Atlas2 ITAP Host Adapter Card

User's Manual

REV: 1.0

July. 2023

Atlas2 ITAP Host Adapter Card

Change history

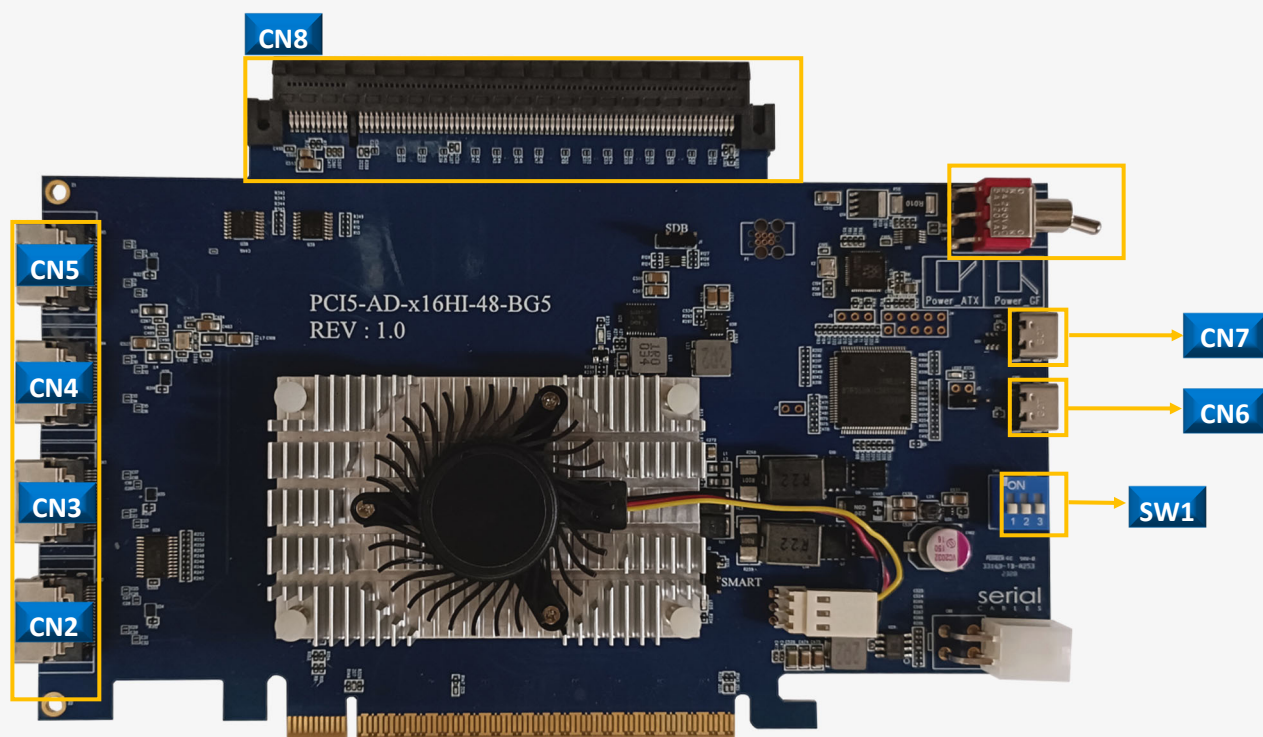| REV	Change history

Atlas2 ITAP Host Adapter Card

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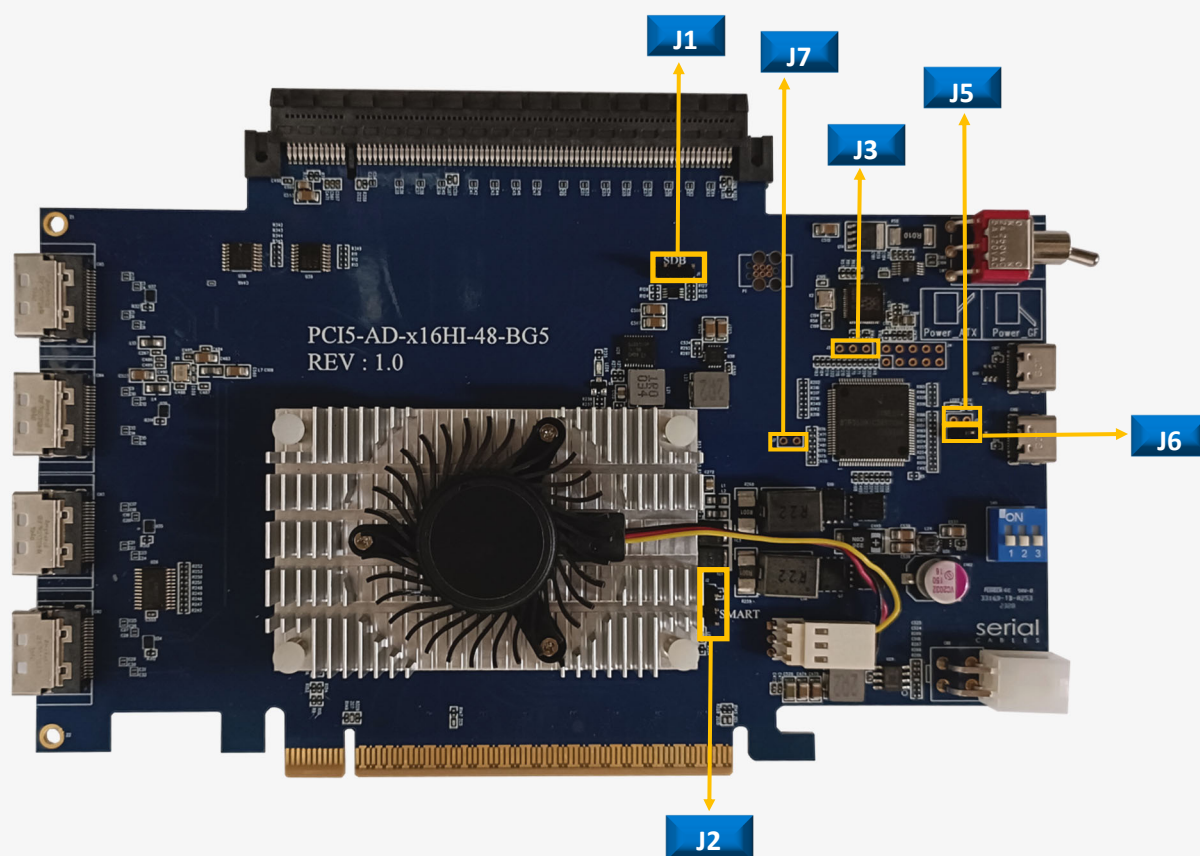
Location	Descriptions	Pinout
J6	ON: MCU without SDB of switch control for debug purpose (etc. needs to access Atlas2 PCIe switch via SDB) OFF: MCU is able to access switch information via SDB (default)	
J1	Atlas2 switch SDB port. UART with 3.3V TTL signals level	TX/RX/GND
J2	Atlas2 switch UART port,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

