

Areca RAID Controllers

SNMP Sub Agent

USER'S Guide

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1. SNMP Operation & Installation

1.1 Overview

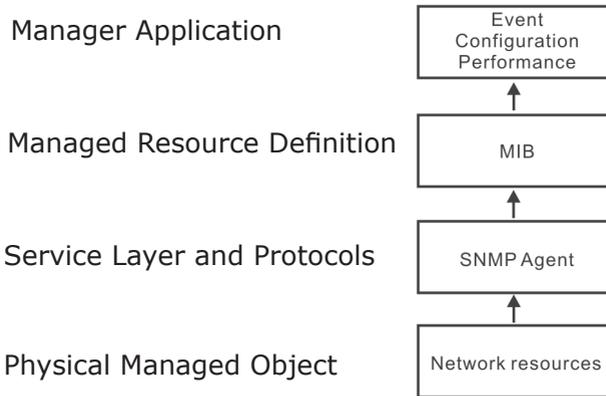
The McRAID storage manager includes a firmware-embedded Simple Network Management Protocol (SNMP) agent and SNMP Extension Agent for the Areca RAID controller. An SNMP-based management application (also known as an SNMP manager) can monitor the disk array. An example of a SNMP management application is Hewlett-Packard's Open View, Net-SNMP or SNMPc. The SNMP extension agent can be used to augment the Areca RAID controller if you are already running an SNMP management application at your site.

1.2 SNMP Definition

SNMP, an IP-based protocol, has a set of commands for getting the status of target devices. The SNMP management platform is called the SNMP manager, and the managed devices have the SNMP agent loaded. Management data is organized in a hierarchical data structure called the Management Information Base (MIB). These MIBs are defined and sanctioned by various industry associations. Each type of device on your network has its own specific MIB file. The MIB file defines the device as a set of managed objects — values that can be read or changed by the SNMP manager. The MIB file enables the SNMP manager to interpret trap messages from devices. To make sense out of a trap that's sent by a device, the SNMP manager needs to have access to the MIB that describes the format and content of the possible traps that the device can send. The objective is for all vendors to create products in compliance with these MIBs so that inter-vendor interoperability can be achieved. To be available for the SNMP manager, a command adds the MIB file for each of devices to the MIB database. This enables the devices to be managed via the SNMP manager.

The following figure illustrates the various components of an SNMP-based management architecture.

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1.3 SNMP Installation

Perform the following steps to install the Areca RAID controller SNMP function into the SNMP manager. The installation of the SNMP manager is accomplished in several phases:

Step 1. Installing the SNMP manager software on the client

Installing the SNMP manager software on the client. This installation process is well-covered in the User's Guide of your SNMP manager application.

Step 2. Compiling the MIB description file with the management

Placing a copy of the RAID controller's MIBs file in a directory which is accessible to the management application and compile the MIB description file with the SNMP management application database. Before the manager application accesses the Areca RAID controller, it is necessary to integrate the MIB into the management application's database of events and status indicator codes. This process is known as "compiling" the MIB into the application. This process is highly vendor-specific and should be well-covered in the User's Guide of your SNMP manager application. Ensure the compilation process successfully integrates the contents of the `areca_sas.mib` file into the traps database.

The MIBs file resides at: `<CD-ROM>\packages\SNMP_MIBs` on the software CD or download from <http://www.areca.com.tw>.

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Each RAID controller needs to have its own MIBs file. Areca provide 4 adapters MIBs file for users. User can request it if more controllers install on one system.

Note:

1. The MIB compiler may be not installed by default with SNMP manager.
2. Some SNMP managers have unique rule on the format of MIB files, you may need to refer the error message to modify the mib file to be able to meet the software requirement.

Step 3. SNMP Service Method

With Areca series RAID cards, there are 3 service methods to get snmp:
ArchHttp, Onboard NIC and in-band PCIe + SNMP extension agent.

