit PIO transfer mode (CFA feature set only)	
3Fh	Y	WRITE LOG EXT	EFh	02h	Y	SET FEATURES: Enable write cache	
40h	Y	READ VERIFY SECTOR(S)	EFh	03h	Y	SET FEATURES: Set transfer mode based on value in Count field	
41h	Y	READ VERIFY SECTOR(S) WITHOUT RETRY	EFh	05h	Y	SET FEATURES: Enable advanced power management	
42h	Y	READ VERIFY SECTOR(S) EXT	EFh	06h	-	SET FEATURES: Enable Power-Up In Standby feature set	
44h	-	Reserved	EFh	07h	-	SET FEATURES: Power-Up In Standby feature set device spin-up	
45h	O	WRITE UNCORRECTABLE EXT	EFh	0Ah	-	SET FEATURES: Enable CFA power mode 1	
47h	Y	READ LOG DMA EXT	EFh	0Bh	-	SET FEATURES: Enable Write-Read-Verify feature set	
50h	-	FORMAT TRACK	EFh	10h	01h	-	SET FEATURES: Enable use of Serial ATA feature
51h	-	CONFIGURE STREAM	EFh	10h	02h	Y	SET FEATURES: Enable DMA Setup FIS Auto-Activate optimization
57h	Y	WRITE LOG DMA EXT	EFh	10h	03h	Y	SET FEATURES: Enable Device-initiated interface power state (DIPM) transitions
60h	Y	READ FPDMA QUEUED	EFh	10h	04h	-	SET FEATURES: Enable use of Serial ATA feature
61h	Y	WRITE FPDMA QUEUED	EFh	10h	05h	-	SET FEATURES: Enable use of Serial ATA feature
70h	Y	SEEK	EFh	10h	06h	O	SET FEATURES: Enable Software Settings Preservation (SSP)

71-76h		-	SEEK	EFh	10h	07h	Y	SET FEATURES: Enable Device Automatic Partial to Slumber transitions
Op Code		Support	Description	Op Code			Support	Description
77h		Y	SET DATE AND TIME EXT	EFh	10h	09h	O	SET FEATURES: Enable Device Sleep
78h		Y	ACCESSIBLE MAX ADDRESS CONFIGURATION	EFh	42h		-	SET FEATURES: Enable Automatic Acoustic Management feature set
79-7Fh		-	SEEK	EFh	43h		-	SET FEATURES: Set Maximum Host Interface Sector Times
87h		-	CFA TRANSLATE SECTOR	EFh	44h		-	SET FEATURES: Vendor Specific ECC byte
90h		Y	EXECUTE DEVICE DIAGNOSTIC	EFh	55h		Y	SET FEATURES: Disable read look-ahead feature
91h		Y	INITIALIZE DEVICE PARAMETERS	EFh	5Dh		-	SET FEATURES: Enable release interrupt
92h		Y	DOWNLOAD MICROCODE	EFh	5Eh		-	SET FEATURES: Enable service interrupt
93h		Y	DOWNLOAD MICROCODE DMA	EFh	5Fh		-	SET FEATURES: Enable NDRQ Feature
94h		-	STANDBY IMMEDIATE	EFh	66h		Y	SET FEATURES: Disable reverting to power-on defaults
95h		-	IDLE IMMEDIATE	EFh	81h		-	SET FEATURES: Disable 8-bit PIO transfer mode (CFA feature set only)
96h		-	STANDBY	EFh	82h		Y	SET FEATURES: Disable write cache
97h		-	IDLE	EFh	85h		Y	SET FEATURES: Disable advanced power management
98h		-	CHECK POWER MODE	EFh	86h		-	SET FEATURES: Disable Power-Up In Standby feature set
99h		-	SLEEP	EFh	8Ah		-	SET FEATURES: Disable CFA power mode
A0h		-	PACKET	EFh	8Bh		-	SET FEATURES: Disable Write-Read-Verify feature set
A1h		-	IDENTIFY PACKET DEVICE	EFh	90h	01h	-	SET FEATURES: Disable use of Serial ATA feature
A2h		-	SERVICE	EFh	90h	02h	Y	SET FEATURES: Disable DMA Setup FIS Auto-Activate optimization
B0h	D0h	Y	SMART: READ DATA	EFh	90h	03h	Y	SET FEATURES: Disable Device-

UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

								initiated interface power state (DIPM) transitions
Op Code		Support	Description	Op Code			Support	Description
B0h	D1h	Y	SMART: READ ATTRIBUTE THRESHOLDS	EFh	90h	04h	-	SET FEATURES: Disable use of Serial ATA feature
B0h	D2h	Y	SMART: ENABLE/DISABLE AUTOSAVE	EFh	90h	05h	-	SET FEATURES: Disable use of Serial ATA feature
B0h	D3h	Y	SMART: SAVE ATTRIBUTE VALUES	EFh	90h	06h	Y	SET FEATURES: Disable Software Settings Preservation (SSP)
B0h	D4h	Y	SMART: EXECUTE OFF-LINE IMMEDIATE	EFh	90h	07h	Y	SET FEATURES: Disable Device Automatic Partial to Slumber transitions
B0h	D5h	Y	SMART: READ LOG	EFh	90h	09h	O	SET FEATURES: Disable Device Sleep
B0h	D6h	Y	SMART: WRITE LOG	EFh	AAh		Y	SET FEATURES: Enable read look-ahead feature
B0h	D8h	Y	SMART: ENABLE OPERATIONS	EFh	BBh		-	SET FEATURES: Default ECC byte
B0h	D9h	Y	SMART: DISABLE OPERATIONS	EFh	C2h		-	SET FEATURES: Disable Automatic Acoustic Management feature set
B0h	DAh	Y	SMART: RETURN STATUS	EFh	C3h		-	SET FEATURES: Enable/Disable the Sense Data Reporting feature set
B0h	DBh	Y	SMART: ENABLE/DISABLE AUTOMATIC OFF-LINE	EFh	CCh		Y	SET FEATURES: Enable reverting to power-on defaults
B0h	E0h	-	SMART: Vendor specific	EFh	DDh		-	SET FEATURES: Disable release interrupt
B1h	C0h	Y	DEVICE CONFIGURATION: RESTORE	EFh	DEh		-	SET FEATURES: Disable SERVICE interrupt
B1h	C1h	Y	DEVICE CONFIGURATION: FREEZE LOCK	EFh	DFh		-	SET FEATURES: Disable NDRQ Feature
B1h	C2h	Y	DEVICE CONFIGURATION: IDENTIFY	F1h			non-FIPS	SECURITY SET PASSWORD
B1h	C3h	Y	DEVICE CONFIGURATION: SET	F2h			non-FIPS	SECURITY UNLOCK
B1h	C4h	Y	DEVICE CONFIGURATION: IDENTIFY DMA	F3h			non-FIPS	SECURITY ERASE PREPARE
B1h	C5h	Y	DEVICE CONFIGURATION: SET DMA	F4h			non-FIPS	SECURITY ERASE UNIT
B4h	0000h	O	SANITIZE DEVICE: SANITIZE STATUS EXT	F5h			non-FIPS	SECURITY FREEZE LOCK

Op Code		Support	Description	Op Code		Support	Description
B4h	0011h	O	SANITIZE DEVICE: CRYPTO SCRAMBLE EXT	F6h		non-FIPS	SECURITY DISABLE PASSWORD
B4h	0012h	O	SANITIZE DEVICE: BLOCK ERASE EXT	F8h		Y	READ NATIVE MAX ADDRESS
B4h	0014h	O	SANITIZE DEVICE: OVERWRITE EXT	F9h	00h	Y	SET MAX: SET MAX ADDRESS
B4h	0020h	O	SANITIZE DEVICE: SANITIZE FREEZE LOCK EXT	F9h	01h	Y	SET MAX: SET MAX PASSWORD
B4h	0040h	O	SANITIZE DEVICE: SANITIZE ANTIFREEZE LOCK EXT	F9h	02h	Y	SET MAX: SET MAX LOCK
B6h	00h	-	NV Cache: SET NV CACHE POWER MODE EXT	F9h	03h	Y	SET MAX: SET MAX UNLOCK
B6h	01h	-	NV Cache: RETURN FROM NV CACHE POWER MODE EXT	F9h	04h	Y	SET MAX: SET MAX FREEZE LOCK
B6h	10h	-	NV Cache: ADD LBA(S) TO NV CACHE PINNED SET DMA EXT	F9h	05h	Y	SET MAX: SET MAX SET PASSWORD DMA
B6h	11h	-	NV Cache: REMOVE LBA(S) FROM NV CACHE PINNED SET DMA EXT	F9h	06h	Y	SET MAX: SET MAX UNLOCK DMA

Notes:

“Y” means “Support”.

