

HS-SSD-D210pro



1 Product Overview

1.1 Introduction

As a leader in the security industry, Hikvision processes EB-level data every year (1 EB = 1024 PB, 1 PB = 1024 TB) and has accumulated many years of data storage and flash memory management technology. At the technical level, the D210PRO series SSD uses advanced SSD master control and 3D NAND Flash technology, paired with Hikvision's independently developed NAND Flash management software to ensure read and write speeds and data security. At the product level, the D210PRO series SSD uses high-quality 3D NAND Flash, produced by an automated SMT production line, and tested by Hikvision data storage application standards to ensure stable service. The D210PRO series SSD can be widely used in data center servers and other equipment to provide stable and high-speed services for the target system.

1.2 Ordering information

D210PRO Series

Capacity	2.5"-7 mm
240 GB	HS-SSD-D210PRO
480 GB	HS-SSD-D210PRO
960 GB	HS-SSD-D210PRO

2 Features

- Main Components
 - 3D TLC NAND Flash Memory
 - Standard Endurance Technology (SET)
 - Form Specifications
 - 2.5"-7 mm
 - Algorithm
 - Garbage collection, wear leveling
 - Hot Swap Support
 - It needs BIOS Enabled
 - Compatibility
 - SATA Revision 3.0; compatible with STAT
 - 6 GB/s, 3 GB/s, 1.5 GB/s interface rates
 - ATA/ATAPI Command Set-3(ACS-3Rev5)
 - Includes SCT(Smart Command Transport) And device statistics log support
 - Enhanced SMART ATA feature set
 - Native Command Queuing(NCQ) Command set
 - Data set management Trim Command (Windows 7 or above)
 - Power Management
 - 5V+/-10%, or 12V+/-10%
 - SATA Interface power management
 - Working Temperature
 - 0 °C~70 °C
 - Impact (working/non-working status)
 - 1000 G/0.5 ms
 - Vibration
 - Working Status: 2 G_{RMS} (5-700 Hz)
 - Non-working Status: 2.1 G_{RMS} (5-800 Hz)
 - Reliability
 - Uncorrectable bit error rate (UBER): 1 sector per 10¹⁶ bit read
 - Mean time between failures 1.5 million equipment hours
 - Data Retention: 3months@40 °C
 - PLP: Power Failure Protection
 - Applicable to a variety of systems
 - Windows 8*, Windows 8.1*, Windows 10*
 - Windows Server 2012*, 2012 R2*
 - Windows Server 2008* Enterprise 64bit SP2,R2
 - VMWare*5.1, 5.5, 6.0, 6.5
 - Red Hat*, SUSE, Centos Linux
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3 Product Specifications

3.1 Interface and Compatibility

- SATA 6 Gbps
- Fully compliance with ATA/ATAPI Command Set-3 (ACS-3Rev5)
- Support enhanced SMART ATA feature set
- Native Command Queuing (NCQ) Command Set
- Support Data Set Management Trim Command

3.2 Performance

D210PRO Sequential and random read and write bandwidth

Capacity	240 GB	480 GB	960 GB	Unit
Sequential Reading	535	537	536	MB/s
Write Sequentially	344	413	417	MB/s
Random Read	87	83	89	IOPS
Random Write	36	40	57	IOPS
Randomly mixed read and write: read	44	45	49	IOPS
Randomly mixed read and write: write	18	19	21	IOPS
Random mixed reading and writing	62	65	70	IOPS

Note :

1. The sequential read and write performance test is based on FIO V3.7
2. The hard disk firmware version and the software and hardware configuration of the test system will affect the performance of the solid state drive. If any of the above factors change, the performance test of the solid state drive will be different.
3. Random read and write performance test is based on FIO V3.7
4. The hard disk firmware version and the software and hardware configuration of the test system will affect the performance of the solid state drive. If any of the above factors change, the performance test of the solid state drive will be different.
5. The ratio of mixed reading and writing is R:W=7:3, and the performance test is based on FIO V3.7
6. The hard disk firmware version and the software and hardware configuration of the test system will affect the performance of the solid state drive. If any of the above factors change, the performance test of the solid state drive will be different.
7. All tests are based on Hikvision Storage's internal test environment and are for reference only. Please refer to actual measurements for hard drive related data.

