



# **ExaSAN SW16-G3**

## **User Guide**

**Accusys Storage Ltd.,**

2024  
Version: V1.1

**Accusys**<sup>®</sup>  
The RAID Architects



# PREFACE

## **Notice**

The product features and specifications described in this guide are subject to change without notice.

The manufacturer shall not be liable for any damage, or the loss of data resulting from the performance or use of the information contained herein.

## **Guide to Conventions**

Inside the double boxes is the important information that users should be aware of:

### **Caution**

This indicates the existence of a potential hazard that could result in personal injury, damage to your equipment or loss of data if the safety instruction is not observed.

### **Note**

This indicates useful tips on getting the most from your RAID system.

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## Preparing to Install ExaSAN SW16-G3

To ensure safe and smooth operation of your ExaSAN SW16-G3, it is essential that you choose an appropriate location for the system, and provide an appropriate operating environment and adequate power for all components of the system. As you plan for installation, follow the guidelines below to ensure that the system and its environment are safely and appropriately positioned for efficient operation and service.

### Precaution for Handling the System

Take the following precautions to avoid damage to the system or potential injury to you.

1. Prepare a flat, sturdy surface before removing the system from its packaging. The table or cart that will hold the system should be as close as possible to the system's carton.
2. Ensure that all power switches have been turned off and all power cords disconnected to prevent personal injury and damage to the hardware.
3. Static electricity can damage electronic components of your system. Follow the guidelines below to avoid such damage:
  - a. Work in a static-free environment
  - b. Wear a grounded anti-static wrist strap
  - c. Store uninstalled components in anti-static bags
  - d. Handle circuit boards by their edges and avoid touching chips and connectors

### Choosing the Location for the System

The ExaSAN SW16-G3 is designed as a rack-mount solution. Depending on where your rack is located, you should keep the following points in mind when determining where to place your system.

1. Measure the amount of available space in the rack. The amount of space required for the A16T3-SHARE is 3U rack space. (dimensions are: L: 567mm W: 441mm H: 131mm)
2. Measure the distance between any two components that need to be connected via cable(s). This measurement will help you determine the length of the required cable(s). Or if you've already purchased the cables, determine the proximity of the components in question.
3. Leave sufficient room, at least two inches, around the unit to allow air ventilation.
4. Do not block or cover any of the ventilation holes in the front and back panels of the unit. Consistent airflow is essential to keeping the system operating efficiently.
5. Allow additional room at the front and back of the unit for service.
6. The ExaSAN SW16-G3 uses several cables and cords. It's a good idea to determine how they will be arranged at the rear of the system, and where the cables will be routed to connect to the host systems and RAID disk systems.

## Electrical Power

At your chosen location for the ExaSAN SW16-G3, make sure that the electrical circuitry and power outlets are sufficient for the combined power needs of all hardware components. To plan for safe and adequate power to the system, follow these guidelines:

1. Check the documentation for all hardware components at the chosen location to determine their power requirements. Then make sure that the available power supply for that location is sufficient for the planned components.
2. If you need assistance determining the power needs of the components at the chosen location, consult an electrical expert who is familiar with your facility.
3. When possible use surge protectors or power conditioners as part of the installation.
4. When planning for electrical power, make sure you have more power than the total power requirements specified for all components. Also make certain that the power load is distributed evenly among circuits to that location. Consult an electrician or other expert if you need assistance with planning for the power needs of your components.
5. When possible, plug the redundant power supplies onto different circuits.
6. Make sure that the power outlets for all hardware components are grounded according to local and national standards. Consult an electrician if you need assistance with grounding.

## Operating Environment

The operating environment for the ExaSAN SW16-G3 must meet certain requirements:

1. Verify that the temperature range of the chosen location is within the limits established for the system and all other components.
2. Make certain that the chosen location has adequate ventilation to maintain the necessary temperature range.
3. If there are multiple hardware components installed at the chosen location, consider additional cooling measures to assure efficient operation of the system and other components.
4. Environment parameters:
  - a. Operating temperature: 0°C to 40°C (32°F to 104°F)
  - b. Non-operating temperature: -40°C to 70°C (-40°F to 158°F)
  - c. Operating humidity: 5-85%, non-condensing
  - d. Storage humidity: 0-95%, non-condensing

## Security

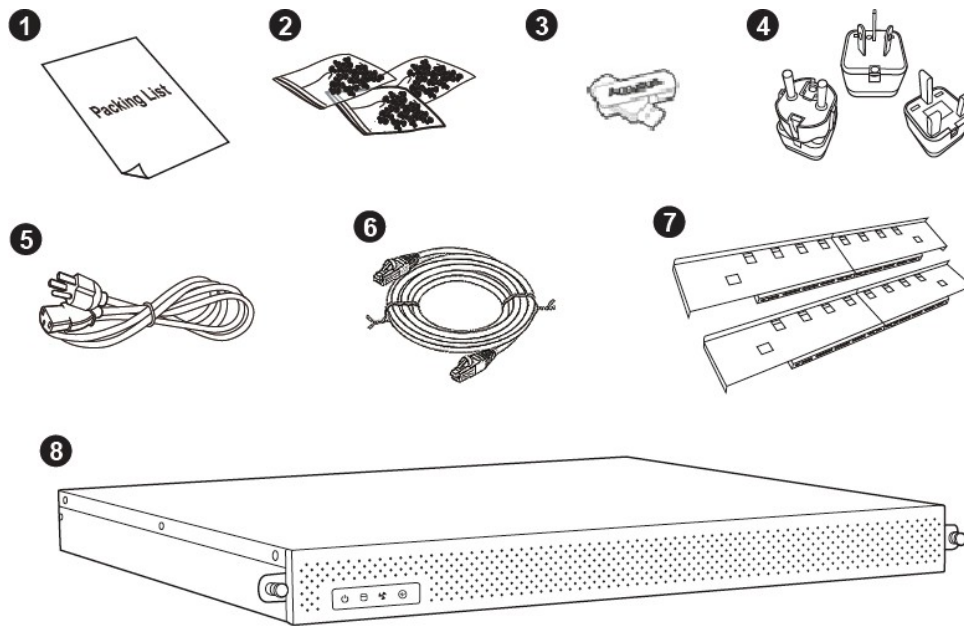
To ensure the security of the ExaSAN SW16-G3, make certain that the chosen location meets your security requirements.



