

CIP5000 series storage

CIP-5316W-00N/CIP-5424W-00N/CIP-5316-JBOD



en User manual

Table of contents

| 1 | Safety | 6 |
|-------|---|----|
| 1.1 | RoHS compliance | 6 |
| 2 | Introduction | 7 |
| 3 | Specifications | 8 |
| 4 | Hardware | 10 |
| 4.1 | Front panel hardware | 10 |
| 4.1.1 | Front panel of CIP-5316W/5424W-00N | 10 |
| 4.1.2 | Front panel of CIP-5316-JBOD | 11 |
| 4.1.3 | Front panel LEDs | 11 |
| 4.2 | Rear panel hardware | 13 |
| 4.2.1 | Rear panel of CIP-5316W/5424W-00N | 13 |
| 4.2.2 | Rear panel LEDs of CIP-5316W/5424W-00N | 14 |
| 4.2.3 | Rear panel connections of CIP-5316W/5424W-00N | 14 |
| 4.2.4 | Rear panel LEDs of CIP-5316-JBOD | 15 |
| 4.2.5 | Rear panel connections of CIP-5316-JBOD | 16 |
| 4.3 | Secure cover | 16 |
| 5 | Hardware configuration | 18 |
| 5.1 | Unpacking | 18 |
| 5.2 | Install enclosure on the rack | 18 |
| 5.2.1 | Install the enclosure | 20 |
| 5.2.2 | Install or remove the secure cover | 22 |
| 5.3 | Install disk drives | 22 |
| 5.3.1 | Drive slot numbering | 23 |
| 5.3.2 | Remove the drive carrier | 23 |
| 5.3.3 | Install 3.5" disk drive in the carrier | 24 |
| 5.4 | Management path connection | 25 |
| 5.4.1 | SAS JBOD expansion | 25 |
| 5.5 | Connect the power supply | 26 |
| 5.6 | Power on | 27 |
| 6 | Management GUI | 28 |
| 6.1 | Login | 28 |
| 6.1.1 | Local login | 28 |
| 6.1.2 | Network login | 28 |
| 6.1.3 | Login screen | 29 |
| 6.2 | Use Management GUI | 30 |
| 6.2.1 | Use the header | 30 |
| 6.2.2 | Use the tree view | 30 |
| 6.2.3 | Use the management view | 31 |
| 6.3 | Choose a display language | 31 |
| 6.4 | View the event frame | 31 |
| 6.5 | Logout | 32 |
| 7 | Subsystems management | 33 |
| 8 | Backgroud activities | 34 |
| 8.1 | Manage background activities settings | 34 |
| 8.1.1 | Rebuild the settings | 35 |
| 8.1.2 | Background synchronization rate | 35 |
| 8.1.3 | Logical drive initialization | 35 |
| 8.1.4 | Redundancy check | 36 |

| 8.1.5 | PDM | 36 |
|--------|--|----|
| 8.1.6 | Transition | 37 |
| 8.2 | Media patrol | 37 |
| 9 | Manage activity schedules | 38 |
| 9.1 | Add or delete activity schedules | 38 |
| 9.2 | View or modify an existing activity schedule | 38 |
| 10 | Event log | 39 |
| 11 | Administrative tools | 40 |
| 11.1 | Restore factory default settings | 40 |
| 11.2 | Clear statistics | 40 |
| 12 | User management | 41 |
| 12.1 | View user information | 41 |
| 12.2 | User settings | 41 |
| 12.2.1 | Change your own user settings | 41 |
| 12.2.2 | Change your own password | 41 |
| 12.3 | Create a user | 41 |
| 12.3.1 | User rights | 42 |
| 12.3.2 | Delete a user | 42 |
| 12.4 | View network settings | 42 |
| 12.5 | Software management | 43 |
| 12.5.1 | Import a configuration script | 43 |
| 12.5.2 | Export a configuration script | 43 |
| 12.5.3 | Save a service report | 43 |
| 12.6 | Email service | 44 |
| 12.6.1 | Stop Email service | 44 |
| 12.6.2 | Restart Email service | 45 |
| 12.6.3 | Email settings | 45 |
| 12.6.4 | Send test Email message | 45 |
| 13 | Performance monitoring | 46 |
| 14 | Controllers | 48 |
| 14.1 | View controller information | 48 |
| 14.2 | View controller statistics | 48 |
| 14.3 | Controller settings | 49 |
| 15 | Enclosures | 50 |
| 15.1 | Enclosure information | 50 |
| 15.2 | Temperature sensor settings | 50 |
| 15.3 | Buzzer settings | 51 |
| 16 | Physical drives | 52 |
| 17 | Disk arrays and logical drives | 54 |
| 17.1 | Logical drive management | 55 |
| 18 | Spare drives | 56 |
| 18.1 | Run spare check | 56 |
| 19 | Logical drive summary | 57 |
| 20 | Maintenance | 58 |
| 20.1 | Remove the failed PSU | 58 |
| 20.2 | Install a new PSU | 58 |
| 21 | Troubleshooting | 59 |
| 21.1 | How to diagnose hard drive failures | 59 |
| 21.1.1 | Check HDD status LEDs | 59 |
| | | |

| 21.1.2 | Check HDD status in Management GUI | 59 |
|--------|------------------------------------|----|
| 21.1.3 | Prevent HDD problems | 60 |
| 21.2 | Rebuild a disk array | 61 |
| 21.2.1 | How to rebuild a disk array | 61 |
| 21.3 | How to save a service report | 63 |
| 21.4 | How to diagnose the alarm buzzer | 64 |
| 21.4.1 | How to disable the alarm buzzer | 64 |
| | | |

| 1 | Safety |
|---|--|
| | Warning! This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. |
| | Danger! Consequences The electronic components within the enclosure are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the device or its subassemblies. |



Warning!

Turn off the power and disconnect the power cord before servicing this device.

1.1

RoHS compliance

CIP5000 series storage

| Hazardous substance table according to SJ/T 11364-2014 | | | | | | |
|--|------------|------------|------------|------------------|--------------|----------------|
| | Pb (Pb) | Hg (Hg) | Cd (Cd) | Cr 6+ (Cr 6+) | PBB (PBB) | PBDE (PBDE) |
| РСВА | Х | 0 | 0 | 0 | 0 | 0 |
| Housing & enclosures | Х | 0 | 0 | 0 | 0 | 0 |
| Cables | 0 | 0 | 0 | 0 | 0 | 0 |
| Power supply units | Х | 0 | 0 | 0 | 0 | 0 |
| Batteries | Х | 0 | 0 | 0 | 0 | 0 |
| | | | | | | |
| This table was created according to the provisions of SJ/T 11364 | | | | | | |

o: The content of such hazardous substance in all homogeneous materials of such component is below the limit defined in GB/T 26572

x: The content of such hazardous substance in a certain homogeneous material is above the limit defined in GB/T 26572

2 Introduction

CIP5000 series storage devices are subjected to a special design, and suitable for medium and large IP video monitoring projects. CIP5000 series storage are most suited for continuous monitoring in banks, shopping malls, casinos, factories, warehouses, and similar sized commercial buildings, residential areas, governmental or private enterprise.

CIP5000 series storage can simplify the installation and setup process by configuring Windows Storage Server 2016 Standard (64-bit) Operating System, a video management software suite as well as hot-swappable hard drives.

CIP5000 series storage devices are integrated servers with built-in RAID storage functions, thus eliminating the need for additional servers, RAID controller cards and separately connected storage cases.

CIP5000 series storage uses thoroughly tested and proven RAID engines and can maximize reliability, all of the drive bays are hot-swappable, and these products are equipped with redundant power supply, which can ensure data security and uninterrupted run.

PCIe slots incorporated in CIP5000 storage devices can improve flexibility. PCIe slots are applicable to other useful functions on video graphics cards, video encoder/decoder cards, RAID cards or PCIe platforms.

Storage capacity can be expanded by means of the CIP-5316-JBOD 3U 16-bay extension cabinet.

3

Specifications

| Model | CIP-5316W-00N | CIP-5424W-00N | |
|----------------------------------|--|--|--|
| General | | | |
| Form factor | 3U, 19" rack mount | 4U, 19" rack mount | |
| Function | Storage appliance for video surve | illance | |
| Drives | 16 hot-swappable drives 3.5" HDD (12Gbs SAS / 6Gbs SATA) | 24 hot-swappable drives 3.5" HDD (12Gbs SAS / 6Gbs SATA) | |
| Controller | Single | | |
| Network | Two Gigabit Ethernet RJ-45 ports | (1000Base-T) | |
| System processor | Intel® Core™ i3-7101E | | |
| System memory | Default 8GB (Maximum 64 GB) @ | DDR4 Non-ECC | |
| Internal built-in storage | 128GB M.2 | | |
| Number of HDD supported | Up to 96 HDD via 5 JBODs | Up to 104 HDD via 5 JBODs | |
| USB ports | Front: two USB 2.0 Rear: four USB 3.0 | | |
| Expansion slot | 1x8-lane gen3 1x1-lane gen3 1x4-lane gen3 | | |
| I/O port | PS/2 x 1 D-Sub Port x 1 DVI Port x 1 HDMI Port x 1 | | |
| Audio | 5 + 1 jack | | |
| RAID levels supported | 0, 1, 1E, 3, 5, 6, 10 (0+1), 30, 50, | 60 | |
| Hot spares | Multiple global or dedicated hot-s | pare drives with revertible option | |
| Maximum LUNs per system/array | 256/32 | | |
| | Software | | |
| Supported OS (64-bit) | Windows Storage Server 2016 Sta | andard | |
| Management | Graphical UI/SNMP via Ethernet, via USB, SDK or API for Integratio | CLI via Ethernet, OPAS Service n | |
| Event notification | Email, SNMP, Buzzer, LEDs | | |
| | System | | |
| AC input | 100 ~ 240 VAC, 60 ~ 50Hz | | |
| Current (maximum) | 8-4A (550W, 8A/100V, 4A/240V) | | |

| Model | CIP-5316W-00N | CIP-5424W-00N | |
|------------------------|--|--|--|
| Power supply | 550W (1+1@550W) in default. | | |
| Fan | Non-swappable | | |
| Temperature | 5° ~ 40°C (-40° ~ 60°C non-opera | tional) | |
| Relative humidity | Operational: 10% to 80% (Non-Condensing) Non-Operational: 10% to 95% (Non-Condensing) | | |
| Dimensions (H x W x D) | 131 x 503 x 447 mm (5.1 x 19.8 x 17.6 in) | 173 x 503 x 447 mm (6.8 x 19.8 x 17.6 in) | |
| Safety/EMI | CE, CCC | | |
| Warranty | 3 years limited warranty | | |

| Model | CIP-JBOD | | |
|--------------------------------|---|--|--|
| | General | | |
| Form factor 3U, 19" rack mount | | | |
| Function | JBOD storage expansion cabinet for CIP5000 | | |
| Drives | SAS (3 Gb / s or 6 Gb / s) / SATA (3 Gb / s or 6 Gb / s) | | |
| | System | | |
| AC input | 100 ~ 240 VAC, 60 ~ 50Hz | | |
| Current (maximum) | 8A | | |
| Power supply | 550W (1+1@550W) in default. | | |
| Power consumption | 177.9 watts (w / SAS drives) 44.9 watts (without drives) | | |
| Fan | Non-swappable | | |
| Temperature | 5° ~ 40°C (-40° ~ 60°C non-operational) | | |
| Relative humidity | Operational: 20% to 80% (Non-Condensing) Non-Operational: ~ 95% (Non-Condensing) | | |
| Dimensions (H x W x D) | 131 x 446.7 x 507 mm (5.1 x 17.6 x 19.96 in) | | |
| Safety/EMI | CE | | |
| Warranty | 3 years limited warranty | | |

4 Hardware

This sections gives an overview of the front panel and rear panel hardware features of CIP-5316W-00N, CIP-5424W-00N storage devices, and CIP-5316-JBOD storage expansion. In this document, these products are referred to as CIP5000 enclosures, CIP5000 units, or CIP5000 systems. The contents of this document apply to all models in the CIP5000 series storage.

