

<u>4-Ch RAIDO (NVMe-IP) Demo Instruction</u>

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4-Ch RAIDO (NVMe-IP) Demo Instruction

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This document describes the instruction to run 4-ch RAID0 demo on FPGA development board by using the PCIe adapter board (AB18-PCIeX16 board) and Quad M.2 Card. The demo is designed to write/verify data with four M.2 NVMe SSDs as RAID0 operation. It is recommended to use the same SSD model for all channels. User controls test operation through Serial console.

1 Environment Requirement

To run the demo on FPGA development board, please prepare following environment.

- 1) FPGA Development board: VCU118
- 2) PC installing Xilinx programmer software (Vivado) and Serial console software such as TeraTerm.
- 3) AB18-PCIeX16 board + ATX power supply for AB18.
- 4) Xilinx power adapter for FPGA board
- 5) ASROCK Ultra Quad M.2 Card, connecting B side (Device) of AB18. <u>https://www.asrock.com/mb/spec/product.asp?Model=ULTRA QUAD M.2 CARD</u>
- 6) Four M.2 NVMe SSDs.
- 7) Two micro USB cables for programming FPGA and Serial console, connecting between FPGA board and PC





Figure 1-1 NVMe-IP RAID0 demo setup by AB18 on VCU118



2 Demo setup

1) Power off system. Then, connect ATX power supply to AB18-PCIeX16 board and Xilinx power adapter to FPGA development board.



Figure 2-1 Power supply connection

2) Connect four M.2 NVMe SSDs to four connectors on Ultra Quad M.2 Card as shown in Figure 2-2.



Figure 2-2 Four M.2 NVMe SSDs with Ultra Quad M.2 Card

Confirm that two mini jumpers are inserted at J5 connector on AB18. After that, connect FPGA Side (A-side) on AB18 to PCIe connector on FPGA board and connect Quad M.2 NVMe SSD Card to device side (B-Side) on AB18, as shown in Figure 2-3.
 Warning: Please confirm that the Quad M.2 NVMe SSD is inserted in the correct side of

AB18 (B-side, not A-side) before power on system.





4) Connect two micro USB cables between FPGA board and PC for FPGA programming and Serial console.



5) Power on FPGA development board, ATX power supply for AB18, and AB18 board, as shown in Figure 2-5.



- Figure 2-5 Turn on power switch on FPGA and adapter board
- 6) On PC, additional COM port is detected after connecting USB cables to FPGA board. More than one COM ports are detected.

In case of VCU118, select Standard COM port as shown in Figure 2-6. On Serial console, the setting is as follows. Baud rate=115,200, Data=8-bit, Non-Parity, and Stop = 1.

🗄 Device Manager —	Tera Term: Serial port	erial setting	×
Eile Action Yiew Help Image: Second state of the second	<u>P</u> ort: Sp <u>e</u> ed: <u>D</u> ata: P <u>a</u> rity: <u>S</u> top bits:	COM5 ~ 115200 ~ 8 bit ~ none ~ 1 bit ~	OK Cancel <u>H</u> elp
Silicon Labs Dual CP2105 USB to UART Bridge: Standard COM Port (COM5) Fint queues	ew control: Transmit delay 0 msecj	none v , V <u>c</u> har O ms	ec/ <u>l</u> ine

Figure 2-6 Two COM ports from FPGA connection



7) Use Vivado tool to download configuration file, as shown in Figure 2-7.



8) Check LED status on FPGA board. The description of LED is as follows.

GPIO I FD	ON	OFF
0110 220	Normal operation	SSD is not good status
0		SSD is not good status
1	System is busy	Idle status
2	IP Error detect	Normal operation
3	Data verification fail	Normal operation

Table 2-1 LED Definition

 After programming completely, LED[0] and LED[1] are ON during PCIe initialization process. Then, LED[1] changes to OFF after PCIe completes initialization process.



