Atlas2 MCIO Host Adapter Card

User's Manual

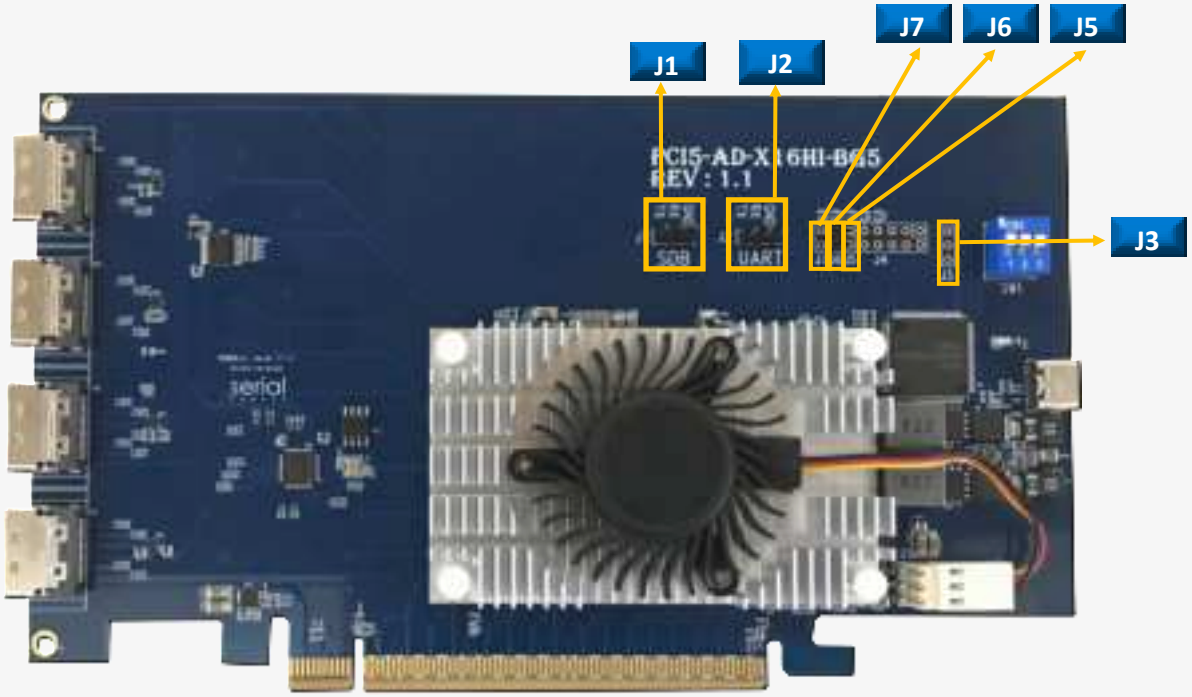
REV: 1.0

May. 2023

Change history

REV	Change history

Function Description For Headers



Location	Descriptions	Pinout
J6	ON: MCU without SDB of switch control for debug purpose (etc. needs to access Atlas2 PCIe switch via SDB)	
J1	Atlas2 switch SDB port. UART with 3.3V TTL signals level	TX/RX/GND
J2	Atlas2 switch UART port, require Atlas2 FW support UART with 3.3V TTL signals level	TX/RX/GND
J3	Reserved I/F for MCU FW debugging	
J5	Reserved I/F for MCU boot-loader mode	
J7	Reserved I/F for MCU FW upgrading	

Atlas2 MCIO Host Adapter Card

Function Description For Connectors

Location	Descriptions
CN2:CN5	X4 MCIO(mini-cool edge IO), SFF-TA-1016 connector.
CN6	Type-C USB connector for CLI commands
SW1	Slide switch for side-band mode selection  SC mode (Default)  ACE mode  ACU mode  CM mode

Side-Band Mode Descriptions (SW1)

Pin	SC mode	ACE mode	ACU mode	CM Mode
A8	CLK_0_P	CLK_0_P	CLK_0_P	CLK_0_P
A9	CLK_0_N	CLK_0_N	CLK_0_N	CLK_0_N
B8	CLK_1_P	PWRDIS	PWRDIS	PERST#
B9	CLK_1_N	HOST_LED	LINKFAT	PWRON
A11	ATLAS_SCL	ATLAS_SCL	ATLAS_SCL	ATLAS_SCL
A12	ATLAS_SDA	ATLAS_SDA	ATLAS_SDA	ATLAS_SDA
B11	PERST#_0	PERST#_0	PERST#_0	PERST#_0
B12	PERST#_1	PERST#_1	PERST#_1	PERST#_1

SC: Serial cables mode

Use for drive direct attached via MCIO cables, support single port U2/U3 and dual ports U2/U3 cables.

visit the website below for more details in cables support

https://www.serialcables.com/product-category/gen5-mcio-cables/

ACE: Adapter Card EDSFF

Using MCIO to MCIO cables connect with “MCIO to EDSFF adapter card”.

a.) It is able set PWRDIS in “H” or “L” in EDSFF drives via CLI.

b.) Turn ON/OFF the Host LED inside EDSFF drives via CLI.

ACU: Adapter Card U2

Use MCIO to MCIO cable to connect with “MCIO to U2 adapter card”.

a.) It is able set PWRDIS in “H” or “L” in U2 drives via CLI.

b.) Turn ON the link match LEDs in adapter if link width isn’t x4.

[Atlas2 host card]

[MCIO to MCIO cable]

[MCIO to U2 adapter]

U.2 single/dual port drives

[MCIO to EDSFF adapter]

E.1L, E1.S, E3 drives

CM: Common mode

a.) Pin B8 of MCIO connector is PERST#.

b.) Pin B9 is “PWRON”, always keep in “H” state after host server power on.