4.1 Front panel hardware

Without the secure cover, the front panel of the enclosures allows access to drives carriers. So the units are shipped with secure covers to protect the drive carriers from being unintentionally removed.

Defective drives shall be replaced immediately in order to ensure data availability. If any drive failed, a hot spare drive automatically replaces a failed drive, thus ensuring the fault-tolerant integrity of the logical drive. The self-contained hardware-based RAID logical drives provide maximum performance in a compact external enclosure.

4.1.1 Front panel of CIP-5316W/5424W-00N

The front panel hardware components on the CIP-5316W-00N and CIP-5424W-00N are identical except the number of drives.

Each side of enclosure is equipped with a handle to secure the enclosure to the rack. The system power button and two USB ports are located on the left handle, and most of the front LED indicators are located on the right handle.





Figure 4.2: CIP-5424W-00N front view

4.1.2 Front panel of CIP-5316-JBOD

The front panel hardware components on the CIP-5316-JBOD is nearly the same as CIP-5316W-00N. However, there is no power button, USB ports and OPAS LED on the left handle of CIP-5316-JBOD enclosure.

The hard disk status and hard disk activity indicators on the hard drive carriers have the same functions as those on CIP-5316W-00N enclosure.

The LEDs of power, system status, global hard disk activity, and system heartbeat indicator on the right handle have the same functions as those of CIP-5316W-00N.

4.1.3 Front panel LEDs

With the power supplies connected, the system can now be powered on. To power on the subsystem, press the power button on the left handle, then observe OPAS LED on the left handle and LEDs on the right handle.



Figure 4.3: Front panel components on the left handle



Figure 4.4: Front panel LEDs on the right handle

| LED | Description |
|---------------------|---|
| Power | Blue - System is powered on. |
| System status | Green - System is normal. Red - System trouble. Such as LD offline, fan malfunction, voltage out of range, system temperature alert. Red flash - HDD high temperature alert Off steady - System is not ready. |
| Global RAID status | Green - Status is normal. Red - RAID volume is offline. Orange - Critical state of any logical drive, or system is rebuilding. |
| Global HDD activity | Blue flash - One or more drives are being accessed. Blue - No drives are being accessed. |
| System heartbeat | Blue flash - Firmware and software are operating normally. |
| OPAS USB | Green - OPAS device (USB disk) is detected. Green flash - OPAS operation is in progress. Red - OPAS operation has failed. |



Figure 4.5: Hard disk drive carrier LEDs

There are two LEDs on each drive carrier. They report activity of the drive, and current condition of the drive.

| LED | Description |
|---------------|---|
| Disk status | Green - HDD is configured and working properly. Red - HDD requires manual replacement. Orange - Status notification of background RAID activity on this articular HDD, and no user action is required. |
| Disk activity | Blue flash - During drive activity. |

4.2 Rear panel hardware

The rear panel of the enclosure provides access to the hot-swappable power supplies, local management connection (via USB keyboard and VGA or HDMI monitor port), iSCSI (Ethernet) data ports, and some units also provide I/O connections for audio sensor and alarm systems. The rear panel includes two system fans.

4.2.1 Rear panel of CIP-5316W/5424W-00N

The rear panel of CIP-5424W-00N is almost the same as the rear panel of the CIP-5316W-00N except for its higher profile. The form factor of the CIP-5424W-00N is 4U and the form factor of the CIP-5316W-00N is 3U.

The rear panel is where you connect power cables, I/O connections, IPMI port, audio out/in, video (VGA), USB serial ports, COM1 (serial port) and SAS port Backend Controller card. Both enclosures include PCIe slots for added system versatility.



Figure 4.6: CIP-5316W-00N rear view



Figure 4.7: CIP-5424W-00N rear view

The rear panel components of CIP-5316W-00N and CIP-5424W-00N are the same, and each model has two power supply units (PSU).



| 1 | PSU fan vents |
|----|----------------------------|
| 2 | Power inserts |
| 3 | System fan vents |
| 4 | PS/2 mouse/keyboard port |
| 5 | VGA port |
| 6 | DVI port |
| 7 | HDMI port |
| 8 | USB 3.0 (4 ports) |
| 9 | Optical SPDIF Out port |
| 10 | Audio In/Out ports |
| 11 | 1000BASE-T RJ-45 (2 ports) |

4.2.2 Rear panel LEDs of CIP-5316W/5424W-00N

The LEDs on the rear panel include LEDs for Ethernet data ports, and LEDs for each hotswappable PSU.

| LED | Description |
|--------------------|--|
| Ethernet | The LED locates on the upper left of each port: Orange - Ethernet connected. Orange flash - There is activity on the port. Off steady - No connection has been established. |
| Link/Act and Speed | The LED locates on the upper right of each port: Orange - 100 Mbps Green - 1000 Mbps |

| LED | Description | | |
|----------------|---|--|--|
| PSU 1 or PSU 2 | Green - normal operation | | |
| | Red or Orange - a problem or unit failure | | |

4.2.3

Rear panel connections of CIP-5316W/5424W-00N

Access to display and management connections are located on the rear panel.

| Function | Description | |
|--------------|---|--|
| D-sub VGA | Video connection for VGA monitors Management GUI display | |
| Display Port | Video connection for Display Port monitors Management GUI display | |
| DVI | Video connection for DVI monitorsManagement GUI display | |
| HDMI | Video connection for HDMI capable monitors Management GUI display | |
| USB | Connection to USB keypads Data transfer to or from USB storage devices | |
| Audio input | Input from a peripheral audio device, such as a (plug-in) microphone. | |
| Audio output | Output to a peripheral audio device, such as a speaker. | |
| Audio Mic | Connection for microphones | |

4.2.4 Rear panel LEDs of CIP-5316-JBOD

Controller LEDs



| LED | Description |
|--|---|
| IOM status LED | Off - Not activated Green - Ready Red - FW is not ready. |
| SFF-8644 SAS Expansion Port Link status LED | Off - Link down Green steady - Link up Green flash - Activity |

Power supply LEDs



| LED | Description |
|--------------|--|
| PSU Status | Off - Not detected Green steady - Normal Green flash - Power off and in standby mode Red - Failed |
| Power switch | Off - Not detected Green steady - Normal Red - Failed |
| Fan status | Off - Not detected Green steady - Normal Red - Failed |

4.2.5 Rear panel connections of CIP-5316-JBOD

| Function | Description |
|--------------|--|
| D-sub VGA | Two SFF-8644 connectors for SAS (1 and 2). When connecting these ports to a CIP-5316W/5424W-00N or other JBOD, be sure to adjust the cable connectors appropriately. Each SAS port has a connection / activity indicator. |
| Display Port | Video connection for Display Port monitors, which is used for diagnosis or other system maintenance functions. |

4.3 Secure cover

The CIP5000 enclosure include a secure cover for better physical security and to prevent unintended or accidental removal of hard drives.

The cover are secured with a single tubular cam lock located near the left side of the cover. Turn the key clockwise to lock, counter clockwise to unlock.



Tubular cam lock

Figure 4.8: CIP-5316W-00N with secure cover (unlocked)



Tubular cam lock Figure 4.9: CIP-5424W-00N with secure cover (locked)

5 Hardware configuration

This section gives the basics on unpacking and hardware installation of CIP5000 units. Hardware installation includes installing units in the rack, connecting power supplies, establishing a network, establishing the data and administrative connections to the units, and installing hard drives.

5.1 Unpacking

CIP-5316W-00N / CIP-5424W-00N

The box contains the following items:

- One of the following storage appliances:
 - CIP-5316W-00N
 - CIP-5424W-00N
- Two 1.83m (6 ft) power cords
- Screws for disk drives
- Front panel bezel cover
- Quick installation guide
- (Optional) Sliding rail assembly for rack mounting

CIP-5316-JBOD

The packing box contains the following items:

- CIP-5316-JBOD storage enclosure
- Two 1.83m (6 ft) power cords
- SFF-8644 external SAS cable
- DB9-to-RJ11 serial data cable
- Screws for disk drives
- Front panel bezel cover
- Quick installation guide
- (Optional) Sliding rail assembly for rack mounting

5.2 Install enclosure on the rack

The instructions here apply to 3U 16-bay models CIP-5316W-00N and the JBOD expansion CIP-5316-JBOD, as well as the 4U 24-bay model CIP-5424W-00N.



Caution!

Do not populate any enclosure hardware with hard drives until it has been securely installed in the rack.



Caution!

At least two persons are required to safely lift, place, and attach the enclosure hardware into a rack system.



Caution!

Do not lift or move the enclosure hardware by the handles, or power supplies. Hold the system itself.



Caution!

Do not install the enclosure hardware into a rack without rails to support the system.



Caution!

Only a qualified technician who is familiar with the installation procedure should mount and install the enclosure hardware.

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|---|-----------------------------|---|
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Caution!

Mount the rails to the rack using the appropriate screws and flange nuts, fully tightened, at each end of the rail.



Caution!

Do not load the rails unless they are installed with screws as instructed.

| | $\mathbf{\hat{\mathbf{A}}}$ | |
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Caution!

The rails available for the CIP enclosure hardware are designed to safely support that CIP enclosure hardware when properly installed. Additional loading on the rails is at the customer's risk.



Caution!

Bosch cannot guarantee that the mounting rails will support your CIP enclosure hardware unless you install them as instructed.

Install the enclosure to the rack using the optional rails.

| ٦ |
|---|
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| J |

Notice!

To lighten the enclosure, you can remove the power supplies. Replace the power supplies after the unit is mounted on the rack.



Notice!

For more information on rack mounting, refer to the Quick Installation Guide for rail assembly.

5.2.1 Install the enclosure





Figure 5.5: System installed in rack

To install the enclosure hardware into a rack with the supplied rails:

- 1. Check the fit of the rails in your rack system.
- 2. Adjust the length of the rails as needed.
 - The rear half of the rail slides inside the front half. The rail halves are riveted _ together, so no adjustment screws are needed.
 - The front-left and front-right rail ends are labeled. _
 - Be sure the front rail support is on the bottom facing inward. _
 - All rail ends, front and rear, attach at the outside of the rack posts.
 - The guide pins at the rail ends align with the holes in the rack posts.

- Use the attaching screws and flange nuts from your rack system. Tighten the screws and nuts according to instructions for your rack system.
- 3. Place the enclosure hardware onto the rails.
- 4. Secure the enclosure hardware to the rack.
 - The unit attaches to the rack posts using the included screws and flange nuts.
 - One screw each side, in the upper hole only.

5.2.2 Install or remove the secure cover



Figure 5.6: Installing or removing secure cover

To attach the secure cover:

- 1. Make sure the lock is in the unlocked position. To unlock, insert the key into the lock and turn counter clockwise.
- 2. Insert the tab on the right side of the cover into the slot receptacle on the right handle.
- 3. Place the cover in position and push in the latch release (to the left of the keyhole).
- 4. Push the cover into position so that the tab on the right side inserts into the receptacle on the right handle when releasing the latch.
- 5. Insert the key and turn clockwise to lock.

