

Areca Expander Box

ARC-8020 SAS Expander Box

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CE Mark

This equipment is in conformity with EM directive.

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1. Introduction

1.1 Overview

Installing an ARC-8020 SAS expander box allows you to support 12/16/24 internal channels using the 3/4/6 SFF-8087 SAS connectors. The ARC-8020 SAS expander box connects to the host system through one 4-lanes SAS connector and two 4-lanes SAS connectors to the next JBOD rackmount. System functions are accessible out-of-band LCD and serial port. The expander box can leverage the existing server enclosure I/O shield to fasten the box capable of accommodating up to 12/16/24 3.0-Gbps, Serial-Attached SCSI (SAS) drives or 3.0-Gbps Serial ATA (SATA) drives. The expander box can be daisy-chained additional enclosures to provide more disk connection. Host-based RAID configuration is supported via an Areca external SAS/Fibre/iSCSI/PCIe to SAS RAID controller, internal ARC-1680 series SAS RAID adapters and ARC-1300 series host adapters.

1.2 Technical Specifications

Drives

SAS hard drives

- up to 12/16/24 1-inch-by-3.5-inch SAS hot-plug hard drives (3.0 Gbps) at speeds of 10K or 15K rpm

SATA hard drives

- up to 12/16/24 1-inch-by-3.5-inch SATA hot-plug hard drives (3.0 Gbps) at speeds of 7.2K rpm.

Enclosure Controller Modules

- Expander Board 1 modules
- Sensors 1 sensor per Expander Board

Internal Connectors

- 3/4/6 SFF-8087 min- SAS connectors
- 1 4P power connector

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Controller External Connectors

SAS connectors

- 1 SAS "IN" connector for connection to the host
- 2 SAS "OUT" connector for expansion to an additional JBOD enclosure

Serial Connector (per Expander Board)

- 1 6-pin UART RJ-11 connector (for expander box manager only)

LED Indicators

Internal Fault/Activity Header

- 12/16/24 2.54mm Fault Header
- 12/16/24 2.54mm Activity Header

External SAS Port

- Expander two one-color LED status indicators for each SAS port, one for SAS port link and one for the activity status

Physical

Height	41 mm
Width	145 mm
Depth	168 mm

Environmental

Temperature

Operating	10° to 40°C
Storage	-40° to 70°C

Relative Humidity

Operating	10% to 80% (non-condensing)
Storage	5% to 95% (non-condensing)

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2. Hardware Installation

This section describes the procedures for installing the cable solution external ARC-8020 series expander box.

2.1 Before Your Begin Installation

Thanks for purchasing the cable solution external ARC-8020 series SAS expander as your data storage subsystem. This user manual gives simple step-by-step instructions for installing and configuring the SAS expander box. To ensure personal safety and to protect your equipment and data, reading the following information package list carefully before you begin installing.

Package Contents

Open the package carefully, and make sure that none of the items listed below are missing.

The ARC-8020 expander box kit may have included the following items in the shipping package:

- ARC-8020 expander box with LCD module
- 1 x RJ11 to RS-232 DB9 cable
- 1 x Quick Installation Guide Manual
- 8 x drive mounting screws (4 screws for each side)

If any item is missing or damaged, please contact your local resellers for service.

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2.2 Board Layout & Outline

The ARC-8020 expander box can support a family included 3/4/6 internal SFF-8087 ports with additional 3 external SFF-8088 ports. This section provides the board layout and connector/jumper for the SAS expander box.

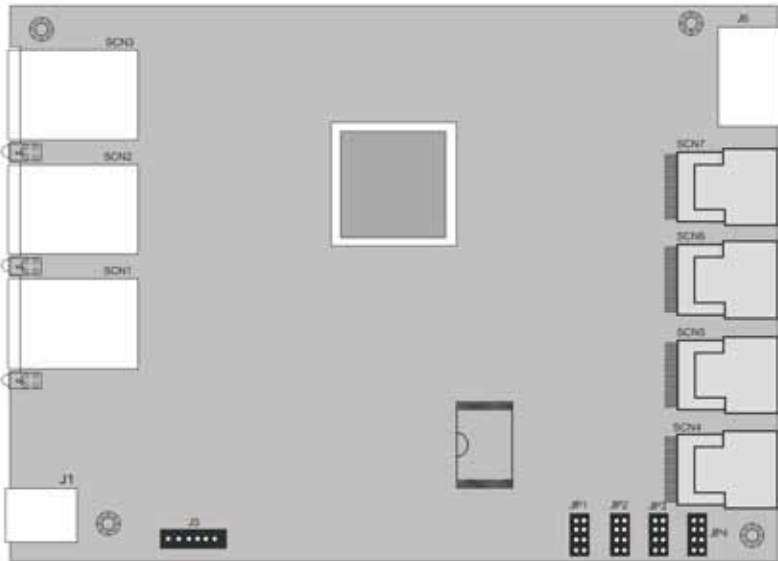


Figure 2-1, ARC-8020-12/16 expander box (Version B)

Connector	Description	Type
1. (SCN3)	Expander Out	Min SAS 4x (SFF-8088)
2. (SCN2)	Expander In	Min SAS 4x (SFF-8088)
3. (SCN1)	Expander Out	Min SAS 4x (SFF-8088)
4. (J1)	RS232 for Expander Configuration	RJ11 Connector
5. (JP1)	Individual Activity LED Header for SAS 1-8 Ports	8-Pin Header
6. (JP2)	Individual Activity LED Header for SAS 9-16 Ports	8-Pin Header
7. (JP3)	Individual Fault LED Header for SAS 1-8 Ports	8-Pin Header

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8. (JP4)	Individual Fault LED Header for SAS 9-16 Ports	8-Pin Header
9. (SCN4)	SAS 1-4 Ports (Internal)	Min SAS 4i (SFF-8087)
10. (SCN5)	SAS 5-8 Ports (Internal)	Min SAS 4i (SFF-8087)
11. (SCN6)	SAS 9-12 Ports (Internal)	Min SAS 4i (SFF-8087)
12.(SCN7)	SAS 13-16 Ports (Internal)	Min SAS 4i (SFF-8087)
13.(J6)	Power Connector	4P Connector
14.(J3)	I2C/LCD Connector	6-Pin Header