Atlas2 MCIO Host Adapter Card

Function Description For LEDs

Location	Color	Description
LED7	Green	**Host card Healthy LED** 0.5Hz blinking for Host card good 2Hz blinking if any failure events detected, etc. voltages, FAN, and temperatures failed
LED6	Blue	**Atlas2 switch Heartbeat LED** Blinking: Indicates the Atlas2 switch working in Synthetic switch mode Solid ON: Indicates the Atlas2 switch working in base fanout switch mode
LED5	Red	**Atlas2 switch failure LED** Solid ON: indicates failure detected in Atlas2 switch
LED1/2/3/4	Red	**MCIO Port link matching LEDs** Each LED corresponds to MCIO port. LED1, LED4, LED3 and LED2 light when attached devices in MCIO port not link at x4 or 2x2 link width.

Atlas2 MCIO Host Adapter Card

MCIO Pin Definition

		2	3	5	6	8	9
CON_0	A	PERN16	PERP16	PERN17	PERP17	CLKP1	CLKN1
	B	PETN16	PETP16	PETN17	PETP17	CLKP0	CLKN0
		14	15	17	18	11	12
	A	PERN18	PERP18	PERN19	PERP19	I2C_SCL3	I2C_SDA3
	B	PETN18	PETP18	PETN19	PETP19	PERST#_6	PERST#_7
CON_1		2	3	5	6	8	9
	A	PERN20	PERP20	PERN21	PERP21	CLKP3	CLKN3
	B	PETN20	PETP20	PETN21	PETP21	CLKP2	CLKN2
		14	15	17	18	11	12
	A	PERN22	PERP22	PERN23	PERP23	I2C_SCL2	I2C_SDA2
	B	PETN22	PETP22	PETN23	PETP23	PERST#_4	PERST#_5
CON_2		2	3	5	6	8	9
	A	PERN24	PERP24	PERN25	PERP25	CLKP5	CLKN5
	B	PETN24	PETP24	PETN25	PETP25	CLKP4	CLKN4
		14	15	17	18	11	12
	A	PERN26	PERP26	PERN27	PERP27	I2C_SCL1	I2C_SDA1
	B	PETN26	PETP26	PETN27	PETP27	PERST#_2	PERST#_3
CON_3		2	3	5	6	8	9
	A	PERN28	PERP28	PERN29	PERP29	CLKP7	CLKN7
	B	PETN28	PETP28	PETN29	PETP29	CLKP6	CLKN6
		14	15	17	18	11	12
	A	PERN30	PERP30	PERN31	PERP31	I2C_SCL0	I2C_SDA0
	B	PETN30	PETP30	PETN31	PETP31	PERST#_0	PERST#_1

Note: Host card supports 4 types of side-band modes (SC,ACE, ACU, and CM).

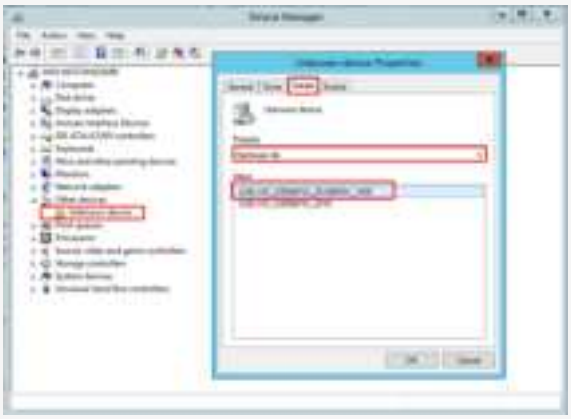
The sideband signals listed in table above is for SC mode.

Install USB Driver

Download and install the CDC driver for unidentified device (VID_03EB&PID_2018)

Available at:

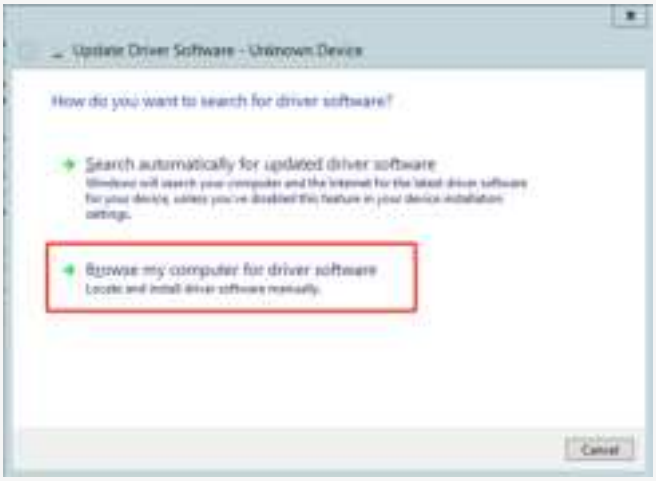
https://www.serialcables.com/wp-content/uploads/2018/11/SynergyUSBCDC_20180518.rar



[Figure 1]

Note: **No USB driver is**

[Figure 2]



[Figure 3]

[Figure 4]

[Figure 5]

[Figure 6]

[Figure 7]

[Figure 8]

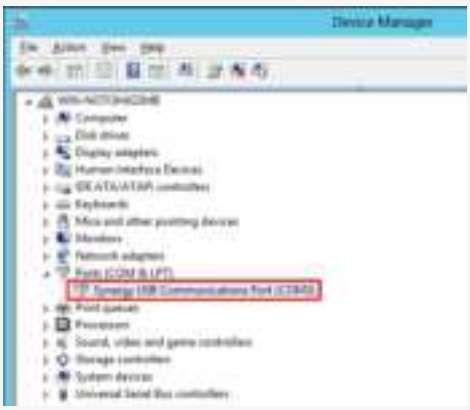
[Figure 9]

[Figure 10]

[Figure 11]

[Figure 12]

[Figure 13]

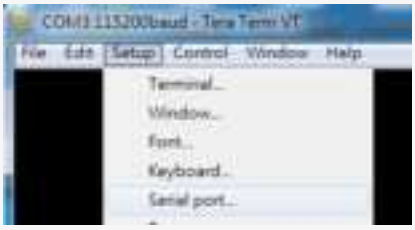


[Figure 14]