To remove the cover, unlock it, press the latch release on the left side and pull the left end out first, holding it with both hands.

5.3 Install disk drives

The CIP-5316W-00N and CIP-5424W-00N support SATA/SAS 3.5-inch hard disks.

Number of drives required

The table below shows the number of drives required for each RAID level.

| RAID level | Number of drives |
|------------|------------------|
| RAID 0 | 1 or more |
| RAID 1 | 2 only |
| RAID 1E | 2 or more |
| RAID 3 | 3 to 32 |

| RAID level | Number of drives |
|------------|------------------------------------|
| RAID 5 | 3 to 32 |
| RAID 6 | 4 to 32 |
| RAID 10 | 4 or more (must be an even number) |
| RAID 30 | 6 or more |
| RAID 50 | 6 or more |
| RAID 60 | 8 or more |

5.3.1 Drive slot numbering

You can install any suitable disk drive into any slot in the enclosure.

| | 1 | 7: | 2 | 3 (: | 4 |
|-------|----|----|----|--------|-------|
| 0 | 5 | | 6 | 7 | 8 (: |
| I II. | 9 | | 10 | 11 | 12 |
| | 13 | | 14 | 15 (: | 16 (: |

Figure 5.7: Drive slot numbering for 3U models

| 0 | 1 | 2 | | 3 | | 4 | 0 |
|---------|----|----|---|----|---|----|---|
| | 5 | 6 | | 7 | | 8 | |
| • | 9 | 10 | • | 11 | • | 12 | |
| 4 📗 4 📗 | 13 | 14 | • | 15 | | 16 | - |
| | 17 | 18 | | 19 | | 20 | |
| | 21 | 22 | | 23 | | 24 | |

Figure 5.8: Drive slot numbering for 4U models

Slot numbering is mapped in the web-based system Management GUI. Insert all of the drive carriers into the enclosure to ensure proper airflow, even if you do not populate all the carriers with disk drives.



Caution!

Swing open the drive carrier handle before you insert the drive carrier into the enclosure.

5.3.2

Remove the drive carrier

The drive carrier accommodates 3.5-inch drives.



Caution!

The CIP5000 models support hot-swapping disk drives.

To avoid hand contact with an electrical hazard, remove only one drive carrier at a time.

Pull here to release the carrier handle latch. Then pull the carrier straight out by the handle. Place your free hand under the carrier. Do not drop the disk carrier, even if it is empty.



Figure 5.9: Disk carrier with HDD installed (front view)

5.3.3 Install 3.5" disk drive in the carrier

Obey the following instructions to install 3.5" hard disk drives into the drive carriers.

- 1. Remove a disk drive carrier.
- 2. Carefully lay the disk drive into the drive carrier at the front, so that the screw holes on the sides line up correctly with the power and data connectors facing away from the carrier handle.
- 3. Insert the screws through the holes in the drive carrier and into the sides of the disk drive.
 - Install only the counter-sink screws supplied with the drive.
 - Install four screws per drive.
 - Snug each screw. Be careful not to over-tighten.

4. Reinstall the drive carrier into the enclosure.

Repeat steps 1 through 3 until all of your disk drives are installed.



Figure 5.10: SATA disk drive mounted in a drive carrier

5.4 Management path connection

This section describes how to establish a management connection for the CIP5000 subsystems.

Through the management GUI - a web browser based GUI, you can finish to configure management path connection.

There are two 1 Gb/s Ethernet RJ-45 ports on the rear panel for connection to an Ethernet network. After logging into the Management GUI as the administrator, you can change the network settings.

To connect the server to a local Ethernet for management:

- 1. Attach one end of an Ethernet cable to the network connector or standard NIC in the Host PC. Attach the other end of the Ethernet cable to one of the ports on the standard network switch.
- 2. Attach one end of an Ethernet cable to one of the ports on the standard network switch. Attach the other end of the Ethernet cable to an Ethernet port (1000 BASE-T) on the back of the server.

If you have more than one CIP5000 system, host, or server, repeat steps 1 and 2 as instructed.

5.4.1 SAS JBOD expansion

JBOD expansion requires:

- One or more CIP-5316-JBOD expansion cabinets
- One cable from SFF-8644 to SFF-8644 SAS for each CIP-5316-JBOD

Connect to JBOD data path

The SFF-8644 SAS expansion port connector is located on the rear panel of the CIP5000 subsystems (CIP-5316W-00N or CIP-5424W-00N). The controller of the CIP5000 subsystems manages the CIP-5316-JBOD system, and no additional management connection is required for the CIP-5316-JBOD system.



Single Controller Expansion

- 1. Connect the SFF-8644 SAS port in the host CIP-5316W-00N or CIP-5424W-00N system to SAS Port 1 on the uppermost CIP-5316-JBOD unit in the rack.
- 2. Connect SAS Port 2 on the same CIP-5316-JBOD to the SAS Port 1 on the next CIP-5316-JBOD in the stack.
- 3. Connect the remaining CIP-5316-JBOD enclosures in the same manner.

i

Notice!

When you are ready to power on the CIP5000 subsystems and SAS JBOD expansion cabinets, first power on the JBOD.

5.5 Connect the power supply

Insert one power cable into the power receptacle for each power supply unit (PSU) and connect the each PSU to a suitable power source. The enclosure is equipped with two PSU using an N+1 arrangement.

Each PSU has a status LED. After power on, check the LEDs on each PSU on the rear of the unit.

These indicators light green to indicate normal operating conditions, and light red to indicate a problem or unit failure.

| | Notice! |
|---|---|
| i | The CIP-5316W-00N and CIP-5424W-00N is equipped with two PSU using an N+1 |
| | arrangement. In this arrangement, one PSU is redundant, so a minimum of one PSU is needed |
| | to power up the enclosure. |





Warning!

Turn off the power and disconnect all power cords before maintaining the CIP5000 units.

5.6

Power on



Notice!

If you are using JBOD storage expansion, power on the JBODs first.

With the power supplies connected, the system can now be powered on. To power on the subsystem, press the power button on the left handle, then observe OPAS

LED on the left handle and LEDs on the right handle.

See also

- Front panel LEDs, page 11

6 Management GUI

This section describes how to use the Bosch Management Graphical User Interface (GUI) to monitor and manage your RAID system.

6.1 Login

You can log into the Management GUI in either of two ways:

- Local login
- Network login

6.1.1 Local login

Connect a keyboard, a mouse and a monitor to the CIP5000 enclosure, then log into the Management GUI, and perform one of the following operations:

- Double-click Management GUI desktop icon.
- Select the Management GUI from the Windows Start menu.
- Obey the steps of the section "Network login".

Notice!

The default IP settings for the Gigabit Ethernet ports are:

| , | |
|---|--|
| | |
| | |

| Port 1 = | 192.168.0.1 |
|----------|-------------|
| Port 2 = | 192.168.1.1 |

IP settings for the ports are controlled through the Windows operating system. If you want to change the default settings, use the normal IP settings configuration of the operating system you are using.

6.1.2

Network login

For the CIP5000 series storage running with the Windows operating system, it is necessary to disable the Windows Firewall in order to permit access to the Bosch Management GUI through the network.

If the Firewall is running, you can not access the Management GUI from the network.

You can access the Management GUI from any computer with network connection to the CIP5000 series storage.

- 1. Launch your browser.
- 2. In the browser address filed, enter the information below. Then press **Enter**.

Note that defaulted IP address of port 1 is used for the example belwo.

If you choose SSL security protocol during installation, use the secure connection. Otherwise, use the regular connection.

Regular connection

Management GUI using HTTP connection.....http:// Enter the IP address of the system.....192.168.0.1 Enter the port number......:8090 Together, your entry looks like this: http:// 192.168.0.1:8090

Secure connection

Management GUI using a secure HTTP connection.....https: // Enter the IP address of the system.....Port 1 = 192.168.0.1 / Port 2 = 192.168.1.1 Enter the port number.....:443 Together, your entry looks like this: https://192.168.0.1:443

Notice!

If you are logging in locally from the Host PC, you can enter the localhost instead of the IP address.

| i | |
|----------|--|

Notice!

Whether you choose regular connection or secure connection, you can log into the Management GUI, and your user password is always secure.

6.1.3 Login screen

When the opening screen appears:

- 1. In the User Name field, enter **administrator**.
- 2. In the Password field, enter **password**.
- 3. Click the **Login** button.

The user name and password are case sensitive.

After successful login, please modify the default user name and password immediately.

| User Name Password Login | Ð | BOSCH | Language | | | |
|--------------------------------|---|-------|----------|-------------|---|--|
| | | | | L User Name | [| |

After logging in, the Quick Links menu pops up.

| BOSCH Language | fiew Storage Network Logout Help About | |
|--|--|-----------|
| Home (User: administrator) Home (User: administrator) Home (User: administrator) Home (User: administrative Tools Home (User: administrati | CIP Quick Links Information and Settings for all logical drives in the subsyste Information and Settings for all physical drives in the enclos Disk arrays information, creation and deletion Network management Event Viewing Background activities management | em ure |
| | O Bosch (Shanghai) Security Systems Ltd. | |

6.2 Use Management GUI

The Bosch Management GUI is a browser-based RAID management software.

| ne (User: administrator) | Background | Activities | | | | | | | | | | |
|--------------------------|---------------|-----------------------------------|---------|---|-----------------------|--------------|-----------|-------------|-----------|--|--|--|
| | Information | Settings | Event | - | Background Activities | \mathbf{T} | Scheduler | • | Lock | | | |
| Administrative Tools | 🔻 Background | Activities | | | | | · | | | | | |
| | No backgroup | nd activity is r | unning | | | | | | | | | |
| | NO Dackgroun | iu acuvity is ii | anning. | | | | | | | | | |
| Disk Arrays | 🔻 Background | Background Activity Parameters | | | | | | | | | | |
| - Spare Drives | Rebuild Rate | Rebuild Rate | | | | | | High | | | | |
| | Background S | Background Synchronization Rate | | | | | | Low | | | | |
| | Logical Drive | Logical Drive Initialization Rate | | | | | | Medium | | | | |
| | Redundancy | | Medium | | | | | | | | | |
| | Migration Rat | | High | | | | | | | | | |
| | PDM Rate | | High | | | | | | | | | |
| | Transition Ra | | Medium | | | | | | | | | |
| | Reassigned B | Reassigned Block Threshold | | | | | | | 32 Blocks | | | |
| | Error Block T | Error Block Threshold | | | | | | 32 Blocks | | | | |
| | Media Patrol | Media Patrol | | | | | | | | | | |
| | Auto Rebuild | Auto Rebuild | | | | | | Enabled | | | | |
| | Last Media Pa | Last Media Patrol Start Time | | | | | | Not Started | | | | |
| | Last Media Pa | Last Media Patrol Ston Time | | | | | | Not Stopped | | | | |

The Management GUI interfaces includes three mains parts:

- Header
- Tree view
- Management view

6.2.1 Use the header

The Header contains the following items:

- Language Choose a display language
- View To view the event frame
- Logout To logout

6.2.2 Use the tree view

The tree view provides access to all components of the CIP5000 system, software management, RAID controller, enclosure, physical drives, disk arrays, logical drives, and spare drives.

The figure below shows the components of the tree view.