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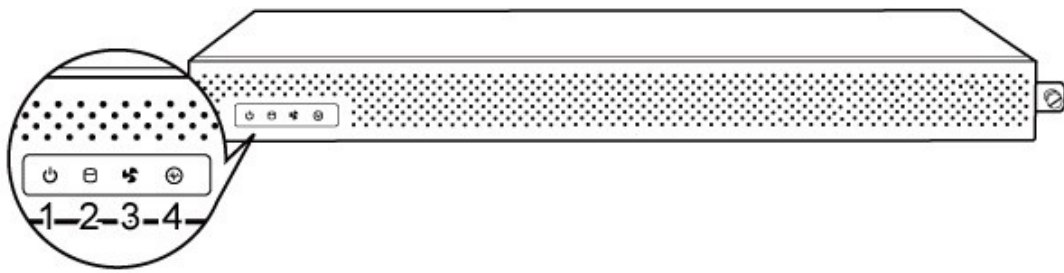
**1. What is in the box**



Item	Name	Description
1	Packing list	Packing list
2	Screw pack	For installing to rack
3	Driver USB	ExaSAN installation files
4	Power converter	UK, EU, AU to US
5	Power cord	AC power cord x2
6	Ethernet cable	10/100/1000 Ethernet cable x2
7	Rail set	Hold up SW16-G3 in rack

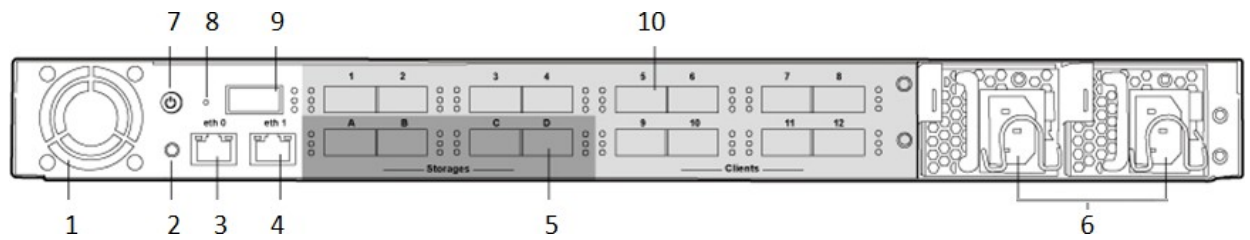
## **2. Introduce SW16-G3**

## 2.1 The front side of SW16-G3



Item	Name	Description	
1	System Power	Indicates the system is booting or ready.	
2	IO Access	Flashing while any data transferring in switch.	
3	FAN, Power Status	<b>Blue</b>	Fan and power are working.
		<b>Red</b>	Fan or power is abnormal.
4	Controller Status	<b>Blue</b>	Switch is in Master mode
		<b>Purple</b>	Switch is in Slave Mode.
		<b>Red</b>	Switch controller is abnormal.