MCU CLI Setup

Step 1. Install and launch Tera Term application

Step 2: To ensure proper communications between host adapter card and the VT100 Terminal emulation, please configure the VT100 Terminal emulation settings to the values shown below:



Step 3:

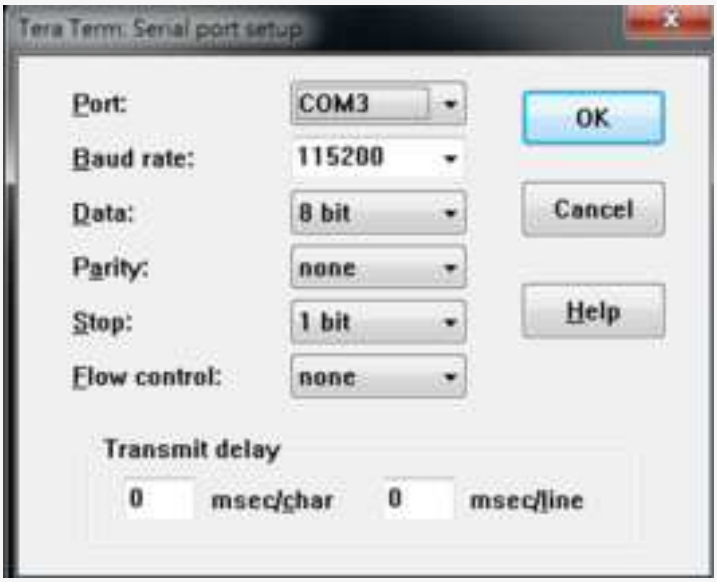
For “Port”, select COM3 in this example. (Depend on which COM port used on Host)

For “Baud rate”, select 115200.

For “Data”, select 8 bit. For “Parity”, select none.

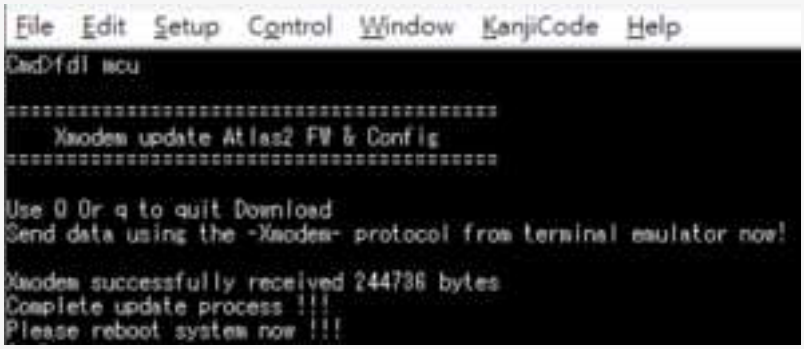
For “Stop”, select 1 bit. For “Flow control”, select: none.

Click OK when you have finished your selections.



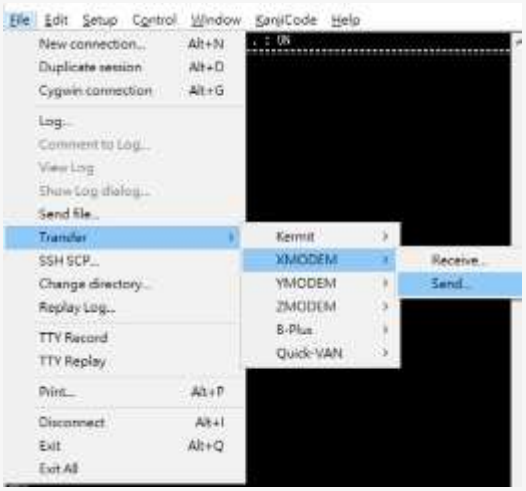
MCU FW Upgrading (Option 1)

Step 1. Type “fdl mcu” in CLI commands



Step 2: Sending updated FW(i.e Atlas2_MCIO_Host_Card_Fw_v001) via XMODEM.

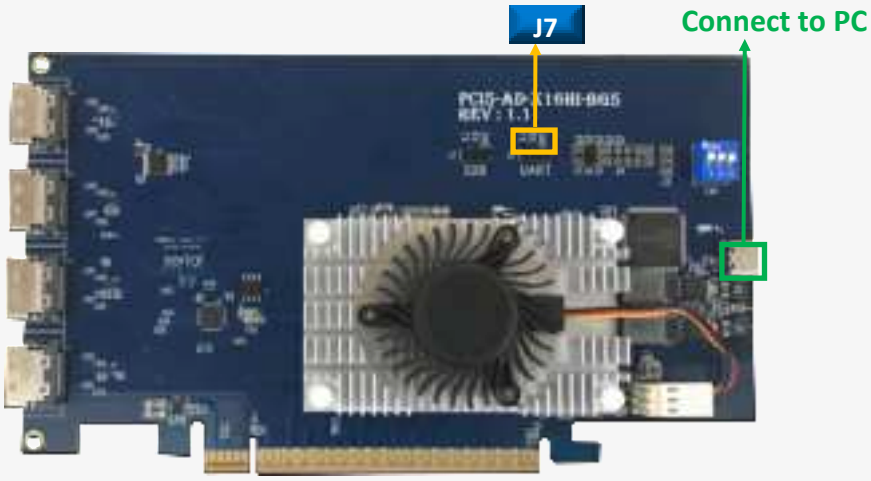
It will take few seconds to complete update process.



Step 3. Power cycle host card to apply new FW setting.

MCU FW Upgrading (Option 2)

Step 1. Jumper J7 ON to force MCU entering FW upgrading mode.



Step 2: Install host adapter card into PCIe slot of server, and connect Micro USB port to PC which uses for FW upgrading, then power on the server.