The Administrative Tools section is different for the Administrator and Super Users than for other users. The remainder of the user tree is the same for all users.

6.2.3 Use the management view

Management view displays information and settings menus according to the items you select in the tree view. It provides the management interface for the enclosure and its components, including creation, maintenance, deletion, and monitoring of disk arrays and logical drives. Through the function tabs, you can access different management view to operate. Click the **Help** link to the right of the tabs in management view to access online help for the function currently displayed.

6.3 Choose a display language

The Management GUI is available in the following languages:

- English
- Simplified Chinese

To change the display language:

- 1. Click the Language drop-down menu in the Header.
- 2. Highlight the language you prefer.

Management GUI displays in the chosen language.

6.4 View the event frame

To view the event frame, click **Show Event Frame** in the Header. To hide the event frame, click **Hide Event Frame** in the Header.

In the event frame, events are listed and sorted by:

- **Device** Disk array, logical drive, physical drive, controller, etc.
- Event ID The hexadecimal number that identifies the specific type of event
- Severity:
 - Information Information only, no action is required
 - Warning User can decide whether or not action is required
 - Minor Action is needed but the condition is not serious at this time
 - Major Action is needed now
 - Critical Action is needed now and the implications of the condition are serious
 - Fatal Non-Recoverable error or failure has occurred

- **Time** Time and date of the occurrence
- **Description** A brief description of the event

You can also view events by clicking the **Subsystems** icon in the tree view, then clicking the **Event** tab in the management view.

6.5 Logout

There are two ways to log out:

- Close your browser window
- Click **Logout** on the Management GUI Header

Clicking **Logout** brings you back to the Login screen. After logging out, you must enter your user name and password to log in again.

7

Subsystems management

The menus listed under Subsystems are all the menus used for device management. Click the Subsystems icon to view read-only information for CIP-5316W-00N or CIP-5424W-00N, including the management IP address, Alias, Model and WWN. To view the menus used for system management, click the + symbol of the Subsystems icon to reveal the sub-menu icons for the following:

- Administrative Tools (includes links for User Management, View Network Settings, Performance Monitoring and Software Management)
- Controllers (view controller information and manage settings)
- **Enclosures** (view device information and virtual enclosure, set temperature thresholds for warnings and enable/disable warning buzzer)
- Disk Arrays (manage disk arrays)
- **Spare Drives** (manage spare drives)
- Logical Drives Summary (read-only logical drive information display)

Click the subsystem IP address and model name listed under the Subsystems top-level menu icon in tree View. In the Information tab, the following information for the subsystem appears:

- Alias
- Vendor
- Model
- Serial Number
- World Wide Number
- Part Number
- Revision Number
- System Date & Time

Here you can also save a System Service Report (useful for troubleshooting) in the form of an HTML file to the computer you are using by clicking on the **Save** button.

The Subsystem home menu includes the following function tabs:

- Information (described above)
- **Settings** (assign an Alias)
- Background Activities
- Scheduler (schedule background activities)
- Event (list runtime and NVRAM events)
- Lock (lock/unlock subsystem)

8 Backgroud activities

Background activities perform a variety of preventive and remedial functions on your physical drives, disk arrays, logical drives, and other components.

You can run a background activity immediately or schedule it to run at a later time. Setting options for each activity are listed after the scheduling options. These settings determine how the background activity affects I/O performance

View current background activities

To view current background activities:

- 1. Click the Subsystem icon of the subsystem on which you want to view background activities.
- 2. In the **Subsystem** menu, click the **Background Activities** tab.

Background activities currently running are displayed in the top portion of the menu. You can also view the current background activities parameter settings in the lower part of the menu. Click the Background Activity Parameters menu expander to view the current parameter settings.

View background activities parameters settings

To view current background parameter settings:

- 1. Click the Subsystem icon of the subsystem on which you want to view background activities.
- 2. Click the Background Activity Parameters menu expander to view the current parameter settings.

The parameters listed are as follows

- Rebuild Rate
- Background Synchronization Rate
- Logical Drive Initialization Rate
- Redundancy Check Rate
- Migration Rate
- Transition Rate
- Reassigned Block Threshold
- Error Block Threshold
- Enable Media Patrol
- Enable Auto Rebuild

8.1 Manage background activities settings

The parameters listed in the Background Activities menu are configured in the Background Activities Settings menu.

To change Background Activities settings:

- 1. Click the Subsystem icon of the subsystem on which you want to view Background Activities.
- 2. Click the menu expander between the Background Activities tab and the Scheduler tab and select the **Settings** option.

The following settings can be configured:

- Rebuild Rate: High, Medium, Low
- Background Synchronization Rate: High, Medium, Low
- Logical Drive Initialization Rate: High, Medium, Low
- Redundancy Check Rate: High, Medium, Low
- Migration Rate: High, Medium, Low
- PDM Rate: High, Medium, Low

- Transition Rate: High, Medium, Low
- Reassigned Block Threshold
- Error Block Threshold
- Enable Media Patrol
- Enable Auto Rebuild

In addition, you can use the scheduler to configure these settings. Use the scheduler according to the following parameters.

8.1.1 Rebuild the settings

To change the rebuild settings in the Background Activity Settings menu:

- 1. Use the **Rebuild Rate** drop-down menu and select a rate:
 - Low Less system resources are used for rebuilding, and more system resources are used for data read / write operations.
 - **Medium** The system resources between the rebuild and data read / write operations are balanced.
 - **High** More system resources are used for rebuilding, and less system resources are used for data read / write operations.
- 2. To enable Auto Rebuild (rebuild automatically when you replace a failed hard disk with a new one). Select the **Enable Auto Rebuild** check box.
- 3. Click the **Submit** button.

Rebuild rate

When you rebuild a disk array, you are actually rebuilding the data on a physical drive (i.e., a physical hard disk).

- When a physical drive in a disk array fails, a spare drive with sufficient capacity is available and the disk array automatically begins to rebuild with a spare drive.
- If a spare drive with sufficient capacity is not available, but the automatic rebuild feature is enabled, the disk array begins to rebuild automatically after you remove the failed physical drive and install an unconfigured physical drive in the same slot.
- If a spare drive with sufficient capacity is not available, and the auto-rebuild feature is disabled, you must replace the failed drive with an unconfigured physical drive and perform a manual rebuild.

8.1.2 Background synchronization rate

Synchronization is automatically applied when a redundant logical drive is created. Recalculate redundant data synchronously to ensure that the work data on the physical drive is properly synchronized.

Background synchronization rate

To change the background synchronization rate in the Background Activity Settings menu:

- 1. Click the **Synchronization Rate** drop-down menu and select a rate:
 - Low Less system resources are used for synchronization, and more system resources are used for data read / write operations.
 - Medium- The system resources between the synchronization and data read / write operations are balanced.
 - High More system resources are used for synchronization, and less system resources are used for data read / write operations.
- 2. Click the **Submit** button.

8.1.3 Logical drive initialization

Initialization is a foreground activity because you can not access a logical drive while initializing.

Initialization is usually done after a logical drive is created from a disk array. Initialization sets all data on the logical drive to zero. This operation is useful because the logical drive may have previously configured legacy data. Therefore, whenever a logical drive is created, initialization is recommended.

Logical drive initialization rate

To change the Logical Drive Initialization Rate Setting in the Background Activity Settings menu:

- 1. Click the Logical Drive Initialization Rate drop-down menu and select a rate:
 - Low Less system resources are used for initialization and more system resources are used for data read / write operations.
 - **Medium** The system resources between the initialization and data read / write operations are balanced.
 - High More system resources are used for initialization and less system resources are used for data read / write operations.
- 2. Click the **Submit** button.

8.1.4 Redundancy check

Redundancy check is a routine maintenance procedure for (redundant) fault-tolerant disk arrays to ensure exact match of all data. Redundancy checks can also correct inconsistencies.

| Notice! |
|--|
| You can use the scheduler to set up a redundancy check schedule. |
| To set up a schedule, click the menu expander on the right side of the Scheduler tab, and |
| select the redundancy check schedule. |
| Redundancy check rate |

To change the redundancy check rate setting in the Background Activity Settings menu:

- 1. Click the Redundancy Check Rate drop-down menu and select a rate:
 - Low Less system resources are used for redundancy check and more system resources are used for data read / write operations.
 - **Medium** The system resources between the redundancy check and data read / write operations are balanced.
 - **High** More system resources are used for redundancy check and less system resources are used for data read / write operations.
- 2. Click the **Submit** button.

8.1.5 PDM

Predictive data migration (PDM) is the migration of data from a suspect physical drive to a spare drive, similar to rebuilding a logical drive. Unlike rebuilding, however, the PDM constantly monitors the physical drive and automatically copies the data to the spare drive before the physical drive fails and the logical drive goes into critical.

PDM settings

To change PDM settings in the Background Activity Settings menu:

- 1. Click the **PDM Rate** drop-down menu and select a rate:
 - **Low** Less system resources are used for PDM and more system resources are used for data read / write operations.
 - Medium The system resources between the PDM and data read / write operations are balanced.
 - **High** More system resources are used for PDM and less system resources are used for data read / write operations.

- 2. Highlight the current value in the Block Threshold field and enter a new value.
 - Reassigned block threshold ranges from 1 to 512 blocks.
 - Error block threshold ranges from 1 to 2048 blocks.
- 3. Click the **Submit** button.

8.1.6 Transition

Transition is the process of replacing a recoverable spare drive that is currently part of a disk array with an unconfigured physical drive or a non-recoverable spare drive.

Transition rate

To change the transition rate setting in the Background Activity Settings menu:

- 1. Click the **Transition Rate** drop-down menu and select a rate:
 - **Low** Less system resources are used for transition and more system resources are used for data read / write operations.
 - **Medium** The system resources between the transition and data read / write operations are balanced.
 - **High** More system resources are used for transition and less system resources are used for data read / write operations.
- 2. Click the **Submit** button.

8.2 Media patrol

Media patrol is a routine maintenance routine that checks the magnetic media on each disk drive. Media patrol is enabled by default on all disk arrays and spare drives. Media patrol relates to media, rather than the data recorded on the media. If a media patrol encounters a critical error, it will trigger PDM if PDM is enabled on the disk array.

Media patrol settings

You can enable or disable media patrol by using the background activity menu, or you can create a schedule to run media patrol.

- To enable media patrol, click the subsystem on the tree view, and then click the Background Activity menu tab. Click to view the Enable Media Patrol option. Also note that the Auto Rebuild option is also there. Make sure this option is enabled if you want to automatically start rebuilding a logical drive immediately after replacing the failed drive.
- To start a media patrol manually, click the Menu Expander on the right side of the Background Activity tab, scroll down and select Start Media Patrol to view the Start Media Patrol menu. Then click the **Start** button.
- To schedule a media patrol, click the Menu Expander on the right of the Scheduler tab, scroll down, and select Add Media Patrol Schedule to open the Schedule menu. Use this menu to add a media patrol schedule.

9 Manage activity schedules

You can create schedules to perform media patrol, redundancy check, and spare drive check at non-rush hours.

9.1 Add or delete activity schedules

To add, enable, or delete an activity schedule:

- 1. Click the Subsystem in the tree view.
- 2. Click the Scheduler Menu Expander on the right of the Scheduler tab.
- 3. Scroll down to the plan options for the menu you want to view.

Schedule options are:

- Add Media Patrol Schedule
- Add Redundancy Check Schedule
- Add Spare Check Schedule
- Delete Schedule.