(1). Service Method-1: using ArchHttp Proxy Server

Pay attention to these:

- Do Not check mark the option: "SNMP Through PCI".
- Make sure you have the latest driver and ArchHttp, from this URL <http://www.areca.com.tw/support/>
- ArchHttp supports sending "traps" only, do not support the "get" command.

(2). Service Method-2: using Onboard NIC.

Pay attention to these:

- Do Not check mark the option: "SNMP Through PCI".
- Do need to fill out the "SNMP Trap Config".

(3). Service Method-3: using In-band PCI + SNMP extension agent.

Pay attention to these:

- Download the snmp extension agent from Areca URL.
- The Agent is to be installed on the system which has the Areca card.
- Check Mark the option: "SNMP Through PCI".
- To use In-Band PCIe host bus interface, keep space (or zero) on all "SNMP Tarp IP Address" options.

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1.3.1 Using ArchHttp

The HTTP management software (Archhttp) runs as a service or daemon, and have it automatically start the proxy for all controllers found. This way the controller can be managed remotely without having to sign in the server. The HTTP management software (Archhttp) also has integrated the ability of sending SNMP trap. Please reference the manual ArchHttp Proxy Dervice Installation section to install it. The ArchHttp proxy server will automatically assign one additional port for setup its configuration. If you want to change the "archhttpsrv.conf" setting up of ArchHttp proxy server configuration, for example: General Configuration, Mail Configuration, and SNMP Configuration, please start Web Browser `http://localhost: Cfg Assistant`. Such as `http://localhost: 82`. The port number for ArchHttp proxy server configuration is McRAID storage manager port number plus 1.

● **SNMP Traps Configuration:**

To enable the controller to send the SNMP traps to client SNMP manager using the IP address assigned to the operating system, such as Net-SNMP manager, you can simply use the SNMP function on the ArchHttp proxy server software. To enable the RAID controller SNMP traps sending function, click on the "SNMP Configuration" link. The Archhttp proxy only provide one direction to send the trap to the SNMP manager without needing to install the SNMP extension agent on the host. If SNMP manager requests to query the SNMP information from RAID controller, please refer the 1.3.2 section Service Method-2: using Onboard NIC and 1.3.3 section Service Method-3: using In-band PCI + SNMP extension agent.

The "SNMP Traps Configurations" menu will show as following:

ARCHTTP Configurations

General Configuration
Mail Configuration
SNMP Trap Configuration

SNMP Trap Configurations

SNMP Trap IP Address #1	192	168	0	173	port 162
SNMP Trap IP Address #2	0	0	0	0	port 162
SNMP Trap IP Address #3	0	0	0	0	port 162

SNMP System Configurations

Community: public

SNMP Trap Notification Configurations

<input type="checkbox"/> Disable Event Notification	No Event Notification Will Be Seen
<input checked="" type="checkbox"/> Urgent Error Notification	Send Only Urgent Event
<input type="checkbox"/> Serious Error Notification	Send Urgent And Serious Event
<input type="checkbox"/> Warning Error Notification	Send Urgent, Serious And Warning Event
<input type="checkbox"/> Information Notification	Send All Event

Confirm The Operation

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(1). SNMP Trap Configurations

Enter the SNMP trap IP address.

(2). SNMP System Configurations

Community name acts as a password to screen accesses to the SNMP agent of a particular network device. Type the community names of the SNMP agent in this field. Before access is granted to a request station, this station must incorporate a valid community name into its request; otherwise, the SNMP agent will deny access to the system. Most network devices use "public" as default of their community names. This value is case-sensitive.

(3). SNMP Trap Notification Configurations

Before the client side SNMP manager application accepts the Areca RAID controller traps, it is necessary to integrate the MIB into the management application's database of events and status indicator codes. This process is known as compiling the MIB into the application. This process is highly vendor-specific and should be well-covered in the User's Guide of your SNMP application. Ensure the compilation process successfully integrates the contents of the `areca_sas.mib` file into the traps database. The MIBs file resides at: `<CD-ROM>\packages\SNMP_MIBs` on the software CD.