Step 3.

a.) it will show an added USB device in PC or laptop.

b.) Put upgrading FW(i.e PCI5_AD_x16HI_BG5_V01.srec) into the folder of FW.

c.) Put update.txt in the root folder.

Step 4. Power cycle host card to apply new FW setting.

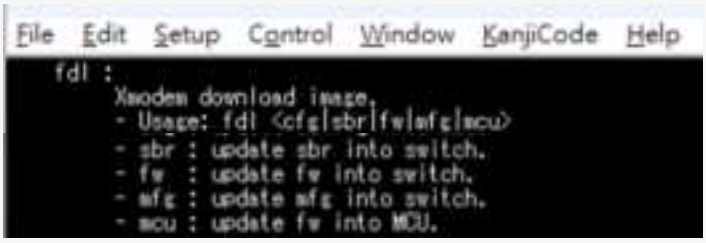
MCU Commands List

Commands	Description
fdl	Update the configuration file or firmware for Atlas2 PCIe switch and MCU FW upgrading
lsd	Shows switch temperature, FAN speed, voltages and Side-band modes.
mw	Write 32bits data into any register as defined in Atlas2 switch
dr	Dump the values of Atlas2 switch for any register with specified address.
dp	Dump the values of Atlas2 switch for any register with specified port number.
df	Dump the values of Atlas2 flash with specified address.
ssdrst	Issue 300ms duration PERST# to attached devices in MCIO ports or straddlePCIe connector.
pwrdis	Set PWRDIS to H state (disable SSD power), or L state (enable SSD power)
hled	Turn ON/OFF the host LED inside EDSFF drive
showport	Show link status for USP in golden finger, DSP for MCIO ports and Straddle port.
bist	On-board I2C devices diagnostic.
spread	Show spread information, set –0.3% or -0.5% SSC in PCIe reference clock to Atlas2 switch.
clk	Show the clock output status or disable/enable the clock output for all MCIO ports.
iicwr	SMBus data read from drive attached in MCIO port.
iicw	SMBus data write to drive attached in MCIO port.
ver	Shows card information, MCU FW and Atlas2 FW version.
sysinfo	Shows system information
reset	MCU FW reset (not including Atlas2 PCIe switch)

fdl Command

Update the configuration file or firmware for Atlas2 PCIe switch.

-Usage: fdl sbr|fw|mfg|MCU

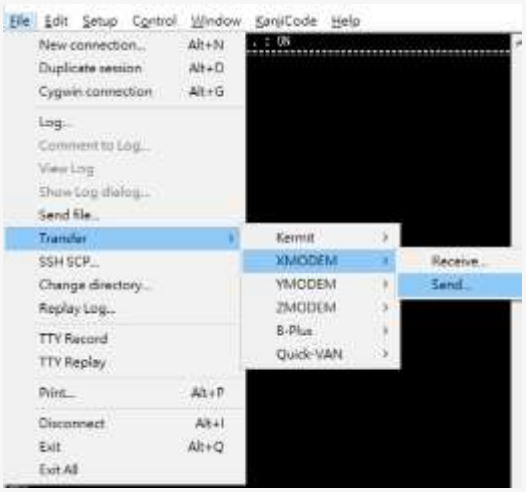


sbr=update the SBR file into flash of Atlas2 switch. (Applicable in base switch mode)

fw=program or upgrade FW into flash of Atlas2 switch (Applicable in Synthetic mode)

mfg=update mfg file into flash of Atlas2 switch (Reserved for further used).

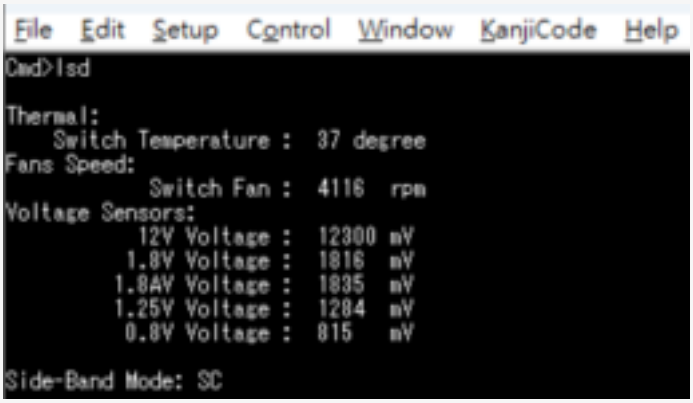
mcu=on-board MCU FW upgrading



lsd Command

Shows switch temperature, FAN speed, voltages and Side-band modes.

-Usage: lsd



Thermal: Temperature sensor near Atlas2 PCIe switch

Fan Speed: The FAN TACH value reading.

Voltage sensors: Main voltages monitoring in Atlas2 host card.

Side-Band Mode: Shows the side-band mode in running.