9.2 View or modify an existing activity schedule

To view existing schedules, including the recurrence, start time, and status of existing schedules, click the Scheduler tab. You can then modify any of the listed schedules by clicking on the schedule name in the list.

10 Event log

The event logs are used for troubleshooting, tracking, and monitoring subsystems. To view, save, or clear the subsystem event log:

- 1. Click the Subsystem in the tree view.
- 2. Click the Event Menu Expander.
- 3. Select Runtime Events or NVRAM Events.
- 4. To save the event log as a simple text file, click the **Save** button in either menu.
- 5. To clear the log and begin the refresh, click the **Clear Event Log** button.

11 Administrative tools

Click the + symbol of the Administrative Tools icon to display the Subsystem Administrative Tools menu links for User Management, View Network Settings, Performance Monitoring, and Software Management.

The Administrative Tools menu lists text hyperlinks to these same menus, as well as links to the following menus: Restore Factory Defaults, Clear Statistics, and Save System Service Reports.

11.1 Restore factory default settings

To reset any firmware or software settings to their default values:

- 1. Click the Administrative Tools icon.
- 2. Click the Restore Factory Defaults link to display a new menu.
- 3. Select the check boxes for the settings you want to restore to the factory default values.
- 4. Click the **Submit** button to restore the selected settings to their default values. To

deselect all options and start over again, click the **Reset** button.

The default setting options are:

- Firmware default settings
 - Background activity
 - Controller settings
 - Enclosure settings
 - Physical drive settings
 - Subsystem settings
- Software default settings
 - Server settings
 - Network server settings
 - E-mail settings

11.2 Clear statistics

To clear all subsystem statistics for a controller, use both physical drives and logical drives:

- 1. Click the Administrative Tools icon.
- 2. Click the Clear Statistics link to display a new menu.
- 3. Click the **Submit** button to clear all device statistics.

12 User management

User management deals with viewing and managing user account information.

12.1 View user information

To view a list of users, their status, access privileges, display name, and e-mail address:

- 1. Click the Administrative Tools icon.
- 2. Click the User Management icon.

The information tab appears in Management view.

12.2 User settings

To change settings of other users:

- 1. Log into Management GUI as the Administrator or a Super User.
- 2. Click the Administrative Tools icon.
- 3. Click the User Management icon.
- 4. Click the **Information** tab.
- 5. In the list of users, click the link of the user whose settings you want to change. The Settings screen for the chosen user displays.
- 6. Enter or change the settings for this user.
 - Enable/disable this user
 - Display name
 - Privilege
- 7. Click the **Submit** button.

The Administrator or Super User can change password of other users.

12.2.1 Change your own user settings

To change your own user settings:

- 1. Log into Management GUI under your own user name.
- 2. Click the Administrative Tools icon.
- 3. Click the User Management icon.
- 4. Click the **Settings** tab in Management View.
- 5. Enter or change the display name or mail address.
- 6. Click the **Submit** button.

12.2.2 Change your own password

To set or change your own password:

- 1. Log into Promise Management GUI under your own user name.
- 2. Click the Administrative Tools icon.
- 3. Click the User Management icon.
- 4. Click the **Password** tab in Management View.
- 5. Enter the current password in the Old Password field.
 - If you do not have a password, leave this field blank.
- 6. Enter the new password in the New Password field.
- 7. Enter the new password in the Retype Password field.
- 8. Click the **Submit** button.

12.3 Create a user

To create a user:

- 1. Log into Management GUI as the Administrator or a Super User.
- 2. Click the Administrative Tools icon.
- 3. Click the User Management icon.

- 4. Click the **Create** tab in Management View.
- 5. Enter a user name in the User Name field.
- 6. Enter the password for this user in the New Password and Retype Password fields.
 - The password is optional. If you do not assign a password, notify this user to leave the password field blank when he/ she logs into to Management GUI. However, it is strongly recommended to set a user password.
- 7. Check the Enabled box to enable this user on this subsystem.
- 8. Enter a display name in the Display Name field.
 - A display name is optional but recommended.
- 9. Select a privilege level from the Privilege drop-down menu.
- For definitions of each privilege level, see the list of user rights below.
- 10. Click the **Submit** button.

12.3.1 User rights

- View Allows the user to view all status and settings, but not to make any changes
- Maintenance Allows users to perform maintenance tasks, including rebuild, PDM, media patrol, and redundancy check.
- Power Allows users to create (but not delete) disk arrays and logical drives, change RAID levels, change stripe sizes, and change the settings for components such as disk arrays, logical drives, physical drives, and controllers.
- **Super** Allow the user to fully access all functions, including creating and deleting users, changing other user settings, and deleting disk arrays and logical drives.
 - The default Administrator account is a super user.

12.3.2 Delete a user

There is at least one Super User account. You cannot delete the user account that is currently log in.

To delete a user:

- 1. Log into Management GUI as the Administrator or a Super User.
- 2. Click the Administrative Tools icon.
- 3. Click the User Management icon.
- 4. Click the **Delete** tab in Management View.
- 5. Check the box to the left of the user you want to delete.
- 6. Click the **Submit** button.
- 7. Click **OK** in the confirmation box.

12.4 View network settings

To view network settings for the Ethernet ports, including the port used for access to Management GUI, click the View Network Settings icon under Administrative Tools. Information listed for each port includes:

- Whether the port is enabled/disabled
- Whether the link is up/down
- IP type IPv4/IPv6
- IP address
- Subnet mask
- MAC address
- Maximum port speed

12.5 Software management

The Software Management menu is used to manage email settings, SNMP settings, and network services.

The email function is used to send event notifications. The network service is used to establish a remote network connection to the Management GUI. In addition, you can use this feature to export and import configuration script files and user database files.

12.5.1 Import a configuration script

You can import a previously saved configuration script and import the script to automatically configure your CIP5000 subsystem.

The script must be a plain, non-encrypted text file. This file can be saved from the same system or from another CIP5000 subsystem.

Caution!

<u>/!</u>

Do not attempt to write or modify the configuration script until you are instructed to do so by technical support personnel.

Importing a configuration script overwrites the current settings on your CIP5000 subsystem.

To import a configuration script for automatic configuration of a subsystem:

- 1. Click the **Administrative Tools** icon.
- 2. Click the **Software Management** icon.
- 3. Click the **Import** tab on the Software Management menu.
- 4. From the **Type** drop-down menu, select **Configuration Script**.
- 5. Click the **Import** button.
- 6. Click **Browse** and locate the file "Configscript.txt" on the host PC.
- 7. Click the **Submit** button.

The configuration script is automatically loaded and applied.

12.5.2 Export a configuration script

You can save the configuration from one subsystem, export it, and then import it to automatically configure your other CIP5000 subsystems.

To export a configuration script:

- 1. Click the **Administrative Tools** icon.
- 2. Click the Service Management icon.
- 3. Click the **Export** tab in the Service Management menu.
- 4. From the **Type** drop-down menu, select Configuration Script.
- 5. Click the **Export** button.
- 6. Select a location on the Host PC for the downloaded file and save the file.

The file is saved to your PC as "Configscript.txt".

12.5.3 Save a service report

A service report is a detailed report that contains the configuration and status of all components in your RAID system. A support technician or field engineer may request a service report for diagnosis and troubleshooting.

To save a system configuration file:

- 1. Click the Subsystem icon (IP address and device name) in Tree View to open the Subsystem Information display.
- 2. Click the Save button in the Save System Service Report row of the information display.
 - Information for the report is gathered and compiled. This process takes a few minutes, depending on the size of your RAID system.

- 3. Locate the path where you want to save the file on the Host PC, and click the Save button in the pop-up menu.
 - The report is saved to your Host PC as a compressed HTML file.
- 4. Double-click the downloaded file to extract it.
- 5. Double-click the report to open it in your default browser.
- The service report includes the following topics:
- About Report utility
- BBM Info Bad Block Manager
- BGA Summary Status and settings
- Buzzer Info
- Controller Info
- Disk Array Info
- Disk Array Dump info
- Disk Array Verbose Info
- Enclosure Info
- Error Table Info
- Event Info NVRAM
- Event Info Runtime
- LogDrive Info Basic logical drive information
- LogDrive Dump Info Diagnostic information
- Logical Drive Verbose Info Full logical drive information
- Network Info Virtual port
- Phydriv Info Basic physical drive information
- Phydriv Verbose Info Full physical drive
- SWMGT Info Software management
- Service Setting Email
- Service Setting Webserver
- Spare Info Basic spare drive information
- Spare Dump Info Diagnostic information
- Spare Verbose Info Full spare Drive information
- Statistic Info
- Subsystem info
- User Info

12.6 Email service

Email service enables the RAID subsystem to send you Email messages about events and status changes. By default, Email service is set to Automatic.

12.6.1 Stop Email service

To stop the Email service:

- 1. Click the **Administrative Tools** icon.
- 2. Click the Software Management icon.
- 3. Click on **Email** in the Service List of the Service Management menu.
- 4. Click the **Stop** button under Service Status -- Email.
- 5. Click the **Confirm** button.
- To start the Email service after stopping it:
- 1. Click the Administrative Tools icon.
- 2. Click the **Software Management** icon.
- 3. Click on **Email** in the Service List of the Service Management menu.
- 4. Click the **Start** button under Service Status -- Email.

5. Click the **Confirm** button.

12.6.2 Restart Email service

To restart the Email service:

- 1. Click the **Administrative Tools** icon.
- 2. Click the Software Management icon.
- 3. Click on **Email** in the Service List of the Service Management menu.
- 4. Click the **Restart** button under Service Status -- Email.
- 5. Click the **Confirm** button.

12.6.3 Email settings

To change Email service settings:

- 1. Click the Administrative Tools icon.
- 2. Click the Software Management icon.
- 3. Click on Email in the Service List of the Service Management menu.
- 4. Make settings changes as required.
- 5. Click the **Submit** button.
- 6. Click the **Confirm** button.

Under Service Setting -- Email choose a startup type:

- Automatic (default) Starts and runs with the subsystem.
- Manual You start the service when you need it.

Under Email Server Settings

- SMTP Server IP address
- SMTP Authentication under Email Server Settings
 - The Yes option enables authentication.
 - The No option disables.
 - SMTP Authentication under Email Server Settings
 - Username Required if SMTP authentication is enabled.
 - SMTP Authentication Password Required if SMTP authentication is enabled.
- Under Email Content Customization
 - Email Sender (From) Address The sender's name shown on notification messages.
 - Email Subject The subject line of the notification message.

12.6.4Send test Email message

After configuring your email settings, you can send a test email.

To send a test email message, complete email settings as described above and check the Send a test email option box, then click the **Submit** button. A test email message is sent to the address you specified.

13 Performance monitoring

The performance monitor displays real-time performance statistics for logical drives and physical drives. The vertical scale adjusts dynamically to accommodate the statistical data. Because it reports performance in real-time, to view data in the monitor, there must be I/O data activity occurring between the subsystem and the Host.

To monitor performance:

- 1. Click the Administrative Tools icon.
- 2. Click the **Performance Monitoring** icon.
- 3. Click the **Information** tab for summarized statistics; or select the **Read/Write** tab to view specific Read and Write performances separately.
- 4. Under Logical Drive, select the metric you want to view from the Measurement dropdown menu.
- 5. Check the boxes for the logical drives you want to view.
 - Total of all logical drives
 - Up to 4 devices
- 6. Under Physical Drive, select the metric you want to view from the Measurement dropdown menu.
- 7. Check the boxes for the physical drives you want to view.
 - Total of all physical drives
 - Up to 4 devices
 - I/Os per second

Since the performance monitor is a real-time display, it does not accumulate information and there is no clear or save function.

