RJ-472-08 USER GUIDE

Version 1.0

2023/2/24

1 Table of Contents

2 Introduction

2.1 Overview

In-Win's RJ-472-08 typically refers to a JBOD enclosure that is designed to support a large number of drives in a relatively small space, thereby achieving a high storage density. RJ-472-08 is often used in data centers and other environments where there is a need for large amounts of storage in a compact form factor.

RJ-472-08 JBOD System is a high performance, reliable storage system with sensors to monitor system health and high-density 4U 72-bay (hot-swappable 3.5-inch drive bays) enclosure and supports SAS3 and SATA3 interfaces. We provide state-of-the-art management functionality for users to monitor and manage JBOD systems efficiently and flexibly. Users can manage JBOD systems through serial port and/or Ethernet according to the system configuration on the system.

RJ-472-08 redundancy can be achieved in several ways, including:

- Redundant Power Supplies: be equipped with two power supplies, which are connected in such a way that if one power supply fails, the other(s) will continue to power the system.
- Redundant Fans: to ensure proper cooling of the drives and other components, RJ-472-08 has been equipped with multiple fans. If one fan fails, the other(s) can continue to provide cooling.
- Redundant Expanders: provide failover in the event of a expander failure.
- Redundant Data Paths: multiple data paths may be available, which can help ensure data availability in the event of a path failure.

By implementing redundant features, RJ-472-08 can provide a higher level of availability and reduce the risk of data loss due to hardware failure and be configured with optional dual-port 12Gb/s SAS3 expansion modules for additional connectivity

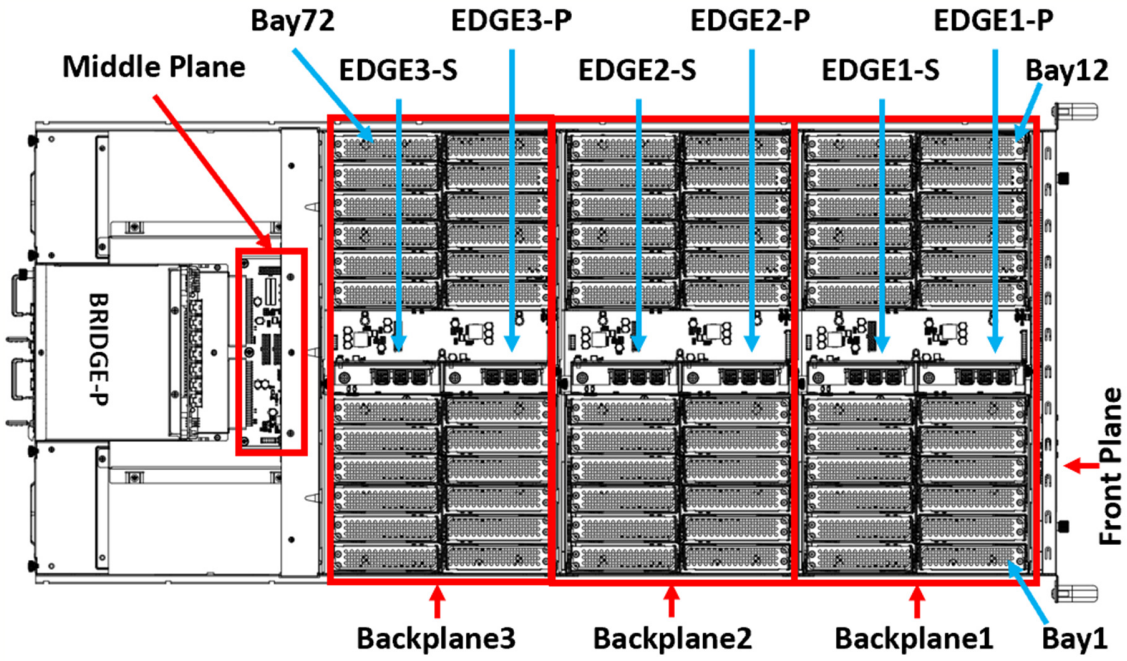

FIGURE 1 RJ-472-08 INTERNAL BACKPLANES

Figure 1 depicts the internal boards system. The backplanes, front panel and power suppliers are shared by primary (BRIDGE-P, EDGE1-P, EDGE2-P and EDGE3-P) and secondary domain (BRIDGE-S, EDGE1-S, EDGE2-S and EDGE3-S). The secondary domain is optional for redundant applications.

2.2 Key Features

- Reliable High Data Rate Support (up to 12Gbps)
  - SAS3 12Gbps support and SATA3 6Gbps support to provide a reliable high-performance data rate.
- Dual SAS3 Domain Support
  - System can accommodate dual domain expanders to support data redundancy capability.
- Power Redundancy
  - System can accommodate 2 sets of power modules as redundancy. Either power module could work independently while the peer is out of order or not selected.
- Hot-swappable Modules
  - The PSUs are hot-swappable. System can keep operating during PSU replacement.

  - The fan modules are hot-swappable. System can keep operating during fan module replacement.
  - The HDDs are hot-swappable. No need to shut down the system for HDD installation and/or replacement when needed.
- TCP/IP Network Support
  - Support ethernet 10/100/1000Mb TELNET/TFTP/HTTP network. User can use ethernet port to enter console and control the system.
- Faulty System Alarm
  - The Faulty System red LED indicator on the front panel illuminates along with a beeping sound while there is faulty part(s) in the system. The buzzing alarm can be muted by pressing the mute button on the front panel.
- Smart Fan Control
  - The fan modules possess a smart control feature set by the providing seven levels of speed RPM according to the detected system temperature.
- Zoning
  - This system support feature dividing disk drives into two or three different groups depending on the system preference. Each group can own users-configurable number of HDDs independently. This feature enables single JBOD to serve multiple hosts.
- Cascading
  - There are cascading ports for cascading another JBOD system to expand disk space when more space is required

2.3 SAS Topology

Tree topology reduces the number of cascade levels (or hops), avoiding or reducing the unfair arbitration that can affect the far-end devices in cascade topology. RJ-472-08 uses tree topology to reduce the number of cascade levels, avoiding or reducing the unfair arbitration. There are 4 expanders to extend the number of devices in a SAS domain. Bridge expander is the root and two edge expanders cascaded. Figure 2 depicts the topology.

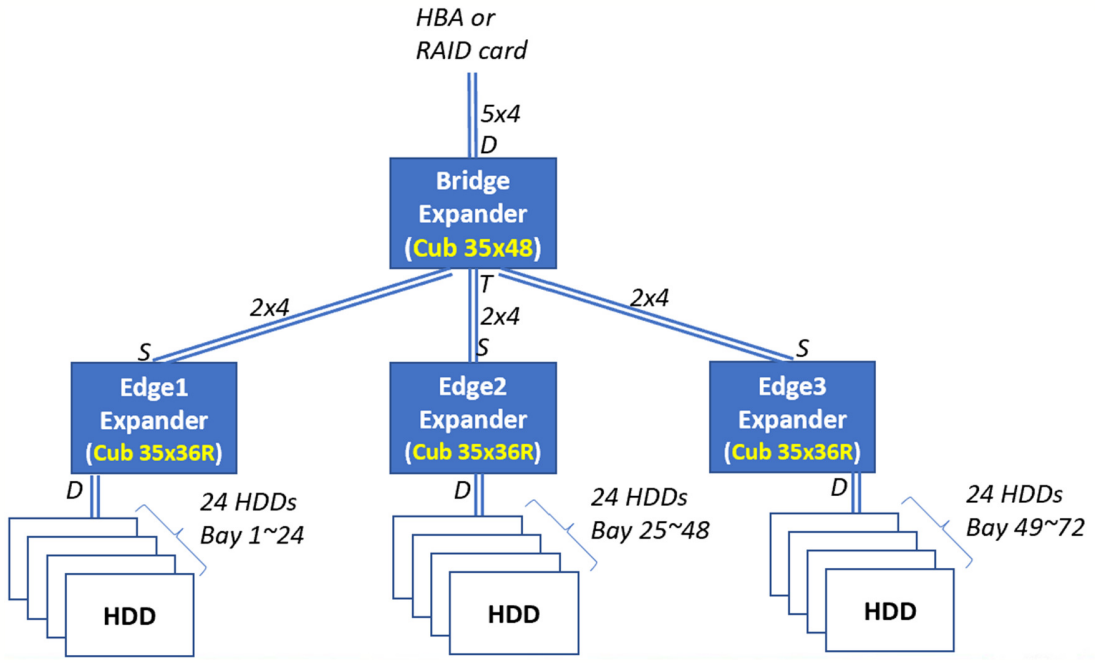

FIGURE 2 RJ-472-08 SAS TOPOLOGY

RJ-472-08 can support path redundancy applications. It constructs path-redundant topologies using multi-ported devices as the Figure 3 illustrates. This topology is suitable for high-availability systems since it can fail over to a different path when one path fails.

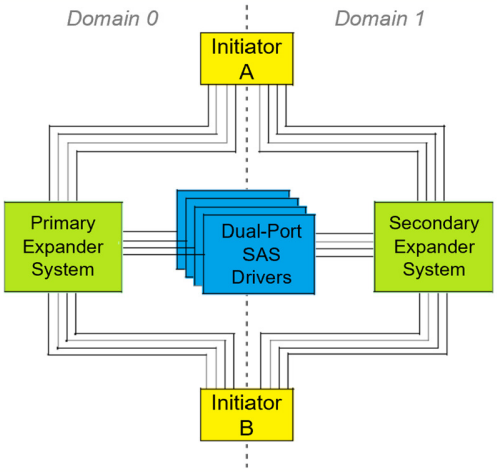

FIGURE 3 REDUNDANT SAS SYSTEM

RJ-472-08 system is a 72-bays redundant JBOD system. There is a SAS-3 path-redundancy topology and is suitable for high availability system. Each SAS-3 domain has four expanders. Connecting HDD expander is called **edge** expander. Bay 1~24 drivers are controlled by **edge1**,

25~48 are controlled by **egde2** and 49~72 are controlled by **edge3**. Bridge expander connects three edges (downstream) and RAID or HBA card (upstream from host side).

