

# KLEVV NEO N600 SSD

DATASHEET

 ESSENCore

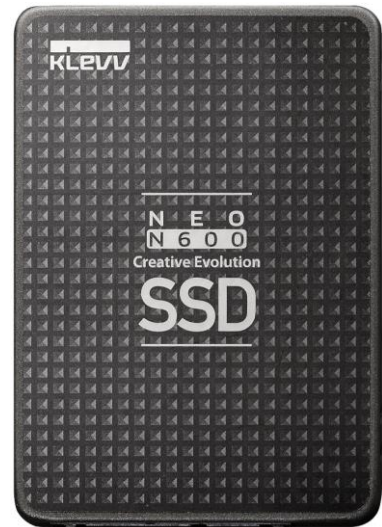
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# 1. General Description

*KLEVV NEO N600 2.5" SATA 6Gb/s SSD delivers all the advantages of flash disk technology with Serial ATA interface, including being fully compliant with standard 2.5-inch form factor, providing low power consumption compared to traditional hard drive and hot-swapping while removing/replacing/upgrading disks.*

*This device is designed based on the standard 7-pin interface for data segment and 15-pin for power segment. Moreover, it can reach up to 560MB/s read as well as 510MB/s write performance via Hynix 16nm Toggle TLC flash (with 128MB/256MB/512MB/1024 MBDDR3 cache enabled and measured by ATTO). Meanwhile, the power consumption of the 2.5" SSD is significantly lower than traditional hard drives.*

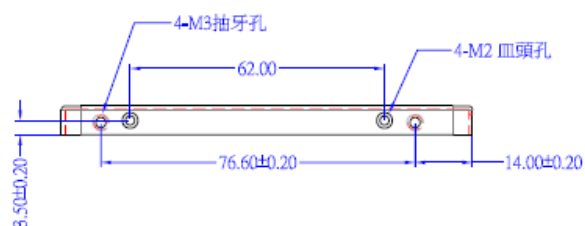
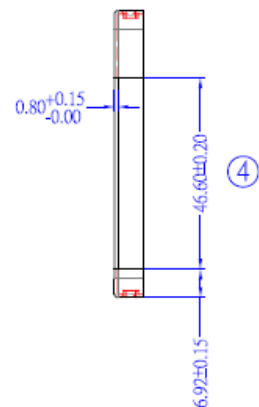
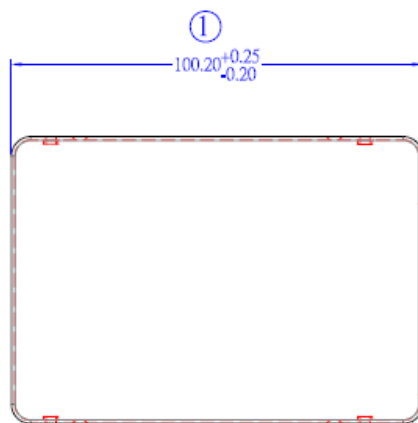
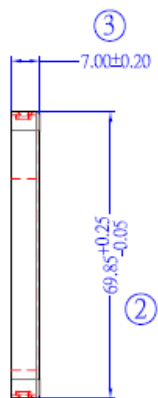


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|---|---|
| <ul style="list-style-type: none"> <li>■ <b>Density</b> – 120GB, 240GB, 480GB and 960GB are available</li> <li>■ <b>Form Factor</b> <ul style="list-style-type: none"> <li>◆ 2.5" Type (100.20 x 69.85 x 7.00 mm)</li> </ul> </li> <li>■ <b>Host interface</b> <ul style="list-style-type: none"> <li>◆ Compliant with SATA Revision 3.1</li> <li>◆ Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface</li> <li>◆ NCQ support up to queue depth = 32</li> <li>◆ Support power management</li> <li>◆ Support expanded register for SATA protocol 48 bits addressing mode</li> </ul> </li> <li>■ <b>Performance</b> <ul style="list-style-type: none"> <li>◆ Host transfer rate: 600 MB/s</li> <li>◆ Sequential Read : <ul style="list-style-type: none"> <li>Up to 560 MB/s (120GB / 240GB / 480GB)</li> <li>Up to 500 MB/s (960GB)</li> </ul> </li> <li>◆ Sequential Write : <ul style="list-style-type: none"> <li>Up to 370 MB/s (120GB)</li> <li>Up to 510 MB/s (240GB, 480GB)</li> <li>Up to 475 MB/s (960GB)</li> </ul> </li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>■ <b>Power Consumption</b> <ul style="list-style-type: none"> <li>◆ Active mode: &lt; 7500 mW (960GB)</li> <li>◆ Idle mode: &lt; 720 mW (960GB)</li> </ul> </li> <li>■ <b>TBW (Terabytes Written)</b> <ul style="list-style-type: none"> <li>◆ 120GB : 75 TBW</li> <li>◆ 240GB : 75 TBW</li> <li>◆ 480GB : 150 TBW</li> <li>◆ 960GB : 300 TBW</li> </ul> </li> <li>■ <b>Advanced Flash Management</b> <ul style="list-style-type: none"> <li>◆ Global Wear Leveling</li> <li>◆ Bad Block Management</li> <li>◆ TRIM</li> <li>◆ SMART</li> <li>◆ Over-Provision</li> </ul> </li> <li>■ <b>Low Power Management</b> <ul style="list-style-type: none"> <li>◆ DIPM/HIPM Mode</li> <li>◆ DEVSLP Mode</li> </ul> </li> <li>■ <b>Temperature Range</b> <ul style="list-style-type: none"> <li>◆ Operation: 0°C ~ 70°C</li> <li>◆ Storage: -40°C ~ 85°C</li> </ul> </li> <li>■ <b>RoHS compliant</b></li> </ul> |
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\*Actual performance may vary depending on use conditions and environment

