



IW-RJ472-05

User Manual

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PREFACE

Thank you for choosing the InWin IW-RJ472-05. This manual is written for system technicians who are responsible for installation, troubleshooting, managing and repairing this server chassis. This document provides the overview of all the features of the chassis, a list of accessories or other components you may need to finish the installation, troubleshooting methods and instructions on adding and removing components on the InWin IW-RJ472-05. For the latest version of this manual, you may visit InWin's server website to download the latest updated version.

SAFETY INFORMATION

To ensure a safe and smooth operation of your InWin IW-RJ472-05, it is essential that you choose an appropriate location for the system, provide an appropriate operating environment and supply an adequate amount power for all components of the system. As you plan for installation, follow the guidelines below to ensure that the system and its environment are safely and appropriately positioned for efficient operation and service. Your system should be installed and serviced only by a qualified technician.

Environment selection: The system is designed to operate in a typical office environment:

- The location should be clean, dry and free of airborne particles.
- It should be situated in a well-ventilated room, and away from sources of heat including direct sunlight and radiators.
- It should be kept away from sources of vibration or physical shock.
- The space should be accommodated with a properly grounded wall outlet, and with sufficient space to access the power supply cords.
- The operating environment temperature should be around 0°C to 40°C (32°F to 104°F).

Heed safety instructions: Before working with InWin IPC/Storage server products, we strongly recommend you use this guide as a reference and follow the safety instructions. The instructions in this manual will help you ensure and maintain compliance with existing product certifications and approvals. Follow the described, regulated components mentioned in this manual. Use of non-UL listing products or other regulators may not comply with product regulations in the region(s) in which the product is sold.

System power on/off: The power button DOES NOT totally turn off the system AC power. To remove the power of the system, you must unplug the AC power cord from the outlet or the system's power supply units. Make sure the power cord is unplugged before you open the chassis or add/remove any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions can be present on/in power supply units and their cables. Disconnect the power cord and any other device attached to the server before opening the case. Failing to follow safety procedures will increase the risk of personal injury or equipment damage.

Electrostatic discharge (ESD) and ESD protection: In most cases, ESD may damage disk drives, electronic boards and other parts. We recommend that you conduct installation only at an ESD free space. If not possible, perform ESD protection protocol by wearing an anti-static wrist straps attached to the ground on any unpainted metal surface on your server during operation.

Installing or removing jumpers: A jumper is a short length conductor used to close, open or bypass part of an electronic circuit. Jumpers on InWin backplanes have a small tab on top that you can pick up with your fingertips. Grip the jumper carefully, and plug the jumper to cover the jumper pins on the backplane. Once you need to remove the jumper, grip the jumper and carefully pull without squeezing.

CAUTION

To avoid damage and maintain your safety, please read the following terms listed below:

1. Do not populate hard drives and turn on the power until the system has stabilized.
Make sure hard drives and other components are properly connected before turning on the system.
2. Tighten or loosen all screws with a screwdriver.
3. Apply the correct screws packed in the accessory box.
4. For your safety, please have at least two people lift and place the unit in its designated area.
5. Before mounting the unit to the cabinet, make sure the rail is installed correctly.
6. When installing and removing any module or part, please use the handles.



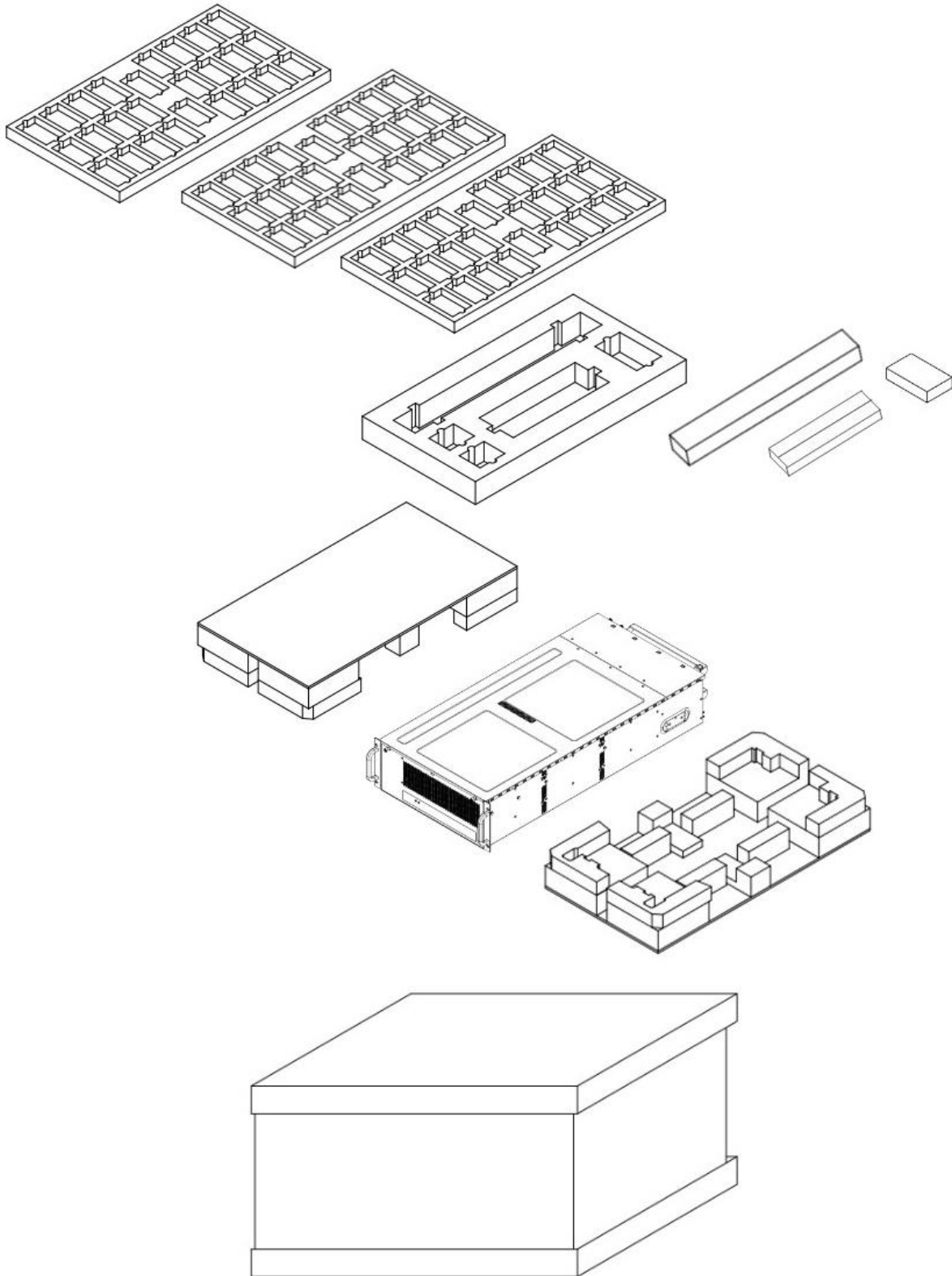
SPECIFICATIONS

Model Name	IW-RJ472-05
Standard	EIA-RS310D
Dimensions (D x W x H) w/o Front Door	914.4 x 482.6 x 176 mm (36" x 19" x 7")
Storage	External: Hot-swap 3.5" x 72 (SAS 12Gbps)
Power Supply (PSU+FAN Modules)	Supports ▪ Form Factor: High efficiency redundant PSU ▪ Watt: 1100W
Cooling Fan (PSU+FAN Modules)	80 x 38 mm PWM x 6
12G Expander Module	1 or 2
Host/Expansion Port	6 x Mini SAS HD (SFF-8644) for each 12G expander module
Management	Smart fan, thermal monitor, HDD monitor, voltage monitor, alarm warning
SES	Supports SES-2 (SCSI Enclosure Service)
Maintenance	Supports management by Ethernet (Optional) and RS-232
HDD Power Management	HDD sequential power on
Temperature	0°C to 35°C
Material	Material: SGCC Thickness: 1.0 mm
Rail Kit	Supports 28" tool-less & ball-bearing slide rail

* The actual product is subject to change without prior notice. In Win Development Inc. reserves the right to make any final modifications.

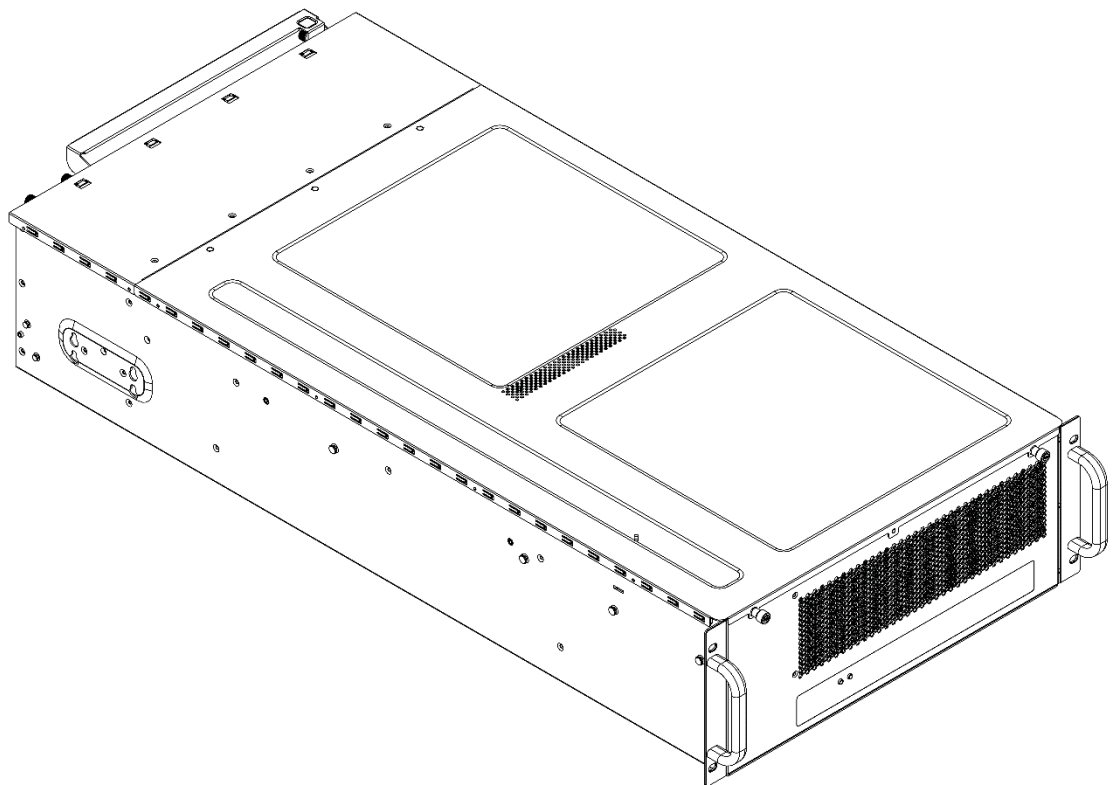
1 Product Introduction

1.1 Box Contents



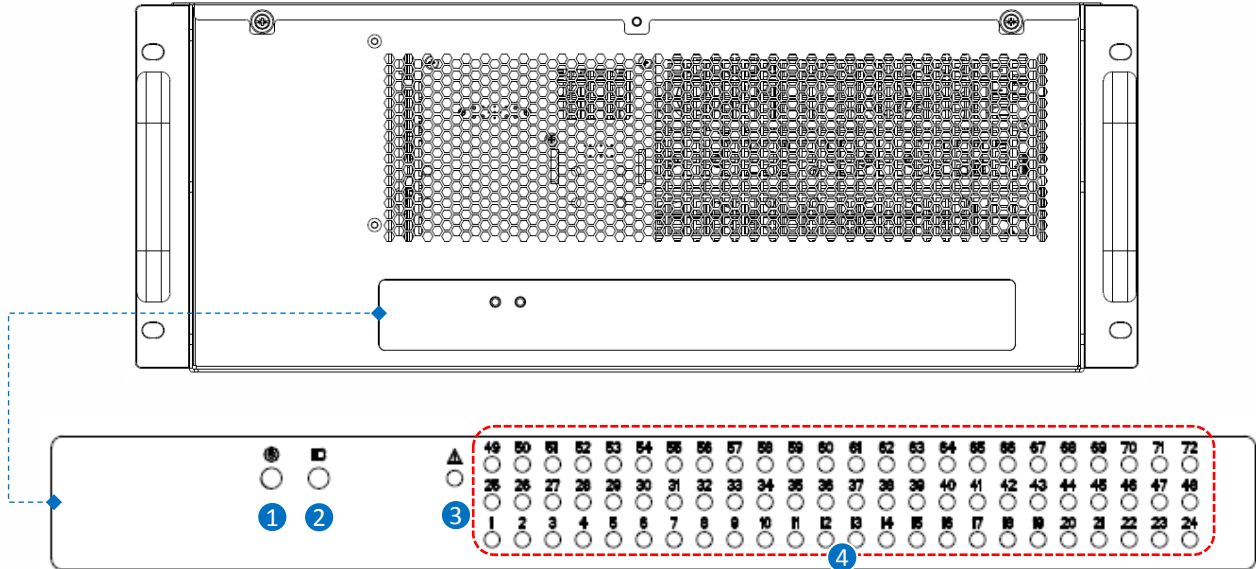
1.2 General Information

Designed for high scalability and high availability in storage applications, the IW-RJ472-05 JBOD enclosure is a high density 4U rackmount storage chassis with 72 tool-less bays, dual hot-swap SAS 12G expander modules, six Mini SAS HD (SFF-8644) for each 12G expander module, six PSU + Fan module fans, dual redundant 1100W power + fan module, and GUI supports via Ethernet board (Optional).



1.2.1 Front Panel Controls and Indicators

The front panel includes control buttons and LED indicators.



No.	Name	Color	Status	Description
1	Power On/Off Button with LED	Blue	Solid on	System is powered on
		N/A	Off	System is off
2	Chassis ID Button with LED	Blue	Solid on	Press the button to activate chassis identification
3	Status LED	Red	Solid on	System maintenance (PSU, fan malfunction)
4	Drives Status LEDs for Bays 1-72	Follow the table below		

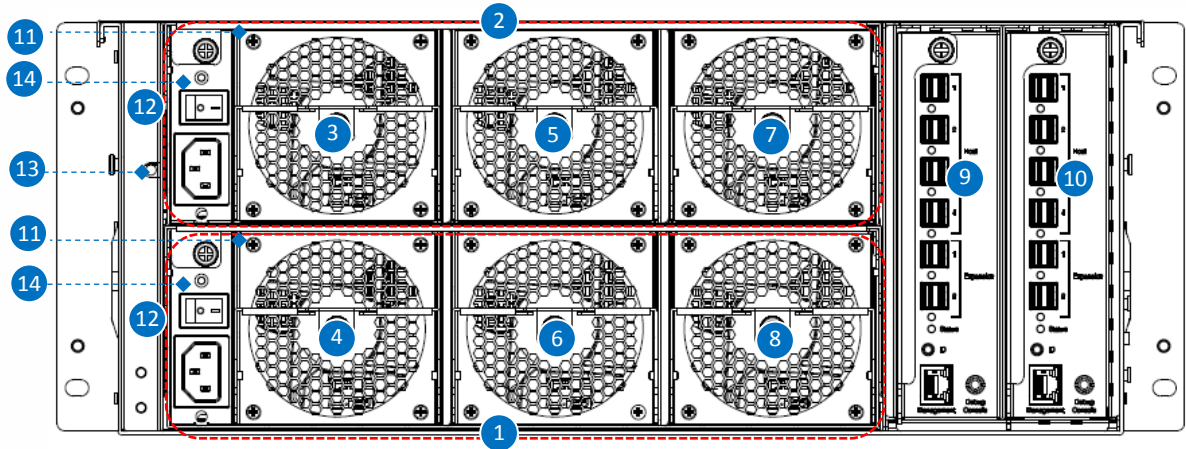
Status LED:

- System Healthy
- System Maintenance (PSU, fan malfunction)

Drive Status LED:

- (Solid) Drive Online
- (Blink) Drive Activity
- (Solid) Drive Failed
- (Blink) Drive Missing
- (Solid) RAID Drive
- (Blinking Purple on Solid Blue) RAID Active / Rebuild
- (Alternating Blink) Drive Faulty / RAID Failure
- (Blink) Drive Locate
- Drive Offline / Removed

1.2.2 Rear Panel Configuration



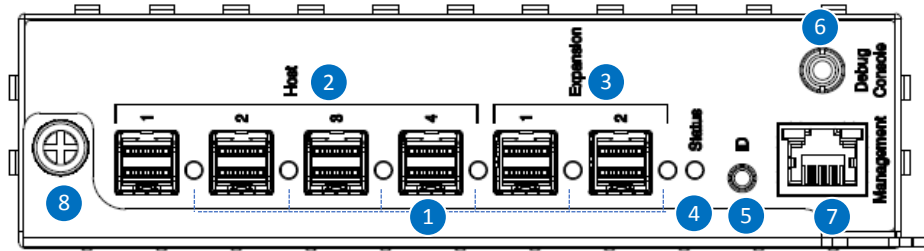
No.	Item
1	Power Module 1 (PSU+FAN Module)
2	Power Module 2 (PSU+FAN Module)
3	Fan Module 1 (PSU+FAN Module)
4	Fan Module 2 (PSU+FAN Module)
5	Fan Module 3 (PSU+FAN Module)
6	Fan Module 4 (PSU+FAN Module)
7	Fan Module 5 (PSU+FAN Module)

No.	Item
8	Fan Module 6 (PSU+FAN Module)
9	Primary Expander Module
10	Secondary Expander Module
11	Power Module Handle
12	Power Switch
13	PSU Alarm Mute Button
14	PSU Status LED

PSU Status LED:

-  Power Standby
-  Power On
-  Loss of Power

1.2.2.1 Expander (Host) Configuration



No.	Name	Description
1	SAS Port LEDs	Host HBA/RAID card connection
2	SAS Host Ports	External Uplink, Connect to HBA/RAID card
3	SAS Expansion Ports	External Downlink, Connect to cascading JBOD
4	Expander Module Status LED	Heartbeat
5	ID LED / Button	Press the button to activate chassis identification
6	Expander Serial Port (RS-232)	RS-232 Support
7	Network Management Port	Connect to Ethernet remote monitoring
8	Expander Module Handle	

SAS Port LEDs:

-  SAS Connection On
-  SAS Activity

Expander Module Status LED:

-  Heartbeat

ID LED:

-  ID on

2 Hardware Installation

2.1 Removing and Inserting the Top Cover

2.1.1 Open the cover of the chassis

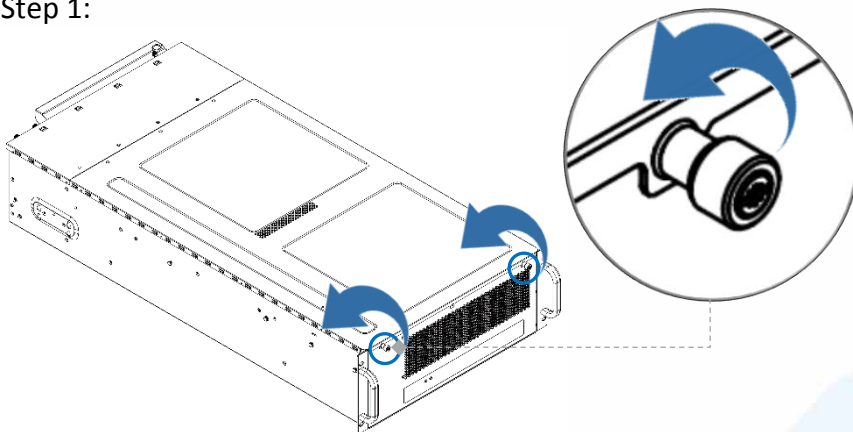
NOTE: Please open the top cover only when necessary and close it within 1 minute to prevent the system from HDD overheating.

Step 1: Loosen the thumbscrews of the top cover.

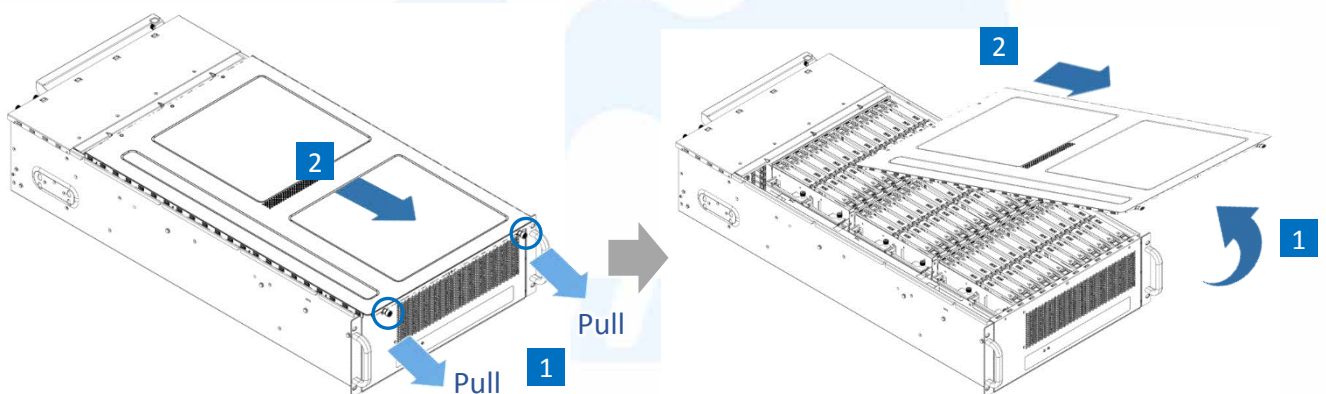
Step 2: Pull the thumbscrews to release the top cover.

Slide and tilt the cover upward from the front and lift to remove.

