Industrial M.2 2280 Specification

(ACHIEVER SERIES, MLC)

Version 1.3

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1. GENERAL DESCRIPTION

1.1. Introduction

FLEXXON's ACHIEVER M.2 2280 has SATA III interface, and is fully compliant with standard NGFF called M.2 Card Format. It supports high performance, high reliability and low power management. It is suitable for heavy-loading or multi-tasking applications.

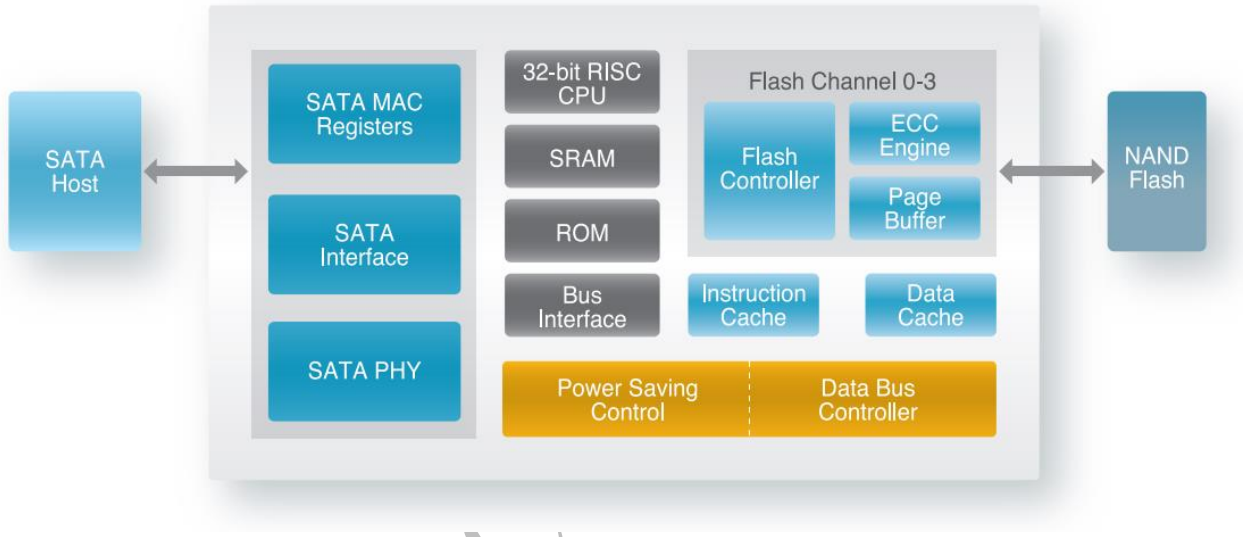


Figure 1-1 ACHIEVER M.2 2280 Controller Block Diagram

1.2. Product Overview

- **Flash**
  - MLC
- **Capacity**
  - 32GB up to 256GB
- **SATA Interface**
  - Compliant with SATA Revision 3.1
  - Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
- **ECC Scheme**
  - Up to 66 bits error in 1K Byte data
- **UART Function**
- **GPIO**
- **Support SMART and TRIM commands**
- **Low Power Management**
- **Internal data shaping technique increase data endurance**
- **Global Wear Leveling Algorithm**
- **Temperature Range**
  - Operation (Silver) : 0°C ~ 70°C
  - Operation (Diamond) : -40°C ~ 85°C
  - Storage: -55°C ~ 95°C
- **RoHS Compliant**

2. PRODUCT SPECIFICATIONS

2.1. Performance

Table 2-1 Performance of ACHIEVER M.2 2280

Capacity	Sequential	
	Read (MB/s)	Write (MB/s)
32/30GB	250	40
64/60GB	350	100
128/120GB	540	200
256/240GB	520	330

NOTES:

1. The performance was measured using CrystalDiskMark with SATA 6Gbps host.
2. Performance may differ according to flash configuration and platform.