\*\* Performance measured using ATTO

## 2. Mechanical Specification



## 3. Product Specification

### 3.1 Performance

Test Software	Read / Write	D120GAA-ET10	D240GAA-ET10	D480GAA-ET10	D960GAA-ET10
CrystalDiskMark	Sequential Read	Up to 540MB/s			Up to 480 MB/s
	Sequential Write	Up to 370 MB/s	Up to 470 MB/s		
ATTO	Sequential Read	Up to 560 MB/s			Up to 500 MB/s
	Sequential Write	Up to 370 MB/s	Up to 510 MB/s		Up to 475 MB/s
IOMeter (Peak)	Random Read	Up to 90K			
	Random Write	Up to 80K			

\*Performance may vary based on SSD capacity, hardware test platform, test software, operating system and other system variables.

### 3.2 Capacity

	D120GAA-ET10	D240GAA-ET10	D480GAA-ET10	D960GAA-ET10
Unformatted Capacity	120GB	240GB	480GB	960GB
User-Addressable Capacity (Bytes)	120,031,539,200	240,054,693,888	480,101,003,264	960,194,670,592

\*User-Addressable capacity may vary from different operating systems and file systems.

### 3.3 Supply Voltage

Parameter	Rating
Operating Voltage	5V $\pm$ 5%

### 3.4 Power Consumption

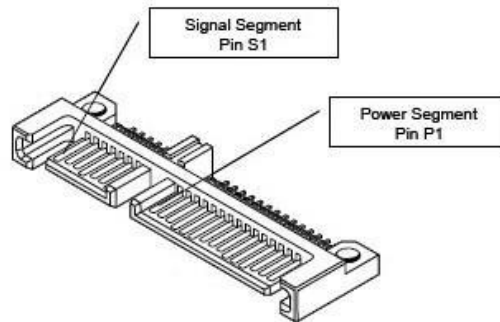
Read(mW)	Write(mW)	Partial(mW)	Slumber(mW)	Idle(mW)
< 3400	< 3500	< 330	< 245	< 720

### 3.5 Environmental Specification

Features	Operating	Non-Operating
Temperature	0°C to 70°C	-40°C to 85°C
Humidity	RH 90% under 40°C	RH 93% under 40°C
Vibration	Non-Operating 20~2000Hz, 20G	
Shock	Non-Operating 1500G, duration 0.5, 3axis	

## 4. Electronical Specification

### 4.1 Pin Assignment



**Signal Segment Pin Assignment and Descriptions**

Pin #	Signal name	Signal Description
S1	GND	Ground
S2	A+	Transmit +
S3	A-	Transmit -
S4	GND	Ground
S5	B-	Receive -
S6	B+	Receive +
S7	GND	Ground

**Power Segment Pin Assignment and Descriptions**

Pin #	Signal name	Signal Description
P1	V33	Not Used
P2	V33	Not Used
P3	V33	DEVSLP
P4	Ground	1st Mate
P5	Ground	2nd Mate
P6	Ground	3rd Mate
P7	V5	5V Pre-charge
P8	V5	5v Power
P9	V5	5v Power
P10	Ground	2nd Mate
P11	Reserved	-
P12	Ground	1st Mate
P13	V12	Not Used