Step 1:



Step 2:

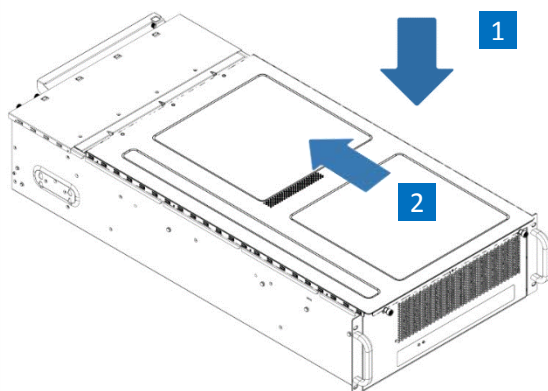


2.1.2 Close the cover of the chassis

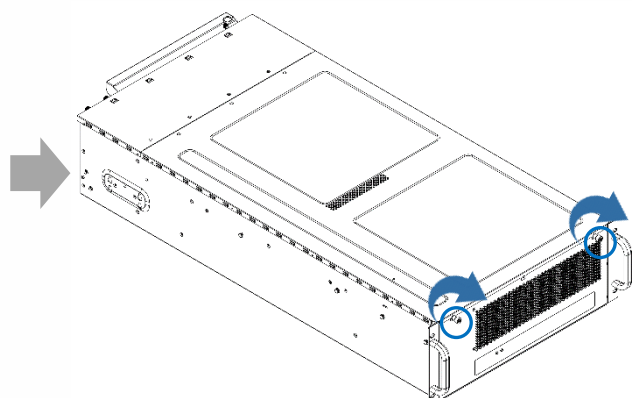
Step 1: Place down the top cover, then slide and match to the proper location.

Step 2: Tighten the screws to secure the top cover.

Step 1:



Step 2:



2.2 Removing and Installing a Hard Drive

The IW-RJ472-05 JBOD features tool-less trays, users can easily swap drives without any screws.

2.2.1 Installing a Hard Drive

Step 1: Release the latch in the direction of the arrow on the tray.

Open the disk tray cover and pull it outward as a handle.

Step 2: Pull up the tray until it clicks.

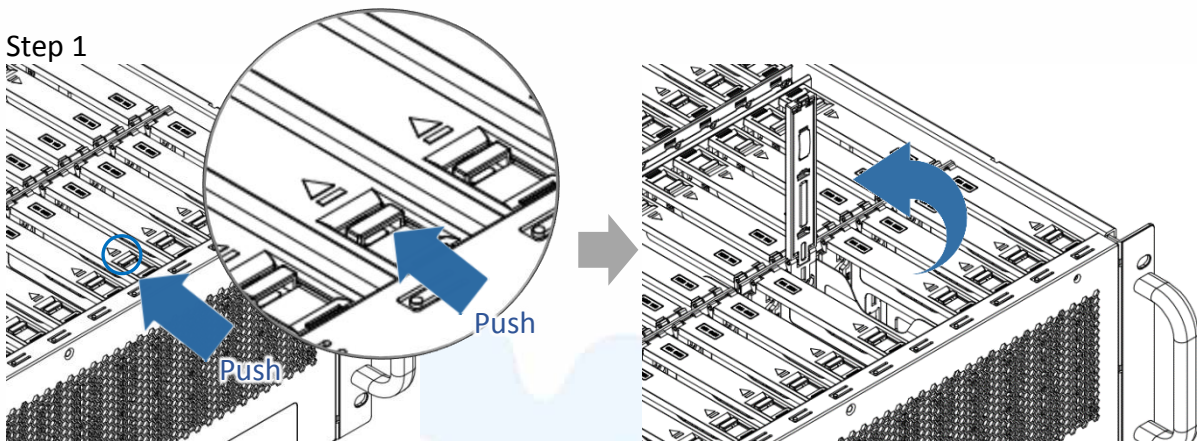
Step 3: Fully insert the HDD into the tray from the correct disk port orientation.

Step 4: Align the HDD screw holes and plug in the pins on the side of the tray.

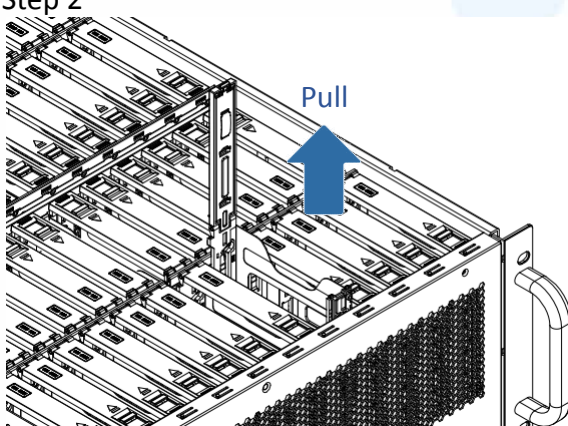
Keep the tray pins against the HDD screw holes and push the disk tray back to the location.

Step 5: Release the latch to close the cover to lock.

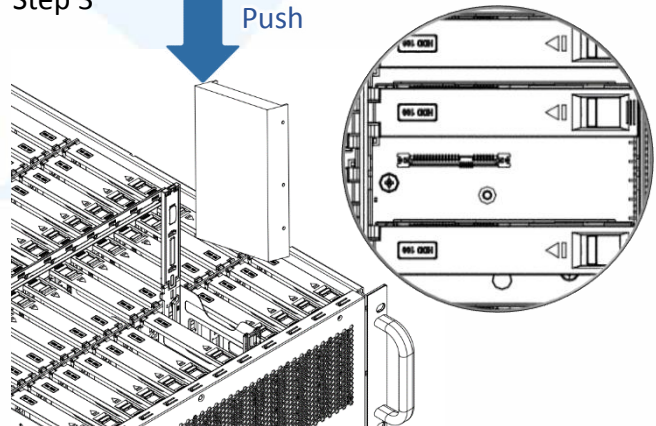
Step 1



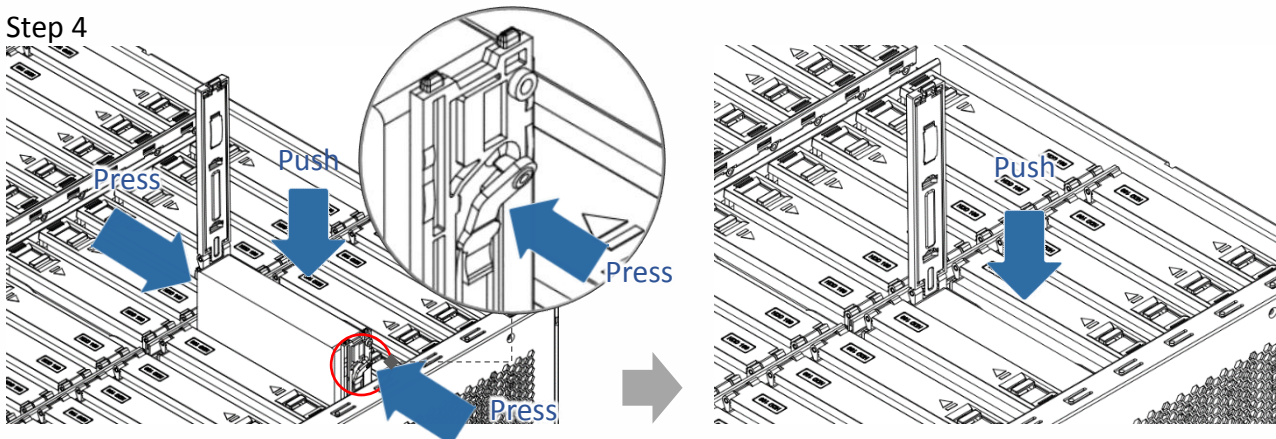
Step 2



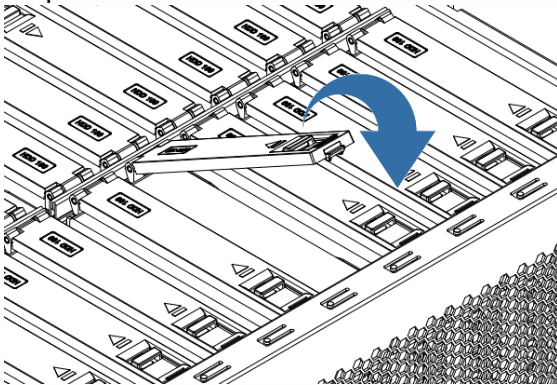
Step 3



Step 4



Step 5



2.2.2 Removing a Hard Drive

Step1: Release the latch in the direction of the arrow on the tray.

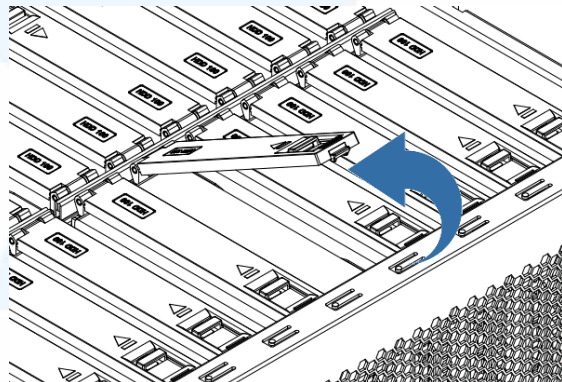
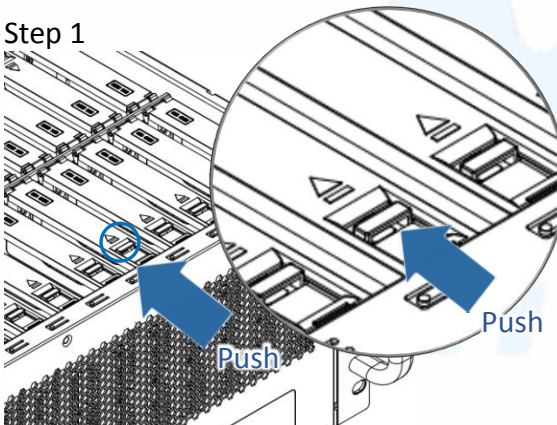
Open the disk tray cover and pull it outward as a handle.

Step2: Pull up the tray until it clicks.

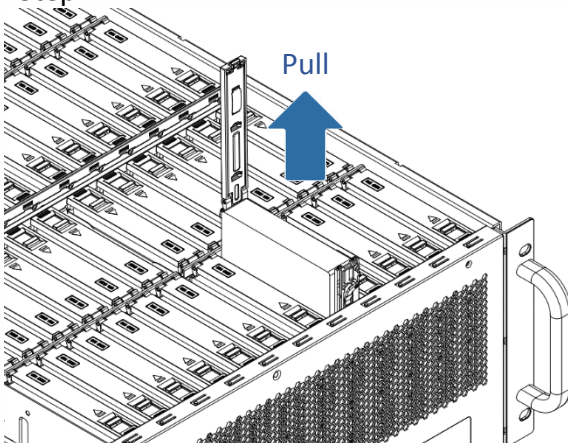
Step3: Pull the hard drive out carefully.

Step4: Lower the disk tray back. Release the latch to close the cover to lock.

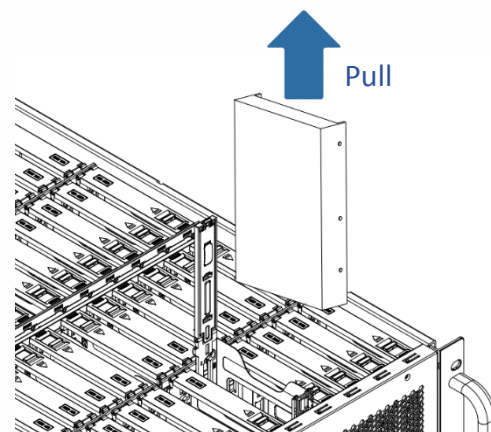
Step 1



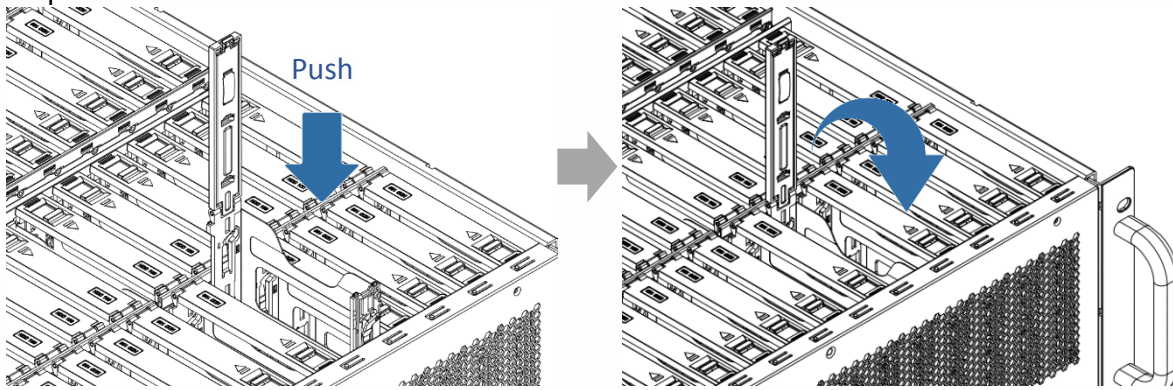
Step 2



Step 3



Step 4



2.3 Removing and Installing the Fan Module

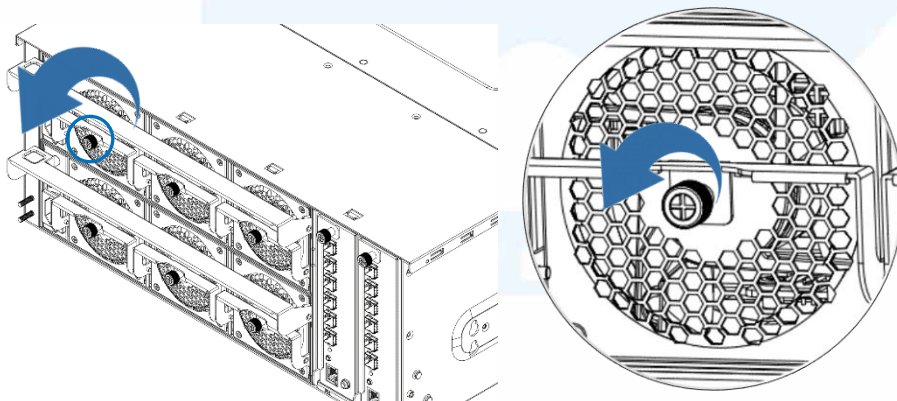
The IW-RJ472-05 JBOD has built-in fan modules that support hot-swappable and redundant features, which are easy to maintain with the tool-less design.

2.3.1 Removing the Fan Module

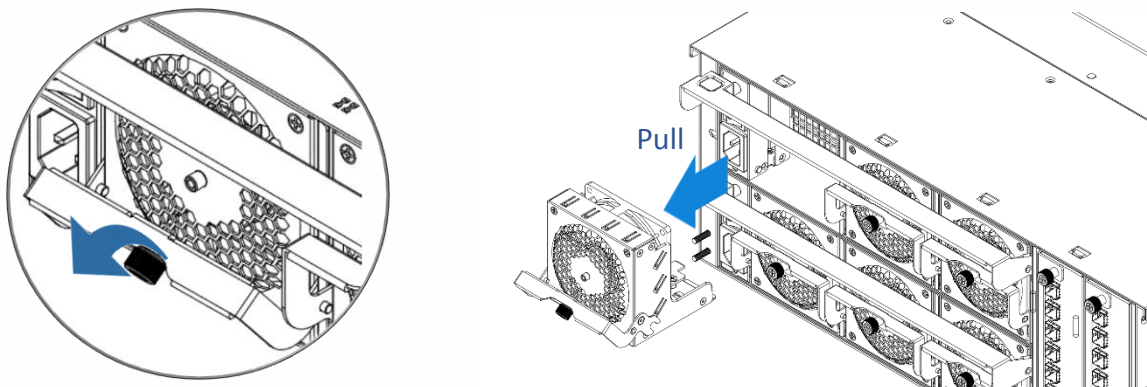
Step 1: Loosen the thumbscrew of the fan module.

Step 2: Press the handle and pull out the fan module with the slot to separate it from the PSU+FAN module.

Step 1



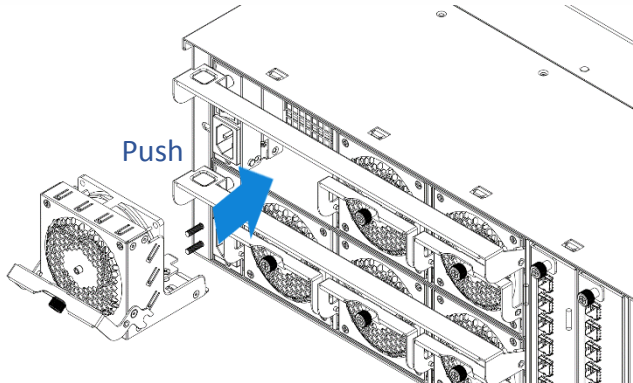
Step 2



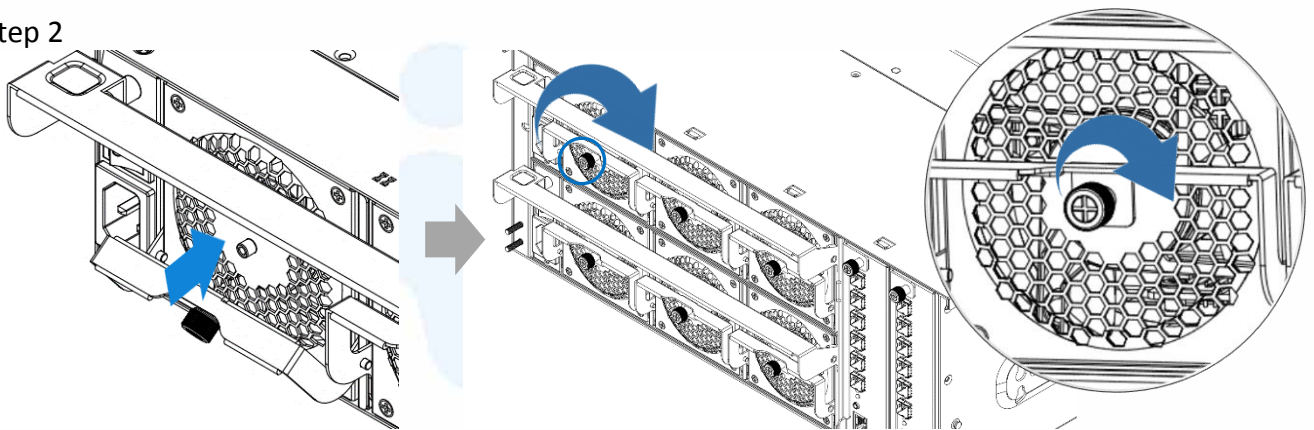
2.3.2 Installing the Fan Module

- Step 1: Push the fan module back into the slot until it clicks.
- Step 2: Secure the thumbscrews in place and tighten.
- Step 3: Connect the fan to the backplane.

Step 1



Step 2



2.4 Removing and Installing the PSU+FAN Module

The IW-RJ472-05 hosts dual built-in redundant 1100W PSU + FAN modules. Each module cage contains one power supply and three fan modules. With this function, the system is capable of still functioning if one of the modules fail. To replace it, the user only needs to release the failed module, then insert a functional module.

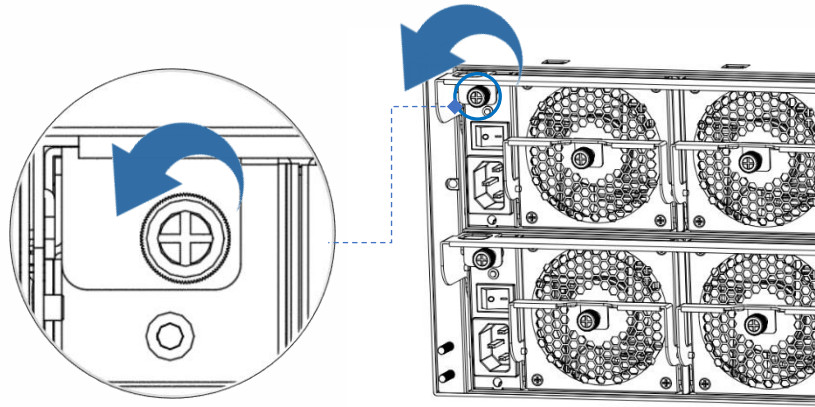
NOTE: The two PSU modules' output wattage must be the same.

To ensure the stability of use, if the PSU module fails, it is recommended to replace the PSU with the fan modules together.

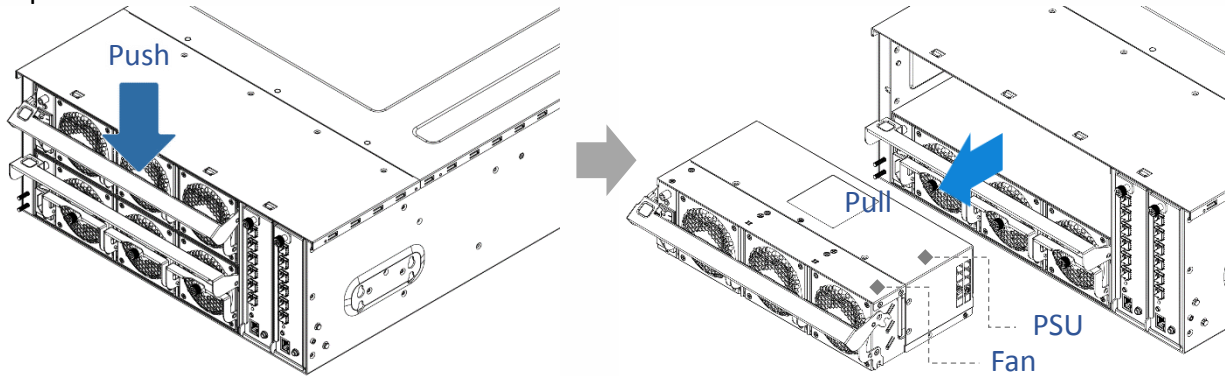
2.4.1 Removing the PSU+FAN Module

- Step 1: Loosen the thumbscrew of the PSU+FAN module cage at the back.
- Step 2: Push down the handle and use the handle to pull out the cage.
Separate the PSU+FAN module from the enclosure.