Note:

Event Notification Table refer to Chapter 2.

After you confirm and submit configurations, you can use "Generate Test Event" feature to make sure these settings are correct.

1.3.2 Using Onboard NIC Installation

By using the built-in LAN port on the RAID controller- RAID controller using built-in LAN interface. You can use the browser-based manager or CLI SNMP configuration to setup the firmware-based SNMP configuration. The following screen is the firmware-embedded SNMP configuration setup screen using browser-based manager:

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To launch the above browser-based RAID controller SNMP function, click on the "System Controls" link. The "System Controls" menu will show available items. Select the "SNMP Configuration" item. The firmware-embedded SNMP agent manager monitors all system events and the SNMP function becomes functional with no agent software required.

The screenshot displays the Areca Technology Corporation web interface. On the left is a navigation tree with 'System Controls' expanded to show 'SNMP Configuration'. The main content area is divided into three sections:

- SNMP Trap Configurations:** A table with three rows for 'SNMP Trap IP Address #1', '#2', and '#3'. Each row has four input fields for IP octets and a 'Port#' field set to '162'.
- SNMP System Configurations:** A form with fields for 'Community', 'sysContact.0', 'sysName.0', and 'sysLocation.0'.
- SNMP Trap Notification Configurations:** A table with five rows for different notification types, each with a radio button and a description of the event to be sent.

At the bottom, there is a 'Confirm The Operation' section with 'Submit' and 'Reset' buttons.

SNMP Trap Configurations				
SNMP Trap IP Address #1	0	0	0	Port# 162
SNMP Trap IP Address #2	0	0	0	Port# 162
SNMP Trap IP Address #3	0	0	0	Port# 162

SNMP System Configurations	
Community	
sysContact.0	
sysName.0	
sysLocation.0	

SNMP Trap Notification Configurations	
<input checked="" type="radio"/> Disable SNMP Trap	No SNMP Trap Will Be Sent
<input type="radio"/> Urgent Error Notification	Send Only Urgent Event
<input type="radio"/> Serious Error Notification	Send Urgent And Serious Event
<input type="radio"/> Warning Error Notification	Send Urgent, Serious And Warning Event
<input type="radio"/> Information Notification	Send All Event

Confirm The Operation

Submit | Reset

(1). SNMP Trap Configurations

Enter the SNMP Trap IP Address.

(2). SNMP System Configurations

Community name acts as a password to screen accesses to the SNMP agent of a particular network device. Type in the community names of the SNMP agent. Before access is granted to a request station, this station must incorporate a valid community name into its request; otherwise, the SNMP agent will deny access to the system. Most network devices use "public" as default of their community names. This value is case-sensitive. The system Contact, Name and Location that will be shown in the outgoing SNMP trap.

(3). SNMP Trap Notification Configurations

Please refer to Chapter 2 of Event Notification Configurations.

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1.3.3 Using In-band PCI + SNMP extension agent Installation

By using the IP address assigned to the operating- RAID controller using Areca SNMP extension agent through PCIe host bus interface.

a). Set only "Community" field and select the "SNMP Port" option on the firmware-embedded SNMP configuration function. There is no function to set other fields on "SNMP System Configuration".

The SNMP community and SNMP port can setup by using browser-based manager or CLI SNMP configuration. To launch the above browser-based RAID controller SNMP function, click on the "System Controls" link. The "System Controls" menu will show available items. Select the "SNMP Configuration" item. The following "SNMP System Configuration" screen is launched by browser-based manager.

About community, Community name acts as a password to screen accesses to the SNMP agent of a particular network device. Type in the community names of the SNMP agent. Before access is granted to a request station, this station must incorporate a valid community name into its request; otherwise, the SNMP agent will deny access to the system.

