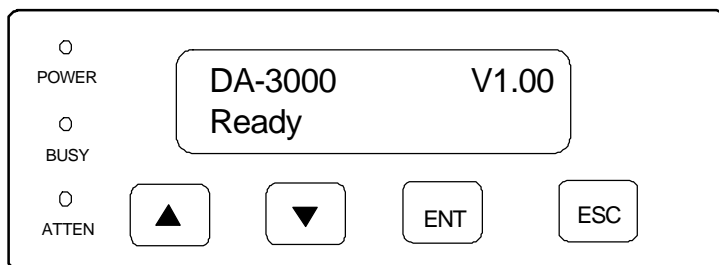


Chapter 4 Hardware Installation

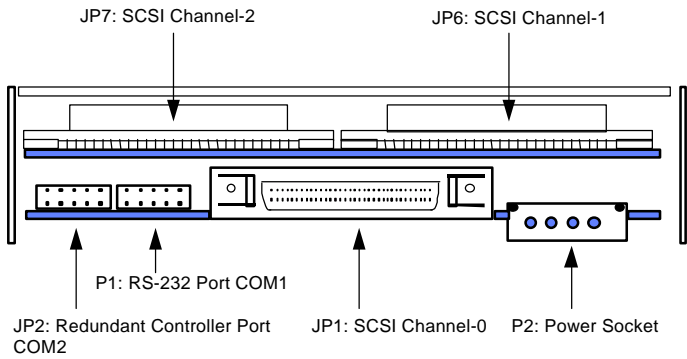
4.1 Locations of the Parts



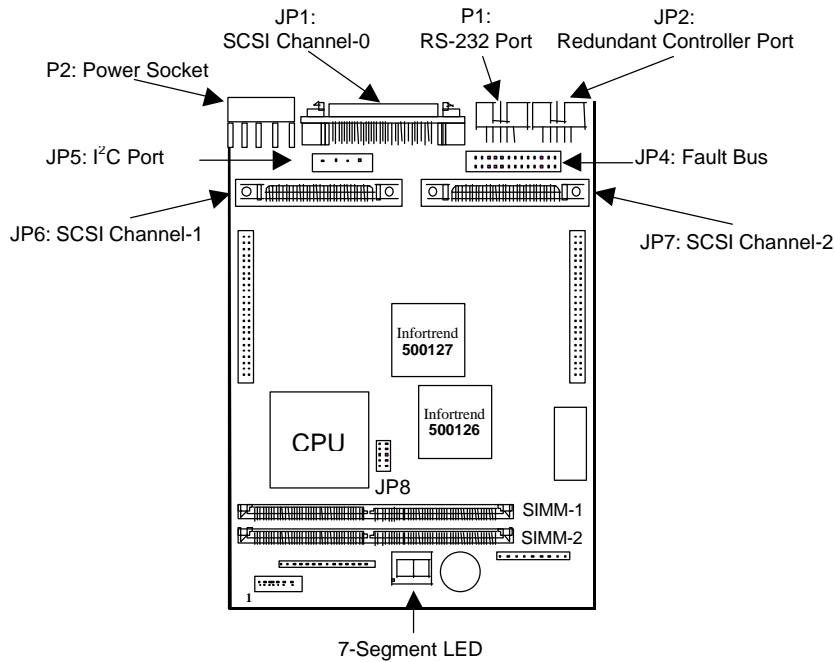
4.1.1 Front View

POWER	Lighted LED indicates power is on.
BUSY	Unlit indicates no activity. Blinking indicates data is being accessed. Lighted LED indicates unprocessed cached data is still in the memory.
ATTEN	Lights when an error message appears or service is required, e.g., when a drive fails and needs to be replaced.
▼▲ buttons	Scroll through available options.
ENT button	Choose or executes an option.
ESC button	Returns to previous menu or cancel selection.
2 x 16 LCD	Displays throughput during normal operation, approximately 256Kbytes/sec per division. Displays message for configuration and management.