Step 1



Step 2

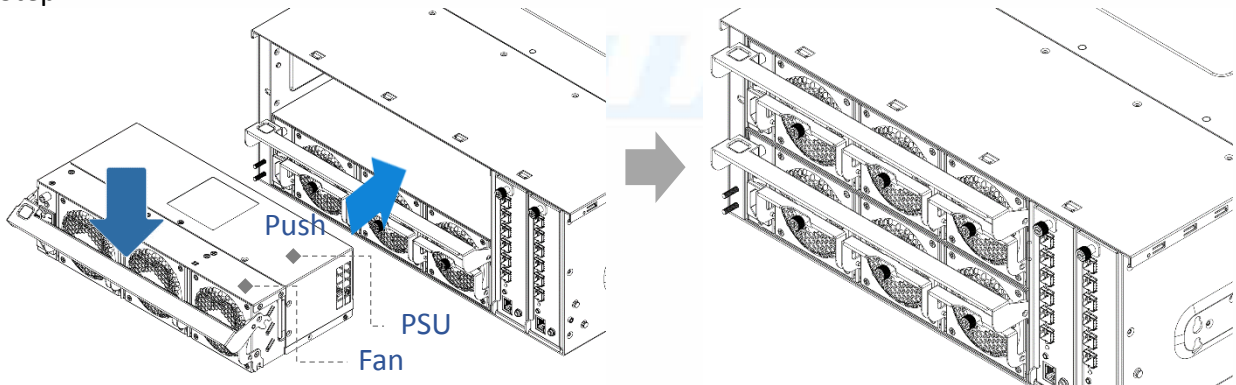


2.4.2 Installing the PSU+FAN Module

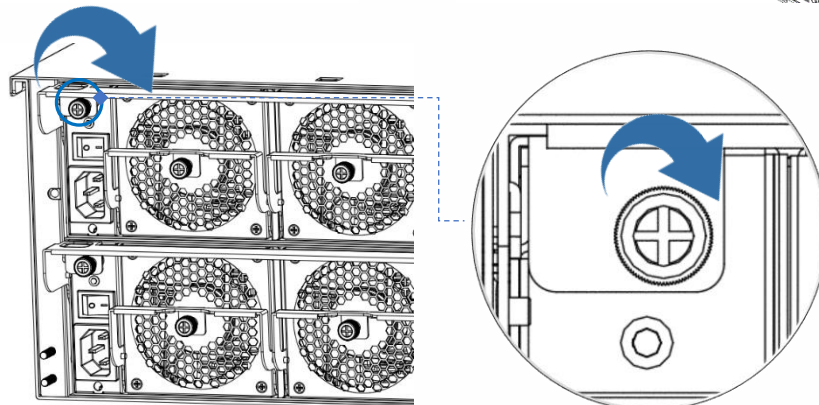
Step 1: Push the 1100W PSU+FAN module into the cage until it clicks back the original location.

Step 2: Tighten the thumbscrew to secure the cage.

Step 1



Step 2



2.5 Removing and Installing the Host & Disk Expander Module

The IW-RJ472-05 JBOD is accommodated with pre-installed dual redundant host expander and six redundant disk expander modules. The internal expander is primary; and the external expander will be the secondary. The host expander module includes an Ethernet management module, which allows users to monitor and maintain the system. Also, the redundant module can minimize downtime should any of the expanders fail.

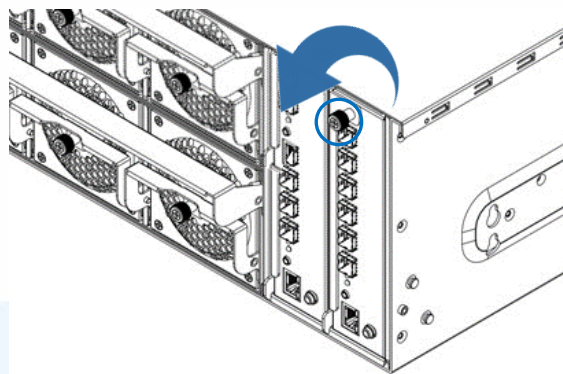
2.5.1 Removing the Host Expander Module

Step 1: Loosen the thumbscrew of the host expander module.

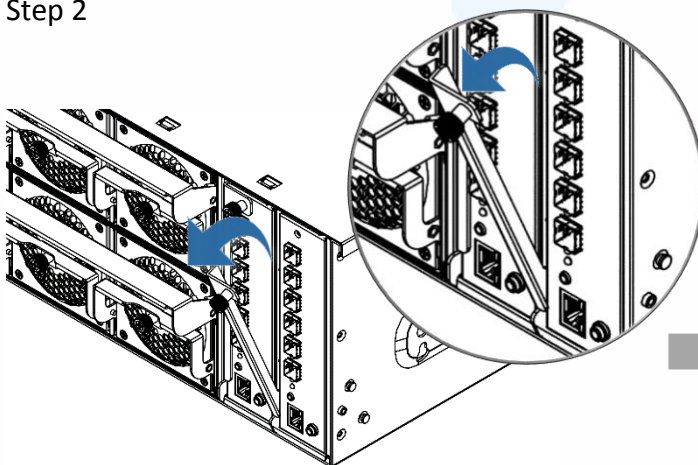
Step 2: Rotated the expander module lever outward.

Step 3: Pull out the expander module.

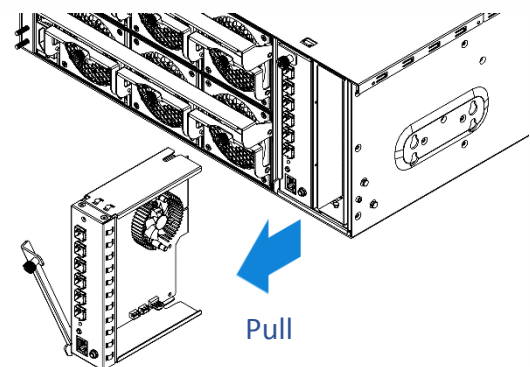
Step 1



Step 2



Step 3



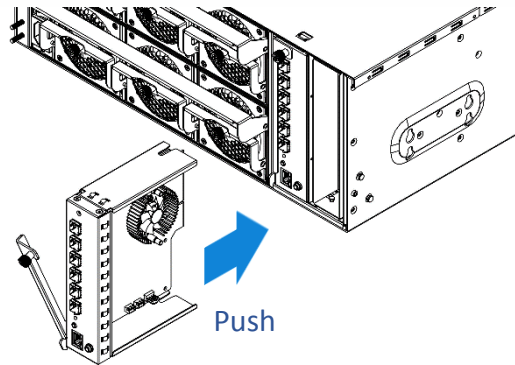
2.5.2 Installing the Host Expander Module

Step 1: Push the expander module into the cage until it clicks back to the original location.

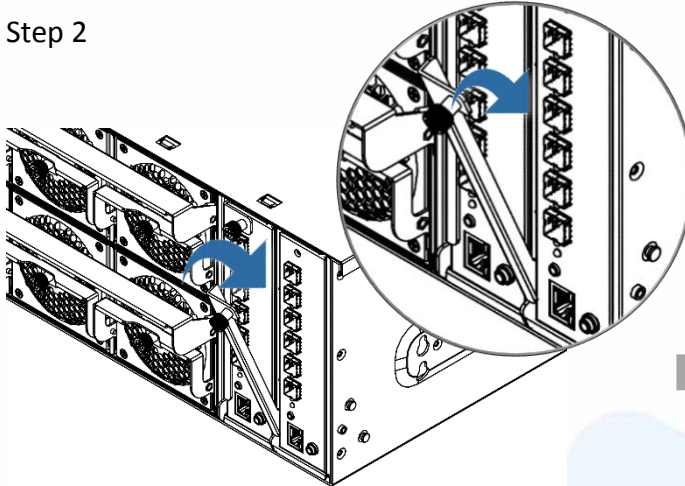
Step 2: Rotated the lever back into position.

Step 3: Tighten the thumbscrew.

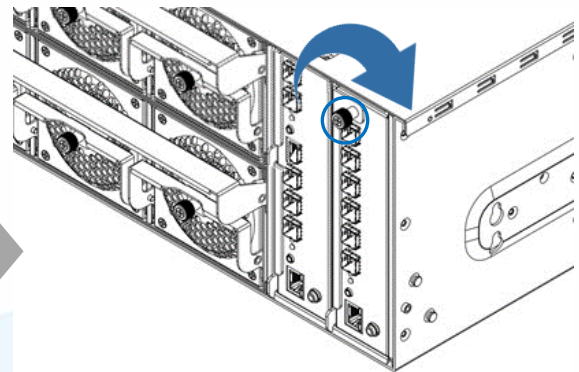
Step 1



Step 2



Step 3



2.5.3 Removing the Disk Expander Module

NOTE: Please open the top cover only when necessary and close it within 1 minute to prevent the system from HDD overheating.

Step 1: Open the top cover of the chassis. (Please refer to 2.1.1)

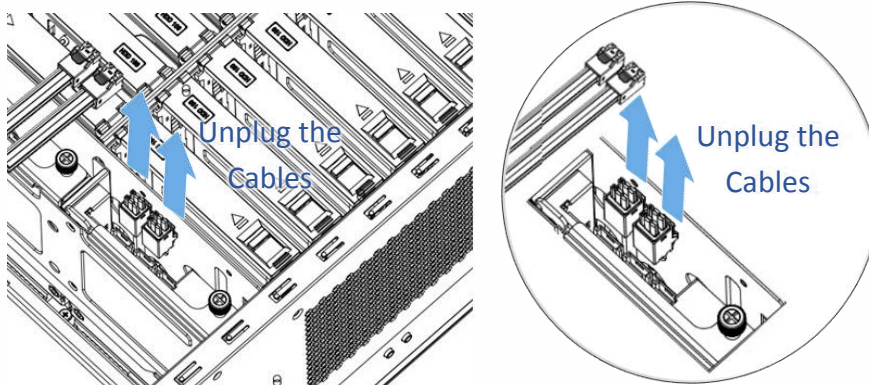
Step 2: Remove the cable from the disk expander module.

Step 3: Loosen the thumbscrew of the module.

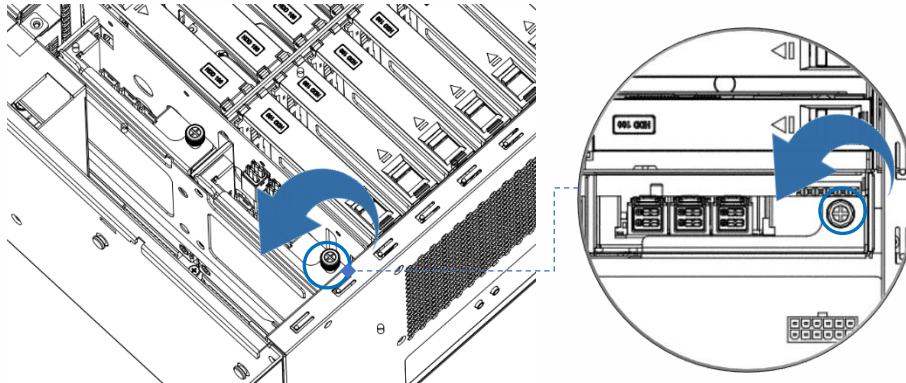
Step 4: Rotate the disk expander module handle outward.

Step 5: Pull out the disk expander module.

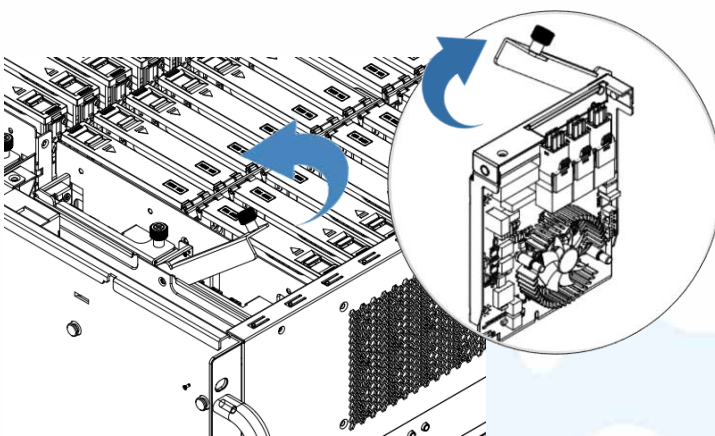
Step 2



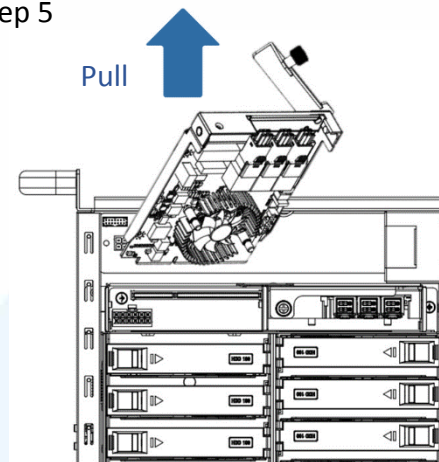
Step 3



Step 4



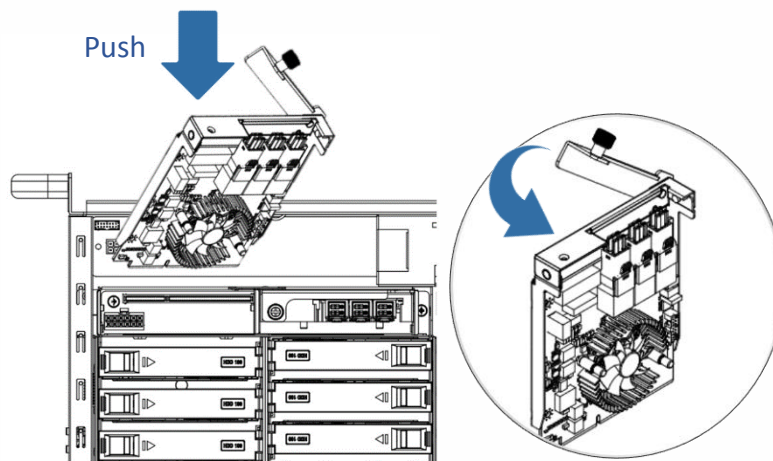
Step 5



2.5.4 Installing the Disk Expander Module

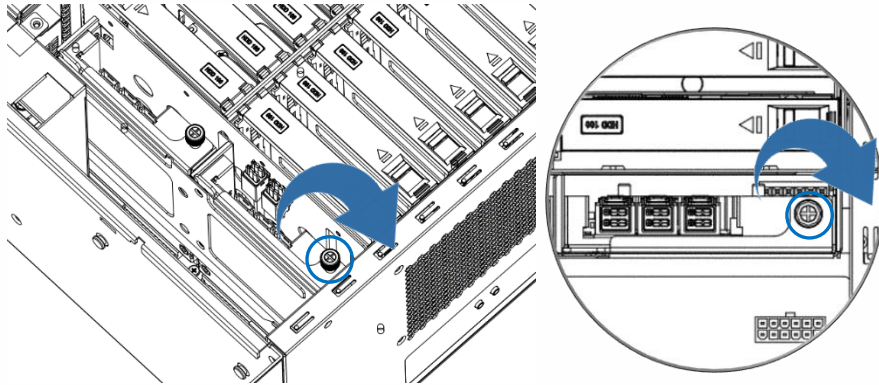
- Step 1: Place the disk expander module into the cage until it clicks.
- Step 2: Put the thumbscrew into position and tighten the thumbscrew.
- Step 3: Connect the cable to the disk expander module.
- Step 4: Close the top cover of the chassis. (Please refer to 2.1.2)

Step 1

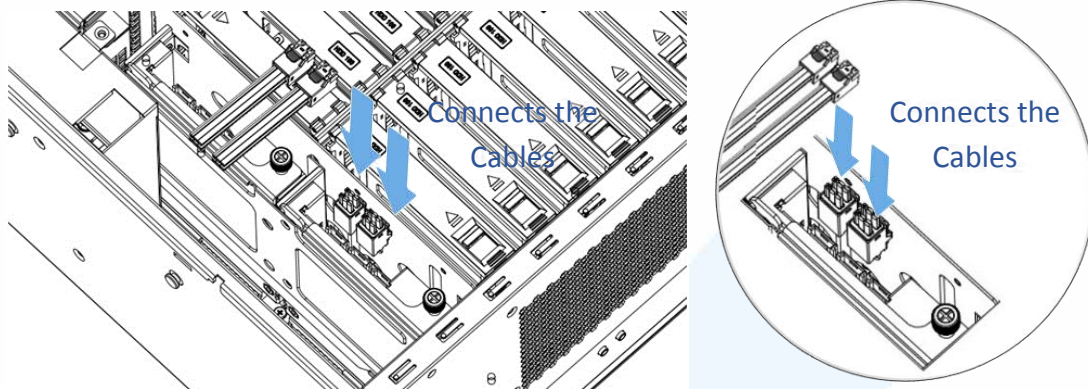




Step 2



Step 3



InWin

2.6 Rail Installation

The IW-RJ472-05 JBOD is a high density 4U rackmount storage model, which supports EIA-RS310D standard cabinets and chassis racks. InWin provides standard slide rails for mounting the JBOD chassis to cabinets.

2.6.1 The Type of Rail Kit

Please follow the instructions to install the rails on the cabinet or chassis rack according to the rail type you ordered.

2.6.2 Slide Rail

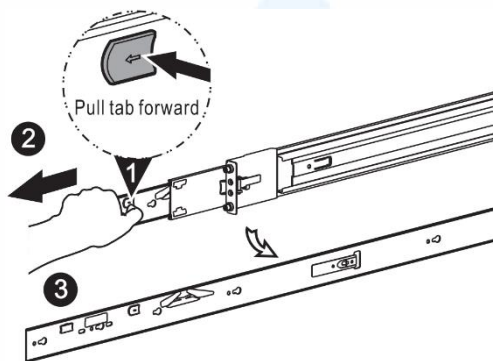
2.6.2.1 Take out the Inner Rail and Slide the Intermediate Rail Back

Step 1: Pull out the inner rail until it reaches the stop. Release the blue slide tab to unlock.

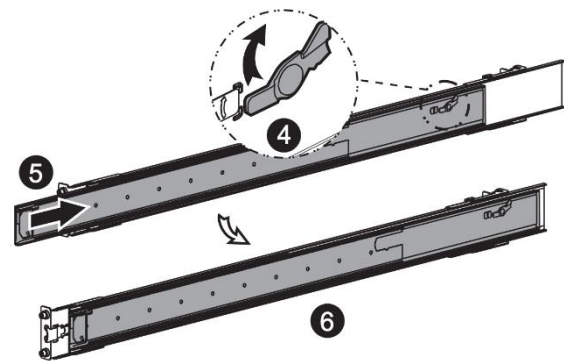
Step 2: Continue pulling the inner rail until the second stops. Release the white slide tab to remove the inner rail.

Step 3: Pull the latch on the middle rail upward and retract the middle rail back.

Step 1 ~ 2



Step 3



2.6.2.2 Attach the Inner Rail to the Chassis

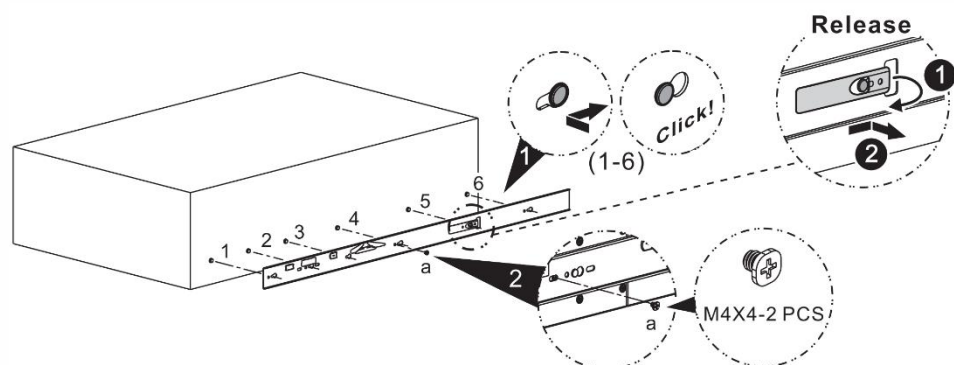
Step 1: Align the chassis sidewall standoffs to the inner rail keyholes. Slide the inner rail toward the front until the standoff snaps into place, securing the rail to the chassis.

Step 2: Repeat the same action on the other side.