Atlas2 ITAP Host Adapter Card

Function Description For Connectors

4

Location	Descriptions
CN2:CN5	X4 MCIO(mini-cool edge IO), SFF-TA-1016 connector.
CN8	PCIe Gen5 X16 Straddle connector.
CN7	Type-C USB connector for ITAP applications.
CN6	Type-C USB connector for CLI commands.
SW1	Slide switch for side-band mode selection. SC mode (Default) ACE mode ACU mode

Atlas2 ITAP Host Adapter Card

Side-Band Mode Descriptions (SW1)

Pin	SC mode	ACE mode	ACU mode
A8	CLK_0_P	CLK_0_P	CLK_0_P
A9	CLK_0_N	CLK_0_N	CLK_0_N
B8	CLK_1_P	PWRDIS	PWRDIS
B9	CLK_1_N	HOST_LED	LINKFAT
A11	ATLAS_SCL	ATLAS_SCL	ATLAS_SCL
A12	ATLAS_SDA	ATLAS_SDA	ATLAS_SDA
B11	PERST#_0	PERST#_0	PERST#_0
B12	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/
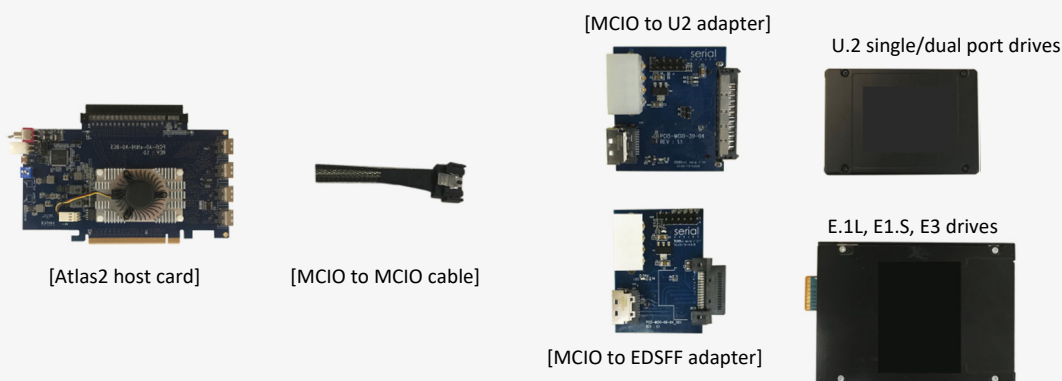
ACE: Adapter Card EDSFF

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 of EDSFF drives via CLI.