Figure 2-8 LED status after programming configuration file and finishing PCIe initialization



10)On the console, the message is displayed to show current status as follows.

"Waiting PCIe Linkup" is displayed after finishing configuration.

"Waiting IP initialization" is displayed after PCIe is linked up.

PCIe speed and number of PCIe lanes are displayed, after RAID0 finishes initialization. Finally, main menu to run six commands is shown on the console.

🔟 COM5 - Tera Term VT		_	×
<u>File Edit Setup Control Window Hel</u>	р		
++++ Start NUMe-IP RAID0x4 Test Wait PCIe Linkup	design [Ver = 4.1] + kup	***	^
Waiting IP initialization Walt R Ch[0]PCIe Gen3 x4 Device Detect Ch[1]PCIe Gen3 x4 Device Detect Ch[2]PCIe Gen3 x4 Device Detect Ch[2]PCIe Gen3 x4 Device Detect Ch[3]PCIe Gen3 x4 Device Detect	AID0 busy PCIe speed = Gen3 and PCIe Iane = 4 Ianes		
Main menu [IPVer = 4.1] [0] : Identify Command [1] : Write Command [2] : Read Command [3] : SMART Command [4] : Flush Command [5] : Shutdown Command	Main menu to select the command		~

Figure 2-9 Main menu after RAID0 finishes initialization

When LBA size is 4 Kbyte, the error message is displayed on the console as shown in Figure 2-10



Figure 2-10 Error message when LBA does not support



3 Test Menu

3.1 Identify Command

Select '0' to send Identify command to RAID0.

💆 COM5 - Tera Term VT	_		×
<u>F</u> ile <u>E</u> dit <u>S</u> etup C <u>o</u> ntrol <u>W</u> indow <u>H</u> elp			
+++ Identify Command selected +++ Ch[0]Model Number : Samsung SSD 960 PR(Ch[1]Model Number : Samsung SSD 960 PR(Ch[2]Model Number : Samsung SSD 970 PR(Ch[3]Model Number : Samsung SSD 970 PR(RAID Capacity= 2048[GB]) 512G) 512G) 512G) 512G) 512G	B B B B	^
Main menu [IPVer = 4.1] [0] : Identify Command [1] : Write Command [2] : Read Command [3] : SMART Command [4] : Flush Command [5] : Shutdown Command	and RA	ID0 caj	pacity ~

Figure 3-1 Test result when running Identify command

After finishing the operation, the SSD information output from Identify command is displayed. The console shows two values.

1) SSD model number: This value is decoded from Identify controller data.

2) RAID capacity: This value is calculated by multiplying device capacity in channel#0 by 4.

Dec

dg_nvmeip_raid0x4_instruction_xilinx_en

3.2 Write Command

Select '1' to send Write command to RAID0.

💆 COM5 - Tera Term VT	Normal	Green: User input Blue: Output to user			
<u>File Edit Setup Control Window</u>	<u>H</u> elp				
++ Write Command selected +++ Input parameters inter Start Address (512 Byte) : 0 - 0xEE784ABF => 0x000000 inter Length (512 Byte) : 1 - 0xEE784ACO => 0xC000000 elected Pattern [0]Inc32 [1]Dec32 [2]All_0 [3]All_1 [4]LFSR=> 4 8.638 [GB] 17.040 [GB] 25.584 [GB] 0 Current transfer size					
100.185 [GB] /	(Dutput performance			
Total = 103.079 [GB] , Time	[otal = 103.079 [GB] , Time = 12383[ms] , Transfer speed = 8324[MB/s]				
Main menu [IPVer = 4.1] [0] : Identify Command [1] : Write Command [2] : Read Command [3] : SMART Command [4] : Flush Command [5] : Shutdown Command					
Figure 3-2 Test	result when running Write cor	nmand			

User sets three parameters as follows.

