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產 品 規 格 書
(Specification)

產 品 類 別 (ITEM)	SSD / STORAGE
品 名 規 格 (DESCRIPTION)	M.2 2280 PCIE GEN4 x 4 SSD
凌 航 型 號 (Goldkey Model)	NSP475 H06 (J0) Series
規 格 書 版 本 (Specification Rev.)	00

Prepared	Approved
Peter	Willy

Total Pages	Product Rev.	Date
13	00	2024/04/02

Revision History

Specification Rev.	Date	Revised Description	Author
00	2024/04/02	Initial	Peter

Specifications Overview:

Summary	Solution	MAP1602/MAP1608 + 3D TLC NAND FLASH HYNIX V7			
	Interface	PCIe Gen 4x4 Protocol NVMe 1.4 certified			
Connector Type	75 pin M.2 Edge (M notched) connector				
Form Factor	NGFF M.2	M.2 2280 PCIe M Key			
Characteristic	Capacity	256GB	512GB	1024GB	2048GB
	Sequence read *1 （MB/s）	3700	4800	4800	4800
	Sequence write *1 （MB/s）	1600	2500	4400	4400
Storage medium	3D TLC NAND FLASH Y HYNIX V7				
Electrical Specifications	Input voltage	3.3V+/-5%			
	Average Active Power	< 5 W			
	Average Idle Power	< 0.7 W			
Reliability	MTBF (hours)	2,000,000			
	Endurance (TBW)	175	350	700	1400
Temperature Range	Working temperature	0~+70℃			
	Storage temperature	-40~+85℃			
Mechanical Characteristics	Height (mm)	w/o heatsink 1.35mm			
	Width (mm)	22.00 mm ± 0.15mm			
	Length (mm)	80.00 mm ±0.15mm			
	Weight	8g (Max.)			

Note:

*1 The performance test results were all obtained using CrystalDiskMark (v8.0.4) software on Windows 10 Professional Edition 64 bit operating system. The interface was GEN4 x 4 during the test, and the total data block size read and write was 1GB. The queue depth for 128K sequential reads and writes is 32, and the thread is 1; The queue depth for 4K random reads and writes is 8, and the thread is 8.

*2 Performance may differ according to flash configuration, SDR configuration, and platform.

*3 The table above is for reference only. The criteria for MP (mass production) and for accepting goods shall be discussed.

Ordering Information for Compliant Products

Part Number	Description	Solution	Capacity
NSP475P4456-H06D2J0	M.2 2280 PCIE SSD	MAP1602 / MAP1608 + HYNIX V7	256GB
NSP475P4451-H06Q2J0	M.2 2280 PCIE SSD	MAP1602 / MAP1608 + HYNIX V7	512GB
NSP475P441T-H06Q4J0	M.2 2280 PCIE SSD	MAP1602 / MAP1608 + HYNIX V7	1024GB
NSP475P442T-H06O4J0	M.2 2280 PCIE SSD	MAP1602 / MAP1608 + HYNIX V7	2048GB

Table of Contents

1. General Descriptions

1.1. Introduction

Neo Forza's M.2 2280 PCIe SSD (Solid State Drive) is a high performance and high reliability storage device based on New 3D TLC NAND Flash technology that is designed to solve the bottleneck of computing system by traditional hard disk drives (HDD). Neo Forza's M.2 2280 PCIe SSD is fully compliant with the standard M.2 2280 form factor. With a high performance and low power consumption, Neo Forza's M.2 2280 PCIe SSD is a great choice of storage device for NB and PC.