“O” means “Option, default not support”.

“-” means “Not support”.

“non-FIPS” means “only supported when in non-FIPS mode”

6.2. Identify Device Data

The following table details the sector data returned by the IDENTIFY DEVICE command of ATA8-ACS4 SPEC.

Word	F: Fixed V: Variable X: retired/obsolete /reserved	Default Value	Description
0	F	0040h	General configuration bit-significant information
1	X	*1	Obsolete – Number of logical cylinders
2	F	C837h	Specific configuration
3	X	0010h	Obsolete – Number of logical heads (16)
4-5	X	00000000h	Retired
6	X	003Fh	Obsolete – Number of logical sectors per logical track (63)
7-8	X	00000000h	Reserved for assignment by the Compact Flash Association
9	X	0000h	Retired
10-19	V	Varies	Serial number (20 ASCII characters)
20-21	X	0000h	Retired
22	X	0000h	Obsolete
23-26	V	Varies	Firmware revision (8 ASCII characters)
27-46	V	Varies	Model number (xxxxxxxx)
47	X	8010h	7:0- Maximum number of sectors transferred per interrupt on MULTIPLE commands
48	F	4001h	Trusted Computing feature set options
49	F	2F00h	Capabilities
50	F	4000h	Capabilities
51-52	X	000000000h	Obsolete
53	F	0007h	Field validity
54	X	*1	Obsolete – Number of logical cylinders
55	X	0010h	Obsolete – Number of logical heads (16)
56	X	003Fh	Obsolete – Number of logical sectors per track (63)
57-58	X	*2	Obsolete – Current capacity in sectors
59	V	0110h	Number of sectors transferred per interrupt on MULTIPLE commands
60-61	V	*3	Maximum number of sector (28bit LBA mode)
62	X	0000h	Obsolete
63	V	0407h	Multi-word DMA modes supported/selected

UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

Word	F: Fixed V: Variable X: retired/obsolete /reserved	Default Value	Description
64	F	0003h	PIO modes supported
65	F	0078h	Minimum Multiword DMA transfer cycle time per word
66	F	0078h	Manufacturer's recommended Multiword DMA transfer cycle time
67	F	0078h	Minimum PIO transfer cycle time without flow control
68	F	0078h	Minimum PIO transfer cycle time with IORDY flow control
69	F	5F30h	Set max password(support)
70-74	X	0000h	Reserved
75	F	001Fh	Queue depth
76	V	E50Eh	Serial SATA capabilities
77	V	0006h	Serial ATA Additional Capabilities
78	V	004Ch	Serial ATA features supported
79	F	0040h	Serial ATA features enabled
80	F	07F8h	Major Version Number
81	F	0000h	Minor Version Number
82	F	746Bh	Command set/feature supported
83	F	7D09h	Command set/feature supported
84	F	4063h	WWN
85	F	7469h	Command set/feature supported or enabled
86	F	BC09h	Command set/feature supported or enabled
87	F	4063h	WWN
88	F	007Fh	Ultra DMA Modes
89	F	0001h	Time required for Normal Erase mode SECURITY ERASE UNIT command
90	F	0001h	Time required for an Enhanced Erase mode SECURITY ERASE UNIT command
91	F	00FEh	Current APM (advanced power management) value
92	F	FFFEh	Master Password Revision Code
93	F	0000h	Hardware reset result.
94	X	0000h	Obsolete
95	F	0000h	Stream Minimum Request Size
96	F	0000h	Streaming Transfer Time – DMA