- 1) Start Address: Start address to write RAID0 as 512-byte unit. The input is decimal unit when the input is only digit number. User can add "0x" to be a prefix for hexadecimal unit.
- 2) Transfer Length: Total transfer size as 512-byte unit. The input is decimal unit when the input is only digit number. User can add "0x" to be a prefix for hexadecimal unit.
- 3) Test pattern: Select test data pattern for writing RAID0. There are five patterns, i.e. 32-bit increment, 32-bit decrement, all 0, all 1, and 32-bit LFSR counter.

When all inputs are valid, the operation begins. During writing data, current transfer size is displayed on the console every second to show that system is still alive. Finally, total size, total time usage, and test speed are calculated and displayed on the console to be a test result.



←64-bit header of each sector→

4	8-bit LBA Address = 0	0x0000 32-bit LF	SR pattern	48-bit LBA Address = 1
Offset	0 1 2 3 4 5	56 7 8 9 A E	3 C D E F	0 1 2 3 4 5 6 7 8 9 A B C D E F
0000000000	00 00 00 00 00 00	0 00 00 FF FF 00 00	FF FF FF 00	01 00 00 00 00 00 00 00 FE FF 00 00 FE FF FF 00
0000000010	01 00 00 00 FF 01	1 00 00 FF FF 01 00) FE FF FF 01	02 00 00 00 FC 01 00 00 FC FF 01 00 FD FF FF 01
0000000020	02 00 00 00 FF 03	3 00 00 FF FF 03 00) FD FF FF 03	04 00 00 00 F9 03 00 00 F9 FF 03 00 FB FF FF 03
0000000030	04 00 00 00 FF 07	7 00 00 FF FF 07 00) FB FF FF 07	09 00 00 00 F2 07 00 00 F2 FF 07 00 F6 FF FF 07
0000000040	09 00 00 00 FF OF	F 00 00 FF FF 0F 00) F6 FF FF OF	12 00 00 00 E4 0F 00 00 E4 FF 0F 00 ED FF FF 0F
0000000050	12 00 00 00 FF 1F	F 00 00 FF FF 1F 00) ED FF FF 1F	24 00 00 00 C9 1F 00 00 C9 FF 1F 00 DB FF FF 1F
		SSD#0		SSD#1
	48-bit LBA Address =	= 4		
00000001A0	9E 24 49 02 D9 F6	6 FF FF 24 D9 F6 FF	7 45 92 B4 FD	3C 49 92 04 7B 9B 24 F9 86 B4 2D F9 E7 FF 6F FB
00000001B0	3C 49 92 04 B2 EE	D FF FF 49 B2 ED FF	7 8A 24 69 FB	79 92 24 09 F7 36 49 F2 0C 69 5B F2 CF FF DF F6
00000001C0	79 92 24 09 64 DE	B FF FF 92 64 DB FF	F 14 49 D2 F6	F3 24 49 12 EE 6D 92 E4 18 D2 B6 E4 9E FF BF ED
00000001D0	F3 24 49 12 C9 B6	6 FF FF 25 C9 B6 FF	7 28 92 A4 ED	E7 49 92 24 DD DB 24 C9 31 A4 6D C9 3C FF 7F DB
00000001E0	E7 49 92 24 92 6E	D FF FF 4A 92 6D FF	51 24 49 DB	CF 93 24 49 BA B7 49 92 62 48 DB 92 79 FE FF B6
00000001F0	CF 93 24 49 24 DE	B FE FF 94 24 DB FE	E A3 48 92 B6	9E 27 49 92 75 6F 93 24 C5 90 B6 25 F2 FC FF 6D
0000000200		0 00 00 FB FF 00 00	D FB FF FF OO	05 00 00 00 00 00 00 00 FA FF 00 00 FA FF FF 00