Figure 4 and 5 show examples of the RAID application view with 15 HDDs case. RJ472Edge1P expander has slot 4, 5, 20 and 21 SAS hard disks installed. RJ472Edge2P expander has slot 28, 32, 33, 40, 46 and 47 SAS hard disks installed. RJ472Edge3P expander has slot 52… SAS hard disks installed.

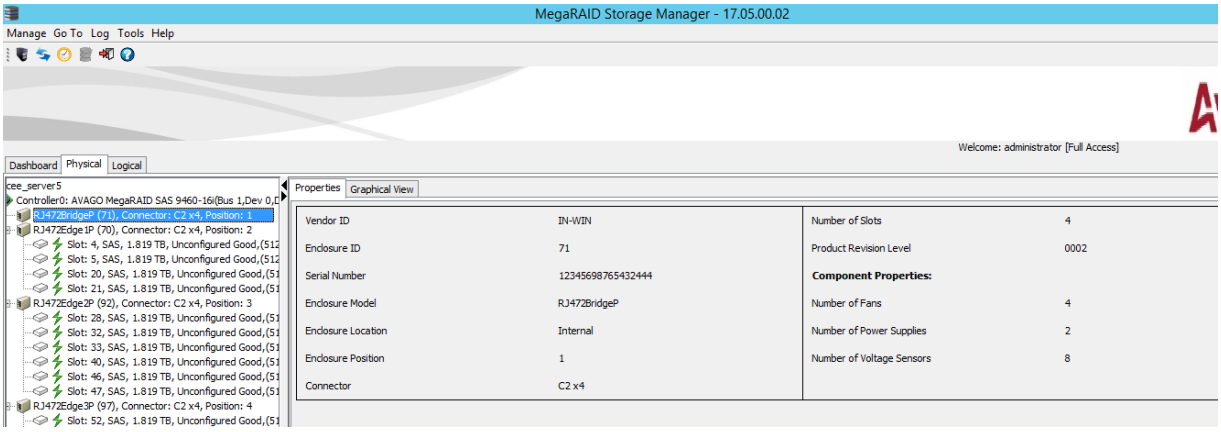

FIGURE 4 MEGARAID EXAMPLE

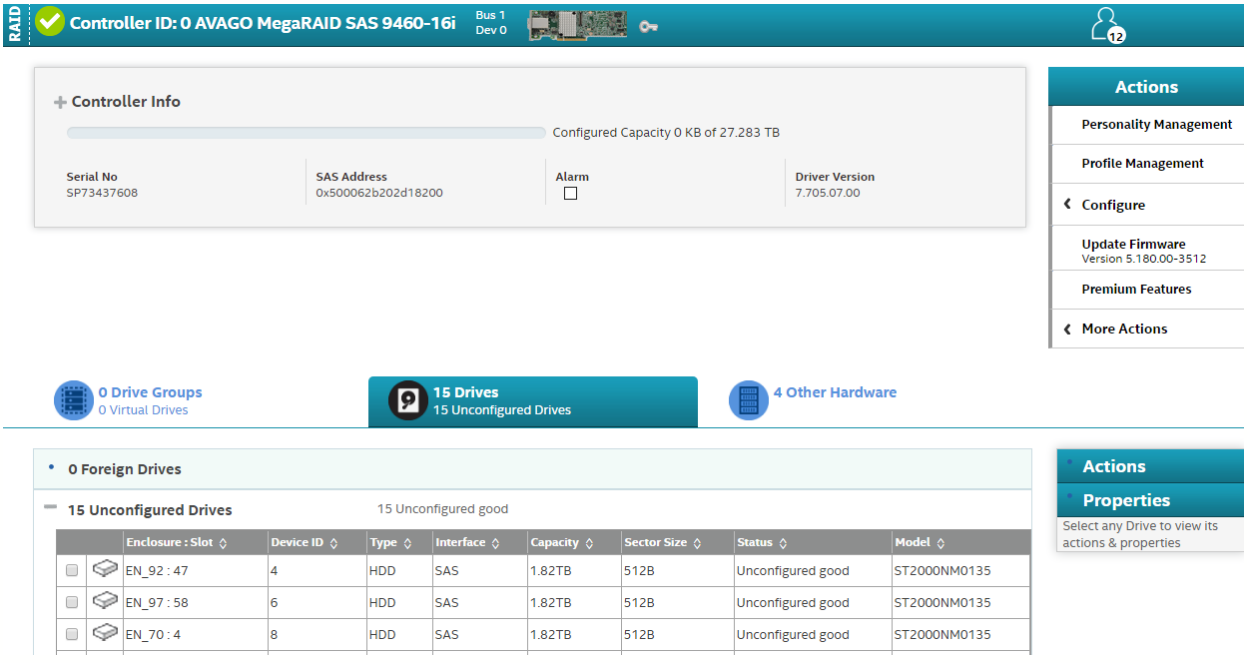

FIGURE 5 LSI STORAGE AUTHORITY EXAMPLE

3 System Interface

3.1 Overview

The RJ-472-08 system components includes:

- Front panel with power, ID, and mute buttons and HDD status, system status and ID LED.
- Rear side with fan, bridge expander and CRPS modules
- Inside of the chassis with edge expander modules, HDD trays and other backplanes.

3.2 Front Panel

Figure 6 shows the buttons, LEDs detail on front panel.

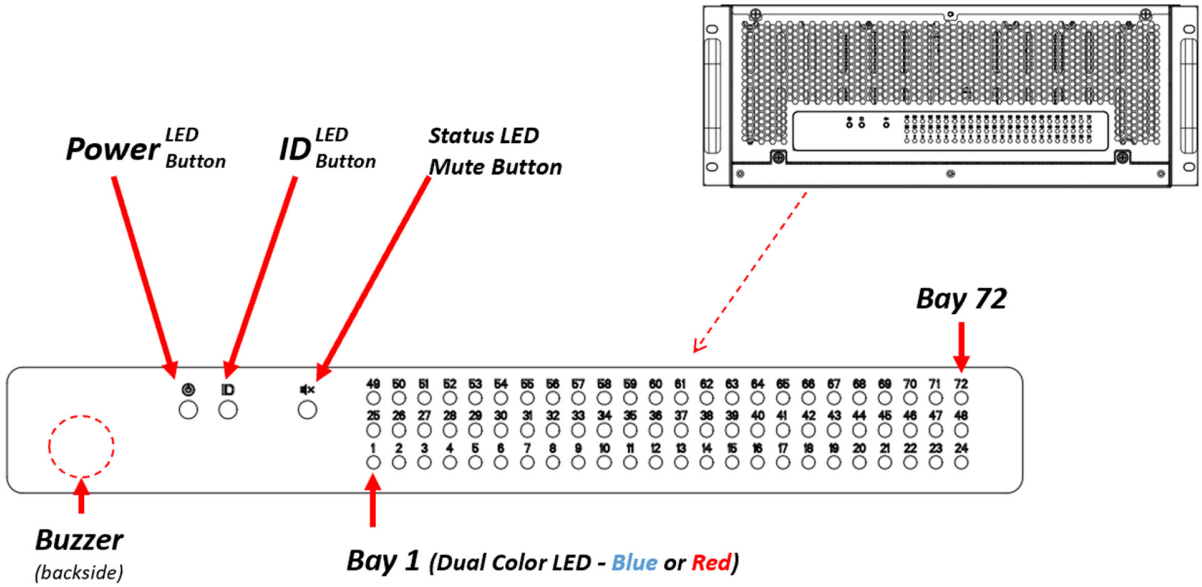

FIGURE 6 FRONT PANEL DETAIL

3.2.1 LED

The system is equipped with LEDs to provide status information for indicating component current state.

Power LED (blue color)

- Power is applied to the system(PSU). LED is illuminated when system is in operating.

Bay LED (dual color)

- Indicates hard disk current state. There are dual color LED that blue is used for operational and red is used for warning, error or failure.
    - Blue LED steady ON – hard disk is installed and powered
    - Blue LED in 4 Hz blinking – hard disk is accessed or in activity
    - Red LED steady ON – hard disk is failed
    - Red LED in 0.5 Hz blinking – hard disk is identified (LOCATE)
    - Red LED in 1 Hz blinking – hard disk is in RAID rebuild state

Status LED (red color)

- System current status
    - Steady ON – System overheats
    - 1 Hz blinking – System fans in error condition

ID LED (green color)

- Push button and turn on to identify the enclosure

3.2.2 Button Control

There are three push-buttons on front panel and two push-buttons on rear side (on bridge expander module).

Power button

- The button is for applying or removing power from the power supply to the system
    - Turn on – Press and hold for more than 3 seconds to power on system
    - Turn off – Press and hold for more than 3 seconds to shutdown system

ID button

- Press the button to toggle the ID LED ON and OFF

Mute button

- Press the button to toggle the buzzer beeping or silence

3.2.3 Advance Button Control

Feature	***Description***
Auto Power-ON	Press **ID + Power** buttons simultaneously to toggle this feature. Power LED blinks when this feature is engaged.
Cooling Mode	Press and hole **ID** button for more than **5** seconds to change mode in turns. There are three fan cooling modes to setup - **quiet, normal, aggressive**. Default is normal mode. ID LED blinks when cooling mode is engaged.
Mute Mode	Press and hold **Mute** button for more than ***5*** seconds to toggle mute feature. Status LED blinks when feature engaged.

