serial CABLES

User Manual

PCI5-ENC24G-U2-1x4
Gen5 PCIe/NVMe JBOF (1x4)

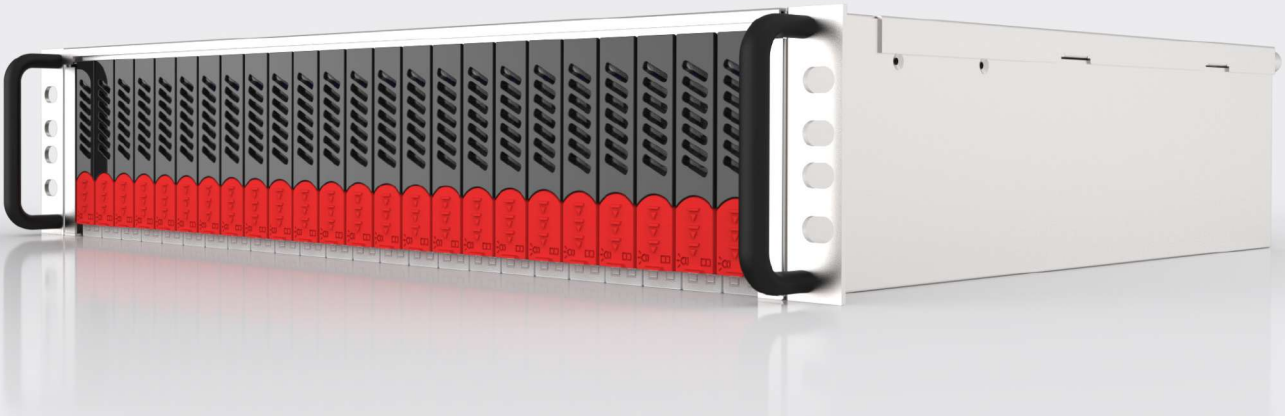
PCI5-ENC24G-U2-2x2
Gen5 PCIe/NVMe JBOF (1x4)

REV / 0.8

2024
Sep

Gen5 JBOf

Board to Board Design



CHANGE HISTORY

REV	Date of Release	Description
0.8	Sep 2024	Initial Release

TABLE of CONTENTS

ATTACHMENT

01

Introduction

1.1 Overview

Description

P5-2425-S/ P5-2425-D is a high density U.2 JBOF board to board design that include two switch (PEX89088) controller boards , chassis , two CRPS power supplies , two ball bearings high CFM fans and 24 full heigh disk trays.

Features

All Support Remote Power On/Off Funtion

P5-2425-S x4 mode advance features for each drive

a. power on / off control

b. Dual_EN# control

c. porta , portb reset control

P5-2425-D 2x2x mode advance features for each drive

a. power on / off control

b. disk reset control

1.2 Specification

Form Factor	EIA-310D 2U form factor
SSD I/F	SFF8639 U.2 form-factor, support single port and dual ports NVMe drivesl
PCIe Switch Board	Broadcom PEX89088
Power Supply	Two 800W 80 PLUS Titanium power supply
Dimension	2U 19″ 19″ 480mm (W) x 3.5″ 88mm (H) x 14.2″ 360mm (D)
System cooling	Two 80mm (W) x 80mm (H) x38mm (D) FANs
LEDs indication	SSD Activity (Blue), Present (White) and Fault (Red) LEDs per slot PSU Fault (Red) LEDs Controller Heart Beat Green LED System healthy (Red/Green) LED Upstream Port Indicate (Bule) LED Upstream Port Link not Matching (Red) LED

Rear I/O per switch board	Five QSFP-DD connectors Two USB Type C port for terminal RJ45 Ethernet 10/100 port, Blue button for power on/off/Mute function
System Alarm	Buzzer beeping for critical events (FANs, PSUs, over voltages and temperatures)
I/O Capability	Upstream bandwidth : One Upstream Port Connect : PCIe Gen5 x 16, 512 GT/s Two Upstream Ports Connect : PCIe Gen5 x 16 x2 1024GT/s maximum Four Upstream Ports Connect : PCIe Gen5 x 16 x4 2048GT/s
Downstream port	24 bays SSDs with PCIe Gen5 1x4 or 2x2
Serviceability	Hot-Swappable SSDs,Switch Controller, PSUs

Environment conditions Operating Temperature : 5C to 35C
Storage Temperature : -10C to 85C
Operating Humidity : 10% to 90% relative humidity non-condensing
Storage Humidity : 5% to 95% relative humidity non-condensing
Enclosure management CLI running in USB or Ethernet port

02

Hardware Description

2.1 Components Description

Front Panel :

※ different color of lights meaning

White LED : Power on and drive present

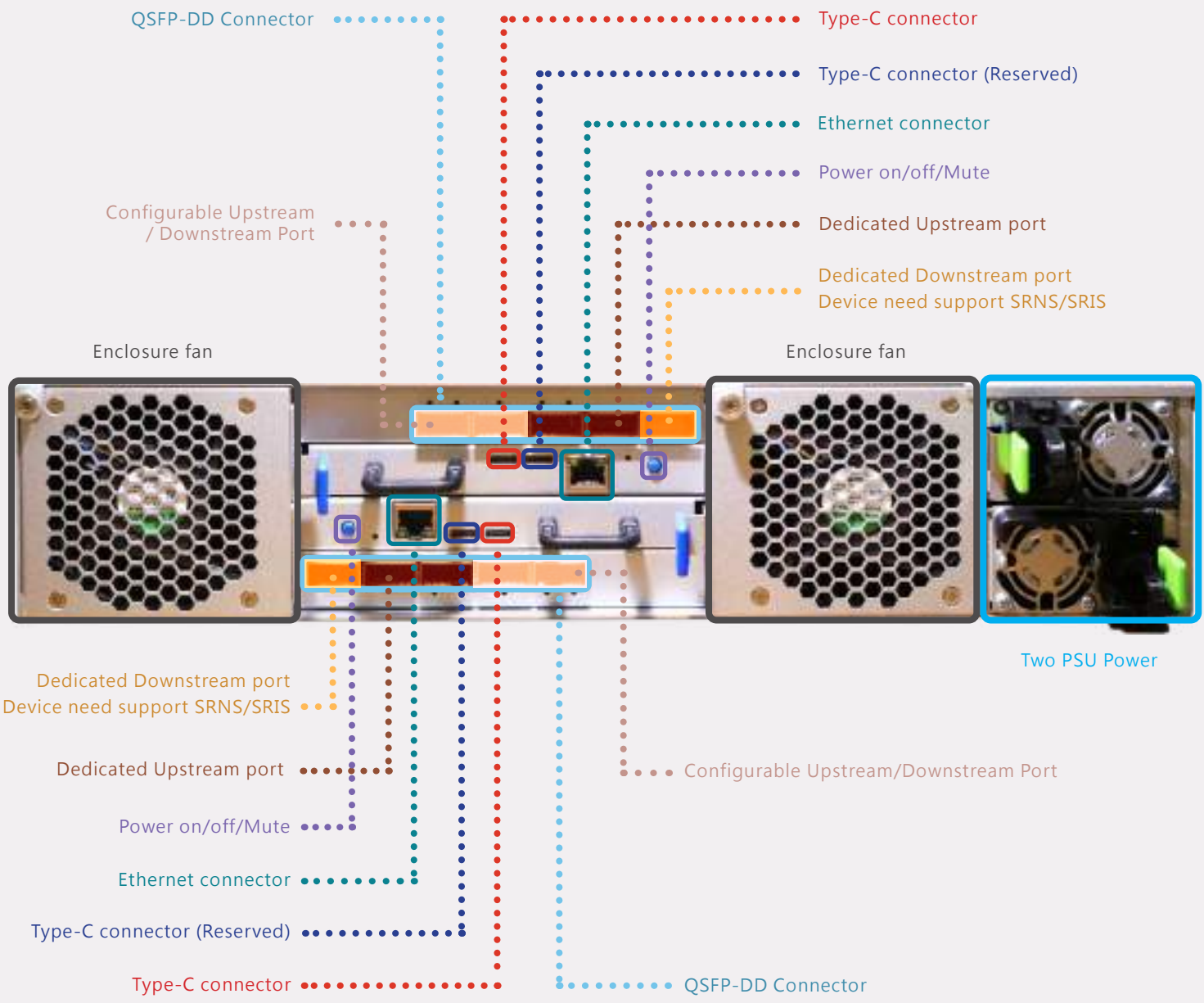
Blue LED : Drive access

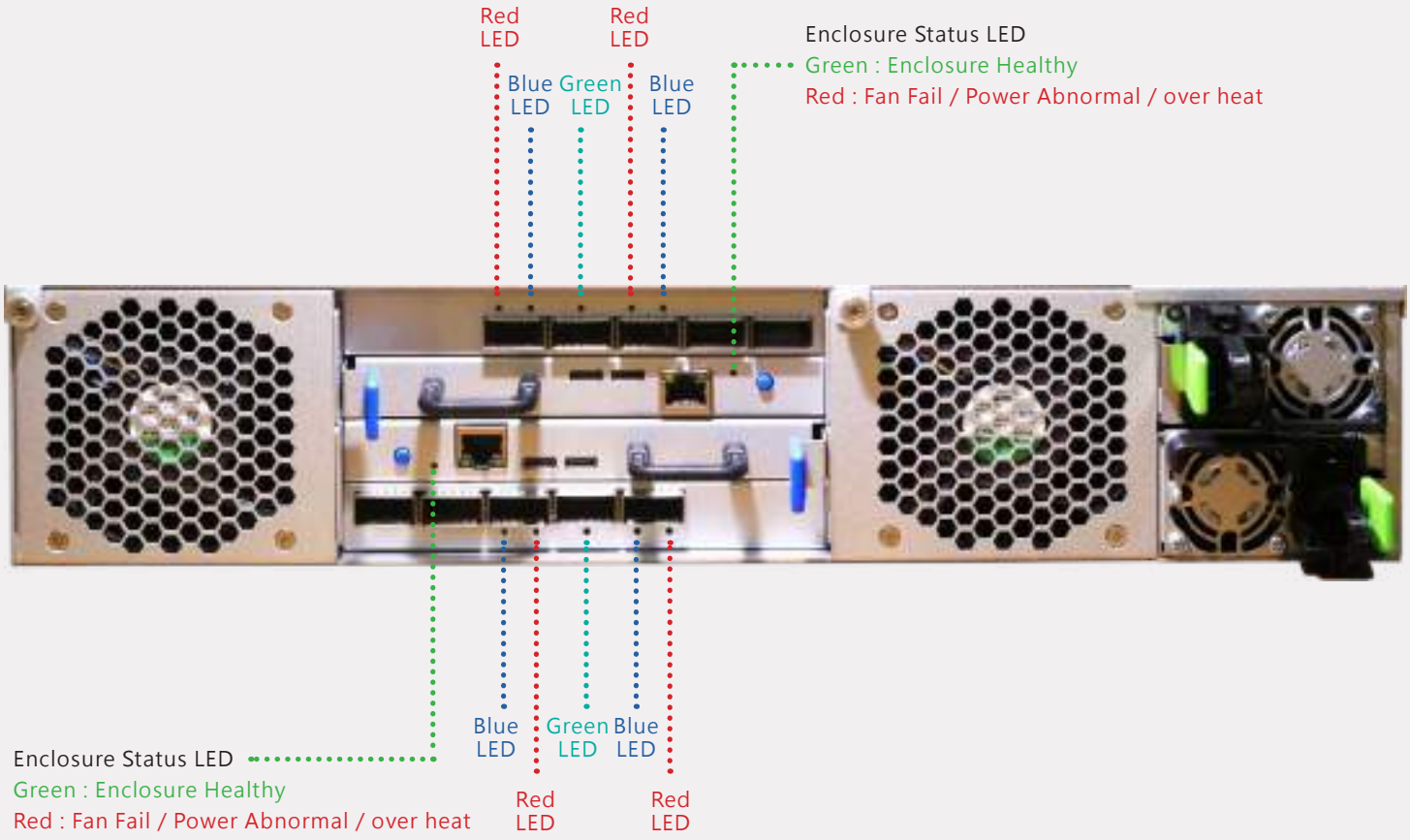
Red LED : link abnormal(Not Gen5 x2 /Gen5 x4)

Left Side LED Blink indicate
Left side fan abnormal

Right Side LED Blink indicate
Right side fan abnormal

Rear Panel :


QSFP-DD Connector
Type-C connector
Type-C connector (Reserved)
Ethernet connector
Power on/off/Mute
Configurable Upstream / Downstream Port
Dedicated Upstream port
Dedicated Downstream port Device need support SRNS/SRIS
Enclosure fan
Enclosure fan
Two PSU Power
Dedicated Downstream port Device need support SRNS/SRIS
Dedicated Upstream port
Configurable Upstream/Downstream Port
Power on/off/Mute
Ethernet connector
Type-C connector (Reserved)
Type-C connector
QSFP-DD Connector



Blue LED : Upstream port

Green LED : Switch heart beat

Red LED : Link abnormal(Not Gen5 x16)

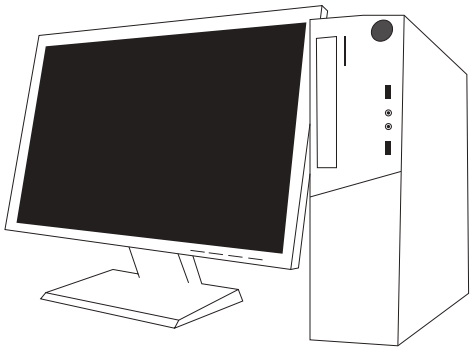
03

Installation guidelines

3.1 SSD Installation Guide

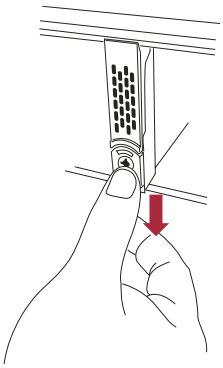
STEP
01

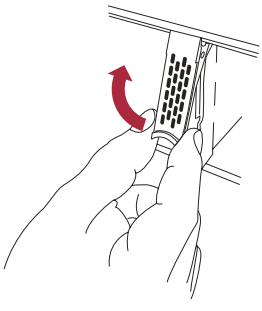
Remove the 24 bay JBOF enclosure from its packaging, and place the enclosure next to computer, server, or workstation.

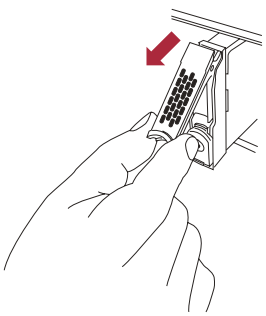


STEP
02

Hold one of the U.2 drive trays from the enclosure and push its button downward for the release of the lever until the lever pops out.

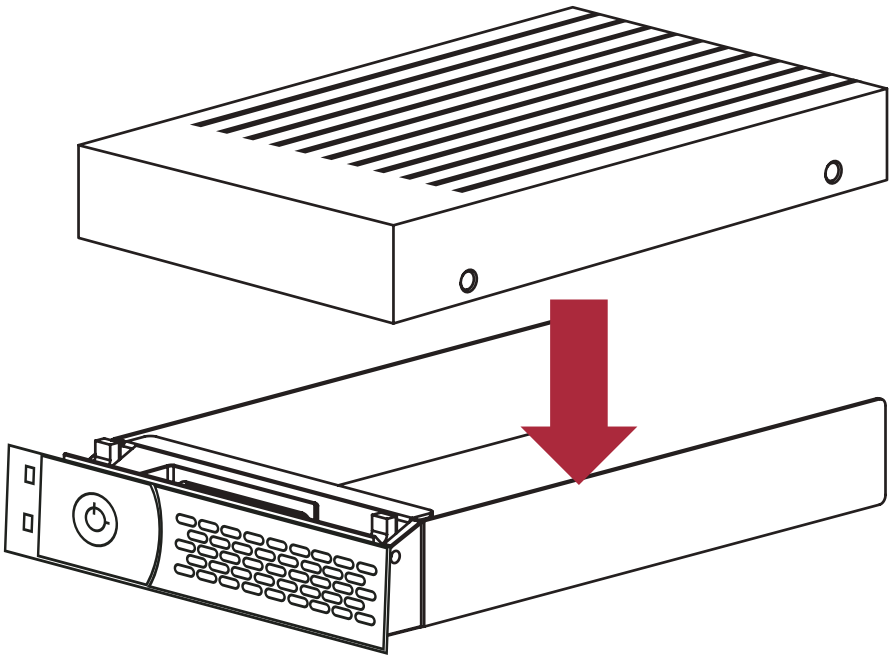






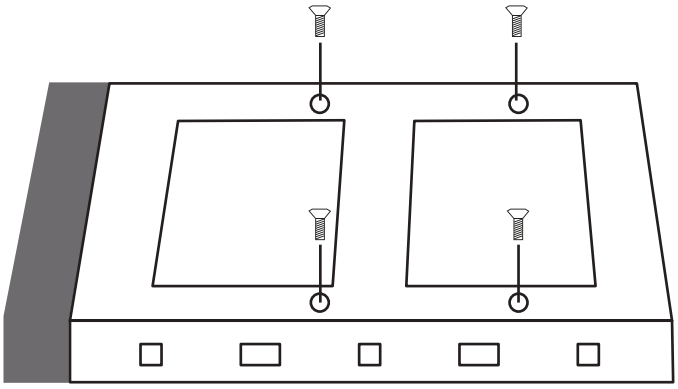
STEP
03

Place a U.2 drive tray on a flat and level surface, and then attach the 2.5″ U.2 NVMe SSD into the tray.



STEP
04

Adopt four of the screws provided, and fasten the U.2 NVMe SSD on the tray. Tighten each screw to fasten the U.2 NVMe SSD snugly to the drive tray. Do not tighten the screws overly.



※ You must verify the heads of the four screws are level with the U.2 drive tray while the 2.5″ U.2 NVMe SSD is attached to the tray; otherwise, a screw may take hold of the tray from the bottom side and prevent you to pull the tray out of the enclosure.

STEP
05

Insert the U.2 drive module into the NS388P enclosure correctly until its lever appears to shut, and then press the lever to close until it clicks to ensure that the U.2 drive module is within the enclosure.

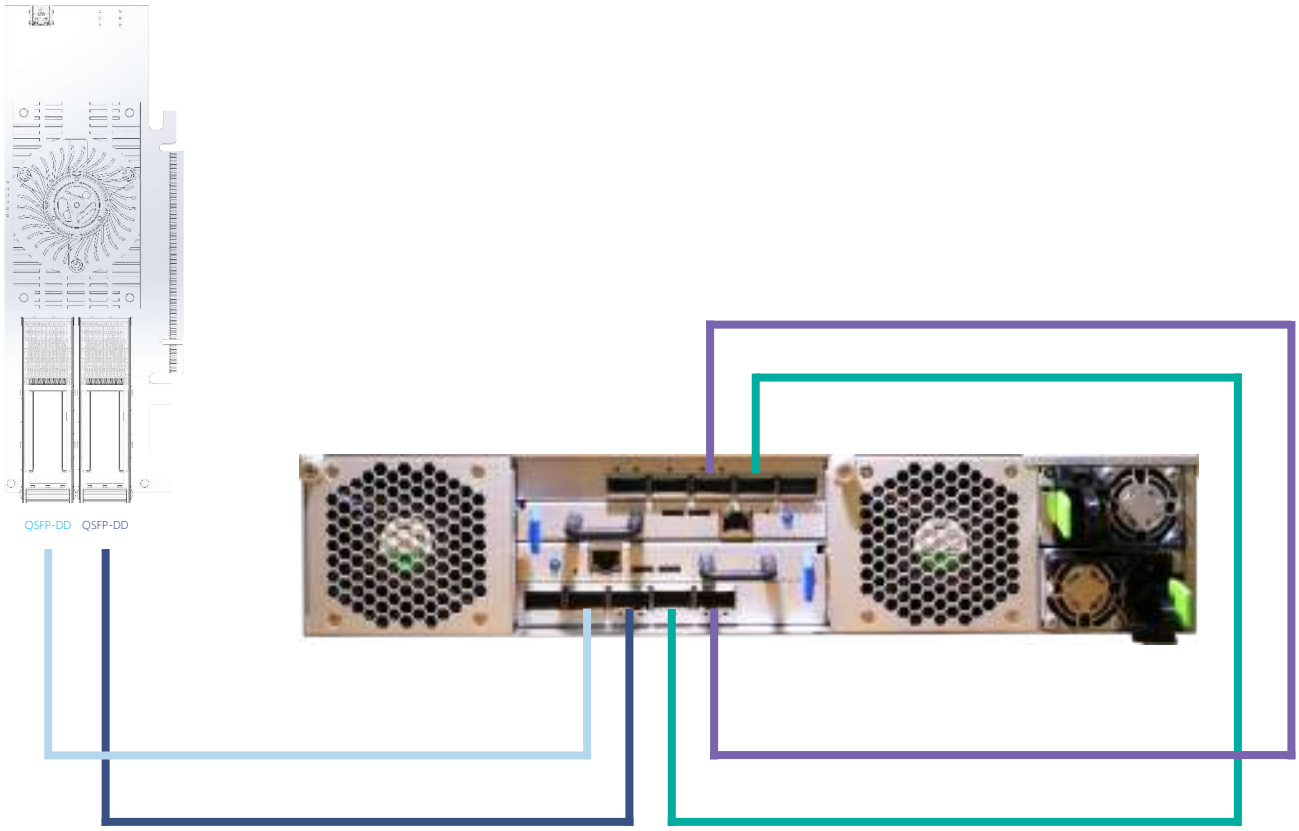
※ Do not force the levers to close while you insert U.2 drive modules into the enclosure. If a lever does not close smoothly, draw out and insert the U.2 drive module again, and then press the lever to close.