ACU: Adapter Card U2

Use MCIO to MCIO cable to connect with "MCIO to U2 adapter card".
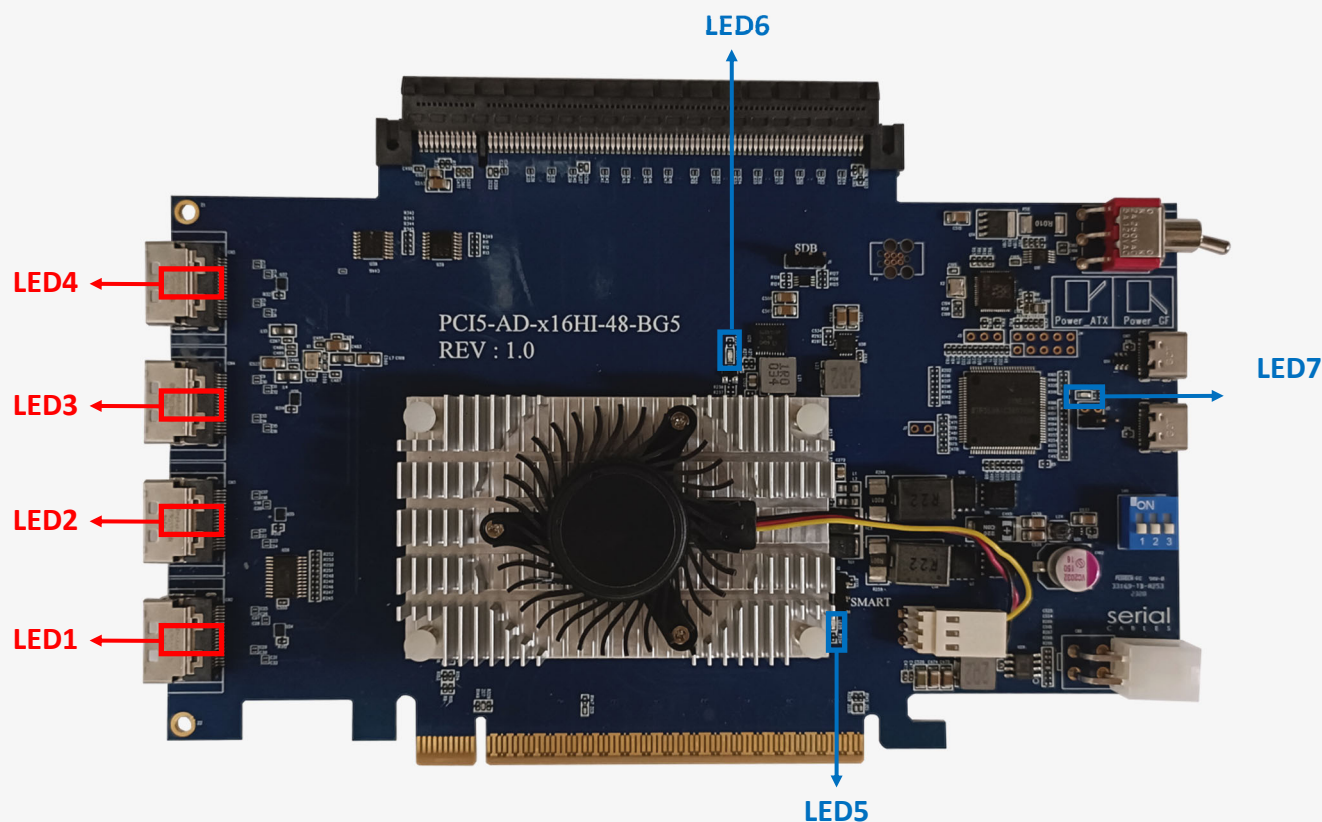
a.) It is able set PWRDIS in "H" or "L" in U2 drives via CLI.

b.) it is able to manual light ON/FF the fault LED of MCIO to EDSFF card.

[MCIO to U2 adapter]

U.2 single/dual port drives

[Atlas2 host card]   [MCIO to MCIO cable]

E.1L, E1.S, E3 drives

[MCIO to EDSFF adapter]

Atlas2 ITAP 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 ITAP Host Adapter Card

MCIO Pins Definition
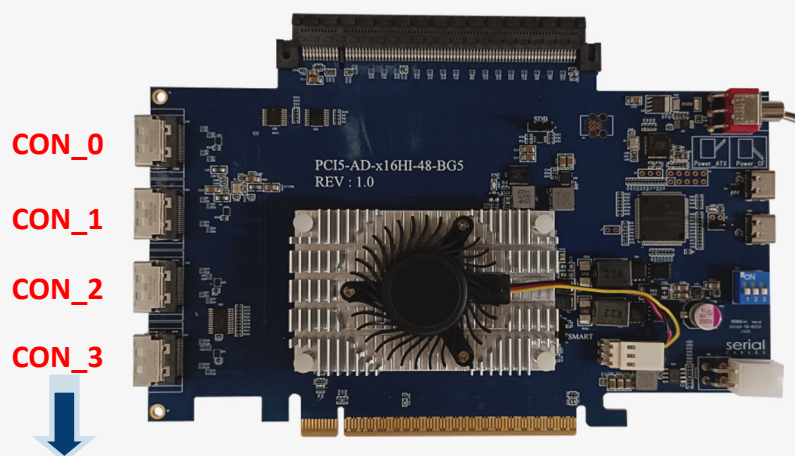
CON_0		2	3	5	6	8	9
	A	PERP15	PERN15	PERP14	PERN14	CLKP1	CLKN1
	B	PETP15	PETN15	PETP14	PETN14	CLKP0	CLKN0
		14	15	17	18	11	12
	A	PERP13	PERN13	PERP12	PERN12	I2C_SCL3	I2C_SDA3
	B	PETP13	PETN13	PETP12	PETN12	PERST#_6	PERST#_7

CON_1		2	3	5	6	8	9
	A	PERP11	PERN11	PERP10	PERN10	CLKP3	CLKN3
	B	PETP11	PETN11	PETP10	PETN10	CLKP2	CLKN2
		14	15	17	18	11	12
	A	PERP9	PERN9	PERP8	PERN8	I2C_SCL2	I2C_SDA2
	B	PETP9	PETN9	PETP8	PETN8	PERST#_4	PERST#_5