3.2.4 Buzzer

The buzzer is to notify system warning states

System Status	***Description***
Fan Error	0.25s beep and 1.75s silence repeatedly. (slow beeps)
Thermal Error	0.25s beep, 0.25 silence, 0.25 beep and 1.25s silence repeatedly. (fast beeps)
Fan & Thermal Error	Alter 'Fan Error' and 'Thermal Error' repeatedly
PSU Error	continuous beep

3.3 Rear Panel

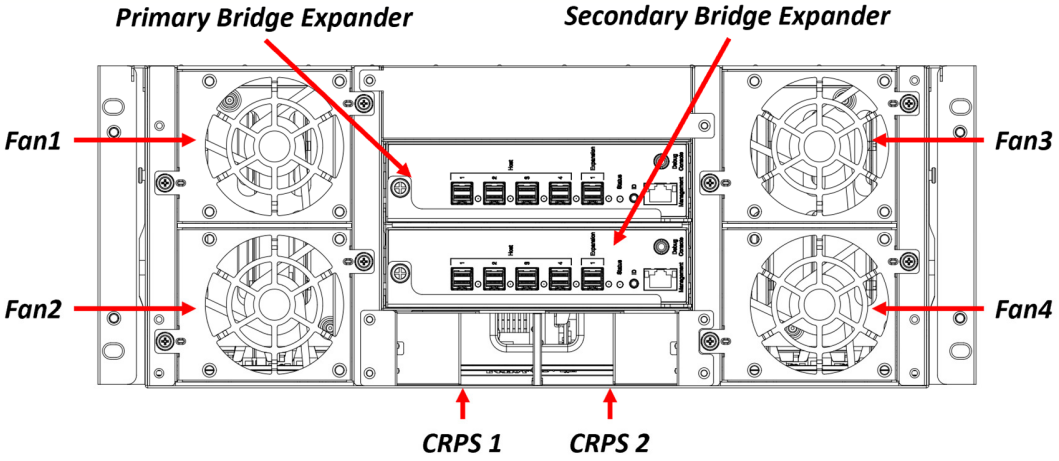

FIGURE 7 BACKSIDE DETAIL

Fan modules, bridge expanders and PSU modules can be plug-in/out on the backside (rear-side). Figure 7 depicts the location of the components.

3.4 Bridge Expander Module

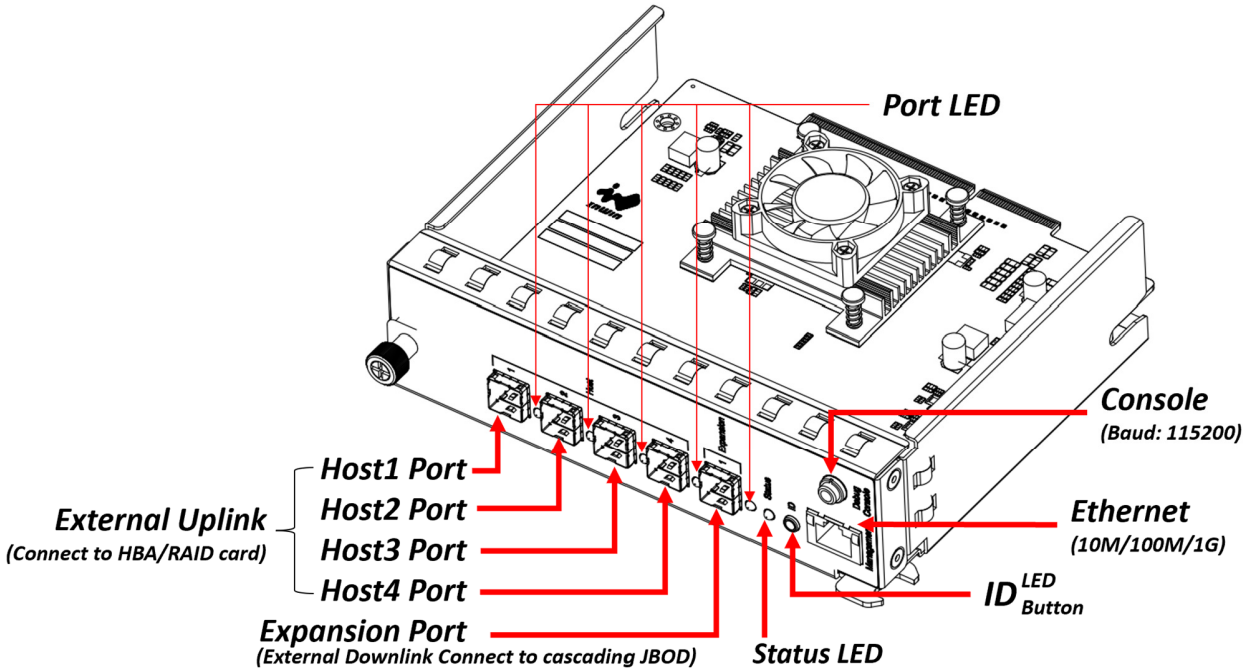

FIGURE 8 BRIDGE EXPANDER MODULE

Bridge expander module (Figure 8) is the main component that controls and manages the RJ-460-08 JBOD system. Users can use ethernet or RS-232 console cable to connect to the bridge module using telnet or some console applications to command it by CLI.

Host port (SFF-8644)

- External uplink port
- RAID or HBA card connect to the bridge module
- There are 4 ports (Host1, Host2, Host3 and Host4) for host connection

Expansion port (SFF-8644)

- External downlink port to cascade another expander

Status LED

- Works like front panel status LED
- Indicates the system current state
    - Steady ON – the system overheats
    - 1 Hz blinking – the system fans in error condition

Port LED

- There are Host1, Host2, Host3, Host4 and Expansion port LEDs
- Illuminated LED Indicates host port connection (from RAID or HBA) or expansion expander is physically connected

ID LED

- Works synchronously with front panel ID LED
- Illuminate to identify the chassis

ID button

- Works synchronously with front panel ID button
- Press to toggle the ID LED ON/OFF

UART Console

- The RS-232 port on the Bridge Expander module provides a serial connection for users to manage the JBOD system with terminal application such as Tera Term, Hyper Term…etc. To manage the JBOD system through the serial port, configure the terminal console as per the settings below to connect it.

Parameter	***Value***
Baud Rate	115200
Data	8 bit
Parity	None
Stop Bit	1 bit
Flow Control	None

Ethernet

- Support 10M/100M/1G bps ethernet PHY
- Support TCP/IP protocol
- Support Telnet CLI
- Support Webpages (http). IP address could be check from CLI then view the webpages for system information on a web browser. Figure 9-12 are the examples of the web pages.