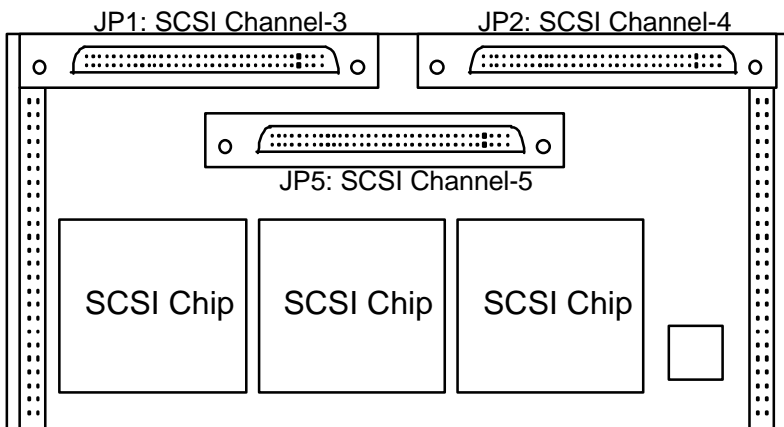
4.1.2 Rear View of the Main Board



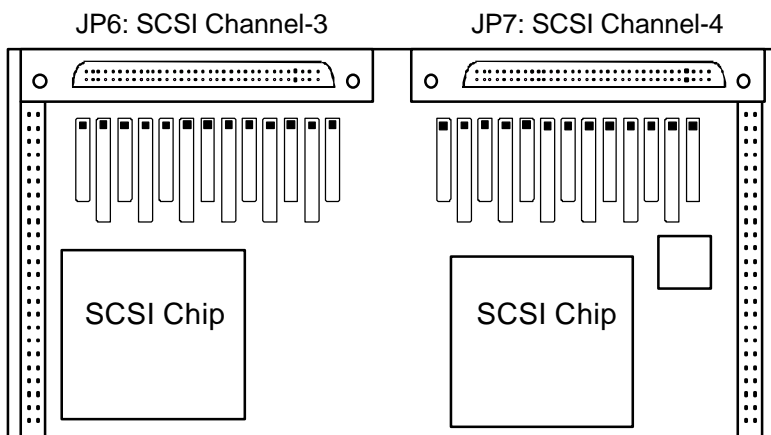
4.1.3 Top View of the Main Board



4.1.4 Top View of the Daughterboard (DA-ACCY-DUS)

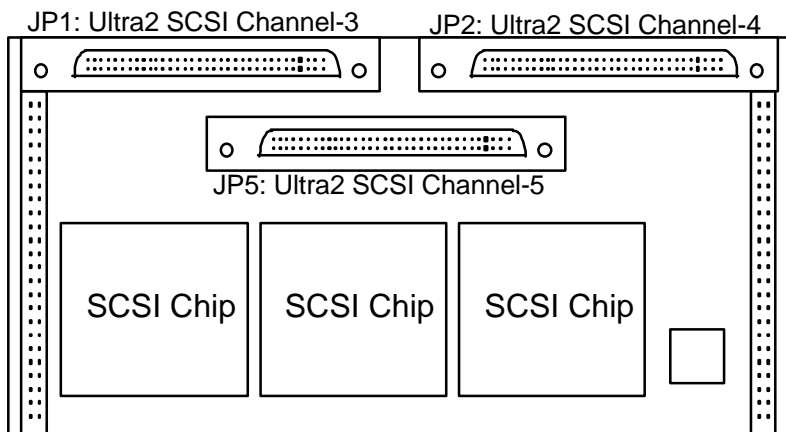


4.1.5 Top View of the Daughterboard (DA-ACCY-DUW)



- Pin 1 of the terminator resistors

4.1.6 Top View of the Daughterboard (DA-ACCY-DU2)



4.2 Installing DRAM SIMM



IMPORTANT:

The DA-3000 controller requires a minimum of 8 Mbytes DRAM SIMM (with or without parity function) installed in a SIMM socket in order for it to operate. The controller is normally delivered without any DRAM installed.