## 2.2 The rear side of SW16-G3

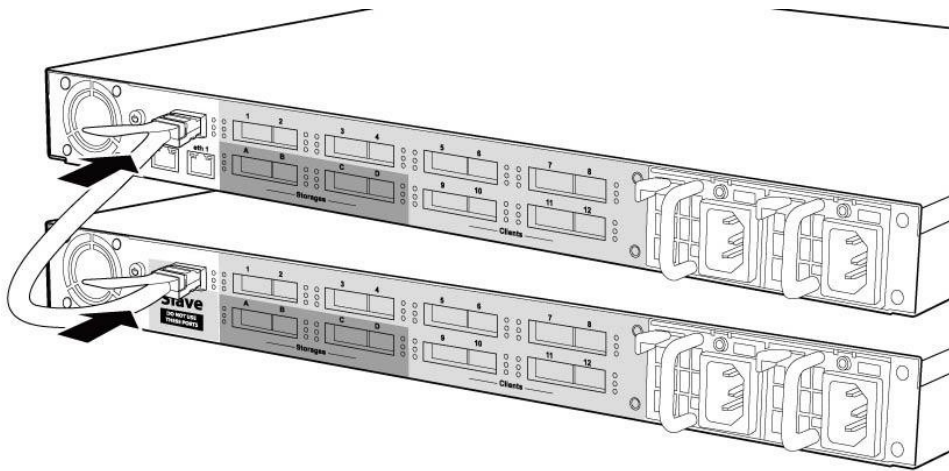


No.	Name	Description						
1	Cooling fan	Smart FAN speed controlling.						
2	Debug port	For engineer debugging.						
3	eth0 port	Open webGUI, default IP is "192.168.0.25".						
4	eth1 port	Open webGUI, default IP is "192.168.1.25".						
5	Storage port (QSFP)	<p>Connect to ExaSAN RAID system.</p> <table border="1"> <tr> <td><b>LED1</b></td> <td><b>Blue</b> Data access status</td> </tr> <tr> <td><b>LED2</b></td> <td><b>Green</b> Link status - Solid: PCIe3.0 link up - Flash: PCIe2.0 link up</td> </tr> <tr> <td><b>LED3</b></td> <td><b>Red</b> Wrong connection</td> </tr> </table>	<b>LED1</b>	<b>Blue</b> Data access status	<b>LED2</b>	<b>Green</b> Link status - Solid: PCIe3.0 link up - Flash: PCIe2.0 link up	<b>LED3</b>	<b>Red</b> Wrong connection
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<b>LED3</b>	<b>Red</b> Wrong connection							
6	Power supply	Redundant Power supply module.						
7	Power button	Click it to power on/off. Press for 5 seconds to force shut down.						
8	Reset hole	Press the button and hold for <b>13 seconds</b> , reset to default IP address after hearing two short beeps.						
9	Expansion port	Connect Master and Slave via QSFP cable.						
10	Client port (QSFP)	Connect to host computer.						

### **3. Build a SAN environment**

### 3.1 Connect to Slave SW16-G3

If you have a slave SW16-G3 switch, use a QSFP cable to connect both expansion ports of Master and Slave SW16-G3.

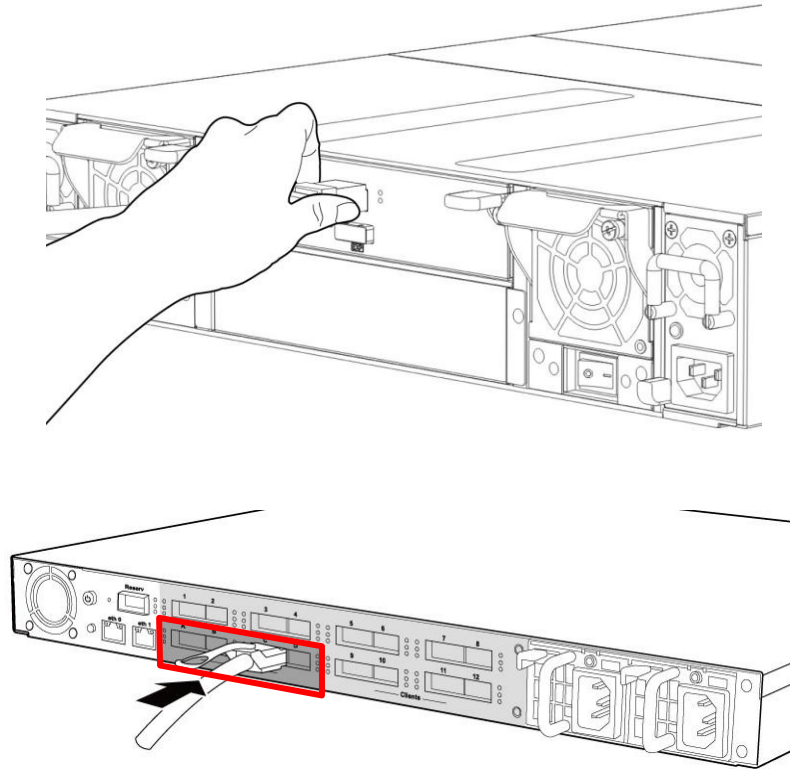


**Note**

QSFP Copper or Optical cable could be used for expansion port.

## 3.2 Connect to RAID storage

Use QSFP cable to connect ExaSAN storage into Storage Port A~B of SW16-G3.



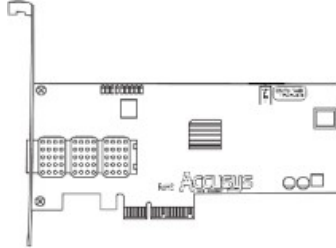
### Note

1. All PCIe port does not support online hot plug.
2. Recommend to use copper cable for connecting RAID storage.

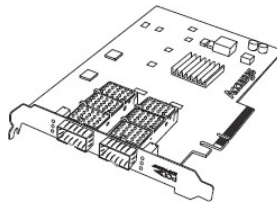
### 3.3 Connect to host

Set PCIe HBA/Thunderbolt Converter to “SAN” mode and install/connect to host computer. There are configurations as below.

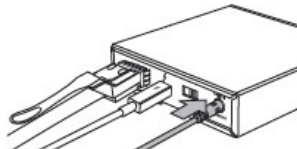
- a. PCIe HBA: Z1M-G2, PCIe2.0 x4, click link for detail;  
<https://www.accusys.io/page770>



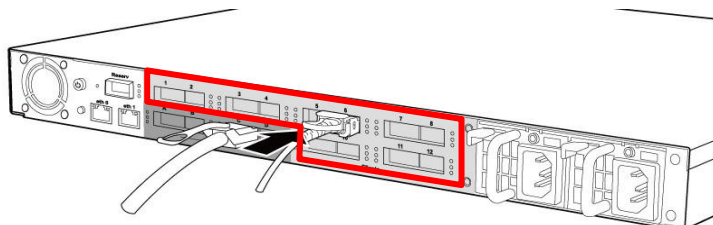
- b. PCIe HBA: Z2M-G3, PCIe3.0 x8, click link for detail;  
<https://www.accusys.io/page770>



- c. Thunderbolt Converter, C1M/C2M, click link for detail;  
<https://www.accusys.io/page769>



Use QSFP cable to connect host computer to Client Port 1~12 of SW16-G3.



#### Note

All PCIe port does not support online hot plug.

## 3.4 Power on sequence

### 3.4.1 Powering On

Make sure all QSFP cables and power cords are installed and connected properly then follow the steps below to power on all equipment.