Word	F: Fixed V: Variable X: retired/obsolete /reserved	Default Value	Description
97	F	0000h	Streaming Access Latency – DMA and PIO
98-99	F	0000h	Streaming Performance Granularity
100-103	V	*4	Maximum user LBA for 48bit Address feature set
104	F	0000h	Streaming Transfer Time – PIO
105	F	0008h	Maximum number of 512-byte blocks per DATA SET MANAGEMENT command
106	F	4000h	Physical sector size/Logical sector size
107	F	0000h	Inter-seek delay for ISO-7779 acoustic testing in microseconds
108-111	V	0000h	World Wide Name (WWN)
112-115	X	000000000000 0000h	Reserved
116	X	0000h	Reserved
117-118	F	00000000h	Words per logical Sector
119	V	4019h	Command set/Feature Supported
120	V	4019h	Command set/Feature Enabled/Supported
121-126	X	0000h	Reserved for expanded supported and enabled settings
127	X	0000h	Obsolete
128	F	0021h	Security status
129-159	V	0000h	Vendor specific
160-167	X	0000h	Reserved for CFA
168	V	Varies	Device Nominal Form Factor
169	F	0001h	DATA SET MANAGEMENT command is supported
170-173	F	0000h	Additional Product Identifier
174-175	X	0000h	Reserve
176-205	F	0000h	Current media serial number
206	V	0000h	SCT Command Transport
207-208	X	0000h	Reserved
209	F	4000h	Alignment of logical blocks within a physical block
210-211	F	0000h	Write-Read-Verify Sector Count Mode 3
212-213	F	0000h	Write-Read-Verify Sector Count Mode 2
214-216	X	0000h	Obsolete
217	F	0001h	Nominal media rotation rate

Word	F: Fixed V: Variable X: retired/obsolete /reserved	Default Value	Description
218	X	0000h	Reserved
219	X	0000h	Obsolete
220	V	0000h	Current mode of the Write-Read-Verify feature set
221	X	0000h	Reserved
222	V	107Fh	Transport major version number
223	F	0000h	Transport minor version number
224-229	X	0000h	reserved
230-233	F	0000h	Extend number of user addressable sectors
234	F	0001h	Minimum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
235	F	FFFFh	Maximum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
236-242	X	0000h	Reserved
243	F	0000h	Security feature 4000 : Self Encrypting Drive
244-254	F	0000h	Reserved
255	V	XXA5h XX is variable	Integrity word (Checksum and Signature)

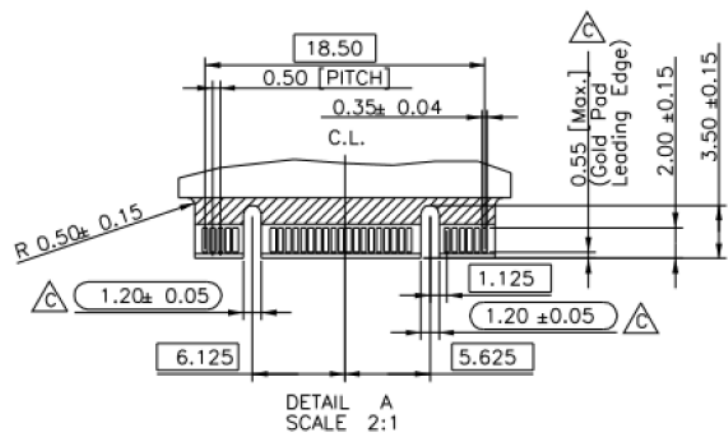
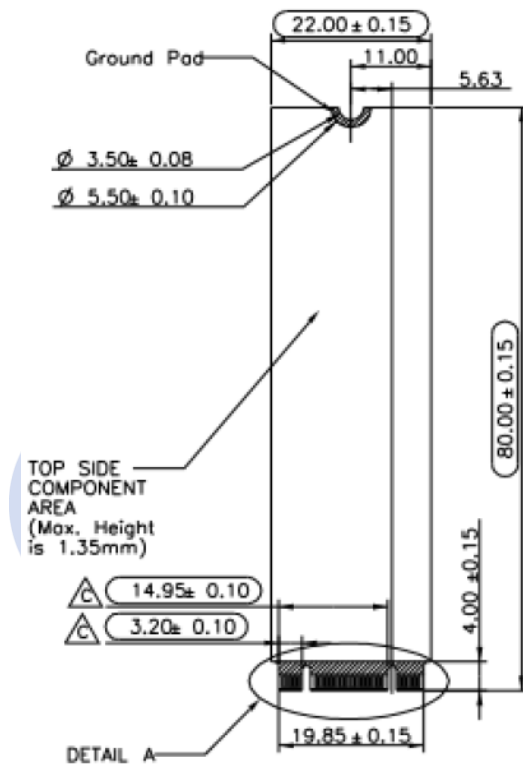
■ List of Device Identification for Each Capacity