3.2 JBOF Connection Guide

3.2.1 P5-2425-S --- x4 mode

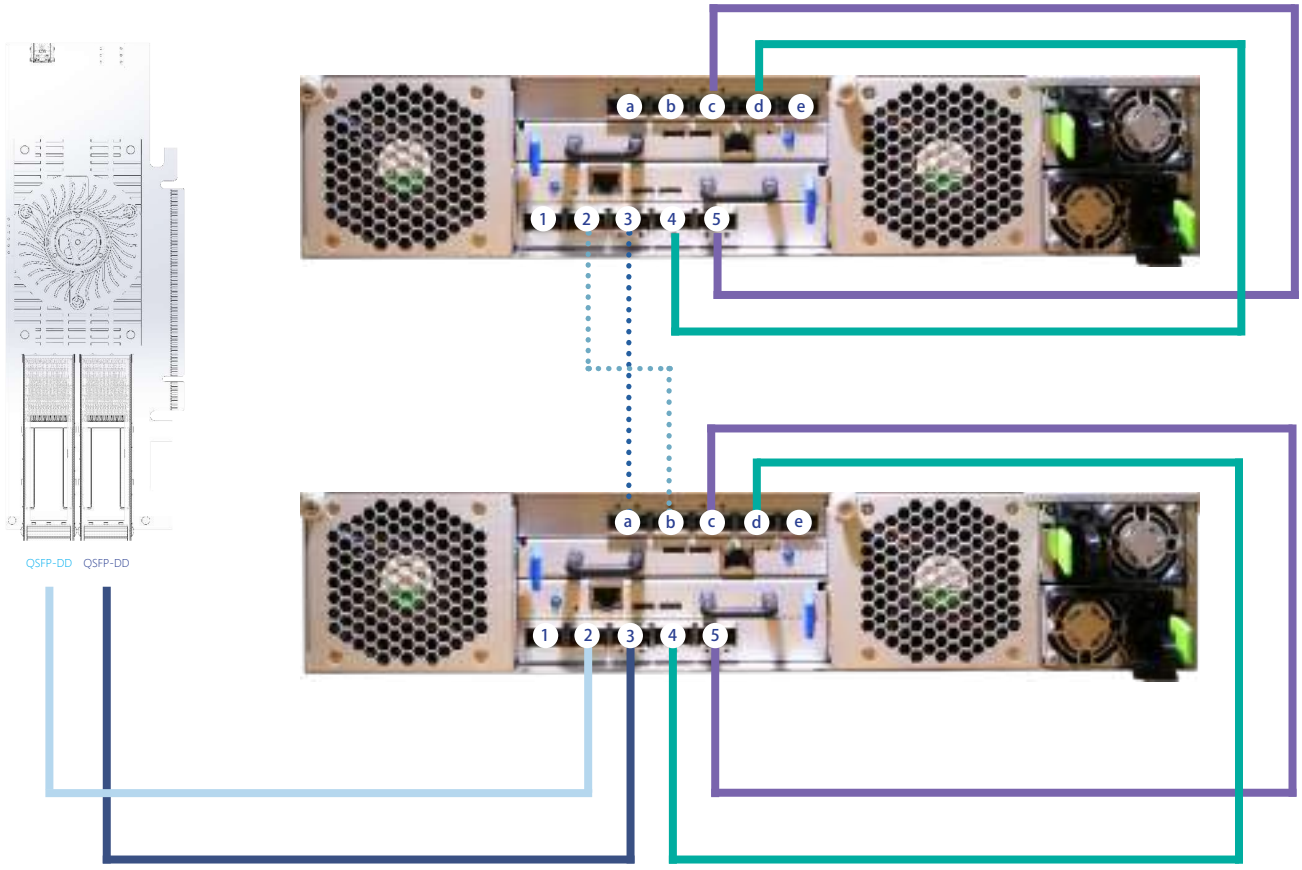
Condition 1 : One host card connect to one JBOF

Connect QSFP-DD with QDD cable to the corresponding position on 24 bay JBOF. The way of connection for using one card marked by color show as below :



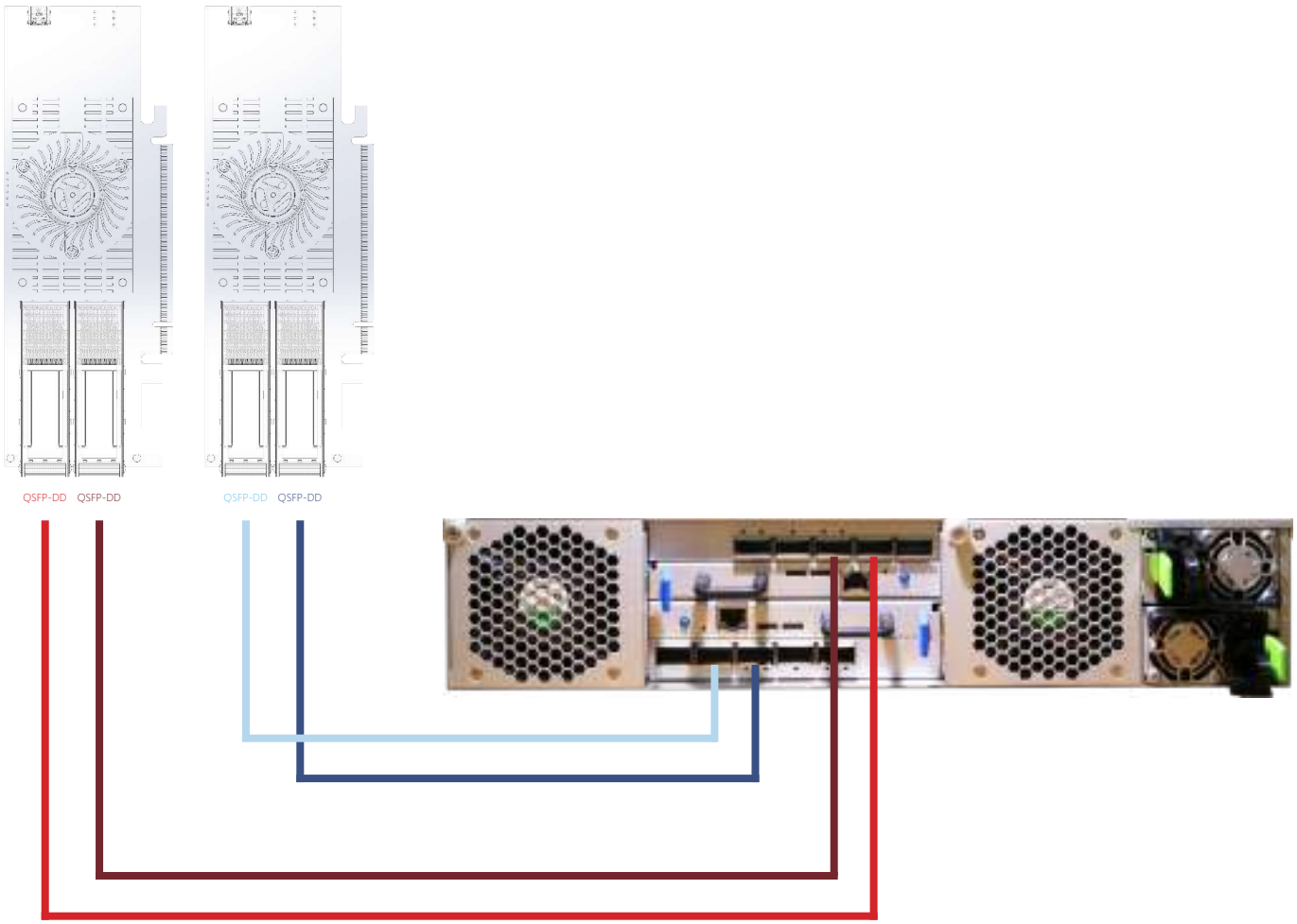
Condition 2 : One host card connect to two JBOFs

Connect QSFP-DD with QDD cable to the corresponding position on 24 bay JBOF. The way of connection for using one card marked by color show as below :



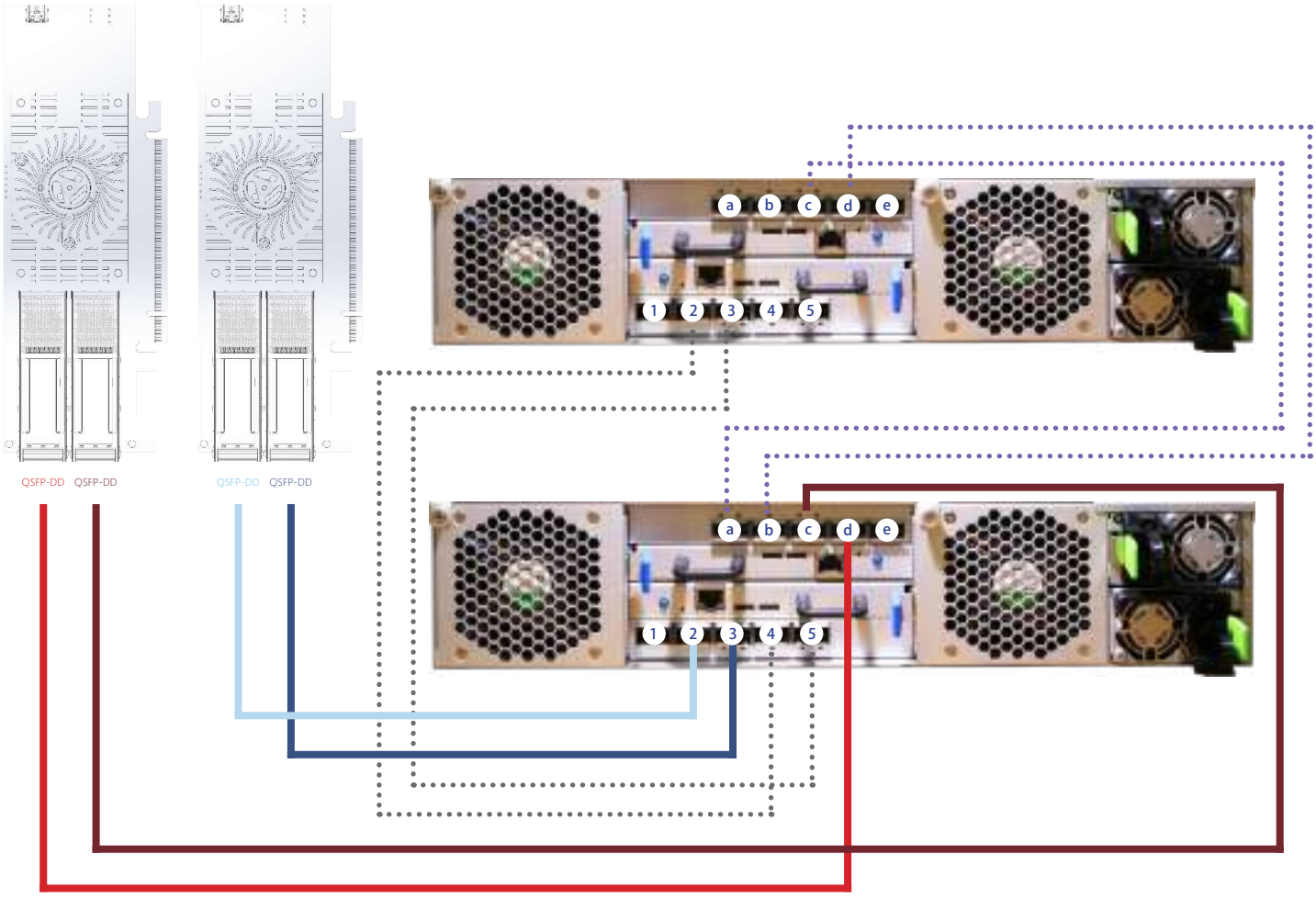
Condition 3 : Two host cards connect to one JBOF

Connect QSFP-DD with QDD cable to the corresponding position on 24 bay JBOF. The way of connection for using two card marked by color show as below :



Condition 4 : Two host cards connect to two JBOFs

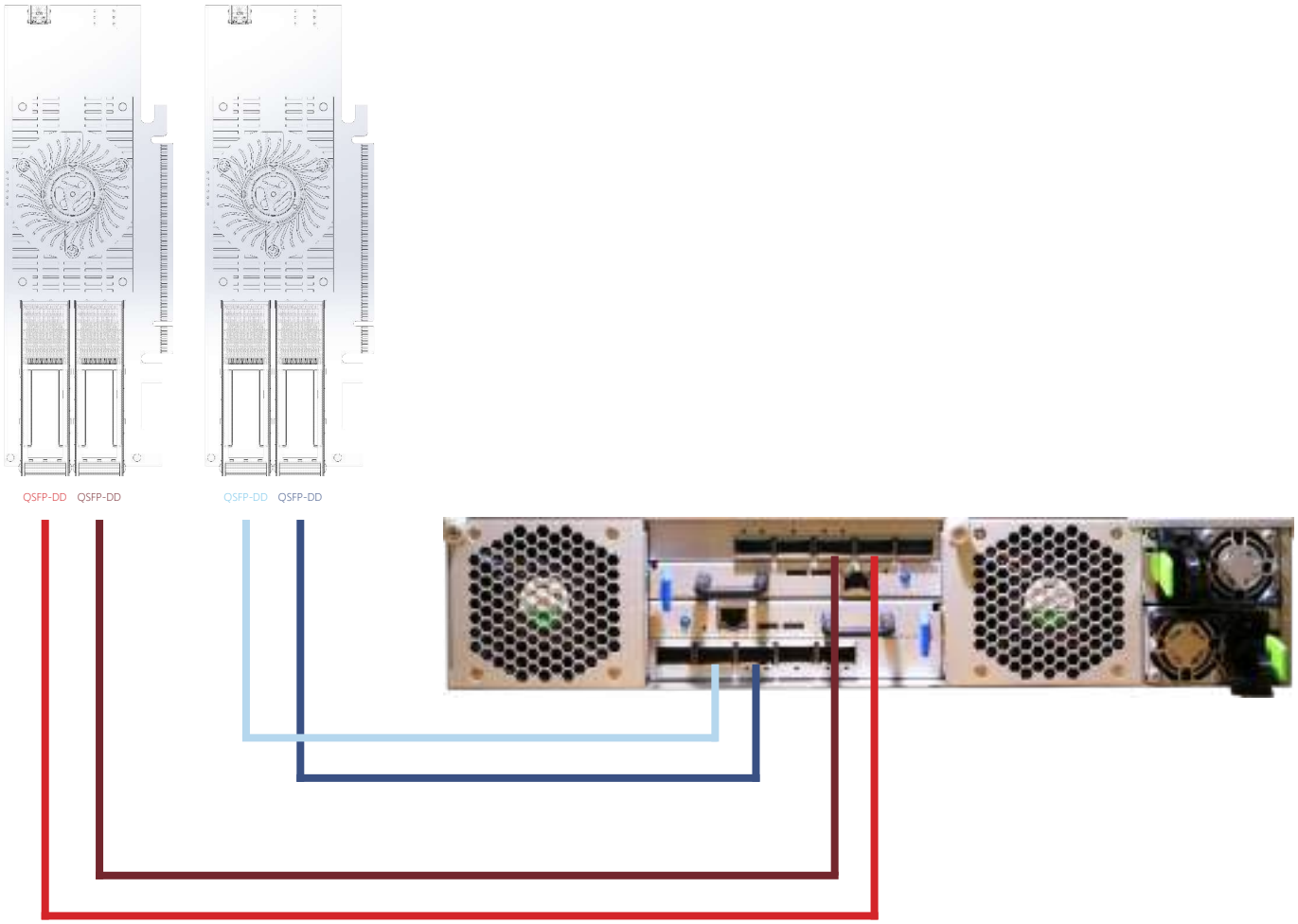
Connect QSFP-DD with QDD cable to the corresponding position on 24 bay JBOF. The way of connection for using one card marked by color show as below :



3.2.2 P5-2425-D --- 2x2 Mode

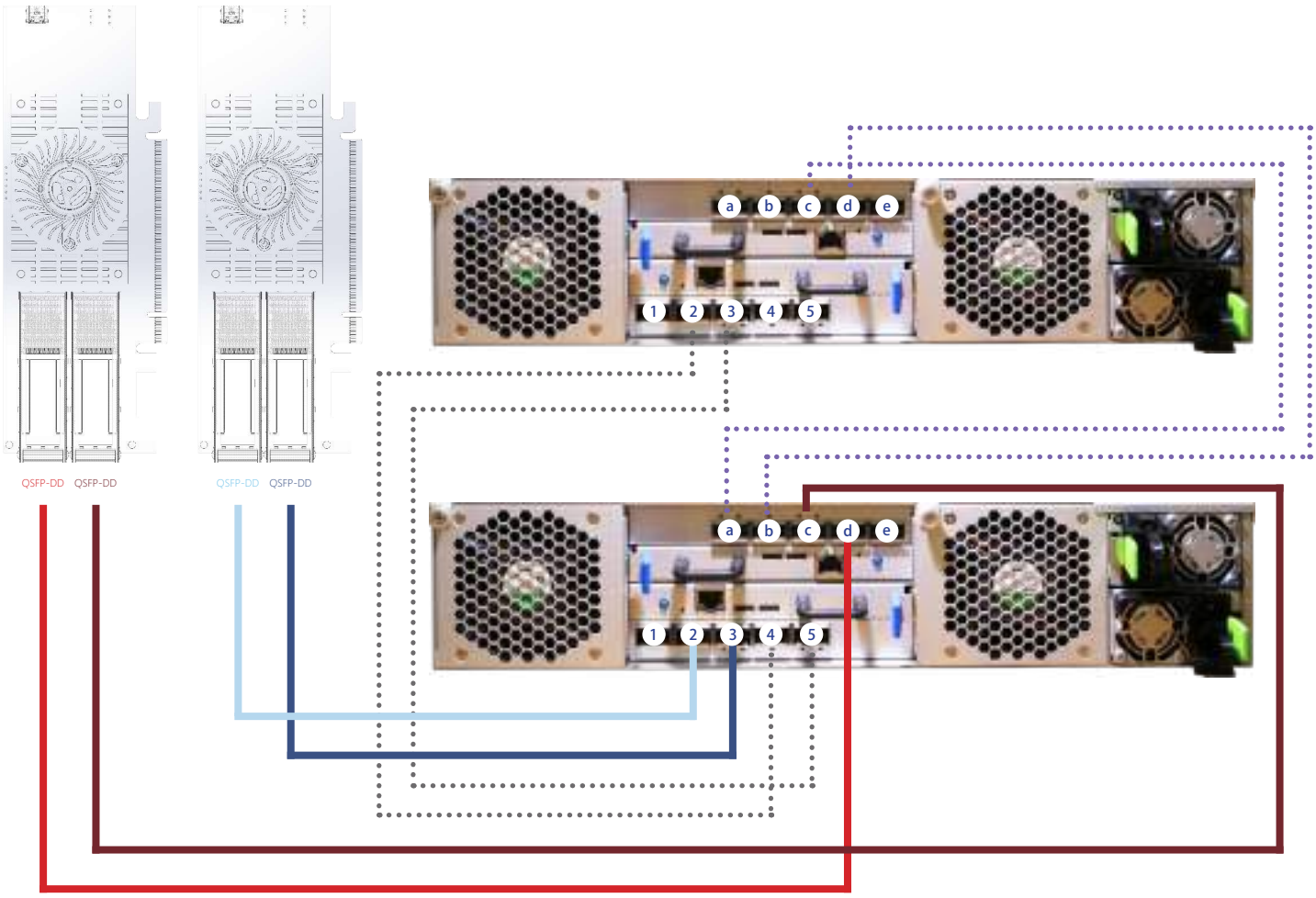
Condition 1 : Two host cards connect to one JBOF

Connect QSFP-DD with QDD cable to the corresponding position on 24 bay JBOF. The way of connection for using one card marked by color show as below :



Condition 2 : Two host cards connect to Two JBOFs

Connect QSFP-DD with QDD cable to the corresponding position on 24 bay JBOF. The way of connection for using one card marked by color show as below :



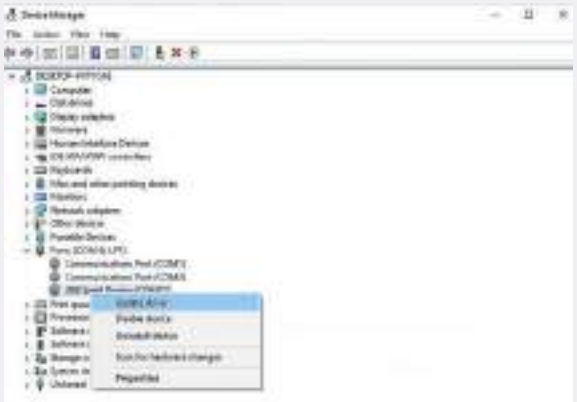
3.3 Install USB Driver

Download and install the synergy CDC driver.

※ No USB driver is required for Windows 10 and Linux

STEP 01

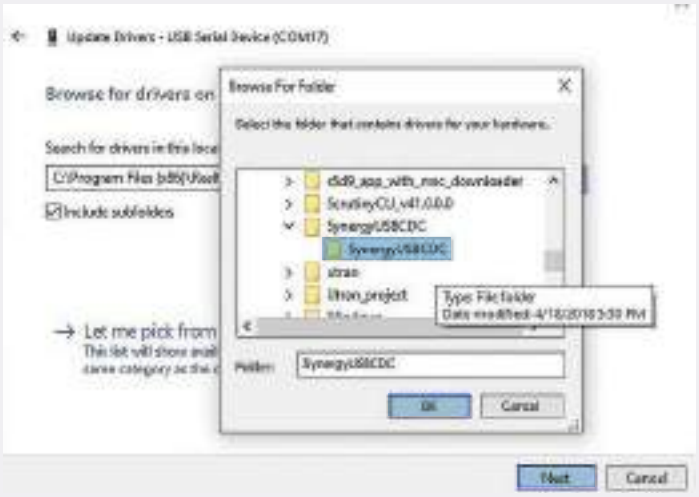
STEP 02



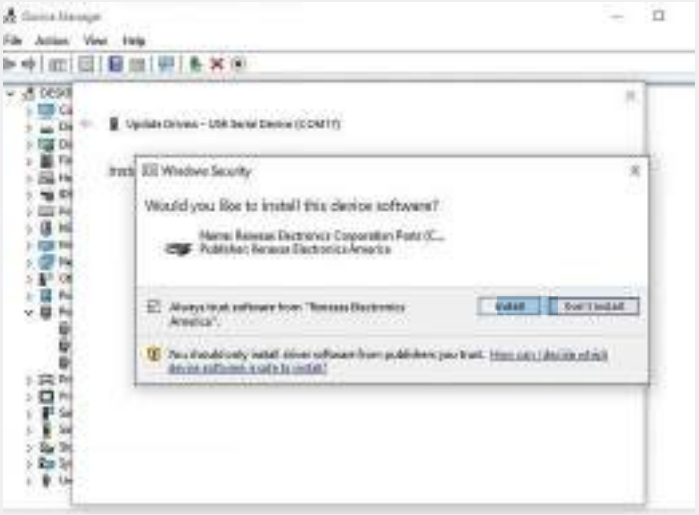
STEP 03

STEP 04

STEP
05



STEP
06



STEP
07

04

Cli Manager

4.1 Start-up Tera term Screen

PCIe switch board uses the USB port as the serial port interface. Please use the USB type A male to Type C male cable to connect PCIe switch board to PC and operation system will detect a new “USB Serial Device”. Please use this serial port to configure the PCIe switch board.

4.1.1 For the USB Serial Device

STEP
01

Install and launch Tera Term application.

https://reurl.cc/qVjg00

STEP
02

Open Tera Term and make a new connection, you will see the USB Serial Device(COM).

STEP
03

To ensure proper communications between PCIe switch board and the Tera Term Terminal emulation, please configure the Tera Term Terminal emulation settings to the values shown below :

For “Port”, select COM3 in this example.
(Depend on which COM port used on Host)
For “Baud rate”, select 9600.
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.

STEP
04

Setup is complete. Please press ENTER , and you will see the cmd> command show as below :

4.1.2 For the Telnet Con-nection

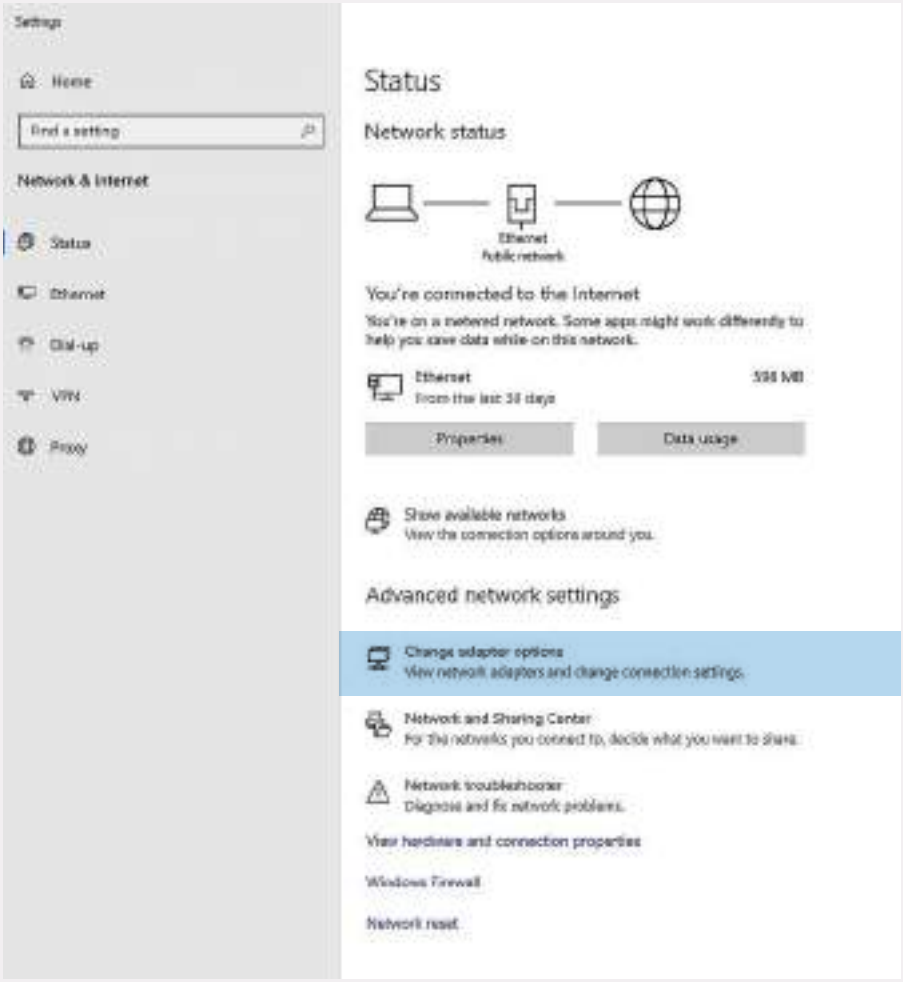
STEP
01

Install and launch Tera Term application

https://reurl.cc/qVjg00

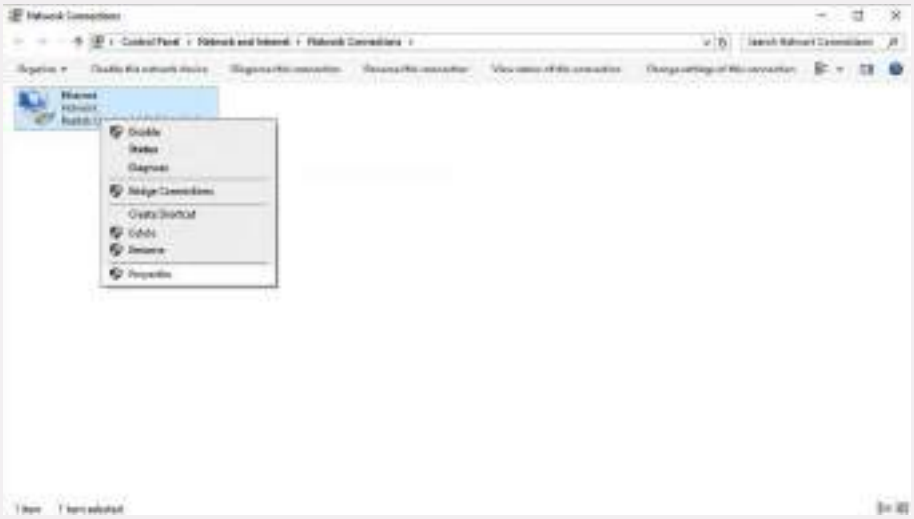
STEP
02

Open windows Ethernet setting and press "Change adapter options". Enter here.