Step1. Power on ExaSAN storage

Power on JBOD enclosure (if it exists) first, then power on RAID system; Storage boots up ready until sound a beep and all front indicators become blue.

Step2. Power on ExaSAN switch

Click power button of slave SW16-G3 first (if it exists) then click power button of master SW16-G3; Switch boots up ready until sound 3 short beeps and all front indicators turn blue.

#### Note

Master takes around 3 minutes to boot; Slave takes 30 seconds.

Step3. Power on host computer

### 3.4.2 Powering Off

Follow the proper order to power off the SAN equipments.

Step1. Power off host computer

Step2. Power off ExaSAN switch

Click power button of master SW16-G3 will sound 5 short beeps, switches will shutdown automatically in few seconds.

Step3. Power off ExaSAN storage

Power off RAID system first, then power off JBOD enclosure (if it exists).

#### Note

1. Make sure to follow the proper power on sequence, wrong sequence may result in unexpectedly problem.
2. Client computer with QSFP cable is NOT support Hot Plug; Thunderbolt connection is support Hot Plug.

#### **4. Install Accusys host driver**

Install Accusys driver is needed to recognize SAN volume of SW16-G3. There are auto-executive files (call as Installer) for Mac and Windows clients; Install driver by using command for Linux client.

**Note**

All files could be found from installation USB, the latest files always upload to Accusys support site: <https://www.accusys.com.tw/page491>

## 4.1 Installing on MAC and Windows

1. Double click the installer file (.mpkg for Mac; .exe for Windows)

Follow the onscreen instructions to install and click **Restart** to complete installation.



## 4.2 Installing driver on Linux

1. Linux system must in developmental environment to build respective driver. For example, CentOS Linux must installed "Development Tools".

2. Open a terminal window, change to Linux driver source directory and type command 'make' to build driver file 'ACS6x.ko'.

```
# sudo make
```

```
# sudo insmod ACS6x.ko
```

```
# sudo lsmod //to see if ACS6x driver is running
```

3. Set driver be started automatically at boot up

A. Copy driver file ACS6x.ko to driver folder.

```
# sudo cp ACS6x.ko /lib/modules/{linux kernel}/kernel/drivers/scsi
```

(Note: 'uname -a' can find {linux kernel})

B. Upgrade all default modules

```
# sudo depmod -a //For RHEL, CentOS, Ubuntu, etc
```

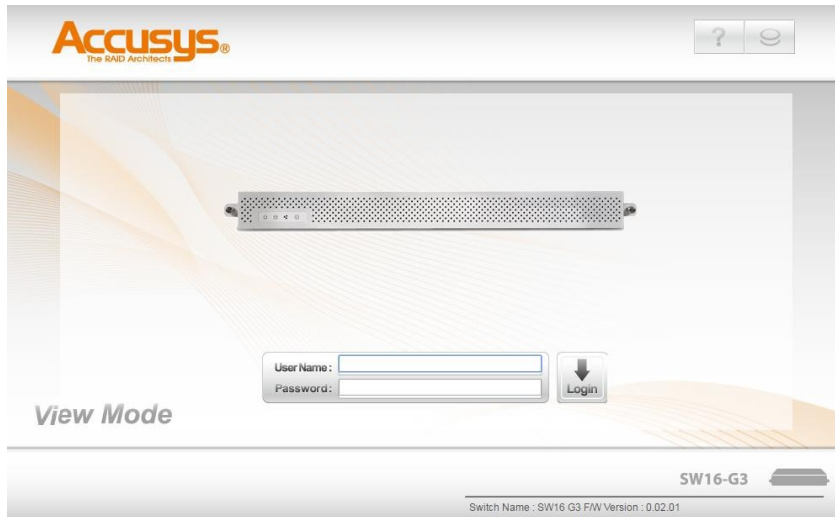
```
#Set the line "allow_unsupported_modules" from 0 to 1 by editing  
/etc/modprobe.d/unsupported-modules // For SUSE, SLES
```

C. Reboot to make it available

## **5. Use SW16-G3 WebGUI**

## 5.1 Entering webGUI

There is an embedded webGUI in the SW16-G3 switch, you can open a web browser by entering IP address of switch (default IP is **eth0: 192.168.0.25**; **eth1:192.168.1.25**), then you can see the monitor page as below.



Type the user name **admin** and password **00000000** (8 zeros) to enter the configuration menu of the webGUI as the following figure.