CON_2		2	3	5	6	8	9
	A	PERP7	PERN7	PERP6	PERN6	CLKP5	CLKN5
	B	PETP7	PETN7	PETP6	PETN6	CLKP4	CLKN4
		14	15	17	18	11	12
	A	PERP5	PERN5	PERP4	PERN4	I2C_SCL1	I2C_SDA1
	B	PETP5	PETN5	PETP4	PETN4	PERST#_2	PERST#_3

CON_3		2	3	5	6	8	9
	A	PERP3	PERN3	PERP2	PERN2	CLKP7	CLKN7
	B	PETP3	PETN3	PETP2	PETN2	CLKP6	CLKN6
		14	15	17	18	11	12
	A	PERP1	PERN1	PERP0	PERN0	I2C_SCL0	I2C_SDA0
	B	PETP1	PETN1	PETP0	PETN0	PERST#_0	PERST#_1

Note: Host card supports 3 types of side-band modes (SC,ACE, and ACU).

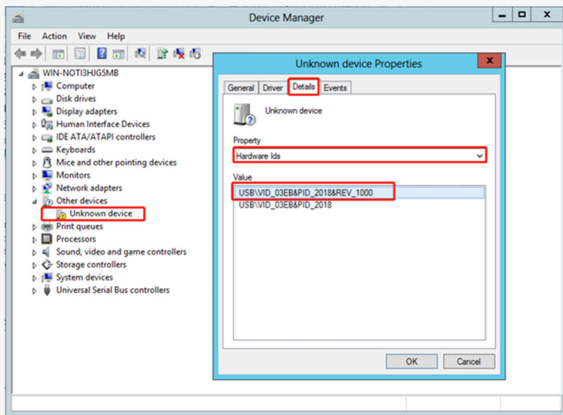The sideband signals listed in table above is for SC mode.
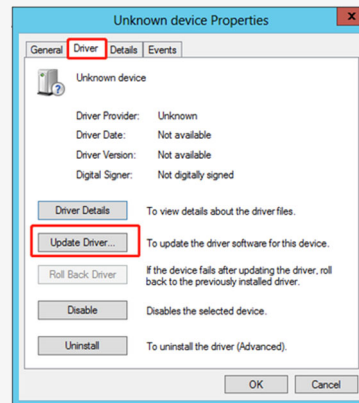
MCU CLI Setup

Step1: USB driver installation.

Note: No USB driver is required for Windows 10 and Linux

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]

[Figure 2]
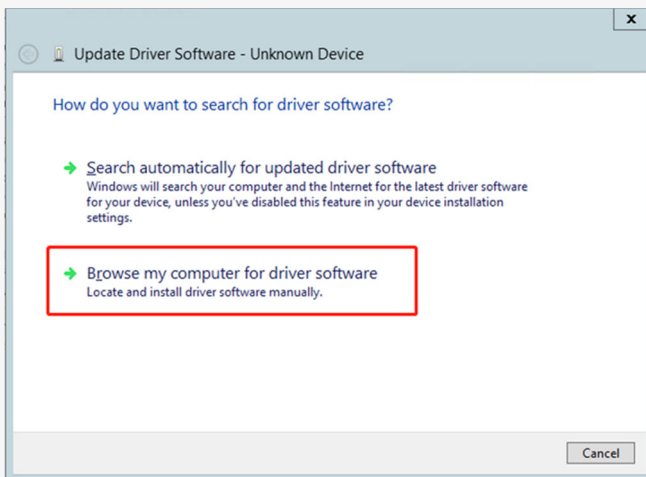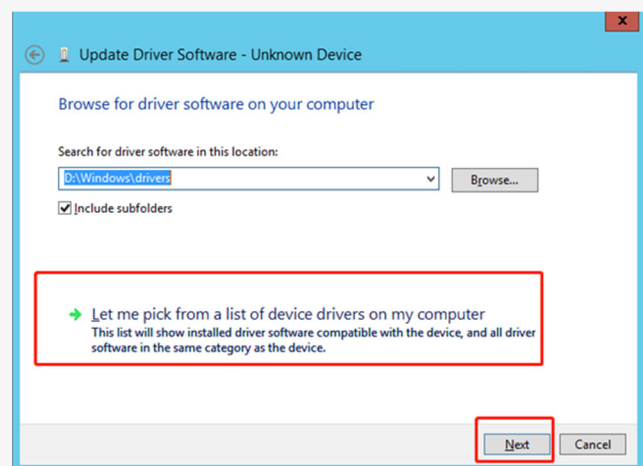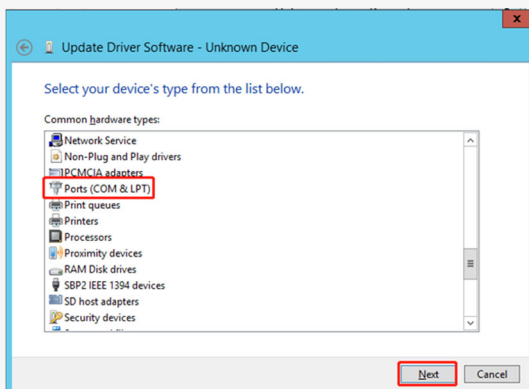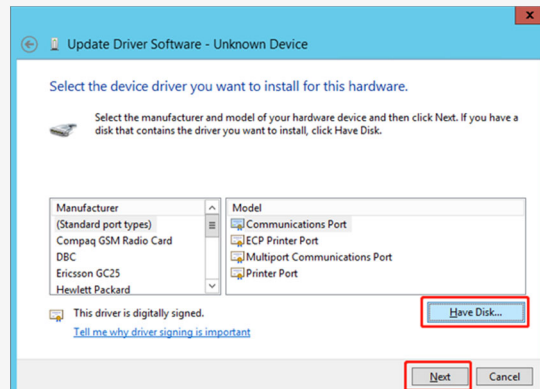