3.3 Power Consumption

D210PRO Power Consumption

Capacity	240GB	480GB	960GB	Unit
Read - average power consumption	2.5	2.5	2.7	W
Read - Maximum power consumption	2.6	2.5	2.7	W
Write - average power consumption	2.4	2.7	3.0	W
Write-max power consumption	2.6	2.8	3.1	W
Standby	0.5	0.5	0.5	W

5 Electronic Interface Specifications

SATA Interface

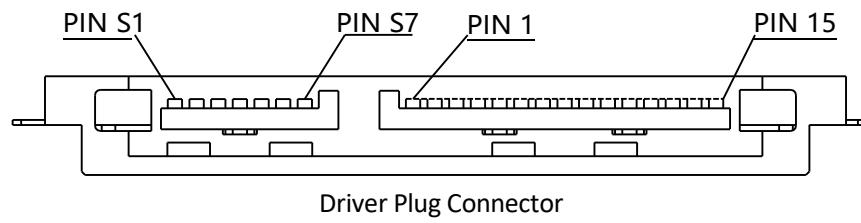


Table 2: Pin Assignment

Segment	PIN#	Function	Definition
Signal	S1	GND	Ground
	S2	A +	Differential signal A form Phy
	S3	A -	
	S4	GND	Ground
	S5	B -	Differential signal B form Phy
	S6	B +	
	S7	GND	Ground
Key and spacing separate signal and power segments			
Power	P1	V33	3.3 V power (not used)
	P2	V33	3.3 V power (not used)
	P3	V33	3.3 V power, pre-charge (not used)
	P4	GND	Ground
	P5	GND	Ground
	P6	GND	Ground
	P7	V5	5 V power, pre-charge
	P8	V5	5 V power
	P9	V5	5 V power
	P10	GND	Ground
	P11	DAS	Device Activity Signal
	P12	GND	Ground
	P13	V12	12 V power, pre-charge
	P14	V12	12 V power
	P15	V12	12 V power

Note

- : 1. 3.3 V power supply not used.
- 2. The solid state drive can operate normally with 5 V or 12 V power supply.

6 Supported Instruction Sets

The D210PRO series supports all mandatory ATA commands described in this section and defined by the ATA8-ACS3 REV5F specification

6.1 ATA general function instruction set

The D210PRO series supports ATA regular function command set (non-Packet), including :

- EXECUTE DEVICE DIAGNOSTIC
- SET FEATURES
- IDENTIFY DEVICE

The D210PRO series also supports the following alternative commands:

- READ DMA
- WRITE DMA
- READ SECTOR(S)
- READ VERIFY SECTOR(S)
- READ MULTIPLE
- SEEK
- SET FEATURES
- WRITE SECTORS(S)
- SET MULTIPLE MODE1
- WRITE MULTIPLE
- FLUSH CACHE
- READ BUFFER
- NOP
- DOWNLOAD MICROCODE
- WRITE UNCORRECTABLE EXTs

6.2 Power Management Instruction Set

Hikvision SSD D210PRO series supports power management instruction sets, including :

- CHECK POWER MODE
- IDLE
- IDLE IMMEDIATE
- SLEEP
- STANDBY
- STANDBY IMMEDIATE

6.3 Safe Mode Feature Set

- Hikvision SSD D210PRO series supports safe mode command sets, including :
- SECURITY SET PASSWORD
- SECURITY UNLOCK
- SECURITY ERASE PREPARE
- SECURITY ERASE UNIT
- SECURITY FREEZE LOCK
- SECURITY DISABLE PASSWORD

6.4 S.M.A.R.T. Instruction Set

Hikvision SSD D210PRO series supports the S.M.A.R.T. command set, including:

- SMART READ DATA
 - SMART READ ATTRIBUTE THRESHOLDS
 - SMART ENABLE/DIABLE ATTRIBUTE AUTOSAVE
 - SMART SAVE ATTRIBUTE VALUES
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- SMART EXECUTE OFF-LINE IMMEDIATE
- SMART READ LOG SECTOR
- SMART WRITE LOG SECTOR
- SMART ENABLE OPERATIONS
- SMART DISABLE OPERATIONS
- SMART RETURN STATUS
- SMART ENABLE/DISABLE AUTOMATIC OFFLINE

Attributes

- The following table lists the S.M.A.R.T. attributes supported by the D210PRO series and the corresponding status flags and threshold settings.