### Note

 Switch to View     Logout     Help     About

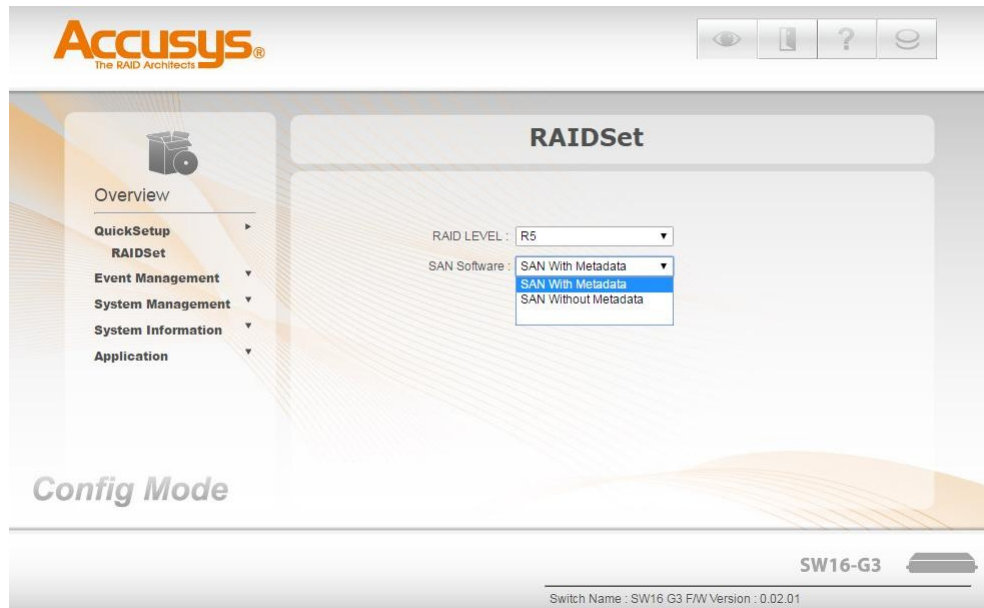
## 5.2 Quick Setup

If you haven't created arrays in your ExaSAN storages yet, Quick Setup function could help to create arrays in few clicks.

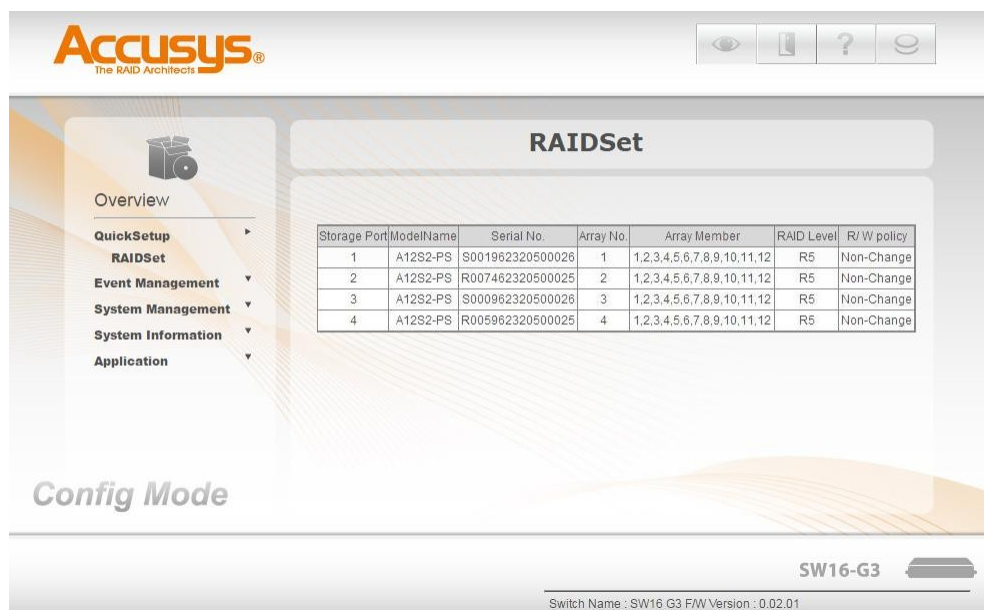
Step 1: Make sure all capacity, number of drive set in all ExaSAN storages.

Step 2: Choose RAID level (RAID5 or RAID6 only).

Step 3: Choose SAN software type and click Next.



Step 4: The preview of Array information will show up, click Apply to start array initialization.

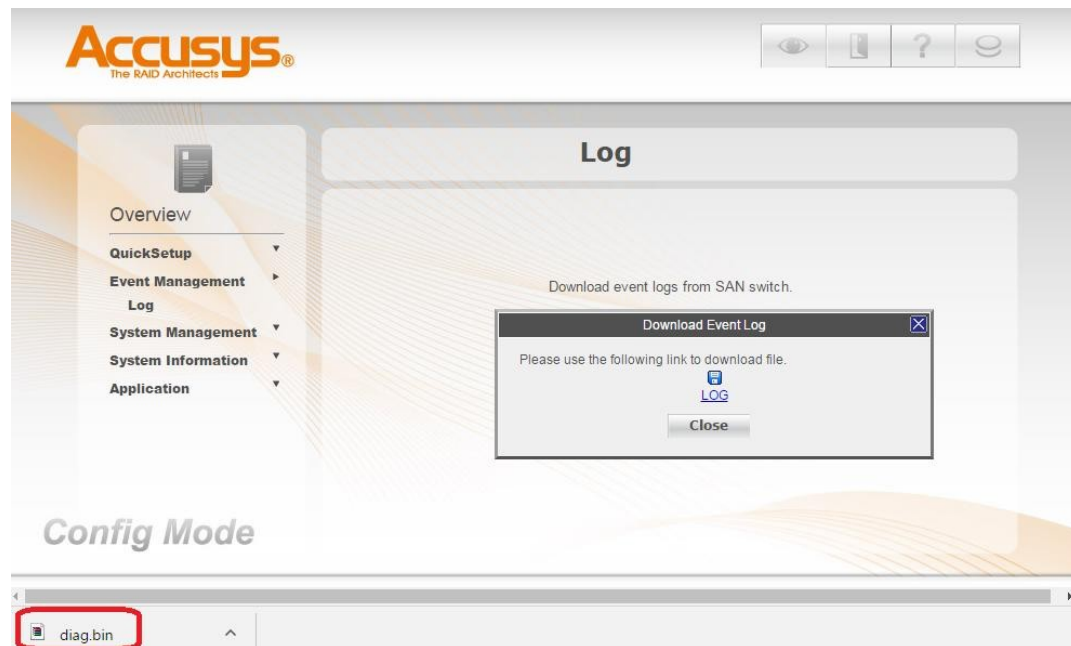


### 5.3 Event Management

SW16-G3 webGUI provides the function to download the log for trouble shooting. Follow the steps below to download log.