2.2. Power

Table 2-2 Supply Voltage of ACHIEVER M.2 2280

Parameter	Rating
Operating Voltage	3.3V +/- 5%

Table 2-3 Power Consumption of ACHIEVER M.2 2280

Parameter	Power Consumption
Idle (max.)	0.264 W
Active (max.)	3.3 W

NOTE:

Power Consumption may differ according to flash configuration and platform.

2.3. TBW (Terabytes Written)

Capacity	TBW
32GB	58
64GB	117
128GB	235
256GB	471

NOTES:

1. TBW may differ according to flash configuration and platform.
2. Samples were tested under JESD218A endurance test method and JESD219A endurance workloads specification.

2.4. MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. Its value represents the average time between a repair and the next failure. The predicted result of FLEXXON's ACHIEVER M.2 2280 is more than 3 million hours.

2.5. Data Retention

- 10 years if > 90% life remaining (@25C)
- 1 year if < 10% life remaining (@25C)

3. ENVIRONMENTAL SPECIFICATIONS

Test Items	Test Conditions
Storage Temperature	-55°C ~ 95°C
Operating Temperature	Silver Grade: 0°C ~ 70°C Diamond Grade: -40°C~ 85°C
Storage Humidity	Silver Grade: 40°C, 95% RH Diamond Grade: 55°C, 95% RH
Operating Humidity	Silver Grade: 40°C, 93% RH Diamond Grade: 55°C, 95% RH
Shock	1500G, Half Sin Pulse Duration 0.5ms
Vibration	80Hz ~ 2000Hz/20G, 20Hz ~ 80Hz/1.52mm, 3 axis/60min
Drop	80cm free fall, 6 face of each unit, 2 times each
Bending	≥ 20N, Hold 1 min/5 times
ESD	24°C, 49% RH, +/-4KV 25 times, Air +/-8KV 10 times

4. ATA COMMANDS

Table 4-1 Supported ATA Command Set

# Command	Code	Protocol
General Feature Set		
Execute Drive Diagnostic	90h	Device diagnostic
Flush Cache	E7h	Non-data
Identify Device	ECh	PIO data-in
Initialize Drive Parameters	91h	Non-data
Read DMA	C8h	DMA
Read Log Ext	2Fh	PIO data-in
Read Multiple	C4h	PIO data-in
Read Sector(s)	20h	PIO data-in
Read Verify Sector(s)	40h or 41h	Non-data
Set Feature	EFh	Non-data
Set Multiple Mode	C6h	Non-data
Write DMA	CAh	DMA
Write Multiple	C5h	PIO data-out
Write Sector(s)	30h	PIO data-out
NOP	00h	Non-data
Read Buffer	E4h	PIO data-in
Write Buffer	E8h	PIO data-out
Power Management Feature Set		
Check Power Mode	E5h or 98h	Non-data
Idle	E3h or 97h	Non-data
Idle Immediate	E1h or 95h	Non-data
Sleep	E6h or 99h	Non-data
Standby	E2h or 96h	Non-data
Standby Immediate	E0h or 94h	Non-data

Security Mode Feature Set		
Security Set Password	F1h	PIO data-out
Security Unlock	F2h	PIO data-out
Security Erase Prepare	F3h	Non-data
Security Erase Unit	F4h	PIO data-out
Security Freeze Lock	F5h	Non-data
Security Disable Password	F6h	PIO data-out
SMART Feature Set		
SMART Disable Operations	B0h	Non-data
SMART Enable/Disable Autosave	B0h	Non-data
SMART Enable Operations	B0h	Non-data
SMART Execute Off-Line Immediate	B0h	Non-data
SMART Read Log	B0h	PIO data-in
SMART Read Data	B0h	PIO data-in
SMART Read Threshold	B0h	PIO data-in
SMART Return Status	B0h	Non-data
SMART Save Attribute Values	B0h	Non-data
SMART Write Log	B0h	PIO data-in
Host Protected Area Feature Set		
Read Native Max Address	F8h	Non-data
Set Max Address	F9h	Non-data
Set Max Set Password	F9h	PIO data-out
Set Max Lock	F9h	Non-data
Set Max Freeze Lock	F9h	Non-data
Set Max Unlock	F9h	PIO data-out
NCQ Feature Set		
Read FPDMA Queued	60h	DMA Queued
Write FPDMA Queued	61h	DMA Queued