Step 3: When removing the inner rail:

Pull up the latch and slide the inner rail forward. Remove the keyhole from the standoff to detach the inner rail. (Action ① and ② in the figure)

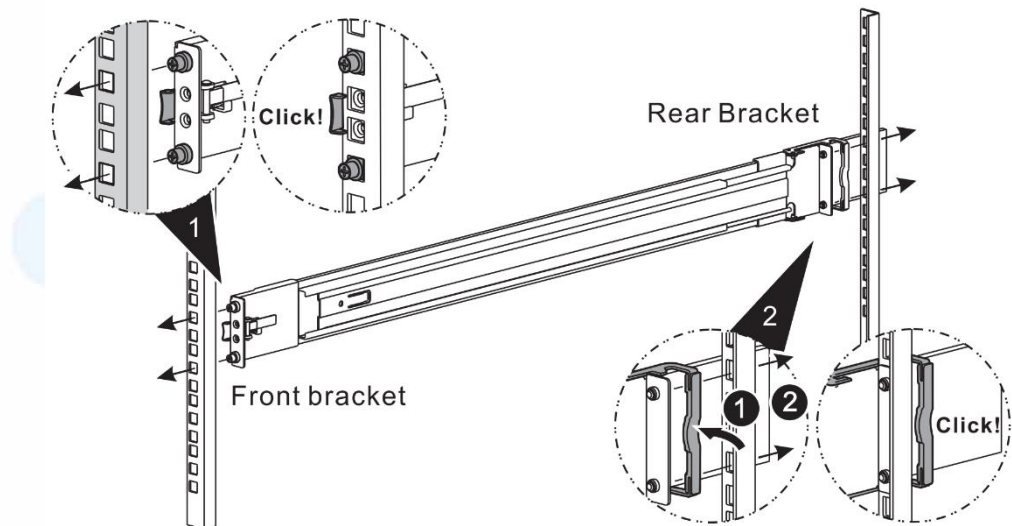
Step 1~3



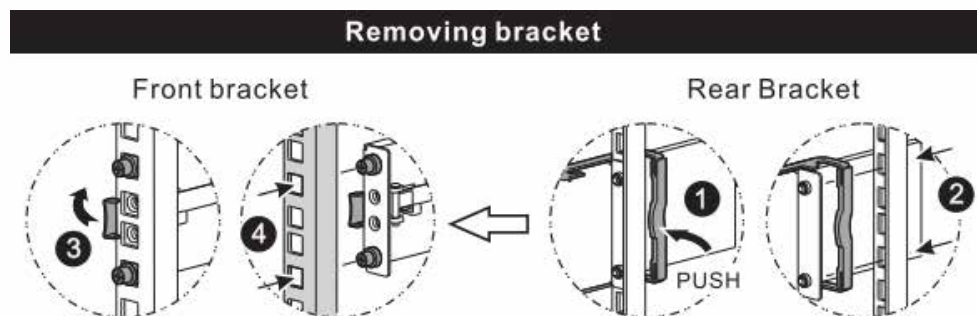
2.6.2.3 Mount the Rail Bracket to the Cabinet

- Step 1: Extend the rail bracket over the rear rack of the cabinet.
- Step 2: Pull out the rear hook on the end of the outer rail, align and push the rail bracket pins into the post holes on the rack. Then, pull back the hook on the end of the outer rail.
- Step 3: Extend the opposite side of the rail bracket to the front rack of the cabinet.
- Step 4: Hang the front hooks of the outer rail at the front of the rack post holes. Pull the rail bracket pins that go into the front post holes on the rack until they click.
- Step 5: The other side of the rail is symmetrical, repeat the installation steps 1-4.
- Step 6: Once you would like to detach the bracket, pull outward on the front and rear hooks of the outer rail to release the bracket. Repeat the same action to the other side.

Step 1~5



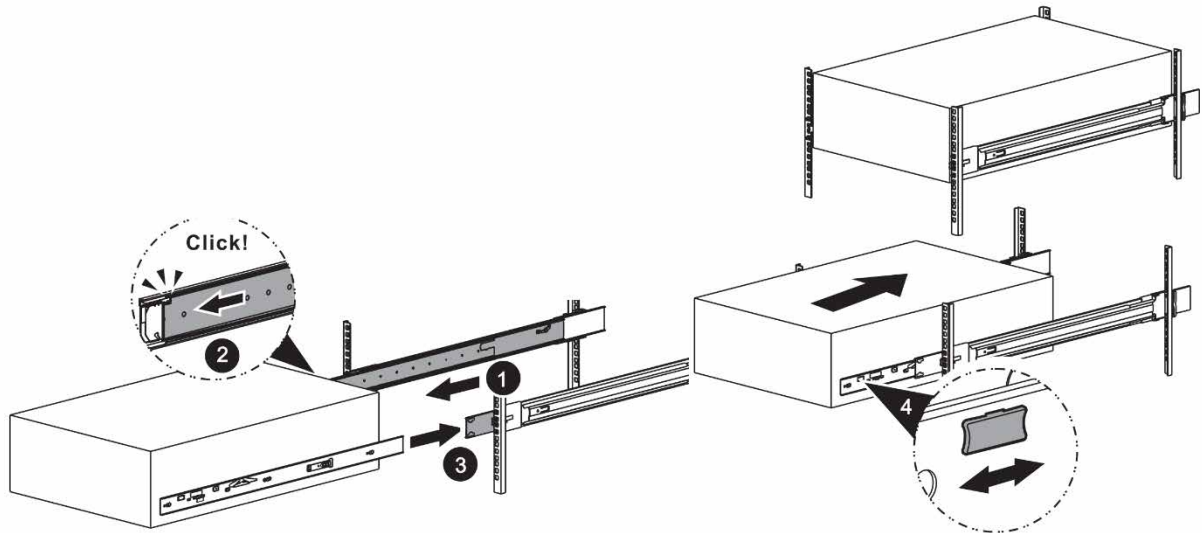
Step 6



2.6.2.4 Insert the Chassis to the Cabinet

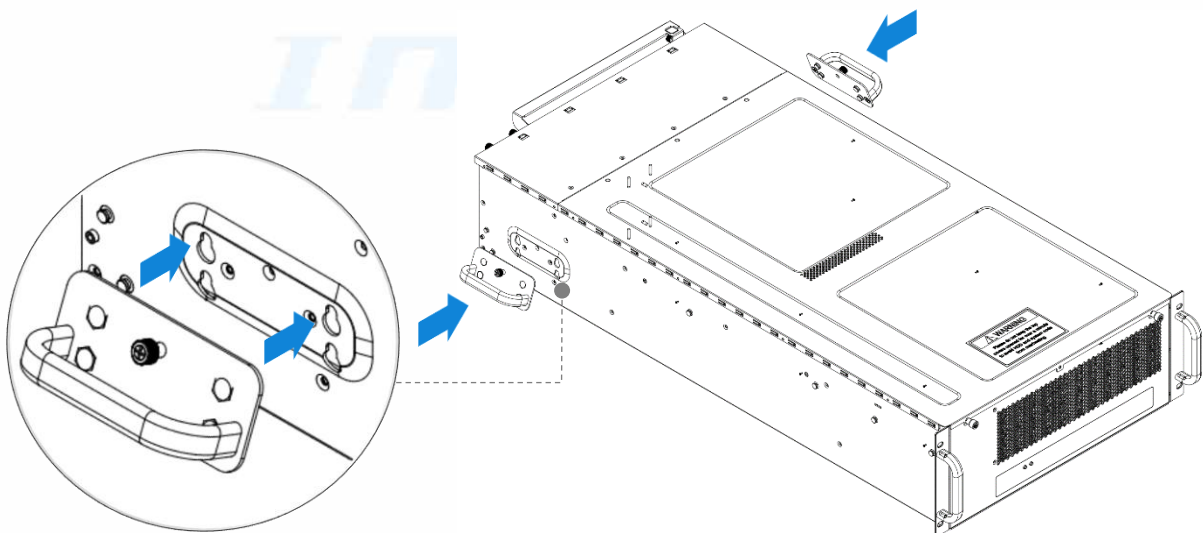
- Step 1: Pull out the middle rail to the stop position.
- Step 2: Move the ball bearing retainer to the front end of the middle rail, it should click into the locked position.
- Step 3: Insert the inner rails of the chassis into the middle rails on the both sides of the rack.

- Step 4: Push the chassis to the stop position, then release the blue slide tab (by either pulling the tab forward or pushing the tab back) to continue.
- Step 5: Until reaching the second stop position, release the blue slide tab again to continue.
- Step 6: Push the chassis into position on the rack completely. Make sure that the front end of the chassis is aligned with the edge of the rack to complete the installation.



NOTE: Heavy Handle with Care!

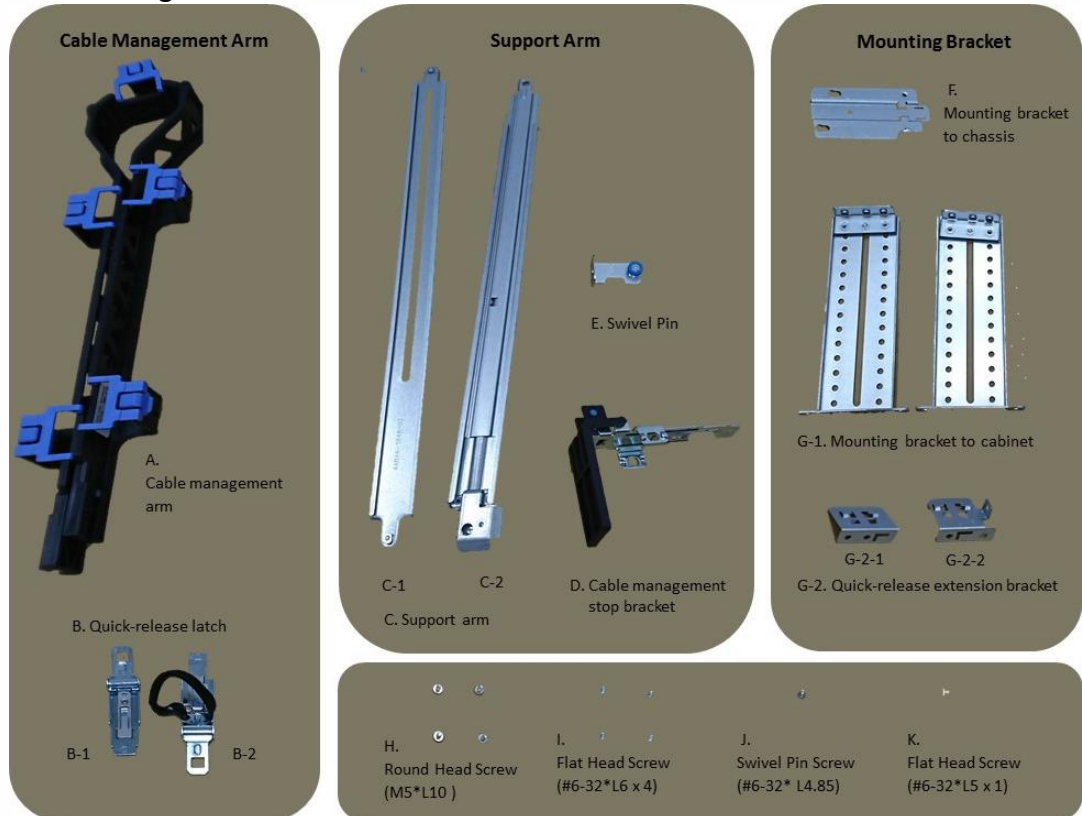
Use the removable handle rivets into the holes in the side of the case and move upward until it clicks to secure before transporting.



2.7 External Cable Management Arm Installation

2.7.1 Parts Required

Please use the following parts from the accessory package to install the external cable management arms.

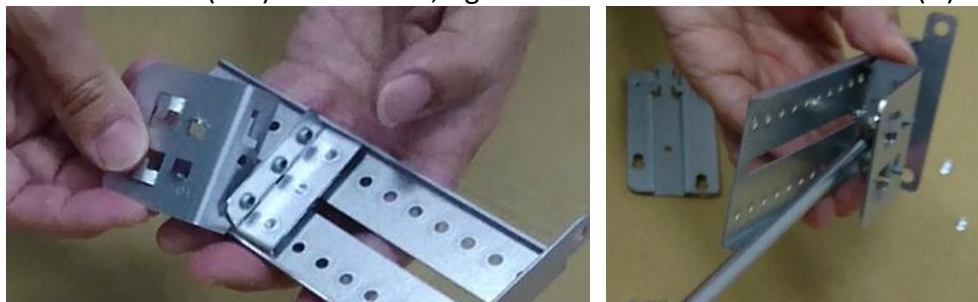


NOTE: The accessory package includes a retractable long rod that is not used in IW-RJ472-05 model. (Picture is as follows)



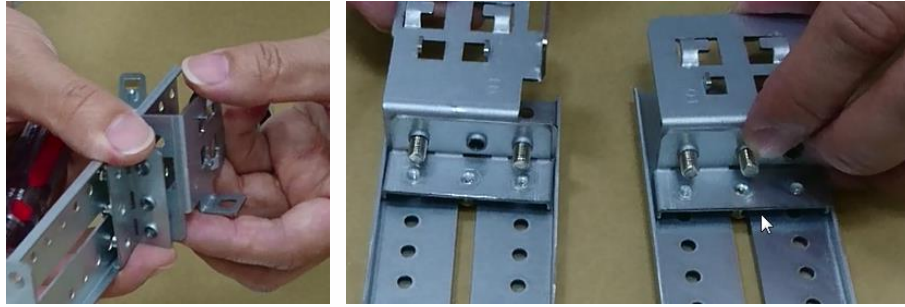
2.7.2 Mounting Bracket Installation

Step 1: Align the quick-release extension bracket (G-2-1) to the cabinet mounting bracket(G-1) screw holes, tighten with two round head screws(H).





Step 2: Align the quick-release extension bracket (G-2-2) to the second cabinet mounting bracket(G-1) screw holes, tighten with two round head screws(H).



2.7.3 Support Arm Installation

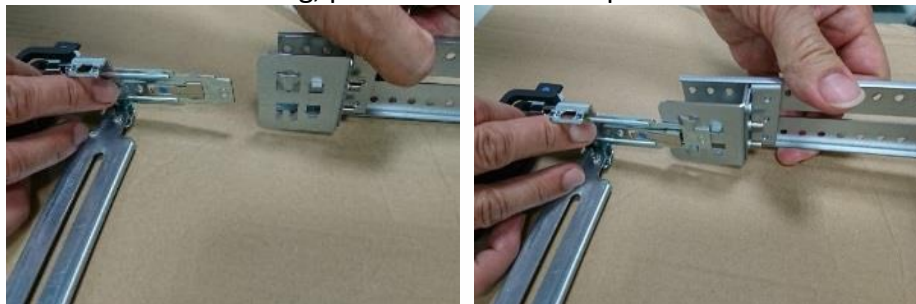
Support Arm C-1

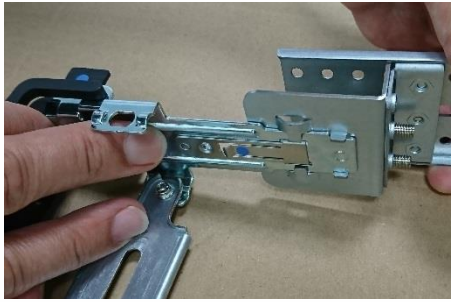
Step 1: Align the support arm(C-1) hexagon head screw to the cable management stop bracket (D) elliptical hole and fasten it down.



Step 2: Insert the latch of the cable management stop bracket (D) into the quick-release extension bracket (G-2-1) on the cabinet mounting bracket(G-1). (Refer to 2.7.2 Step 1)

* When removing, press the blue dot to pull out.





Step 3: Align the opposite side hexagon head screw of the support arm(C-1) with the quick-release extension bracket (G-2-2) and fasten it down.



Step 4: Insert the quick-release latch (B-1) into the quick-release extension bracket (G-2-2) on the cabinet mounting bracket(G-1). (Refer to 2.7.2 Step 2)

* When removing, press the blue dot to pull out.



Support Arm C-2

Step 1: Place the support arm(C-2) hexagon head screw down to the middle hollow of the support arm(C-1) and fasten it.



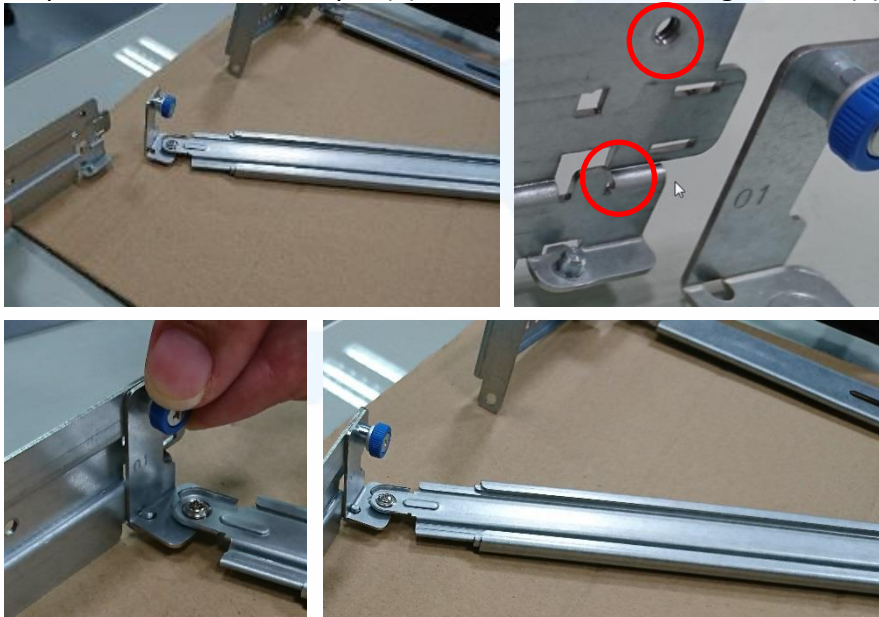
Step 2: Align the swivel pin (E) with the end of the screw hole of the support arm(C-2) and tighten the swivel pin screw (J).



Step 3: Put the chassis mounting bracket(F) along the end of chassis. Align the screw holes and tighten the flat head screws(K).



Step 4: Secure the swivel pin (E) to the chassis mounting bracket (F).



2.7.4 Cable Management Arm Installation

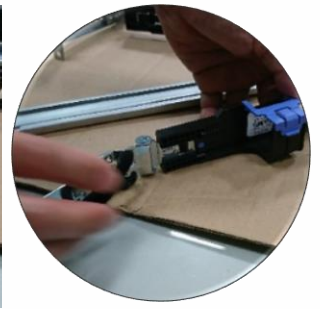
Step 1: Insert the quick-release latch (B-1) into the right of the cable-management arm (A).

- * The purple fastener of the cable-management arm is facing up.
- * When removing, press the blue dot to pull out.



Step 2: Insert the quick-release latch (B-2) into the other side of the cable-management arm (A).

* When removing, press the blue dot to pull out.



Step 3: Insert the other side of the quick-release latch (B-2) into the chassis mount bracket(F).

* When removing, press the blue dot to pull out.





2.7.5 Completing Installation

Step 1: Place the chassis in the cabinet.

Step 2: According to the required depth position, the hole is locked on the fixing bracket of the cabinet (There are two screws on the left and right, which need to be in the same position).

Step 3: Tighten the flat head screw(l) to secure the mounting bracket (G-1) to the cabinet.



* For more detailed dynamic installation instructions, see the RJ472 Rail CMA - Assembly Live Video File. ([Link](#))

2.7.6 Insert the Chassis to the Cabinet External Cable Management Arm Installation

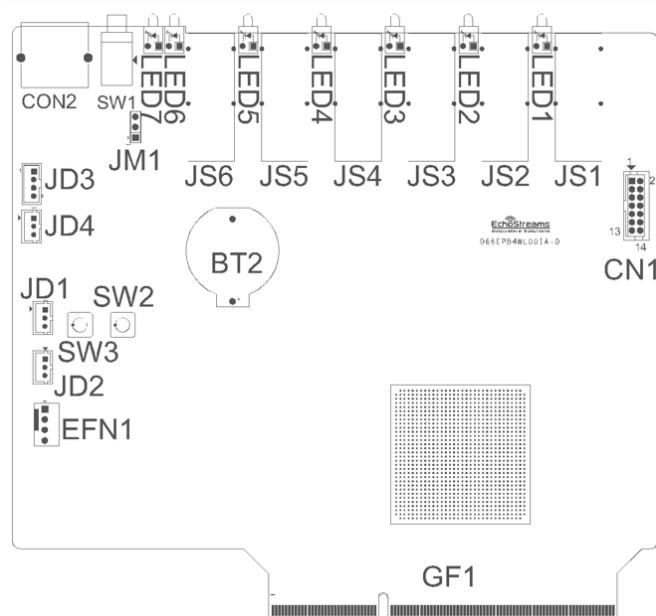
Step 1: Pull out the middle rail to the stop position.

Step 2: Move the ball bearing retainer to the front end of the middle rail, it should click into the locked position.

InWin

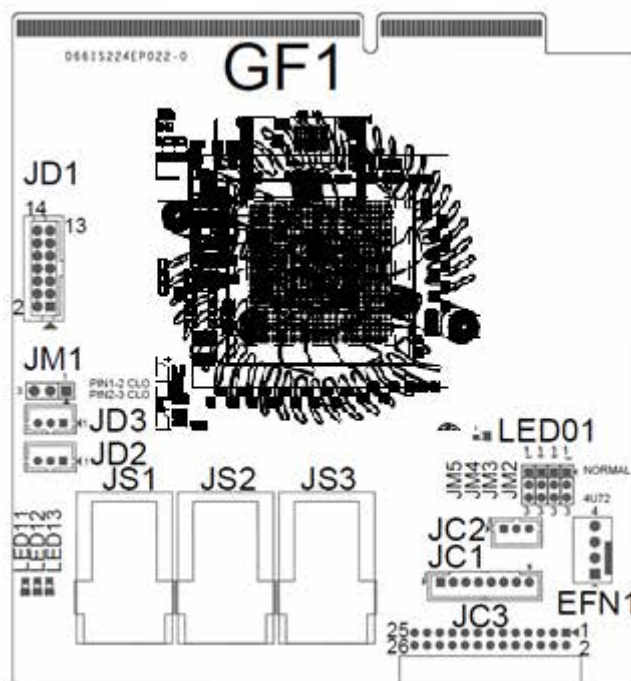
3 Expander Board Introduction (Host & Disk)

3.1 Expander Board (Host)



Location	Description
JS1-JS4	(HOST)External Uplink MINI SAS HD Connector
JS5-JS6	(Expansion)External Downlink MINI SAS HD Connector
LED1-LED6	PHY LINK LED
LED7	Status LED
CN1	Programming (Factory Only)
SW1	ID SW/LED
SW2	System Reset (Factory Only)
SW3	Flash Burn-In Test (Factory Only)
CON2	Management LAN Port
JD1	EXP Smart Console Mode
JD2	EXP Debug Console Mode
JD4	System Debug Console Mode
EFN1	Expander Fan
BT2	RTC Battery

3.2 Expander Board (Disk)



Location	Description
JD1	Programming (Factory Only)
JD2	Console Debug Mode
JD3	Console Smart Mode
JC1	MB Fan Control
JC2	PMBUS
JC3	Front Panel Signal Connector
EFN1	Expander Fan Connector
LED11/12/13	(LED11-13) JS1-JS3 PHY LED
LED01	Expander Heartbeat LED
JS1-JS3	JS1-JS2: Internal Mini-SAS HD Uplink JS3: Internal Mini-SAS HD Downlink
JM1	Power Mode Select



4 User Interface Introduction

4.1 Overview

InWin's JBOD System is a high performance, reliable storage system with sensors to monitor system health.