[Figure 3]

[Figure 4]

[Figure 5]

[Figure 6]
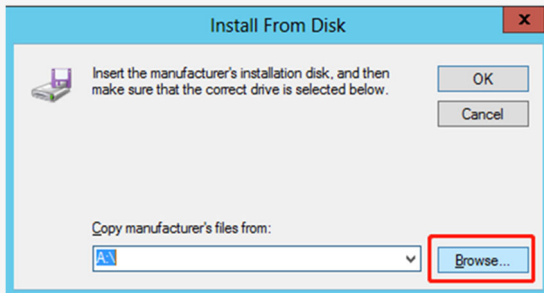
[Figure 7]
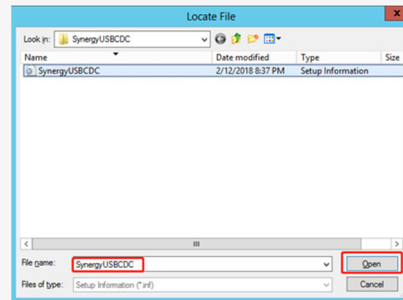
[Figure 8]
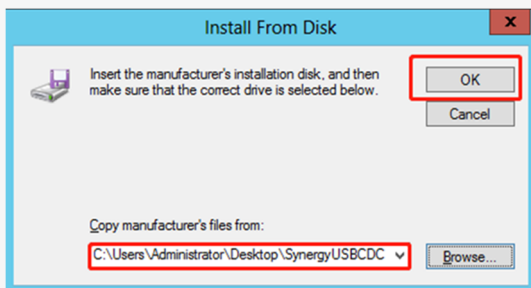
[Figure 9]
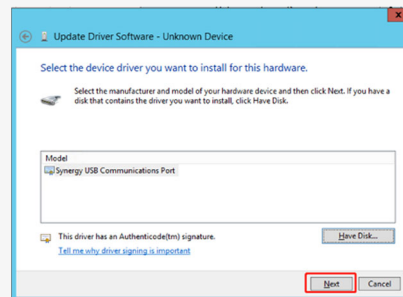
[Figure 10]
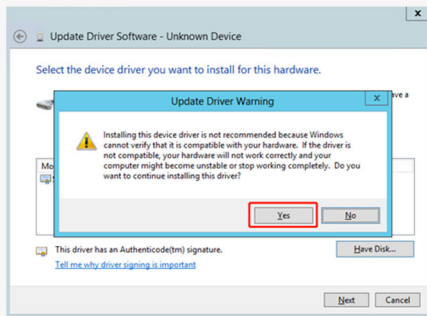
[Figure 11]
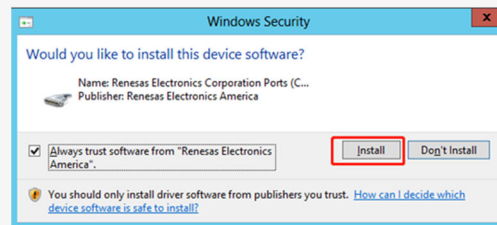
[Figure 12]
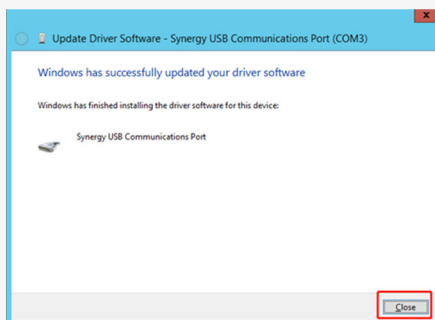
[Figure 13]
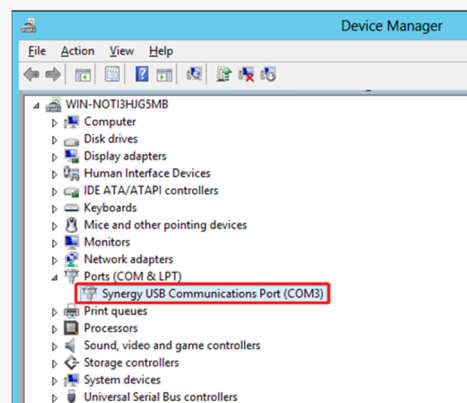
[Figure 14]

MCU CLI Setup

Step2: Tera-term setting

Step 1. Install and launch Tera Term application

(or Hyper Terminal requires version 3.0 or higher).

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:
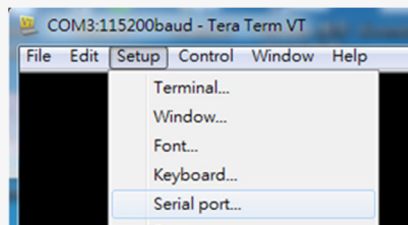
Step 3:

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.