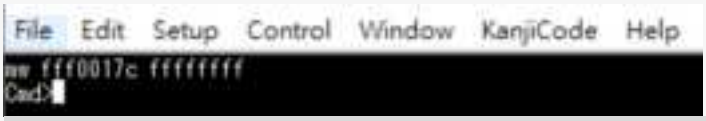
mw Command

Write 32bits data into any register as defined in Atlas2 switch

-Usage: mw <register(H)> <data(H)>

-register(H) : register should be 0x00000000 ~ 0xFFFFFFFC

-data(H) : data should be 0x00000000 ~ 0xFFFFFFFF



Write data “0xFFFFFFFF” into register address “0xFFF0017C” of Atlas2 PCIe switch

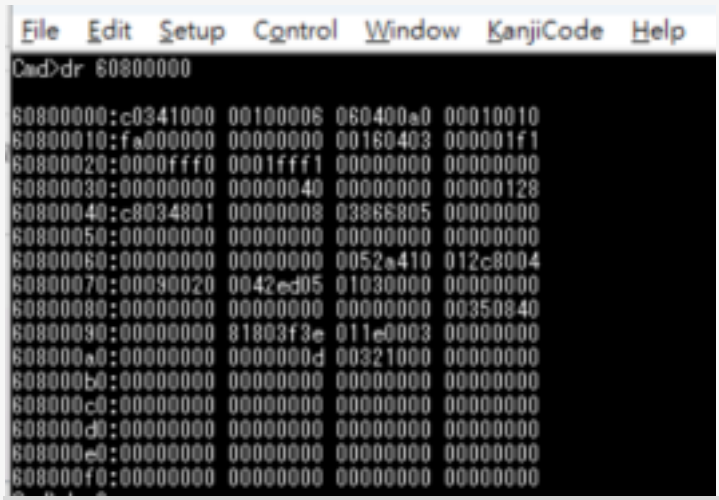
dr Command

Dump the values of Atlas2 switch for any register with specified address.

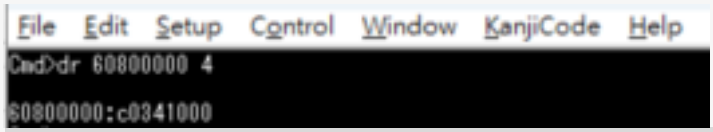
-Usage: dr <register<H> [count(H)]

-register(H) : register should be 0x00000000 ~ 0xFFFFFFFC

-count(H) : count should be 0x00000000 ~ 0xFFFFFFFC



Dump the values in Atlas2 switch registers, start from address “0x60800000” .



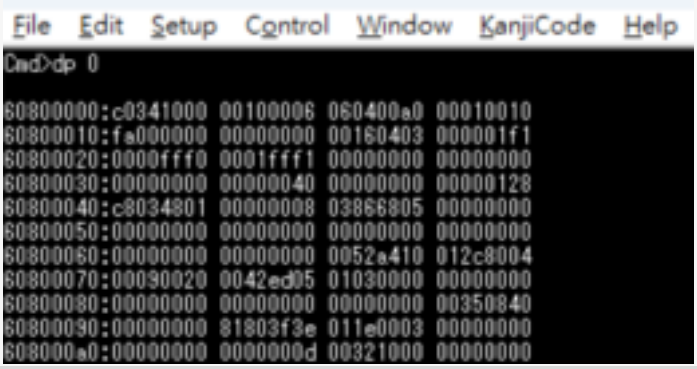
Dump the values in Atlas2 switch registers, start from address “0x60800000” with 4bytes count.

dp Command

Dump the values of Atlas2 switch for any register with specified port number.

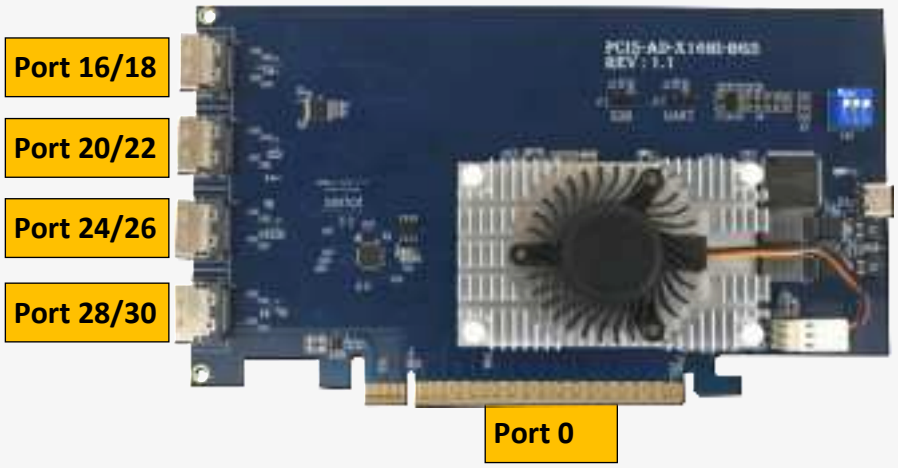
-Usage: dp port_number(D)

-port_number(D) : port_number shoule be 0 ~ 31



Dump the values in Atlas2 switch registers for Port “0”.

Port number mapping



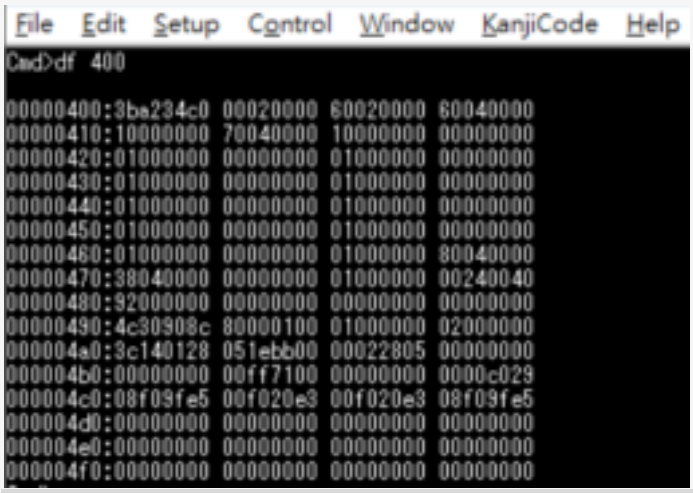
df Command

Dump the values of Atlas2 flash with specified address.

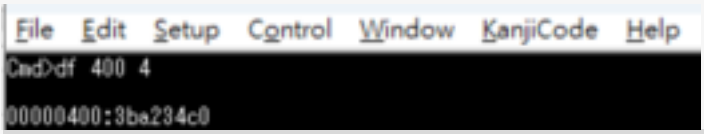
-Usage: df address(H) [count(H)]

-address(D) : address shoule be 0x00000000 ~ 0xFFFFFFFC

-count(H) : count shoule be 0x00000000 ~ 0xFFFFFFFC



Dump the values in Atlas2 flash registers, start from address “0x00000400”.