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. We support a variety of network protocols for network management including Telnet, SSH, Web-GUI, SNMP and SMTP. We also support active system alert functions by sending information to email addresses specified in the system, so the users can be informed of any system changes in a timely manner.

This users' manual is for all series of InWin JBOD systems including RJ-212, RJ-224, RJ-316, RJ-424, RJ-448, RJ-460 and RJ-472. It provides the information and instructions of frequently used functions. Please refer to the table of contents to find the topics you are interested in.

4.2 Key Features

- **Reliable High Data Rate Support (up to 12Gbps)**

SAS 12Gbps support and SATA3 6Gbps support to provide a reliable high-performance data rate.

- **Dual Expanders Support**

System can accommodate dual 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 installed.

- **Hot-swappable Power Module**

The PSUs are hot-swappable. No need to shut down the system for PSU replacement when required.

- **Hot-swappable Fan Modules**

The fan modules are hot-swappable. No need to shut down the system for fan module replacement when required.

- **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 beeping sound can be muted by pressing the mute button on the front or rear panel.

- **Hot-swappable HDDs**

The HDDs are hot-swappable. No need to shut down the system for HDD installation and/or replacement when needed.

- **Smart Fan Control**

The fan modules possess a smart control feature set by the firmware to provide seven levels of speed RPM according to the detected system temperature.

- **Zoning**

This system support feature divides disk drives into two or more 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 on the Expander for cascading another JBOD system to expand disk space when more space is required.

4.3 Software Management

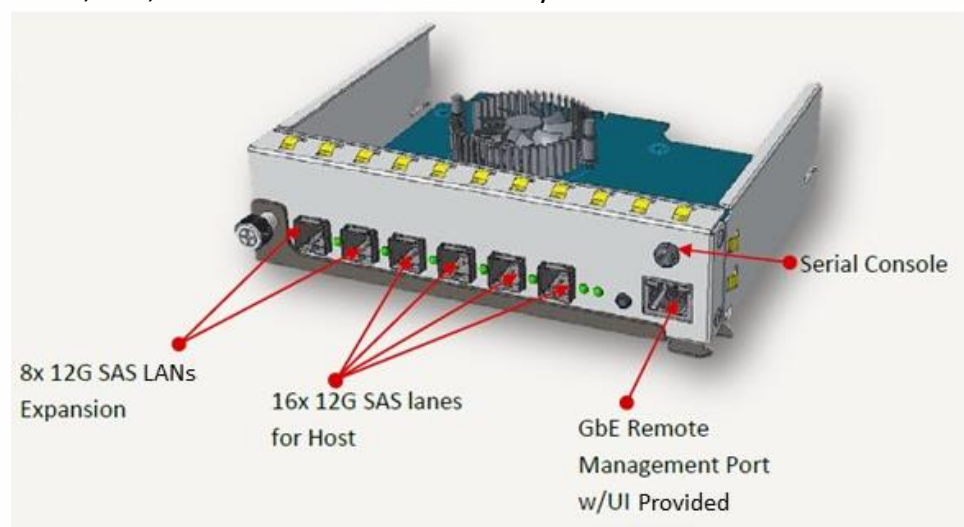
4.3.1 System Management Structure

InWin's JBOD Systems supports an out-of-band Network Management feature, which enables a rich set of protocols and a flexible way for SAS Expander management anytime from anywhere.

4.3.1.1 Ethernet Management

The Bridge Expander is equipped with a network management port allowing users to manage JBOD systems from a remote location.

With a proper IP address setting, users can manage the system through Telnet, SSH, Web-GUI and SNMP remotely.





The rich set of network protocols are leveraged for flexible remote management. The supported protocols including Telnet, SSH, Web-GUI, SNMP and SMTP enables various ways to manage the system.

Please be sure the IP address of the system is correctly configured to enable network access. Our system's supports are Static IP address or DHCP dynamic IP address as per users' configuration.

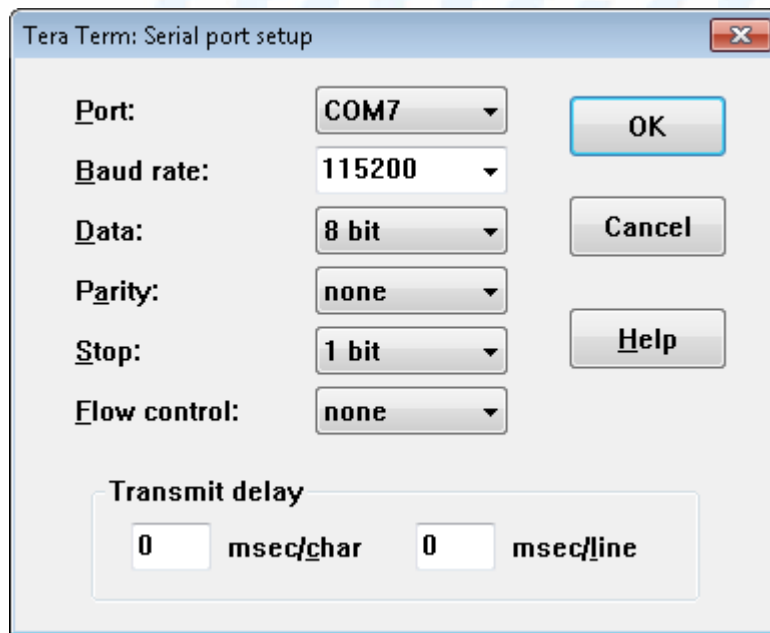
4.3.1.2 Serial Port Management

A 3.5mm audio jack serial port (RS-232) on the Expander module enables users to manage the system through terminal console applications such as Tera Term, Putty, etc. Users need to prepare a DB9 RS-232 adapter on host and connect to a serial cable shipped along with the system to gain access to the serial port management. Use CLI commands to manage the system through serial console.

4.3.2 Serial Port Management

The RS-232 port on the 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.

Baud Rate : 115200
Data : 8 bit
Parity : None
Stop Bit : 1 bit
Flow Control : None



Tera Term: Serial port setup

Port: COM7

Baud rate: 115200

Data: 8 bit

Parity: none

Stop: 1 bit

Flow control: none

Transmit delay

0 msec/char 0 msec/line

OK Cancel Help

4.3.2.1 CLI Commands

Some useful CLI commands are listed below

■ Network Management Layer

The “/mgmt.s#” prompts in the Console Terminal, which means the system is now in the network management level. Under this level, users can manage the network setting such as configuring the IP address and enabling/disabling services.

The “list” command displays all the Ethernet layer commands the system supports.

```
/mgmt.s# list
?      dns      expander3  mail      ping      snmp      userdel
console expander0  gateway    netmask   reboot    timezone  userlist
date    expander1  help       ntp       save      upgrade   version
dhcp    expander2  ipaddr     passwd    service   useradd
/mgmt.s#
```

The “help” command lists the description of the commands.

```
/mgmt.s# help
cd      change control path to management board or expander control path
date    display or set current date/time
dhcp    display or set DHCP client
dns      display or set DNS server
gateway display or set router (example: 192.168.100.254)
ipaddr  display or set Ethernet IP address (example: 192.168.100.100)
list    list path commands or control path
mail     display or set sendmail parameters
netmask display or set Ethernet IP netmask (default: 255.255.255.0)
passwd  change password
reboot  reboot management board
save    save config to NVRAM
service display or set service(telnet/SSH/WEB/SNMP)
upgrade upgrade management board or expander software
useradd add new user account
userdel delete a user account
userlist list user account
version display management board's information
/mgmt.s#
```

Type command without argument to display the current status.

```
/mgmt.s# service
Telnet Server: 1
WEB Server: 1
SNMP Agent: 1
SSH Server: 1
Send Mail: 0
/mgmt.s#
```

Type command with “?” to display the usage of the command.

```
/mgmt.s# service ?
Usage: service [telnet|web|snmp|ssh|mail] [0|1]
/mgmt.s#
```

Type command with argument to configure the setting of the command.

```
/mgmt.s# service mail 1
/mgmt.s# service
Telnet Server: 1
WEB Server: 1
SNMP Agent: 1
SSH Server: 1
Send Mail: 1
/mgmt.s#
```

Note:

Any changes that have been made only available until system reboot. Please be sure to type 'save' command to store the configuration so the changes will be kept for next system boot.

■ Expander Management Layer

The "`cd expander0`" or "`console 0`" changes the directory for bridge expander management. In this layer, users can manage SAS Expander settings "`cd ..`" or "`CTRL-X`" to change the directory back to the upper layer. It's typically used for jumping back to the network management layer from expander management layer.

The "?" or "`help`" displays the CLI commands for the SAS Expander.

```
/mgmt.s# cd expander0
/mgmt.s/expander0# ?
?

=====
Function                                Command
=====
Enclosure Info                          encl [Info-Type]
- Info-Type:
  rev          : Show H/W & S/W revision
  sensor       : Show enclosure sensor state
  pd           : Show disk phy state
  pmon         : phy signal monitoring
  (Omit Info-Type to dump all)
  cmfg         : Show MFG embedded in FW

QA Test                                t.QA

Thermal status                          t.thermal

Fan speed reading                        t.fan

Zone Configuration                      ucfg.zone < [state] | enable | disable >
When enabled:
-- Disks are divided into 2 zones
-- Each BRC exposes disks in one zone
(PPrimary: Zone #1 ; Secondary: Zone #2)

Console Select                           con [ 0 .. 2 | 'n' | 'p' | '?' ]
'n', 'p': switch to next/previous console,
'?' : display current console ID
```

Type "`command`" to display the current status of the command.

```
/mgmt.s/expander0# encl rev
encl rev

Vendor ID      : IN WIN
Product ID     : RJ-472-05pb
Project ID     : 4WL1A
HW version     : A
FW version     : 00.0C.02.EE 00.12.02.238. 10/03/2017 18:02
MFG CFG Version: 00.0C.00.01 10/14/2016 15:55
SAS address    : 5B0BD6D1A304403F
I2C peer error count : 0
```



Type “? <command>” to display usage of the command.

```
/mgmt.s/expander0# ? enc1
? enc1

=====
Function          Command
=====
Enclosure Info    enc1 [Info-Type]
                   - Info-Type:
                   rev       : Show H/W & S/W revision
                   sensor    : Show enclosure sensor state
                   pd        : Show disk phy state
                   pmon      : phy signal monitoring
                   (Omit Info-Type to dump all)
                   cmfg      : Show MFG embedded in FW
=====
```

As the design, there are three internal expanders inside the chassis expanded from the bridge expander. Users can also get into the internal expander management when required.

Type “cd expander1” or “console 1” to manage 1st expander.

Type “cd expander2” or “console 2” to manage 2nd expander.

Type “cd expander3” or “console 3” to manage 3rd expander.

Note:

Please jump back to “mgmt.s” layer by typing “cd ..” or “CTRL X” every time before you can jump to another expander management layer.

4.3.3 Network Management

The Ethernet port on Expander module is to provide Network Management in various protocols such as Telnet, SSH, Web-GUI and SNMP. It also provides an email notification while an alarm is in effect by properly configuring the SMTP information.

The default settings of the network information are as listed below:

IP Address : 192.168.100.1 (Static IP Address)
 Subnet Mask : 255.255.255.0
 Gateway : 192.168.100.254
 Username : admin
 Password : default

- * Please be sure the system IP network is reachable by the management host.
- * Users can make changes of the settings to meet the network environment.
- * For security reasons, we strongly recommend users to change the password immediately before the system is put online.

Note:

The factory default IP address is static address 192.168.100.1. If there is a DHCP server in the IP network, users can simply change the IP address on web GUI or through serial console.

In serial console, type “**dhcp 1**” in “mgmt.s” layer to enable dynamic IP address for the system. Type “**save**” so the setting is kept for the next system boot.

4.3.3.1 Telnet

- The Telnet service is enabled by default. It shares the same level of CLI commands as it is through the serial console terminal.
Users can disable the Telnet support on web GUI or with CLI commands if there are security concerns.
In CLI, in “mgmt.s” layer type “**service telnet 0**” to disable telnet service.
- The difference compared with serial console is that Telnet sessions require a Credential (Username and Password) to gain access to it.
Refer to the above session for the default credential information.
- Below is a reference capture of a tenet session.

```

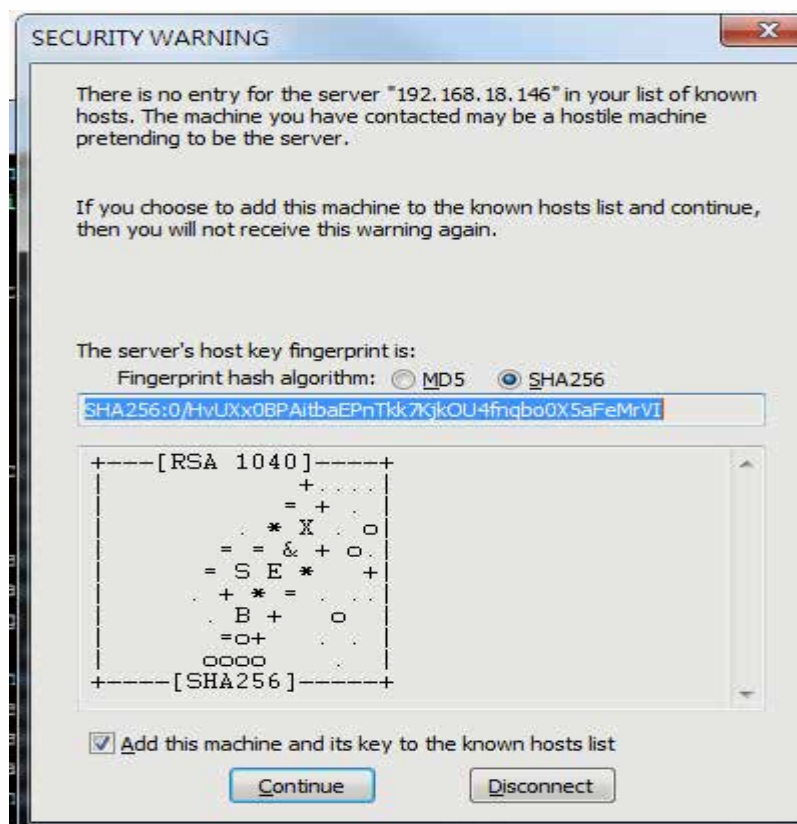
C:\> Telnet 192.168.18.144

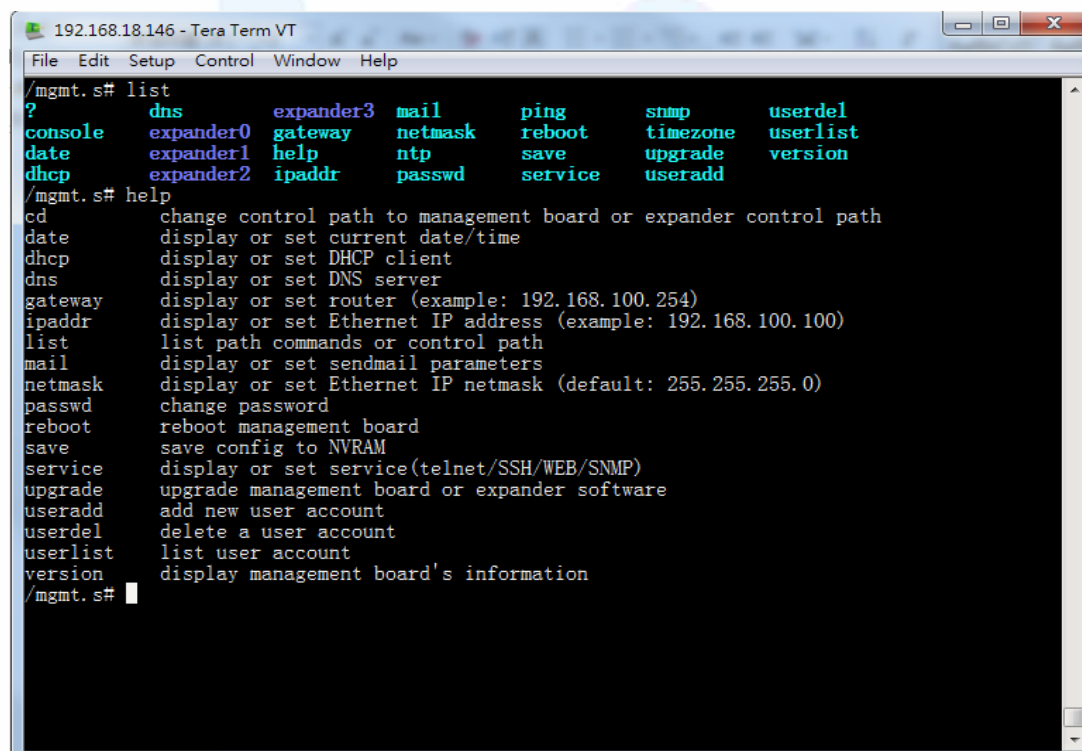
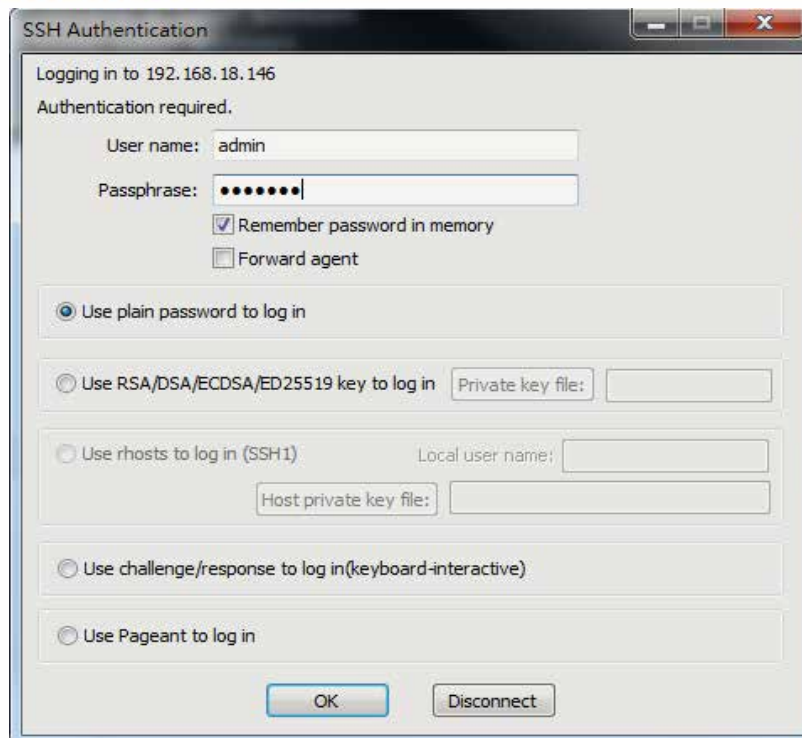
RJ-472-05 login: admin
Password:
/mgmt.s# help
cd                change control path to management board or expander control path
date              display or set current date/time
dhcp              display or set DHCP client
dns               display or set DNS server
gateway           display or set router (example: 192.168.100.254)
ipaddr            display or set Ethernet IP address (example: 192.168.100.100)
list              list path commands or control path
mail              display or set sendmail parameters
netmask           display or set Ethernet IP netmask (default: 255.255.255.0)
passwd            change password
reboot            reboot management board
save              save config to NVRAM
service           display or set service(telnet/SSH/WEB/SNMP)
upgrade           upgrade management board or expander software
useradd           add new user account
userdel           delete a user account
userlist          list user account
version           display management board's information
/mgmt.s#

```

4.3.3.2 SSH

- The SSH service is enabled by default. It provides the same level of CLI commands as it is through serial console or Telnet session.
- SSH provides a secure connection between host and the JBOD system. It is enabled by default on most Linux OSes. There are some freeware SSH tools for Windows such as Putty, Tera Term, ...etc.
- Below is the Tera Term example to establish the SSH session.