Atlas2 ITAP Host Adapter Card
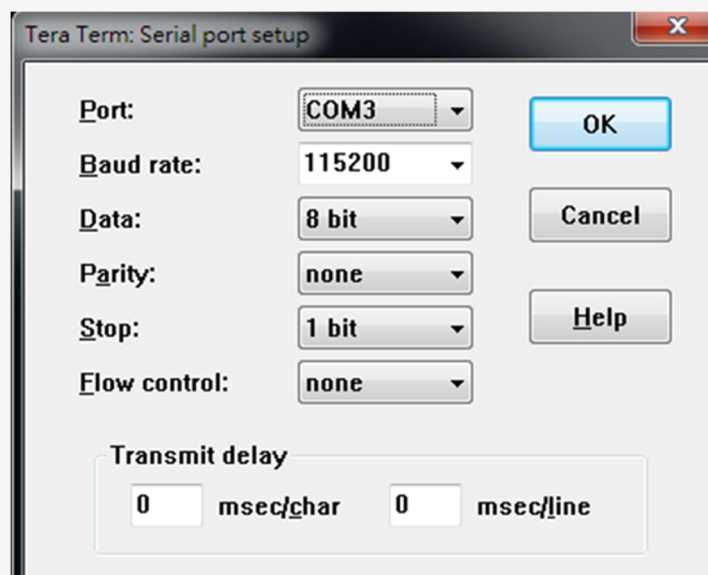
MCU Commands List

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.
itap	Set iTAP mode enable
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

1. Update the configuration file or firmware for Atlas2 PCIe switch.

2. on-board MCU FW upgrading

-Usage: fdl sbr|fw|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)

mcu=on-board MCU FW upgrading

Atlas2 ITAP Host Adapter Card
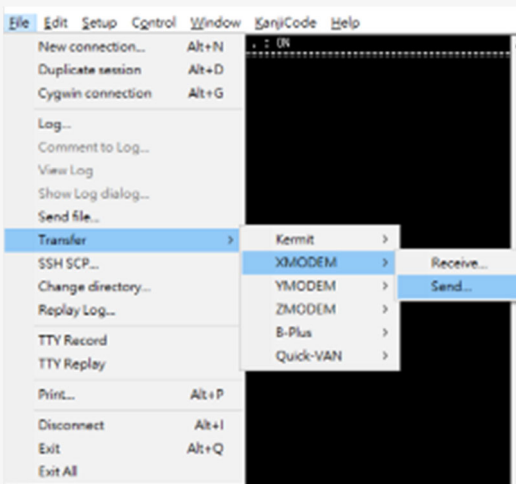
lsd Command

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

-Usage: lsd

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>lsd

Thermal:
      Switch Temperature :  37 degree
Fans Speed:
            Switch Fan :  4023   rpm
Atlas2 Card Current:
            12V Current :  2467   mA
Voltage Sensors:
            12V Voltage :  12129 mV
            1.8V Voltage :  1816  mV
            1.8AV Voltage :  1842  mV
            1.25V Voltage :  1284  mV
            0.8V Voltage :  813   mV

Side-Band Mode: SC
```

Thermal: Temperature sensor near Atlas2 PCIe switch

Fan Speed: The FAN TACH value reading.

Atlas2 Card current: The P12V consumed current from either ATX connector or Golden finger.

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


```
File   Edit   Setup   Control   Window   KanjiCode   Help
mw fff0017c ffffffff
Cmd>
```

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 shoule be 0x00000000 ~ 0xFFFFFFFC

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

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>dr 60800000

60800000:c0341000 00100006 060400a0 00010010
60800010:fa000000 00000000 00160403 000001f1
60800020:0000fff0 0001fff1 00000000 00000000
60800030:00000000 00000040 00000000 00000128
60800040:c8034801 00000008 03866805 00000000
60800050:00000000 00000000 00000000 00000000
60800060:00000000 00000000 0052a410 012c8004
60800070:00090020 0042ed05 01030000 00000000
60800080:00000000 00000000 00000000 00350840
60800090:00000000 81803f3e 011e0003 00000000
608000a0:00000000 0000000d 00321000 00000000
608000b0:00000000 00000000 00000000 00000000
608000c0:00000000 00000000 00000000 00000000
608000d0:00000000 00000000 00000000 00000000
608000e0:00000000 00000000 00000000 00000000
608000f0:00000000 00000000 00000000 00000000
```