Most network devices use "public" as default of their community names. This value is case-sensitive.

Areca Technology Corporation			
[open all] [close all]			
*SNMP Trap Configurations			
SNMP Trap IP Address #1	ip	ip	ip
SNMP Trap IP Address #2	ip	ip	ip
SNMP Trap IP Address #3	ip	ip	ip
	Port#		ip
*SNMP System Configurations			
Community			
sysContact.O			
sysName.O			
sysLocation.O			
*SNMP Trap Notification Configurations			
<input checked="" type="radio"/> Disable SNMP Trap	No SNMP Trap will be Sent		
<input type="radio"/> Urgent Error Notification	Send Only Urgent Event		
<input type="radio"/> Serious Error Notification	Send Urgent And Serious Event		
<input type="radio"/> Warning Error Notification	Send Urgent, Serious And Warning Event		
<input type="radio"/> Information Notification	Send All Event		
<input type="checkbox"/> SNMP Through PCI Inband	Ethernet SNMP is Disabled		
<input type="checkbox"/> Confirm The Operation			
[Cancel] [Reset]			

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b). Mark the check box on the "SNMP Through PCI Inband" setting and keep space (or zero) on all "SNMP Tarp IP Address" options.

c). Installing the SNMP extension agent on the server
Please refer to next section of SNMP Extension Agent Installation for different operation system such as Windows, Linux and FreeBSD.

1.3.4 SNMP Extension Agent Installation

The SNMP extension agent on the device is able to return meaningful, highly useful information to the SNMP manager. The Areca RAID controllers have supported the extension agent for Windows, Linux and FreeBSD. This section is the detail procedures for those extension agent installation.

1.3.4.1 Windows

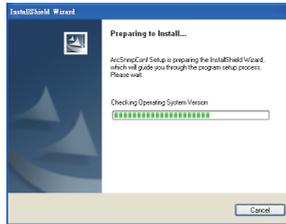
You must have administrative level permission to install 6Gb/s SAS RAID controller extension agent software. This procedure assumes that the RAID hardware and Windows are both installed and operational in your system.

To enable the SNMP agent for Windows, configure Windows for TCP/IP and SNMP services. The Areca SNMP extension agent file is ARCSNMP.DLL.

Screen captures in this section are taken from a Windows XP installation. If you are running another version of Windows, your screens may look different, but the Areca SNMP extension agent installation is essentially the same.

1. Insert the Areca RAID controller software CD in the CD-ROM drive.
2. Run the setup.exe file that resides at: <CD-ROM>\packages\windows\SNMP\setup.exe on the CD. (If SNMP service was not installed, please install SNMP service first.)

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3. Click on the "setup.exe" file then the welcome screen appears.

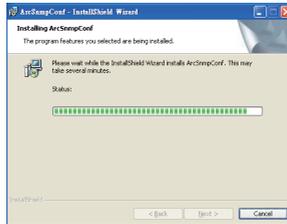


4. Click the "Next" button and then the "Ready Install the Program" screen will appear. Follow the on-screen prompts to complete Areca SNMP extension agent installation.

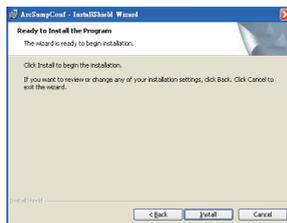


5. A Progress bar appears that measures the progress of the Areca SNMP extension agent setup. When this screen completes, you have completed the Areca SNMP extension agent setup.

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6. After a successful installation, the "Setup Complete" dialog box of the installation program is displayed. Click the "Finish" button to complete the installation.

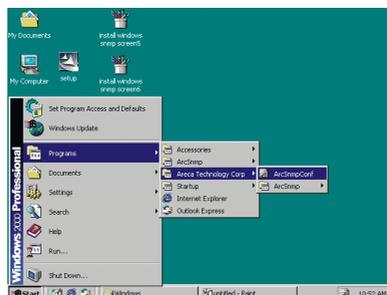


Starting SNMP Trap Notification Configurations

To start "SNMP Trap Notification Configurations", There have two methods. First, double-click on the "Areca RAID Controller".