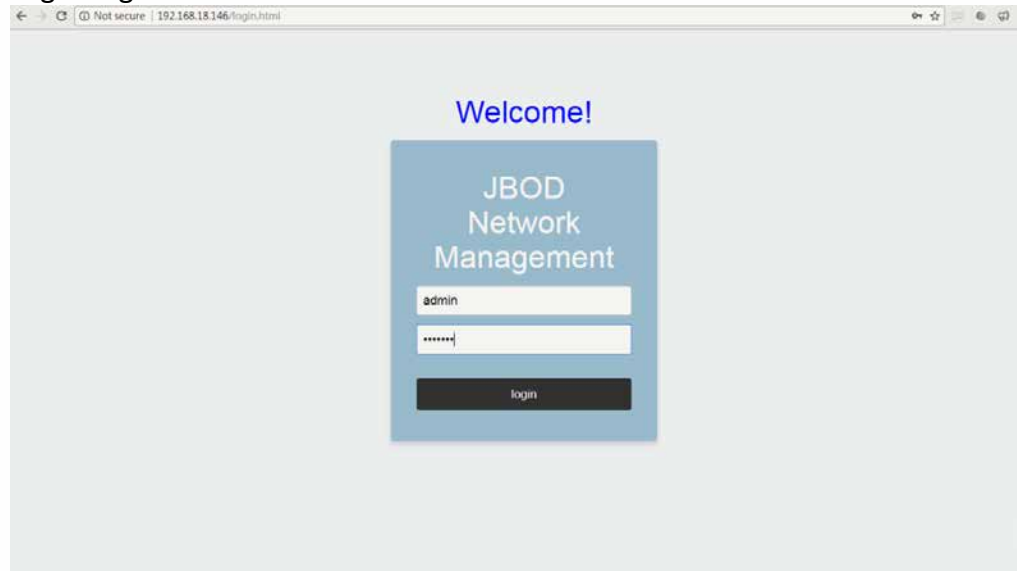




4.3.3.3 Web-GUI

- The Web-GUI is the easiest way to manage the JBOD system. It is enabled by default on this system.
- Users can simply open the web browser and give the JBOD management IP address in the URL address field to start managing.

Login Page



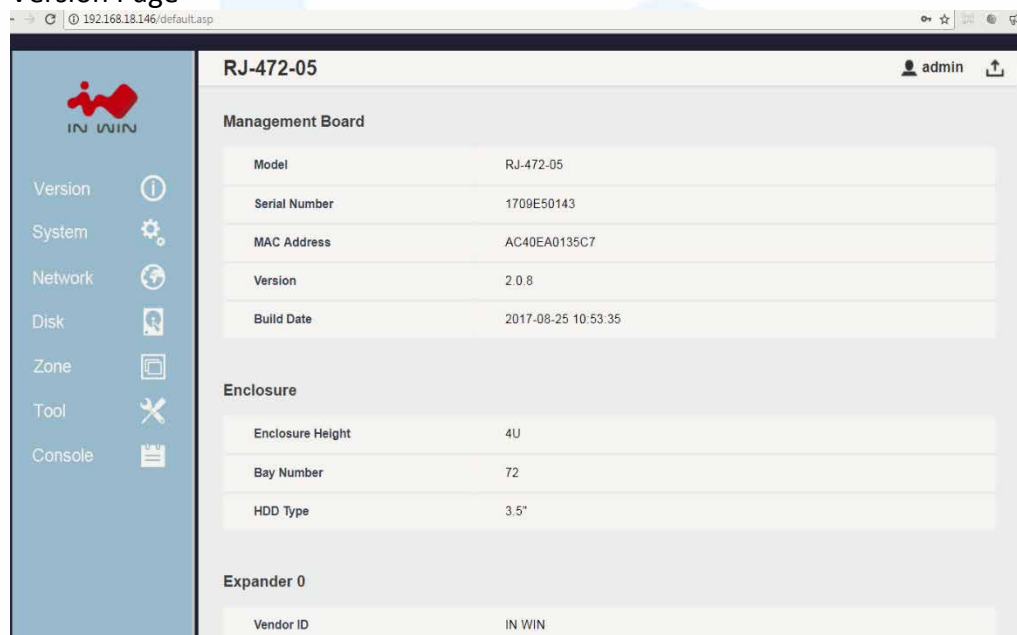
Welcome!

JBOD
Network
Management

admin

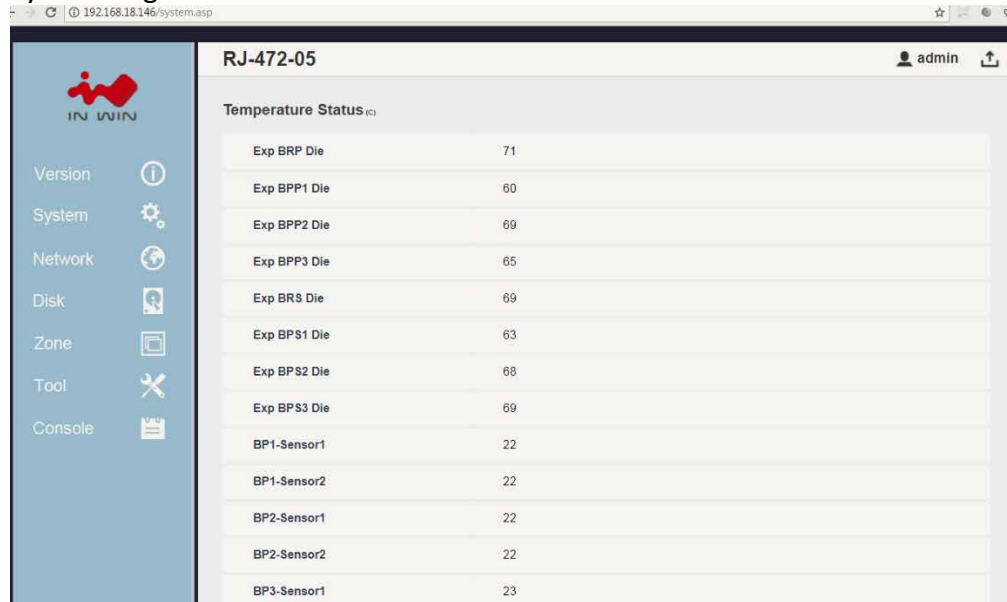
login

Version Page



RJ-472-05		admin
Management Board		
Model	RJ-472-05	
Serial Number	1709E50143	
MAC Address	AC40EA0135C7	
Version	2.0.8	
Build Date	2017-08-25 10:53:35	
Enclosure		
Enclosure Height	4U	
Bay Number	72	
HDD Type	3.5"	
Expander 0		
Vendor ID	IN WIN	

System Page.



RJ-472-05	
Temperature Status (C)	
Exp BRP Die	71
Exp BPP1 Die	60
Exp BPP2 Die	69
Exp BPP3 Die	65
Exp BR3 Die	69
Exp BPS1 Die	63
Exp BPS2 Die	68
Exp BPS3 Die	69
BP1-Sensor1	22
BP1-Sensor2	22
BP2-Sensor1	22
BP2-Sensor2	22
BP3-Sensor1	23

4.3.3.4 SNMP

- The SNMP is a popular network device management protocol that is widely used by IT people to manage mass amounts of systems, devices and equipment which are embedded with a SNMP agent.
- The InWin JBOD system's management module is implemented by a SNMP agent with v1 and v2c support.
- Users need to configure the same read and write community string in the JBOD system as the SNMP manager so the system can be managed by the SNMP Manager.
- An InWin proprietary MIB, which defines system information, is required for the SNMP Manager so the OID is accessible.
Below is the proprietary MIB file:



inwin-jnm.mib

- **SNMP Settings on the System**
Users can change the SNMP settings through CLI and Web-GUI.

- Check and configure via CLI

```
/mgmt.s# snmp
community read: public
community write: private
sysName: RJ-472-05
sysContact: Company
sysLocation: Room 1-1
/mgmt.s#
/mgmt.s# snmp ?
Usage: snmp <read|write|sysName|sysDescr|sysContact|sysLocation> 'parameter'
```

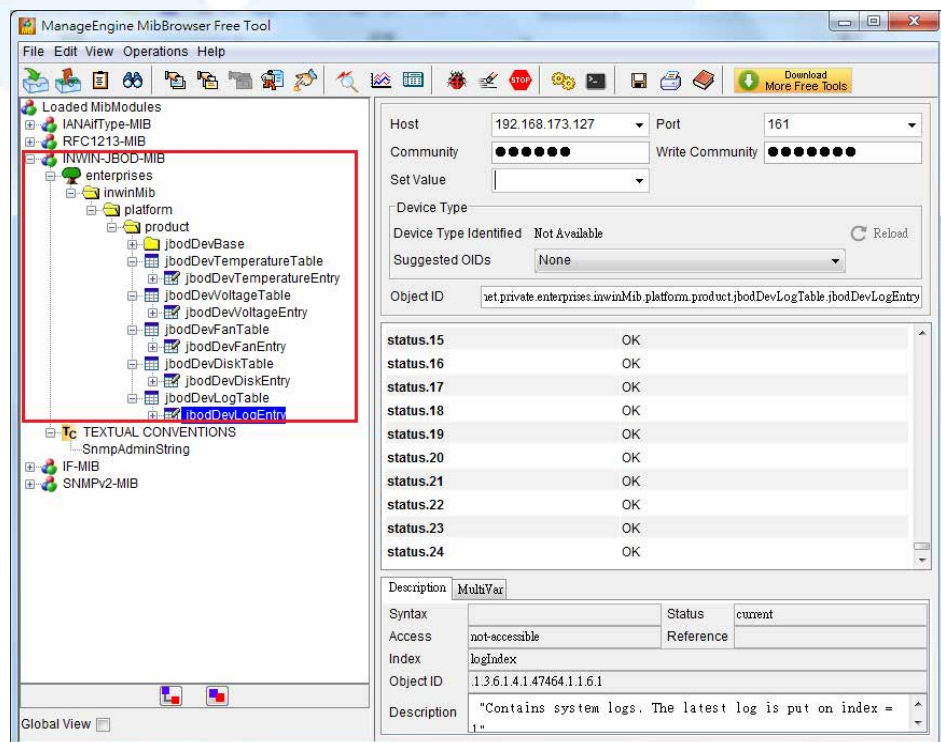
- Check and configure via Web

SNMP Setting

Read Community	public
Write Community	private
sysName	JBOD
sysContact	IN-WIN Development Inc
sysLocation	Room 1-1
Apply	

■ SNMP Manager

Any SNMP Managers can be used to manage the system by properly configuring the system settings including IP address, read community string and write community string to match the settings in the system. Compiling the InWin JBOD MIB file to the SNMP manager is necessary. Below is an example to browse the system MIB with a free SNMP Manager tool.

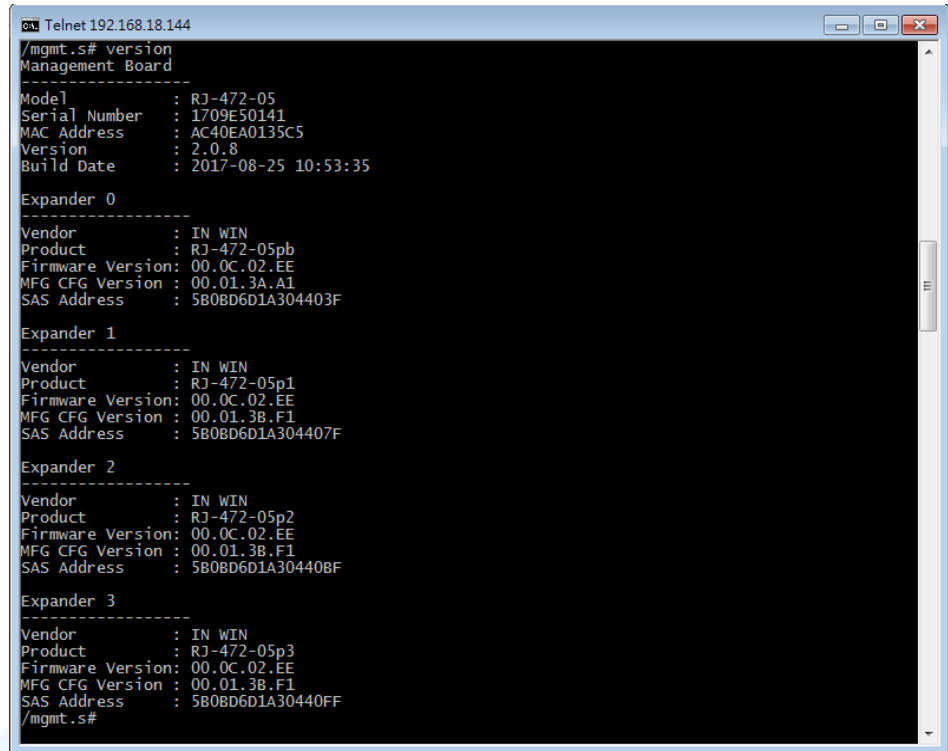


4.3.4 Version Information

Users can check the system hardware and firmware version through various ways with CLI commands, Web GUI and SNMP.

4.3.4.1 CLI (UART, Telnet and SSH)

- Type the “**version**” command on “mgmt.s” Layer to display all the version information including Ethernet firmware version, Expander firmware version and MFG CFG file version.



```

Telnet 192.168.18.144
/mgmt.s# version
Management Board
-----
Model       : RJ-472-05
Serial Number : 1709E50141
MAC Address  : AC40EA0135C5
Version     : 2.0.8
Build Date   : 2017-08-25 10:53:35

Expander 0
-----
Vendor      : IN WIN
Product     : RJ-472-05pb
Firmware Version: 00.0C.02.EE
MFG CFG Version : 00.01.3A.A1
SAS Address  : 5B0BD6D1A304403F

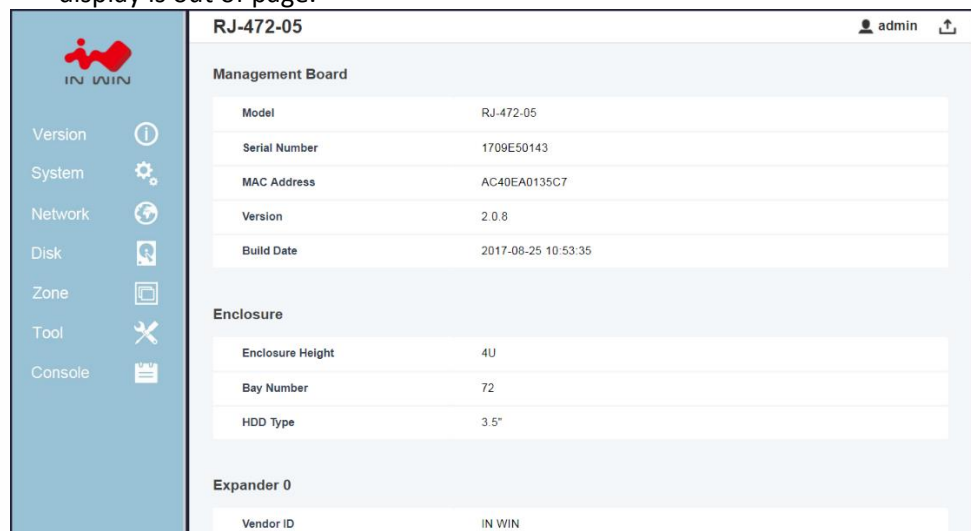
Expander 1
-----
Vendor      : IN WIN
Product     : RJ-472-05p1
Firmware Version: 00.0C.02.EE
MFG CFG Version : 00.01.3B.F1
SAS Address  : 5B0BD6D1A304407F

Expander 2
-----
Vendor      : IN WIN
Product     : RJ-472-05p2
Firmware Version: 00.0C.02.EE
MFG CFG Version : 00.01.3B.F1
SAS Address  : 5B0BD6D1A304408F

Expander 3
-----
Vendor      : IN WIN
Product     : RJ-472-05p3
Firmware Version: 00.0C.02.EE
MFG CFG Version : 00.01.3B.F1
SAS Address  : 5B0BD6D1A30440FF
/mgmt.s#
  
```

4.3.4.2 Web-GUI

- Type system IP address on Web Browser URL address field to gain access to the system. After logging in, click “Version” on the left pane to view the system version information on the right pane. Scroll down to view all information if the display is out of page.



4.3.5 System Status

The System Status is to display the status of the system sensors including temperature, voltage, fan speed and power supply. All the SAS Expander modules are equipped with sensors to monitor system health and control environmental cooling systems accordingly.



4.3.5.1 CLI (UART, Telnet and SSH)

- Type “`encl sensor`” command in “`mgmt.s/expander0`” layer to display the System sensors’ readings and their status.
- Please note that the Expander temperature sensors “Exp Die” is the silicon core temperature and the temperature sensors “BPx-Sensor x” are on the backplanes.
- There are mechanisms communicating between primary and secondary domain expander modules so the peer side module sensors information can be exposed at the same screen.

```

Telnet 192.168.18.144
/mgmt.s/expander0# encl sensor
encl sensor

<< Enclosure Sensor State >>

Temperature      14 0x0
( 1) Exp BRP Die :    71 dC  status : OK
( 2) Exp BPP1 Die :    60 dC  status : OK
( 3) Exp BPP2 Die :    69 dC  status : OK
( 4) Exp BPP3 Die :    65 dC  status : OK
( 5) Exp BRS Die :    69 dC  status : OK
( 6) Exp BPS1 Die :    63 dC  status : OK
( 7) Exp BPS2 Die :    68 dC  status : OK
( 8) Exp BPS3 Die :    69 dC  status : OK
( 9) BP1-Sensor1 :    22 dC  status : OK
(10) BP1-Sensor2 :    22 dC  status : OK
(11) BP2-Sensor1 :    22 dC  status : OK
(12) BP2-Sensor2 :    22 dC  status : OK
(13) BP3-Sensor1 :    23 dC  status : OK
(14) BP3-Sensor2 :    22 dC  status : OK

Voltage          6 0x0
( 1) BP1-5V Senso :   4.99 V  status : OK
( 2) BP1-12V Sens :  12.07 V  status : OK
( 3) BP2-5V Senso :   4.99 V  status : OK
( 4) BP2-12V Sens :  12.17 V  status : OK
( 5) BP3-5V Senso :   4.97 V  status : OK
( 6) BP3-12V Sens :  12.05 V  status : OK

Fan              14 0x0
( 1) EnclFan1     :   5970 RPM status : OK
( 2) EnclFan2     :   6240 RPM status : OK
( 3) EnclFan3     :   6120 RPM status : OK
( 4) EnclFan4     :   6240 RPM status : OK
( 5) EnclFan5     :   6000 RPM status : OK
( 6) EnclFan6     :   5910 RPM status : OK
( 7) BrcFan       :   4920 RPM status : OK
( 8) Bpc1Fan      :   4860 RPM status : OK
( 9) Bpc2Fan      :   4860 RPM status : OK
(10) Bpc3Fan      :   4770 RPM status : OK
(11) PeerBrcFan   :   5220 RPM status : OK
(12) PeerBpc1Fan  :   4800 RPM status : OK
(13) PeerBpc2Fan  :   4800 RPM status : OK
(14) PeerBpc3Fan  :   4860 RPM status : OK

Power Supply     2 0x0
( 1) AC Module 1 :          status : OK
( 2) AC Module 2 :          status : OK

```

4.3.5.2 Web-GUI

- Type the system IP address on the web browser URL field to gain access to the system. After logging in, click “System” on the left panel to view the system status information on the right panel. Scroll down to view all information if the display is out of page.





Version

System

Network

Disk

Zone

Tool

Console















RJ-472-05

admin



Temperature Status (C)

Exp BRP Die	71
Exp BPP1 Die	60
Exp BPP2 Die	69
Exp BPP3 Die	65
Exp BRS Die	69
Exp BPS1 Die	63
Exp BPS2 Die	68
Exp BPS3 Die	69
BP1-Sensor1	22
BP1-Sensor2	22
BP2-Sensor1	22
BP2-Sensor2	22
BP3-Sensor1	23

4.3.6 Network Settings

The Network settings is for configuring system network information such as DHCP/Static IP Address selection, Network Services, Mail configuration and SNMP configuration.

4.3.6.1 CLI (UART, Telnet and SSH with Ethernet Board)

- There are a couple network setting commands on "mgmt.s" layer such as "ipaddr", "gateway", "netmask", ...etc. to view and configure the settings respectively.
- Please be sure to apply the "save" command so the settings are saved for the next system reboot.

```

/mgmt.s# list
?      dns      expander3  mail      ping      snmp      userdel
console expander0  gateway    netmask   reboot    timezone  userlist
date   expander1  help       ntp       save      upgrade   version
dhcp   expander2  ipaddr     passwd    service   useradd

/mgmt.s#
/mgmt.s# ipaddr
Current IP Address: 192.168.18.144
Configure Static IP Address: 192.168.100.1
/mgmt.s#
/mgmt.s# gateway
Current Gateway: 192.168.18.254
Config Gateway: 192.168.100.254
/mgmt.s#
/mgmt.s# ntp
NTP server: time.stdtime.gov.tw
/mgmt.s#

```

4.3.6.2 Web-GUI

- Type the system IP address on the web browser URL field to gain access to the system. After logging in, click the "Network" button on the left panel to view the network information on the right panel. Scroll down to view all information if the display is out of page.





Version 

System 

Network 

Disk 

Zone 

Tool 

Console 

RJ-472-05 admin

Current Network Status: DHCP

Management IP	Netmask	Gateway	DNS
192.168.10.144	255.255.255.0	192.168.10.254	192.168.5.1

IP Address Automation

☐ Static IP
 ☒ DHCP
 Apply

Network Service Setting

☒ Telnet
 ☒ WEB
 ☒ SSH
 ☒ SNMP
 ☐ Sendmail
 Apply

Static IP Setting

LAN IP:
 Netmask:

4.3.7 Disk Information

The disk information is to show the disk drives' status on the system, including Bay id, Phy id, SAS Address, Link speed and current status.