Table 2-1, ARC-8020 expander box connectors

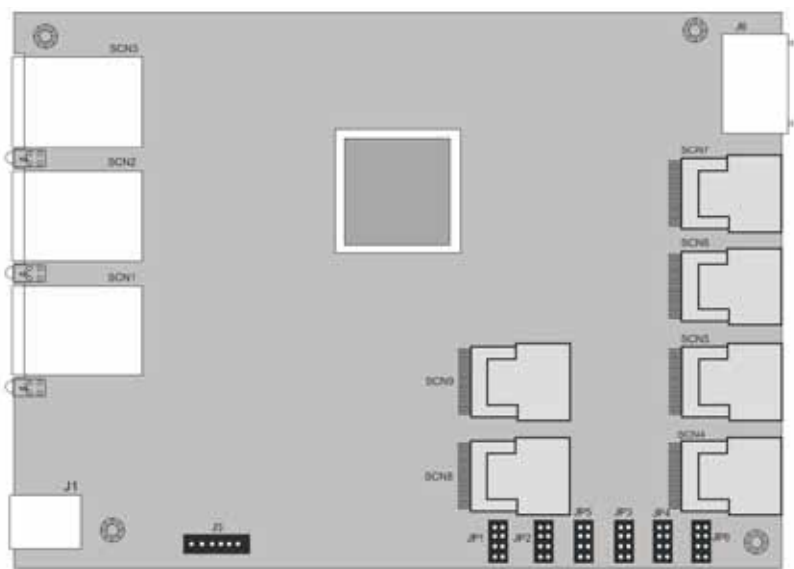


Figure 2-2, ARC-8020-12/16/24 expander box

Connector	Description	Type
1. (SCN3)	Expander Out	Min SAS 4x (SFF-8088)
2. (SCN2)	Expander In	Min SAS 4x (SFF-8088)
3. (SCN1)	Expander Out	Min SAS 4x (SFF-8088)
4. (J1)	RS232 for Expander Configuration	RJ11 Connector

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5. (JP6)	Individual Fault LED Header for SAS 17-24 Ports	8-Pin Header
6. (JP4)	Individual Fault LED Header for SAS 9-16 Ports	8-Pin Header
7. (JP3)	Individual Fault LED Header for SAS 1-8 Ports	8-Pin Header
8. (JP5)	Individual Activity LED Header for SAS 17-24 Ports	8-Pin Header
9. (JP2)	Individual Activity LED Header for SAS 9-16 Ports	8-Pin Header
10. (JP1)	Individual Activity LED Header for SAS 1-8 Ports	8-Pin Header
11. (SCN4)	SAS 1-4 Ports (Internal)	Min SAS 4i (SFF-8087)
12. (SCN5)	SAS 5-8 Ports (Internal)	Min SAS 4i (SFF-8087)
13. (SCN6)	SAS 9-12 Ports (Internal)	Min SAS 4i (SFF-8087)
14.(SCN7)	SAS 13-16 Ports (Internal)	Min SAS 4i (SFF-8087)
15.(SCN8)	SAS 17-20 Ports (Internal)	Min SAS 4i (SFF-8087)
16.(SCN9)	SAS 21-24 Ports (Internal)	Min SAS 4i (SFF-8087)
17.(J6)	Power Connector	4P Connector
18.(J3)	I2C/LCD Connector	6-Pin Header

Table 2-2, ARC-8020-12/16/24 expander box connectors

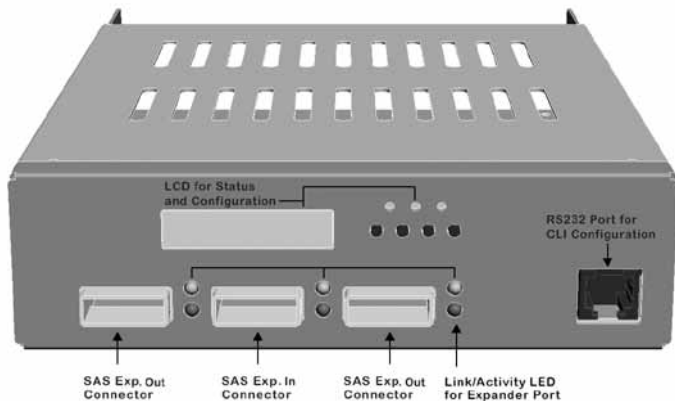


Figure 2-3, Front view of ARC-8020 expander box

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The following describes the ARC-8020 expander box link/activity LED.

SAS Host Port LED	Status
Link LED (Green light)	When host port link LED illuminate for 1 second and light off for 3 seconds that indicates one link has connected. When host port Link LED illuminate for 2 seconds and light off for 2 seconds that indicates two links have connected. When host port Link LED illuminate for 4 seconds that indicates four links have connected.
Activity LED (Blue light)	When activity LED illuminated that indicates SAS host accesses to the ARC-8020 expander box.

2.3 Installation

The ARC-8020 expander box housed in a 5¼-inch half-height canister with a removable LCD module, a host channel, two expander and a RS-232 CLI port controller. The expander controller is provided for customers who want to use the exiting SAS/SATA enclosure. It is designed to fit into one 5¼-inch half-height drive bays located in a server chassis or storage case. Standard mounting holes are located on both sides of the controller canister. These mounting holes accept commonly available No. 6-32 coarse-thread screws. Use the following instructions below to install the ARC-8020 expander box.

Step 1. Power the Enclosure Off

Turn off the enclosure and remove the AC power cord. Remove the enclosure's cover. For the instructions, please see the enclosure documentation.