Capacity (GB)	*1 (Word 1/Word 54)	*2 (Word 57–58)	*3 (Word 60–61)	*4 (Word 100–103)
128	3FFFh	FBFC10h	EE7C2B0h	EE7C2B0h
256	3FFFh	FBFC10h	0FFFFFFFh	1DCF32B0h
512	3FFFh	FBFC10h	0FFFFFFFh	3B9E12B0h
1024	3FFFh	FBFC10h	0FFFFFFFh	773BD2B0h
2048	3FFFh	FBFC10h	0FFFFFFFh	EE7752B0h

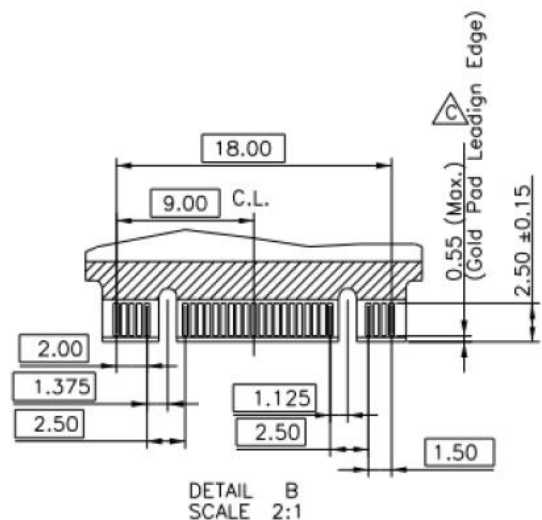
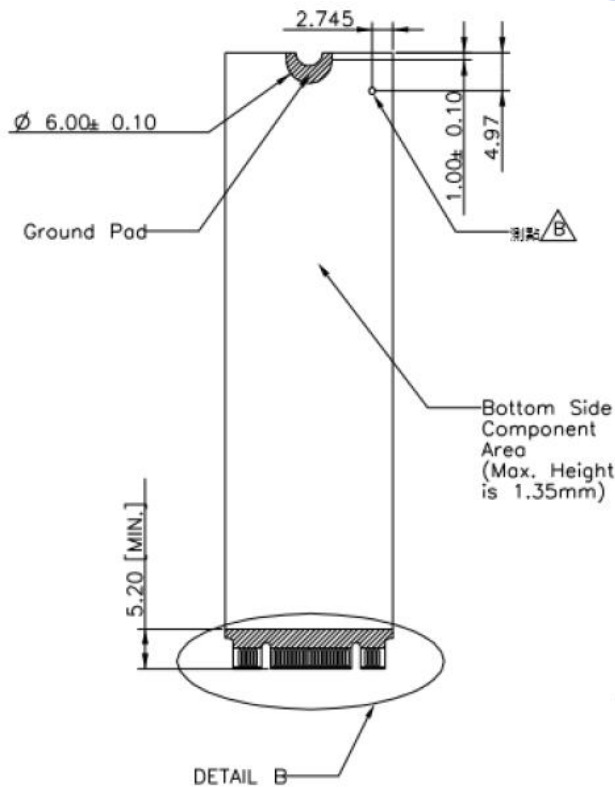
7. PHYSICAL DIMENSION

Dimension (double side): 80mm(L) x 22mm(W) x 3.5mm(H)