Table 1: S.M.A.R.T. Properties

ID	Attribute	Status Flag						Threshold
		SP	EC	ER	PE	OC	PW	
05h	Reallocated Sector Count	1	1	0	0	1	0	0
09h	Power On Hours Count	1	1	0	0	1	0	0
0Ch	Power Cycle Count	1	1	0	0	1	0	0
AAh	Available Reserved Space	1	1	0	0	1	1	10
ABh	Program Fail Count	1	1	0	0	1	0	0(none)
ACh	Erase Fail Count	1	1	0	0	1	0	0(none)
A Eh	Unexpected Power Loss	1	1	0	0	1	0	0(none)
AFh	Power Loss Protection Failure	1	1	0	0	1	1	10
B7h	SATA Downshift Count	1	1	0	0	1	0	0(none)
B8h	End-to-End Error Detection Count	1	1	0	0	1	1	90
BBh	Uncorrectable Error Count	1	1	0	0	1	0	0(none)
BEh	Case Temperature-Reports the SSD case temperature	1	0	0	0	1	0	0(none)
C0h	Power-Off Retract Count(Unsafe Shutdown Count)	1	1	0	0	1	0	0(none)
C2h	Temperature-Device Internal Temperature	1	0	0	0	1	0	0(none)
C5h	Pending Sector Count	0	1	0	0	1	0	0(none)
C7h	CRC Error Count	1	1	1	1	1	0	0(none)
CFh	SSD Life	1	1	0	0	1	0	0(none)
E1h	Host Writes	1	1	0	0	1	0	0(none)
E8h	Available Reserved Space	1	1	0	0	1	1	10
E9h	Read Only	1	1	0	0	1	0	0(none)
E Ah	Thermal Throttle Status	1	1	0	0	1	0	0(none)
F1h	Total LBAs Written	1	1	0	0	1	0	0(none)
F2h	Total LBAs Read	1	1	0	0	1	0	0(none)
F3h	Total Bytes Written	1	1	0	0	1	0	0(none)
FEh	Capacitance Value	1	1	0	0	1	0	0(none)

S.M.A.R.T. Attribute Status Flag

Table 2: S.M.A.R.T. attribute status flags

Status Flag	Description	Value=0	Value=1
SP	Self-preserving attribute	Not a self-preserving attribute	Self-preserving attribute
EC	Event count attribute	Not an event count attribute	Event count attribute
ER	Error rate attribute	Not an error rate attribute	Error rate attribute
PE	Performance attribute	Not a performance attribute	Performance attribute
OC	Online collection attribute	Collected only during offline activity	Collected during both offline and online activity
PW	Pre-fail warranty attribute	Advisory	Pre-fail

7 Appendix

Appendix A: Identification Device Command Data

Table 1: Returned Sector Data

Word	Value	F/V	Description
0	0040h	F X F X X F X F	General configuration bit-significant information: 15 0 = ATA device 14-8 Retired 7 1 = removable media device 6 Obsolete 5-3 Retired 2 Reserved 1 Retired 0 Reserved
1	3FFFh	X	Number of logical cylinders
2	C837h	V	Specific configuration
3	0010h	X	Number of logical heads
4-5	0000h	X	Retired
6	003Fh	X	Number of logical sector per logical track
7-8	0000h	V	Reserved for assignment by the CompactFlash_ Association
9	0000h	X	Retired
10-19	variables	F	Serial number (20 ASCII characters)
20-21	0000h	X	Retired
22	003Fh	X	Obsolete
23-26	variables	F	Firmware revision (8 ASCII characters)
27-46	variables	F	Model number (40 ASCII characters)
47	8001h	F	15-8 80h