Step 2. Unpack ARC-8020 Expander Box

Unpack and remove the ARC-8020 expander box from the package. Inspect it carefully, if anything is missing or damaged, contact your local dealer.

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Step 3. Mounting ARC-8020 Expander Box into the Enclosure

Remove the enclosure cover and find a 5.25 inch CD-ROM wide place to fasten the ARC-8020 expander box in the external enclosure. The expander box requires one 5.25" half-height drive bay.

Step 4. Connecting Expander Controller Power

The power input and connection of the ARC-8020 expander box is exactly the same as those for hard disk drives. Connect one free power 4P cables to the power connector on the rear side of the ARC-8020 expander box.

Step 5. Install the LED Cable (option)

Please check the method which controls fault LED on the backplane. If the backplane supports SGPIO feature, ignore the individual fault LED cable connection. The preferred I/O connector for server backplanes is the Min SAS 4i (SFF-8087) internal connector. This connector has eight signal pins to support four SAS/SATA drives and six pins for the SGPIO (Serial General Purpose Input/Output) side-band signals. The SGPIO bus is used for efficient fault/activity LED management and for sensing drive locate status. See SFF 8485 for the specification of the SGPIO bus. For backplane without SGPIO supporting, Please refer to section step 5-1. LED cables for fault/activity LED cable installation.

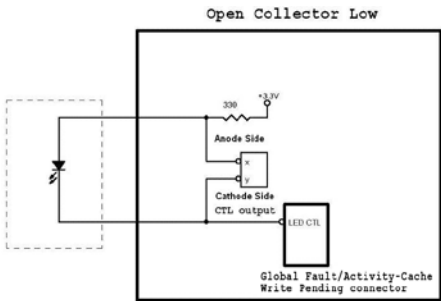
Step 5-1. Install and Re-check Fault LED Cable Connections (optional)

Make sure that the proper failed drive channel information is displayed by the fault LEDs. An improper fault LED cable connection will tell the user to "Hot Swap" the wrong drive. This can result in removing the wrong disk (one that is functioning properly) from the controller. This can result in failure and loss of system data.

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The following electronics schematic is the SAS expander logical of fault/activity header. The signal for each pin is cathode (-) side.

The following diagrams and descriptions describe each type of connector.

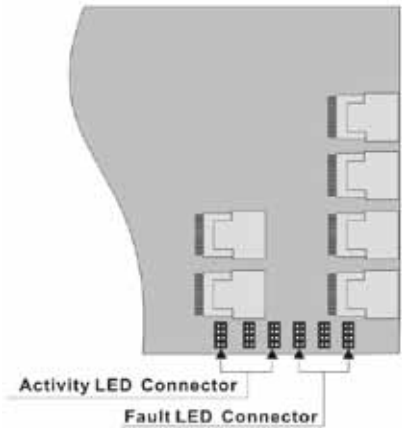


Note:

Cables for the individual drive LEDs may come with a drive cage, or you may need to purchase them.

Connect the cables for the drive activity LEDs and fault LEDs between the backplane of the cage and the respective connector on the ARC-8020 expander box header. The following table describes the activity/fault LED.

Figure 2-4, ARC-8020
12/16/24 expander box
activity/fault LED connector



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LED	Normal Status	Problem Indication
Activity LED	When the activity LED is illuminated, there is I/O activity on that disk drive. When the LED is dark, there is no activity on that disk drive.	N/A
Fault LED	<p>When the fault LED is solid illuminated, there is no disk present and When the fault LED is off, that disk is present and status is normal.</p> <p>When the "Identify Drive" is selected, the selected drive fault LED will blank.</p>	<p>When the fault LED is slow blinking (2 times/sec), that indicate disk drive has failed and should be hot-swapped immediately.</p> <p>When the activity LED is illuminated and fault LED is fast blinking (10 times/sec) that indicate there is rebuilding activity on the disk drive.</p>

Step 6. Connecting SFF-8087 Cable to Backplane

The ARC-8020 expander box supports 3/4/6 SFF-8087 connectors on the back side. User uses suitable cable (depends on the backplane) to connect the expander box connector to the enclosure backplane.



Figure 2-5, Connect ARC-8020 and backplane

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Step 7. Install the Enclosure Top Cover

Check the installation thoroughly, reinstall the enclosure cover, and reconnect the power cord cables.

Step 8. Loading Drive to the Drive Tray

You can connect the SAS/SATA drives to the controller through direct cable and backplane solutions. In the direct connection, SAS/SATA drives are directly connected to SAS PHY port with SAS/SATA cables. The SAS expander module can support up to 12/16/24 PHY internal ports and 12 PHY external ports. Remove the front bezel from the computer chassis and install the cages or SAS/SATA drives in the computer chassis. Loading drives to the drive tray if cages are installed. Be sure that the power is connected to the individual drives or cage.

In the backplane solution, SAS/SATA drives are directly connected to SAS system backplane. The number of SAS/SATA drives is limited to the number of slots available on the backplane. Your ARC-8020 expander box supports up to 12/16/24 SAS or SATA 3.0-Gbps drives, each one contained in its individual drive carrier. Each drive is hot-pluggable, allowing you to remove and insert drives without shutting down your ARC-8020 expander enclosure. Install the drives to 12-bays ARC-8020 expander enclosure as shown in figure 2-6.

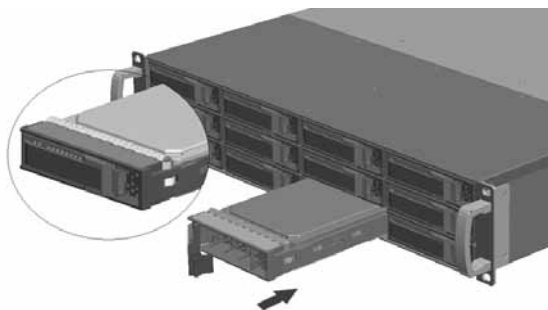


Figure 2-6, Install the drives to 12-bays ARC-8020 expander enclosure.