Dump the values in Atlas2 flash registers, start from address “0x00000400” with 4bytes count.

ssdrst Command

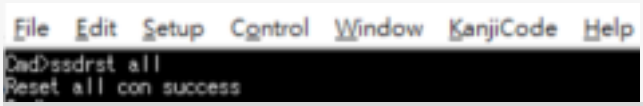
Issue PERST# with 300ms duration to attached devices in MCIO ports.

-Usage: ssdrst <con(D)|all> [channel(C)]

-con(D) : con number should be 0 ~ 3

-channel(C) : channel number should be a or b

Issue PERST# signals in MCIO CON1.



Issue PERST# signals in MCIO CON0 to CON3.

Issue PERST# signals in MCIO CON1 for channel A.

CON Mapping

pwrdis Command (Applicable in ACE and ACU modes)

Set the signal level of pwrdis in MCIO connectors to be high or low.

- Usage: pwrdis [<con(D)|all> <h/l>(C)]

- con(D) : con number should be 0 ~ 3

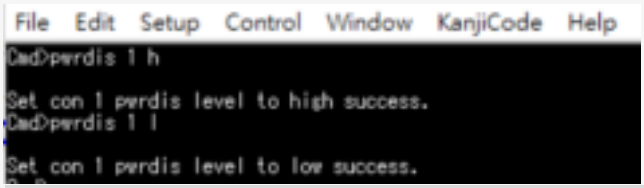
- h(C) : disable SSD power

- l(C) : enable SSD power

    - Ex : pwrdis all h

    - Ex : pwrdis 1 h

Set PWRDIS to “H” state in all of MCIO ports



Set PWRDIS to “H” or “L” state in MCIO port 1

hled Command (Applicable in ACE mode)

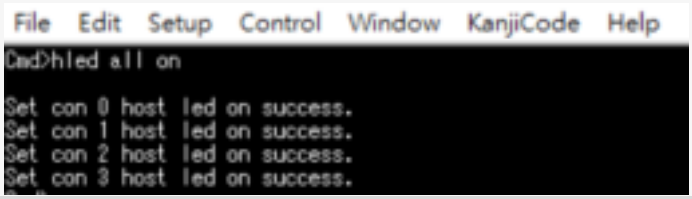
Set hled signals in EDSFF SSD to be on or off.

- Usage: htled <con(D)|all> <on|off>

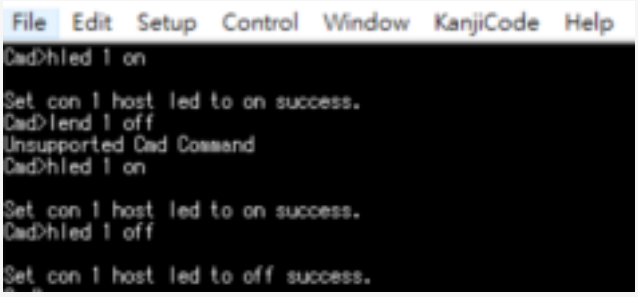
- con(D) : con number should be 0 ~ 3

- Ex : hled all on

- Ex : hled 1 on



Turn on all of host LEDs in EDSFF drives.



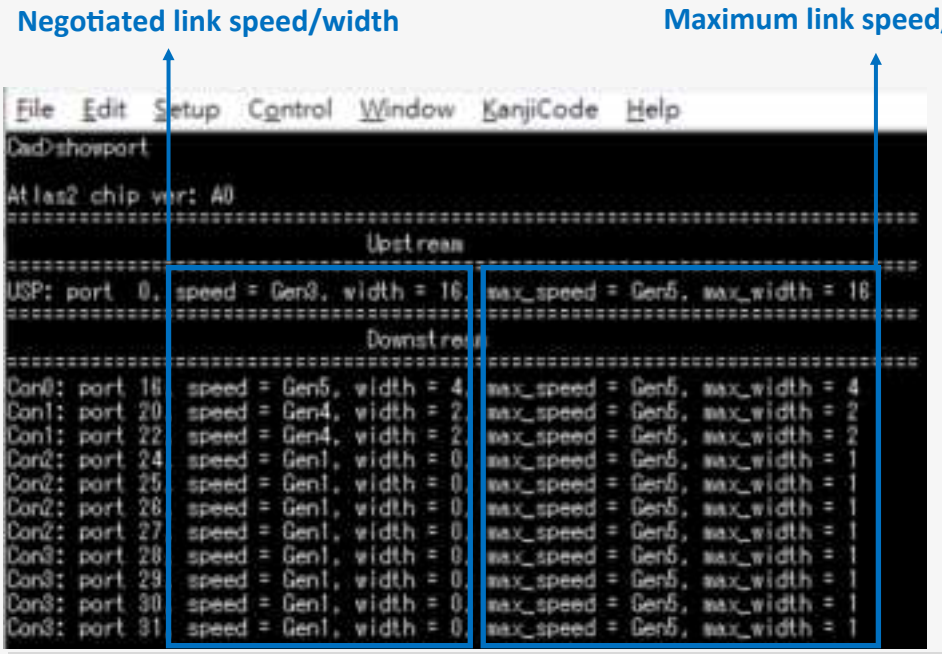
Turn ON/OFF host LED in EDSFF drive which attached in MCIO port1

showport Command

Show link status for USP in golden finger, DSP for MCIO ports and Straddle port.

-Usage: showport

Refer to page 18 for Port number and page 20 for CON number mapping.



USP (Upstream port), the port in Golden finger.

etc.

The maximum link speed is Gen5 and link width to x16 in default.

The negotiated link speed and width to Gen3 x16.

DSP (Downstream ports), the ports in MCIO connectors.

Atlas2 PCIe switch supports DPR (Dynamic Port Reconfiguration), it configures Gen5 x1 for 16 lanes in MCIO ports 16 to 31.

etc.