1.2. Performance

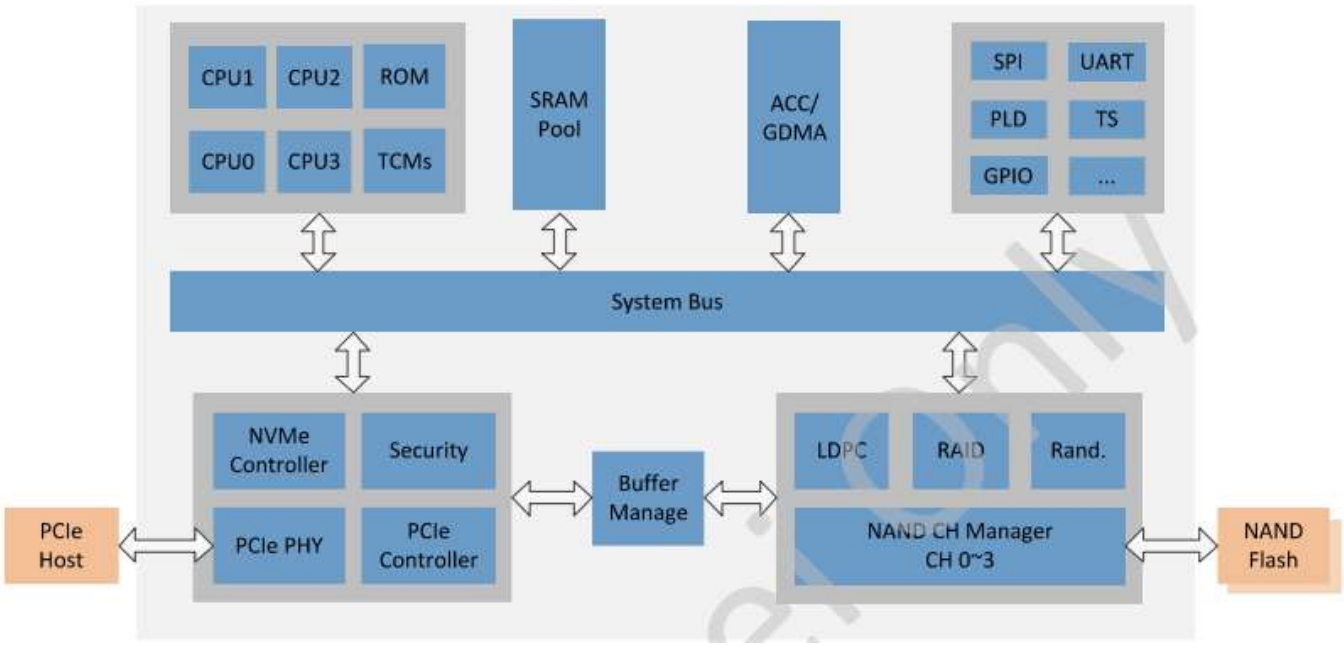
Table 1-1 Performance Specifications

Capacity	Sequence	
	Read (MB/s)	Write (MB/s)
256GB	3700	1600
512GB	4800	2500
1024GB	4800	4400
2048GB	4800	4400

Note:

*1 The performance test results were all obtained using CrystalDiskMark (v8.0.4) software on Windows 10 Professional Edition 64 bit operating system. The interface was GEN4 x 4 during the test, and the total data block size read and write was 1GB. The queue depth for 128K sequential reads and writes is 32, and the thread is 1; The queue depth for 4K random reads and writes is 8, and the thread is 8.

2. Block Diagram



MAP1602A Block Diagram

3. Product Specifications

- **Capacity**

  256GB/512GB/1024GB/2048GB

- **Compatibility**
  - NVMe/PCIe Gen 4x4 Interface
  - PCI Express Base Specification Rev. 4.0
  - NVM Express Specification Rev.1.4

- **Additional Capabilities**
  - S.M.A.R.T. (Self-Monitoring, analysis and reporting Technology) feature set support
  - HMB Management
  - SLC Cache
  - Support Admin & NVM Command Set
  - Power Consumption (Avg) : < 5 W
  - Operating Temperature Range: 0℃ ~ 70℃
  - Storage Temperature Range: -40℃ ~ 85℃

4. Interface Description

4.1. Pin Assignment and Descriptions

There are a total of 75 pins. 12 pin locations are used for mechanical key locations; this allows such a module to plug into Key M connectors.