Word	Value	F/V	Description
		F	7-0 00h = Reserved
		F	01h = Maximum number of 1 sectors on READ/WRITE MULTIPLE commands
48	4000h	F	Reserved
49	2F00h	F	Capabilities
		F	15-14 Reserved for the IDENTIFY PACKET DEVICE command.
		F	13 1 = Standby timer values as specified in this standard are supported
		F	0 = Standby timer values shall be managed by the device
		F	12 Reserved for the IDENTIFY PACKET DEVICE command.
		F	11 1 = IORDY supported
		F	0 = IORDY may be supported
		F	10 1 = IORDY may be disabled
		F	9 1 = LBA supported
		X	8 1 = DMA supported.
			7-0 Retired
50	4000h	F	Capabilities
		F	15 Shall be cleared to zero.
		F	14 Shall be set to one.
		F	13-2 Reserved.
		X	1 Obsolete
		F	0 Shall be set to one to indicate a device specific Standby timer value minimum.
51-52	0000h	X	Obsolete
53	0007h	F	15-3 Reserved
		F	2 1 = the fields reported in word 88 are valid
		F	0 = the fields reported in word 88 are not valid
		F	1 1 = the fields reported in words 70:64 are valid
		F	0 = the fields reported in words 70:64 are not valid
		X	0 1 = the fields reported in words 58:54 are valid
		F	0 = the fields reported in words 58:54 are not valid
54	3FFFh	X	Obsolete: Number of logical cylinders
55	0010h	X	Obsolete: Number of logical heads
56	003Fh	X	Obsolete: Number of logical sectors per logical track
57-58	00FBFC10	X	Obsolete
59	0101h	F	15-9 Reserved
		V	8 1 = Multiple sector setting is valid
		V	7-0 xxh = Setting for number of sectors that shall be transferred per interrupt on R/W Multiple command
60-61	variables	F	Total number of user addressable sectors
62	0000h	X	Obsolete
63	0407h	F	15-11 Reserved
		V	10 1 = Multiword DMA mode 2 is selected
		F	0 = Multiword DMA mode 2 is not selected

Word	Value	F/V	Description
		V	9 1 = Multiword DMA mode 1 is selected 0 = Multiword DMA mode 1 is not selected
		V	8 1 = Multiword DMA mode 0 is selected 0 = Multiword DMA mode 0 is not selected
		F	7-3 Reserved
		F	2 1 = Multiword DMA mode 2 and below are supported
		F	1 1 = Multiword DMA mode 1 and below are supported
		F	0 1 = Multiword DMA mode 0 is supported
64	0003h	F	15-8 Reserved
		F	7-0 Advanced PIO modes supported
65	0078h	F	Minimum Multiword DMA transfer cycle time per word
66	0078h	F	Manufacturer's recommended Multiword DMA transfer cycle time
67	0078h	F	Minimum PIO transfer cycle time without flow control
68	0078h	F	Minimum PIO transfer cycle time with IORDY flow control
69-74	0020h	F	Reserved (for future command overlap and queuing)
75	001Fh	F	Queue depth 15:5 Reserved 4:0 Maximum queue depth - 1
76	E70Eh	F	Serial ATA Capabilities 15:13 Reserved for Serial ATA 12 1 = Supports NCQ priority information 11 1 = Supports Unload while NCQ commands are outstanding 10 1 = Supports the SATA Phy Event Counters log 9 1 = Supports receipt of host initiated power management requests 8 1 = Supports the NCQ feature set 7:4 Reserved for Serial ATA 3 1 = Supports SATA Gen3 Signaling Speed (6.0Gb/s) 2 1 = Supports SATA Gen2 Signaling Speed (3.0Gb/s) 1 1 = Supports SATA Gen1 Signaling Speed (1.5Gb/s) 0 Shall be cleared to zero
77	0086h	X	Reserved
78	014Ch	V	Serial ATA features supported 15:7 Reserved for Serial ATA 6 1 = Device supports Software Settings Preservation 5 Reserved for Serial ATA 4 1 = Device supports in-order data delivery 3 1 = Device supports initiating power management 2 1 = Device supports DMA Setup auto-activation 1 1 = Device supports non-zero buffer offsets 0 Shall be cleared to zero
79	0040h	V	Serial ATA features enabled 15:7 Reserved for Serial ATA 6 1 = Software Settings Preservation enabled 5 Reserved for Serial ATA 4 1 = In-order data delivery enabled