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

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>dr 60800000 4

60800000:c0341000
```

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

Atlas2 ITAP Host Adapter Card

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 ~ 47

Dump the values in Atlas2 switch registers for Port "0".

Port number mapping
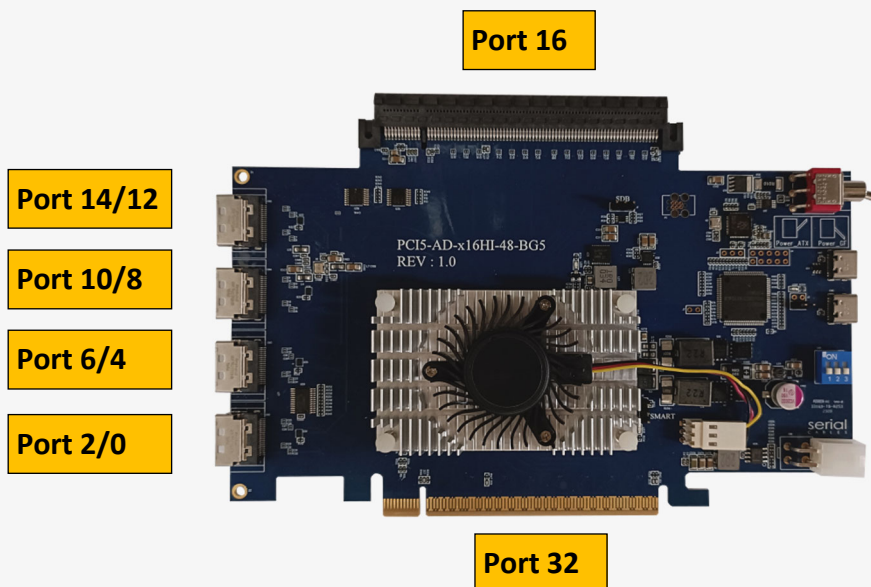
df Command

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

```
File   Edit   Setup   Control   Window   KanjiCode   Help
Cmd>df 400

00000400:3ba234c0  00020000  60020000  60040000
00000410:10000000  70040000  10000000  00000000
00000420:01000000  00000000  01000000  00000000
00000430:01000000  00000000  01000000  00000000
00000440:01000000  00000000  01000000  00000000
00000450:01000000  00000000  01000000  00000000
00000460:01000000  00000000  01000000  80040000
00000470:38040000  00000000  01000000  00240040
00000480:92000000  00000000  00000000  00000000
00000490:4c30908c  80000100  01000000  02000000
000004a0:3c140128  051ebb00  00022805  00000000
000004b0:00000000  00ff7100  00000000  0000c029
000004c0:08f09fe5  00f020e3  00f020e3  08f09fe5
000004d0:00000000  00000000  00000000  00000000
000004e0:00000000  00000000  00000000  00000000
000004f0:00000000  00000000  00000000  00000000
```

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

```
File   Edit   Setup   Control   Window   KanjiCode   Help
Cmd>df 400 4

00000400:3ba234c0
```

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 ~ 4

-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

Atlas2 ITAP Host Adapter Card
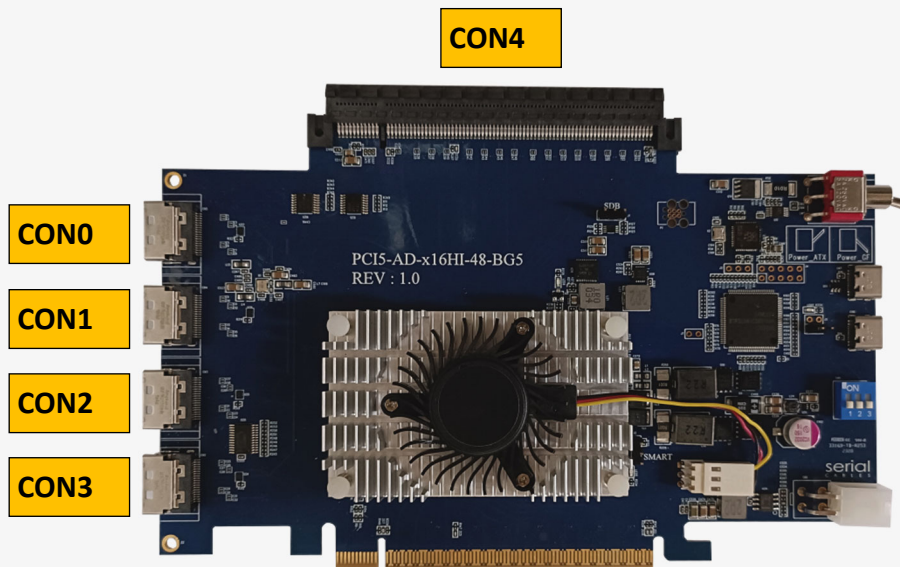
pwrdis Command (Applicable in ACE and ACU modes)

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

```
File   Edit   Setup   Control   Window   KanjiCode   Help
Cmd>pwrdis all h

Set con 0 pwrdis level to high success.
Set con 1 pwrdis level to high success.
Set con 2 pwrdis level to high success.
Set con 3 pwrdis level to high success.
```

Set PWRDIS to "H" state in all of MCIO ports

```
File   Edit   Setup   Control   Window   KanjiCode   Help
Cmd>pwrdis 1 h

Set con 1 pwrdis level to high success.
Cmd>pwrdis 1 l

Set con 1 pwrdis level to low success.
```

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

Atlas2 ITAP Host Adapter Card

showport Command

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

-Usage: showport

Refer to page 17 for Port number and page 19 for CON number mapping.

Negotiated link speed/width   **Maximum link speed/width**

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

Example:

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

The negotiated link speed and width to Gen5 x8.

DSP (Downstream ports), the ports in MCIO and straddle connector.

Atlas2 PCIe switch supports DPR (Dynamic Port Reconfiguration), it configures Gen5 x1 for 16 lanes in MCIO ports 0 to 15.

Example:

1. A Gen5 x4 device attached in CON1, it shows the negotiated speed/width to be Gen5x4 in Port 8.

2. A Gen4 dual port SSDs attached in CON0, it shows Gen4x2 in Port 12 and Port 14.

3. A Gen5 device attached in straddle connector, it shows the negotiated speed/width as Gen5 x16 in

bist Command

On-board I2C devices diagnostic.

- Usage: bist

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>bist

Scan I2C channel 0 devices ....
Device address:0xa0 ok.
Device address:0x12 ok.

Scan I2C channel 1 devices ....
Device address:0xe2 ok.
```

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 and

straddle connector.

