



# X-PHY® Cyber Secure PCIe M.2 2280 Specification

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# 1. GENERAL DESCRIPTION

## 1.1. INTRODUCTION

FLEXXON X-PHY® CYBER SECURE SSD is the AI-embedded, software-free data protection solution that offers elite-level end-to-end data protection in the forms of a cost effective, standalone SSD that's reliable, predictable and dependable.

Built on advanced AI engine, FLEXXON X-PHY® CYBER SECURE SSD monitors and protects user data in real time and stops security threats including system attacks, physical attacks and ransomware attacks.

## 1.2. PRODUCT OVERVIEW

### ◆ Flash

- ◆ 3D NAND

### ◆ Capacity

- ◆ 512GB ~ 1TB

### ◆ PCIe Interface

- ◆ Compliant with NVMe 1.3
- ◆ Compatible with PCIe I/II/III x4 interface

### ◆ ECC Scheme

- ◆ LDPC (Low Density Parity Check)  
of ECC algorithm

### ◆ GPIO

### ◆ UART

### ◆ Dynamic and Static Wear Leveling

### ◆ Support SMART and TRIM commands

### ◆ Power Loss Protection Algorithm

### ◆ Temperature Range

- ◆ Operation : 0°C ~ 60°C
- ◆ Storage: -40°C ~ 85°C

### ◆ RoHS Compliant



FLEXXON X-PHY® CYBER SECURE PCIe M.2 has PCIe Gen 3x4 interface, and is fully compliant with NVMe 1.3 industrial standard.

## 2. PRODUCT FEATURES

### 2.1. XPHY STREAM PROTECTION™

Lock down the data streams with XPHY STREAM PROTECTION™ – the smart, practical solution to secure the most sensitive communication signals. XPHY STREAM PROTECTION™ monitors data sent through signal communications while giving added layers of physical and cyber security.

Any attempted breach of the data stream will activate the build-in data security system.

### 2.2. XPHY FACTOR ENCRYPTION™

XPHY FACTOR ENCRYPTION™ provides the encryption and 2-factor tools to keep the information safe and secure.

It locks down the data behind advanced 2-factor verification that requires the pairing of multiple unique keys before data can be accessed. It prevents keys from being stolen and used independently to access sensitive data.

It keeps the encryption keys and data safe from cyberattacks by disabling and blocking attacks at the source rendering the secured accounts safe and inaccessible to any users who attempt to login without approved encryption keys.



It disables firmware update attacks and maintains the security of the firmware by only allowing updates that have been approved for the firmware's unique number.



## 2. PRODUCT FEATURES

### 2.3. XPHY GUARD™

XPHY GUARD™ keeps data secure by keeping SSD free and clear from virus, malware and ransomware.

It uses AI algorithms to detect and stop different types of ransomware from breaching the most secure data. Data transfer is faster and more efficient, reducing the possibility of data leaks during file transfers.

### 2.4. XPHY SITE SECURE™

XPHY SITE SECURE™ is the first and last level of defense against physical attacks on data.

It monitors the power, temperature and motion of SSD, and springs into action at the chance of any threat.



### 2.5. XPHY FORENSIC™

XPHY FORENSIC™ protects the most sensitive data, including cryptocurrency transactions, and keeps user in the know about all of the data that is moving around on SSD.

It uses AI processing at the SSD level to increase the drive endurance and reliability while greatly enhancing file move speed.