000000210	09 00 00 00 F7 01	1 UU UU F7 FF UI UU	J F6 FF FF U1	UA UU UU UU F4 U1 UU UU F4 FF U1 UU F5 FF FF U1
	48-bit LBA Address =	= 2		48-bit LBA Address = 3
Offset	0 1 2 3 4 5	56789AE	3 C D E F	0 1 2 3 4 5 6 7 8 9 A B C D E F
0000000000	02 00 00 00 00 00	0 00 00 FD FF 00 00) FD FF FF 00	03 00 00 00 00 00 00 00 FC FF 00 00 FC FF FF 00
0000000010	04 00 00 00 FA 01	1 00 00 FA FF 01 00) FB FF FF 01	07 00 00 00 F9 01 00 00 F9 FF 01 00 F8 FF FF 01
0000000020	09 00 00 00 F4 03	3 00 00 F4 FF 03 00) F6 FF FF 03	OF 00 00 00 F2 03 00 00 F2 FF 03 00 F0 FF FF 03
0000000030	12 00 00 00 E9 07	7 00 00 E9 FF 07 00) ED FF FF 07	1F 00 00 00 E4 07 00 00 E4 FF 07 00 E0 FF FF 07
0000000040	24 00 00 00 D2 OF	F 00 00 D2 FF 0F 00	DB FF FF OF	3F 00 00 00 C9 0F 00 00 C9 FF 0F 00 C0 FF FF 0F
0000000050	49 UU UU UU A4 1F	F UU UU A4 FF 1F UU	J B6 FF FF 1F	7F 00 00 00 92 1F 00 00 92 FF 1F 00 80 FF FF 1F
		SSD#2		SSD#3
000000130	79 92 24 09 3F 40	0 92 F4 C3 6F 9B F4	42 24 D9 F6	DB FF FF 0F 9C 2D 49 F2 61 02 40 F2 00 49 02 F0
00000001R0	F3 24 49 12 7D 80	0 24 E9 86 DF 36 E9	45 49 B2 ED	B6 FF FF 1F 38 5B 92 E4 C3 04 80 E4 00 92 04 E0
00000001C0	E7 49 92 24 FA 00	0 49 D2 0C BF 6D D2	8A 92 64 DB	6D FF FF 3F 70 B6 24 C9 86 09 00 C9 00 24 09 C0
00000001D0	CF 93 24 49 F5 01	1 92 A4 19 7E DB A4	14 25 C9 B6	DB FE FF 7F E1 6C 49 92 0D 13 00 92 00 48 12 80
00000001E0	9E 27 49 92 EB 03	3 24 49 33 FC B6 49	9 28 4A 92 6D	B6 FD FF FF C3 D9 92 24 1B 26 00 24 00 90 24 00
00000001F0	3D 4F 92 24 D6 07	7 48 92 66 F8 6D 93	8 51 94 24 DB	6C FB FF FF 87 B3 25 49 37 4C 00 48 00 20 49 00
0000000200	06 00 00 00 00 00	0 00 00 F9 FF 00 00) F9 FF FF 00	07 00 00 00 00 00 00 00 F8 FF 00 00 F8 FF FF 00
0000000210	OC 00 00 00 F2 01	1 00 00 F2 FF 01 00) F3 FF FF 01	OF 00 00 00 F1 01 00 00 F1 FF 01 00 F0 FF FF 01
Figure 3	3-3 Example Te	est data of the 1 ^s	^{it} and 2 nd 512 b	ovte of each SSD by using LFSR pattern

The stripe size in 4-ch RAID0 demo is 512-byte. For incremental, decremental, or LFSR pattern, each 512-byte data has unique 64-bit header which consists of 48-bit address (in 512-byte unit) and 16-bit zero value. The data after 64 bits header is the test pattern which is selected by user. The 1st stripe is mapped to the first 512-byte of SSD#0. The 2nd - the 4th stripe are mapped to the first 512-byte of SSD#1 - SSD#3 respectively, as shown in Figure 3-3. The unique header is not included when running all-0 or all-1 pattern.