4.3.7.1 CLI (UART, Telnet and SSH)

- Type the “[phyinfox -s](#)” command on “mgmt.s/expander0” layer to display the system hard disk drives' status on the system.

```

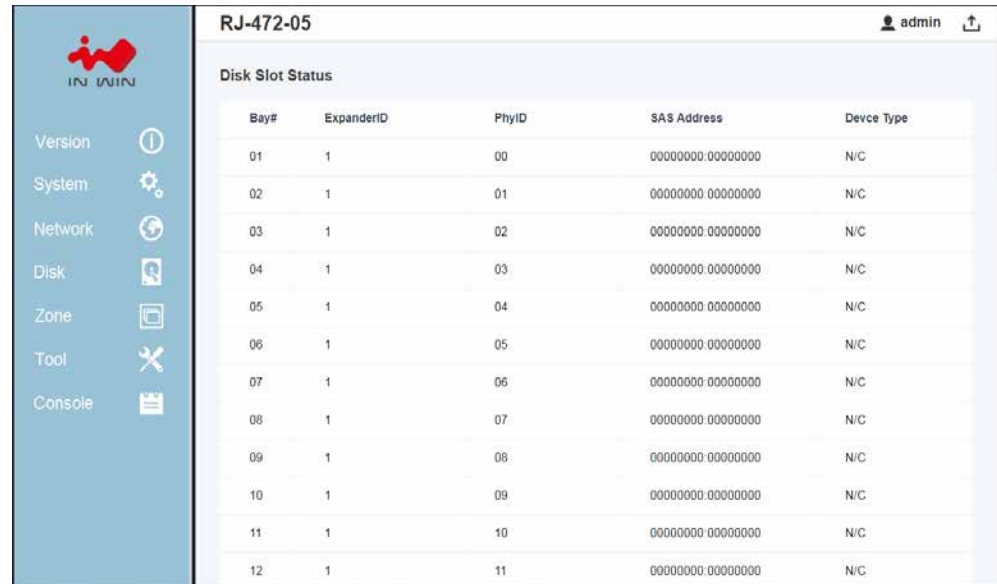
/mgmt.s/expander0# phyinfox -s
phyinfox -s

=== Phy status in Consolidated SES ArrayDevice Directory ===

Bay  BPC  PhyID      SAS_Addr      Attached
ID                                     PhyID      SAS_Addr      Device
01  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
02  1    01      5B0BD6D1:A304407F  0      00000000:00000000  N/C
03  1    02      5B0BD6D1:A304407F  0      00000000:00000000  N/C
04  1    03      5B0BD6D1:A304407F  0      00000000:00000000  N/C
05  1    04      5B0BD6D1:A304407F  0      00000000:00000000  N/C
06  1    05      5B0BD6D1:A304407F  0      00000000:00000000  N/C
07  1    06      5B0BD6D1:A304407F  0      00000000:00000000  N/C
08  1    07      5B0BD6D1:A304407F  0      00000000:00000000  N/C
09  1    08      5B0BD6D1:A304407F  0      00000000:00000000  N/C
10  1    09      5B0BD6D1:A304407F  0      00000000:00000000  N/C
11  1    10      5B0BD6D1:A304407F  0      00000000:00000000  N/C
12  1    11      5B0BD6D1:A304407F  0      00000000:00000000  N/C
13  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
14  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
15  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
16  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
17  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
18  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
19  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
20  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
21  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
22  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
23  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
24  1    00      5B0BD6D1:A304407F  0      00000000:00000000  N/C
25  2    00      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
26  2    01      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
27  2    02      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
28  2    03      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
29  2    04      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
30  2    05      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
31  2    06      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
32  2    07      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
33  2    08      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
34  2    09      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
35  2    10      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
36  2    11      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
37  2    00      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
38  2    00      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
39  2    00      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
40  2    00      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
41  2    00      5B0BD6D1:A30440BF  0      00000000:00000000  N/C
  
```

4.3.7.2 Web-GUI

- Type the system IP address on the web browser URL field to gain access to the system. After logging in, click the “Disk” button on the left panel to view the disk drives information on the right panel. Scroll down to view all information if the display is out of page.



The screenshot shows the InWin Web-GUI interface. On the left is a navigation menu with options: Version, System, Network, Disk (selected), Zone, Tool, and Console. The main area displays the 'Disk Slot Status' for 'RJ-472-05'. It includes a table with columns: Bay#, ExpanderID, PhyID, SAS Address, and Device Type. The table lists 12 bays, all with ExpanderID 1 and Device Type N/C.

Bay#	ExpanderID	PhyID	SAS Address	Device Type
01	1	00	00000000.00000000	N/C
02	1	01	00000000.00000000	N/C
03	1	02	00000000.00000000	N/C
04	1	03	00000000.00000000	N/C
05	1	04	00000000.00000000	N/C
06	1	05	00000000.00000000	N/C
07	1	06	00000000.00000000	N/C
08	1	07	00000000.00000000	N/C
09	1	08	00000000.00000000	N/C
10	1	09	00000000.00000000	N/C
11	1	10	00000000.00000000	N/C
12	1	11	00000000.00000000	N/C

4.3.8 Zone Setting

The Zoning feature supports the function to divide disk arrays into multiple groups. Once the zoning feature is enabled, the specific-wide port is hard-coded and designed to join the specific group as the access port of the specific group.

RJ-212, RJ-316, RJ-224 support 2-group zoning.

RJ-448 supports up to 4-group zoning – mode 2 and 4

RJ-472 supports up to 6-group zoning – mode 2, mode 3 and mode 4.

RJ-460 does not support zoning.

Note: Zoning Mode Definition

Mode 2: Configure JBOD system disks into 2 groups

Mode 3: Configure JBOD system disks into 3 groups

Mode 4: Configure JBOD system disks into 4 groups

Mode 6: Configure JBOD system disks into 6 groups

4.3.8.1 CLI

- For RJ-472-05 and RJ-448-05 systems,

Type “`ucfg.zone`” command in “`mgmt.s/expander0`” layer to show the zoning status.

Type “`ucfg.zone + n`” command in “`mgmt.s/expander0`” layer to enable the zoning setting where $n = 2, 3, 4$ or 6 .

Type “`ucfg.zone -`” command in “`mgmt.s/expander0`” layer to disable the zoning setting.

Please refer to below the capture for details of the configuration.



```

/mgmt.s# console 0
press Ctrl-X to exit console

brP >ucfg.zone ?

Command Syntax:
Zone Configuration    ucfg.zone +[mode_id] | - | [state]
                        '+' : enable, disable zoning
                        '+ mode_id' : enable zoning with mode_id
                        mode_id :
                        72-bay: [ 2 | 3 | 6 ]
                        48-bay: [ 2 | 4 ]
                        * mode 4: only for 48-bay box (2 phys per zone/port)
When enabled:
- Both BRCs expose identical zones
mode 2: 2 Zones (24 or 36 bays in each zone)
      Zone  BRC-UplinkPort  DiskBay Range
      1      1,2 (5)        1 ~ 24/36
      2      3,4 (6)        25/37 ~ 48/72
mode 3: 3 zones (24 bays in each zone)
      Zone  BRC-UplinkPort  DiskBay Range
      1      1,2           1~24
      2      3,4           25~48
      3      5,6           49~72
mode 4: 4 zones (12 bays in each zone)
      Each BRC Uplink Port exposes one zone
      (only for 48-bay box, 2 phys per zone/port)
mode 6: 6 zones (12 bays in each zone)
      Each BRC Uplink Port exposes one zone

```

- For RJ-212-03, RJ-316-03 and RJ-424-03 systems,
Type “c.zone” command in “mgmt.s/primary” and “mgmt/secondary”
layer to show the zoning status.
Type “c.zone enable” to enable zoning feature.
Type “c.zone disable” to disable zoning feature.
Please refer to below the capture for details.

```

/mgmt.s/primary# ? c.zone
? c.zone

=====
Function      Command
=====
Zone Configuration
c.zone <enable|disable>
c.zone slot <ZoneNo> <<SlotNo>|<SlotNo>~<SlotNo>>
      ZoneNo      : 1 to MaxGroup
      SlotNo      : 1 to MaxSlot
c.zone sloth <ZoneNo> <SlotMapHi> <SlotMapLow>
      SlotMapHi   : bit map for slot 33 to 64
      SlotMapLow  : bit map for slot 1 to 32
c.zone down <ZoneNo>
      set downstream zone
***** zone only support JBOD system *****
=====

```



```

/mgmt.s/primary# c.zone
c.zone

Current zone      : enable
=====
zone group1 : ffffffff0 0000000f
zone group2 : ffffffff0 000000f0
down stream : 00000000 00000f00 , zone : 1
=====
Slot  1    2    3    4    5    6    7    8    9   10   11   12
Phy   12   13   14   15   16   17   18   19   20   21   22   23
Zone  2    2    2    1    1    1    1    1    1    1    1    1

Slot  13   14   15   16   17   18   19   20   21   22   23   24
Phy   24   25   26   27   32   33   34   35   28   29   30   31
Zone  1    1    1    1    1    1    1    1    2    2    2    2
=====

Zone configuration : enable
=====
zone group1 : ffffffff0 0000000f
zone group2 : ffffffff0 000000f0
down stream : 00000000 00000f00 , zone : 1
=====
Slot  1    2    3    4    5    6    7    8    9   10   11   12
Phy   12   13   14   15   16   17   18   19   20   21   22   23
Zone  2    2    2    1    1    1    1    1    1    1    1    1

Slot  13   14   15   16   17   18   19   20   21   22   23   24
Phy   24   25   26   27   32   33   34   35   28   29   30   31
Zone  1    1    1    1    1    1    1    1    2    2    2    2
=====

```

Note:

Zoning configuration with CLI in serial console or Telnet session requires a system reboot to take effect.
 In Web-GUI, Expanders would be reset when applied.
 Zoning configuration needs to be set on both domains manually to make them work consistently.

4.3.8.2 Web-GUI

Web GUI provide a more user friendly way for configuring and checking zoning for JBOD systems.

■ For RJ-472-05 and RJ-448-05

Type the system IP address on the web browser URL field to gain access to the system. After logging in, click the “Zone” button on the left panel to view and configure the zoning setting of the system on the right panel of the page.

Select zoning mode on the right panel of Zone page by clicking on the radio button. After configuration is selected, click “Apply” button to reset the Expanders to take effect.

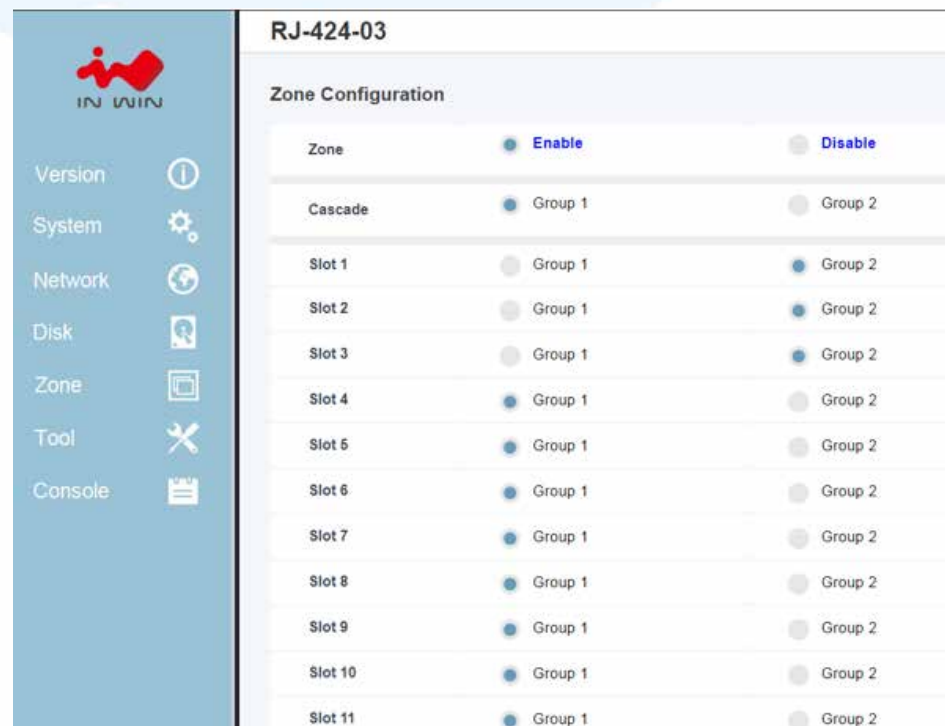


■ For RJ-212, RJ-316, RJ-224 and RJ-424

Type the system IP address on the web browser URL field to gain access to the system. After logging in, click the “Zone” button on the left panel to view and configure the zoning setting of the system on the right panel of the page.

Select zoning mode on the right panel of Zone page by clicking on the radio button. After configuration is selected, click “Apply” button to reset the Expanders to take effect.

These JBOD systems support flexible zoning configuration meaning that each disk is allowed to configure to either Group1 or Group2.



4.3.9 Firmware Upgrade

The firmware upgrade function provides a way to update system firmware when necessary.

There are 3 firmware for the InWin JBOD system:

1. Network Management Firmware
2. SAS Expander Firmware
3. SAS Expander MFG CFG file

There are a couple of ways to upgrade the system firmware according to the HW configurations. Please note that the upgraded firmware won't take effect until a system reboot

Note:

Be careful NOT to power off the system when conducting system firmware upgrade. Power loss during firmware upgrade would somehow crash system firmware.

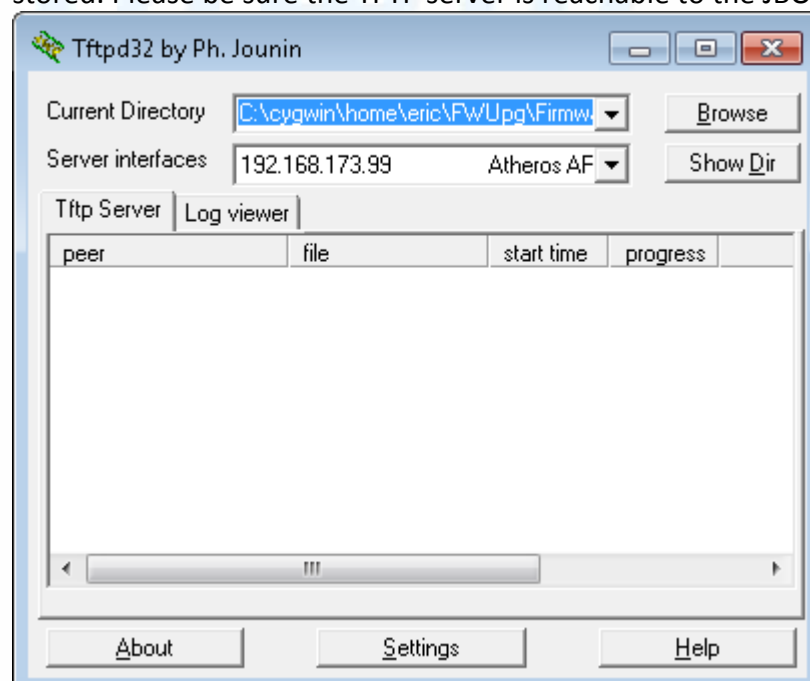
In case firmware crash occurs, call help from technical support.

4.3.9.1 CLI (Telnet or SSH)

Users are able to upgrade management firmware, SAS Expander firmware and MFG CFG file through TFTP or Xmodem when using CLI commands. Below the examples are with TFTP server.

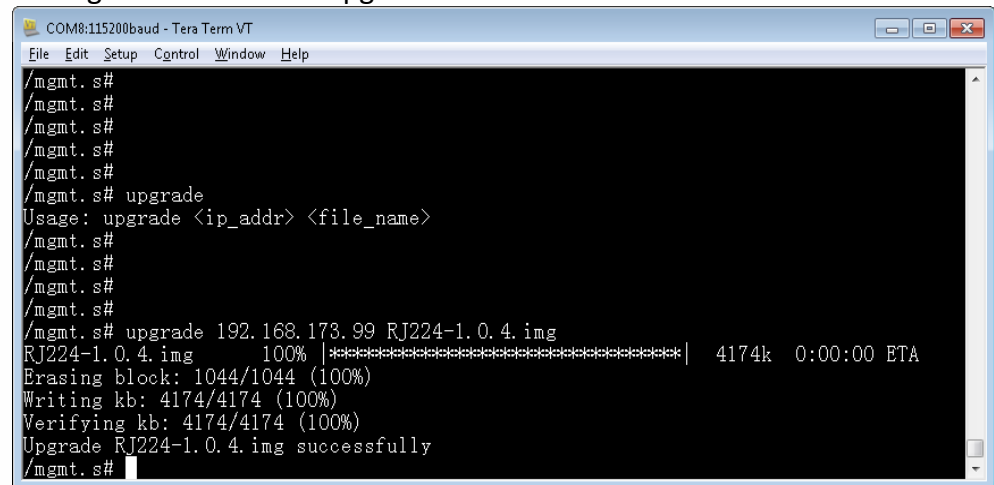
All sorts of firmware upgrades going through TFTP would be intelligently upgraded to the right hardware. More conveniently, all Expanders (including Bridge Expander and internal expanders, they are sharing the same firmware and MFG file) can be upgraded at the same time when upgrade command is applied and committed.

To upgrade through TFTP, open a TFTP server 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.

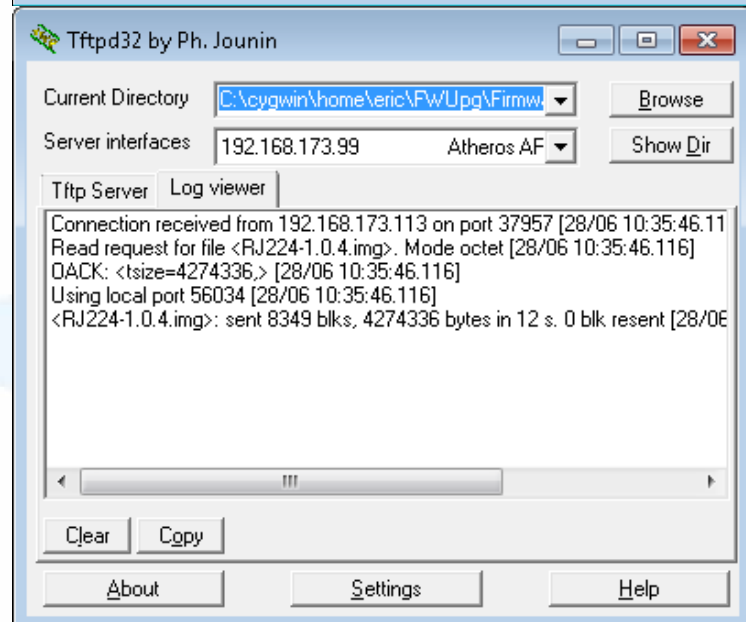


■ Management Firmware upgrade

Type “`upgrade <tftp_server_ip> <filename>`” command to start Management Firmware upgrade.



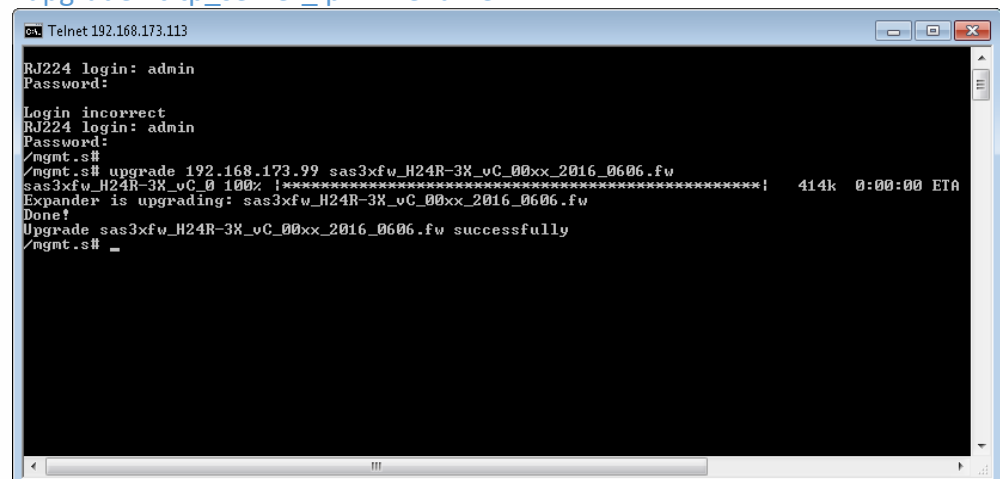
```
COM8:115200baud - Tera Term VT
File Edit Setup Control Window Help
/ mgmt.s#
/ mgmt.s#
/ mgmt.s#
/ mgmt.s#
/ mgmt.s#
/ mgmt.s# upgrade
Usage: upgrade <ip_addr> <file_name>
/ mgmt.s#
/ mgmt.s#
/ mgmt.s#
/ mgmt.s# upgrade 192.168.173.99 RJ224-1.0.4.img
RJ224-1.0.4.img 100% |*****| 4174k 0:00:00 ETA
Erasing block: 1044/1044 (100%)
Writing kb: 4174/4174 (100%)
Verifying kb: 4174/4174 (100%)
Upgrade RJ224-1.0.4.img successfully
/ mgmt.s#
```



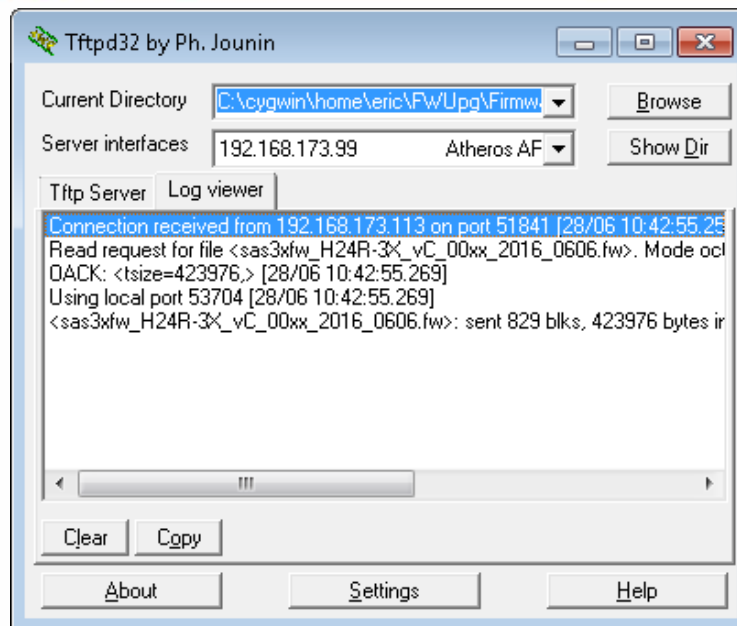
■ SAS Expander Firmware

It's the same as for Management firmware by using the Expander Firmware filename instead in command.