5. PIN ASSIGNMENT

Table 5-1 Pin Assignment and Description of ACHIEVER M.2 2280

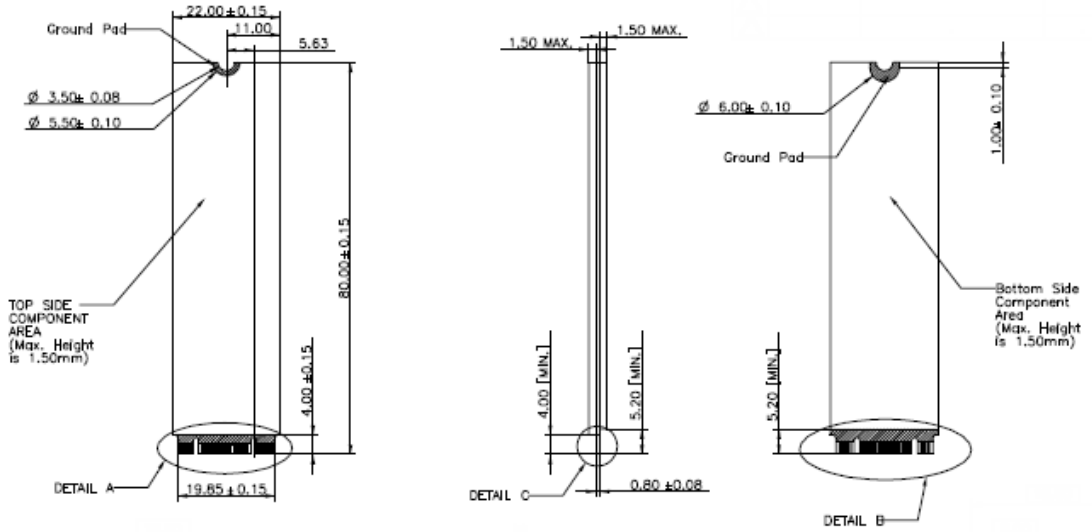
Pin #	SATA Pin	Description
1	CONFIG_3 = GND	Ground
2	3.3V	Supply pin
3	GND	Ground
4	3.3V	Supply pin
5	N/C	No Connect
6	N/C	No Connect
7	N/C	No Connect
8	N/C	No Connect
9	N/C	No Connect
10	DAS/DSS# (O) (OD)	Status indicators via LED devices that will be provided by the system Active Low. A pulled-up LED 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