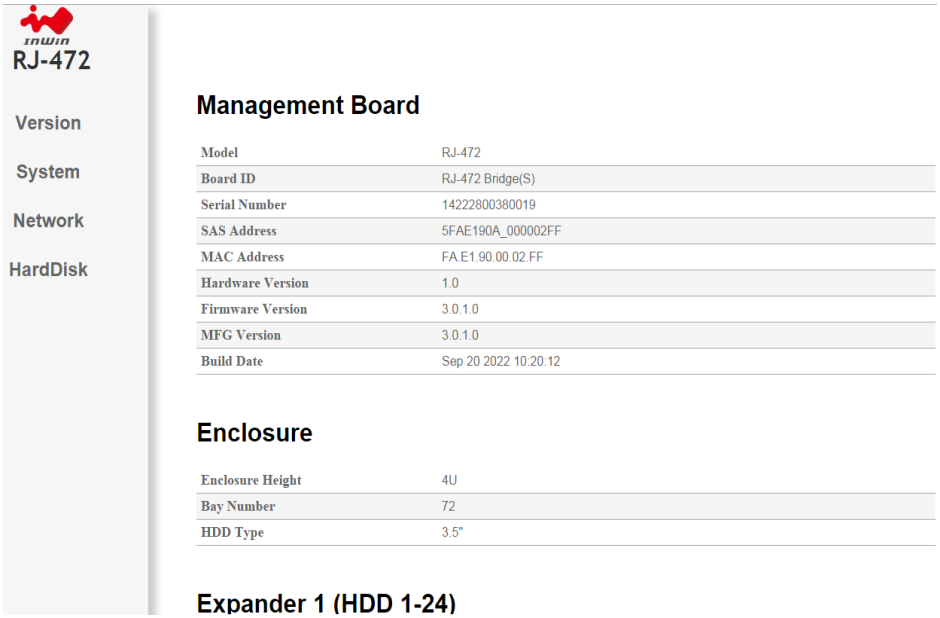

FIGURE 9 VERSION PAGE

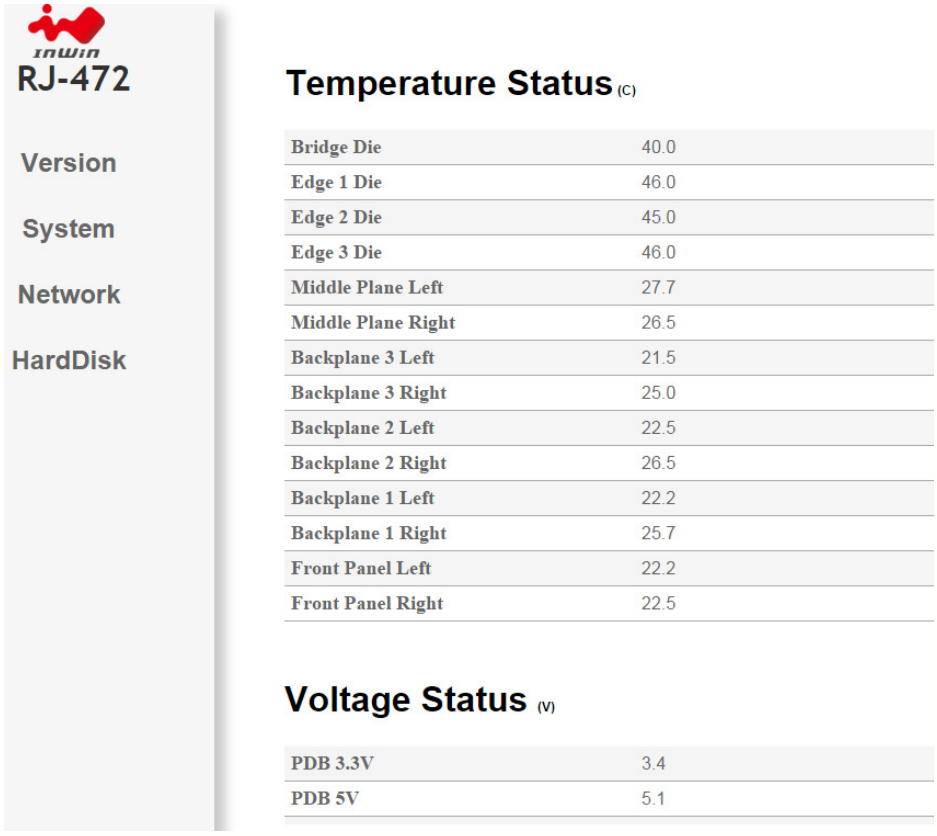

FIGURE 10 SYSTEM PAGE

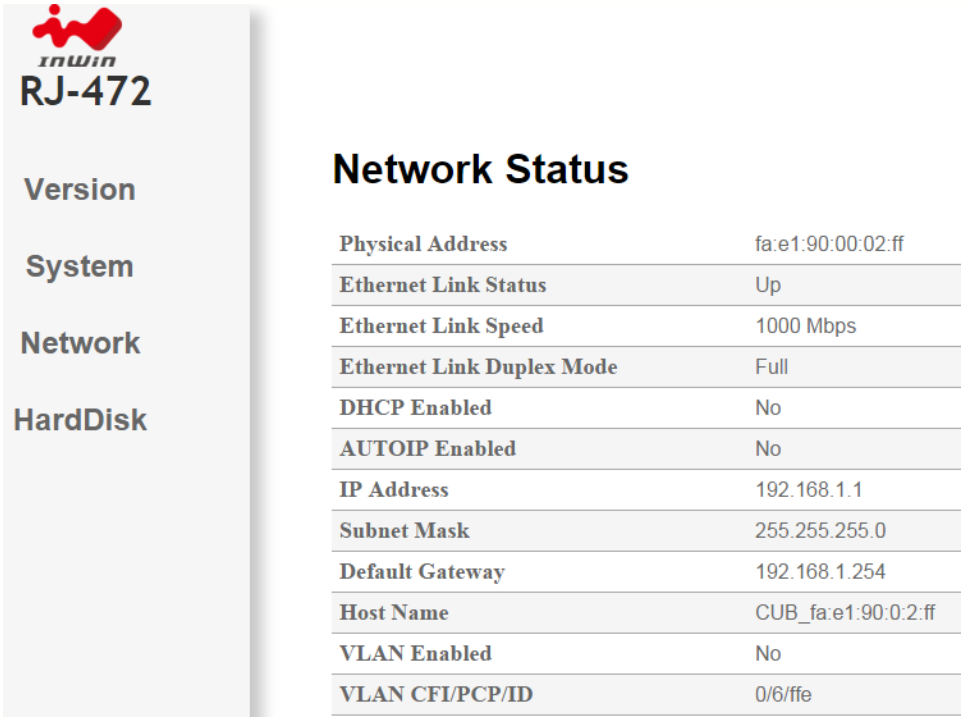

FIGURE 11 NETWORK PAGE

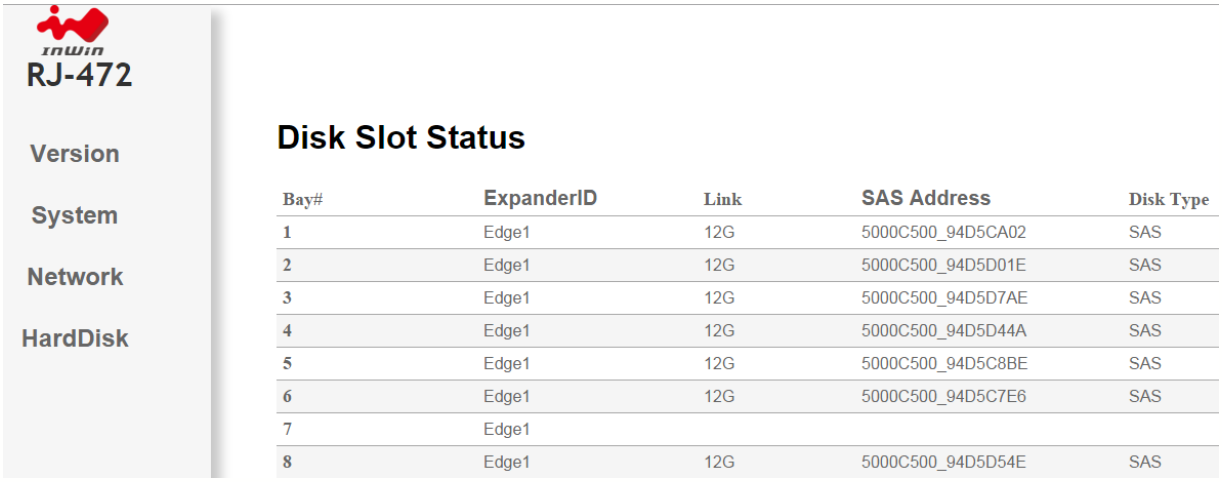

FIGURE 12 HARD DISK PAGE

3.5 Edge Expander Module

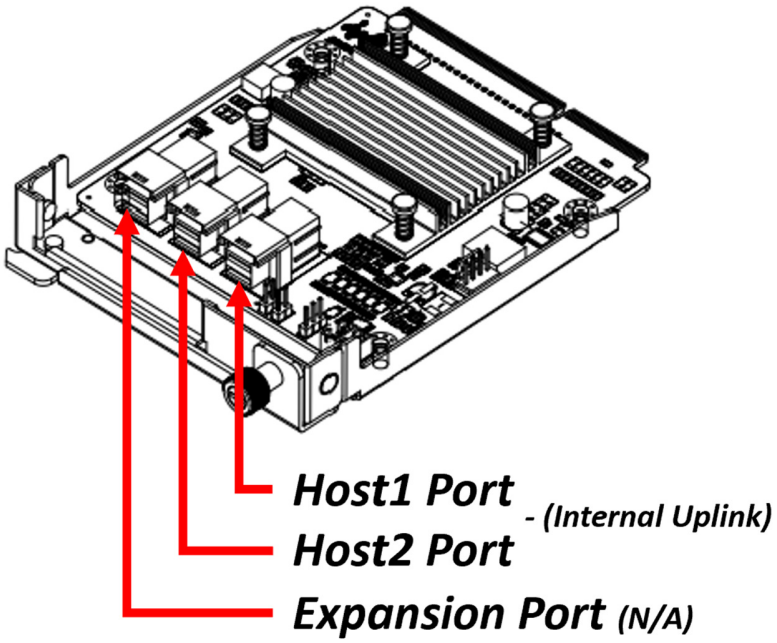

FIGURE 13 EDGE EXPANDER MODULE

This edge expanders are connected to the bridge expander module by internal SFF-8643 cables. they are controlled by bridge expander. User may manage it through bridge CLI interface (ethernet or RS-232).

Host port (SFF-8643)

- Internal uplink port
- There are 2 ports (Host1 and Host2) connecting to middle plane. Host1 port must connect to middle plane CN6 and Host2 must connect to middle plane CN7.

Expansion port (SFF-8643)

- Not applicable

4 Command Line Interface (CLI)

The RJ-472-08 system provide flexible and useful commands to monitor and manage hard disk, expanders and backplane system. Users can use telnet or console applications to manage the system with CLI commands.

4.1 help

List all command list and the usage

Syntax

```
help [Command]
 - X means a mandatory argument described as x
 - [X] means an optional argument
 - <X> means replace argument with value
 - X(D) means a decimal value
 - X(H) means a hexadecimal value
 - X(*) means special formatting is specified
 - X(s) means a decimal value in seconds
 - X(ms) means a decimal value in milliseconds
 - opt1|opt2|opt3 means literally specify "opt1","opt2", or "opt3"
 - X1 X2 ... means a variable number of arguments
```

Example

```
Bridge >help

================================================================================

    Description             Command

================================================================================

    Show Sensors            sensor

    Remote Command 3        edge3

    Remote Command 2        edge2

    Remote Command 1        edge1

    Remote Command 0        bridge
                        .
                        .
                        .

 Bridge >help fdl

================================================================================

    Description             Command

================================================================================
```

```
    File download           fdl <BufferID(H)> <Offset(H)> <Erase(*)>
                             - Erase is replaced with "Y" or "N"


================================================================================
```