Figure 3-4 shows the example when the input is not in the recommended range for each parameter. The console displays "Invalid input" and then the operation is cancelled.

🔟 COM5 - Tera Term VT	Error input		- C	: נ
<u>File Edit Setup Control W</u> indow	<u>H</u> elp			
+++ White Command selected	+++	Out of range	e address	
Enter Start Address (512 By Invalid input	te) :0	- Ø×EE784ABF =	> Ø×FFFF	FFFF
🔟 COM5 - Tera Term VT			- 0	>
<u>File Edit Setup Control W</u> indow	<u>H</u> elp			
+++ Write Command selected Enter Start Address (512 By Enter Length (512 Byte) Invalid input	+++ te> :0 :1	Out of ran - ØxEE784ABF = - ØxEE784ACØ =	ge length > 0x0000 > 0xFFFF	0000 FFFF
M COM5 - Tera Term VT File Edit Setup Control Window	Help	-	- 🗆	×
+++ Write Command selected Enter Start Address (512 By Enter Length (512 Byte) Selected Pattern [0]Inc32 [Invalid input	+++ te> : 0 : 1 1]Dec32 [2](Invalid - 0xEE784ABF = - 0xEE784AC0 = 111_0 [3]A11_1	pattern > 0×0000 > 0×C000 [4]LFSR=	1000 1000 => 8



3.3 Read Command

Select '2' to send Read command to RAID0.

💆 COM5 - Tera Term VT	Normal _				
<u>File Edit Setup Control Window H</u> el	lp				
+++ Read Command selected +++ Enter Start Address (512 Byte) Enter Length (512 Byte) Selected Pattern [Ø]Inc32 [1]De 12.803 [GB] 25.621 [GB] 38.431 [GB] 51.249 [GB] 64.065 [GB] 76.879 [GB] 89.659 [GB] 102.409 [GB]	Input parameters : 0 - 0×EE784ABF => 0×0000000 2 : 1 - 0×EE784AC0 => 0×C000000 2 ec32 [2]All_0 [3]All_1 [4]LFSR=> 4 3 size				
Total = 103.079 [GB] , Time =	8052[ms] , Transfer speed = 12801[MB/s]				
Main menu [IPVer = 4.1] [0] : Identify Command [1] : Write Command [2] : Read Command [3] : SMART Command [4] : Flush Command [5] : Shutdown Command					
Figure 3-5 Input and result of Read Command menu					

- User inputs three parameters as follows.1) Start Address: Start address to read SSD as 512-byte unit. The input is decimal unit when the input is only digit number. User can add "0x" to be a prefix for hexadecimal unit.
- 2) Transfer Length: Total transfer size as 512-byte unit. The input is decimal unit when the input is only digit number. User can add "0x" as a prefix for hexadecimal unit
- Test pattern: Select test data pattern to verify data from RAID0. Test pattern must be matched with the pattern using in Write Command menu. There are five patterns, i.e. 32-bit increment, 32-bit decrement, all 0, all 1, and 32-bit LFSR counter

Similar to Write command menu, test system starts reading data from RAID0 when all inputs are valid. During reading data, current transfer size is displayed on the console every second to show that system is still alive. Total size, total time usage, and test speed are calculated and displayed after finishing data transferring.



Figure 3-6 shows error message when data verification is failed. "Verify fail" is displayed with the information of the 1st failure data, i.e. the error byte address, the expected value, and the read value. User presses any keys to cancel read operation or waits until finishing Read command. Without cancelling the operation, the output performance is displayed on the console after finishing the operation.

When pressing some keys to cancel the operation, the read command does not complete in the good sequence. It is recommended to power-off/on AB18 and then presses "RESET" button to restart system.