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Step 9. Connect to Host Interface

Once the ARC-8020 expander box has finished the configuration (option), then you can connect it to a host interface. The enclosure can be connected to a host interface which may a host adapter or RAID controller through the SFF-8088 SAS cable. By installing host adapter port and ARC-8020 expander box using the correct external cables which may be included in your enclosure kits. Then connect ARC-8020 expander box and host adapter port as shown below:

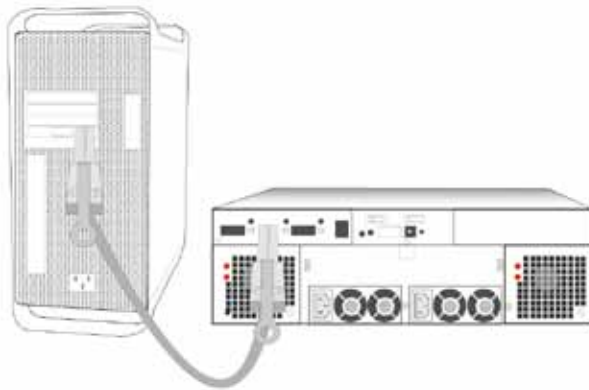


Figure 2-7, Connect ARC-8020 expander box and host port adapter

Step 10. Connecting Expander Box's RS-232 Port (Option)

The ARC-8020 expander box's system functions can be managed via a PC running a VT-100 terminal emulation program, or a VT-100 compatible terminal. The provided internal cable converts the RS-232C signals from the RJ11 into the one 9-pin D-Sub male connector.

Step 11. Add More Expander Boxes (option)

ARC-8020 expander box can run in one of two modes:

- Normal Mode
- Zone Mode

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You must select either mode using the CLI utility and restart the ARC-8020 expander enclosure again. The manufacture is default on the Normal Mode. Changing the mode while the ARC-8020 expander box is on. This will not affect expander operation until the ARC-8020 expander enclosure is rebooted.

In normal mode, a SAS host can communicate with up to 24 drives in the 24 bay enclosure via a single ARC-8020 expander box. ARC-8020 SAS expander box is a device that contain expander ports. Expander ports may support being attached to SAS initiator ports, SAS and/or SATA target ports, and to other expander ports. The SAS RAID controller or host adapter can support daisy-chain how many enclosures which depend on the RAID controller or the host adapter firmware. The following figure shows how to connect the external Min SAS cable from the SAS RAID controller that has external ports to the ARC-8020 expander box enclosures.

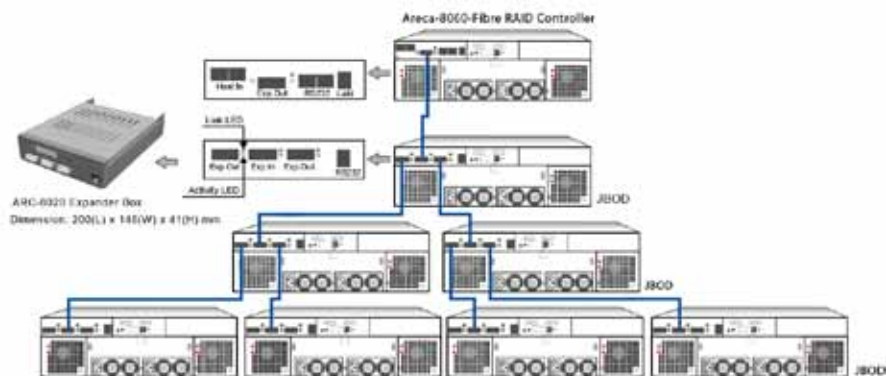
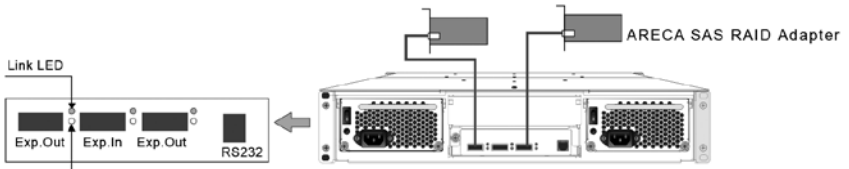


Figure 2-8, SAS expander connect to a drive Box or drive enclosure.

In zone mode, the ARC-8020 expander enclosure is split into two virtual groups, one group drive channels (assign by CLI GR command) controlled by the Left Exp.Out. The remaining not specified drive channels (assign by CL GR command) are controlled by the Right Exp.Out. Zone Mode only works on ARC-8020 expander enclosure with those RAID or Host adapter ports which directly come from the SAS controller chip.



Note:

Turn on the expander enclosure first to make sure the SAS RAID controller or SAS host adapter recognizes the drives in the enclosure.

Step 12. Connect the Power

Turn on the power switch at the rear of the enclosure (if equipped) and then press the power button at the front of the ARC-8020 expander enclosure.

Step 13. Configure ARC-8020 Expander Box

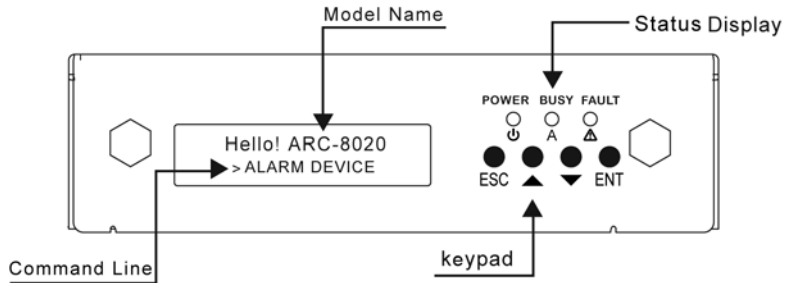
The ARC-8020 expander box is normally delivered with LCD pre-installed. Your ARC-8020 expander box can be managed by using the LCD with keypad or a serial device (terminal emulation).