Step 1: Click “Event Management”, then clicking “Download” button to process.

Step 2: After the processing finished, you can see the log hyper-link in the middle of the following figure, right click LOG to save log file in your computer.



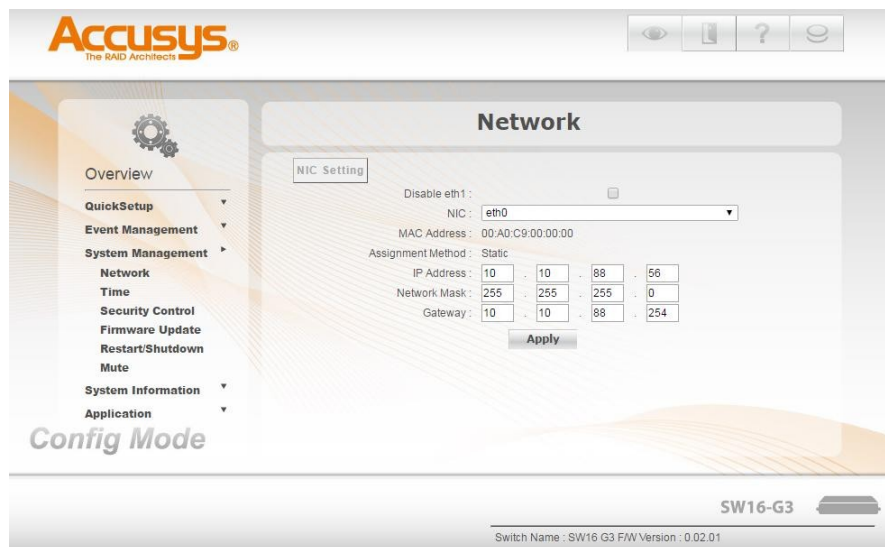
## 5.4 System Management

There are several functions in “System Management”. It includes

- Network
- Time
- Security Control
- Firmware Update
- Restart/Halt
- Mute

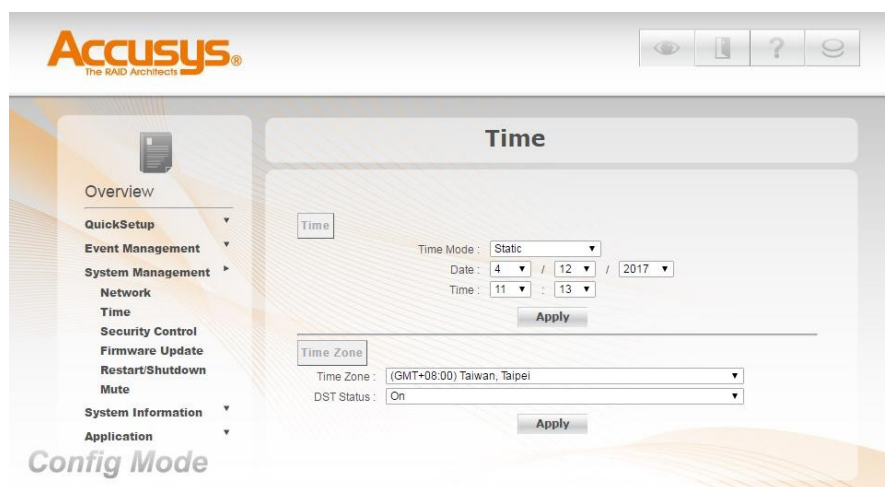
## 5.5 Network

Choose a NIC (eth0 or eth1) would be modified and then setup the parameters, click Apply the setup will be available immediately.



## 5.6 Time

Setup a Static or NTP date/time and then click Apply to make it available immediately.



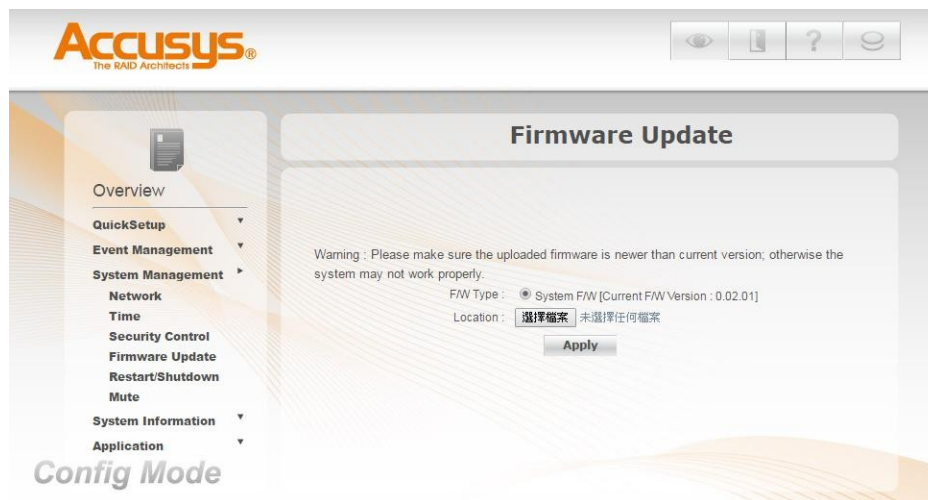
## 5.7 Security Control

You can change the login password from default (00000000) for entering webGUI.



## 5.8 Firmware Update

Sometimes you may need to update the firmware of SW16-G3, preparing the correct firmware file and click the Apply to start the firmware update. Firmwareupdate may take 30 minutes to finish.