To save performance statistics for analysis or troubleshooting, please save a Service Report.

Information (logical drive)

- Bandwidth in MB/s
- Cache usage by %
- Dirty cache usage by %
- Maximum latency in ms
- Average latency in ms
- Minimum latency in ms
- I/Os per second

Read/Write (logical drive)

- Read bandwidth
- Write bandwidth
- Maximum Read latency in ms
- Maximum Write latency in ms
- Average Read latency in ms
- Average Write latency in ms
- Minimum Read latency in ms
- Minimum Write latency in ms
- Write Regs
- Read Regs

Information (physical drive)

- Bandwidth in MB/s
- Maximum latency in ms
- Average latency in ms
- Minimum latency in ms

I/Os per second

Read/Write (physical drive)

- Read bandwidth
- Write bandwidth
- Maximum Read latency in ms
- Maximum Write latency in ms
- Average Read latency in ms
- Average Write latency in ms
- Minimum Read latency in ms
- Minimum Write latency in ms
- Write Regs
- Read Regs

14 Controllers

Click on a specific controller in the tree view to view information or statistics for a controller, or to change controller settings.

14.1 View controller information

To view controller information:

- 1. Click the Controllers icon.
- 2. Click the specific Controller icon of the controller for which you want to view its information.

The Information tab displays basic controller information.

The controller information includes:

- Cache usage
- Unclean buffer usage
- Part number
- Serial number
- Hardware revision
- WWN
- Supported SCSI protocol
- Setup package version
- Setup package creation date

Click the Advanced Information menu expander to view advanced information. Advanced controller information includes:

- Memory Type
- Memory Size
- Flash Type
- Flash Size
- Preferred Cache Line Size
- Cache Line Size
- Coercion Enabled/Disabled*
- Coercion Method*
- SMART Log Enabled/Disabled*
- SMART Polling Interval *
- Write Back Cache Flush Interval*
- Enclosure Polling interval
- Host Cache Flushing Enabled/Disabled*
- Forced Read Ahead Enabled/Disabled*
- Spin Down Type
- HDD Power Levels*
- HDD Idle Time*
- HDD Standby Time*
- HDD Stopped Time*
- Physical Drive Temperature Threshold*
- Physical Drive Critical Temperature Threshold*

Items with an asterisk (*) are adjustable under Controller Settings.

14.2 View controller statistics

To view controller statistics:

- 1. Click the Controllers icon.
- 2. Click the specific Controller icon of the controller for which you want to view statistics.
- 3. At the top of the Information display menu, click on the menu expander, which is between the Information and Settings tabs, to display the Statistics link.

Controller statistics include:

- Data Transferred
- Read Data Transferred
- Errors
- Read Errors
- I/O Requests
- Read IO Requests
- Statistics Start Time
- Write Data Transferred
- Non-Read/Write Errors
- Write Errors
- Non-Read/Write Requests
- Write I/O Requests
- Statistics Collection Time

14.3Controller settings

To configure controller settings:

- 1. Click the Controllers icon.
- 2. Click the specific Controller icon of the controller you want to manage.
- 3. Click the **Settings** tab.
- 4. Change settings as required:
 - Enter, change or delete the alias in the Alias field.
 - **Coercion** Check the box to enable or uncheck to disable.
 - **Coercion Method** Choose a method from the drop-down menu:
 - GBTruncate
 - 10GBTruncate
 - GrpRounding
 - TableRounding
 - Write Back Cache Flush Interval Enter a value into the field, 1 to 12 seconds.
 - HDD Power Saving Select time periods from the drop-down menus. After an HDD has been idle for the set period of time:
 Power Saving Idle Time - Parks the read/write heads.
 Power Saving Standby Time - Lowers disk rotation speed.
 Power Saving Stopped Time - Spins down the disk (stops rotation).
 - **Host Cache Flushing** Check the box to enable or uncheck to disable.
 - Forced Read Ahead (cache) Check the box to enable or uncheck to disable.
 - **Physical Drive Temperature Threshold** Type a temperature (50-55 °C) to trigger an event notice and email alert.
 - **Physical Drive Critical Temperature Threshold** Type a temperature (58-65 °C) to trigger system shutdown.
- 5. Click the **Submit** button.

15 Enclosures

The Enclosures menu provides information about the individual components of the enclosure and monitors its status. Click on a specific enclosure in the tree view or in the enclosures list to display information or settings menu of this enclosure.

Locate the enclosure

To locate an enclosure in the list, click the **Locate** button. The LED indicators on the front panel of the enclosure flash for one minute.

15.1 Enclosure information

The enclosure information read-only display menu provides key real-time information about status of the enclosure hardware.

Click on the expander button to display current conditions and status of the enclosure, power supplies, fans, browsers, temperature sensors and voltage sensors.

In the virtual enclosure that appears at the top of the menu, move the cursor over the icon to view the statistics on status and relevant conditions of the fans, power supplies, and temperature sensors.

Enclosure information menu



15.2 Temperature sensor settings

When the internal temperature reaches a high level, the temperature threshold settings is used to send event notifications.

To set enclosure temperature thresholds:

- 1. Click **Enclosures** in the tree view.
- 2. Click the **Settings** tab to view the Enclosure Settings menu.

Two thresholds can be configured:

- Controller Warning Temperature Threshold [80-95 C°] If the enclosure temperature reaches this threshold, a warning message is sent, and the event is recorded in the event log.
- Controller Critical Temperature Threshold [100-105 C°] If the enclosure temperature reaches this threshold, a warning message is sent, and the event is recorded in the event log.

15.3 Buzzer settings

You can enable or disable the audible enclosure alarm buzzer. To enable or disable the buzzer:

- 1. Click **Enclosures** in the tree view.
- 2. Click the **Buzzer** menu expander.
- 3. Scroll to Settings and click the check **Enable Buzzer** option box.
- 4. Click the **Submit** button.

16 Physical drives

The Physical Drives menu are used to view information and statistics about the physical hard disks installed in the enclosure and to set the global settings for the hard disks. To view the physical drive list:

Expand the individual enclosure icon in the tree view to view the physical drive icon for the enclosure.

To display information for any slot:

- Expand the physical drive icon in the tree view to display a link for each slot.
- Click on the slot in the physical drive list.
- Click on the slot in the virtual enclosure that displays in the menu.

| Home (User: administrator) | Physical Drive 1 | | | | | |
|--------------------------------|---|--|--|--|--|--|
| 👔 Subsystems | Information Settings Force C | Offline | | | | |
| a 💼 192.168.204.146 (CIP-5316) | | | | | | |
| 🗉 🗊 Administrative Tools | Enclosure Front View | | | | | |
| E E Controllers | | | | | | |
| = 🧮 Enclosures | | | | | | |
| Enclosure 1 | | | | | | |
| 😑 🚍 Physical Drives | | | | | | |
| Slot 1: HGST HUS72404 | Enclosure 1 | | | | | |
| Slot 2: Hitachi HUA7230 | | | | | | |
| Slot 3: ST4000VX000-1F | | | | | | |
| Slot 4: SEAGATE ST6000 | | | | | | |
| Slot 5: Hitachi HUA7230 | | warment dates from the lattice back to be about the same strength the state of the state of the state of | | | | |
| Slot 6: Hitachi HUA7230 | Current drive location is highlighted. To choose a new drive click on the desired location. | | | | | |
| Slot 7: WDC WD1001FA | Physical Drive Information | | | | | |
| Slot 8: WDC WD1003FB | Physical Drive ID | 1 | | | | |
| 🔚 Slot 9: Hitachi HUA7230 | Location | Enclosure 1 Slot 1 | | | | |
| 📻 Slot 10: ST31000528AS | Alias | | | | | |
| Slot 11: Hitachi HUA723 | District Consults | 0.6170 | | | | |

931.32GB 512 Bytes

Information for individual physical drives includes:

Physical drive information

Slot 13: WDC

- Physical Drive ID
- Location [Enclosure # Slot #]
- Alias
- Physical Capacity
- Configurable Capacity
- Used Capacity
- Block Size [Bytes]
- Operational Status
- Configuration Status
- Model
- Drive Interface
- Serial Number
- Firmware Version
- Protocol Version
- Visible To [Controller #]

Advanced physical drive information

- Write Cache [Enabled/Disabled]
- Read Look Ahead Cache [Enabled/ Disabled]
- SMART Feature Set
- SMART Self Test

- SMART Error Logging
- Command Queuing Support
- Command Queuing [Enabled/Disabled]
- Queue Depth
- Maximum Multiple DMA Mode Supported
- Maximum Ultra DMA Mode Supported
- DMA Mode
- Drive Temperature [C°/F°]
- Reference Drive Temperature
- Power Saving Mode

17 Disk arrays and logical drives

Use Disk Arrays menu to create and manage disk arrays and logical.

Use Array Configuration menu to view the disk array list, and to create or delete disk arrays on the enclosure. Expand the disk array icon in the tree view to view the menu links for the existing array. Each array icon can be expanded again to view logical drive icons, and can be extended to view each logical drive icon.

For detailed description of how to create disk arrays and logical drives using the Management GUI, refer to the quick installation guide.

Use the top-level Disk Arrays menu to view the disk array list, to delete existing arrays, and to create new disk arrays using the Automatic, Express, or Advanced disk array creation menu. Note that there must be physical drives available in order to create menu for any disk arrays. To view information for existing disk arrays, click on the icon in the tree view or click on the array name in the disk array list. Use the individual array menu to create or delete logical drives, to change settings (Alias and start/ stop PDM, Media Patrol and Power Management) for disk arrays, or to initiate background activities, including PDM, Rebuild, and Transition.

Individual disk arrays information menu



Information in the Disk Array menu includes:

- Disk Array ID [#]
- Alias
- Operational Status (see below)
- Total Physical Capacity
- Configurable Capacity
- Free Capacity [Bytes]
- Max Contiguous Free Capacity [Bytes]
- Media Patrol [Enabled/Disabled]
- Drive Health Polling
- Power Management [Enabled/Disabled]
- Number of Physical Drives
- Number of Logical Drives
- Available RAID Levels

Other lists in this menu:

- Physical Drives in the Disk Array
- Logical Drives in the Disk Array
- Available Spare Drives to the Disk Array

Disk Array operational status

- OK This is the normal state of the logical drive. When the logical drive is operating properly, it is ready for immediate use. For RAID Levels other than RAID 0, the logical drive has full redundancy.
- Synchronizing This condition is temporary. Synchronizing is a maintenance function that verifies the integrity of data and redundancy in the logical drive. When the logical drive is synchronizing, it keeps operating and the data is available. However, access is slower due to the synchronizing operation.
- Critical / Degraded This condition occurs due to the failure of the physical drive. The degraded logical drive keeps operating and the data is still available. However, the logical drive has lost redundancy (fault tolerance). You shall identify the cause of the problem and correct it.
- Rebuilding This condition is temporary. When the physical drive has been replaced, the logical drive automatically starts rebuilding in order to restore redundancy (fault tolerance). When the logical drive is rebuilding, it keeps operating and the data is available. However, access is slower due to the rebuilding operation.

17.1 Logical drive management

Logical drives derive from disk arrays. In the tree view, you can see the icons for the logical drives that belong to each array. You can access the logical drive list in the tree view by expanding the disk array, and clicking the logical drive icon for any existing disk array, or simply clicking the subsystem's Logical Drive Summary icon.