🔟 COM5 - Tera Term VT	Verification error without cancellation	- COM5 - Tera Term Verification error with cancellation
<u>File Edit Setup Control</u>	<u>W</u> indow <u>H</u> elp	<u>File Edit S</u> etup C <u>o</u> ntrol <u>W</u> indow <u>H</u> elp
+++ Read Command se Enter Start Address Enter Length (512 B Selected Pattern [Ø	lected +++ (512 Byte) : 0 - 0xEE784ABF => 0x0000000 yte> : 1 - 0xEE784AC0 => 0xC000000 JInc32 [1]Dec32 [2]All_0 [3]All_1 [4]LFSR=}[]	+++ Read Command selected +++ Enter Start Address (512 Byte) : 0 - 0xEE784ABF => 0x0000000 Enter Length (512 Byte) : 1 - 0xEE784AC0 => 0xC000000 Selected Pattern [0]Inc32 [1]Dec32 [2]All_0 [3]All_1 [4]LFSR=> 1
Verify fail 1st Error at Byte Ad Expect Data[511:384 Expect Data[255:128 Expect Data[255:128 Read Data[255:128] Read Data[383:256] Read Data[255:128] Read Data[255:128] Read Data[255:128] Read Data[255:128] Read Data[255:128] Read Data[255:128] Read Data[2780] Read Data[2780] Rea	ddr = 0x00000000 1 = 0xFFFFFF0_FFFF0_FFFFFF1_FFFFF7 1 = 0xFFFFF70_FFFFF7_FFFF75_FFFF76_FFFFF77 1 = 0xFFFFF76_FFFF75_FFFF75_FFF775 1 = 0xFFFFF76_FFF75_00000000_00000000 0 x07FFFF75_00007FF5_0000007FF_000000000 0 x03FFFF75_00007FF5_000001FF_000000000 0 x03FFFF75_000007FF5_0000001FF_000000000 0 x03FFFF75_00000FFF5_0000001FF_000000000 0 x00FFFFF5_0000FFF5_0000001FF_000000000 0 x00FFFFF5_0000FFF5_0000001FF_000000000 0 x00FFFFF5_00000FFF5_00000000000000000 accl operation Message when verification is failed	<pre>Verify fail 1st Error at Byte Addr = 0x00000000 Expect Data[511:384] = 0xFFFFF9_FF9_FF9_FF9_FFF9_FF79_FFF79_FFF79_FFF79_FFF79_FFF79_FFF79_FFF79_FFF79_FF797_Expect Data[255:128] = 0xFFFFFF9_FF79_FFF79_FF79_FF79_FF79_0000000_00000000 Read Data[511:384] = 0x07FFFF9_0007FFF_00000000_000000000 Read Data[511:384] = 0x07FFFF9_0007FFF_00000000_00000000000 Read Data[255:128] = 0x03FFFFF_0000FFFF_00000000_000000000 Read Data[255:128] = 0x03FFFFF_0000FFFF_00000000_000000000 Read Data[255:128] = 0x03FFFFF_0000FFFF_00000000_00000000 Read Data[255:128] = 0x03FFFFF_0000FFFF_000000000_00000000 Read Data[255:128] = 0x03FFFFF_0000FFFF_0000000000000 Read Data[127:0] = 0x00FFFFFF_00000FFFF_000000000000 Press any key to cancel operation 12.816 [GB] 25.638 [GB] Operation is cancelled Please reset system before starting a new test Main menu [IPUer = 4.1] [0] : Identify Command [1] : Write Command [1] : Write Command [1] : Write Command [1] : SMART Command [1] : Fluch Command [1] : Fluch Command [1] : Fluch Command [1] : Fluch Command [2] : Read Command [2] : Fluch Command [2] : SMART Command [3] : SMART Command [4] : Fluch C</pre>
	Figure 3-6 Data	verification is failed



3.4 SMART Command

Select '3' to send SMART command to RAID0.