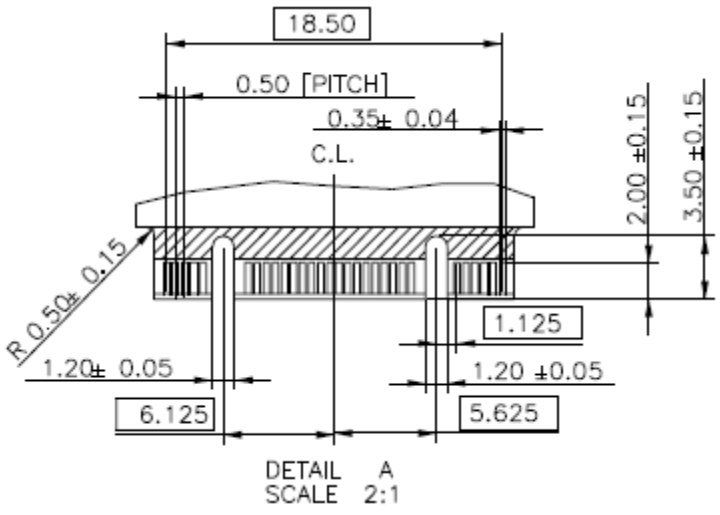
Pin #	SATA Pin	Description
29	N/C	No Connect
30	N/C	No Connect
31	N/C	No Connect
32	N/C	No Connect
33	GND	Ground
34	N/C	No Connect
35	N/C	No Connect
36	N/C	No Connect
37	N/C	No Connect
38	DEVSLP (I) (0/3.3V)	Device Sleep, Input. When driven high the host is informing the SSD to enter a low power state
39	GND	Ground
40	N/C	No Connect
41	SATA A+	SATA differential signals in the SATA specification
42	N/C	No Connect
43	SATA A-	SATA differential signals in the SATA specification
44	N/C	No Connect
45	GND	Ground
46	N/C	No Connect
47	SATA B-	SATA differential signals in the SATA specification
48	N/C	No Connect
49	SATA B+	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	N/C	Not Connect
57	GND	Ground
58	N/C	No Connect
59	Module Key	
60	Module Key	
61	Module Key	
62	Module Key	

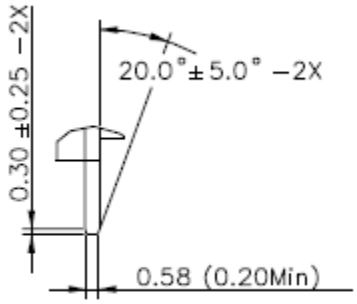
Pin #	SATA Pin	Description
63	Module Key	
64	Module Key	
65	Module Key	
66	Module Key	
67	N/C	No Connect
68	N/C	No Connect
69	CONFIG_1 = GND	Defines module type
70	3.3V	Supply pin
71	GND	Ground
72	3.3V	Supply pin
73	GND	Ground
74	3.3V	Supply pin
75	CONFIG_2 = GND	Ground

6. PHYSICAL DIMENSION

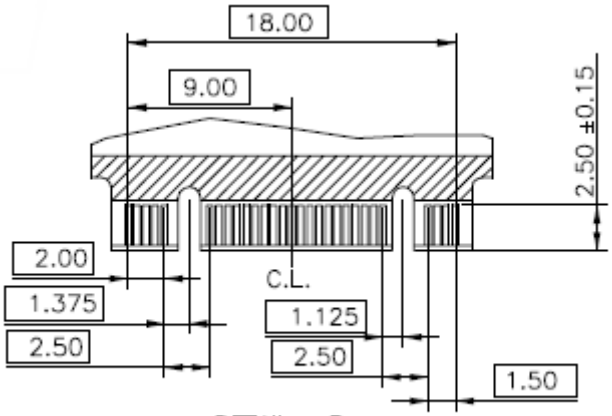
Dimension: 80mm(L) x 22mm(W) x 3.8mm(H)







DETAIL C
SCALE 2:1



DETAIL B
SCALE 2:1

7. ORDERING INFORMATION

Capacity	MPN (Diamond Grade)	MPN (Silver Grade)
32GB	FSSO032GME-M100	FSSO032GMS-M100
30GB	FSSO030GME-M100	FSSO030GMS-M100
64GB	FSSO064GME-M100	FSSO064GMS-M100
60GB	FSSO060GME-M100	FSSO060GMS-M100
128GB	FSSO128GME-M100	FSSO128GMS-M100
120GB	FSSO120GME-M100	FSSO120GMS-M100
256GB	FSSO256GME-M100	FSSO256GMS-M100
240GB	FSSO240GME-M100	FSSO240GMS-M100

Revision History

Revision	Date	Description
1.0	2016/01	First release
1.1	2016/09	Update Ordering Information
1.2	2016/12	Update performance and TBW
1.3	2020/08	Update capacity