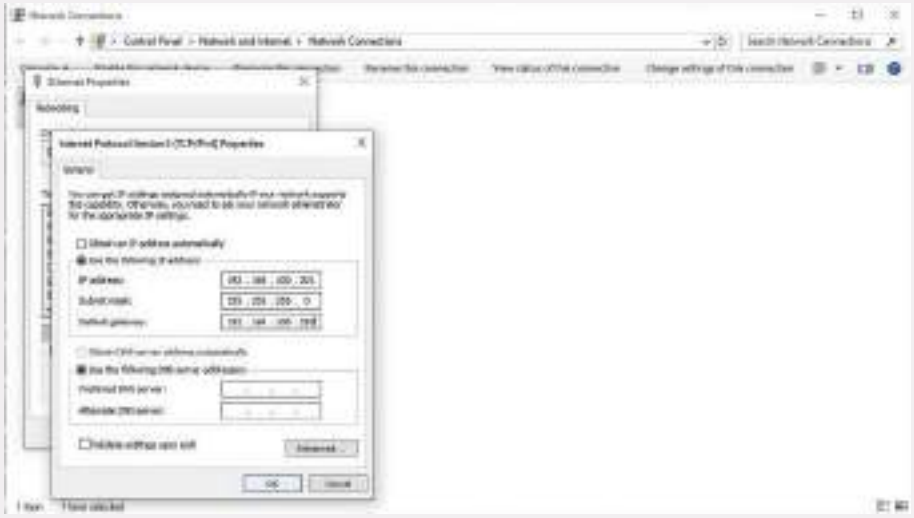
STEP
03

Please enter the Ethernet properties.



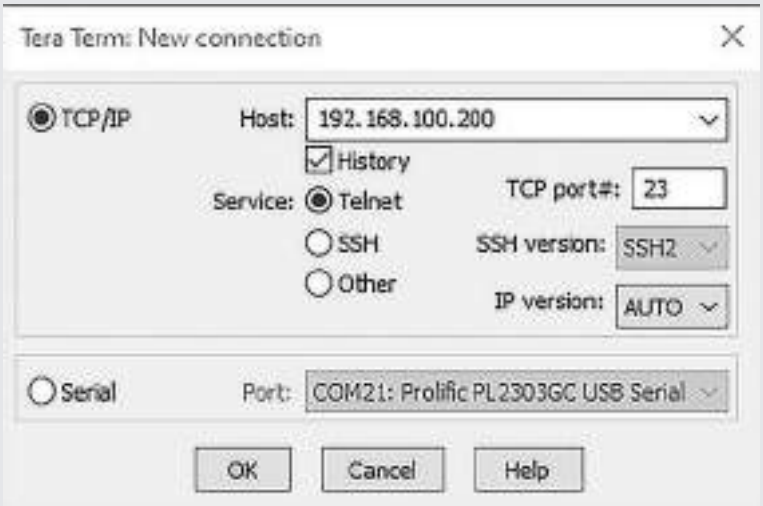
STEP
04

Setting the IP address like the picture below :



STEP
05

Type the IP “192.168.100.200” (default) in the host option Select “Telnet” in service option, press “OK” to start the telnet con-nection. You will see the cmd command.



4.2 CLI Command

This section provides detailed information about PCIe switch board' s CLI function. Please type in lower case for all of commands.

Command	Descriptions
?	Show list of commands
syspwr	NVMe JBOF enclosure power ON/OFF control
eth	Ethernet IP configuration
dhcp	Ethernet DHCP function control
setmac	Set Ethernet MAC address
fdl	Update MCU FW
lsd	Show environmental info, including temperatures, FANs, PSUs, voltages
dr	Dump switch-specific registers.
dp	Dump switch port-specific registers.
spwr	Control the power of each U.2 slot.
srst	Reset each U.2 NVMe SSD
pwrdis	slot led control.
showport	Show link status for USP/DSP and slot.
buz	buzzer control.
pwmctrl	JBOF enclosure FANS speed control
ver	Show on-board mcu and PCIe switch F/W information.
sysinfo	Show system information.
reset	Reset switch controller board.

? Command

This command provides an on-line table of contents, providing brief descriptions of the supported command groups and built-in commands.
Type "?" to get detail information about the CLI commands summary.

Usage	?

Example cmd>?

```
Cmd>?
  Cmd Help Menu
    syspwr :
          NVMe JBOF enclosure power control.
          - Usage: syspwr [on|off]

    eth :
          Set Ethernet IP Configuration.
          - Usage: eth <ipaddr(*)> <subnet(*)> <gateway(*)>

    dhcp :
          Enable DHCP.
          - Usage: dhcp <on|off>

    mw :
          Write 32-bit data to register.
          - Usage: mw <register(H)> <data(H)>
          - register(H) : register should be 0x00000000 ~ 0xFFFFFFFC
          - data(H) : data should be 0x00000000 ~ 0xFFFFFFFF

    setmac :
          Set Ethernet MAC address.
          - Usage: setmac <xx:xx:xx:xx:xx:xx>

    fdl :
          Xmodem download image.
          - Usage: fdl <fw|mcu>
          - fw  : update fw into switch.
          - mcu : update on-board mcu fw.

    lsd :
           Show environmental conditions information.
          - Usage: lsd

    dr :
          Dump switch-specific registers.
          - Usage: dr <register(H)> [count(H)]
          - register(H) : register should be 0x00000000 ~ 0xFFFFFFFC
          - count(H) : count should be 0x00000000 ~ 0xFFFFFFFC

    dp :
          Dump switch port-specific registers.
          - Usage: dp <port_number(D)>
          - port_number(D) : port_number should be 0 ~ 31

    portpwr :
          Port power control.
          - Usage: portpwr [<portpwr(D|all)> <on|off>]
          - portpwr(D) : portpwr number should be 0 ~ 9

    portrst :
          Reset port.
          - Usage: ssdrst <port(D)|all>
          - slot(D) : slot number should be 0~9
          - Ex: portrst 4
          - Ex: portrst all

    led :
          slot red led blink control.
          - Usage: led [<slot(D|all)> <t|g|b> <on|off>]
          - slot(D) : slot number should be 0 ~ 9
          - Ex : led 1 r on
          - Ex : led 4 t on
```

syspwr Command

Switch board enclosure power control.
This command allows users to remote power ON/OFF the Switch board.

Usage	syspwr on/off

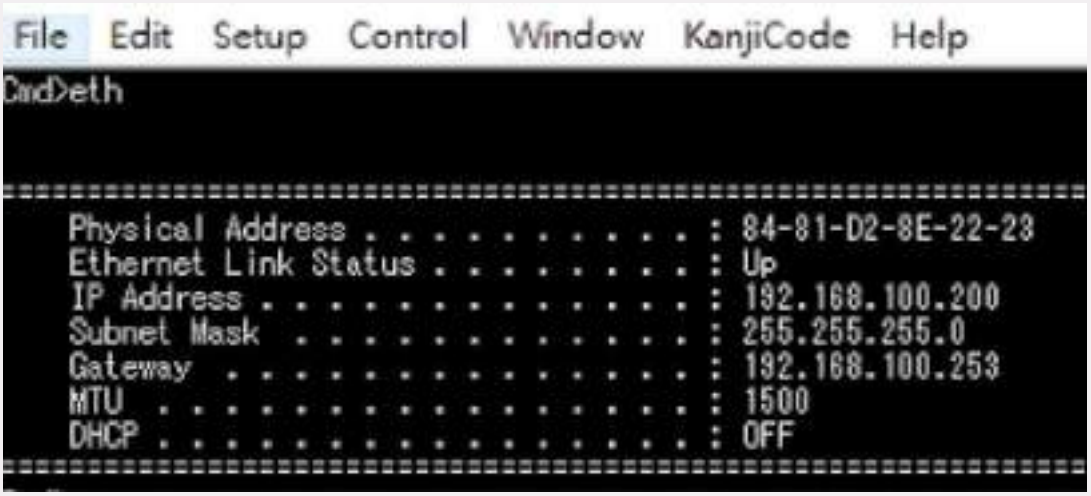
Example syspwr on

eth Command

Ethernet IP configuration
Shows the Ethernet port configuraiton , etc. MAC address,
IP address, link status, gateway, MTU, DHCP.

Usage	eth

Example cmd>eth

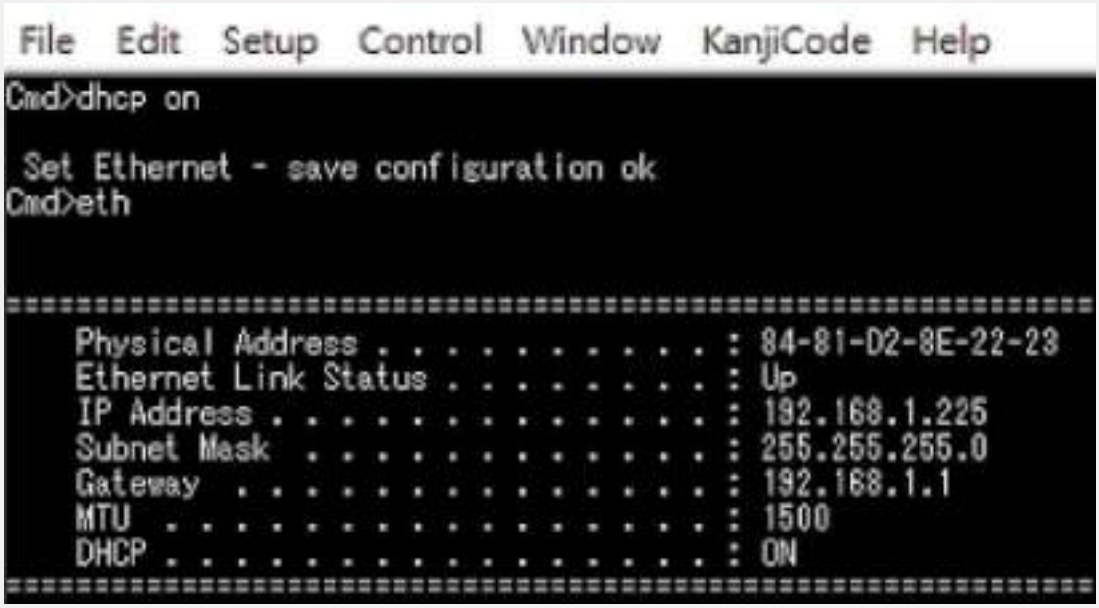


dhcp Command

Ethernet DHCP function control
Enable or disable DHCP function support for Ethernet port.

Usage	dhcp on/off

Example cmd>dhcp on

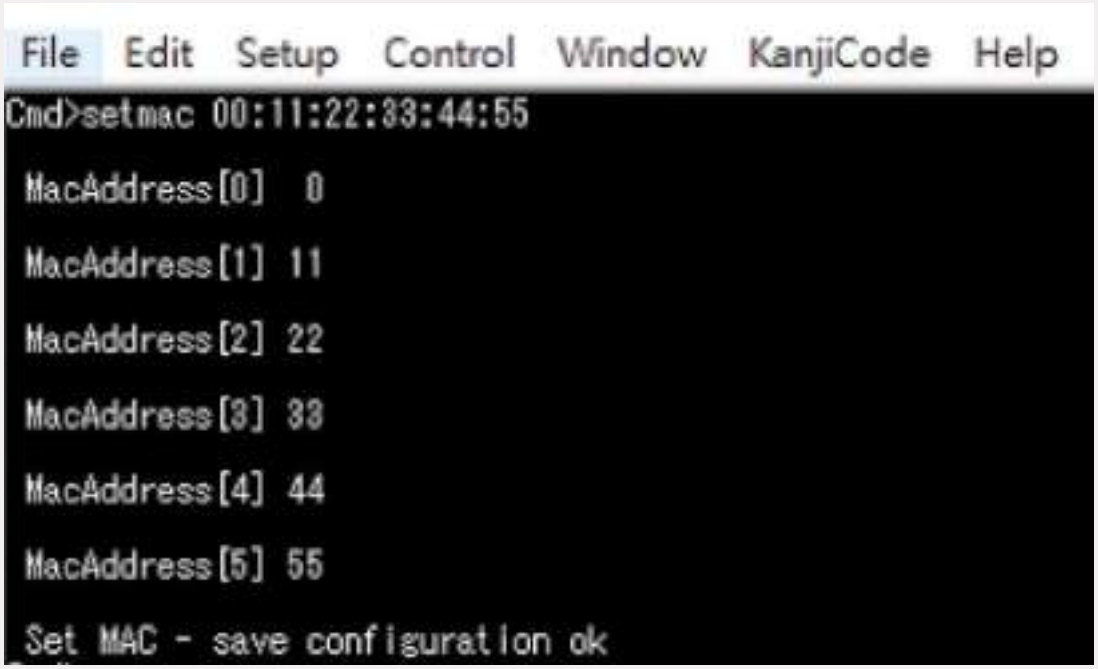


setmac Command

Setting the MAC address to the Ethernet
To program any MAC address for testing purpose. The new MAC address will be applied after MCU reset or switch controller board power cycle.

Usage	setmac <xx:xx:xx:xx:xx:xx>

Example cmd>setmac 00:11:22:33:44:55



fdl Command

Update MCU FW
Sending the new FWs via XMODEM.
A few seconds for switch config or MCU FW updating.

Usage	fdl mcu

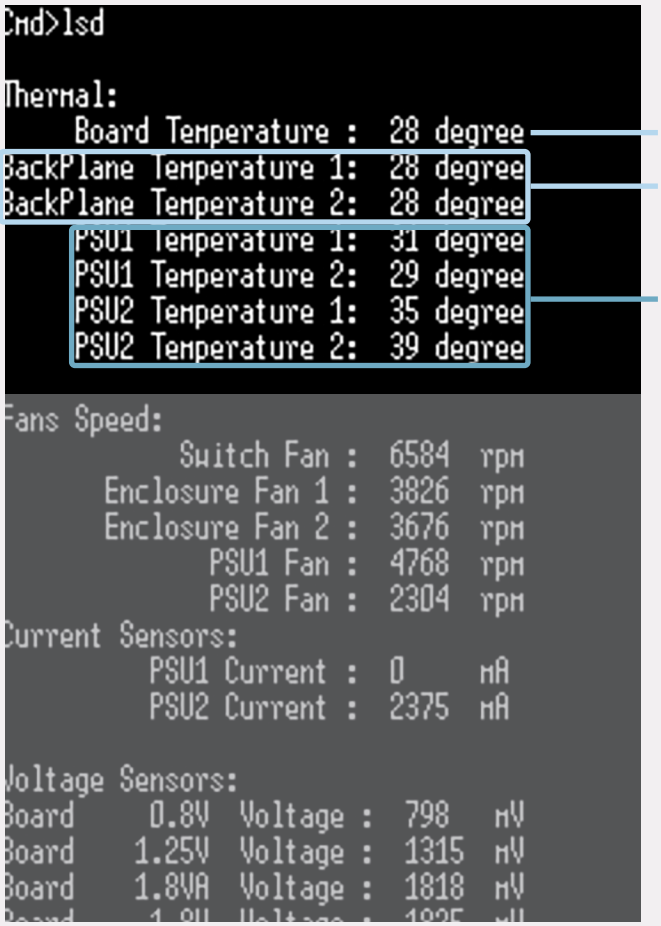
Example cmd>fdl mcu

lsd Command

Show environmental info, including temperature, FANs, PSUs, voltages.

Usage	lsd

Example cmd>lsd

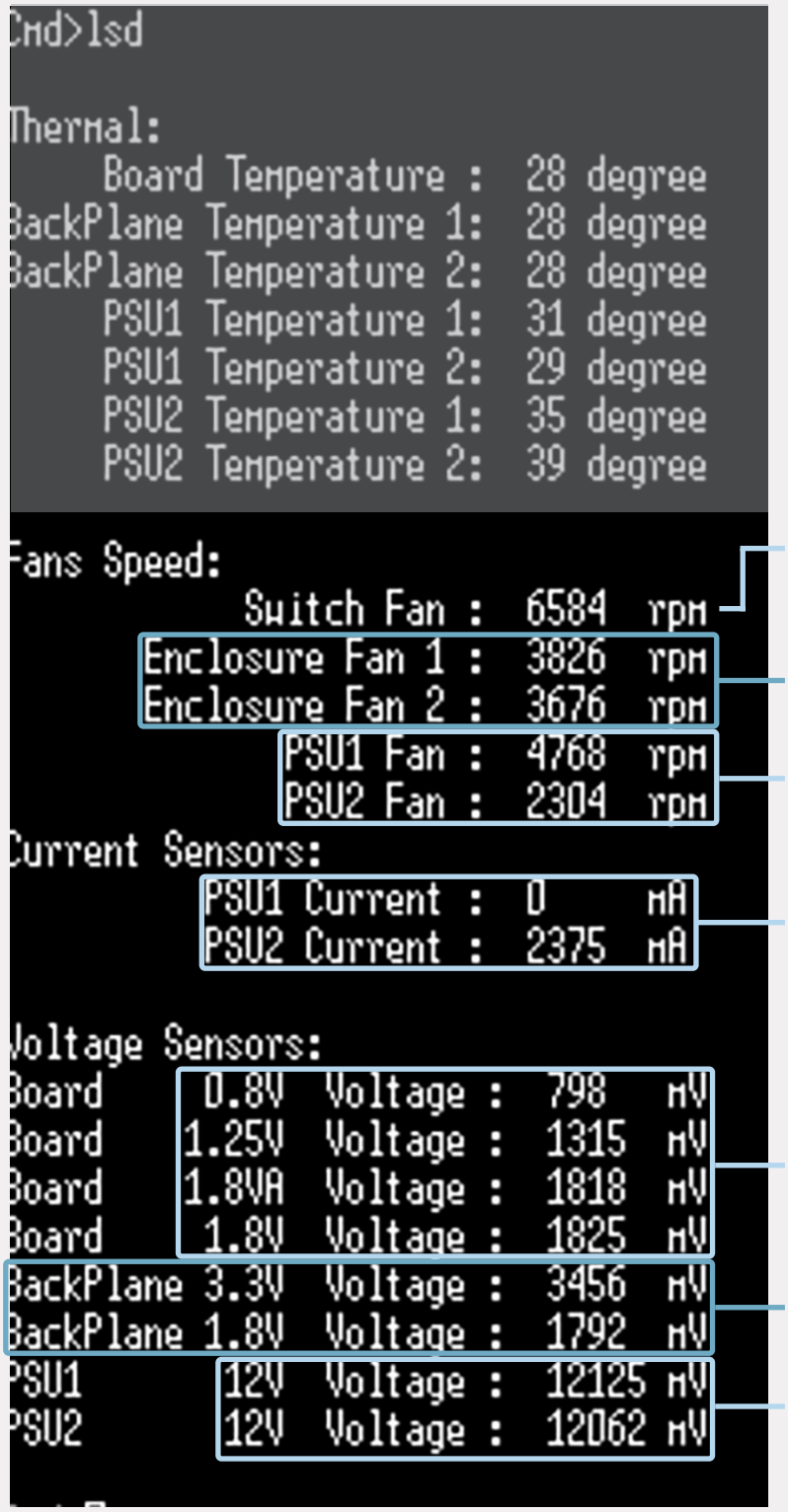


Board temp is the sensor in switch module

Two temp fan sensors on blackplane

Two temp sensors inside PSU

Example cmd>lsd



Switch FAN is the FNA for PCIe switch

Fan1/Fan2 are the FANs located in the rear of en-closure

FAN sensor in two PSU

The current measure per PSU

4 voltage sensors

Two voltage sensors on blackplane

12Volts output monitoring per PSU

dr Command

Dump switch-specific registers.

Usage	dr <SW address>

Example cmd>dr 0xfff00000

dp Command

Dump switch port-specific registers.

Usage	dp <port(0~142)>

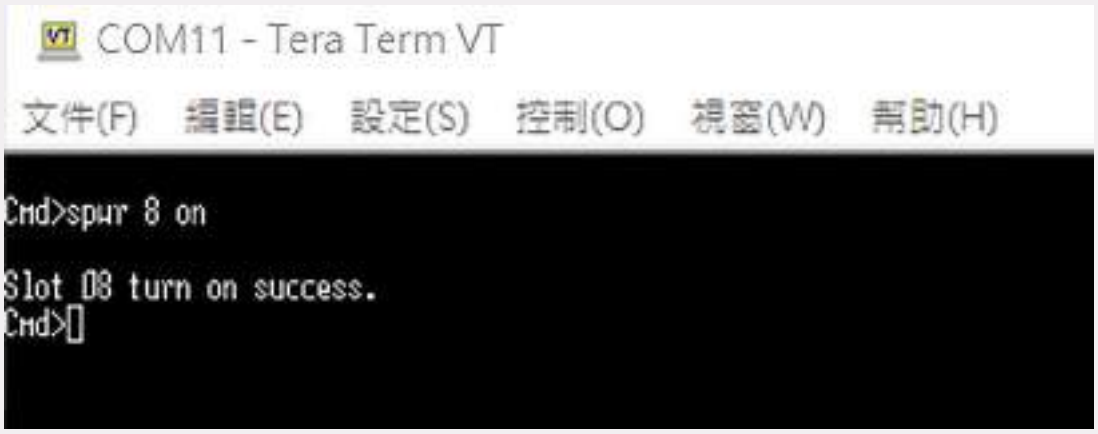
Example cmd>dp 96

spwr Command

The command is for controlling the 12 volts power of each U.2 NVMe drive slot.

Usage	spwr <slot(1~24)> <on/off>

Example cmd>spwr 8 on



srst Command

To generate an around 350ms “L” duration in PERST# signals in U.2 slot.
A channel means ePERST0# in U.2 Pin E5 for 1st PHY of dual port drives.
B channel means ePERST1# in U.2 Pin E4 for 2nd PHY of dual port drives.

Usage	srst <slot(1~24)>

Example cmd>srst 8

pwrdis Command

Set PWRDIS in U.2 as "H" or "L" state.
Set pwrdis in slot pin3 level to high/low.
Set PWRDIS to "H" state to disable SSD power.
Set PWRDIS to "L" state to enable SSD power.