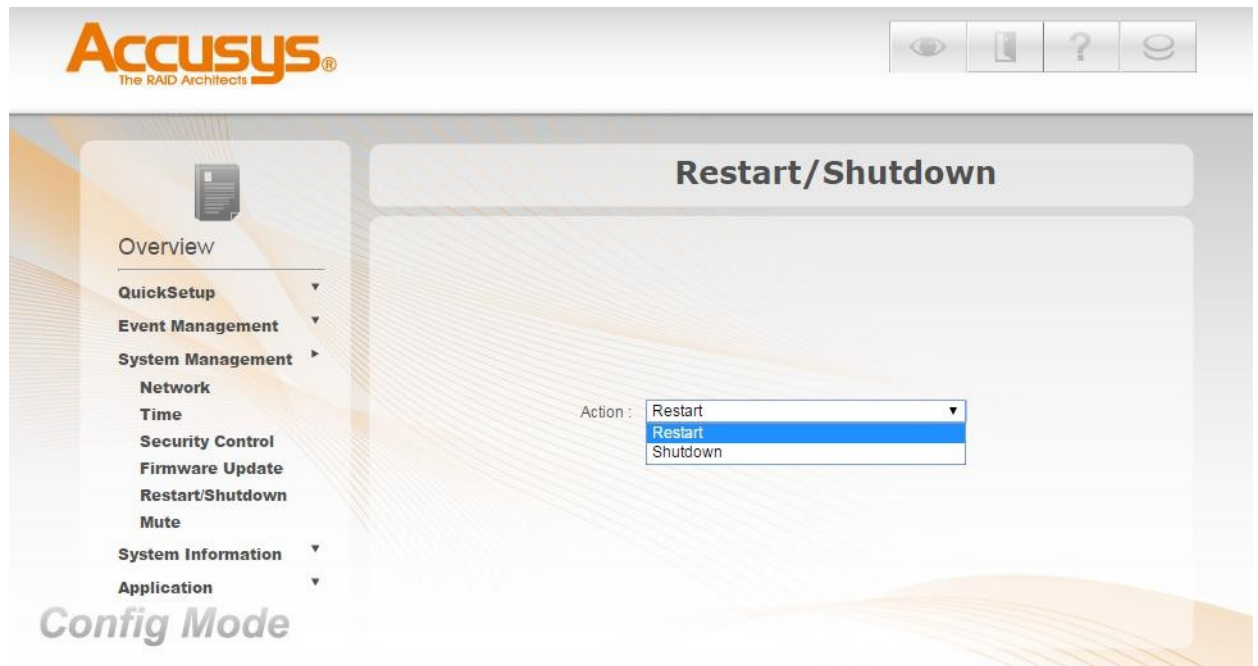


### Note

1. Stop any IO access with SW16-G3 while firmware updating.
2. You can get latest firmware from website <https://www.accusys.com.tw/page491> the directory is /ForSAN/SW16-G3/System Code/xxx.zip, unzip to get firmware file.

## 5.9 Restart / Shutdown

Select Restart or Shutdown SW16-G3 and click Apply to do immediately.



## 5.10 Mute

Click Apply to mute any beeper alert of SW16-G3.



## 5.11 System Information

You can monitor the status of SW16-G3 by clicking item of Port(Client andStorage), Network, Time , Volt (Voltage), FAN and Temperature.

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Port

Port	Link Status	Link Speed
1-1	4 lanes	32 Gbts/sec
1-2	4 lanes	20 Gbts/sec
1-3	4 lanes	20 Gbts/sec
1-4	-----	-----
1-5	-----	-----
1-6	-----	-----
1-7	-----	-----
1-8	-----	-----
1-9	-----	-----
1-10	-----	-----
1-11	-----	-----
1-12	-----	-----

Config Mode

### Note

The prefix "1-" means the information from Master SW16-G3; "2-" means from Slave.

## 5.12 Application

You can configure **LUN masking** (similar to FC zoning) to define which client port cannot see the specific LUN from storage.

For example, set LUN masking to deny Client Port 1 to recognize LUNs of StoragePort A & Storage Port B.

Step1. Check LUN Masking and select Client Port1 from drop menu. Step2. Check the LUN0 box under Storage Port A & Storage Port B Step3. Click Apply to make it available.

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**Client Port Setting**

LUN Masking

Client Port 1

1-StoragePort A		1-StoragePort B		1-StoragePort C		1-StoragePort D	
LUN No.	Mask	LUN No.	Mask	LUN No.	Mask	LUN No.	Mask
LUN 0	<input checked="" type="checkbox"/>	LUN 0	<input checked="" type="checkbox"/>	LUN 0	<input type="checkbox"/>	LUN 0	<input type="checkbox"/>

Next  
Apply

Config Mode

### Note

Click Next button to view Salve SW16-G3 Storage ports.

## **6. Manage Storage on RAIDGuardX**

## 6.1 Run RAIDGuardX Client GUI

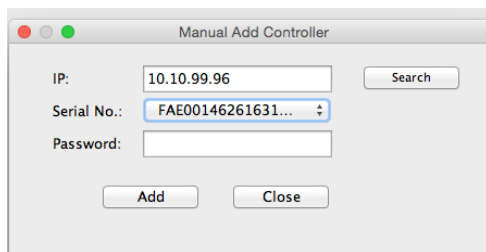
RAIDGuardX client GUI is a Java based application, the console be opened on Windows/Mac/Linux operation system.