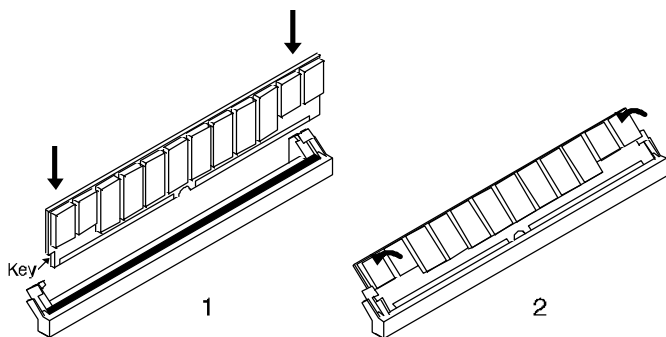
The following are guidelines on using DRAMs:

- ✓ **Use 72-pin 60ns DRAM or 60ns EDO RAM SIMM module.** EDO RAM is recommended for better performance.
- ✓ A SIMM, with or without parity, can be auto-detected by the controller. A SIMM with parity is recommended for security.
- ✓ The minimum DRAM required is 8 MBytes installed in a SIMM socket, however 16 Mbytes is recommended.
- ✓ The controller supports 8 MB, 16 MB, 32 MB, 64 MB and 128MB DRAM SIMM modules. Maximum DRAM size is 128 MBytes.

To install the DRAM SIMM:

1. Power off the system and disconnect the power connector.

2. Insert the DRAM SIMM vertically into the socket making sure the key is on the left side (1). Now push the module backward until the hooks on both sides of the socket snap into place (2).



4.3 *Installing the SCSI Channel Upgrade Daughterboard*

The DA-3000 base module has 3 Ultra-Wide SCSI channels. Installing a SCSI channel upgrade daughter board (DA-ACCY-DUS, DA-ACCY-DUW, or DA-ACCY-DU2) onto the base module allows you to expand up to a total of 6 SCSI channels. (Only one daughter board can be mounted at a time).

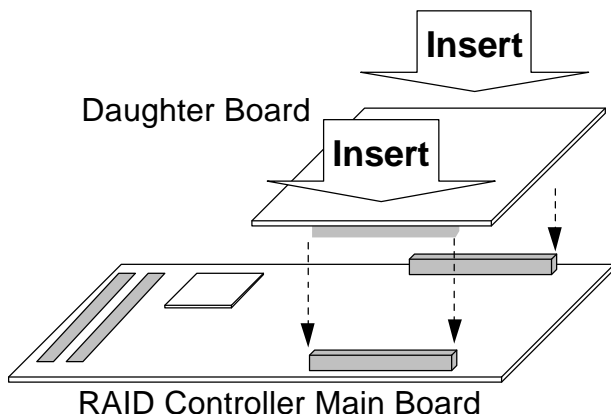
DA-ACCY-DUS : 3 Single-Ended Ultra Wide SCSI Channels

DA-ACCY-DUW: 2 Differential Ultra Wide SCSI Channels

DA-ACCY-DU2 : 3 Ultra2 Wide SCSI Channels

To install the SCSI channel upgrade daughterboard:

1. Make sure the power of the host system and drives are off.
2. Position the daughter board so that the SCSI connectors are facing the rear of the controller.
3. While at it, make sure the connector pins on the daughter board are aligned with the two header connectors on the controller main board.
4. Press both sides of the daughter board downward so that the connector pins on the daughter board insert into the header connectors on the main board. Make sure the daughter board is seated properly.