Top View



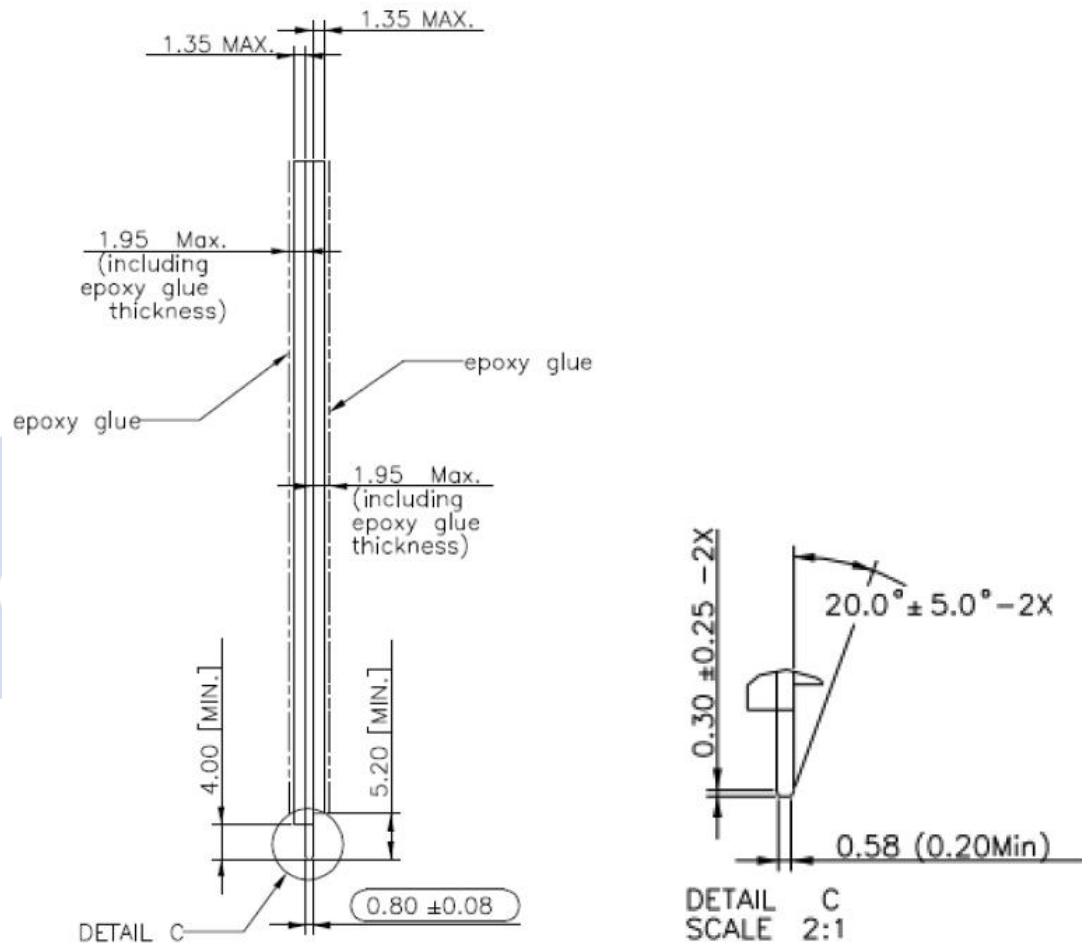
Bottom View



UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

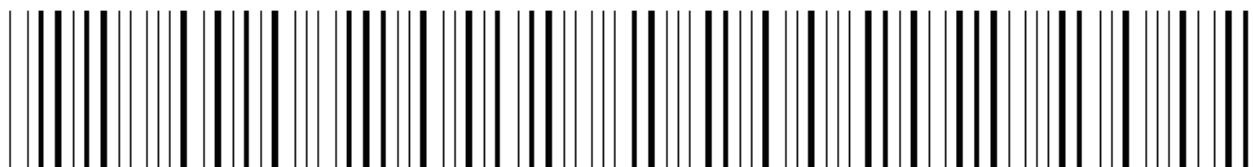
3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

Side View



Unit : mm

8. BARCODE DESCRIPTION



M 2 S 8 0 D A 0 0 2 T B A 8 P

Part Number

Manufacturing

Data: YYMMDD Flash Type:

yyymmddXX

9. ORDERING INFORMATION



Capacity	Part Number
128GB	M2S-80DA128GB-A8P
256GB	M2S-80DA256GB-A8P
512GB	M2S-80DA512GB-A8P
1TB	M2S-80DA001TB-A8P
2TB	M2S-80DA002TB-A8P

UD info CORP. TEL: +886-2-7713-6050 FAX: +886-2-8511-3151

3F-4, No.8, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)