**Windows-** Double click the **RAIDGuardX Client** from start menu.

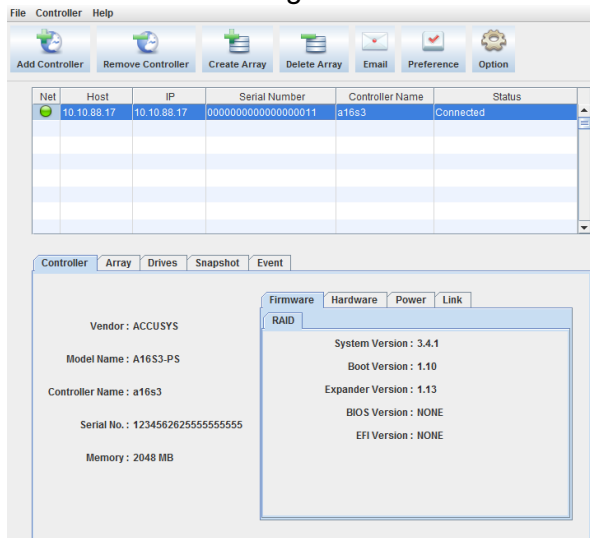
**Mac-** Double click the **RAIDGuardX Client** from folder /applications/RAIDGuardX.

**Linux-** Use command **sudo java -jar RAIDGuardX.jar** in RAIDGuardX Client folder.

1. Drop in **controller** tab, click **Manually Add Controller**.
2. Key in switch IP address (default is 192.168.0.1) and press **Search**, allstorage's serial number will be listed.
3. Select a controller's serial number and key in password (default is 00000000) , then press **Add** to add controller onto RAIDGuardX





4. Once controller is added onto RAIDGuardX, you can start to configure and monitor the storage.



## **7. SW16-G3 Specification**

The ExaSAN SW16-G3 is SAN switch in a 1U rackmount enclosure employing the latest PCIe3.0 technology with 12 client ports and 4 storage ports which can expand to 24 client ports and 8 storage ports by connecting to a Slave SW16-G3. The total bandwidth of single SW16-G3 is up to 100 Gb/s.

		
<b>Model</b>	SW16-G3 (Master)	SW16-G3 (Slave)
<b>Expandable</b>	Yes	Yes (connect to Master only)
<b>Host Interface</b>	12 QSFP PCIe3.0 x4 ports Support HBA: Z1M(PCIe2.0), Z2M(PCIe3.0) Support Convertor: C1M(Thunderbolt 2), C2M(Thunderbolt 3)	
<b>Storage Interface</b>	4 QSFP PCIe3.0 x4 ports Support ExaSAN storage: A12S2, A12S3, B08S3, A08S3, A08S4, A16S3	
<b>Supports SAN software</b>	Support main-stream SAN software, SANit, TigerStore, Xsan, Fibrejet, etc	
<b>Management</b>	Friendly web-based GUI management Support RAID management via RAIDGuardX ClientSupport SNMP trap	
<b>Hardware Monitor</b>	FAN, Power, Temperature status LED indication in the front panel.	
<b>Dimension</b>	43.8mm(H) x 447mm(W) x 410mm(L)	
<b>Weight</b>	6.9 Kg(15.21 lb)	
<b>Operating Condition</b>	Humidity: 5% - 85% Temperature: 0 °C - 40 °C	
<b>Certification</b>	RoHS, CB, BSMI, UL, LVD	
<b>Support Cable</b>	Copper cable: 2M Optical cable: 10M, 30M, 50M, 100M	

## 8. FAQ

1. **Q: Does SW16-G3 support hot plug QSFP cable?**  
**A:** No. It may affect whole system unstable. Please plug QSFP cable after power off.
  
2. **Q: Does SW16-G3 support Thunderbolt host computer?**  
**A:** Yes, you need to purchase C1M(for Thunderbolt 2) or C2M(for Thunderbolt 3) converter and install the latest driver.
  
3. **Q: One of client computer does not recognize SAN volume.****A:** Check following items.
  - I. HBA(Converter) set to SAN mode.
  - II. Hardware is linked: all link LED should be light on.
  - III. Driver is installed: check Chapter 4 for more detail.
  - IV. LUN isn't masked, entering in webGUI > application, make sure the Client Port do not mask any LUN.
  
4. **Q: Why doesn't the performance reach the expected levels while testing the SAN volume?****A:** The performance is very depending on which model of drive you used in ExaSAN storage, the enterprise level drive always provide best and steady throughput; or just refer to our compatibility list for choosing the certified drive model.

5. **Q: How to understand the meaning of system beeper?****A:** Below is the beeper table

Switch Status	Beeper issues
Powering on	One short beep followed by three beeps
Powering off	Five short beeps
Kernel Panic	A long beep
Fan Failure Fan speed is under 5500RPM Power Failure Over Temperature	Three short beeps repeatedly

6. **Q: When inserting the HDD into my RAID system, why does RAIDGuard X show the HDD mode as Lock?**  
**A:** The lock indicates that the HDD has been previous used in Accusys products and that it contains a portion of a RAID data. If the data can be deleted, you can unlock the HDD.

## **9. Customer Service**

### ***System Log***

When you contact us for technical support, our support staff might ask for your system log file for troubleshooting purpose.

- 1) RAID controller log by [Dump controller log of RAIDGuard X](#)
- 2) Client operation system log. (it's better to record related error message.)

### ***Contact Us***

Email us for customer services and technical support; Sales: [sales@accusys.com.tw](mailto:sales@accusys.com.tw)

Technical Support: [support@accusys.com.tw](mailto:support@accusys.com.tw)

### ***Our Website***

Please visit our websites frequently for the most up-to-date product and support information. All countries: [www.accusys.com.tw](http://www.accusys.com.tw)