- **Method 1: LCD Panel with Keypad**

You can use LCD front panel and keypad function to simply manage the ARC-8020 expander box. The LCD status panel also informs you of the expander's current system functions at a glance. The LCD provides a system of screens with areas for information, status indication, or menus. The LCD screen displays up to two lines at a time of menu items or other information. Please refer to Chapter 3 LCD Configuration Manager.

The initial screen is as following:

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- **Method 2: RS-232 Port**

The ARC-8020 expander box's system functions can also be managed via a VT-100 compatible terminal or a PC running a VT-100 terminal emulation program. You can attach a serial (Character-Based) terminal or server com port to the ARC-8020 expander box for accessing the text-based setup menu. Please refer to Chapter 4 CLI Manager.

3. LCD Configuration Manager

The SAS expander box LCD configuration utility is a character-based utility that you can run after powering the unit. Use LCD configuration utility to see and configure:

- Alarm Device,
- Voltage,
- Set Link,
- Set Alarm,
- Set Password,
- Save Config, and
- System Reset

The LCD display front panel function keys are the primary user interface for the SAS expander box. Except for the "Firmware update", all configurations can also be performed through this interface.

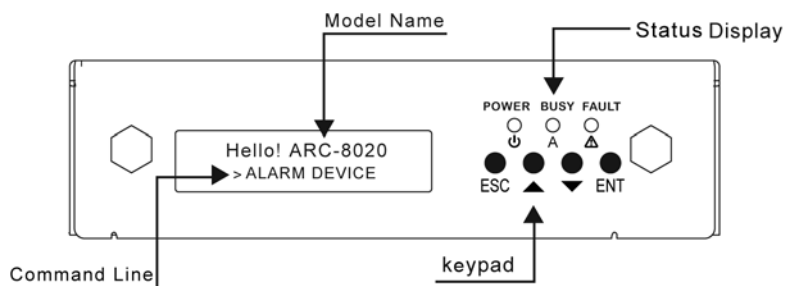
3.1 Using local front panel touch-control keypad

The front panel keypad and liquid crystal display (LCD) is the primary user interface for the SAS expander box. All configuration and management of the expander controller and its properly connected disk arrays can be performed from this interface. The front panel keypad and LCD is connected to the ARC-8020 SAS expander box to access the built-in configuration that resides in the SAS expander controller's firmware.

The LCD provides a system of screens with areas for information, status indication, or menus. The LCD screen displays up to two lines at a time of menu items or other information.

The initial screen is as following:

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Function Key Definitions:

The four function keys at the right of the front panel perform the following functions:

Key	Function
Up Arrow	Use to scroll the cursor Upward / Rightward
Down Arrow	Use to scroll the cursor Downward / Leftward
ENT Key	Submit selected icon function (Confirm a selected item)
ESC Key	Return to previous screen (Exit a selection configuration)

There are a variety of failure conditions that cause the ARC-8020 expander box monitoring LED to light. Below table provides a summary of the front panel LED.

Panel LED	Normal Status	Problem Indication
Power LED	Bright Green	This LED does not light up after power switched on
Busy LED (Host Access)	Blink green during host computer accessing the expander box	LED never flickers
Fault LED	Unlit	Solid red

3.2 Navigation Map of the LCD

The password option allows user to set or clear the SAS expander box's password protection feature. Once the password has been set, the user can only monitor and configure the SAS expander box by providing the correct password. The password is used to protect the SAS expander box from unauthorized entry. The SAS expander box will check the password only when entering the main menu from the initial screen. The SAS expander box will automatically go back to the initial screen when it does not receive any command in 5 minutes. The SAS expander box's password is default setting at 0000 by the manufacture.

The following flow is an expansion of LCM setup option items hierarchical menu.

LCM setup option items hierarchical menu:

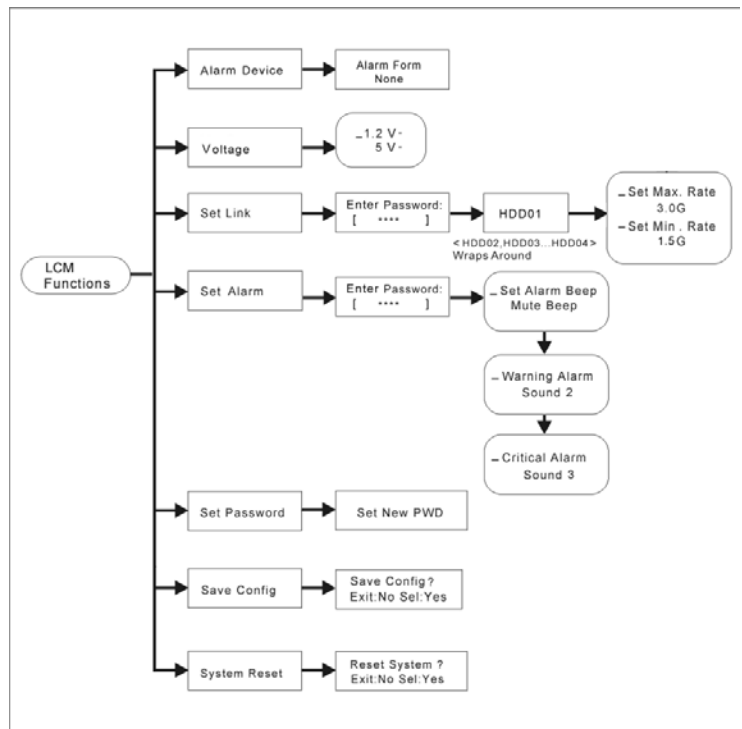


Figure 3.2-1

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● Alarm Device

Show which device that fail to work, its sub-items could be "Power Supply", "Fan", "Temp. Sensor" and "Voltage Sensor".

● Voltage

Show enclosure chip voltage in status data, represent in V.

The sub-items are shown as below:

1.2V- , the expander controller voltage is 1.2V

5V- , the expander controller voltage is 5V

For the setup item, the LCM key represent:

Up key to enter the 0 - 9 data.