“`upgrade <tftp_server_ip> <filename>`”



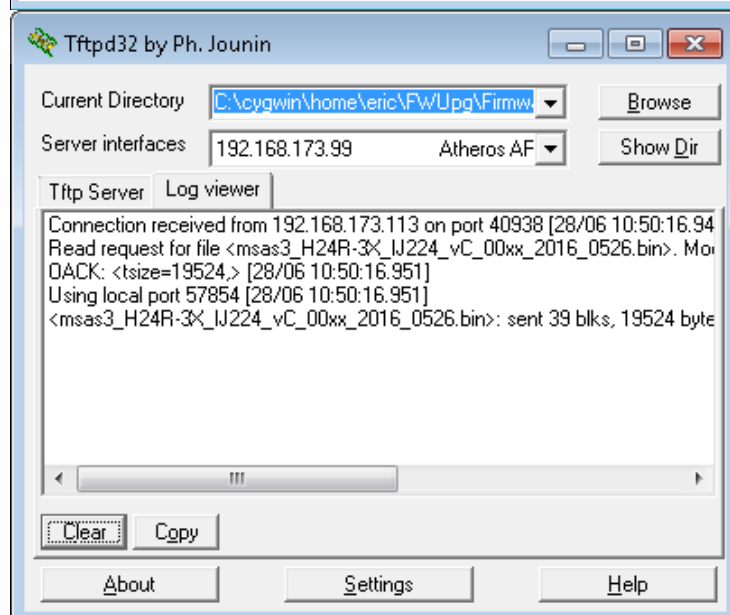
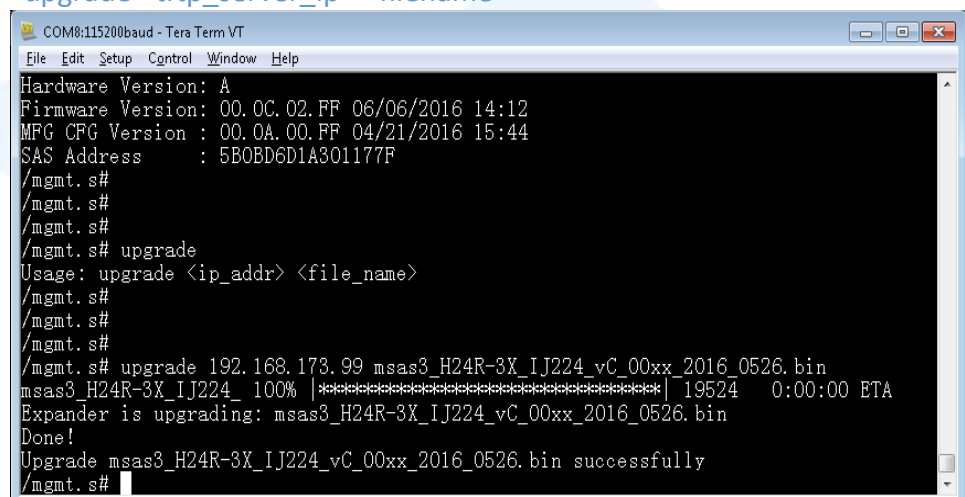
```
Telnet 192.168.173.113
RJ224 login: admin
Password:
Login incorrect
RJ224 login: admin
Password:
/ mgmt.s# upgrade 192.168.173.99 sas3xfw_H24R-3X_vC_00xx_2016_0606.fw
sas3xfw_H24R-3X_vC_0 100% |*****| 414k 0:00:00 ETA
Expander is upgrading: sas3xfw_H24R-3X_vC_00xx_2016_0606.fw
Done!
Upgrade sas3xfw_H24R-3X_vC_00xx_2016_0606.fw successfully
/ mgmt.s#
```



■ SAS Expander MFG CFG file

Same as Management firmware by using the Expander MFG CFG file filename in command.

“upgrade <tftp_server_ip> <filename>”



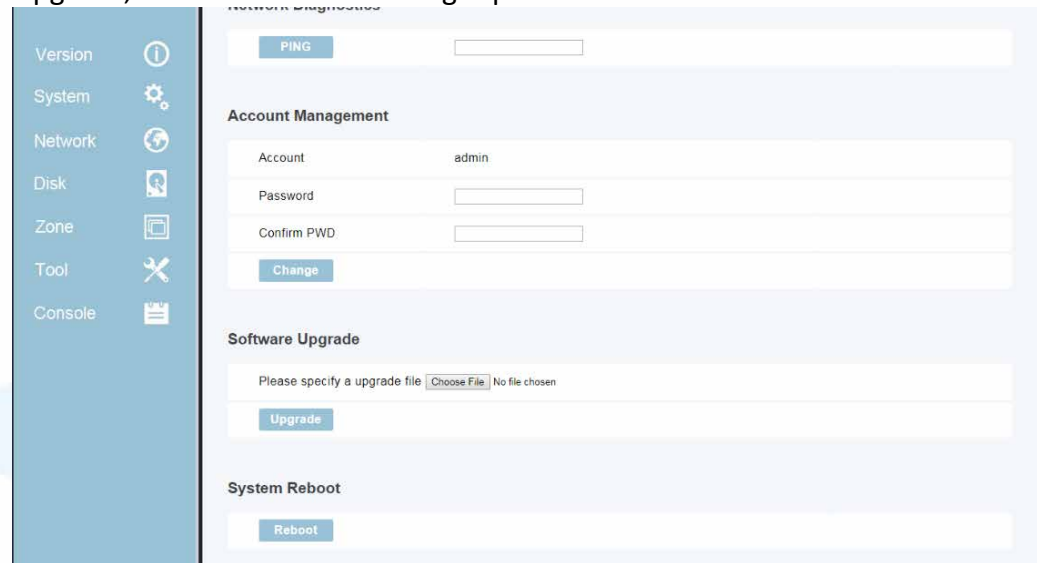
4.3.9.2 Web-GUI

- Upgrade system firmware through Web-GUI is much easier than other ways. Just simply select the firmware by file browser and click 'Apply' to start.

All the firmware including Network Management firmware, SAS Expander firmware and MFG CFG file apply the same way to upgrade.

After system upgrade, be sure to reboot system to take effect the new firmware which has been upgraded to the hardware.

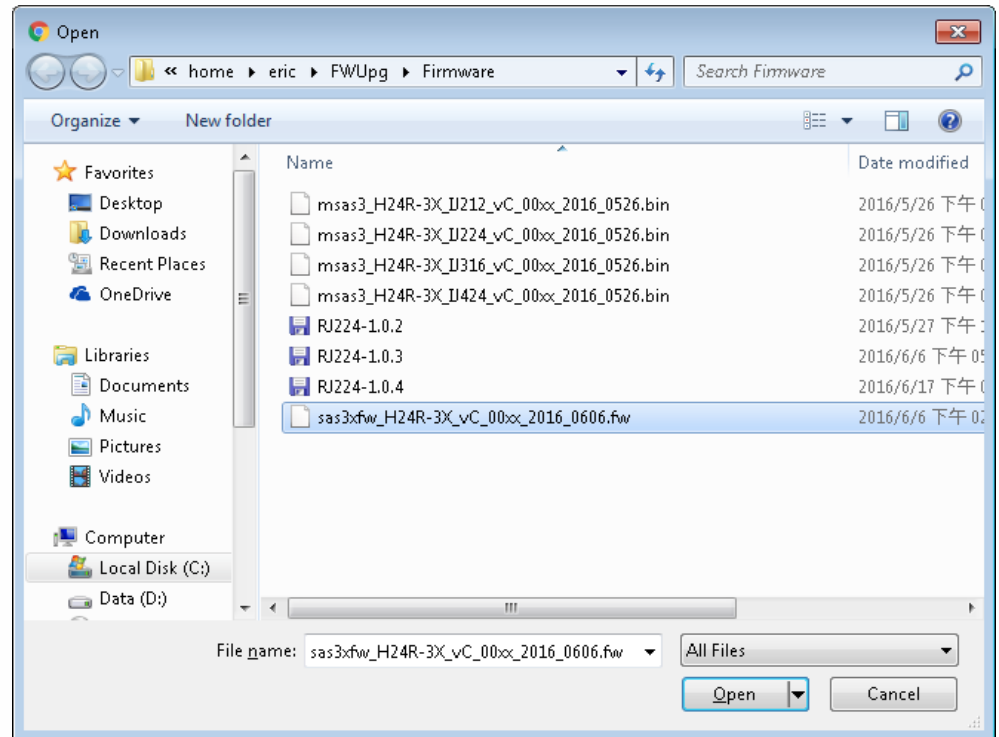
- Click the "Tool" button on the left panel and scroll down to "Software Upgrade," the session is on the right panel.



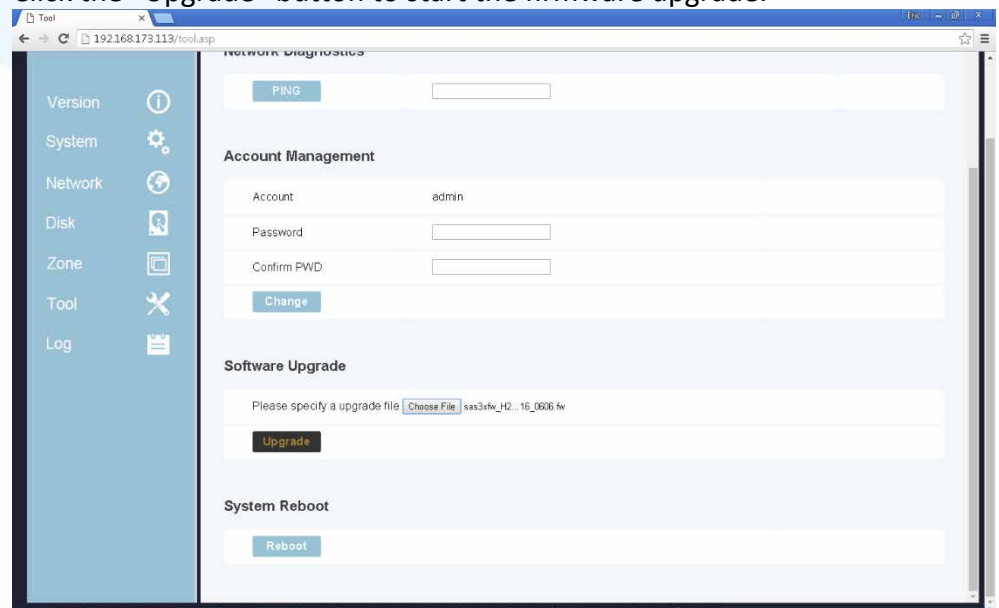
The screenshot shows the Web-GUI interface. On the left is a vertical menu with options: Version, System, Network, Disk, Zone, Tool, and Console. The 'Tool' option is selected. The main content area on the right is divided into sections. At the top is a 'PING' section with a button and an input field. Below that is the 'Account Management' section, which includes fields for 'Account' (set to 'admin'), 'Password', and 'Confirm PWD', along with a 'Change' button. The 'Software Upgrade' section follows, featuring a text prompt 'Please specify a upgrade file', a 'Choose File' button, and an 'Upgrade' button. At the bottom is the 'System Reboot' section with a 'Reboot' button.

Click the "Choose File" button to select the firmware being upgraded from file browser and click "Open" to commit.

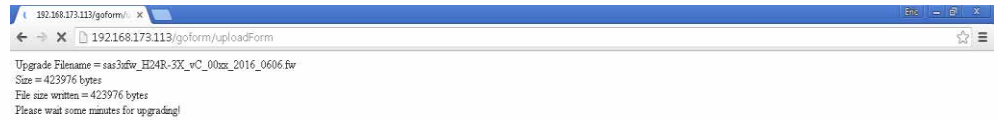
The firmware can be management firmware, SAS Expander firmware or SAS Expander MFG CFG file. The system would intelligently detect the firmware type and upgrade to the right hardware.



Click the “Upgrade” button to start the firmware upgrade.



Web would direct to a page telling the firmware is upgrading.
After upgrade is done, Web will direct to the Login page.



A system reboot is require to take effect.

4.3.10 Web Console

Web console provides an easy way for users to apply CLI commands to a specific SAS Expander without needing a console terminal.

4.3.10.1 Utilize Web Console

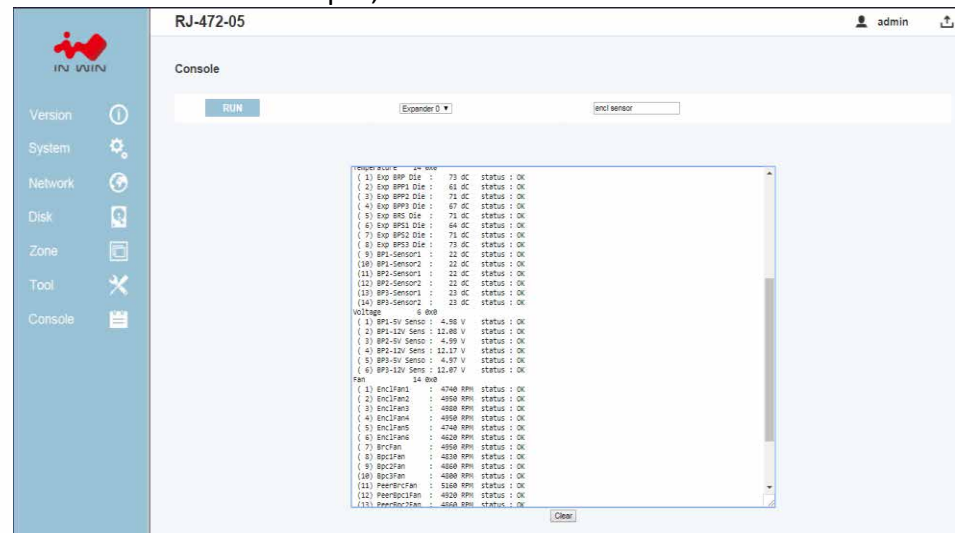
- Login into Web-GUI then click “Console” on the left panel.

Then, on the right panel, select the SAS expander that you would like to apply the command to and fill the command to the rightest square.

Click “RUN” to apply commit the command to expander.

The output of the command would appear on the lower square.

To clear the console output, click the “Clear” button.



4.3.11 Advanced Configuration

There are some other advanced configurations that the users might want to configure to the non-factory-default settings.

Warning:

Changing factory default setting is not encouraged. Please be sure you have consult our technical staffs before making these changes.
Be cautious to the risks of the changes you have made.

4.3.11.1 Cooling Policy

- The factory default system cooling mode is set to regular cooling mode which might cover most system thermal requirement cases. However, the JBOD systems designed to allow users configuring to other modes for some applications.

- Users can then configure the system cooling mode in console CLI.

For RJ-472-05 and RJ-448-05:

Command “ucfg cool” under “mgmt.s\console 0” layer to show the current cooling mode.

```
/mgmt.s# console 0
press Ctrl-X to exit console

brP >ucfg cool

UCFG Thermal Config Override State:
cooling mode      : is overridden (RegularCool).
fan number        : not overridden (14)
temp. sensor number : not overridden (14)
```

Command “ucfg” under “mgmt.s\console 0” to show cooling mode allowed to set.

```
Cooling Mode      cool <CoolMode>
- CoolMode
qc : Quiet,        rc : Regular
ac : Aggressive,   hc : Hysterical
mc : Monitor only, nc : No Thermal Support
*** Applied in JBOD mode only for some models ***
```

Command “ucfg cool <CoolMode>” under “mgmt.s\console 0” layer to change cooling mode. eg. “ucfg cool ac” will turn cooling mode into aggressive mode.

Be sure to configure the same on both domains and reset system to take effect the settings.

For RJ-212, RJ-316, RJ-224 and RJ-424:

Command “? c.syscfg” under “mgmt.s\primary” or “mgmt.s\secondary” layer to show the cooling mode allowed to set.



```
Cool mode input      c.syscfg cool <CoolMode>
- CoolMode
  qc : Quiet cooling   , rc : Regular cooling
  ac : Aggressive cooling, hc : Hysterical cooling
  mc : Monitor only   , nsc : No system cooling
  MFG : set to MFG
***** c.syscfg cool only support JBOD system *****
```

Command “c.syscfg cool <CoolMode>” under “mgmt.s\primary” or “mgmt.s\secondary” layer to set the cooling mode. Eg. “c.syscfg cool ac” to turn into aggressive mode.

Be sure to configure the same on both domain and reboot system to take effect.

4.3.11.2 EDFB Configuration

- EDFB is a feature of Avago expander chip to boost the IO performance for the higher speed device to lower speed device by store-and-forward technology. The EDFB mode is default disabled for RJ-472-05 and RJ-448-05 JBOD systems and default enabled for RJ-212, RJ-316, RJ-224 and RJ-424 JBOD systems.

- Users is allowed to enable or disable the feature in console CLI when required.

Note: as per Avago, EDFB has disk compatibility risk that might casue some SATA HDDs not detected once enabled. So, please disable the feature in case the disk compatibility issue is encountered.

For RJ-472-05 and RJ-448-05:

Command “ucfg” under “mgmt.s\console 0” layer to show the command usage.

```
IOP Boost      edfb <EdfbMode>
- EdfbMode
  dis : Disable EDFB feature.
  en1 : Enable for SATA target.
  en2 : Enable SATA & SAS target.
```

Command “ucfg edfb” under “mgmt.s\console 0” layer to show the current EDFB status.

```
/mgmt.s# console 0
press Ctrl-X to exit console

brP >ucfg edfb

UCFG: EDFB mode not overridden (model default).
```

Command “ucfg edfb <EefbMode>” “mgmt.s\console 0” layer to enable EDFB mode. Eg. “ucfg edfb en1” to enable EDFB mode for SATA drives. Please be sure to reboot system to take effect after configuration.

```
brP >ucfg edfb en1
Are you sure? (Y/[n])

UCFG: EDFB mode is overridden (SATA enabled).
Reboot to activate.
```

For RJ-212, RJ-316, RJ-224 and RJ424:

Command “? c.syscfg” under “mgmt.s\primary” or “mgmt.s\secondary” layer to show the command usage.

```
EDFB mode input      c.syscfg edfb <EdfbMode>
- EdfbMode
  en : Enable mode    , dis : Disable mode
  MFG : set to MFG
```

Command “c.syscfg <EdfbMode>” under “mgmt.s\primary” or “mgmt.s\secondary” layer to enable or disable EDFB mode.
Eg. “c.syscfg edfb dis” to disable EDFB mode. Please be sure to reboot system to take effect after configuration.

```
/mgmt.s/primary# c.syscfg edfb dis
c.syscfg edfb dis

----- W A R N I N G -----
Change system configuration!
Are you sure? (Y/[n])

Write EDFB mode to dis.
```



4.4 Appendix A

Management Firmware CLI Commands

Function	Command
cd	changes control path to management board or expander control path
date	display or set current date/time
dhcp	display or set DHCP client
dns	display or set DNS server
gateway	display or set router (example: 192.168.100.254)
ipaddr	display or set Ethernet IP address (example: 192.168.100.100)
list	list path commands or control path
mail	display or set send mail parameters
netmask	display or set Ethernet IP netmask (default: 255.255.255.0)
passwd	change password
reboot	reboot management board
save	save configuration to NVRAM
service	display or set service (Telnet/SSH/WEB/SNMP)
upgrade	upgrade management board or expander software
useradd	add new user account
userdel	delete a user account
userlist	list user account
version	display management board's information

4.5 Appendix B

SAS Expander Firmware Useful CLI Commands

Function	Command
Enclosure Info	encl [Info-Type]
	- Info-Type: rev : Show H/W & S/W revision sensor : Show enclosure sensor state pd : Show disk phy state pmon : phy signal monitoring (Omit Info-Type to dump all) cmfg : Show MFG embeded in FW
Zone Configuration	ucfg.zone < [state] enable disable > When enabled: -- Disks are divided into 2 zones -- Each BRC exposes disks in one zone (PPrimary: Zone #1 ; Secondary: Zone #2)



Function	Command
Console Select	con [0 .. 2 'n' 'p' '?'] 'n', 'p': switch to next/previous console, '?' : display current console ID (Omit parameter to select 1st console)
Show/Set the current Date and Time	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.
Reset the Expander	reset [watchdog]
Display phy info.	phyinfox [-i [(1 .. NumBpc)]] -s -i : show phy info of BPC expander -s : show SES Array Device info of CSE BRC (bridge console only)
Configuration Update	mfgdl Download and Update MFG configuration. (feed it with 'MFG image file')
Firmware Update	fwdl Download and update firmware
Display info for all phys	phyinfo [help edfb power cable] [up <PhyNum(D)>] - no arguments displays default output - 'help' displays detailed help information - 'edfb' subcommand displays EDFB info - 'power' subcommand displays power mgmt info - 'up' filters to display connected phys only - 'cable' subcommand displays cable mgmt info - <PhyNum> is a valid phy index and filters the output to display info about that phy



Function	Command
Display or Reset All	counters [config event reset]
phy counters	- no arguments displays phy error counters and generic broadcast counters - 'config' subcommand displays phy event configuration - 'event' subcommand displays phy event counters - 'reset' subcommand resets all phy counters
Display Expander	sasaddr [-d]
SAS Address	('d': also show virtual ports address)
Show POST info	showpost
Show MFG Revision	showmfg
Show firmware revision	rev

5 Compatibility Lists

To reach the best performance and avoid system failure, InWin strongly recommends users to choose the components from InWin's compatibility list. All the components are tested in InWin's lab, and assured the components are complementary with InWin's chassis.

You can download the latest updated device compatibility list from InWin's website:

<https://www.in-win.com/en/ipc-server>

6 Technical Support

If you need help with installation or troubleshooting, you can contact your local InWin partner, or send an e-mail to InWin's local contacts for technical assistance.