Click on any logical drive (LD) in the list to view information and statistics, to change settings (Alias, Read Policy, Write Policy), to start background activities (Initialization, Redundancy Check), or to view the LD checklist.

Information displayed in the menu includes:

- Logical Drive ID
- Alias
- Raid Level
- Operational Status
- Capacity
- Physical Capacity
- Number of Axles [#]
- Number of Used Physical Drives [#]
- Stripe Size
- Sector Size [Bytes]
- Disk Array ID
- Read Policy
- Write Policy
- Current Write Policy
- Serial Number
- WWN
- Synchronized [Yes/No]
- Tolerable Number of Dead Drives Per Axle
- Parity Pace
- Codec Scheme

18 Spare drives

When a physical drive in a disk array fails, a spare drive with sufficient capacity is available and the disk array begins to rebuild automatically with a spare drive.

In the tree view, click on the Spare Drive icon to view the list of spare drives, to create a new spare drive, or to delete an existing spare drive. Click any spare drive in the list to learn about the drive.

Spare drive information includes:

- Spare Drive ID
- Physical Drive ID
- Spare Type
- Revertible [Yes/No]
- Operational Status
- Spare Check Status
- Physical Capacity
- Configurable Capacity
- Block Size
- Drive Interface
- Model
- Location
- Configuration Status
- Serial Number
- Firmware Version

18.1 Run spare check

Spare check verifies the operation status of your spare drive. In addition, you can schedule a spare check.

To check the spare drive:

- 1. Click the Spare Drives icon.
- 2. Click the Spare Check tab.
- 3. From the Physical Drives drop-down menu, select the spare drive you want to check. Or select All to check all spare drives at the same time.
- 4. Click the **Submit** button.

The result of the spare check displays under the spare check status in the Info tab. "Health" means normal conditions.

19 Logical drive summary

Logical Drive Summary displays a list of all logical drives in the subsystem. This list does not place logical drives under the disk array, nor under the enclosure in which they are located. This menu operates in the same way as the menu of Logical Drives.

20 Maintenance

This section describes how to replace the power supply units (PSU). The power supply and its fans are replaced as a unit.

The CIP-5316W-00N and CIP-5424W-00N systems accommodate two AC power supplies in the bay at the rear of the chassis. Each unit provides up to 550 Watts of power. Only a single power supply is required for operation, with the second power supply purely as a redundant, load-sharing backup. It can be removed without affecting system operation.



Notice!

In a redundant system, you do not need to power down the server; you can disconnect the power cord from the failed PSU and replace the PSU with a new one.

20.1 Remove the failed PSU

To remove the failed PSU:

- 1. Verify that the PSU status indicator is red.
- 2. Unplug the power cord.
- 3. Hold onto the power supply handle while pressing the locking lever towards the power supply handle.
- 4. Pull to remove the power supply from the chassis.

20.2 Install a new PSU

To install the power supply:

- 1. Align the power supply unit with the power supply slot.
- 2. Carefully slide the PSU all the way into the power supply bay until it clicks into place.
- 3. Plug in the power cord.
- 4. Turn on the power.
- 5. Verify that the power indicator is green.

21 Troubleshooting

This section focuses on how to solve problems that may occur during the lifetime of the CIP5000 enclosure.

Frequently asked questions for customers include hard disk problems, how to know when problems occur on the hard disk, and how to create and send service reports to technical support personnel.

21.1 How to diagnose hard drive failures

If the hard disk suffers from an error, and there will be a failure or failure has occurred, it needs to be replaced.



The hot swappable hard drives on the CIP5000 models can be replaced without shutting down the system.

There are several ways to get to know hard disk failures. In the Management GUI, you can find it out from the event frame, or form the Physical Drives information. And you can also directly check the status LEDs of hard drives.

21.1.1 Check HDD status LEDs

If you are near a device, the quickest way to check the status of your hard drives is to simply view the hard drives status LED indicators, and check the other status indicators on the right side of the front panel to help diagnose any problems that might exist.



Red Drive Status (Replace this drive)

Activity (dark), under normal conditions this will flash blue color when there is activity on the drive.

For more details hard drive status LED, system status LED and global RAID status LED, refer to *Front panel LEDs, page 11*.

21.1.2 Check HDD status in Management GUI

To view the event frame, click **Show Event Frames** in the Management GUI header and check the list under the **Device**. Any HDD problems will be displayed in the far right column and the top row of the event table will list the installed physical drives.

In addition, in the Management GUI, you can access the **Physical Drives List**. To view the physical drives list, expand the individual enclosure icon in the tree view, and view the physical drive icon for the enclosure.

To display information for any slot, you can expand the physical drives icon in the tree view to display the link for each slot, or click the slot in the physical drive list, or click the slot in the virtual enclosure displayed in the menu.

View physical drive list

| A Home (User: administrator) | Physical Drive | es | | | | | | Help | | | |
|------------------------------|----------------|----------------------------|----------|------|-----------------------|----------------|--------------------|----------------------|--|--|--|
| = 👔 Subsystems | Information G | nformation Global Settings | | | | | | | | | |
| 192.168.204.146 (CIP-5316) | | | | | | | | | | | |
| | | JIC VIEW | | | | | | | | | |
| | | | 1 | | | | | | | | |
| | | | - | | | | | | | | |
| Enclosure 1 | | | Ð | | | | | | | | |
| Physical Drives | | | | (| | | | | | | |
| Slot 1: HGST HUS72404 | | Enclosure 1 | | | | | | | | | |
| 🔜 Slot 2: Hitachi HUA7230 | | E | | | | | | | | | |
| - Slot 3: ST4000VX000-1F | | - | | (| | | | | | | |
| Slot 4: SEAGATE ST6000 | | | | 11.1 | | | | | | | |
| 🚍 Slot 5: Hitachi HUA7230 | | | | | | | | | | | |
| Slot 6: Hitachi HUA7230 | | | | | Click a drive to le | ocate. | | | | | |
| Slot 7: WDC WD1001FA | Physical Driv | o List | | | | | | | | | |
| - Slot 8: WDC WD1003FB | | | | | | | | | | | |
| Slot 9: Hitachi HUA7230 | Device | Model | | уре | Configurable Capacity | Location | Operational Status | Configuration Status | | | |
| | PD1 | HGST HUS/24040ALA640 | | SATA | 3.6418 | End 1 Slot 1 | OK | Array0 SeqNo1 | | | |
| Slot 11: Hitachi HUA723 | PD2 | FT4000//Y000_1E4169 | | SATA | 2.6578 | End 1 Slot 2 | OK | Array0 SeqNo5 | | | |
| Slot 12: WDC WD1001E | PD3 | ST4000VX000-1F4108 | | | 3.651B | End 1 Slot 3 | OK | Global Spare | | | |
| Slot 13: WDC WD4000F | PD5 | Hitachi HUA723020ALA640 | | SATA | 1.82TB | End 1 Slot 5 | ок | Array0 SegNo6 | | | |
| Slot 14: WDC WD4000E | PD6 | Hitachi HUA723020ALA640 | 1 5 | SATA | 1.82TB | End 1 Slot 6 | ок | Arrav0 SegNo7 | | | |
| | PD7 | WDC WD1001FAES-55W7A | .0 5 | SATA | 931.32GB | End 1 Slot 7 | ок | Array0 SegNo10 | | | |
| | PD8 | WDC WD1003FBYX-01Y7B | 1 5 | SATA | 931.32GB | End 1 Slot 8 | ОК | Array0 SeqNo11 | | | |
| Slot 16: WDC WD1001F/ | PD9 | Hitachi HUA723020ALA640 | | SATA | 1.82TB | Encl 1 Slot 9 | ок | Array0 SeqNo8 | | | |
| E Disk Arrays | PD10 | ST31000528AS | 5 | SATA | 931.32GB | Encl 1 Slot 10 | ОК | Array0 SeqNo12 | | | |
| I in Spare Drives | PD11 | Hitachi HUA723020ALA640 | 5 | SATA | 1.82TB | End 1 Slot 11 | ок | Array0 SeqNo9 | | | |
| 🔳 🧮 Logical Drive Summary | PD12 | WDC WD1001FAES-55W7A | <u>۵</u> | SATA | 931.32GB | End 1 Slot 12 | ок | Array0 SeqNo13 | | | |

View individual physical drive information

| ☆ Home (User: administrator) ■ ■ Subsystems ■ ■ 192.168.204.146 (CIP-5316) | Physical Drive 1 Information Settings Force Offline | Help |
|--|---|--|
| 📱 📑 Administrative Tools | 👿 Enclosure Front View | |
| E Controllers | | |
| = 📄 Enclosures | | |
| Enclosure 1 | | |
| 😑 📻 Physical Drives | | |
| Slot 1: HGST HUS72404 | Enclosure 1 | |
| Slot 2: Hitachi HUA7230 | | |
| Slot 3: ST4000VX000-1F | | |
| Slot 4: SEAGATE ST6000 | | |
| Slot 5: Hitachi HUA7230 | Curre | nt drive location is highlighted. To choose a new drive click on the desired location. |
| Slot 7: WDC WD100154 | | |
| Slot 8: WDC WD10011A | Physical Drive Information | |
| Slot 9: Hitachi HUA7230 | Physical Drive ID | 1 |
| Slot 10: ST31000528AS | Location | Endosure 1 Slot 1 |
| Slot 11: Hitachi HUA723 | Allas Physical Canacity | 3.64TB |
| 🚍 Slot 12: WDC WD1001F/ | Configurable Capacity | 3.64TB |
| 🚍 Slot 13: WDC WD4000F | Used Capacity | 931.32GB |
| Slot 14: WDC WD4000F | Block Size | 512 Bytes |
| Slot 15: WDC WD4000F | Operational Status | ОК |



Notice!

In order to diagnose and fix hard disk problems, it is strongly recommended to ensure that media patrol is enabled and running, and Auto Rebuild is enabled if there are unused spare drives.

If using a spare drive, make sure it is working and available.

21.1.3 Prevent HDD problems

It is recommended that you always have a spare drive running, and run Media Patrol as a background activity so that the data can be migrated from a failed HDD to a spare hard disk before the problem gets worse.

In the Management GUI, Media Patrol is enabled or disabled through Background Activities menu, or you can create a schedule to run Media Patrol.

Enable Media Patrol

| Abome (User: administrator) | Background Activities | Help |
|--|---|--------------|
| Subsystems 192.168.204.146 (CIP-5316) | Information Settings Event V Background Activities V Schedu | ler 🔻 Lock |
| 🗉 对 Administrative Tools | Background Activity Settings | |
| E Controllers | Rebuild Rate High | v |
| Enclosures | Background Synchronization Rate Low | ▼ |
| Bisk Arrays | Logical Drive Initialization Rate Medium | ▼ |
| E 🗃 Disk Array 0 | Redundancy Check Rate Medium | ۲ |
| | Migration Rate High | • |
| | PDM Rate High | ¥ |
| Spare Drives | Transition Rate Medium | ▼ |
| 🗉 🧮 Logical Drive Summary | Reassigned Block Threshold [1-512] 32 | Blocks |
| | Error Block Threshold [1-2048] 32 | Blocks |
| | Enable Media Patrol | |
| | Enable Auto Rebuild | |
| | Reset | ubmit Cancel |

 To enable Media Patrol, click Background Activities in the Quick Links menu on the Home page; or click the Subsystem in the tree view, and then click the Background Activities menu tab. Click to check the Enable Media Patrol option.