Usage	pwrdis <slot(1~24)> <h/l>

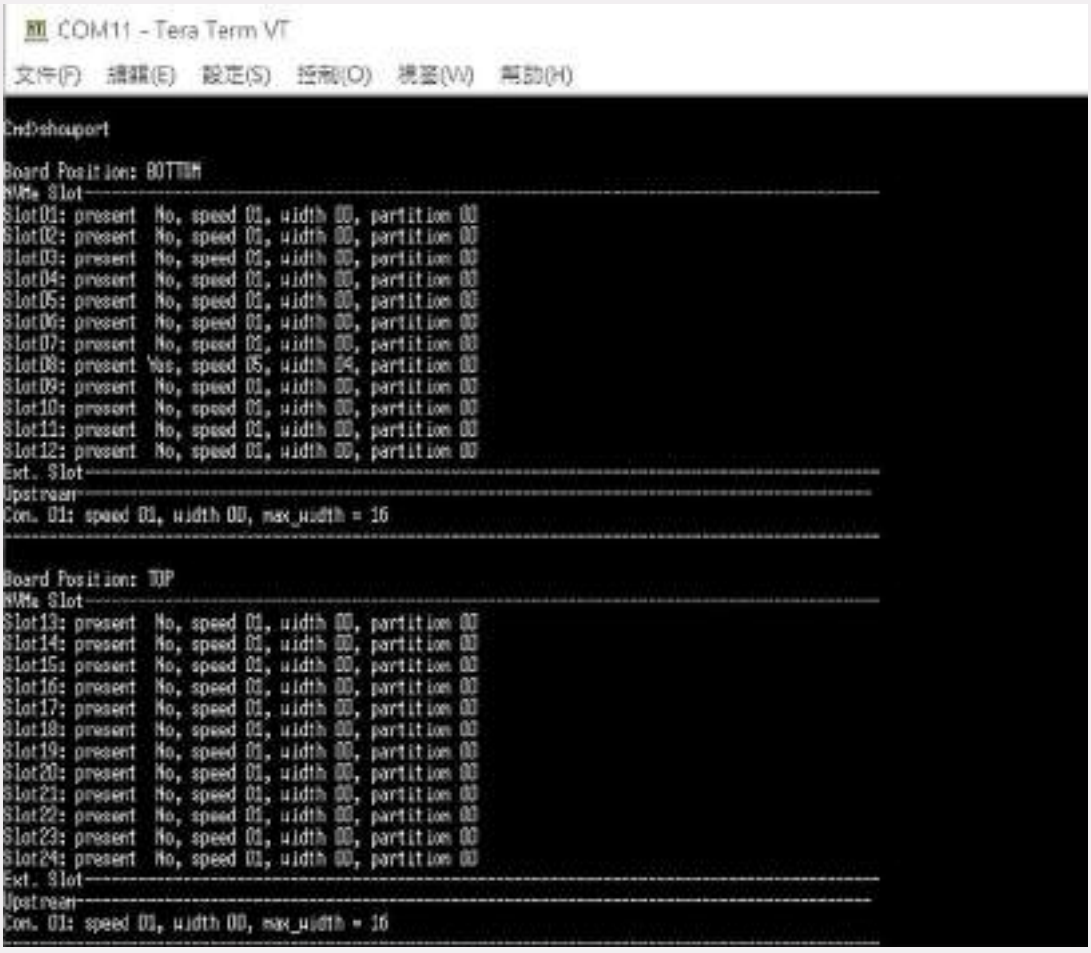
Example cmd>pwrdis 8 h

showport Command

Show link status for each USP/DSP slot.

Usage	showport

Example cmd>showport



buz Command

This command is for setting the buzzer of PCIe switch board.
Buzzer control

Usage	buz <on/off/en/dis>

Example cmd>buz on

pwmctrl Command

JBOF enclosure FANS speed control(use percentage)

Usage	pwmctrl <fan(1~2)> <speed(30~100percentage)>

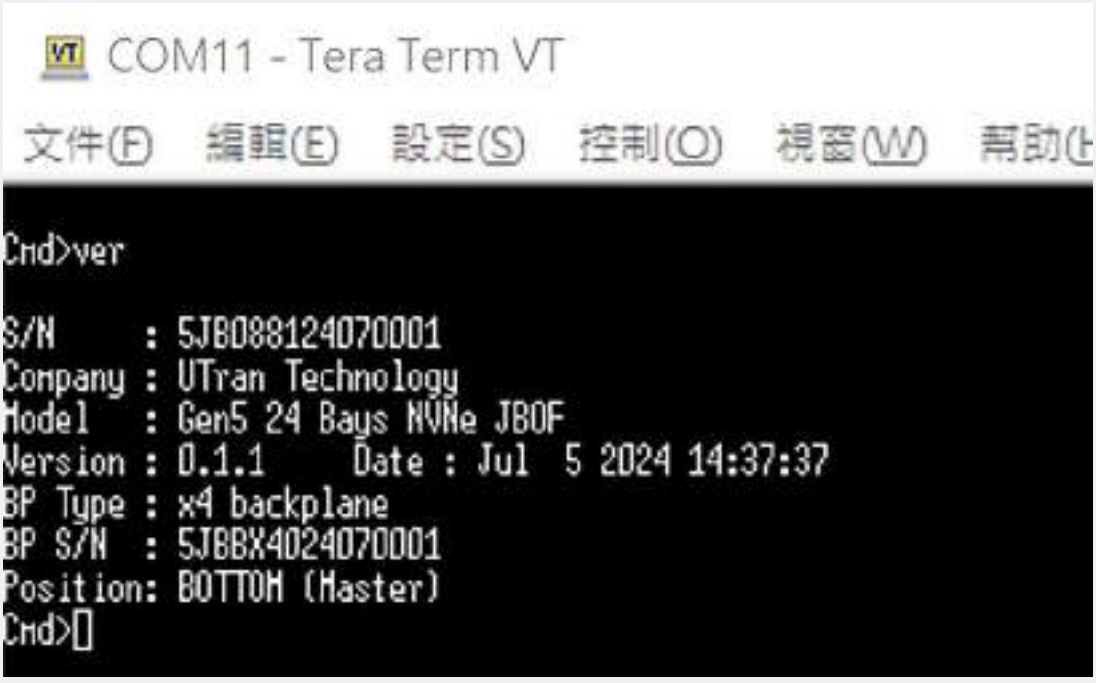
Example cmd>pwmctrl 1 50

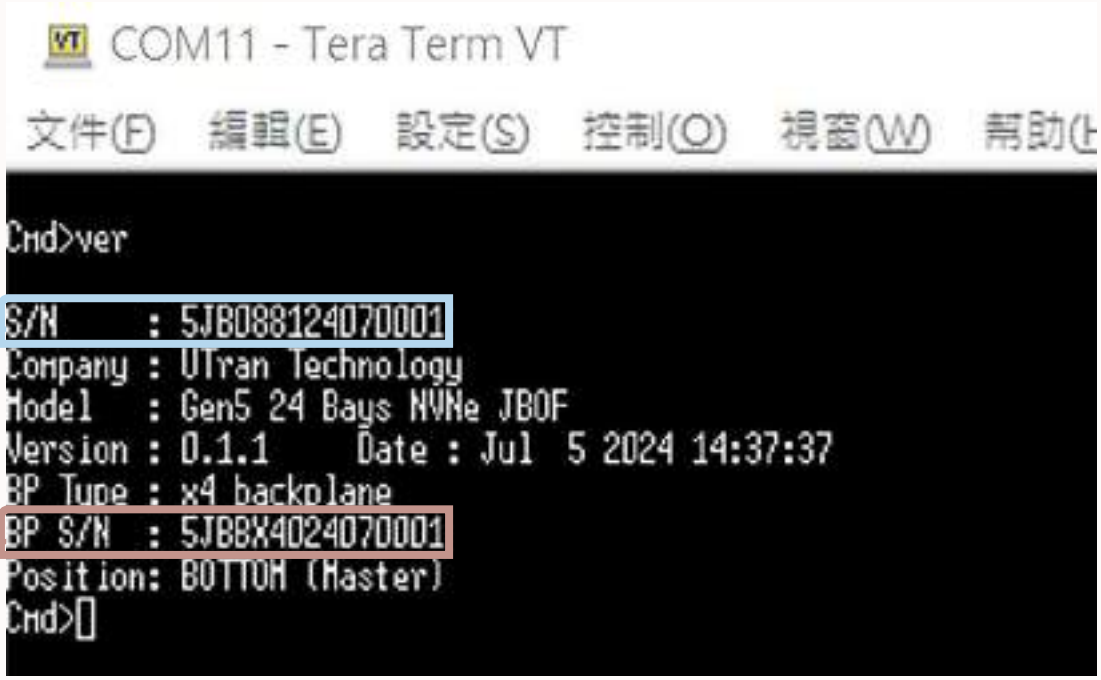
ver Command

Show on-board MCU and PCIe switch F/W information.

Usage	ver

Example cmd>ver





JBOF (control board) | Version One | atlas2 version

5 JB 088 1 2407 1 001

Gen 5 | 88 lanes | Warranty Period (Year/Month) | Serial Number

JBOF (control board) | Original Version | atlas2 version

5 JB B X4 0 2407 1 001

Gen 5 | Backplace | Warranty Period (Year/Month) | Serial Number

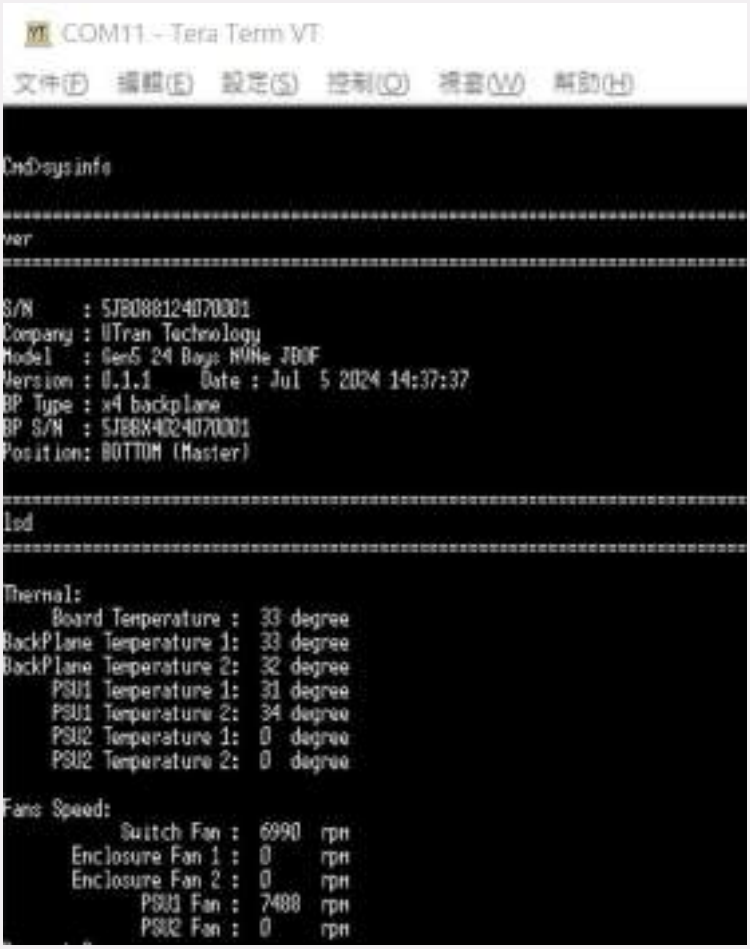
sysinfo Command

Show system information

Sysinfo command is for switch board enclosure diagnostic, it combines ver, lsd, showport command

Usage	sysinfo

Example cmd>sysinfo



reset Command

reset switch controller board
MCU reset and the MCU will have PCIe switch power on reset.

Usage	reset

Example cmd>reset

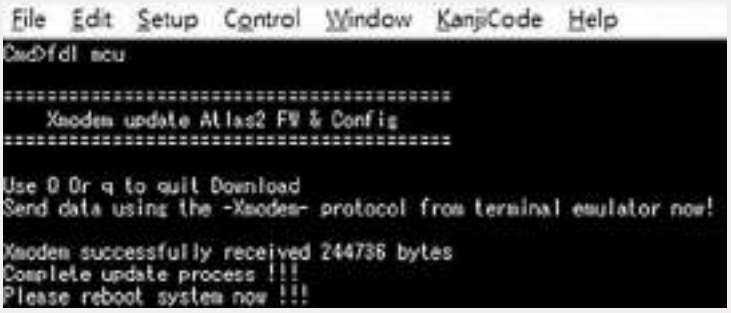
05

Firmware Upgrade

5.1 Mcu firmware upgrade

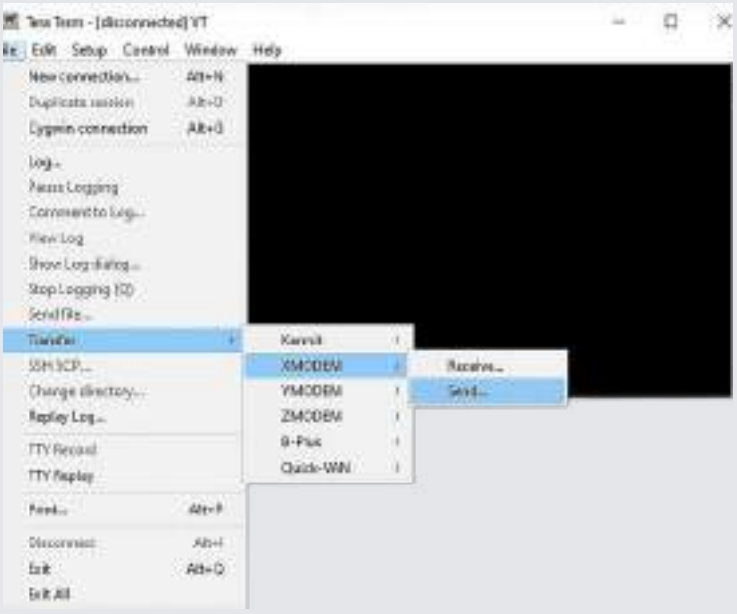
STEP
01

Type "fdl mcu" on command line,you will see the picture in below.



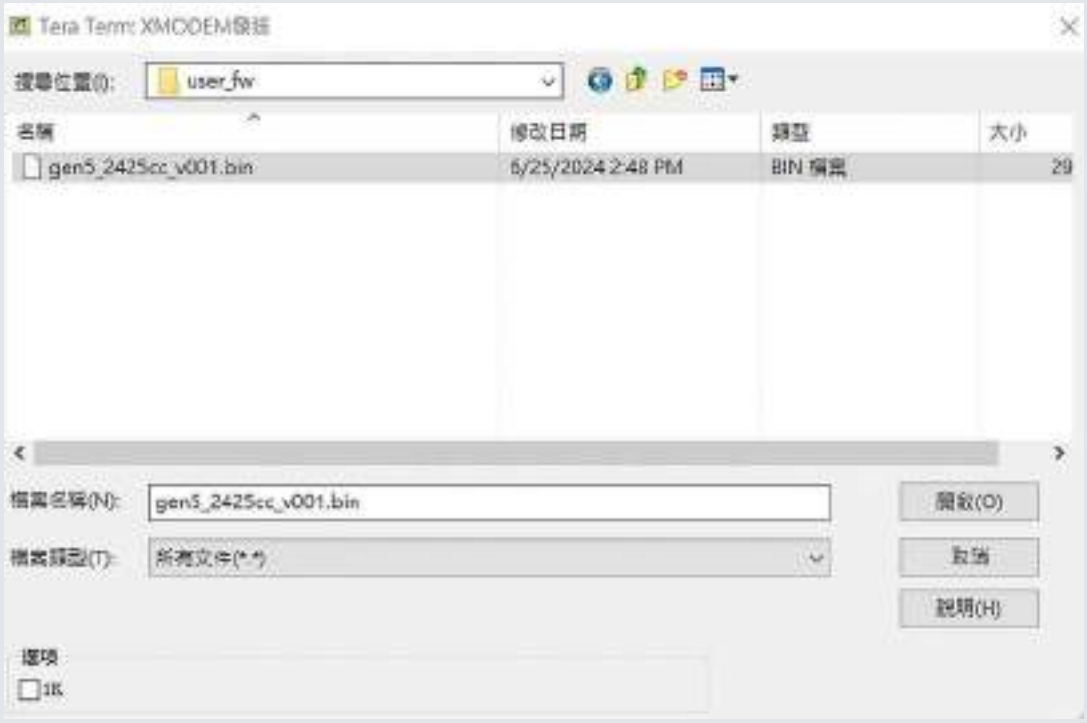
STEP
02

Click on the file, scroll down to Transfer, and select "XMODEM"on the second frame,you will see the sent.



STEP
03

Makesure the file you sent is bin.
(the latest version firmware please download on official websites.)



STEP
04

You will see this picture which means the firmware is already upgrading.

Please reset the system when it complete, and you can enjoy the latest firmware.

5.2 Switch firmware upgrade

Please contact Utran to get the password.

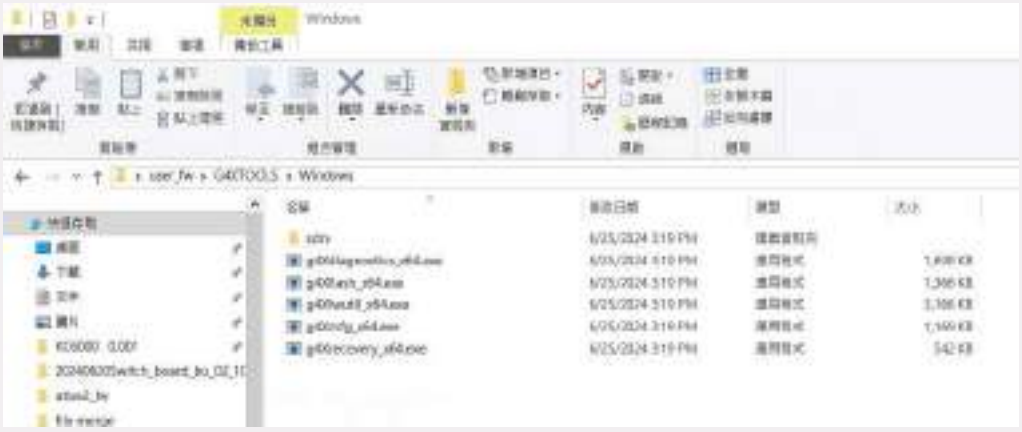
STEP
01

Download the "G4XTOOLS" on the website.

Connect the USB Type-C port(Reserved)

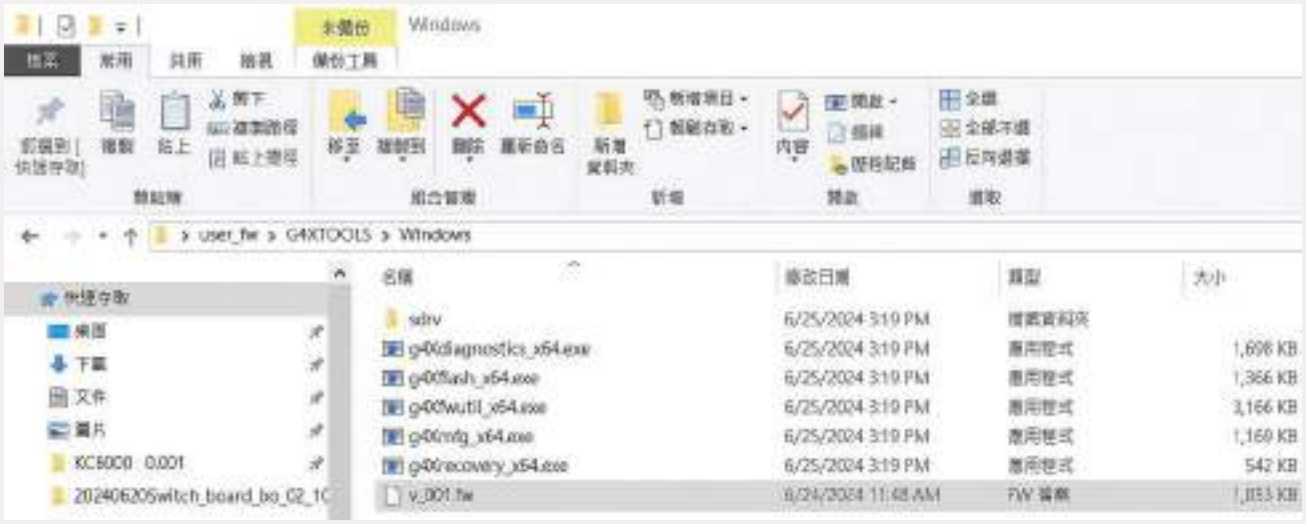
STEP
02

Open the G4XTOOLS file,there are two files named Windows / LINUX, select your system to get one of them in.Here will take Windows for example, click windows file.



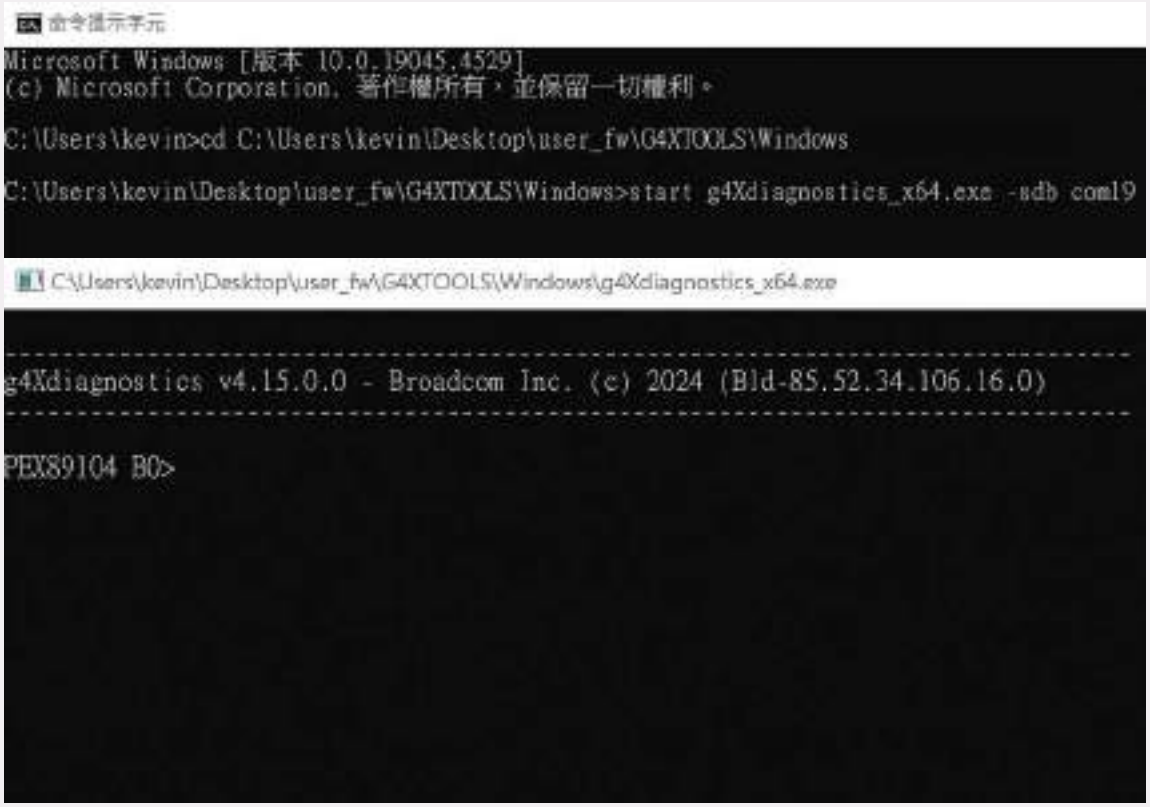
STEP
03

Download the .fw file on the website, and open CMD Command, replicate your .fw file, then go back to G4XTOOLS file. You can use cmd command to enter the specified path where your firmware file located in, and paste the .fw file you just replicated.



STEP
04

Type >start g4Xdiagnostics_x64.exe -sdb com "numder" on the last line.The numder filled in is depend on your device manager. You can see boardcom switch name after you press "enter".



STEP
05

Type >dl -p ".fw file" -o 0x0 on the first line of the second paragraph.

※ *Do not shut down your device during the program update.*

Restart it when update is complete, and the brand new firmware will be ready for enjoying.