## 3. PERFORMANCE

**Table 3-1 Performance of X-PHY PCIe M.2 2280**

Capacity	Sequential	
	Read (MB/s)	Write (MB/s)
512GB	2100	1900
1TB	2600	2400

\*Performance may differ according to flash configuration and platform

**Table 3-2 Endurance of X-PHY PCIe M.2 2280**

Capacity	TBW
512GB	769
1TB	1538

## 4. PIN ASSIGNMENT

**Table 4-1 Pin Assignment and Description of X-PHY PCIe M.2 2280**

Pin No.	PCIe Pin	Description
1	GND	CONFIG_3 = GND
2	3.3V	3.3V source
3	GND	Ground
4	3.3V	3.3V source
5	PETn3	PCIe TX Differential signal defined by PCI Express M.2 spec
6	N/C	No connect
7	PETp3	PCIe TX Differential signal defined by PCI Express M.2 spec
8	N/C	No connect
9	GND	Ground
10	LED1#	Open drain, active low signal. These signals are used to allow the add-in card to provide status indicators via LED devices that will be provided by the system.

11	PERn3	PCIe RX Differential signal defined by PCI Express M.2 spec
12	3.3V	3.3V source
13	PERp3	PCIe RX Differential signal defined by PCI Express M.2 spec
14	3.3V	3.3V source

## 4. PIN ASSIGNMENT

**Table 4-1 Pin Assignment and Description of X-PHY PCIe M.2 2280**

Pin No.	PCIe Pin	Description
15	GND	Ground
16	3.3V	3.3V source
17	PETn2	PCIe TX Differential signal defined by PCI Express M.2 spec
18	3.3V	3.3V source
19	PETp2	PCIe TX Differential signal defined by PCI Express M.2 spec
20	N/C	No connect
21	GND	Ground
22	N/C	No connect
23	PERn2	PCIe RX Differential signal defined by PCI Express M.2 spec
24	N/C	No connect
25	PERp2	PCIe RX Differential signal defined by PCI Express M.2 spec
26	N/C	No connect
27	GND	Ground
28	N/C	No connect
29	PETn1	PCIe TX Differential signal defined by PCI Express M.2 spec
30	N/C	No connect
31	PETp1	PCIe TX Differential signal defined by PCI Express M.2 spec
32	N/C	No connect
33	GND	Ground

34	N/C	No connect
35	PERn1	PCIe RX Differential signal defined by PCI Express M.2 spec
36	N/C	No connect
37	PERp1	PCIe RX Differential signal defined by PCI Express M.2 spec

## 4. PIN ASSIGNMENT

**Table 4-1 Pin Assignment and Description of X-PHY PCIe M.2 2280**

Pin No.	PCIe Pin	Description
38	N/C	No connect
39	GND	Ground
40	SMB_CLK (I/O) (0/1.8V)	SMBus Clock; Open Drain with pull-up on platform
41	PETn0	PCIe TX Differential signal defined by PCI Express M.2 spec
42	SMB_DATA (I/O) (0/1.8V)	SMBus Data; Open Drain with pull-up on platform
43	PETp0	PCIe TX Differential signal defined by PCI Express M.2 spec
44	ALERT#(O) (0/1.8V)	Alert notification to master; Open Drain with pull-up on platform; Active Low
45	GND	Ground
46	N/C	No connect
47	PERn0	PCIe RX Differential signal defined by PCI Express M.2 spec
48	N/C	No connect
49	PERp0	PCIe RX Differential signal defined by PCI Express M.2 spec
50	PERST#(I)(0/3.3V)	PE-Reset is a functional reset to the card as defined by the PCIe Mini CEM specification.
51	GND	Ground
52	CLKREQ#(I/O)(0/3.3V)	Clock Request is a reference clock request signal as defined by the PCIe Mini CEM specification; Also used by L1 PM Sub-states.
53	REFCLKn	PCIe Reference Clock signals (100 MHz) defined by the PCI Express M.2 spec.
54	PEWAKE#(I/O)(0/3.3V)	PCIe PME Wake. Open Drain with pull up on platform; Active low



Pin No.	PCIe Pin	Description
55	REFCLKp	PCIe Reference Clock signals (100 MHz) defined by the PCI Express M.2 spec.
56	Reserved for MFG DATA	Manufacturing Data Line. Used for SSD manufacturing only. Not used in normal operation. Pins should be left N/C in platform socket.
57	GND	Ground
58	Reserved for MFG CLOCK	Manufacturing Clock Line. Used for SSD manufacturing only. Not used in normal operation. Pins should be left N/C in platform socket.