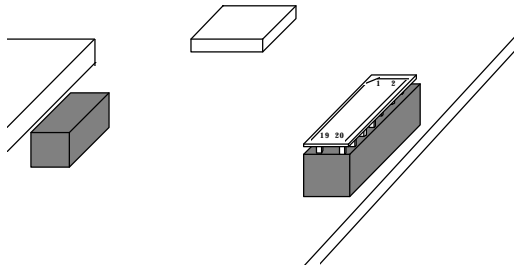
4.4 Battery Back-up

The DA-3000 controller operates using cache memory. However, when power failure occurs, the cache memory may contain buffered data that has not yet been written to the hard disks. These buffered data are not retrievable when power returns.

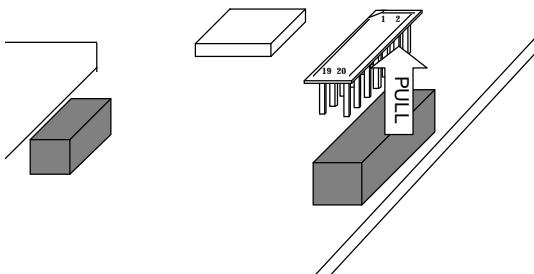
To avoid this from happening, a battery back-up solution (DA-ACCY-BD and DA-ACCY-BA) is available to provide up to 100 hours of back-up time. The DA-ACCY-BD is a battery backup daughter board that plugs into the controller. The DA-ACCY-BA is a battery pack that connects to the DA-ACCY-BD battery backup daughter board. Several DA-ACCY-BD can be daisy chained to provide long hours of unattended operation over a period of days.

To install the battery backup daughter board and battery pack:

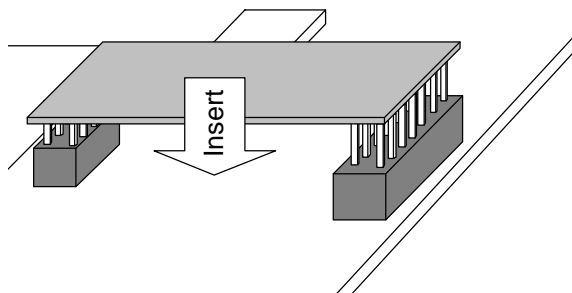
1. Make sure the power of the controller and drives are off.



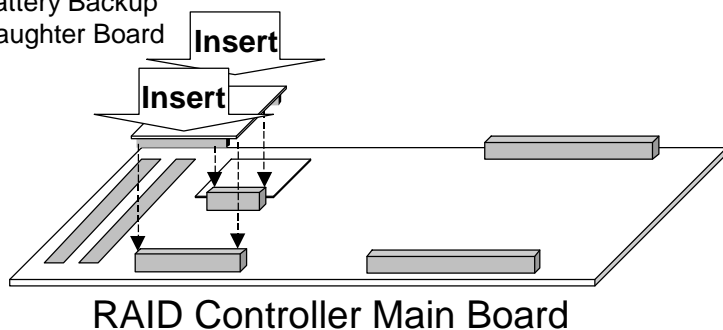
2. Locate for the female pin socket (JP2) on the DA-3000 mainboard. Remove the socket plug that is on JP2.



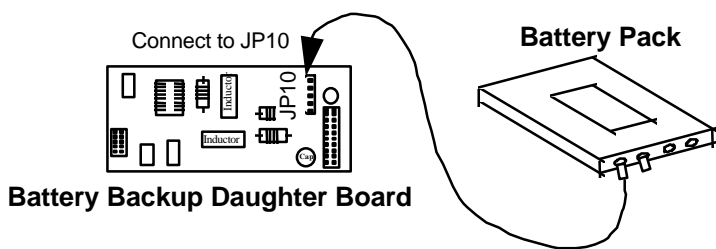
3. Now install the DA-ACCY-BD battery backup daughterboard onto the motherboard.