4.2 rev

Show vendor ID, product ID, active firmware and firmware version information

Syntax

```
rev
```

Example

```
 Bridge >rev

================================================================================
Hardware Revision Information:-
================================================================================

Vendor ID                       :IN-WIN
Product ID                      :RJ-472 Bridge(P)
Product Revision Level          :Minor = 0x00, Unit = 0x01
Component Type                  :Cub
Component ID                    :0x0238 (Bond Option :48)
Component Revision Level        :1      (B0)

================================================================================
Firmware Revision Information:-
================================================================================

Active Firmware: Firmware Copy 1

Boot Image:
  Revision: 3.0.0.0
  Platform Name:   IN-WIN Cub Expander System
  Version Name:    SAS35xFW-03.00.00.00 09/13/21
  Firmware Family: 0  OemFamily: 0
  Fast Boot: Yes  Image Address: 0x10000000

Firmware Copy 1:
  Revision: 3.0.1.0
  Platform Name:   IN-WIN Cub Expander System
  Version Name:    SAS35xFW-03.00.01.00 10/20/22
  Firmware Family: 0  OemFamily: 0
  Fast Boot: Yes  Image Address: 0x10180000

Firmware Copy 2:
  Revision: 3.0.0.0
  Platform Name:   IN-WIN Cub Expander System
  Version Name:    SAS35xFW-03.00.00.00 10/03/22
  Firmware Family: 0  OemFamily: 0
  Fast Boot: Yes  Image Address: 0x10300000

================================================================================
```

```
SDK Revision:-
================================================================================
  HAL      Revision: 0.16.0.0
  SES      Revision: 0.16.0.0
  SCE      Revision: 0.16.0.0
  Spico Fw Revision: 0x8a69_014f
  CSWLib   Revision: 0.0.17.0

================================================================================
Current Toolchain Revision:-

================================================================================
ARM RVDS v.410713
```

4.3 showmfg

Show manufacture configuration version information

Syntax

```
showmfg
```

Example

```
 Bridge >showmfg
================================================================================
Manufacturing Image Version Information:-
================================================================================
Product ID :                    3
Platform ID:                    3
Associated Firmware Revision:   0:11:0:0
Mfg Revision:                   3:0:1:0
Product Name:                   RJ-472 Bridge(P)
Platform Name:                  Expander Cub x48
Mfg Image Creation time stamp:  9/20/22 8:23 (mm/dd/yy hr:min)
```

4.4 sasaddr

display expander's SAS address

Syntax

```
sasaddr
```

Example

```
Bridge >sasaddr

 Expander SAS Addresses -

  SxP Port 0 SAS Address: 0x5FAE1909100000FD
  SxP Port 1 SAS Address: 0x5FAE1909100000FF
  SxP Port 2 SAS Address: 0x0000000000000000
```

4.5 date

Show or set current date time. There are no RTC in system. System always starts up at incorrect date. System log will record event with datetime. User can set datetime and broadcast the new value to other expanders by 'date send'

Syntax

```
date [ set <newdate(*)> | send [<SasAddrHi(H)> <SasAddrLow(H)>] |
                          recv [<SasAddrHi(H)> <SasAddrLow(H)>] ]
 - no arguments, output local expander date/time and uptime
 - 'set <newdate(*)>' Set local expander date/time using format for <newdate> of
   YYYYMMDDHHMMSS
 - 'send [sas_addr]' If sas_addr set then set the remote expander's clock using the
   local expander's current clock value.  If sas_addr not specified then set clock
   for all expanders in the domain.
 - 'recv [sas_addr]' If sas_addr set then fetch the remote expander's current clock
   and output the result.  If sas_addr not specified then get and output the current
   clock for all expanders in the domain.
```

Example

```
Bridge >date

Tue Sep 20 09:30:28 2022

Current expander uptime is 0 days, 0 hours, 35 minutes, 19 seconds



 Bridge >date set 20230202103000

Expander date/time set to Thu Feb  2 10:30:00 2023




 Bridge >date send
Result sending SET TIMESTAMP to 5fae19091000003d:  SUCCESS

Result sending SET TIMESTAMP to 5fae19091000007d:  SUCCESS

Result sending SET TIMESTAMP to 5fae1909100000bd:  SUCCESS



 Bridge >edge1 date
>>>edge1:


Thu Feb  2 10:30:42 2023

Current expander uptime is 0 days, 0 hours, 37 minutes, 48 seconds
```

4.6 showlogs

Show the current system logs

Syntax

```
showlogs [hex|detail|default]
```

Example

```
 Bridge >showlogs
<Sep 13 2021 07:53:37.336>:PLATFORM:Firmware initialization started

<Sep 13 2021 07:53:38.682>:EXP:FW COPY 1 REGION: FW image missing

<Sep 13 2021 07:53:38.684>:EXP:FW COPY 2 REGION: FW image missing

<Sep 13 2021 07:53:38.686>:CONFIG:Expander MFG image is not valid

<Sep 13 2021 07:53:37.319>:PLATFORM:Firmware initialization started
…
```

4.7 clearlogs

Clear the system logs

Syntax

```
clearlogs
```

Example

```
 Bridge >clearlogs


 Bridge >showlogs


 Bridge >
```

4.8 showpost

Show POST (Power-On-Self-Test) status of expander

Syntax

```
showpost
```

Example

```
 Bridge >showpost

POST status of expander on-chip devices


================================================================================
```

```
On-Chip Device            POST Status

================================================================================

Smart Serial              :PASS
Watchdog Timer            :PASS
Timer 1                   :PASS
Timer 2                   :PASS
Timer 3                   :PASS
Timer 4                   :PASS
PLLs                      :PASS
Interrupt                 :PASS
Phy Loopback              :PASS
ISTWI Channel 00          :PASS
ISTWI Channel 01          :PASS
ISTWI Channel 02          :PASS
ISTWI Channel 03          :PASS
ISTWI Channel 04          :PASS
ISTWI Channel 05          :PASS
ISTWI Channel 06          :PASS
ISTWI Channel 07          :PASS
ISTWI Channel 08          :PASS
ISTWI Channel 09          :PASS
ISTWI Channel 10          :PASS
ISTWI Channel 11          :PASS
True Random Num Generator:PASS
Internal RAM Test         :PASS
Forced ECC Error Test     :PASS
SXP Port Buffers Test     :PASS

================================================================================
```

4.9 sesinfo

Display SES-2 devices information

Syntax

```
sesinfo
```

Example

```
Bridge >sesinfo
Show SES Enclosure Elements

Current Fan Level(1~7): 4 4 4 4
Fan01           FanSpd:  8100   SpdCode:     4  Fail:     0
Fan02           FanSpd:  8580   SpdCode:     4  Fail:     0
Fan03           FanSpd:  9420   SpdCode:     5  Fail:     0
Fan04           FanSpd:  7920   SpdCode:     3  Fail:     0
BridgeDie.C     Fail: 0 Tempt: 36       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
MP Left.C       Fail: 0 Tempt: 28       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
MP Right.C      Fail: 0 Tempt: 27       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
BP3 Left.C      Fail: 0 Tempt: 28       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
BP3 Right.C     Fail: 0 Tempt: 30       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
BP2 Left.C      Fail: 0 Tempt: 29       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
BP2 Right.C     Fail: 0 Tempt: 29       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
BP1 Left.C      Fail: 0 Tempt: 26       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
BP1 Right.C     Fail: 0 Tempt: 26       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
FP Left.C       Fail: 0 Tempt: 22       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
```

```
FP Right.C      Fail: 0 Tempt: 23       UTWarn: 0       UTFail: 0       OTWarn: 0     OTFail: 0
PdbVoltage3.3V  340
PdbVoltage 5V   510
PdbVoltage 12V  1260
MPVoltage 5V    10
MPVoltage 12V   1400
BP3 Voltage 5V  2430
BP2 Voltage 5V  510
BP1 Voltage 5V  510
PowerSupplyElement00    Install: 1, Fail: 0
PowerSupplyElement01    Install: 1, Fail: 0
```

4.10 sensor

Display backplane system sensor information

Syntax

```
sensor
```

Example

```
 Bridge >sensor

BP Description: RJ-472,HW:3.0,SW:3.0.0,1
Status: 5(SMBus)        00(BP)  00(FAN)
Expander Installed: 03(MP)      03(BP1) 03(BP2) 03(BP3)
CRPS: 00(Status)        03(Installed)
Temperature: (C)
        ExpDie: 44, 57, 57, 54
        MP:  26.5, 26.7
        BP3: 29.5, 30.7
        BP2: 31.5, 32.0
        BP1: 30.2, 30.2
        FP:  24.7, 26.2
Voltage: (V)
        PDB:  3.4,  5.1, 12.6
        MP:   1.8,  0.1, 14.0
        BP3:  5.1,  5.1
        BP2:  5.1,  5.1
        BP1:  5.1,  5.1
        FP:   5.0
Fan RPM:
 9180, 8760, 7980, 8340,
Fan PWM:
    0,    0,    0,    0,   64,   72,   63,   66,
```