1. A Gen5 x4 device attached in CON0, it shows the negotiated speed/width to be Gen5x4 in Port 16.
2. A Gen4 dual port SSDs attached in CON1, it shows Gen4x2 in Port 20 and Port 22.

bist Command

On-board I2C devices diagnostic.

- Usage: bist

Show all of on-board I2C devices for debug purpose.

Spread Command

Set the PCIe reference clock to Show spread information or set -0.5% SSC in PCIe reference clock to Atlas2 switch.

-Usage: spread [1|2|off]

-1 : Down spreading 3000PPM.

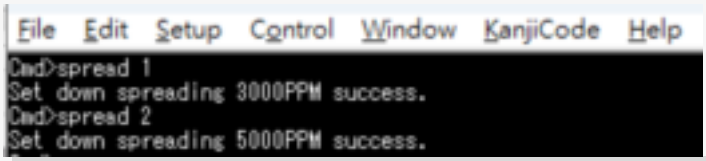
-2 : Down spreading 5000PPM.

- off : Turn off spread.

1. Spread command usually used for SRIS testing.

It requires to power cycle host card to apply new “spread” setting.

Shows the reference clock of Atlas2 switch running in CFC (spread off) or SSC (3000ppm or 5000ppm).



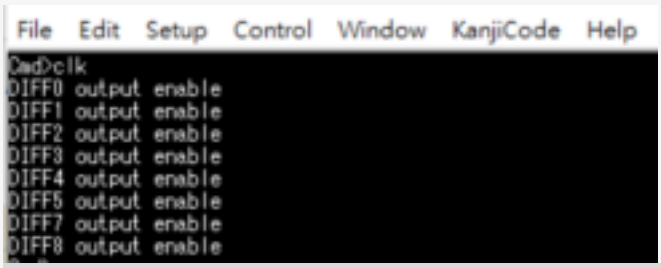
Set to PCIe reference clock to SSC(3000ppm or 5000ppm).

clk Command

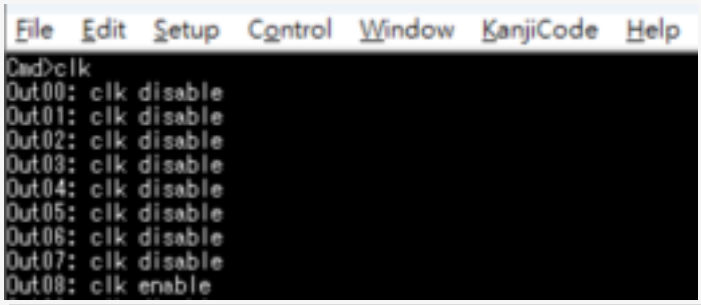
Show the clock output status or disable/enable the clock output for all MCIO ports.

Usage: clk [en|dis]

clk command usually used for SRNS or SRIS testing.



Show the clock output status for Atlas2 PCIe switch and all MCIO ports.



1. Enable or disable clock output are for all of clocks in MCIO ports, the PCIe reference clock to Atlas2 PCIe switch is always enabled.
2. Clock output/disable feature is allowed for dynamically changed, it doesn't need to power cycle host card to apply new setting.
3. The clock enable/disable setting will be stored in MCU and applied automatically in next time host card power on.

iicwr Command

SMBus data read from drive attached in MCIO ports.

-Usage: iicwr <Addr(H)> <con(D)> <ReadByte(D)> <WriteData(H)>

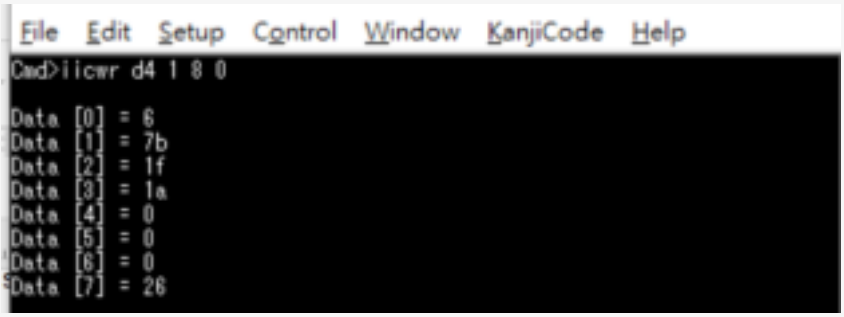
-Addr(H) : Device address

C-on(D) : Con should be 0 ~ 3

-ReadByte(D) : Max read byte is 32 byte

-WriteData(D) : Max write byte is 32 byte

Ex : iicwr d4 1 8 0



Read 8 bytes data starts from register “0” of I2C slave address “0xd4” in drive which attaches in MCIO CON1.

Refer to page 20 for CON number mapping.

iicw Command

SMBus data write to drive attached in MCIO port.

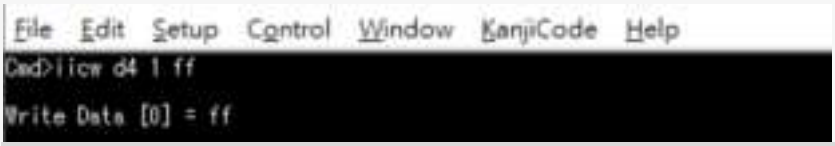
-Usage: iicw <Addr(H)> <conD)> <WriteData(H)...>

-Addr(H) : Device address

-con(D) : Con should be 0 ~ 4

-WriteData(D) : Max write byte is 128 byte

Ex : iicw d4 1 ff



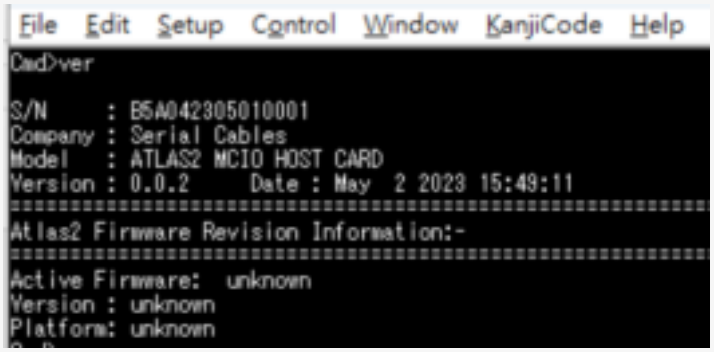
Write data “0xff” to I2C slave address “0xd4” in drive which attaches in MCIO CON 1.