Battery Backup
Daughter Board

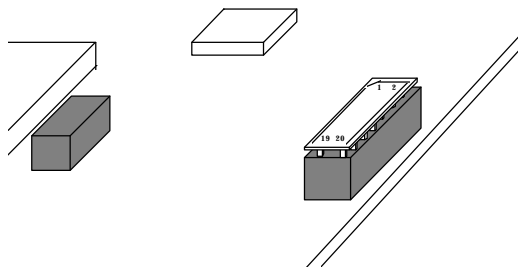


4. Connect the DA-ACCY-BA battery pack to JP10 located on the DA-ACCY-BD daughter board.



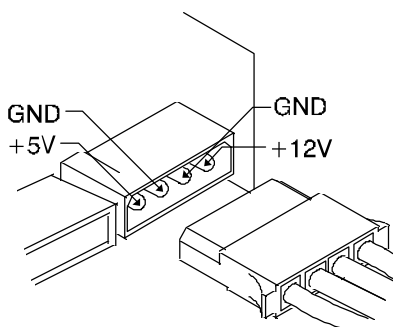
**NOTE:**

It is a must to install the socket plug back to JP2 once you have removed the DA-ACCY-BD battery backup daughterboard. The controller will not work if you fail to do so.



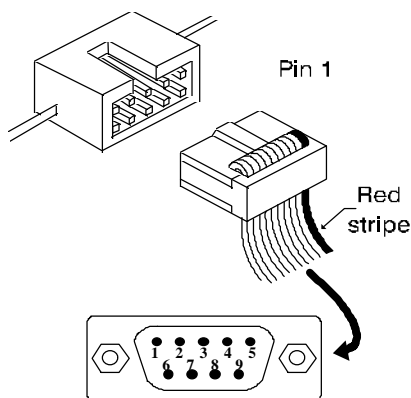
4.5 Power Connection

The power input and connection of the DA-3000 controller is exactly the same as those for hard disk drives. The power connection is shown below.



4.6 Serial Port Connection and Setup

The DA-3000 controller can be configured via a PC running a VT-100 terminal emulation program, or a VT-100 compatible terminal. The provided interface cable converts the RS-232 signal of the 10-pin header connector on the controller into a 9-pin D-Sub male connector. The pin layout of the 9-pin D-Sub male connector is similar to that of a PC's serial port and is set as a DTE device. The proper connection of the cable and pin layout is shown below.



The following are guidelines on using the serial port:

- The serial port's default is set at 9,600 baud, 8 bit, 1 stop bit and no parity. Use the COM1 serial port of the controller.
- In most cases, connecting RD, TD and SG are enough to establish communication with a terminal.
- If you are using a PC as a terminal, any of the VT-100 terminal emulation software will suffice. Microsoft Windows includes a terminal emulation program as presented with the "Terminal" icon in the Accessories window.

The baud rate can be changed using the front panel. To change the baud rate:

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to

View and Edit
Configuration ..

select “View and Edit Configuration ..”, then press **ENT**.

Select “Communication Parameters ..”, then press **ENT**.

Communication
Parameters ..

Select “RS-232 Configuration ..”, then press **ENT**.

RS-232
Configuration ..

Select “COM1 Configuration ..”, then press **ENT**.

COM1
Configuration ..

Select “Baud-rate 9600 ..”, then press **ENT**.

Baud-rate 9600
..

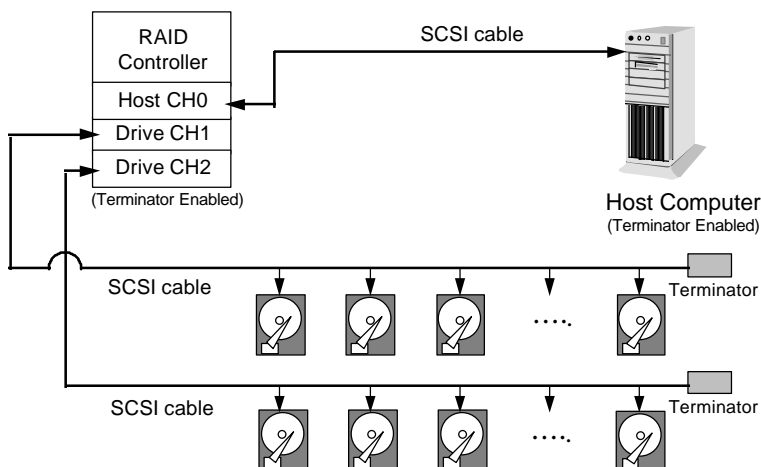
Press ▼ or ▲ to select the baud rate, then press **ENT** for 2 seconds to confirm the selected baud rate.