Please be noted that the **Auto Rebuild** option is also there. Make sure this option is enabled if you want to automatically start rebuilding a logical drive immediately after the failed drive is replaced.

- To start Media Patrol manually, click the menu expander on the right side of the Background Activities tab, scroll down and select Start Media Patrol to view the Start Media Patrol menu. Then click the Start button.
- To schedule Media Patrol, click the menu expander to the right of the Scheduler tab, scroll down, and select Add Media Patrol Schedule to open the Schedule menu. Use this menu to add a media patrol schedule.

21.2 Rebuild a disk array

When you rebuild a disk array, actually you are rebuilding the data on a physical drive.

- In the event of a physical drive failure in a disk array, if a sufficient spare drive is available, the disk array automatically begins to rebuild using the spare drive.
- If there is no spare drive with sufficient capacity, but the Auto Rebuild function is enabled, the disk array starts rebuilding automatically after the failed physical drive is removed and an unconfigured physical drive is installed in the same slot.
- If there is no spare drive with sufficient capacity and the Auto Rebuild function is disabled, you must replace the failed drive with an unconfigured physical drive and perform a Manual Rebuild.

21.2.1 How to rebuild a disk array

When the logical drive is downgraded or in a critical state, you need to rebuild the array that contains the drive. If you do not use Auto Rebuild (a spare drive is required), you must rebuild the array manually after the affected drives have been replaced. Obey the instructions described here to rebuild a disk array.

By looking at the operational status in the **Logical Drives Information** display, you get to know whether the logical drive is in a critical state.

Logical drive information

| A Home (User: administrator) | Logical D | | | | | | | | Help |
|--|-------------|--------------------|-------------|----------|---------------|--------|----------|-------------------------|--------------------|
| Subsystems 192.168.204.146 (CIP-5316) | Information | | | | | | | | |
| 🛓 🚮 Administrative Tools | 🔻 Logical | Drive List (2 Logi | cal Drives) | | | | | | |
| 🗉 🧮 Controllers | Device | Alias | Raid Level | Capacity | Disk Array ID | Stripe | Sector | Preferred Controller ID | Operational Status |
| 🗉 🧮 Enclosures | LD0 | | RAID5 | 11.82TB | 0 | 64KB | 512Bytes | N/A | Critical |
| 🗉 📑 Disk Arrays | LD1 | | RAID0 | 931.32GB | 1 | 64KB | 512Bytes | N/A | Initializing |
| 🔳 📑 Disk Array 0 | | | | | | | | | |
| 🗉 🧮 Logical Drives | | | | | | | | | |
| 🗉 📑 Disk Array 1 | | | | | | | | | |
| 🗉 🧱 Logical Drives | | | | | | | | | |
| - 🎁 Spare Drives | | | | | | | | | |
| 🗈 👸 Logical Drive Summary | | | | | | | | | |
| | | | | | | | | | |

To start rebuilding the drive, go to the **Background Activities** of the local host menu and move the cursor to select **Start Rebuild**. A new menu displays.

Background Activities - Start Rebuild 1

| A Home (User: administrator) | Subsystem Help | | | | | | | | | |
|--------------------------------|--------------------------------|---------------|----------------------|----|------------------------|------|--------------|------|------|--|
| = 🚮 Subsystems | Information | Settings | Event | L. | Background Activities | ΨĪ | Scheduler | L I | Lock | |
| 🖻 🚮 192.168.204.146 (CIP-5316) | Information | Dettings | Lvene | | buckground Activities | ÷ | Scheduler | | LOCK | |
| 🗉 🗊 Administrative Tools | 🔻 Subsyste | m Information | | | Settings | | | | | |
| 🗉 🧮 Controllers | Alias Vendor Model | | Start Media Patrol | | | | | | | |
| 🗉 📷 Enclosures | | | | os | ch | | | | | |
| 🗉 🖼 Disk Arrays | | | Start Rebuild | IP | -5316 | | | | | |
| 📕 🚅 Disk Array 0 | Serial Nurr | iber | | | Start PDM | 00 | 000000000 | | | |
| T 🗟 Logical Drives | WWN | | | | | 00 | 0-0001-5500- | 0000 | | |
| E E Disk Array 1 | Part Number Revision Number | | Start Transition | | | | | | | |
| | | | Start Initialization | | 0 2010 14.4 | 0.05 | | | | |
| | System Da | te & fille | | | | ep | 9, 2019 14:4 | 8:05 | | |
| - Spare Drives | Save Syste | | | | Start Redundancy Check | | Save | | | |
| Elogical Drive Summary | | | | | | - | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

The source drive and target drive to be rebuilt are now defined. In the new menu, select the **Source Physical Drive** and **Target Physical Drive**, and click the **Submit** button.

Background Activities - Start Rebuild 2

| Amme (User: administrator) | Start Rebuild | lelp | | | | |
|----------------------------|---|------|--|--|--|--|
| Subsystems | Information Settings Event V Background Activities V Scheduler V Lock | | | | | |
| Administrative Tools | 🔻 Rebuild Parameters | | | | | |
| I I Controllers | Source Physical Drive Array 0 SeqNo 0: 3.64TB 🔻 | | | | | |
| 🗉 🙀 Enclosures | Target Physical Drive ID1: 3.64TB | | | | | |
| 🗏 🚮 Disk Arrays | | | | | | |
| 🗉 💏 Disk Array 0 | Reset Submit Cancel | | | | | |
| 🗉 📈 Logical Drives | | | | | | |
| 🗏 📑 Disk Array 1 | | | | | | |
| 🖩 🚍 Logical Drives | | | | | | |
| 👘 Spare Drives | | | | | | |
| 🖩 🙀 Logical Drive Summary | | | | | | |

The progress of the rebuild is displayed in the Background Activities information display.

| Amme (User: administrator) | Background Activities Rebuilt we surved successfully. Help | | | | | | | | |
|--|--|---------------------------------|--|--|--|--|--|--|--|
| Subsystems 192.168.204.146 (CIP-5316) | Information Settings Event 🔻 Background Activitie | s 🔽 Scheduler 🔽 Lock | | | | | | | |
| 🔳 📑 Administrative Tools | | | | | | | | | |
| E Controllers | PD1 - Rebuild | 0% | | | | | | | |
| 🗉 📷 Enclosures | | | | | | | | | |
| 🗏 🔿 Disk Arrays | isk Arrays 🖉 🗟 Background Activity Parameters | | | | | | | | |
| 📄 🧱 Disk Array 0 | Rebuild Rate | High | | | | | | | |
| 📕 🧮 Logical Drives | Background Synchronization Rate | Low Medium Medium High | | | | | | | |
| E 🗃 Disk Array 1 | Logical Drive Initialization Rate | | | | | | | | |
| E I ogical Drives | Redundancy Check Rate | | | | | | | | |
| Enara Drives | Migration Rate | | | | | | | | |
| . Spare Drives | PDM Rate | High | | | | | | | |
| E 😿 Logical Drive Summary | Transition Rate | Medium 32 Blocks | | | | | | | |
| | Reassigned Block Threshold | | | | | | | | |
| | Error Block Threshold | 32 Blocks | | | | | | | |
| | Media Patrol | Enabled | | | | | | | |
| | Auto Rebuild | Enabled | | | | | | | |
| | Last Media Patrol Start Time | Not Started | | | | | | | |
| | Last Media Patrol Stop Time | Not Stopped | | | | | | | |
| | | | | | | | | | |

Background Activities - Rebuild status

21.3 How to save a service report

A service report is a detailed report that contains the configuration and status of all components in the RAID system. A support technician or field engineer may request a service report for diagnosis and troubleshooting.

Subsystem information

| A Home (User: administrator) | Subsystem He | | | | | | | | |
|---|---|----------------------|--|--|--|--|--|--|--|
| Subsystems 192.168.204.146 (CIP-5316) | Information Settings Event v Background Activities | Scheduler V Lock | | | | | | | |
| 🗉 📷 Administrative Tools | V Subsystem Information | | | | | | | | |
| 🔳 🧮 Controllers | Alias | | | | | | | | |
| II 🗐 Enclosures | Vendor | Bosch CIP-5316 | | | | | | | |
| 🗉 🗃 Disk Arrays | Model | | | | | | | | |
| 🔳 📑 Disk Array 1 | Serial Number | 0000000000 | | | | | | | |
| | WWN | 2000-0001-5500-0000 | | | | | | | |
| | Part Number | | | | | | | | |
| Spare Drives | Revision Number | A1 | | | | | | | |
| III 🧮 Logical Drive Summary | System Date & Time | Sep 9, 2019 14:51:25 | | | | | | | |
| | Save System Service Report | Save | | | | | | | |
| | | | | | | | | | |

To save a system configuration file:

- 1. Click the Subsystem icon (IP address and device name) in the tree view to open the Subsystem information display.
- 2. Click the **Save** button in the Save System Service Report row of the information display.
 - Information for the report is collected and compiled. This can take a few minutes, depending on the size of your RAID system.
- 3. Locate the path where you want to save the file on the host PC, and click the **Save** button in the pop-up menu.
 - The report is saved as a compressed HTML file on your host PC.
- 4. Double-click the downloaded file to extract it.
- 5. Double-click the report to open it in your default browser.

Once you have created a service report file, you can email it to your technical support representative.

The Service Report includes the following topics:

- About Report utility
- BBM Info Bad Block Manager
- BGA Summary Status and settings
- Buzzer Info
- Controller Info
- Disk Array Info
- Disk Array Dump info
- Disk Array Verbose Info
- Enclosure Info
- Error Table Info
- Event Info NVRAM
- Event Info Runtime
- LogDrive Info Basic logical drive information
- LogDrive Dump Info Diagnostic information
- Logical Drive Verbose Info Full logical drive information
- Network Info Virtual port
- Phydriv Info Basic physical drive information
- Phydriv Verbose Info Full physical drive
 - SWMGT Info Software management

- Service Setting Email
- Service Setting Webserver
- Spare Info Basic spare drive information
- Spare Dump Info Diagnostic information
- Spare Verbose Info Full spare Drive
- information
- Statistic Info
- Subsystem info
- User Info

21.4 How to diagnose the alarm buzzer

When you power up the CIP5000 system for the first time, the alarm buzzer beeps twice to indicate the system is operating normally.

If the audio alarm sounds at any other time, you need to be aware of the system. However, buzzer alarms are not specific to this situation. View the device indicators and Events displays or logs for more information.

When the alarm sounds:

- Check the red or orange indicators on the front and rear of the enclosure.
- Check the new messages if the email notification is enabled.
- Check the event log.

During continuous beeps, the buzzer sounds in various alarm patterns simultaneously.

Alarm buzzer patterns



Pattern 2

Alarm Pattern 2 is three short beeps after a long period of silence and then repeat. This indicates a serious problem, such as a high enclosure temperature or a system fan is not installed, that requires immediate solution. When you hear the sound of Pattern 2, check the System Status LED. If the LED is normal, then it might be a physical drive problem or a PSU problem, you can check the event log for more information.

Pattern 3

It indicates that LD is offline.

Pattern 4

It indicates that there may be an LD critical sector or a bad sector on the physical disk.

21.4.1 How to disable the alarm buzzer

To disable the alarm buzzer:

1. Open the Management GUI.

- 2. Click **Enclosures** in the tree view.
- 3. Click the **Buzzer** menu expander, scroll to Settings, and un-check the **Enable Buzzer**.
- 4. Click the **Submit** button.

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