Word	Value	F/V	Description
		F	7 Reserved
		F	6 1 = SET FEATURES subcommand required to spinup after power-up
		F	5 1 = Power-Up In Standby feature set supported
		F	4 1 = Removable Media Status Notification feature set supported
		F	3 1 = Advanced Power Management feature set supported
		F	2 1 = CFA feature set supported
		F	1 1 = READ/WRITE DMA QUEUED supported
		F	0 1 = DOWNLOAD MICROCODE command supported
84	4161h		Command set/feature supported extension.
		F	15 Shall be cleared to zero
		F	14 Shall be set to one
		F	13-2 Reserved
		F	1 1 = SMART self-test supported
		F	0 1 = SMART error logging supported
85	7069h		Command set/feature enabled.
		X	15 Obsolete
		F	14 1 = NOP command enabled
		F	13 1 = READ BUFFER command enabled
		F	12 1 = WRITE BUFFER command enabled
		X	11 Obsolete
		V	10 1 = Host Protected Area feature set enabled
		F	9 1 = DEVICE RESET command enabled
		V	8 1 = SERVICE interrupt enabled
		V	7 1 = release interrupt enabled
		V	6 1 = look-ahead enabled
		V	5 1 = write cache enabled
		F	4 Shall be cleared to zero to indicate that the PACKET Command feature set is not supported.
		F	3 1 = Power Management feature set enabled
		V	2 1 = Removable Media feature set enabled
		V	1 1 = Security Mode feature set enabled
		V	0 1 = SMART feature set enabled
86	B401h		Command set/feature enabled.
		F	15-9 Reserved
		F	8 1 = SET MAX security extension enabled by SET MAX SET PASSWORD
		F	7 See Address Offset Reserved Area Boot, INCITS TR27:2001
		V	6 1 = SET FEATURES subcommand required to spin-up after power-up
		V	5 1 = Power-Up In Standby feature set enabled
		F	4 1 = Removable Media Status Notification feature set enabled
		F	3-1 1 = Advanced Power Management feature set enabled
		F	0 1 = DOWNLOAD MICROCODE command supported
87	4161h		Command set/feature default.

Word	Value	F/V	Description
		F	15 Shall be cleared to zero
		F	14 Shall be set to one
		F	13-2 Reserved
		F	1 1 = SMART self-test supported
		F	0 1 = SMART error logging supported
88	007Fh	V	15-14 Reserved
		V	13 1 = Ultra DMA mode 5 is selected 0 = Ultra DMA mode 5 is not selected
		V	12 1 = Ultra DMA mode 4 is selected 0 = Ultra DMA mode 4 is not selected
		V	11 1 = Ultra DMA mode 3 is selected 0 = Ultra DMA mode 3 is not selected
		V	10 1 = Ultra DMA mode 2 is selected 0 = Ultra DMA mode 2 is not selected
		V	9 1 = Ultra DMA mode 1 is selected 0 = Ultra DMA mode 1 is not selected
		F	8 1 = Ultra DMA mode 0 is selected
		F	0 = Ultra DMA mode 0 is not selected
		F	7-6 Reserved
		F	5 1 = Ultra DMA mode 5 and below are supported
		F	4 1 = Ultra DMA mode 4 and below are supported
		F	3 1 = Ultra DMA mode 3 and below are supported
		F	2 1 = Ultra DMA mode 2 and below are supported
		F	1 1 = Ultra DMA mode 1 and below are supported
		F	0 1 = Ultra DMA mode 0 is supported
89	0001h	F	Time required for security erase unit completion
90	0001h	F	Time required for Enhanced security erase completion
91	0000h	V	Current advanced power management value
92	FFFEh	V	Master Password Revision Code
93	0000h	X	Hardware reset result
94-126	0000h	V	Reserved
127	0000h	F	Removable Media Status Notification feature set support
		F	15-2 Reserved
		F	1-0 00 = Removable Media Status Notification feature set not supported 01 = Removable Media Status Notification feature supported 10 = Reserved 11 = Reserved
128	0021h	F	Security status
		F	15-9 Reserved
		V	8 Security level 0 = High, 1 = Maximum
		F	7-6 Reserved
		F	5 1 = Enhanced security erase supported
		V	4 1 = Security count expired
		V	3 1 = Security frozen

Word	Value	F/V	Description
		V	2 1 = Security locked
		V	1 1 = Security enabled
		F	0 1 = Security supported
129-159	0000h	X	Vendor specific
160-254	0000h	X	Reserved
255	xxxxh	X	Integrity word 15-8 Checksum 7-0 Signature

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