Usage: clk [en|dis]

clk disable usually used for SRNS or SRIS testing.

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>clk
Out00: clk enable
Out01: clk enable
Out02: clk enable
Out03: clk enable
Out05: clk enable
Out06: clk enable
Out07: clk enable
Out08: clk enable
Out09: clk enable
Out11: clk enable
```

Show the clock output status for Atlas2 PCIe switch, all of MCIO ports and straddle connector.

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>clk dis
OK, clock output disable
Cmd>
```

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>clk
Out00: clk disable
Out01: clk disable
Out02: clk disable
Out03: clk enable
Out05: clk disable
Out06: clk disable
Out07: clk disable
Out08: clk disable
Out09: clk disable
Out11: clk disable
```

1. Enable or disable clock output are for all of clocks in MCIO ports and straddle.

   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.

Itap Command

Set iTAP mode enable.   25

Usage: itap [en|dis]

Enable the ITAP mode for embedded PCIe analysis support.

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>itap
iTAP mode:Disable
```
Show ITAP setting.

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>itap en
iTAP mode enable success
Cmd>itap dis
iTAP mode disable success
```
Disable or enable ITAP setting.

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>showport

iTAP mode not disable
Cmd>ver

SN       :
Company : Serial Cables
Model   : ATLAS2 ITAP HOST CARD
Version : 0.0.1    Date : Jul 26 2023 18:08:53
======================================================
Atlas2 Firmware Revision Information:-
======================================================
Active Firmware:   unknown
Version : unknown
Platform: unknown

iTAP mode not disable
```
Note: The showport command doesn't support in ITAP mode also it can't read the PCIe switch

FW version in ver command.

iicwr Command

SMBus data read from drive attached in MCIO ports and straddle connector.

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

-Addr(H) : Device address

C-on(D) : Con should be 0 ~ 4

-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 19 for CON number mapping.

iicw Command

SMBus data write to drive attached in MCIO ports and straddle connector.
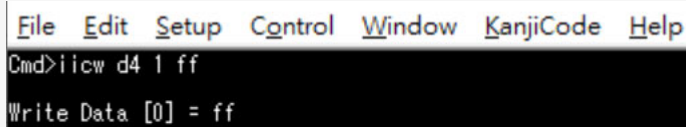
-Usage: iicw <Addr(H)> <conD)> <WriteData(H)...>

-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.

ver Command

Shows card information, MCU FW and Atlas2 FW version.

-Usage: ver

Atlas2 ITAP Host Adapter Card

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

```
File  Edit  Setup  Control  Window  KanjiCode  Help
Cmd>sysinfo

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ver
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S/N     : B5A062308010001
Company : Serial Cables
Model   : ATLAS2 ITAP HOST CARD
Version : 0.0.1      Date : Jul 26 2023 18:08:53
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Atlas2 Firmware Revision Information:-
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Active Firmware:  unknown
Version : unknown
Platform: unknown

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lsd
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Thermal:
    Switch Temperature :   32 degree
Fans Speed:
        Switch Fan :  4056   rpm
Atlas2 Card Current:
        12V Current :  749    mA
Voltage Sensors:
        12V Voltage :  12351  mV
        1.8V Voltage :  1811  mV
        1.8AV Voltage :  1837 mV
        1.25V Voltage :  1288 mV
        0.8V Voltage :  814   mV

Side-Band Mode: SC

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pwrdis
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Not support in SC mode

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spread
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Spread status:OFF

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clk
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Out00: clk enable
Out01: clk enable
Out02: clk enable
Out03: clk enable
Out05: clk enable
Out06: clk enable
Out07: clk enable
Out08: clk enable
Out09: clk enable
Out11: clk enable
```

```
File  Edit  Setup  Control  Window  KanjiCode  Help
showport

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Atlas2 chip ver: A0
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                    Upstream
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USP: port 32, speed = Gen1, width = 0, max_speed = Gen5, max_width = 16
                    Downstream
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Con0: port 15, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con0: port 14, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con0: port 13, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con0: port 12, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con1: port 11, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con1: port 10, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con1: port  9, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con1: port  8, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con2: port  7, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con2: port  6, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con2: port  5, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con2: port  4, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con3: port  3, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con3: port  2, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con3: port  1, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
Con3: port  0, speed = Gen1, width = 0, max_speed = Gen5, max_width = 1
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                  Straddle Port
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Con4: port 16, speed = Gen1, width = 0, max_speed = Gen5, max_width = 16

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bist
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Scan I2C channel 0 devices ....
Device address:0xa0 ok.
Device address:0x12 ok.

Scan I2C channel 1 devices ....
Device address:0xe2 ok.
```

reset Command

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

-Usage: reset