Second, you may also use the "Taskbar Start/programs/Areca Technology Corp/ArcSnpmConf" menu shown below.



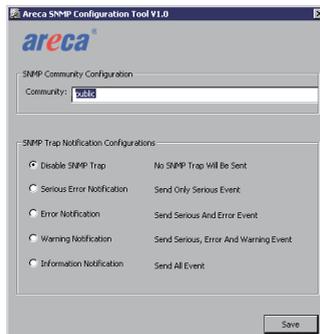
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SNMP Community Configurations

About community, Community name acts as a password to screen accesses to the SNMP agent of a particular network device. Type in the community names of the SNMP agent. Before access is granted to a request station, this station must incorporate a valid community name into its request; otherwise, the SNMP agent will deny access to the system. Most network devices use "public" as default of their community names. This value is case-sensitive.

SNMP Trap Notification Configurations

The "Community Name" should be the same as firmware-embedded SNMP Community. The "SNMP Trap Notification Configurations" includes level 1: Serious, level 2: Error, level 3: Warning and level 4: Information. The level 4 covers notification events such as initialization of the controller and initiation of the rebuilding process; Level 3 includes events which require the issuance of warning messages; Level 2 covers notification events which once have happen; Level 1 is the highest level, and covers events the need immediate attention (and action) from the administrator.



1.3.4.2 Linux

You must have administrative level permission to install Areca RAID software. This procedure assumes that the Areca RAID hardware and Linux are installed and operational in your system. The old version agent has to modify the open source project, integrate the changes from Areca manually, then take the modified binaries and manually deploy them. Users need to change source code from the linux distribution and then maintain it by themselves.

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The new version agent provides the way to integrate with those codes into snmpd/snmptrapd and create a sub agent for user easy to install it. The new version SNMP extension agent installation for Linux procedure, please refer to <CD-ROM>\packages\Linux\SNMP\readme.txt or download from ftp://ftp.areca.com.tw/RaidCards/AP_Drivers/Linux/SNMP/V4.1/ .

1.3.4.3 FreeBSD

You must have administrative level permission to install Areca RAID software. This procedure assumes that the Areca RAID hardware and FreeBSD are installed and operational in your system. The old version agent has to modify the open source project, integrate the changes from Areca manually, then take the modified binaries and manually deploy them. Users need to change source code from the linux distribution and then maintain it by themselves.

The new version agent provides the way to integrate with those codes into snmpd/snmptrapd and create a sub agent for user easy to install it. The new version SNMP extension agent installation for FreeBSD procedure, please refer to <CD-ROM>\packages\FreeBSD\SNMP\readme.txt or download from ftp://ftp.areca.com.tw/RaidCards/AP_Drivers/FreeBSD/SNMP/V4.1/ .

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2. Event Notification Configurations

The controller classifies disk array events into four levels depending on their severity. These include level 1: Urgent, level 2: Serious, level 3: Warning and level 4: Information. The level 4 covers notification events such as initialization of the controller and initiation of the rebuilding process; Level 2 covers notification events which once have happen; Level 3 includes events which require the issuance of warning messages; Level 1 is the highest level, and covers events that need immediate attention (and action) from the administrator. The following lists sample events for each level:

A. Device Event

Event	Level	Meaning	Action
Device Inserted	Warning	HDD inserted	
Device Removed	Warning	HDD removed	
Reading Error	Warning	HDD reading error	Keep Watching HDD status, may be it caused by noise or HDD unstable.
Writing Error	Warning	HDD writing error	Keep Watching HDD status, may be it caused by noise or HDD unstable.
ATA Ecc Error	Warning	HDD ECC error	Keep Watching HDD status, may be it caused by noise or HDD unstable.
Change ATA Mode	Warning	HDD change ATA mode	Check HDD connection
Time Out Error	Warning	HDD time out	Keep Watching HDD status, may be it caused by noise or HDD unstable.
Device Failed	Urgent	HDD failure	Replace HDD
PCI Parity Error	Serious	PCI parity error	If only happen once, it may be caused by noise. If always happen, please check power supply or contact to us.
Device Failed(SMART)	Urgent	HDD SMART failure	Replace HDD
PassThrough Disk Created	Inform	Pass Through Disk created	

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PassThrough Disk Modified	Inform	Pass Through Disk modified	
PassThrough Disk Deleted	Inform	Pass Through Disk deleted	

B. Volume Event

Event	Level	Meaning	Action
Start Initialize	Warning	Volume initialization has started	
Start Rebuilding	Warning	Volume rebuilding has started	
Start Migrating	Warning	Volume migration has started	
Start Checking	Warning	Volume parity checking has started	
Complete Init	Warning	Volume initialization completed	
Complete Rebuild	Warning	Volume rebuilding completed	
Complete Migrate	Warning	Volume migration completed	
Complete Check	Warning	Volume parity checking completed	
Create Volume	Warning	New volume created	
Delete Volume	Warning	Volume deleted	
Modify Volume	Warning	Volume modified	
Volume Degraded	Urgent	Volume degraded	Replace HDD
Volume Failed	Urgent	Volume failure	
Failed Volume Revived	Urgent	Failed volume revived	
Abort Initialization	Warning	Initialization been abort	
Abort Rebuilding	Warning	Rebuilding aborted	
Abort Migration	Warning	Migration aborted	
Abort Checking	Warning	Parity check aborted	
Stop Initialization	Warning	Initialization stopped	
Stop Rebuilding	Warning	Rebuilding stopped	
Stop Migration	Warning	Migration stopped	
Stop Checking	Warning	Parity check stopped	

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C. RAID Set Event

Event	Level	Meaning	Action
Create RaidSet	Warning	New RAID set created	
Delete RaidSet	Warning	Raidset deleted	
Expand RaidSet	Warning	Raidset expanded	
Rebuild RaidSet	Warning	Raidset rebuilding	
RaidSet Degraded	Urgent	Raidset degraded	Replace HDD

D. Hardware Monitor Event

Event	Level	Meaning	Action
DRAM 1-Bit ECC	Urgent	DRAM 1-Bit ECC error	Check DRAM
DRAM Fatal Error	Urgent	DRAM fatal error encountered	Check the DRAM module and replace with new one if required.
Controller Over Temperature	Urgent	Abnormally high temperature detected on controller (over 60 degree)	Check air flow and cooling fan of the enclosure, and contact us.
Hdd Over Temperature	Urgent	Abnormally high temperature detected on Hdd (over 55 degree)	Check air flow and cooling fan of the enclosure.
Fan Failed	Urgent	Cooling Fan # failure or speed below 1700RPM	Check cooling fan of the enclosure and replace with a new one if required.
Controller Temp. Recovered	Serious	Controller temperature back to normal level	
Hdd Temp. Recovered			
Raid Powered On	Warning	RAID power on	
Test Event	Urgent	Test event	
Power On With Battery Backup	Warning	RAID power on with battery backup	
Incomplete RAID Discovered	Serious	Some RAID set member disks missing before power on	Check disk information to find out which channel missing.
HTTP Log In	Serious	a HTTP login detected	

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Telnet Log	Serious	a Telnet login detected	
InVT100 Log In	Serious	a VT100 login detected	
API Log In	Serious	a API login detected	
Lost Rebuilding/ MigrationLBA	Urgent	Some rebuilding/ migration raidset member disks missing before power on.	Reinserted the missing member disk back, controller will continued the incompleted rebuilding/migration.