Down key to enter "a" - "z" and "A" - "Z" data.

Enter key to confirm the input or ready to update a sub-item data.

Esc/Exit key to go back to the main selection.

● Set Link

Set HDD devices maximum/minimum link speed rate. the value could be 3.0G or 1.5G each of HDD devices link speed will have the sub-items are shown as below:

_Set Max. Rate

3.0G

_Set Min. Rate

1.5G

● Set Alarm

Set enclosure buzzer warning/critical error beep style or mute the current beep. The value could be "Sound 1", "Sound 2", "Sound 3", "Sound 4" and "Sound Disabled". Sound 1 to 4 means different frequency sound. Sound disabled means disable the sound beep. The sub-items are shown below:

_Set Alarm Beep

Mute beep

Warning Alarm

_Sound 2

_Critical Alarm

Sound 3

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- **Set Password**

Change the enclosure LCM/UART CLI password. The sub-item is " Set New PWD".

- **Save Config**

Save all the updated option value into non-volatile memory area.

- **System Reset**

Reboot the system.

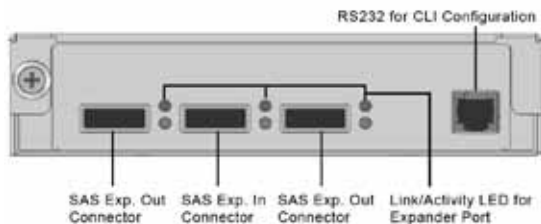
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4. CLI Manager

This Command Line Interface (CLI) is provided for you to manage the Areca ARC-8020 series 12/16/24 SAS expander system functions. The CLI is useful in environments where a graphical user interface (GUI) is not available.

• Locations of RS-232C Port

The ARC-8020 expander box uses the RJ11 port as the serial port interface. Please use the cable included on the shipping box to configure the expander controller.



• Establishing the Connection for the RS-232 Port

The CLI function can be done by using an ANSI/VT-100 compatible terminal emulation program. You must complete the appropriate installation procedure before proceeding with the CLI function. Whichever terminal emulation program is used must support the 1K XMODEM file transfer protocol.

The serial port on the ARC-8020 series controller's bracket can be used in VT100 mode. The provided interface cable converts the RS232 signal of the RJ11 connector on the SAS expander controller into a 9-pin D-Sub male connector. The firmware-based terminal SAS expander management interface can access the expander through this RS-232 port. You can attach a VT-100 compatible terminal or a PC running a VT-100 terminal emulation program to the serial port for accessing the text-based setup menu.

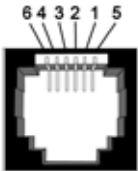
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4.1 Expander RS-232C Port Pin Assignment

To ensure proper communications between the SAS expander box and the VT-100 Terminal Emulation, Please configure the VT100 terminal emulation settings to the values shown below:

Terminal requirement	
Connection	Null-modem cable
Baud Rate	115,200
Data bits	8
Stop	1
Flow Control	None

The controller RJ11 connector pin assignments are defined as below.

Pin Assignment				
Pin	Definition	Pin	Definition	
1	RTS (RS232)	4	GND	
2	RXD (RS232)	5	GND	
3	TXD (RS232)	6	GND	

4.2 Start-up VT100 Screen

By connecting a VT100 compatible terminal, or a PC operating in an equivalent terminal emulation mode, all CLI administration functions can be exercised from the VT100 terminal.

There are a wide variety of Terminal Emulation packages, but for the most part they should be very similar. The following setup procedure is an example Setup VT100 Terminal in Windows XP system using Hyper Terminal use Version 3.0 or higher.

Step 1. Open the "Taskbar Start"/"Programs"/"Accessories"/"Communications"/"Hyper Terminal". (Hyper Terminal requires version 3.0 or higher).



Step 2. Open "HYPERTRM.EXE".



Step 3. Enter a name you prefer and then click “OK”.



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Step 4. Select an appropriate connecting port and then click "OK".



Step 5. Configure the port parameter settings and then click "OK".

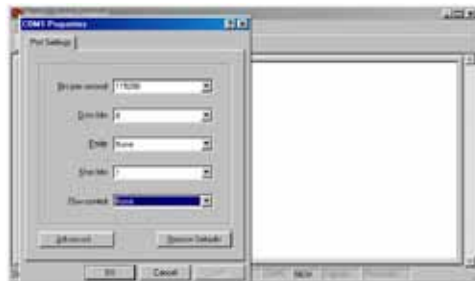
Bits per second: 115200

Data bits: 8

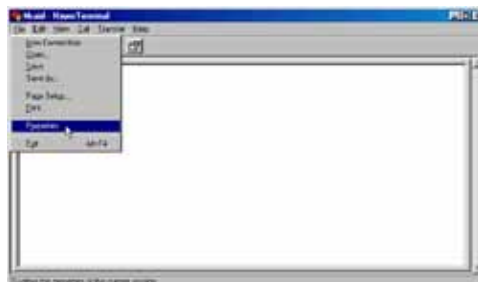
Parity: None

Stop bits: 1

Flow control: None



Step 6. Open the file menu and select "Properties".

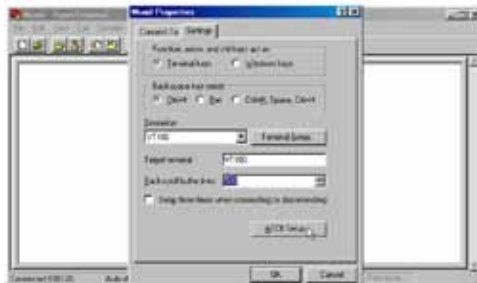


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Step 7. Configure the "Connect To" setting.



Step 8. Configure the "Settings" items and then click "OK".
Function, arrow and ctrl keys act as: Terminal Keys
Backspace key sends: Ctrl+H
Emulation: VT100
Telnet terminal: VT100
Back scroll buffer lines: 500



4.3 Command

This section provides detail information about the ARC-8020 SAS expander box's CLI function.