ATTACHMENT

ATTACHMENT

01 Verify Signal Integrity

Verification Software

Boardcom ARCTIC -12.18247

Verification conditions

Error bit rate 10^-18

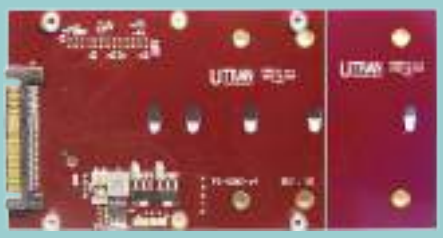
All lanes passed

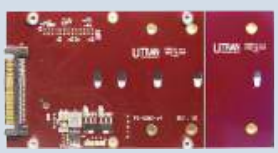
Signal Flow

All Lanes Passed

Upstream port captured signal path

Downstream port captured signal path





02

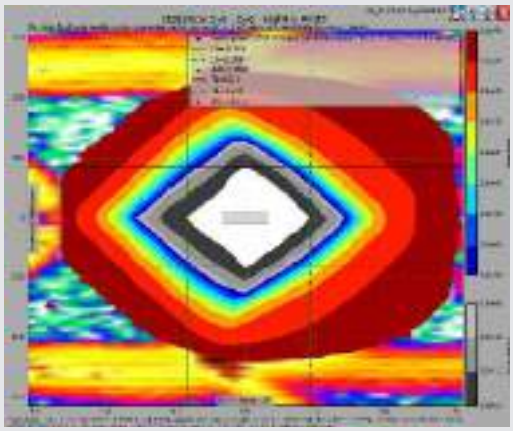
Eyescope

Diagrams

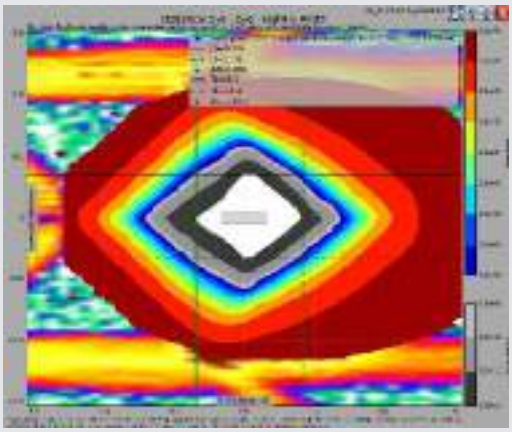
b.1 P5-2425-S Slot 1-24

Eyescope Diagrams / JBOF x4 / slot 1

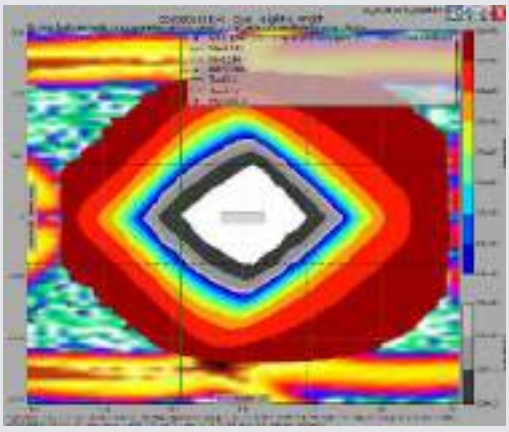
lane 0



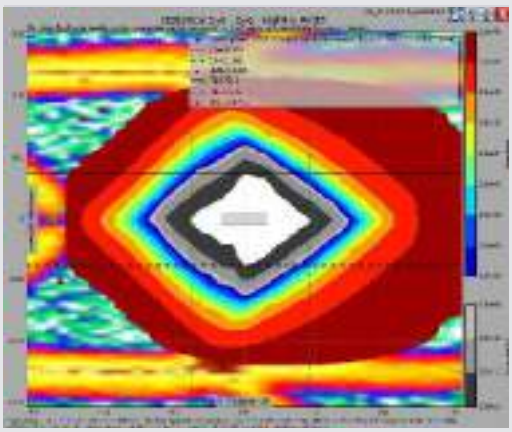
lane 1



lane 2

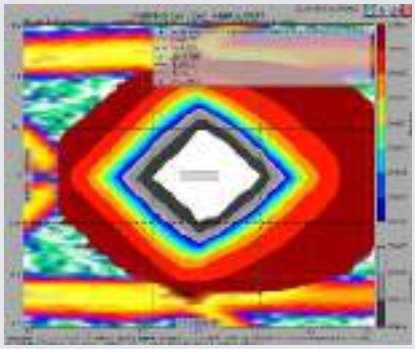


lane 3

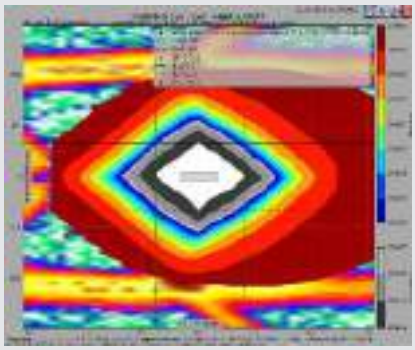


Eyescope Diagrams / JBOF x4 / slot 2

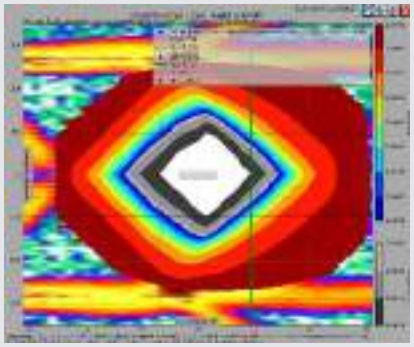
lane 4



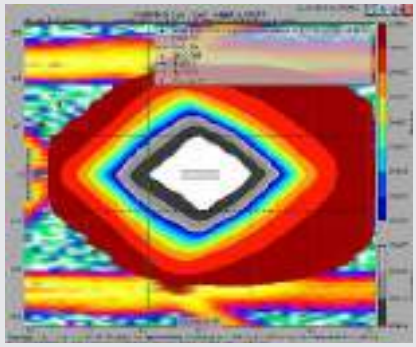
lane 5



lane 6

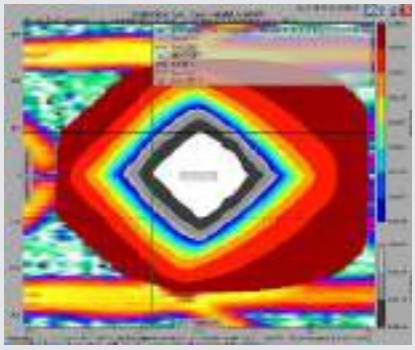


lane 7

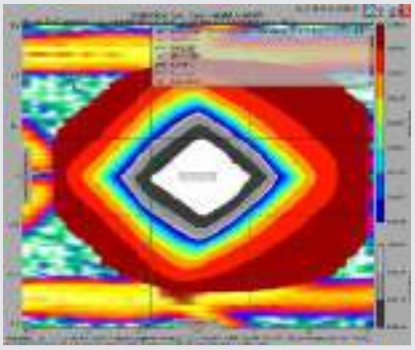


Eyescope Diagrams / JBOF x4 / slot 3

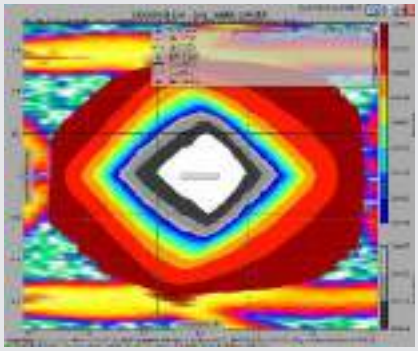
lane 8



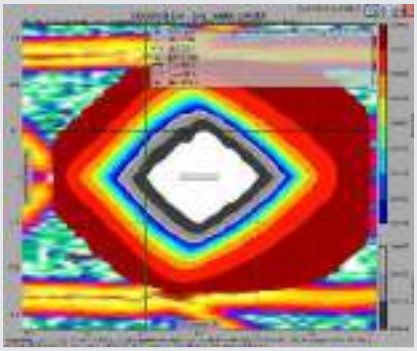
lane 9



lane 10

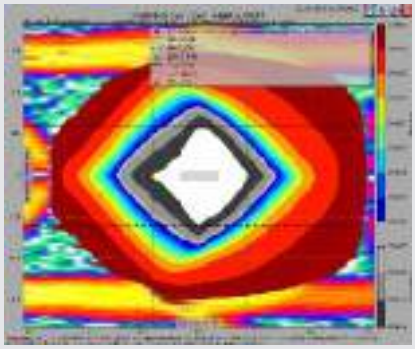


lane 11

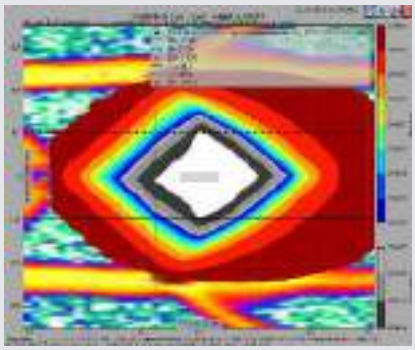


Eyescope Diagrams / JBOF x4 / slot 4

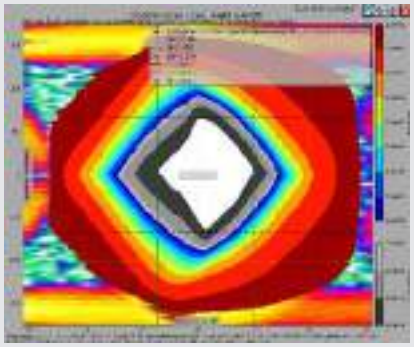
lane 12



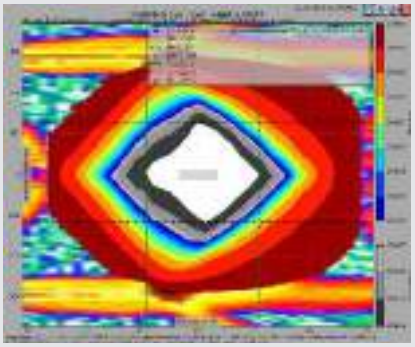
lane 13



lane 14

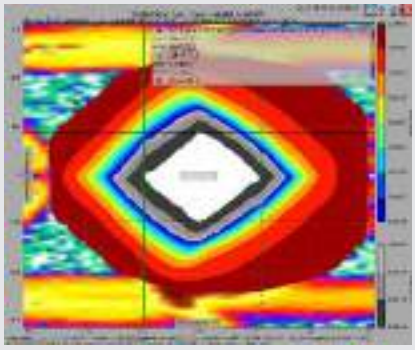


lane 15

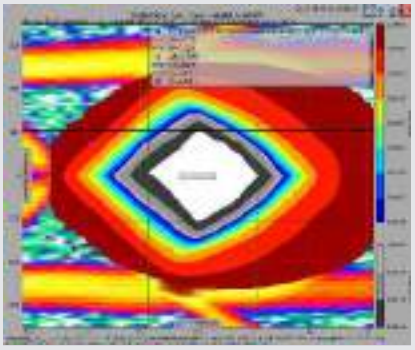


Eyescope Diagrams / JBOF x4 / slot 5

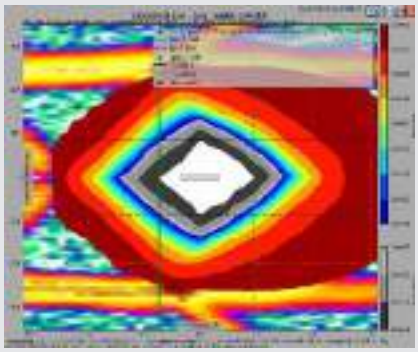
lane 16



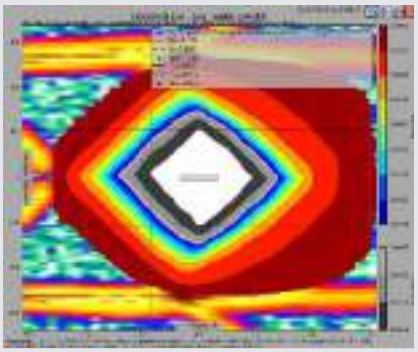
lane 17



lane 18

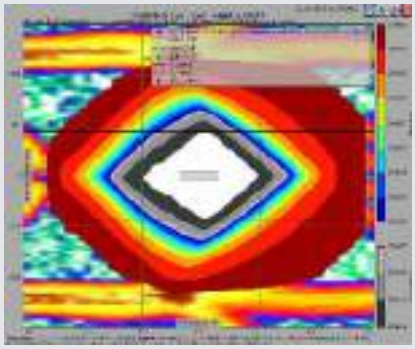


lane 19

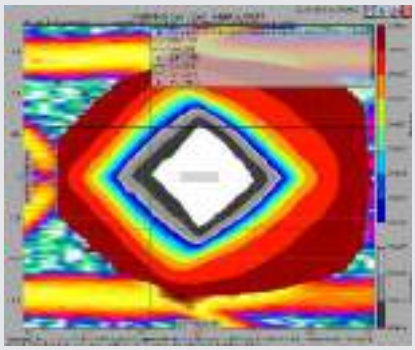


Eyescope Diagrams / JBOF x4 / slot 6

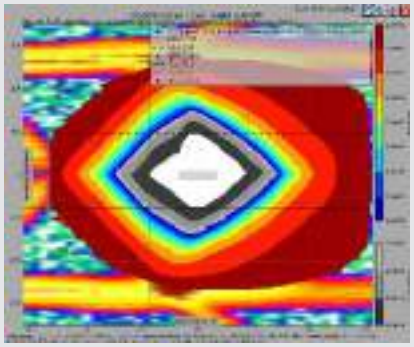
lane 20



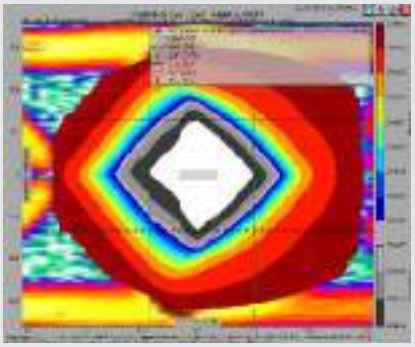
lane 21



lane 22

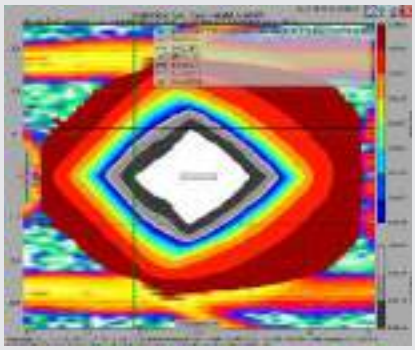


lane 23

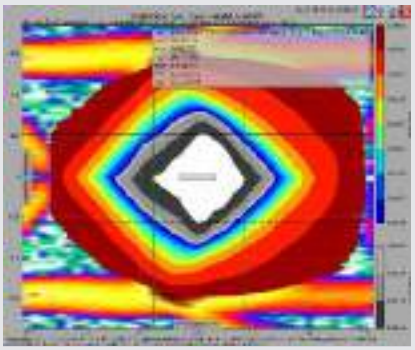


Eyescope Diagrams/ JBOF x4 / slot 7

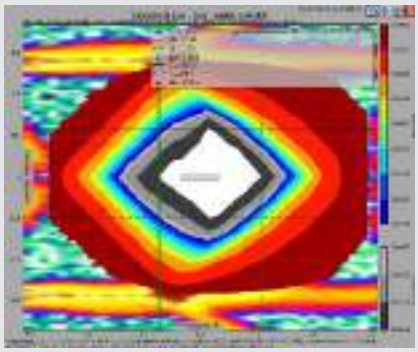
lane 24



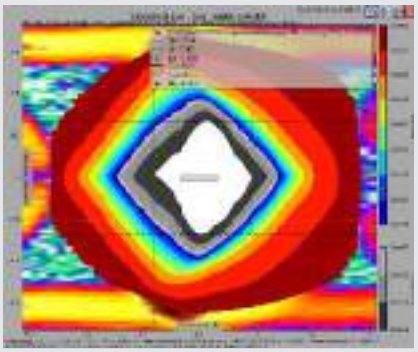
lane 25



lane 26

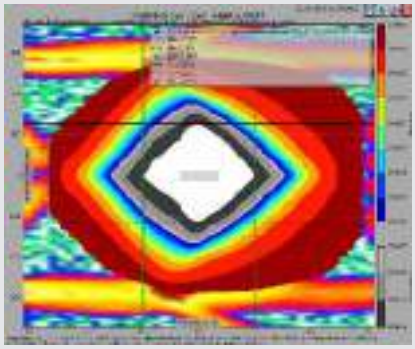


lane 27

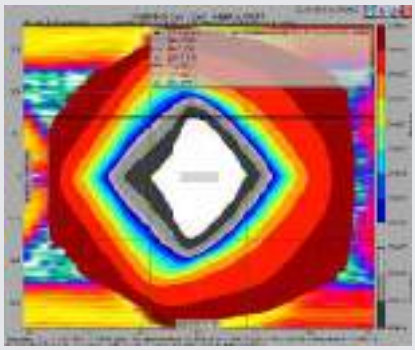


Eyescope Diagrams / JBOF x4 / slot 8

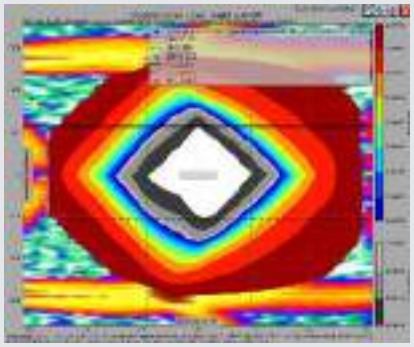
lane 28



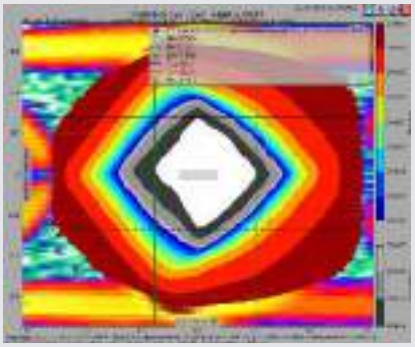
lane 29



lane 30

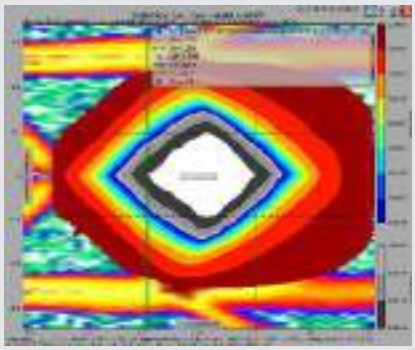


lane 31

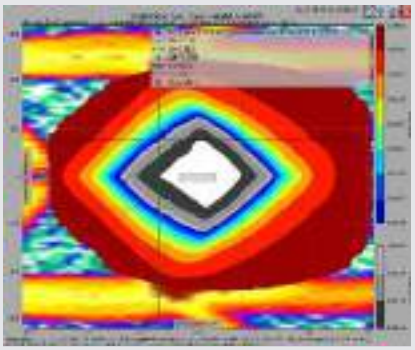


Eyescope Diagrams / JBOF x4 / slot 9

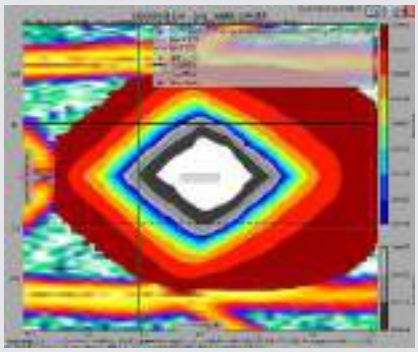
lane 32



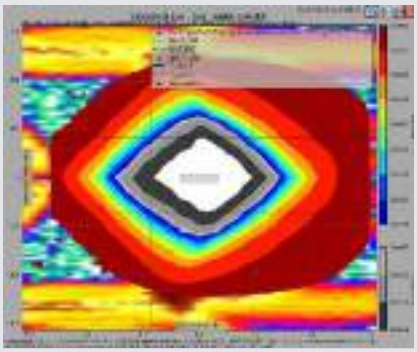
lane 33



lane 34

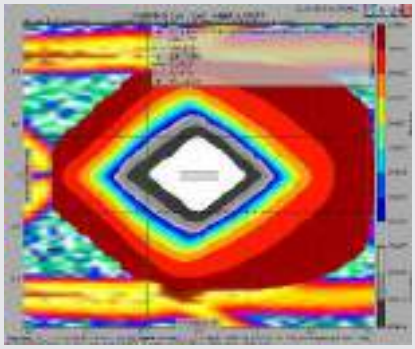


lane 35

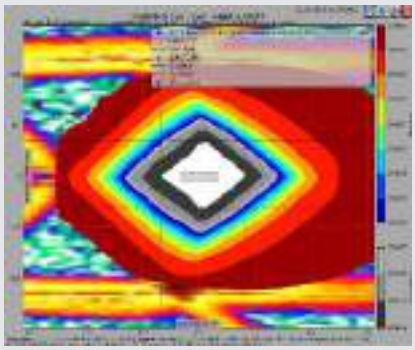


Eyescope Diagrams / JBOF x4 / slot 10

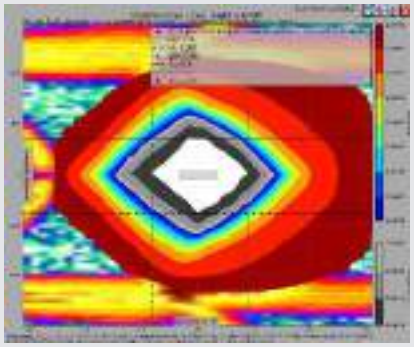
lane 36



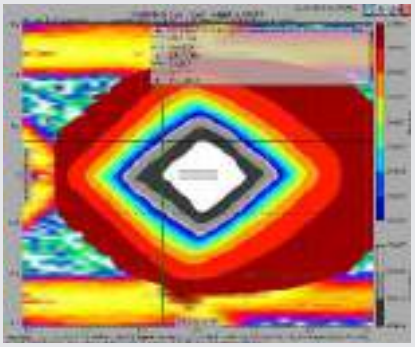
lane 37