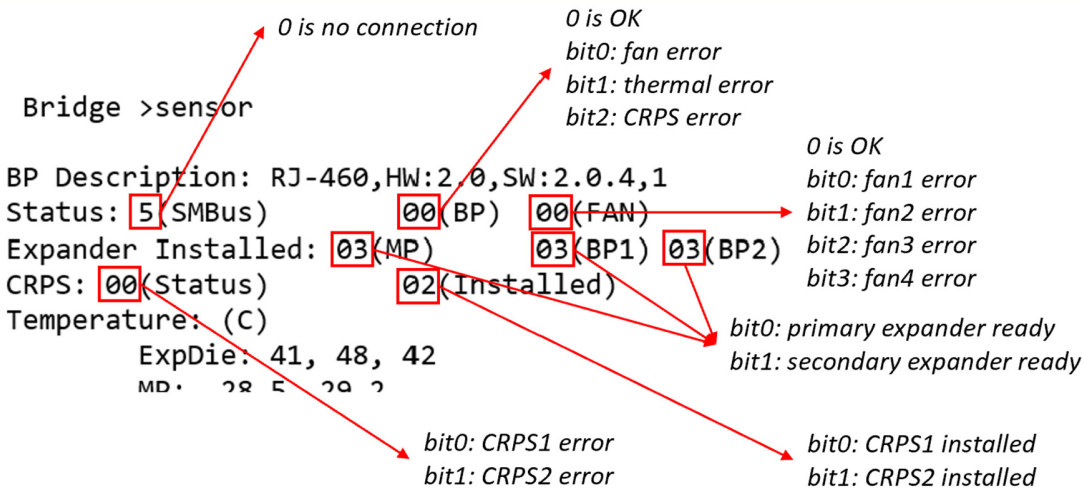

FIGURE 14 SENSOR INFORMATION DETAIL

4.11 hdd

Display 72 bays hard disk PHY information

Syntax

```
hdd
```

Example

```
 Bridge >hdd
              PHY                                  ZONE      CONN CONN MAP
HDD  DEV      CNG                      ROUTE ZONE CTRL CONN ELEM PHY  PHY
No   TYPE NLR CNT  ATTACHED SAS ADDR    TYPE  GRP  BUS  TYPE INDX LINK ID

  1  END  12G 0x03 5000C500_94D5CA01     D  0x01 0x04 0x20 0x01 0x00 000
  2  END  12G 0x03 5000C500_94D5D01D     D  0x01 0x04 0x20 0x02 0x00 001
  3  END  12G 0x03 5000C500_94D5D7AD     D  0x01 0x04 0x20 0x03 0x00 002
  4  END  12G 0x03 5000C500_94D5D449     D  0x01 0x04 0x20 0x04 0x00 003
  5  END  12G 0x03 5000C500_94D5C8BD     D  0x01 0x04 0x20 0x05 0x00 004
  6  END  12G 0x03 5000C500_94D5C7E5     D  0x01 0x04 0x20 0x06 0x00 005
  7  END  12G 0x03 5000C500_94D5C6F1     D  0x01 0x04 0x20 0x07 0x00 006
  8  END  12G 0x03 5000C500_94D5D54D     D  0x01 0x04 0x20 0x08 0x00 007
  9  END  12G 0x03 5000C500_94D5C80D     D  0x01 0x04 0x20 0x09 0x00 008
 10  END  12G 0x03 5000C500_94D5D2CD     D  0x01 0x04 0x20 0x0A 0x00 009
 11  END  12G 0x03 5000C500_94D5D60D     D  0x01 0x04 0x20 0x0B 0x00 010
 12  END  12G 0x03 5000C500_94D5D575     D  0x01 0x04 0x20 0x0C 0x00 011
 13  END  12G 0x03 5000C500_94D5D035     D  0x01 0x04 0x20 0x0D 0x00 012
 14  END  12G 0x03 5000C500_94D5C915     D  0x01 0x04 0x20 0x0E 0x00 013
 15  END  12G 0x03 5000C500_94D5D4E1     D  0x01 0x04 0x20 0x0F 0x00 014
 16  END  12G 0x03 5000C500_94D5D195     D  0x01 0x04 0x20 0x10 0x00 015
 17  END  12G 0x03 5000C500_94D5D215     D  0x01 0x04 0x20 0x11 0x00 016
 18  END  12G 0x03 5000C500_94D5CAA1     D  0x01 0x04 0x20 0x12 0x00 017
 19  END  12G 0x03 5000C500_94D5D72D     D  0x01 0x04 0x20 0x13 0x00 018
 20  END  12G 0x03 5000C500_94D5D365     D  0x01 0x04 0x20 0x14 0x00 019
```

```
 21  END  12G 0x03 5000C500_94D5CA8D    D  0x01 0x04 0x20 0x15 0x00 020
 22  END  12G 0x03 5000C500_94D5CF25    D  0x01 0x04 0x20 0x16 0x00 021
 23  END  12G 0x03 5000C500_94D5D21D    D  0x01 0x04 0x20 0x17 0x00 022
 24  END  12G 0x03 5000C500_94D5C941    D  0x01 0x04 0x20 0x18 0x00 023
 25  END  12G 0x03 5000C500_94D5D6F5    D  0x01 0x04 0x20 0x19 0x00 000
 26  END  12G 0x03 5000C500_94D5D7A5    D  0x01 0x04 0x20 0x1A 0x00 001
 27  END  12G 0x03 5000C500_94D5CD49    D  0x01 0x04 0x20 0x1B 0x00 002
 28  END  12G 0x03 5000C500_94D5CA11    D  0x01 0x04 0x20 0x1C 0x00 003
 29  END  12G 0x03 5000C500_94D5D1D1    D  0x01 0x04 0x20 0x1D 0x00 004
 30  END  12G 0x03 5000C500_94D5D111    D  0x01 0x04 0x20 0x1E 0x00 005
 31  END  12G 0x03 5000C500_94D5CF75    D  0x01 0x04 0x20 0x1F 0x00 006
 32  END  12G 0x03 5000C500_94D5CBE9    D  0x01 0x04 0x20 0x20 0x00 007
 33  END  12G 0x03 5000C500_94D5D2BD    D  0x01 0x04 0x20 0x21 0x00 008
 34  END  12G 0x03 5000C500_94D5D775    D  0x01 0x04 0x20 0x22 0x00 009
 35  END  12G 0x03 5000C500_94D5CA45    D  0x01 0x04 0x20 0x23 0x00 010
 36  END  12G 0x03 5000C500_94D5CB15    D  0x01 0x04 0x20 0x24 0x00 011
 37  END  12G 0x03 5000C500_94D5C76D    D  0x01 0x04 0x20 0x25 0x00 012
 38  END  12G 0x03 5000C500_94D5D09D    D  0x01 0x04 0x20 0x26 0x00 013
 39  END  12G 0x03 5000C500_94D5D379    D  0x01 0x04 0x20 0x27 0x00 014
 40  END  12G 0x03 5000C500_94D5CF71    D  0x01 0x04 0x20 0x28 0x00 015
 41  END  12G 0x03 5000C500_94D5D569    D  0x01 0x04 0x20 0x29 0x00 016
 42  END  12G 0x03 5000C500_94D5CF79    D  0x01 0x04 0x20 0x2A 0x00 017
 43  END  12G 0x03 5000C500_94D5CB01    D  0x01 0x04 0x20 0x2B 0x00 018
 44  END  12G 0x03 5000C500_94D5D095    D  0x01 0x04 0x20 0x2C 0x00 019
 45  END  12G 0x03 5000C500_94D5D4BD    D  0x01 0x04 0x20 0x2D 0x00 020
 46  END  12G 0x03 5000C500_94D5D011    D  0x01 0x04 0x20 0x2E 0x00 021
 47  END  12G 0x03 5000C500_94D5CF61    D  0x01 0x04 0x20 0x2F 0x00 022
 48  END  12G 0x03 5000C500_94D5D1A1    D  0x01 0x04 0x20 0x30 0x00 023
 49  END  12G 0x03 5000C500_94D5CBB9    D  0x01 0x04 0x20 0x31 0x00 000
 50  END  12G 0x03 5000C500_94D5D591    D  0x01 0x04 0x20 0x32 0x00 001
 51  END  12G 0x03 5000C500_94D5CE01    D  0x01 0x04 0x20 0x33 0x00 002
 52  END  12G 0x03 5000C500_94D5CC81    D  0x01 0x04 0x20 0x34 0x00 003
 53  END  12G 0x03 5000C500_94D5C9D1    D  0x01 0x04 0x20 0x35 0x00 004
 54  END  12G 0x03 5000C500_94D5CC99    D  0x01 0x04 0x20 0x36 0x00 005
 55  END  12G 0x03 5000C500_94D5D48D    D  0x01 0x04 0x20 0x37 0x00 006
 56  END  12G 0x03 5000C500_94D5CBE1    D  0x01 0x04 0x20 0x38 0x00 007
 57  END  12G 0x03 5000C500_94D5CBD9    D  0x01 0x04 0x20 0x39 0x00 008
 58  END  12G 0x03 5000C500_94D5CCF1    D  0x01 0x04 0x20 0x3A 0x00 009
 59  END  12G 0x03 5000C500_94D5CFC1    D  0x01 0x04 0x20 0x3B 0x00 010
 60  END  12G 0x03 5000C500_94D5D725    D  0x01 0x04 0x20 0x3C 0x00 011
 61  END  12G 0x03 5000C500_94D5D3B5    D  0x01 0x04 0x20 0x3D 0x00 012
 62  END  12G 0x03 5000C500_94D5CBF9    D  0x01 0x04 0x20 0x3E 0x00 013
 63  END  12G 0x03 5000C500_94D5D7FD    D  0x01 0x04 0x20 0x3F 0x00 014
 64  END  12G 0x03 5000C500_94D5D4C5    D  0x01 0x04 0x20 0x40 0x00 015
 65  END  12G 0x03 5000C500_94D5CEED    D  0x01 0x04 0x20 0x41 0x00 016
 66  END  12G 0x03 5000C500_94D5CFD1    D  0x01 0x04 0x20 0x42 0x00 017
 67  END  12G 0x03 5000C500_94D5CDF9    D  0x01 0x04 0x20 0x43 0x00 018
 68  END  12G 0x03 5000C500_94D5CE71    D  0x01 0x04 0x20 0x44 0x00 019
 69  END  12G 0x03 5000C500_94D5D735    D  0x01 0x04 0x20 0x45 0x00 020
 70  END  12G 0x03 5000C500_94D5CA19    D  0x01 0x04 0x20 0x46 0x00 021
 71  END  12G 0x03 5000C500_94D5D5E9    D  0x01 0x04 0x20 0x47 0x00 022
 72  END  12G 0x03 5000C500_94D5D761    D  0x01 0x04 0x20 0x48 0x00 023
```

4.12 console

Switch RS-232 UART control to bridge, edge1, edge2 or edge3 expander.