● Help Command

This command provides an on-line table of contents, providing brief descriptions of the help sub-commands. You can use the <CLI> -he or -help to get detail information about the command.

Syntax

CLI>HE or HELP [Enter]

Example:

CLI>help

CLI Commands:

- ER - Erase Block Region
- FL - Update Flash Region
- ST - Store System Configurations in Flash
- PA - Set Password
- PL - Print System Log.
- SY - Print System Information
- SP - Operate the HDD SpinUp Attribute
- LI - Operate the Device Link Rate
- GR - Set the PHY Group
- DR - Set the PHY Driven Strength
- LO - Logout CLI Shell
- HE - Show All CLI Commands and its Usage

All numeric arguments must in HEX format, eg: 0x1028A, 0x8

● ER Command

Flash memory is a popular form of non-volatile memory. An entire block of flash can be erased with a single command. Erase the Code area before you update the firmware. There are two regions that you can erase expander microcode on ARC-8020 SAS expander.

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- (1).FW file (CODE) : romXXXXX.bin
- (2).Data file (DAT1) : mfgdataYYYYY.rom

Syntax

CLI> ER {CODE | DAT1 } [Enter]

Example:

CLI>ER CODE

Erase Flash Region ...OK

● FI Command

The controller has added the expander firmware update through the CLI on the external RS-232 port. Before you process the firmware update, use the ER command to erase program block region. There are two block regions that you can update expander microcode on ARC-8020 SAS expander.

- (1).FW file (CODE) : romXXXXX.bin
- (2).Data file (DAT1) : mfgdataYYYYY.rom

To update the expander controller firmware, follow the procedure below:

Syntax

CLI>FL { CODE | DAT1 } [Enter]

Then use XModem/1K protocol transmit file to update ROM Region

The following procedures is used to update firmware through the RS-232:

- A. Open any UART communication tools like HypeTerminal(115200,n,8,1).
- B. Press any key on HyperTerminal window, the window will show "CLI>" prompt.
- C. Type help will show help screen.
- D. 2 commands for update firmware, erase & flash. Step as follow,
- E. First issue "erase code" under "CLI>" prompt.
CLI>ER CODE

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- F. After success, issue "flash code" under "CLI>".
CLI>FL CODE
Wait to Receive File ...C <-----expander prompt for ready
receive file to program.
- G. Then under HyperTerminal program, use the pull down menu
item transfer "Send" -> send files when dialog box prompt,
choose "Xmodem 1K" and the file in the directory then press
"send".
- (1). If under the expander receive to file under the timeout
limit (30s), the program starts.
- (2). If time out, please retry the step F again.
- H. You can also cancel the program step by type 3 time ctrl-X.
- I. Then store Firmware in flash.
CLI> ST 0xFF [Enter]
- J. If program OK, cold-start expander again.(or Power Off-On)

Example:

Update procedure, use Xmodem/1K to transfer, refer to ER and FL
command for detail operation.

```
CLI> ER { CODE | DAT1 }  
CLI> FL { CODE | DAT1 }
```

Use HyperTerminal or TeraTerm utility with Xmodem/1K mode to
transfer romXXXXX.bin.

```
CLI> ST 0xFF [Enter]
```

The following firmware and data are available in the form of DOS
file.

CODE means the FW file : romXXXXX.bin

DAT1 means the data file : mfgdataYYYYY.rom

Update ARC-8020 expander firmware:

```
CLI> ER CODE
```

```
CLI> FL CODE
```

Use HyperTerminal or TeraTerm utility with Xmodem/1K mode to
transfer romXXXXX.bin.

```
CLI> ST 0xFF [Enter]
```

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Update ARC-8020 expander data file:

```
CLI>ER DAT1
```

```
CLI>FL DAT1
```

Use HyperTerminal or TeraTerm utility with Xmodem/1K mode to transfer mfgdataYYYYYY.rom.

```
CLI> ST 0xFF [Enter]
```

● ST Command

ST command stores system configurations in flash. The 0xFF means store all element data in flash. Since all the revised parameter setting is temporarily stored in the working RAM, the ST command saves those parameters permanently in flash ROM.

Syntax

```
CLI> ST 0xFF [Enter]
```

Example:

```
CLI>ST 0xFF
```

```
CLI>
```

● PA Command

The PA command allows user to set or clear the expander controller password protection feature. Once the password has been set, the user can only monitor and access the expander controller setting by providing the correct password. The password can accept max. 8 chars and min. 4 chars. The manufacture default password is "0000".

Syntax

```
CLI>PA [Enter]
```

Example:

```
CLI>PA
```

```
Old Password:****
```

```
New Password:****
```

```
Verify New Password:****
```

```
Password Changed But Not Save Permanently!
```

```
Note, use CLI command "ST 0xFF" to keep permanently.
```


● PL Command

The PL command allows you to display system event notifications that have been generated event by the SAS expander controller.

Syntax

CLI>PL [Enter]

Example:

CLI>PL

```
0: 0: 0>POST: System Boot Up!
0: 0: 0>POST: Enter the Main Loop ...
0: 2:50>UART: Password Is Changed!
0: 0: 0>POST: System Boot Up!
0: 0: 0>POST: Enter the Main Loop ...
0: 3:10>OK : Save Config !
0: 0: 0>POST: System Boot Up!
0: 0: 0>POST: Enter the Main Loop ...
0: 0:10>UART: Password Is Changed!
```

● SY Command

SY command is used to view the SAS expander's information. Typical information includes: vendor, model name, serial/unit number, expander port number/chip revision/firmware version, CFG data file and work time.