P14	V12	Not Used
P15	V12	Not Used

## 5. Command

### 5.1 ATA Command List

Op-Code	Command Description	Op-Code	Command Description
00h	NOP	60h	Read FPDMA Queued
06h	Data Set Management	61h	Write FPDMA Queued
10h	Recalibrate	70h	Seek
20h	Read Sectors	90h	Execute Device Diagnostic
21h	Read Sectors without Retry	91h	Initialize Device Parameters
24h	Read Sectors EXT	92h	Download Microcode
25h	Read DMA EXT	93h	Download Microcode DMA
27h	Read Native Max Address EXT	B0h	SMART
29h	Read Multiple EXT	B0h	D0h SMART READ DATA
2Fh	Read Log EXT	B0h	D1h SMART READ DATA ATTRIBUTE THRESHOLD
30h	Write Sectors	B0h	D2h SMART ENABLE/DISABLE ATTRIBUTE AUTOSAVE
31h	Write Sectors without Retry	B0h	D3h SMART SAVE ATTRIBUTE VALUES
34h	Write Sectors EXT	B0h	D4h SMART EXECUTE OFF-LINE IMMEDIATE
35h	Write DMA EXT	B0h	D5h SMART READ LOG
37h	Set Native Max Address EXT	B0h	D6h SMART WRITE LOG
39h	Write Multiple EXT	B0h	D8h SMART ENABLE OPERATIONS
3Dh	Write DMA FUA EXT	B0h	D9h SMART DISABLE OPERATIONS
3Fh	Write Long EXT	B0h	DAh SMART RETURN STATUS
40h	Read Verify Sectors	B0h	DBh SMART ENABLE/DISABLE AUTOMATIC OFF-LINE
41h	Read Verify Sectors without Retry	B1h	DEVICE CONFIGURATION OVERLAY
42h	Read Verify Sectors EXT	B1h	C0h DEVICE CONFIGURATION RESTORE
45h	Write Uncorrectable EXT	B1h	C1h DEVICE CONFIGURATION FREEZE LOCK
47h	Read Log DMA EXT	B1h	C2h DEVICE CONFIGURATION IDENTIFY
57h	Write Log DMA EXT	B1h	C3h DEVICE CONFIGURATION SET



Op-Code		Command Description	Op-Code		Command Description
B1h	C4h	DEVICE CONFIGURATION IDENTIFY DMA	ECh		Identify Device
B1h	C5h	DEVICE CONFIGURATION SET DMA	EFh		Set Features
C4h		Read Multiple	EFh	02h	Enable 8-bit PIO transfer mode
C5h		Write Multiple	EFh	03h	Set transfer mode based on value in Count field
C6h		Set Multiple Mode	EFh	05h	Enable advanced power management
C8h		Read DMA	EFh	10h	Enable use of Serial ATA feature
C9h		Read DMA without Retry	EFh	10h 02h	Enable DMA Setup FIS Auto-Activate optimization
CAh		Write DMA	EFh	10h 03h	Enable Device-initiated interface power state (DIPM) transitions
CBh		Write DMA without Retry	EFh	10h 06h	Enable Software Settings Preservation (SSP)
CEh		Write Multiple FUA EXT	EFh	10h 07h	Enable Device Automatic Partial to Slumber transitions
E0h		Standby Immediate	EFh	10h 09h	Enable Device Sleep
E1h		Idle Immediate	EFh	55h	Disable read look-ahead feature
E2h		Standby	EFh	66h	Disable reverting to power-on defaults
E3h		Idle	EFh	82h	Disable write cache
E4h		Read Buffer	EFh	85h	Disable advanced power management
E5h		Check Power Mode	EFh	90h	Disable use of Serial ATA feature set
E6h		Sleep	EFh	90h 02h	Disable DMA Setup FIS Auto-Activate optimization
E7h		Flush Cache	EFh	90h 03h	Disable Device-initiated interface power state (DIPM) transitions
E8h		Write Buffer	EFh	90h 06h	Disable Software Settings Preservation (SSP)
E9h		Read Buffer DMA	EFh	90h 07h	Disable Device Automatic Partial to Slumber transitions
EAh		Flush Cache EXT	EFh	90h 09h	Disable Device Sleep
EBh		Write Buffer DMA	EFh	AAh	Enable read look-ahead feature

Op-Code		Command Description	Op-Code		Command Description
EFh	CCh	Enable reverting to power-on defaults	F4h		Security Erase Unit
F1h		Security Set Password	F5h		Security Freeze Lock
F2h		Security Unlock	F6h		Security Disable Password
F3h		Security Erase Prepare	F8h		Read Native Max Address

## 5.2 Identify Device Data

Word	ATA Identify Parameter	Value
0	General configuration	0040h
1	Number of cylinders in the default CHS translation	3FFFh
2	Specific configuration	C837h
3	Number of heads in the default CHS translation	0010h
4-5	Retired	0000h
6	Number of sectors per track in the default CHS translation	003Fh
7-8	Reserved for the CFA	0000h
9	Obsolete	0000h
10-19	Serial number	ASCII
20	Retired	0000h
21	Retired	0000h
22	Obsolete	0000h
23-26	Firmware revision	ASCII
27-46	Model number	ASCII
47	READ/WRITE MULTIPLE commands function	8010h
48	Trusted Computing feature set options	4000h
49	Capabilities	2F00h
50	Capabilities	4000h
51-52	Obsolete	0000h
53	field validity	0007h
54	Number of cylinders in the current CHS translation	3FFFh
55	Number of heads in the current CHS translation	0010h
56	Number of sectors per track in the current CHS translation	003Fh
57-58	Current capacity in sectors	00FBFC10h
59	Multiple sector setting	0110h
60-61	Total number of user addressable logical sectors for 28-bit commands	*3
62	Obsolete	0000h
63	Multiword DMA modes	0407h
64	PIO mode supported	0003h
65	Minimum Multiword DMA transfer cycle time per word	0078h
66	Manufacturer's recommended Multiword DMA transfer cycle time	0078h

## 6. Product Line Up

Product Number	Capacity	Remark
D120GAA-N600	120GB	
D240GAA- N600	240GB	
D480GAA- N600	480GB	
D960GAA- N600	960GB	