Syntax

```
console <0|1|2|3>
```

Example

```
 Bridge >console 1
Switch Smart Console to Edge1
```

```
 Edge1 >
 Edge1 >console 0
Switch Smart Console to Bridge


 Bridge >
 Bridge > console 2
Switch Smart Console to Edge2


 Edge2 >
 Edge2 >console 0
Switch Smart Console to Bridge



 Bridge >
```

4.13 bpsys

Display backplane system control parameters that are saved in persistent storage (flash)

Syntax

```
bpsys
```

Example

```
 Bridge >bpsys
BP System NVRAM Config:
        Fan Speed Profile: Normal
        Auto Power UP: 0
        Mute Enable: 0
        Fan Control Temperature Base: 44
        Zone Config: 0 (Disable)

BP System Running Status:
        Test Enable: 0
        ID LED Enable: 0
```

bpsys power <0|1>

set backplane system auto power-on and startup after power suppliers ready. Default value 0 requires users to press power button for more than 3 seconds to power up system.

Syntax

```
bpsys power <0|1>
```

Example

```
 Bridge >bpsys power 1
Set Auto Power UP: 1
```

bpsys default <0>

reset backplane system configuration to default

Syntax

```
bpsys default <0>
```

Example

```
 Bridge >bpsys default 0
Reset bpsys to default configuration!
Reboot system to use the new setting


 Bridge >reset

Performing POST for Smart Serial
…
```

bpsys fan <0|1|2>

Set backplane system fan speed profile mode. There are 3 modes for fan speed profile. Default value is 1 (Normal)

Mode ID	***Name***	***Description***
0	Quiet	8 fan RPM levels – 34%, 44%, 54%, 63%, 71%, 79%, 87%, 95%
1	Normal	8 fan RPM levels – 41%, 49%, 57%, 65%, 73%, 81%, 89%, 97%
2	Aggressive	8 fan RPM levels – 45%, 53%, 61%, 69%, 77%, 85%, 93%, 100%

Syntax

```
bpsys fan <0|1|2>
```

Example

```
 Bridge >bpsys fan 0
Set Fan Speed Profile: 0
```

bpsys thermal <37~52>

Set maximum temperature (Celsius) for fan speed maximum level control. Default value is 44 (Celsius). Fan controller get thermal sensors' readings in Celsius and use the maximum value to map the SES fan level for PWM(or RPM) control. User can adjust fan speed control level by the command.

Below figure shows "bpsys thermal 42" and "bpsys thermal 45" cases. For example, system set fan speed profile to normal mode and the highest value in system temperature sensors (not including expander die temperature) is 40.1. If configure

"bpsys thermal 42" then the fan speed will reach highest level (97% speed). If configure "bpsys thermal 45" then the fan speed will reach second highest level (89% speed). Because the hard divers may install partial and make cooling airflow too much or less. User can adjust the value to find the efficient fan speed.

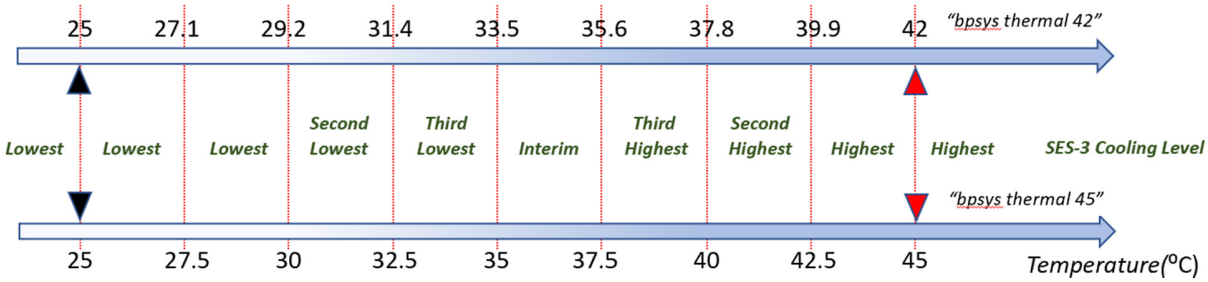

FIGURE 15 3 ZONES CONFIGURATION

Syntax

```
bpsys thermal <37~52>
```

Example

```
 Bridge >bpsys thermal 45
Set Fan Control Max Temperature (37C~52C): 45
```

bpsys zone <0|1>

Set PHY zone mode. There are 2 zone mode (0 - disable or 1 - enable). Default (0) is zone disabled. Refer to Figure 16 for enable mode (3 zones – zone1 is bay1-24, zone2 is bay25-48, zone3 is bay49-72)

3 Zones Configuration – 24/24/24

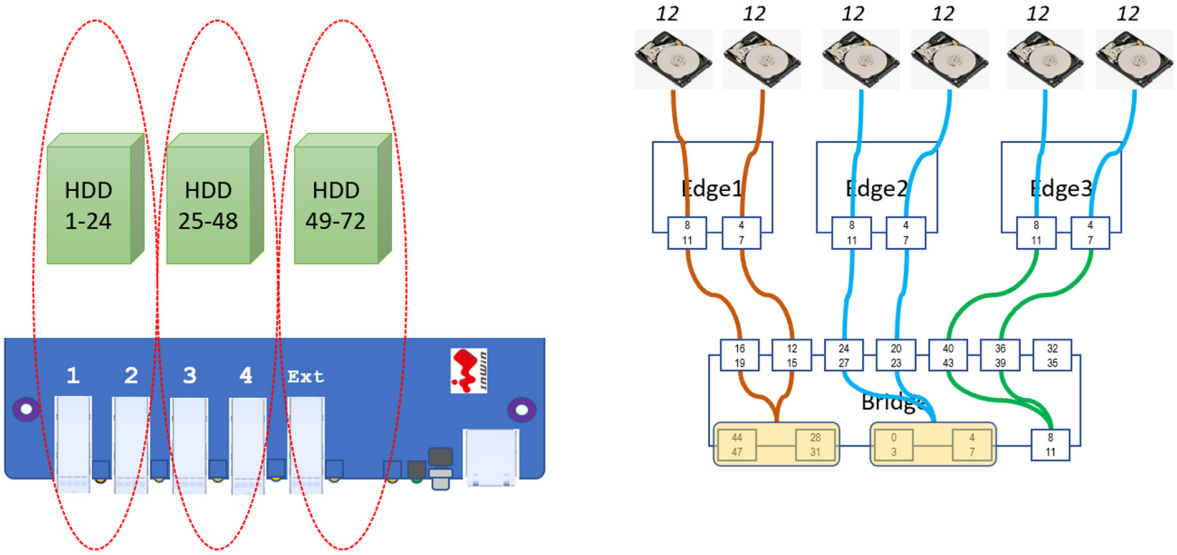

FIGURE 16 3 ZONES CONFIGURATION

Syntax

```
bpsys zone <0|1>
```

Example

```
 Bridge >bpsys zone 1
Set Zone Profile: 1
```

bpsys mute <0|1>

Set backplane system buzzer to mute mode. Default (0) is to enable beeping when system occurs some errors.

Syntax

```
bpsys mute <0|1>
```

Example

```
 Bridge >bpsys mute 1
Set Mute Enable: 1
```

bpsys id <0|1>

Turn backplane system ID LED on or off. The value is not saved to storage. Default (0) is to turn off ID LED. This command enable user to turn on ID LED from remote.

Syntax

```
bpsys id <0|1>
```

Example

```
 Bridge >bpsys id 1
ID LED Enable: 1
```

bpsys test <0|1>

Set backplane system to test mode that blinks all LEDs and play buzzer for test. The value is not saved to storage. Default (0) is to quit the test mode.

Syntax

```
bpsys test <0|1>
```

Example

```
 Bridge >bpsys test 1
Test Enable: 1
```

bpsys reset <1>

Make backplane system to reset all backplanes, expanders, front panel, middle plane and PDB. The command will power down all expanders, front panel, BP1, BP2, BP3. Then reset middle plan and PDB modules. System will then power on BP1, BP2, BP3 and front panel in few seconds, and wait another few seconds to power on expanders and HDDs.

Syntax

```
bpsys reset <1>
```

Example

```
 Bridge >bpsys reset 1
Reset MCU System


 Bridge >
Performing POST for Smart Serial
…
```

4.14 ipconfig

Show or configure network interface IP address for RJ-460-08 bridge board.

ipconfig [verbose]

Display bridge expander module ethernet port configuration that are saved in persistent storage (flash). Default setting is static IP address (192.168.100.1).

Syntax

```
ipconfig [verbose]
```

Example

```
 Bridge >ipconfig

================================================================================
    Physical Address . . . . . . . . . . : FA-E1-90-00-02-FF
    DHCP Enabled . . . . . . . . . . . . : No
    AUTOIP Enabled . . . . . . . . . . . : No
    IP Address . . . . . . . . . . . . . : 192.168.1.1
    Subnet Mask  . . . . . . . . . . . . : 255.255.255.0
    Default Gateway  . . . . . . . . . . : 192.168.1.254
    Ethernet Link Status . . . . . . . . : Up
    Ethernet Link Speed  . . . . . . . . : 1000 Mbps
    Ethernet Link Duplex Mode  . . . . . : Full
================================================================================



 Bridge >ipconfig verbose

================================================================================
    Physical Address . . . . . . . . . . : FA-E1-90-00-02-FF
    DHCP Enabled . . . . . . . . . . . . : No
    AUTOIP Enabled . . . . . . . . . . . : No
    IP Address . . . . . . . . . . . . . : 192.168.1.1
    Subnet Mask  . . . . . . . . . . . . : 255.255.255.0
    Default Gateway  . . . . . . . . . . : 192.168.1.254
    Ethernet Link Status . . . . . . . . : Up
    Ethernet Link Speed  . . . . . . . . : 1000 Mbps
    Ethernet Link Duplex Mode  . . . . . : Full
    Ethernet speed/duplex initial setting: 0
    Host Name  . . . . . . . . . . . . . : CUB_fa:e1:90:0:2:ff
    VLAN Enabled . . . . . . . . . . . . : No
    VLAN CFI/PCP/ID  . . . . . . . . . . : 0/6/ffe
    WakeLan Magic Packet Wakeup Enabled  : No
    WakeLan Unicast Packet Wakeup Enabled: No
================================================================================
```

ipconfig dhcp

configure ethernet port IP address to DHCP mode.