Refer to page 20 for CON number mapping.

ver Command

Shows card information, MCU FW and Atlas2 FW version.

-Usage: ver

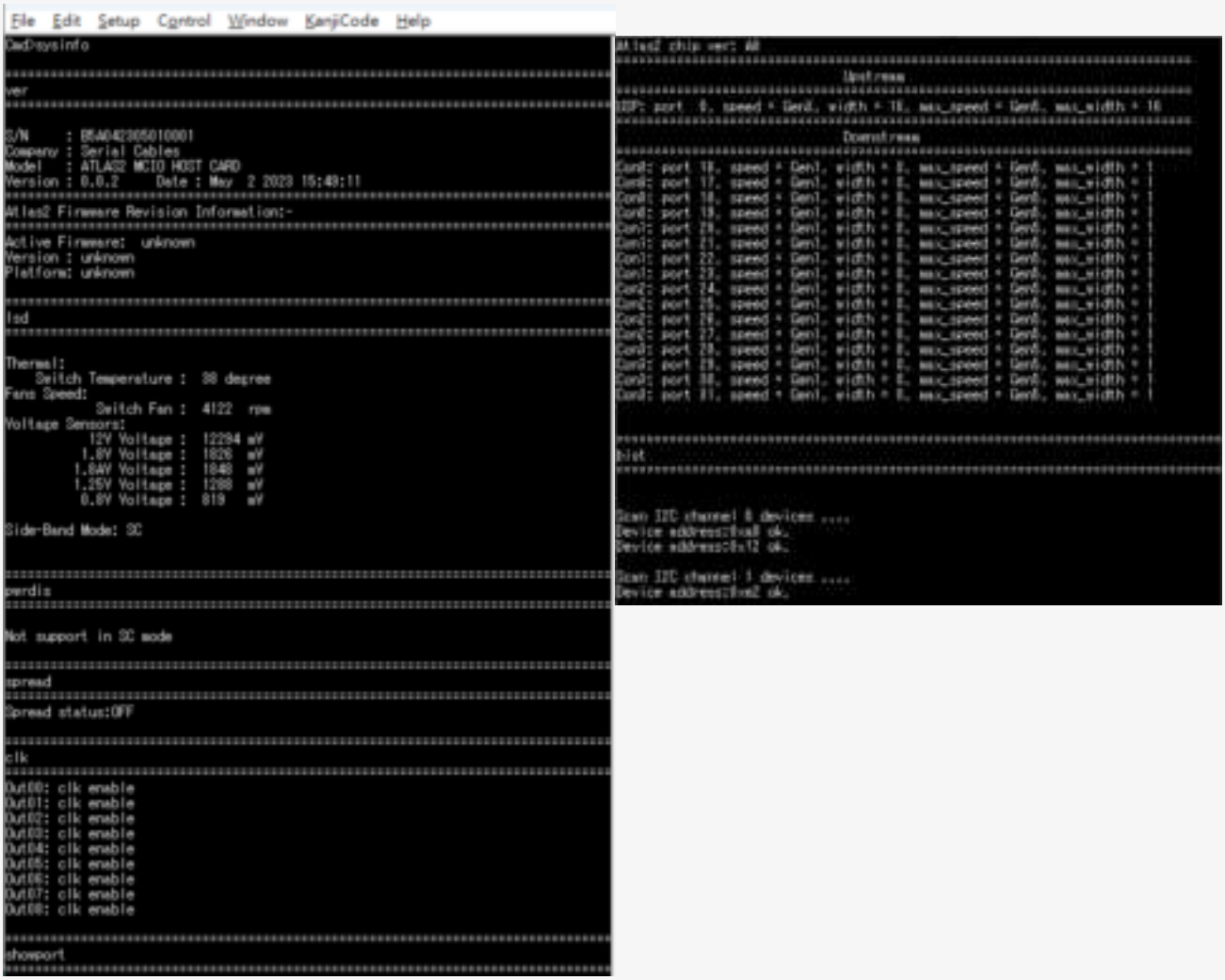


sysinfo Command

Show system information.

Sysinfo command is for host card diagnostic, it combines ver, lsd, pwrdis, spread, clk, showport, and bist commands.

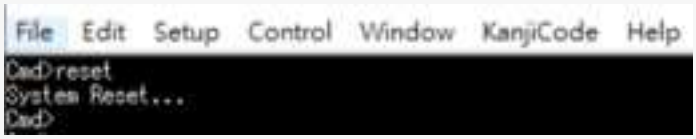
- Usage: sysinfo



reset Command

MCU FW reset (It won't reset Atlas2 PCIe switch)

-Usage: reset



Atlas2 MCIO Host Adapter Card

Cables interoperability

PCI5-ENC8-E3-08

PCI5-AD-MCIOU2

U.2 1x4 or 2x2

MCIO5-4XL-4XL

PCI5-AD-MCIOEDSFF

E.1L, E1.S, E3

MCIO5-4X-39U3-1X4
MCIO5-4X-39U2-2X2
MCIO5-4X-39U3-2X2
MCIO5-4X-39U2LL-1X4

U.2 1x4 or 2x2
U.3 1x4 or 2x2

MCIO5-4XSC-EDSFF-1X4
MCIO5-4XSC-EDSFF-2X2

E.1L, E1.S, E3