lane 38

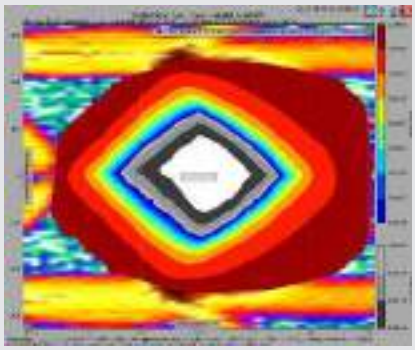


lane 39

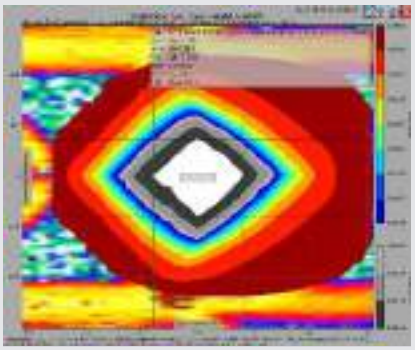


Eyescope Diagrams / JBOF x4 / slot 11

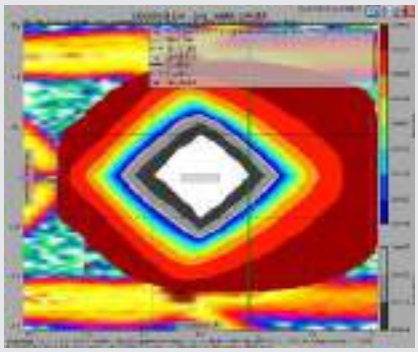
lane 40



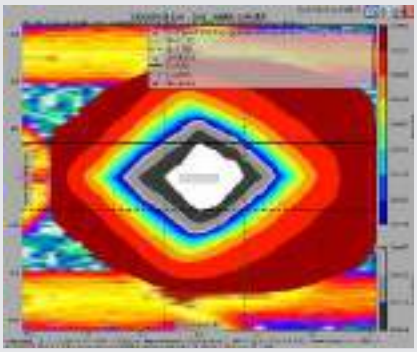
lane 41



lane 42

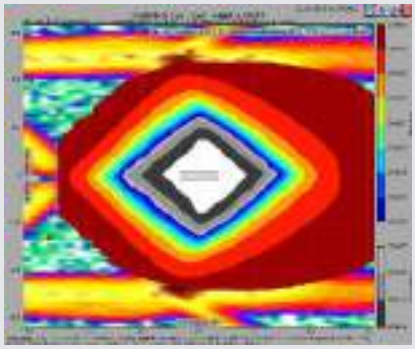


lane 43

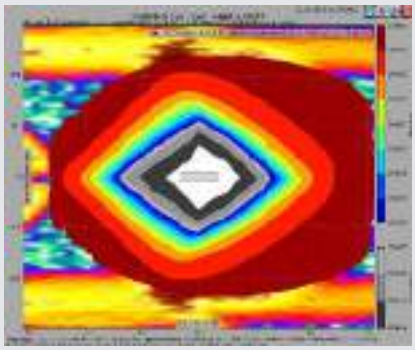


Eyescope Diagrams / JBOF x4 / slot 12

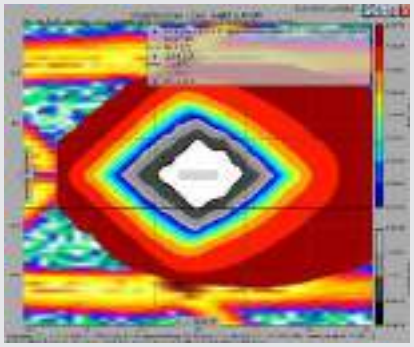
lane 44



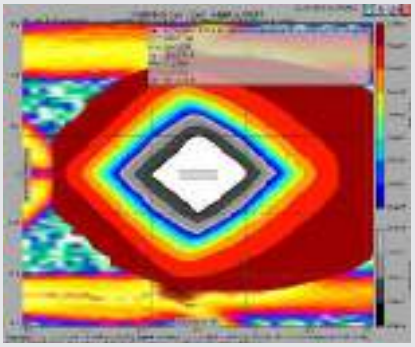
lane 45



lane 46

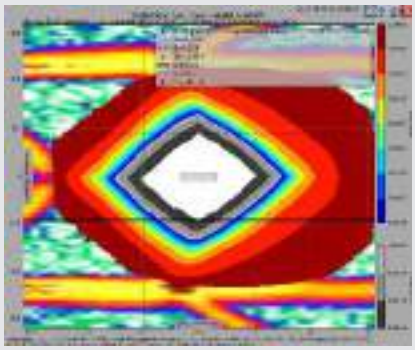


lane 47

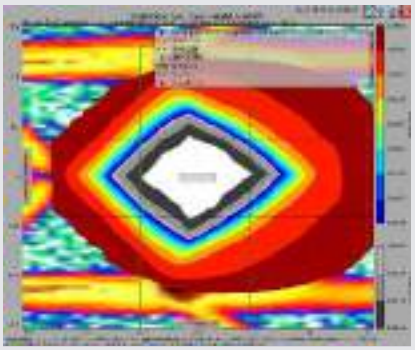


Eyescope Diagram / JBOF x4 / slot 13

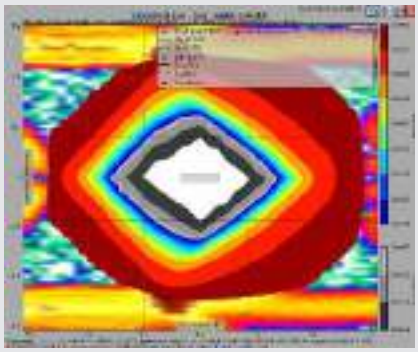
lane



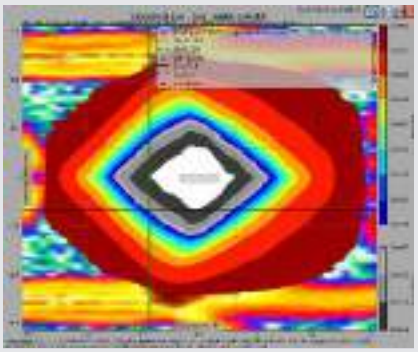
lane



lane

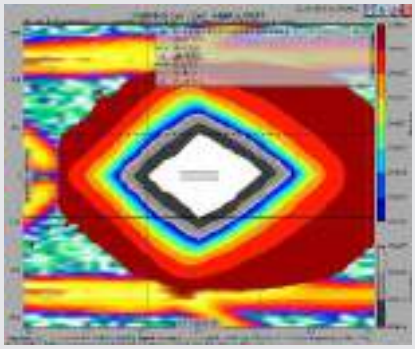


lane

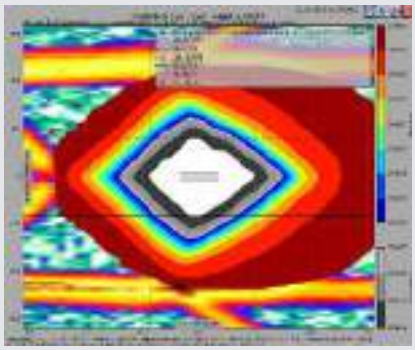


Eyescope Diagram / JBOF x4 / slot 14

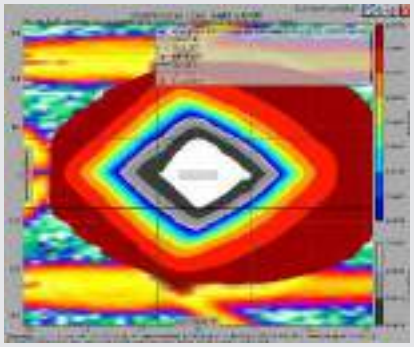
lane



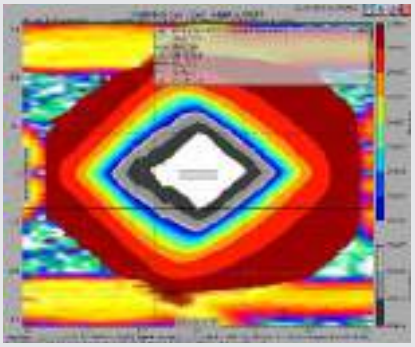
lane



lane 38

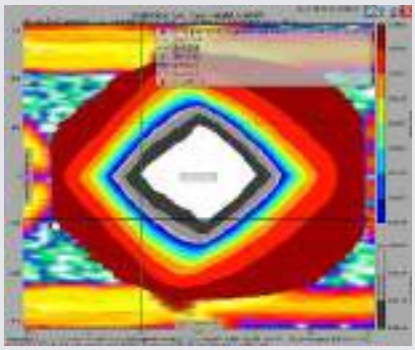


lane 39

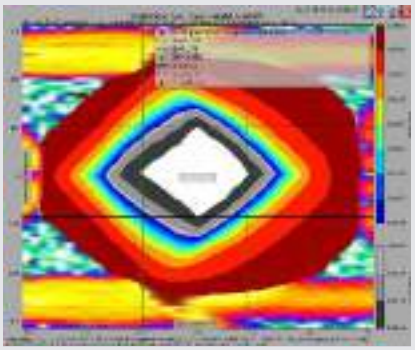


Eyescope Diagram / JBOF x4 / slot 15

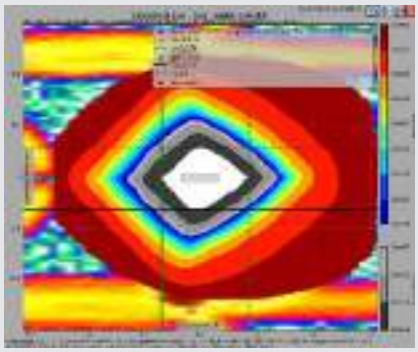
lane



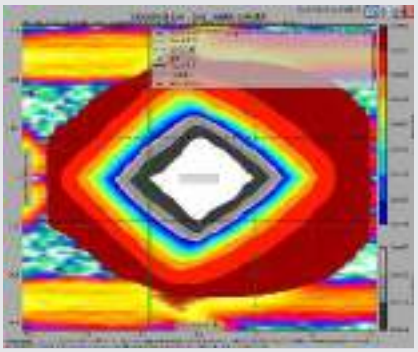
lane



lane

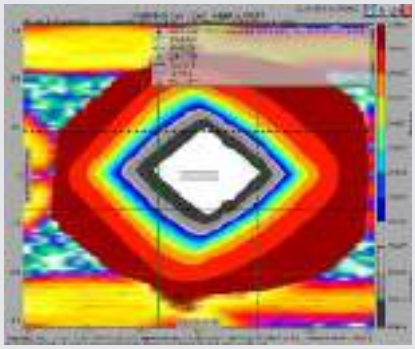


lane

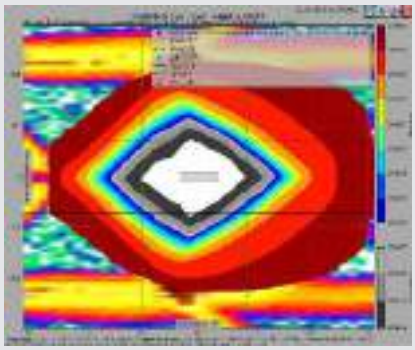


Eyescope Diagram / JBOF x4 / slot 16

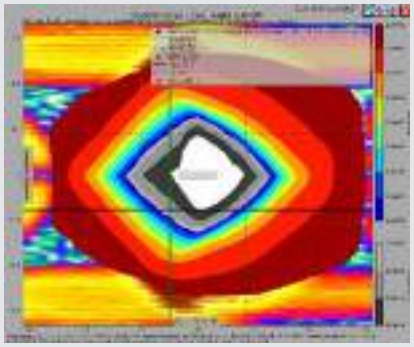
lane 28



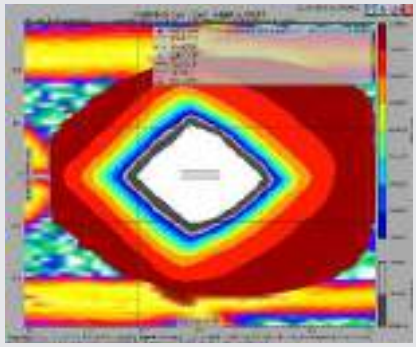
lane 29



lane 30

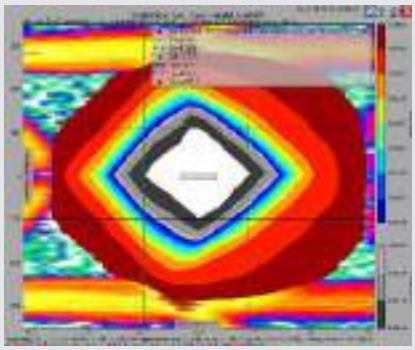


lane 31

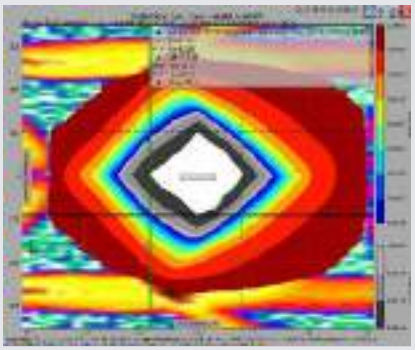


Eyescope Diagrams / JBOF x4 / slot 17

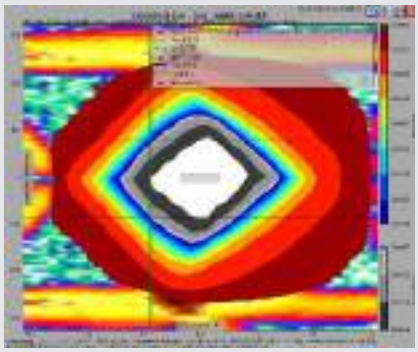
lane



lane



lane



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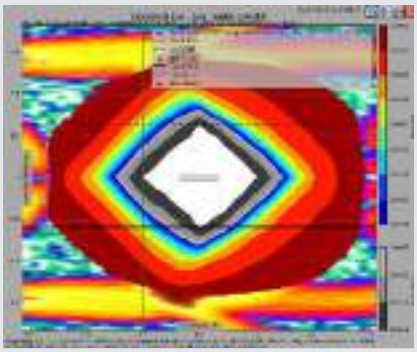
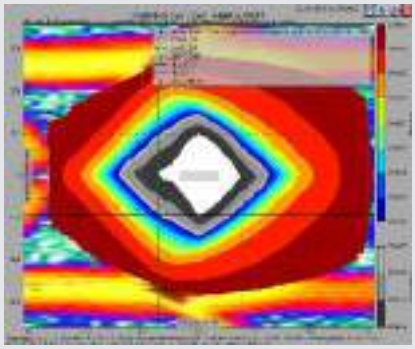
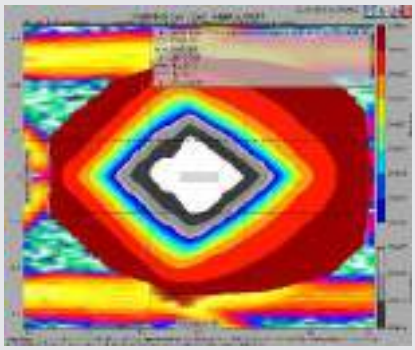


Eyescope Diagrams / JBOF x4 / slot 18

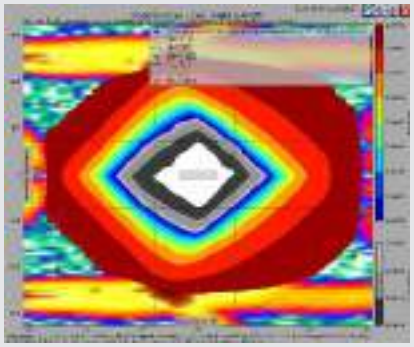
lane



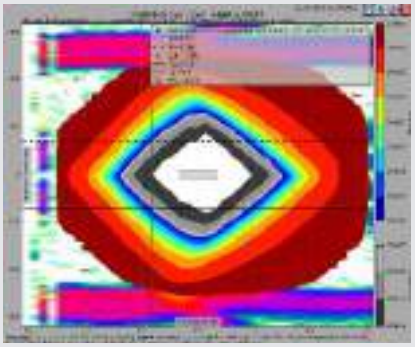
lane



lane

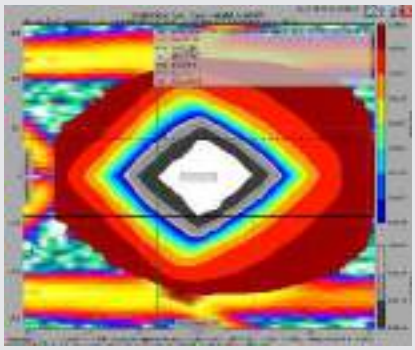


lane

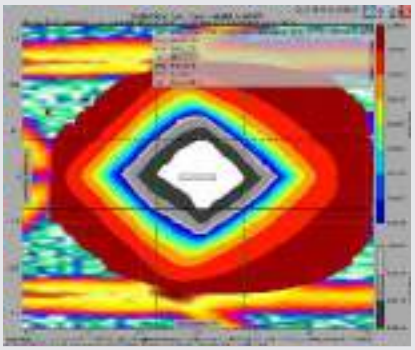


Eyescope Diagrams / JBOF x4 / slot 19

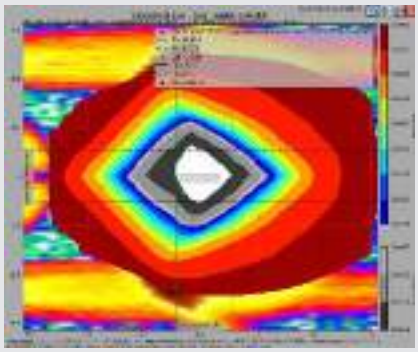
lane



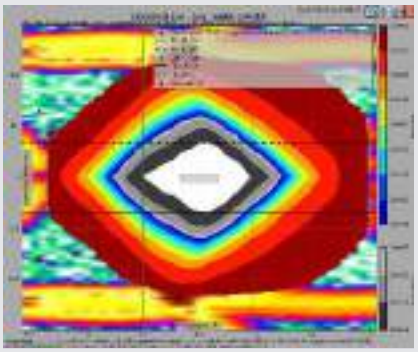
lane



lane

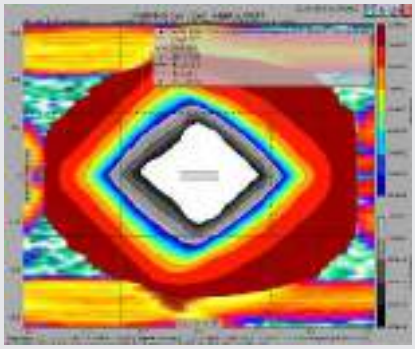


lane

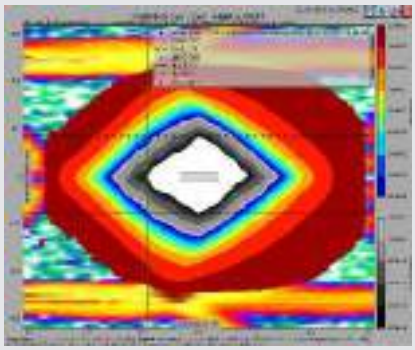


Eyescope Diagram / JBOF x4 / slot 20

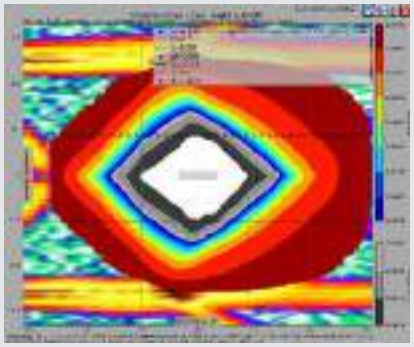
lane



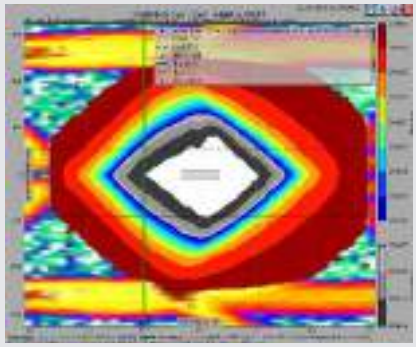
lane



lane 30

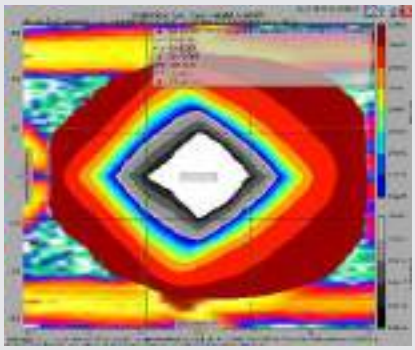


lane 31

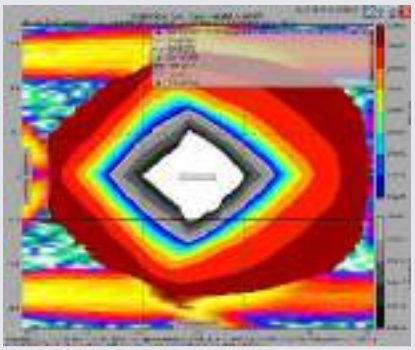


Eyescope Diagrams / JBOF x4 / slot 21

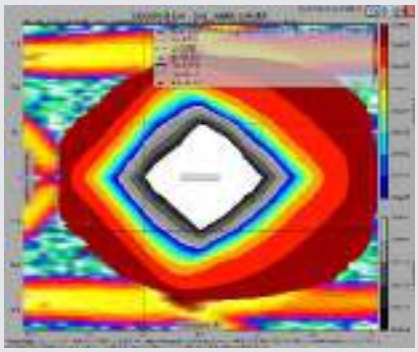
lane



lane



lane



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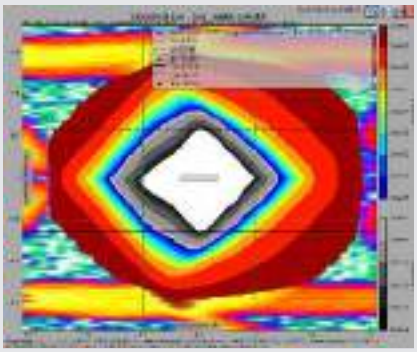
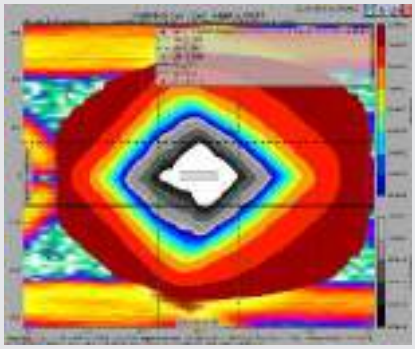
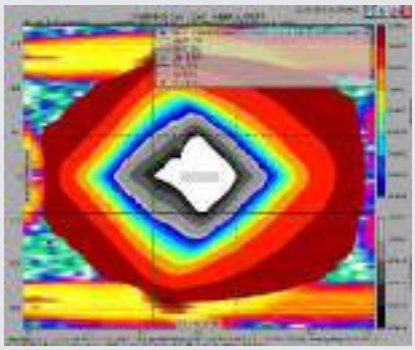