Baud-rate 9600
Change to 38400?

* The available baud rates are:
2400, 4800, 9600, 19200 and
38400.

4.7 Basic Operational Setup

An example of the operational setup is shown below:



- The SCSI cable must be shorter than 12 meters using high-quality SCSI cable and terminators.
- Channel 0 is connected to the Host system.
- Drives are connected to drive channels 1 and/or 2.
- SCSI nodes on the same channel have their own unique ID number.
- Both the Host and drive SCSI cables are properly terminated.
- The terminator of all the hard drives must be disabled.
- The power supply is attached.
- All operation parameters are properly set.

To connect the components:

1. Make sure power is off or the power connector is disconnected.
2. Connect channel 0 of the controller to the Host system's SCSI port using a suitable SCSI cable.

**NOTE:**

Channel 0 is the default Host interface using ID number '0'. Any of the channels can also be set as the Host interface. More than one channel can be set as the Host interface when operating with redundant Host or multiple Host systems.

3. Make sure the host side of the SCSI cable is properly terminated.
4. Assign a unique SCSI ID for every hard disks that are to be connected on the same SCSI cable; between ID numbers '0' and '6' and '8' and '15'. The default ID of the controller's channel 0 is '7'.
5. Connect the other end of the drive SCSI cable to one of the remaining channel on the controller.
6. Connect the connectors located at the middle of the drive SCSI cable to the hard disk(s).
7. Terminate the SCSI cable by installing an external terminator on the last connector. Terminators on all the hard drives must be removed so that removing a hard drive will not affect cable termination.

4.10 In-band SCSI

4.10.1 What is it and why do you need it?

These days more and more external devices require communication with the host computer for device monitoring and administration. This is usually done through RS-232C ports.

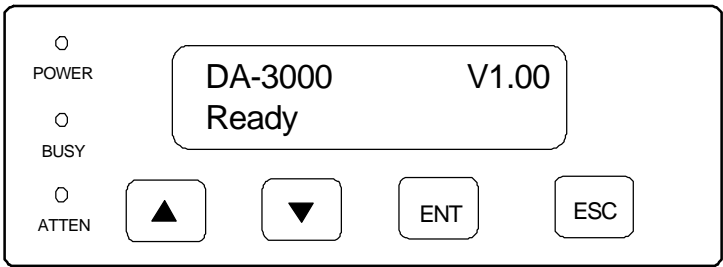
ASUS now offers an alternative means of communication for its RAID controllers' n-band SCSI. The traditional way for SCSI controllers to communicate with the host computer has been via software (such as the GUI RAID Manager) using an RS-232C connection. With In-band SCSI, integrators have more flexibility. They may use RS-232C or the existing SCSI cable instead.

How does it use the SCSI cable? In-band SCSI technology translates the original commands into standard SCSI commands. These SCSI commands are then sent to and received from the SCSI raid controller. The GUI RAID Manager can administrate the RAID controller just as it could before via RS-232C. (Note: It is assumed that users of In-band SCSI possess the following: a third-party SCSI adapter and a channel on their ASUS RAID controller that can be designated as a host channel.) Both of these are required for In-band SCSI communication between the host and the RAID controller.)