Syntax

```
ipconfig dhcp
```

Example

```
 Bridge >ipconfig dhcp

 Please reboot for new setting



 Bridge >reset

…
 Bridge >ipconfig

================================================================================
    Physical Address . . . . . . . . . . : FA-E1-90-00-15-FF
    DHCP Enabled . . . . . . . . . . . . : Yes
    AUTOIP Enabled . . . . . . . . . . . : No
    IP Address . . . . . . . . . . . . . : 192.168.173.153
    Subnet Mask  . . . . . . . . . . . . : 255.255.255.0
    Default Gateway  . . . . . . . . . . : 192.168.173.250
    Ethernet Link Status . . . . . . . . : Up
    Ethernet Link Speed  . . . . . . . . : 1000 Mbps
    Ethernet Link Duplex Mode  . . . . . : Full
================================================================================
```

ipconfig static <ip_addr> <netmask> <gateway>

Configure ethernet port to static mode and assign the IP address, netmask and gateway.

Syntax

```
ipconfig static <IP_addr> <Netmask> <Gateway>
```

Example

```
 Bridge >ipconfig static 192.168.1.1 255.255.255.0 192.168.1.254

 Please reboot for new setting



 Bridge >reset


…
 Bridge >ipconfig

================================================================================
    Physical Address . . . . . . . . . . : FA-E1-90-00-15-FF
    DHCP Enabled . . . . . . . . . . . . : No
    AUTOIP Enabled . . . . . . . . . . . : No
    IP Address . . . . . . . . . . . . . : 192.168.1.1
    Subnet Mask  . . . . . . . . . . . . : 255.255.255.0
    Default Gateway  . . . . . . . . . . : 192.168.1.254
```

```
    Ethernet Link Status . . . . . . . . : Up
    Ethernet Link Speed  . . . . . . . . : 1000 Mbps
    Ethernet Link Duplex Mode  . . . . . : Full
================================================================================
```

ipconfig auto

Configure ethernet port to auto IP mode.

Syntax

```
ipconfig auto
```

Example

```
 Bridge >ipconfig auto

 Please reboot for new setting



 Bridge >reset


…
Bridge >ipconfig

================================================================================
    Physical Address . . . . . . . . . . : FA-E1-90-00-15-FF
    DHCP Enabled . . . . . . . . . . . . : No
    AUTOIP Enabled . . . . . . . . . . . : Yes
    IP Address . . . . . . . . . . . . . : 169.254.125.78
    Subnet Mask  . . . . . . . . . . . . : 255.255.0.0
    Default Gateway  . . . . . . . . . . : 0.0.0.0
    Ethernet Link Status . . . . . . . . : Up
    Ethernet Link Speed  . . . . . . . . : 1000 Mbps
    Ethernet Link Duplex Mode  . . . . . : Full
================================================================================
```

ipconfig dhcp_auto

Configure ethernet port to DHCP and auto IP mode that system will try to get IP address from DHCP. If no DHCP server exist, system will use auto IP mode.

Syntax

```
ipconfig dhcp_auto
```

Example

```
 Bridge >ipconfig dhcp_auto

 Please reboot for new setting
```

```
 Bridge >reset


…
Bridge >ipconfig

================================================================================
    Physical Address . . . . . . . . . : FA-E1-90-00-15-FF
    DHCP Enabled . . . . . . . . . . . : Yes
    AUTOIP Enabled . . . . . . . . . . : Yes
    IP Address . . . . . . . . . . . . : 192.168.173.156
    Subnet Mask  . . . . . . . . . . . : 255.255.255.0
    Default Gateway  . . . . . . . . . : 192.168.173.250
    Ethernet Link Status . . . . . . . : Up
    Ethernet Link Speed  . . . . . . . : 1000 Mbps
    Ethernet Link Duplex Mode  . . . . : Full
================================================================================
```

4.15 fdl

fdl <0|1> <0> <y>

Download firmware or manufacture config (MFG) image from console or telnet. The download protocol is XMODEM, refer to Figure 17

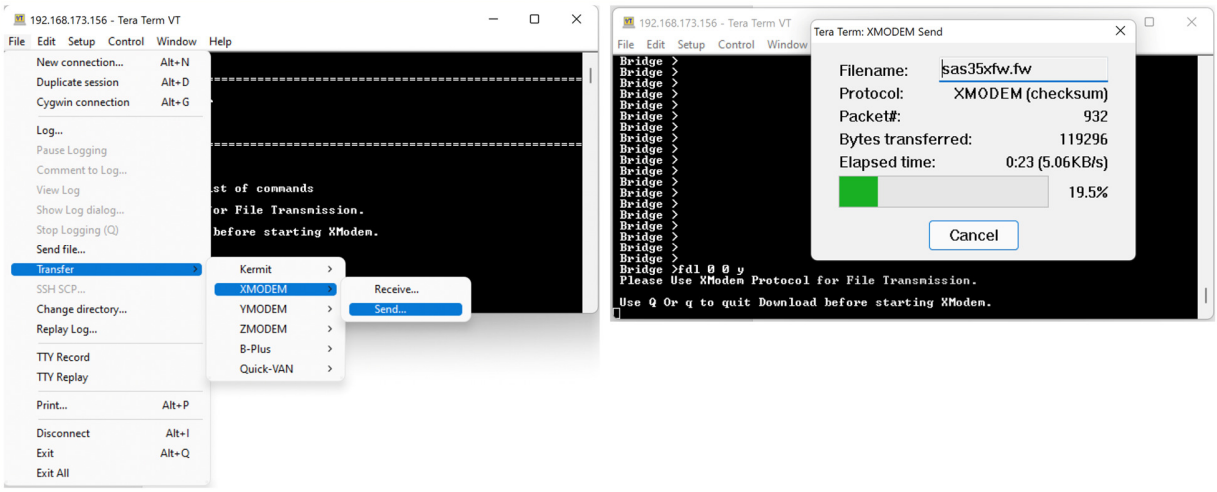

FIGURE 17 FIRMWARE UPGRADE BY XMODEM

Syntax – Download Firmware

```
fdl 0 0 y
```

Syntax – Download MFG

```
fdl 1 0 y
```

Example

```
Bridge >fdl 0 0 y
Please Use XModem Protocol for File Transmission.

Use Q Or q to quit Download before starting XModem.


Received 612736Bytes
Buffer Download Complete
       Start downloading to Edge Expanders ...
       Edge1 Download Successfully!
       Edge2 Download Successfully!



Bridge >fdl 1 0 y
Please Use XModem Protocol for File Transmission.

Use Q Or q to quit Download before starting XModem.


Received 49152Bytes
Buffer Download Complete
       Start downloading to Edge Expanders ...
       Edge1 Download Successfully!
       Edge2 Download Successfully!
```

4.16 tftpfdl

tftpfdl <0|1> <0> <y> <tftp_server_ip> <filename>

To upgrade firmware through TFTP, open a TFTP server (Figure 18) on your console host and specify the path in TFTP server to the directory where the firmware is stored. Please be sure the TFTP server is reachable to the JBOD system.

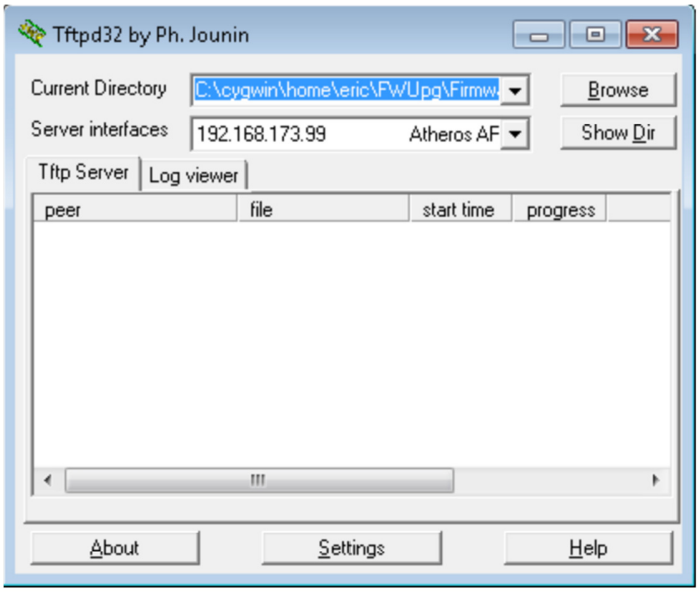

FIGURE 18 TFTP SERVER FOR UPGRADE

Syntax – Download Firmware through TFTP

```
tftpfdl 0 0 y <tftp_server_ip> <fw_filename>
```

Syntax – Download MFG through TFTP

```
tftpfdl 1 0 y <tftp_server_ip> <mfg_filename>
```

Example

```
Bridge >tftpfdl 0 0 y 192.168.173.139 RJ472-3.0.1.fw

 Received 612776Bytes
 Firmware Download Complete
        Start downloading to Edge Expanders ...
        Edge1 Download Successfully!
        Edge2 Download Successfully!
```