Eyescope Diagrams / JBOF x4 / slot 22

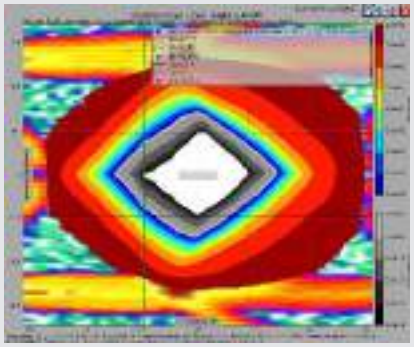
lane



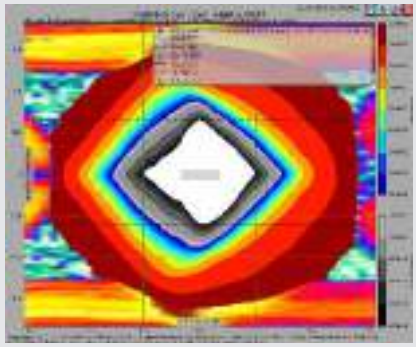
lane



lane

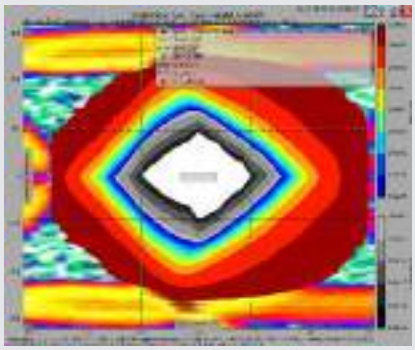


lane

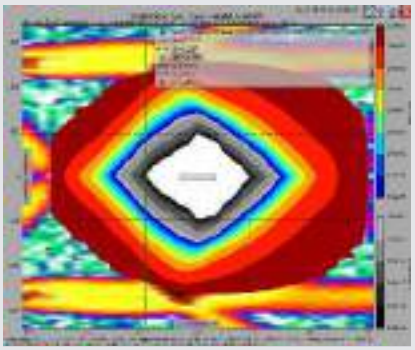


Eyescope Diagrams / JBOF x4 / slot 23

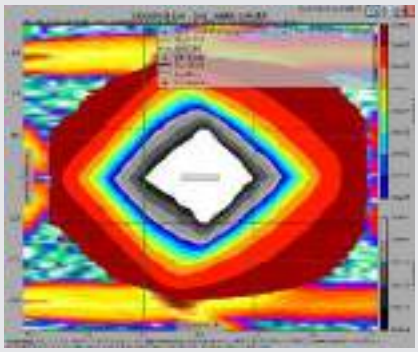
lane



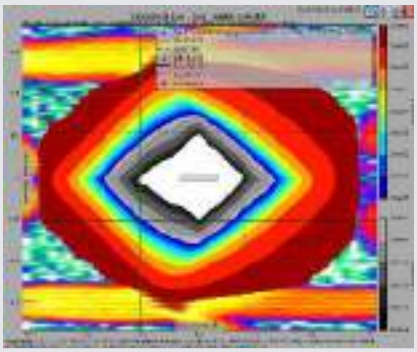
lane



lane

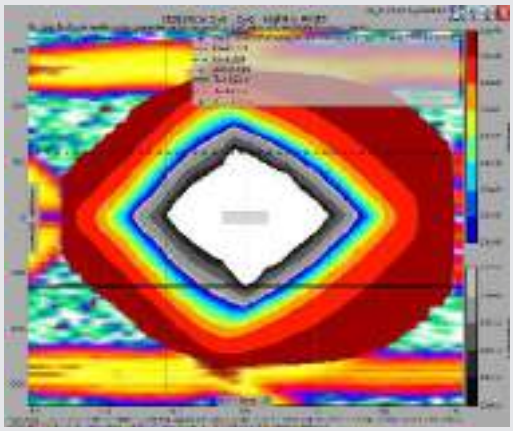


lane

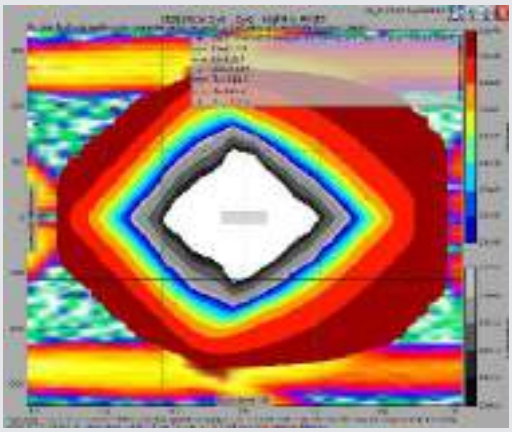


Eyescope Diagrams / JBOF x4 / slot 24

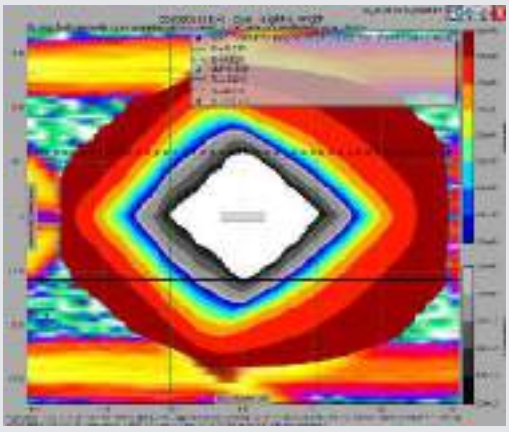
lane



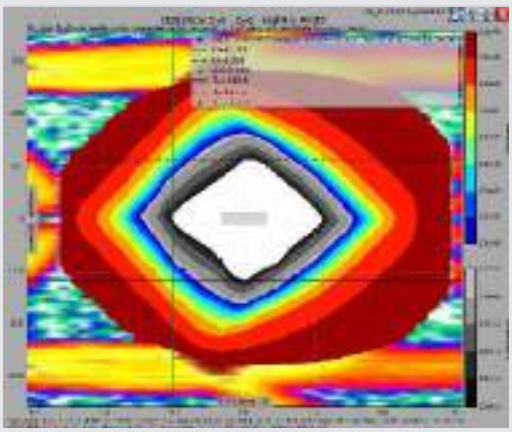
lane



lane

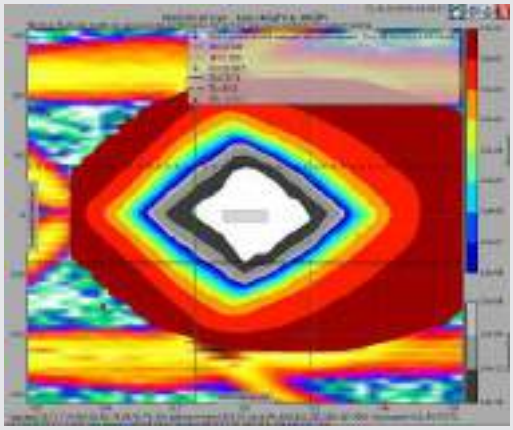


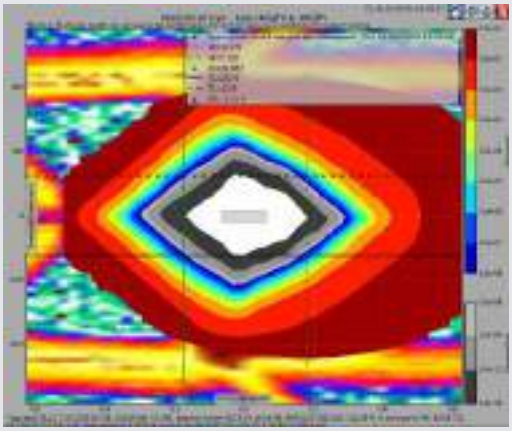
lane



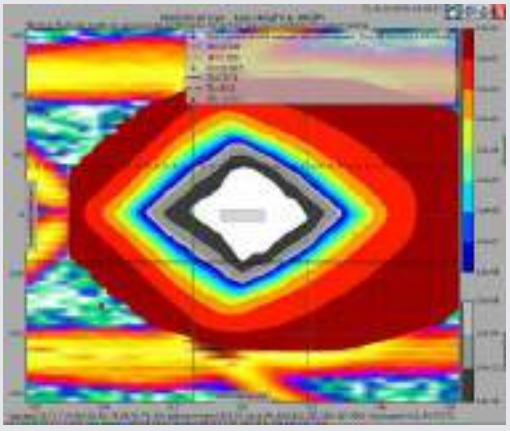
b.2 P5-2425-D Slot 1-24

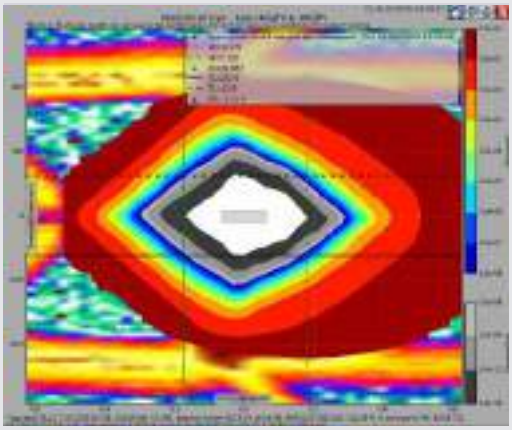
JBOF 2x2 / slot 1 / Top Controller



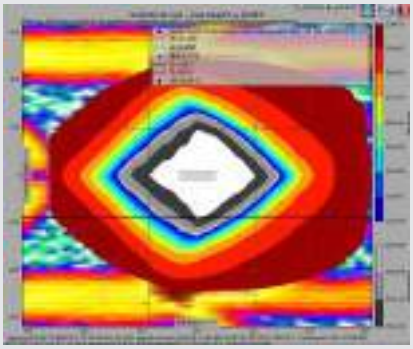


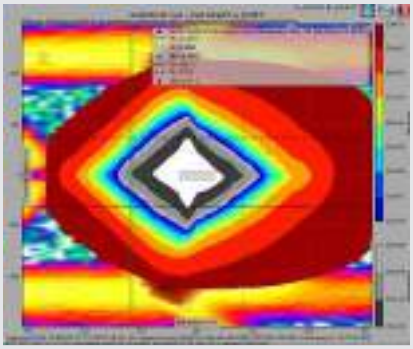
JBOF 2x2 / slot 1 / Bottom Controller



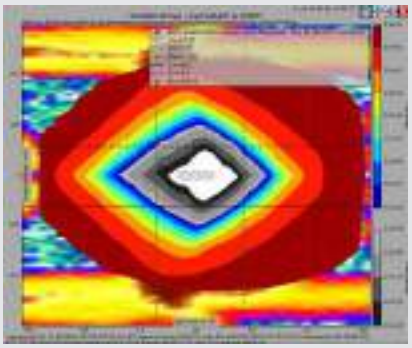


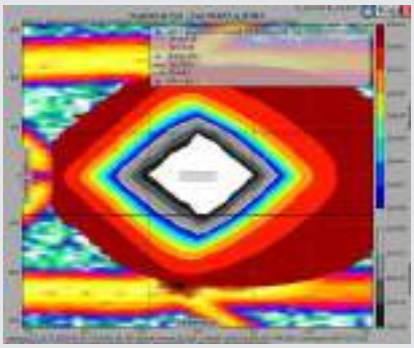
JBOF 2x2 / slot 2 / Top Controller



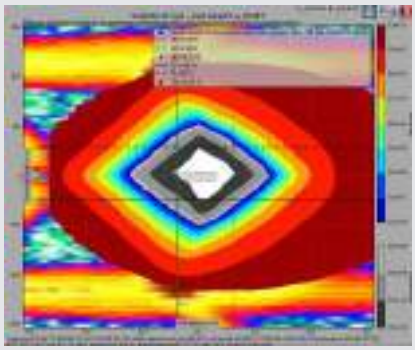


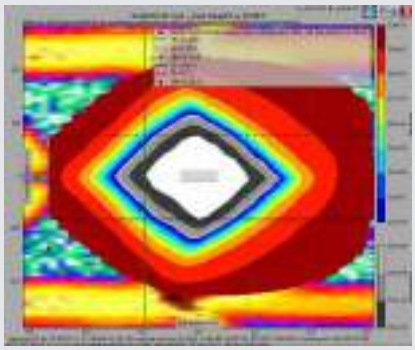
JBOF 2x2 / slot 2 / Bottom Controller



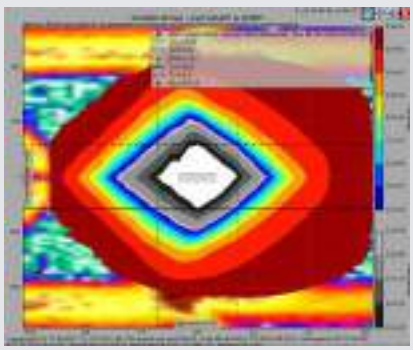


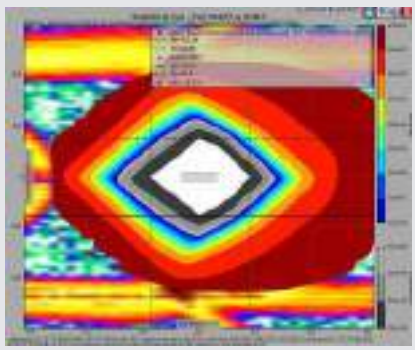
JBOF 2x2 / slot 3 / Top Controller



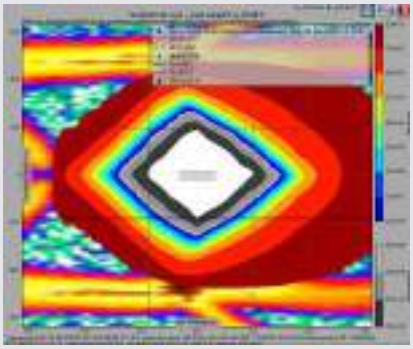


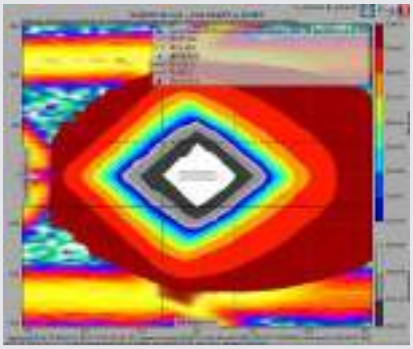
JBOF 2x2 / slot 3 / Bottom Controller



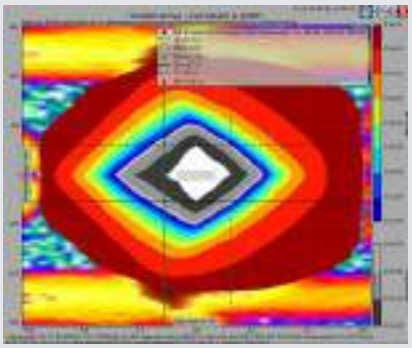


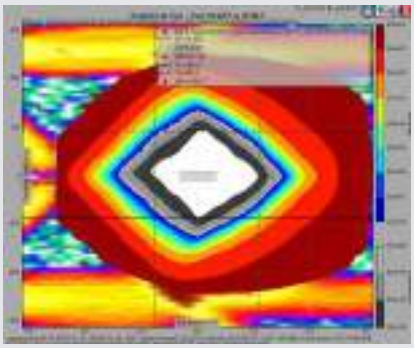
JBOF 2x2 / slot 4 / Top Controller



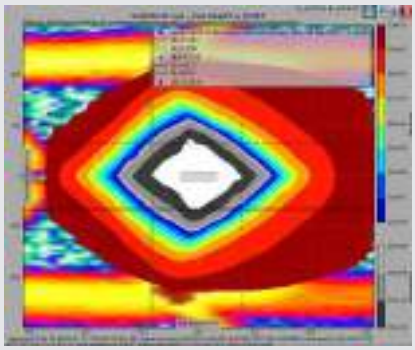


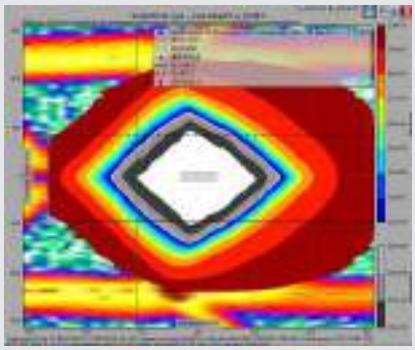
JBOF 2x2 / slot 4 / Bottom Controller



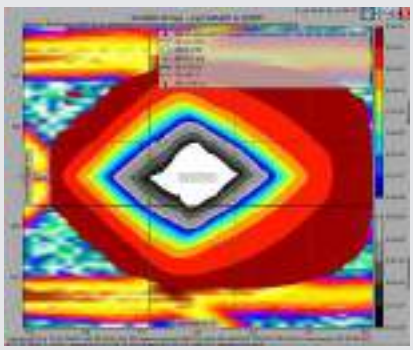


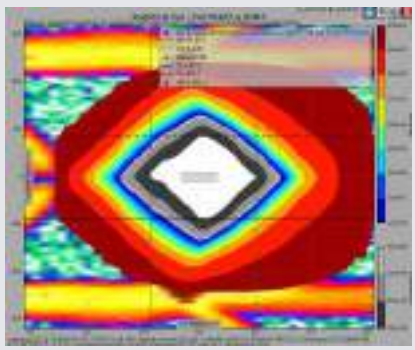
JBOF 2x2 / slot 5 / Top Controller



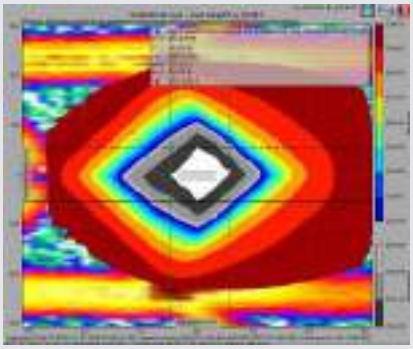


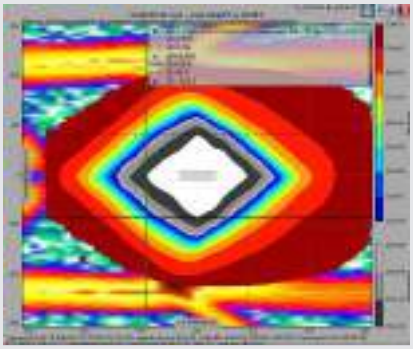
JBOF 2x2 / slot 5 / Bottom Controller



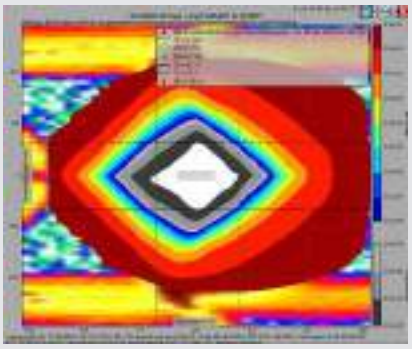


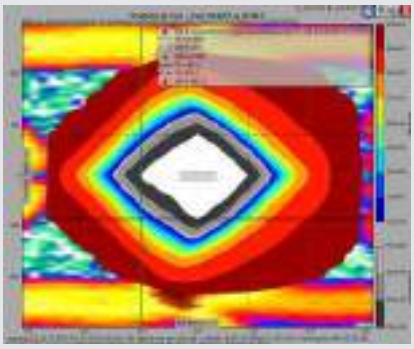
JBOF 2x2 / slot 6 / Top Controller



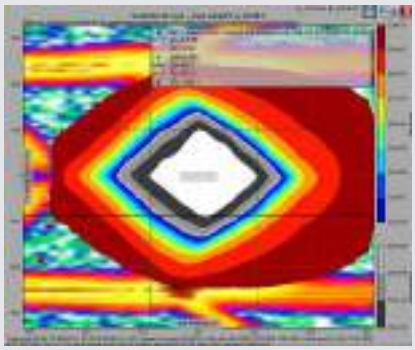


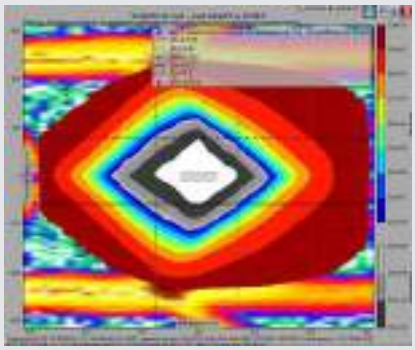
JBOF 2x2 / slot 6 / Bottom Controller



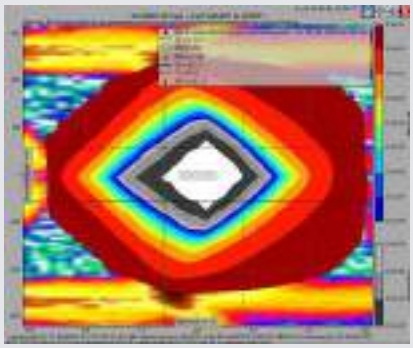


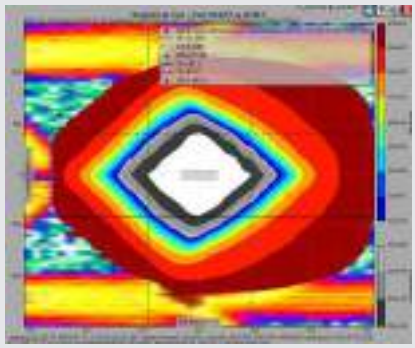
JBOF 2x2 / slot 7 / Top Controller



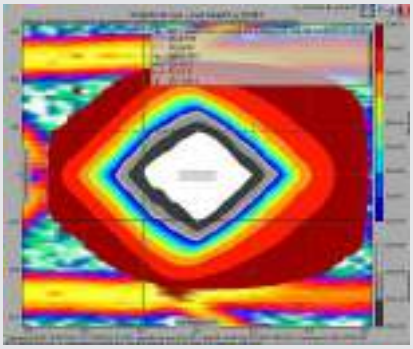


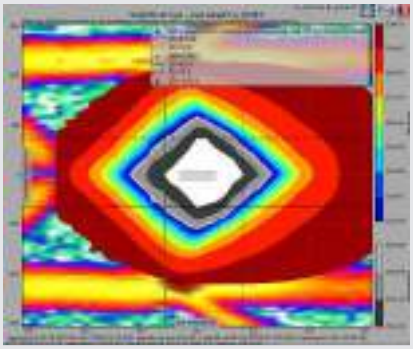
JBOF 2x2 / slot 7 / Bottom Controller



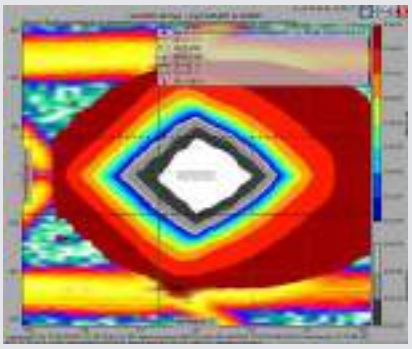


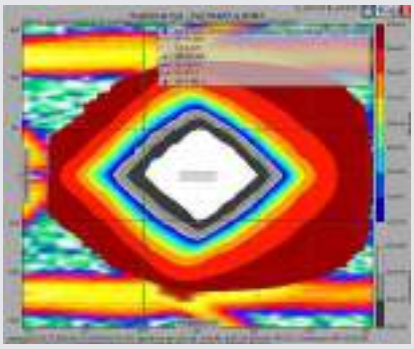
JBOF 2x2 / slot 8 / Top Controller



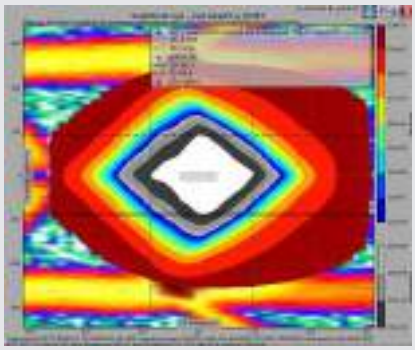


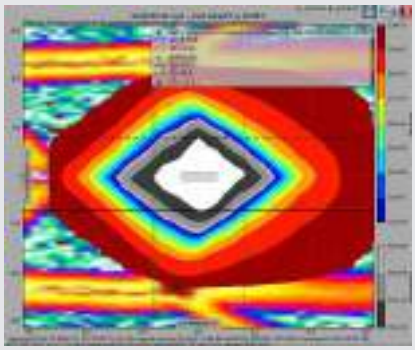
JBOF 2x2 / slot 8 / Bottom Controller



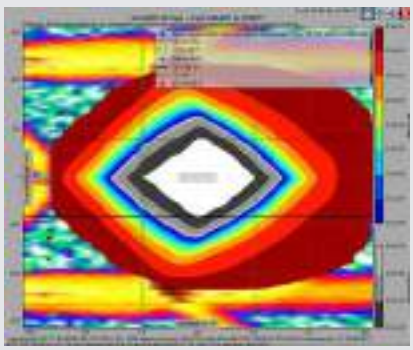


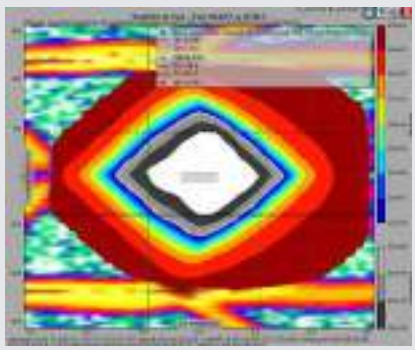
JBOF 2x2 / slot 9 / Top Controller



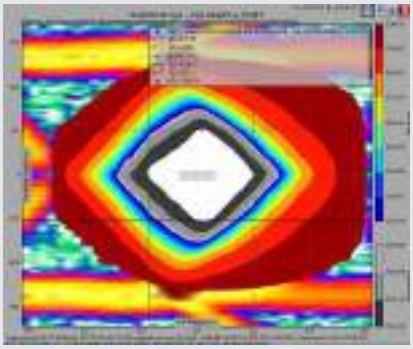


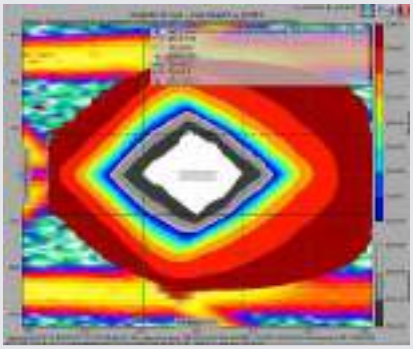
JBOF 2x2 / slot 9 / Bottom Controller



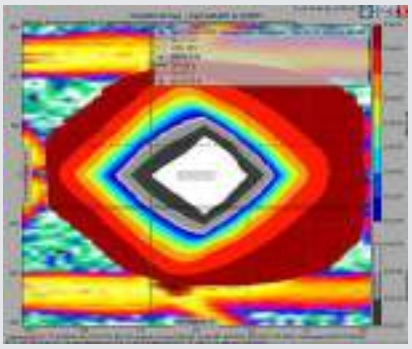


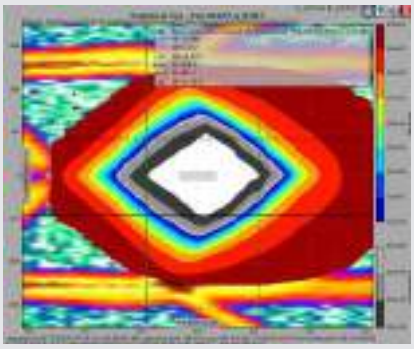
JBOF 2x2 / slot 10 / Top Controller



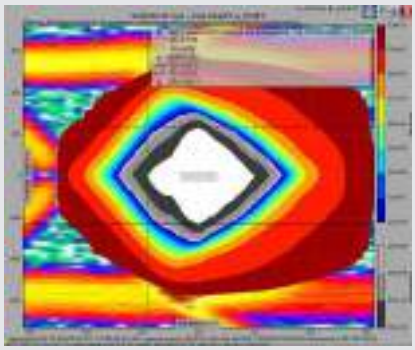


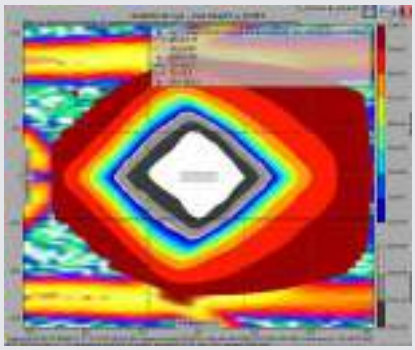
JBOF 2x2 / slot 10 / Bottom Controller



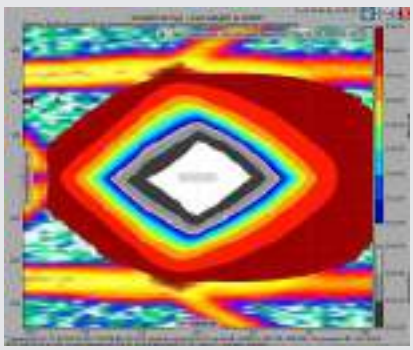


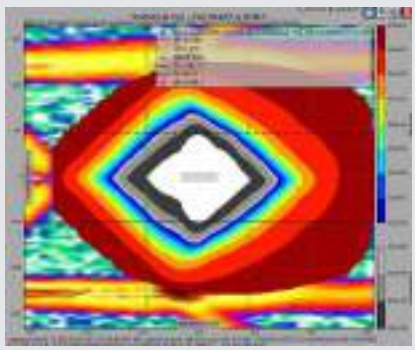
JBOF 2x2 / slot 11 / Top Controller



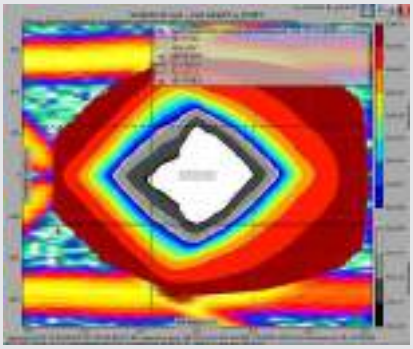
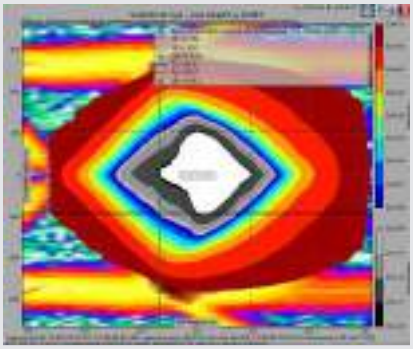