## 4. PIN ASSIGNMENT

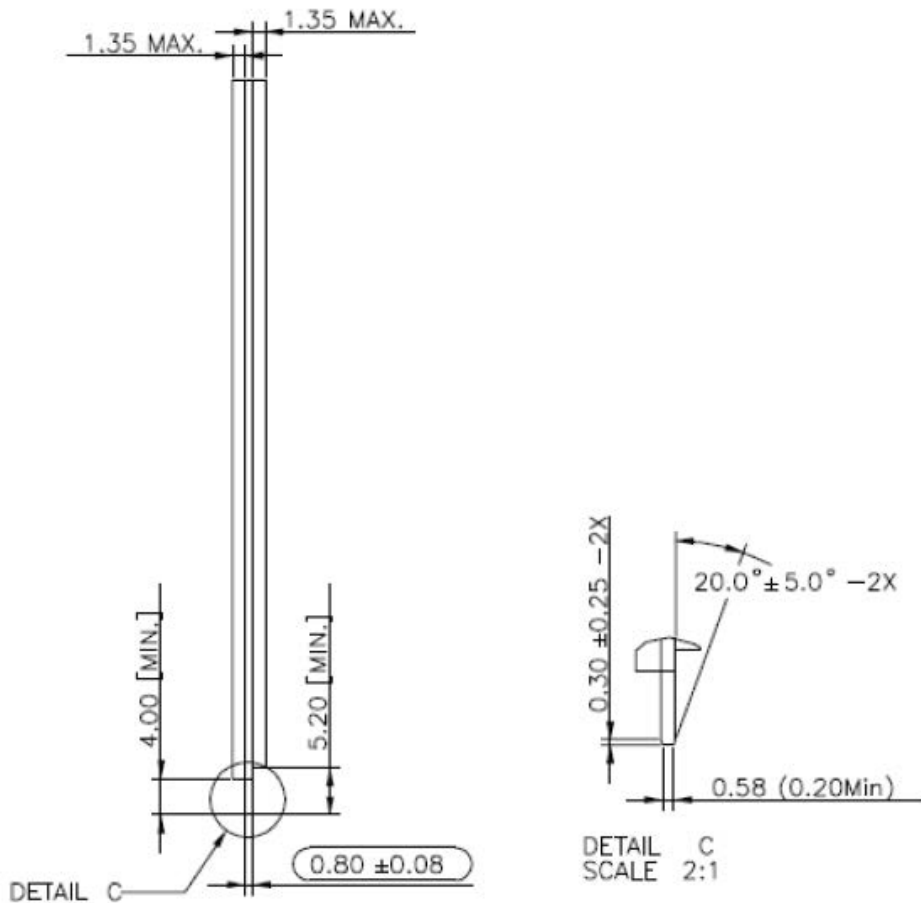
**Table 4-1 Pin Assignment and Description of X-PHY PCIe M.2 2280**

Pin No.	PCIe Pin	Description
59	Module Key M	Module Key
60	Module Key M	
61	Module Key M	
62	Module Key M	
63	Module Key M	
64	Module Key M	
65	Module Key M	
66	Module Key M	
67	N/C	No connect
68	SUSCLK	Not Use
69	PEDET	NC-PCIe
70	3.3V	3.3V source
71	GND	Ground
72	3.3V	3.3 source
73	GND	Ground
74	3.3V	3.3V source
75	GND	Ground

**Dimension: 80mm(L) x 22mm(W) x 2.33mm to 3.5mm(H)**



# 5. PHYSICAL DIMENSION



Side View

## 6. ORDERING INFORMATION

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Capacity	MPN
512GB	XACSO-512G
1TB	XACSO-1TB