Syntax

CLI>SY [Enter]

Example:

CLI>SY

```
Vender    : Areca Technology Co Ltd. Taiwan, R.O.C
Model     : ARC-8020
Serial No. : 00000000000000000
Unit Serial:
SAS address: 0x5001B4DFFFFFFF03F
Customer  : 0x91
Port Num.  : 28
Chip Rev.  : A01
Firmware   : 05.10.A123 03/18/08
```

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CFG Data : 0x05
Work Time : 0: 2:45

● SP Command

SP command defines the mode of staggering drive spin-up function connected on the expander controller. The "H" and "S" parameter gives the host and expander controller the ability to spin up the disk drives sequentially or in groups, allowing the drives to come ready at the optimum time without straining the system power supply. Staggering drive spin-up in a multiple drive environment also avoids the extra cost of a power supply designed to meet short-term startup power demand as well as:

Syntax

CLI> SP [I|H|S [Delay Num] [Drive Num]] [Enter]

I - Power up to spin up all drives simultaneously mode.

H - Host/RAID controller notify mode.

S - Expander issues the spin up the drives by [Delay Num] [Delay Num] parameter.

Example1:

CLI>SP S 0X40 0X2

CLI>SP

SpinUp Attribute: (1tc= 16ms)

Mode = SelfTimed, Delay = 0x0040tc(4x16x16ms=1s), Drive Num = 0x02(2Disks per step)

Example2:

CLI>SP I

OK:Pls. Save Config. & Reboot To Take Effect

CLI>SP

SpinUp Attribute: (1tc= 16ms)

Mode = Immediate

Example3:

CLI>SP H

SpinUp Attribute: (1tc= 16ms)

Mode = Host-Notify

• LI Command

The LI command allows you to set the operate device link rate that has been connected on expander controllers. Typical parameters include: Max and Min disk speed connected the SAS expander controller.

Syntax

CLI>LINK [Index Max Min] [Enter]

Index: slot Index

Max, Min: speed code, 0x8 means 1.5G, 0x9 means 3.0G

PS. Pls. Save Config. & Reboot To Take Effect

CLI>ST 0xFF

Example:

CLI>LI

Device Link Attribute: 8=1.5G, 9=3.0G

====PHY====SPEED=MAX=MIN=====

0x00	0x08	NA	9	8	NA	SLOT 01
0x01	0x09	NA	9	8	NA	SLOT 02
0x02	0x0A	3.0G	9	8	SATA	SLOT 03
0x03	0x0B	NA	9	8	NA	SLOT 04
0x04	0x0C	NA	9	8	NA	SLOT 05
0x05	0x0D	NA	9	8	NA	SLOT 06
0x06	0x0E	NA	9	8	NA	SLOT 07
0x07	0x0F	NA	9	8	NA	SLOT 08
0x08	0x10	NA	9	8	NA	SLOT 09
0x09	0x11	NA	9	8	NA	SLOT 10
0x0A	0x12	NA	9	8	NA	SLOT 11
0x0B	0x13	NA	9	8	NA	SLOT 12

//Set the slot 0x2 max. speed to 1.5G

CLI>LI 0x2 0x8 0x8

OK:Pls. Save Config. & Reboot To Take Effect

CLI>LI

Device Link Attribute: 8=1.5G, 9=3.0G

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```
=====PHY=====SPEED=MAX=MIN=====
0x00 0x08 NA 9 8 NA SLOT 01
0x01 0x09 NA 9 8 NA SLOT 02
0x02 0x0A 1.5G 8 8 SATA SLOT 03 <----- max 1.5G
0x03 0x0B NA 9 8 NA SLOT 04
0x04 0x0C NA 9 8 NA SLOT 05
0x05 0x0D NA 9 8 NA SLOT 06
0x06 0x0E NA 9 8 NA SLOT 07
0x07 0x0F NA 9 8 NA SLOT 08
0x08 0x10 NA 9 8 NA SLOT 09
0x09 0x11 NA 9 8 NA SLOT 10
0x0A 0x12 NA 9 8 NA SLOT 11
0x0B 0x13 NA 9 8 NA SLOT 12
```

CLI>ST 0xFF
Reboot to take effect.

● GR Command

GR command is used to associate the external port with the devices/phys as one zone group. The other not specified external ports and devices/phys will associate an another zone group.

Syntax

CLI> GR [-D {-L|-R} Start_Index End_index -C] [Enter]

-D : Index base,

-D : use SLOT number as device group index

{-L|-R} : select the Left or Right external port

-L : choose Left port

-R : choose Right port

Start_Index, End_index : specify the zone group range

Start_Index: first device index of the group

End_index : last device index of the group

-C : remove group setting

Example1:

CLI>GR -D -L 0x1 0x6

We associate the left external port with hdd device range slot number 1 to number 6 as a zone group and the right/middle external ports and slot index 7 to 12 will be another zone group.

Example2:

```
CLI>GR -D -L 0x3 0xB
```

We associate the right external port with hdd device range slot number 3 to number 11 (0xB) as a zone group and the left/middle external ports and the other slot indexes will be another zone group.

Example3:

```
CLI>GR -C
```

Remove group setting

● DR Command

The DR command allows you to adjust the PHY driver strength that can meet different SAS cable length.

Syntax

```
CLI> DR [-[C|S] 0x{1..8}] [Enter]
```

C: For external cable setting.

S: For internal cable setting.

{1..8} : For cable length 1 to 8m.

Example:

```
CLI>DR
```

SAS Cable Signal Level:

External Port Level : 1m

Internal Port Level : 7m

```
CLI>DR -C 0x5
```

OK:Pls. Save Config. & Reboot To Take Effect

```
CLI>DR
```

SAS Cable Signal Level:

External Port Level : 5m

Internal Port Level : 7m

```
CLI>DR -S 0x3
```

OK:Pls. Save Config. & Reboot To Take Effect

```
CLI>DR
```

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SAS Cable Signal Level:
External Port Level : 5m
Internal Port Level : 3m
CLI>

● **LO Command**

To close the currently selected expander controller and exit the CLI, use the exit LO command.

Syntax

CLI> LO [Enter]

Example:

CLI>LO

Password:

Revision	Page	Description
1.2	p.30~32	Revise FL command