JBOF 2x2 / slot 11 / Bottom Controller

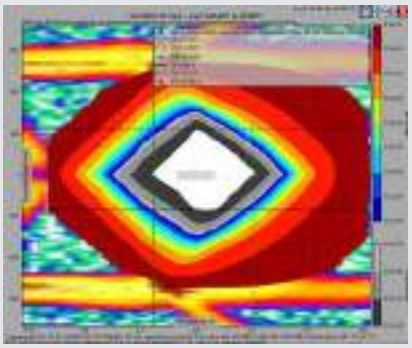
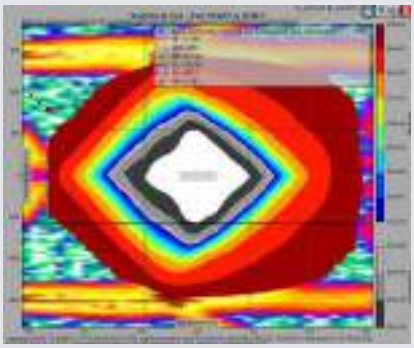




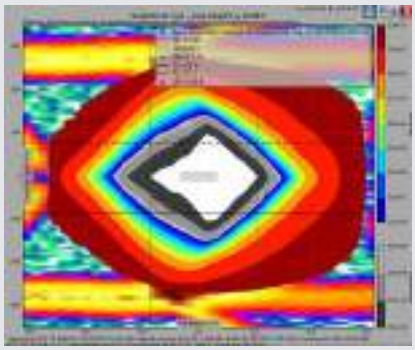
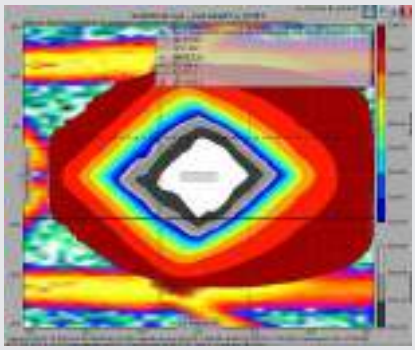
JBOF 2x2 / slot 12 / Top Controller

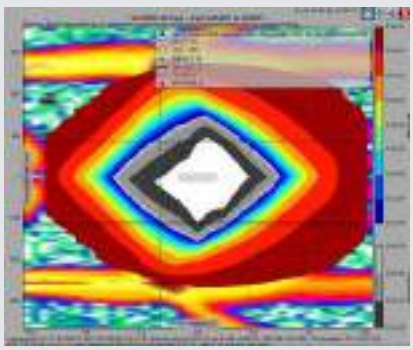
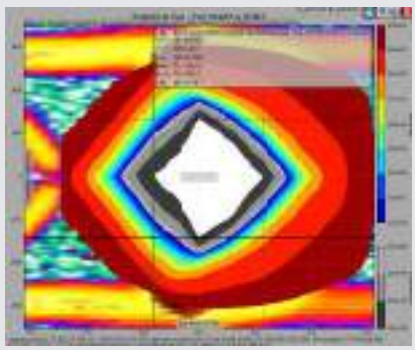
JBOF 2x2 / slot 12 / Bottom Controller

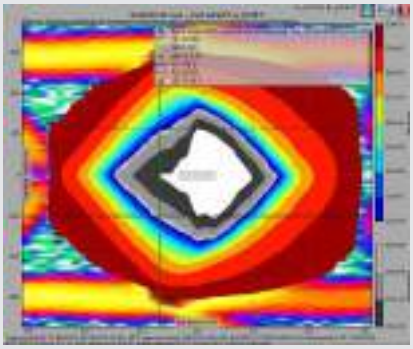
JBOF 2x2 / slot 13 / Top Controller

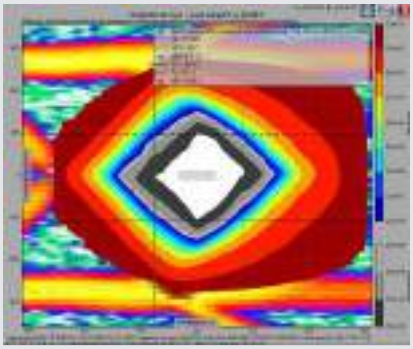



JBOF 2x2 / slot 13 / Bottom Controller

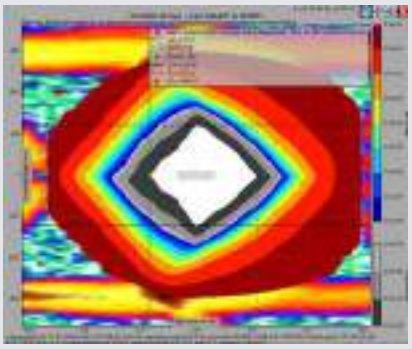



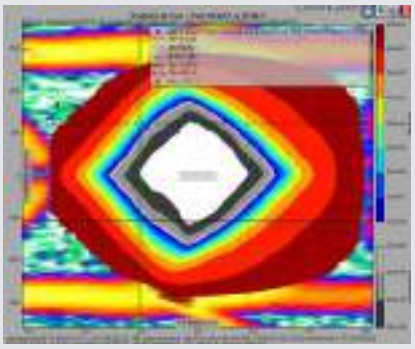
JBOF 2x2 / slot 14 / Top Controller



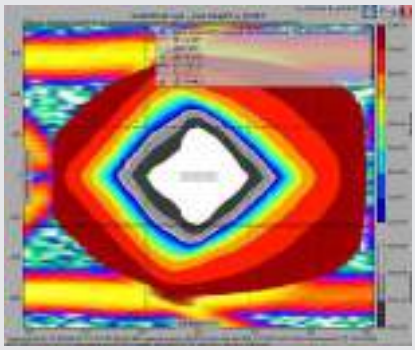


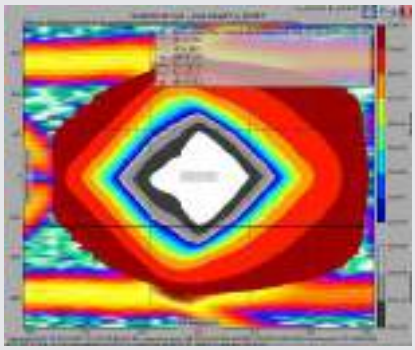
JBOF 2x2 / slot 14 / Bottom Controller



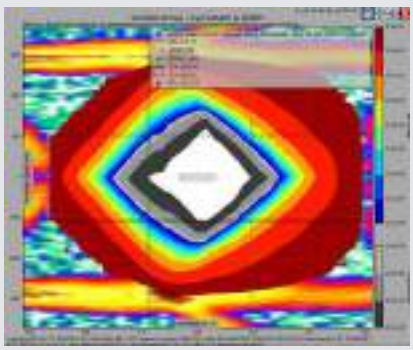


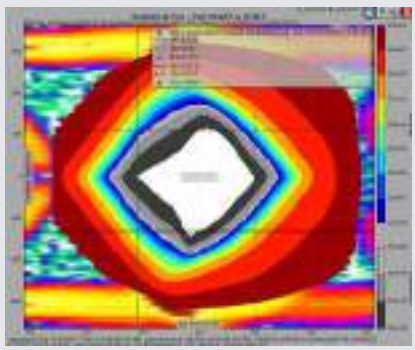
JBOF 2x2 / slot 15 / Top Controller



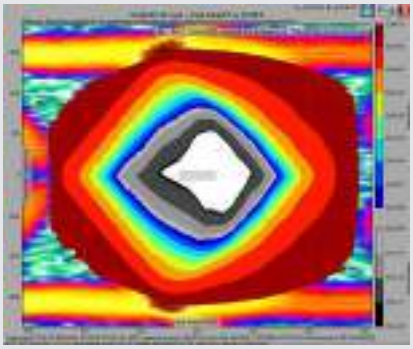


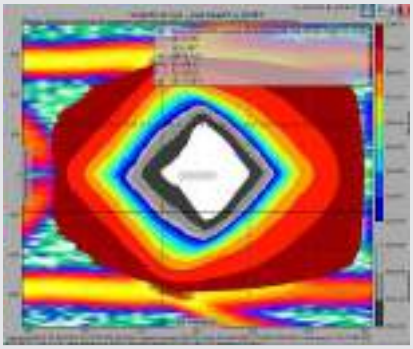
JBOF 2x2 / slot 15 / Bottom Controller



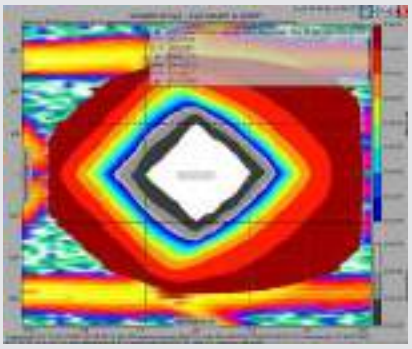


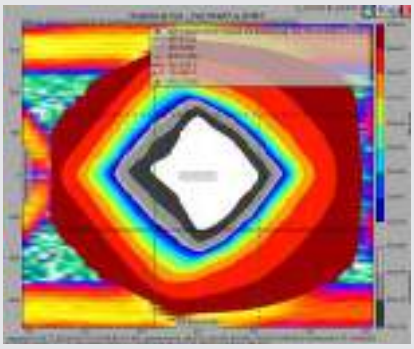
JBOF 2x2 / slot 16 / Top Controller



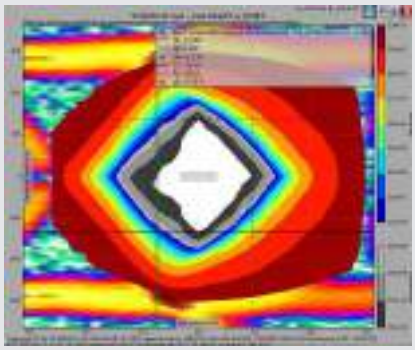


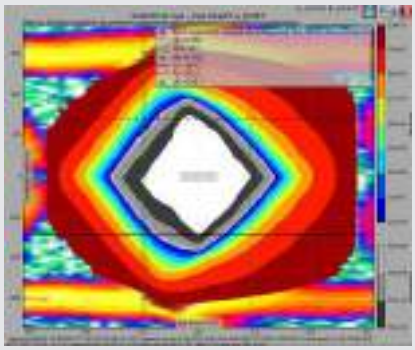
JBOF 2x2 / slot 16 / Bottom Controller



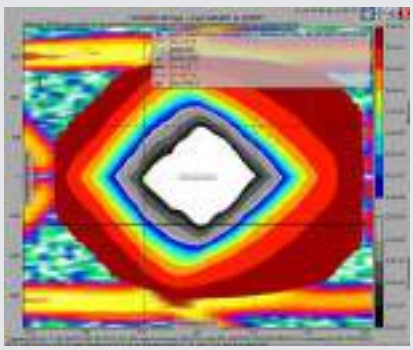


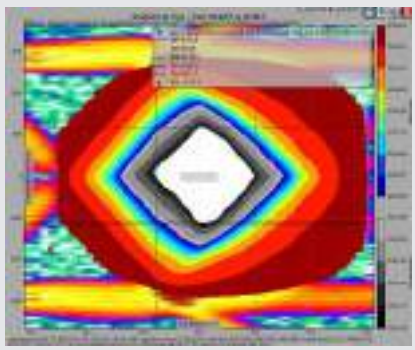
JBOF 2x2 / slot 17 / Top Controller



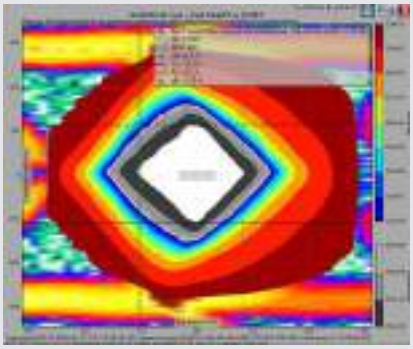


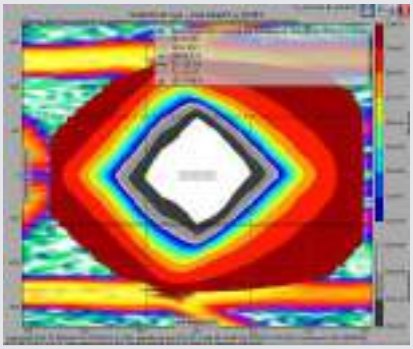
JBOF 2x2 / slot 17 / Bottom Controller



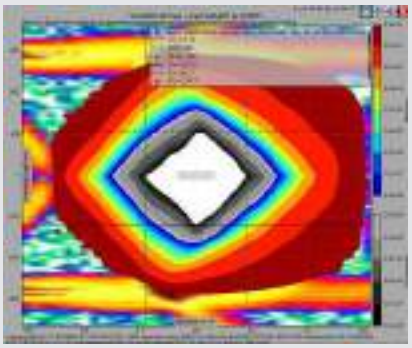


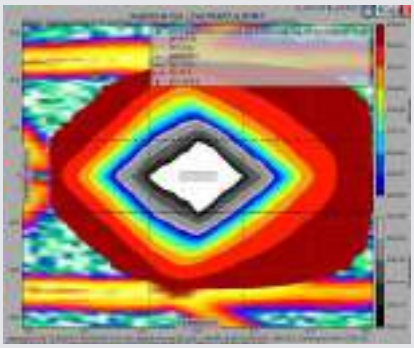
JBOF 2x2 / slot 18 / Top Controller



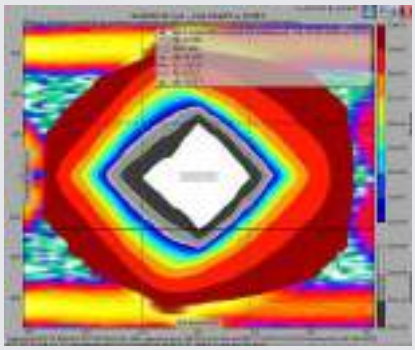


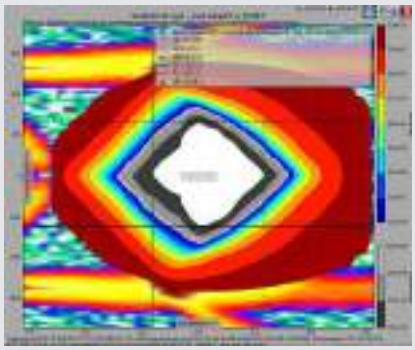
JBOF 2x2 / slot 18 / Bottom Controller



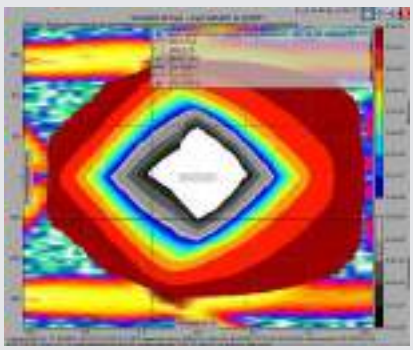


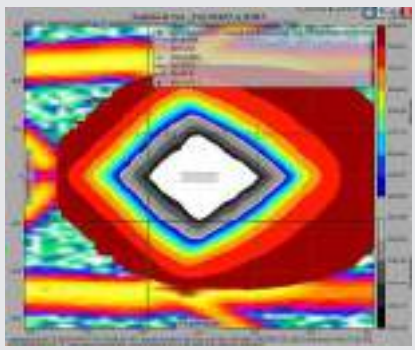
JBOF 2x2 / slot 19 / Top Controller



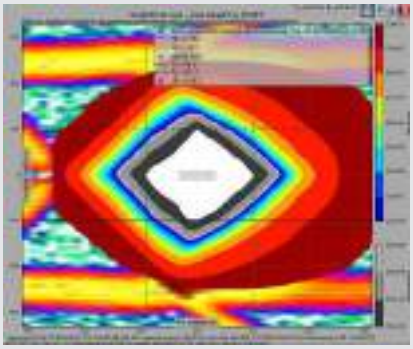


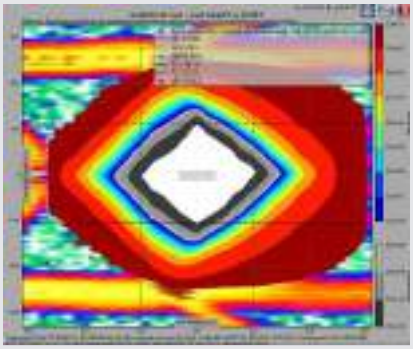
JBOF 2x2 / slot 19 / Bottom Controller



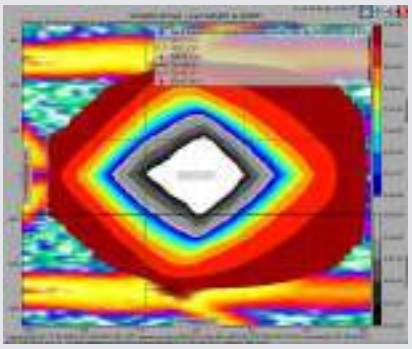


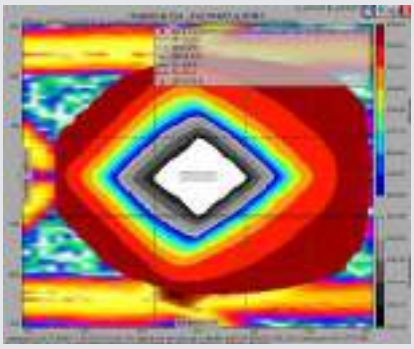
JBOF 2x2 / slot 20 / Top Controller



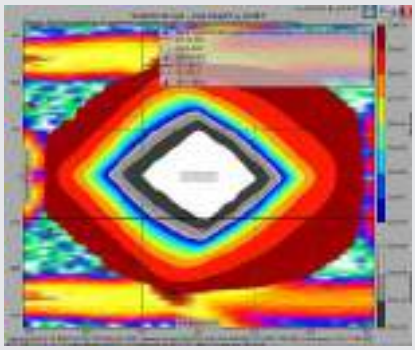


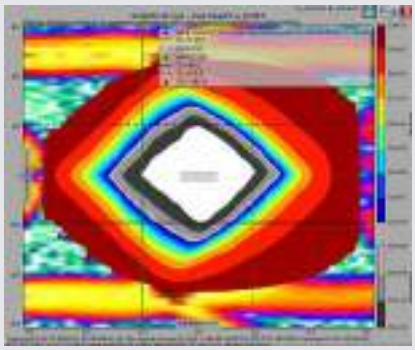
JBOF 2x2 / slot 20 / Bottom Controller



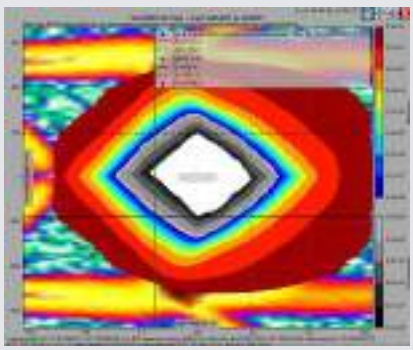


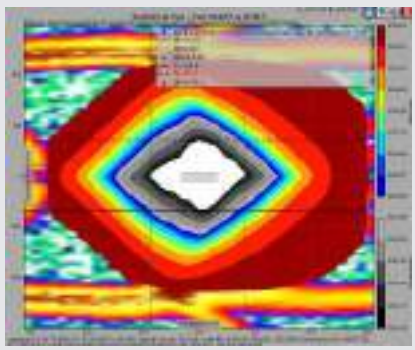
JBOF 2x2 / slot 21 / Top Controller



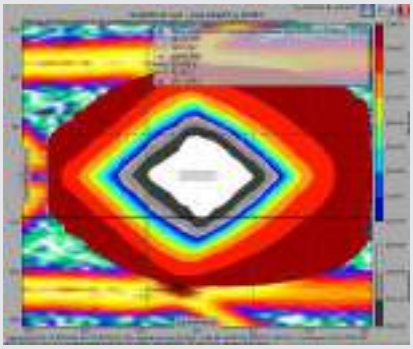


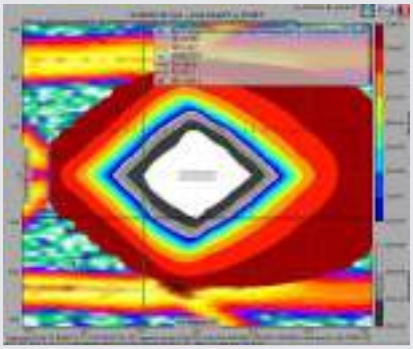
JBOF 2x2 / slot 21 / Bottom Controller



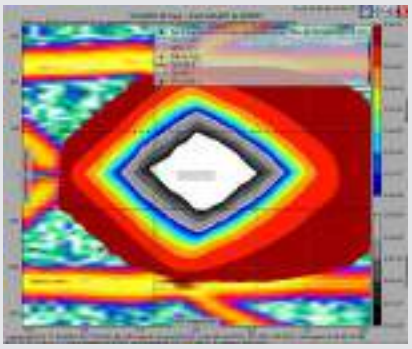


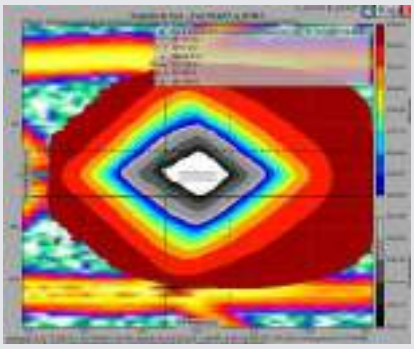
JBOF 2x2 / slot 22 / Top Controller



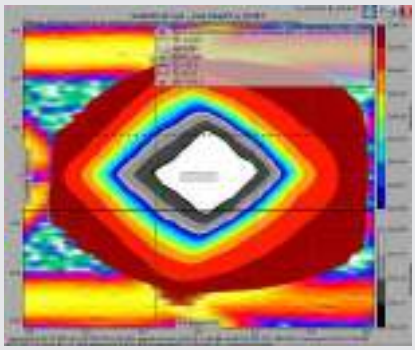


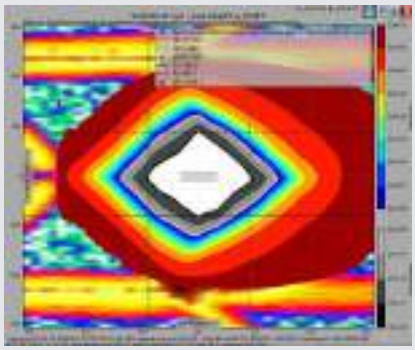
JBOF 2x2 / slot 22 / Bottom Controller



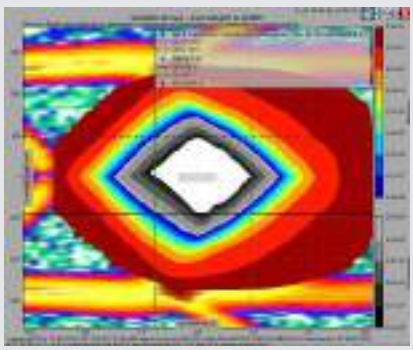


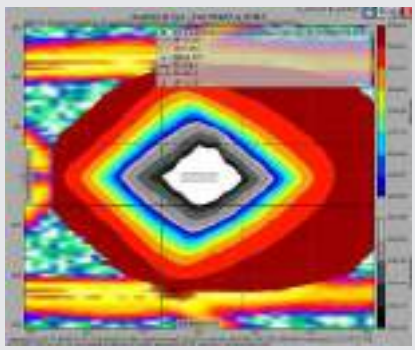
JBOF 2x2 / slot 23 / Top Controller



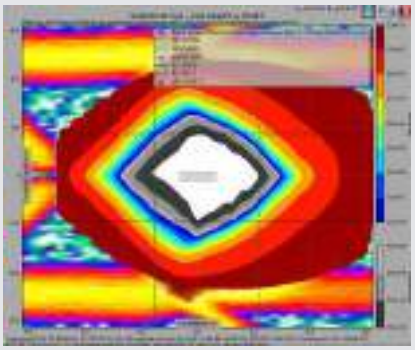


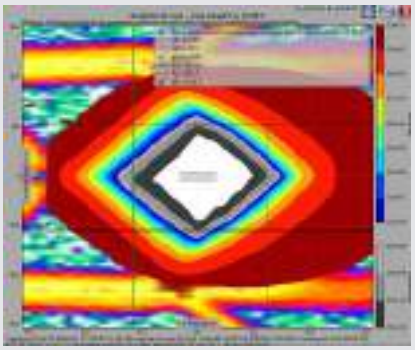
JBOF 2x2 / slot 23 / Bottom Controller





JBOF 2x2 / slot 24 / Top Controller





JBOF 2x2 / slot 24 / Bottom Controller