Table 4-1: M.2 Pin Definitions

1	GND		
3	GND	2	3.3V
5	PETn3	4	3.3V
7	PETp3	6	Not Used
9	GND	8	Not Used
11	PERn3	10	NC
13	PERp3	12	3.3V
15	GND	14	3.3V
17	PETn2	16	3.3V
19	PETp2	18	3.3V
21	GND	20	Not Used
23	PERn2	22	Not Used
25	PERp2	24	Not Used
27	GND	26	Not Used
29	PETn1	28	Not Used
31	PETp1	30	Not Used
33	GND	32	Not Used
35	PERn1	34	Not Used
37	PERp1	36	Not Used
39	GND	38	Not Used
41	PETn0	40	SMB_CLK
43	PETp0	42	SMB_DAT
45	GND	44	ALERT#
47	PERn0	46	Not Used
49	PERp0	48	Not Used
51	GND	50	PERST#
53	REFCLKn	52	CLKREQ#
55	REFCLKp	54	PEWAKE#
57	GND	56	Reserved for MFG DATA
59	Module Key M	58	Reserved for MFG CLOCK
61	Module Key M	60	Module Key M
63	Module Key M	62	Module Key M
65	Module Key M	64	Module Key M
67	Not Used	66	Module Key M
69	PEDET(NC-PCIe)	68	SUSCLK
71	GND	70	3.3V
73	GND	72	3.3V
75	GND	74	3.3V

5. Electrical Specification

5.1. Operating Voltage

- Table 5-1 Operating Voltage

Item	Range
Supply Voltage	3.14V to 3.47V

5.2. Power Consumption

- Table 5-2 Power Consumption

Mode		Unit
Average Active mode Power	5	W
Average Idle mode power	700	mW

Note:

The workload is 128KB, queue depth is 256, sequential writes, measured root mean square power (RMS) over a 500ms sampling period. The performance and power consumption values are typical and may vary depending on platform settings.

6. Performance Testing

SSD Review Test System Specifications:

Chipset:	ROG Crosshair VIII Dark Hero / AMD Ryzen 7 5800X
System OS:	Microsoft Windows 10 (64Bit)

6.1. Crystal Disk Mark

Rev: 8.0.4(x64)
Empty Disk

Test Item	CrystalDiskMark			
Capacity	256GB	512GB	1024GB	2048GB
Sequential Read (MB/s)	3700	4800	4800	4800
Sequential Write (MB/s)	1600	2500	4400	4400

Note:

1. The performance test results were all obtained using CrystalDiskMark (v8.0.4) software on Windows 10 Professional Edition 64 bit operating system. The interface was GEN4 x 4 during the test, and the total data block size read and write was 1GB. The queue depth for 128K sequential reads and writes is 32, and the thread is 1; The queue depth for 4K random reads and writes is 8, and the thread is 8.

7. Reliability Specifications

7.1. Environmental

Environmental specifications are shown in Table 7-1.

Table 7-1 Environmental Specifications

Environmental	Specifications
Temperature	0℃ to 70℃ (Working)
	-40℃ to 85℃ (Storage)

Result: No any abnormality is detected when power on

7.2. Mean Time Between Failures (MTBF)

Mean Time Between Failures (MTBF) is predicted based on reliability data for the individual components in SSD is more than 2,00,000 hours (Predicted data).

7.3. Endurance

The endurance of a storage device is predicted by TeraBytes Written based on several factors related to usage, such as the amount of data written into the drive, block management conditions, and daily workload for the drive. Thus, key factors, such as Write Amplifications(WAF) and the number of P/E cycles, can influence the lifespan of the drive.

Table 7-2 Endurance Specifications

Total Byte Written (TBW)	256GB	512GB	1024GB	2048GB
	175	350	700	1400

8. Mechanical Characteristics

8.1. Dimension

Length(mm)	Width(mm)	Height(mm) *	PCB Thickness(mm) *
22±0.15	80±0.15	1.35 Max (Single-sided)	0.8 ±0.1