💻 COM5 - Tera Term VT File Edit Setup Control Window Help +++ SMART Command selected +++ Data output decoded from SMART command << SMART Log Information Ch[0] >> Temperature : 32 Degree Celsius 58341 GB Total Data Read Total Data Read (Raw data) 0x0000000_0000000_00000000_06CA9C39 Total Data Written 61699 GB Total Data Written (Raw data) : 0x0000000_0000000_0000000_072EAC8A Power On Cycles Power On Hours : 1813 Times : 122 Hours Unsafe Shutdowns : 1598 Times << SMART Log Information Ch[1] >> Temperature : 32 Degree Celsius 102749 GB Total Data Read Total Data Read (Raw data) 0x0000000 0000000 0000000 0BF5F920 Total Data Written 109708 GB : 0x0000000_0000000_0000000_0CC55E34 Total Data Written (Raw data) Power On Cycles Power On Hours : 2675 Times : 216 Hours Unsafe Shutdowns : 2119 Times << SMART Log Information Ch[2] >> 32 Degree Celsius Temperature Total Data Read : 4709 GB Total Data Read (Raw data) Total Data Written 0x0000000 0000000 0000000 008C559F 5603 GB : 0×00000000_00000000_0000000_00A6F917 Total Data Written (Raw data) Power On Cycles Power On Hours : 204 Times : 15 Hours : 135 Times Unsafe Shutdowns << SMART Log Information Ch[3] >> 30 Degree Celsius Temperature Total Data Read 6012 ĞB Total Data Read (Raw data) Total Data Written 0x0000000_0000000_0000000_00B32A18 7210 GB Total Data Written (Raw data) : 0x0000000_0000000_0000000_00D6E352 Power On Cycles Power On Hours : 155 Times : 17 Hours Unsafe Shutdowns : 75 Times SMART Command Complete

Figure 3-7 Test result when running SMART command

When the operation is completed, SMART/Health Information (output from SMART command) is displayed as shown in Figure 3-7. The console shows six values from each SSD.

- 1) Temperature in °C unit.
- 2) Total Data Read decoded as GB/TB unit. Also, raw data without decoding is displayed in 128-bit hexadecimal unit. The unit size of raw data is 512,000 byte.
- 3) Total Data Written decoded as GB/TB unit. Also, raw data without decoding is displayed in 128-bit hexadecimal unit. The unit size of raw data is 512,000 byte.
- 4) Power On Cycles: Display the number of power cycles.
- 5) Power On Hours: Display period of time in hours that the SSD is power on.
- 6) Unsafe Shutdowns: Display the number of unsafe shutdowns of SSD



3.5 Flush Command

Select '4' to send Flush command to RAID0.



"Flush Command Complete" is displayed after finishing Flush operation.

3.6 Shutdown Command

Select '5' to send Shutdown command to RAID0.

🔟 COM5 - Tera Term VT		_		\times
<u>F</u> ile <u>E</u> dit <u>S</u> etup C <u>o</u> ntrol <u>W</u> indow	<u>H</u> elp			
Main menu [IPUer = 4.1] [0] : Identify Command [1] : Write Command [2] : Read Command [3] : SMARI Command [4] : Flush Command [5] : Shutdown Command +++ Shutdown Command select Are you sure you want to sh Press 'y' to confirm : y Shutdown command is complet	ed Confirm utdown the Press 'y	ation m devic 'to con	assage e now	?
The device has turned off	Last messag and SSD are	je befoi inactiv	re NVM ve statu	e IP s

Figure 3-9 Message after Shutdown command is completed

The confirmation message is displayed on the console. User enters 'y' or 'Y' to confirm the operation or enters other keys to cancel the operation.

After finishing Shutdown operation, "Shutdown command is complete" is displayed on the console as the last message. Main menu is not displayed and user needs to power off/on the test system to start new test operation.



4 Revision History

Revision	Date	Description
1.0	13-Nov-19	Initial version release
1.1	20-Apr-20	Remove power adapter cable from AB18