4.10.2 How Do You Configure the GUI RAID Manager to Use In-band SCSI?

4.10.2.1 RAID Controller Adjustments

Don't disconnect the RS-232C cable yet! It is required for another 10 minutes or so. Some adjustments must be made to the RAID controller and to the host computer's SNMP settings before the two can communicate using SCSI commands. (Note: The SNMP settings must be changed prior to installation of the GUI RAID Manager. See *SNMP Settings* below for a detailed explanation.) The RAID controller settings can be changed using the Front Panel. (The front panel may be different in appearance from the one shown in this example.)



From the Main Menu, press ▼ or ▲ to select “View and Edit Configuration Parameters. “

View and Edit
Config Parm

Press <Enter>; and then use the ▼ or ▲ to select “Host-side SCSI Parameters.” Then press <Enter>.

Host-side SCSI
Parameters ..

You will need to make adjustments in the following four submenu's: Peripheral Device Type, Peripheral Device Qualifier, Device Support for Removable Media, and LUN Application. Different host operating systems require different adjustments. Look at the table below to find the proper settings for your host operating system.

Peripheral Device Type Parameters Reference for Various Operating Systems:

Operating System	Peripheral Device Type	Peripheral Device Qualifier	Device Support for Removable Media	LUN Applicability
NT 4.0	1f	connected	disabled	All Undefined LUNs
NT 5.0	3	connected	enabled	All Undefined LUNs
NetWare 4.x	3	connected	disabled	All Undefined LUNs
SCO Unix 5.0x	7f	connected	either is okay	All Undefined LUNs
UnixWare 2.1x	3	connected	either is okay	All Undefined LUNs
Solaris 2.5.x/2.6	7f	connected	either is okay	All Undefined LUNs

Peripheral Device Type Settings:

Device Type	Setting
No Device Present	7f
Direct-access Device	0
Sequential-access Device	1
CD-ROM Device	5
Scanner Device	6
MO Device	7
Unknown Device	1f
Processor Type	3

Example: Settings for Windows NT 4.0

The settings for Windows NT 4.0 are provided here as an example. For the settings for other operating systems, please refer to the table above, *Peripheral Device Type Parameters Reference for Various Operating Systems*.

On the front panel, use ▼ or ▲ to select “Peripheral Device Type Parameters”; and then press <Enter>.

Periph Dev
Type Parameters

(For this example, we assume that there are currently no peripheral devices.)

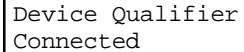
Device Type -
No Device (0x7f)

Press ▼ or ▲ to choose “Unknown Device - 1f”.

Set Device
Type?

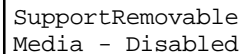
Press <Enter> to confirm the selection. Now that we have changed the Peripheral Device Type, let us set the Peripheral Device Qualifier. Press <Esc> to return to the sub-menu mentioned above. Use the arrow keys to scroll down to Device Qualifier., press ▼ or ▲ to select “Device Qualifier Connected. “

The default setting is “Connected.” If your Front Panel reads “Disconnected,” press <ENT> and you will be prompted to change to “Connected”. If your Device Qualifier setting reads “Connected,” press <Esc> to return to the Host-side SCSI submenu .



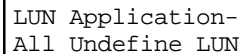
Device Qualifier
Connected

Use the ▼ or ▲ to select Support for Removable Media. The default setting is “Disabled.” If the LCD reads “Enabled,” press <Enter> and you will be prompted to accept a change. If the screen reads “Disabled,” press <Esc> to return to the Host-side SCSI submenu .



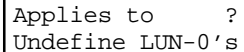
SupportRemovable
Media - Disabled

Press ▼ or ▲ to select “LUN Application”; and then press <Enter>. The default setting is “All Undefined LUN.”



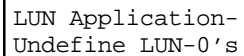
LUN Application-
All Undefined LUN

Press <Enter> and use ▼ or ▲ to select “Undefined LUN-0 .”



Applies to ?
Undefined LUN-0's

Press <Enter> to accept. The screen should display the following message.



LUN Application-
Undefined LUN-0's

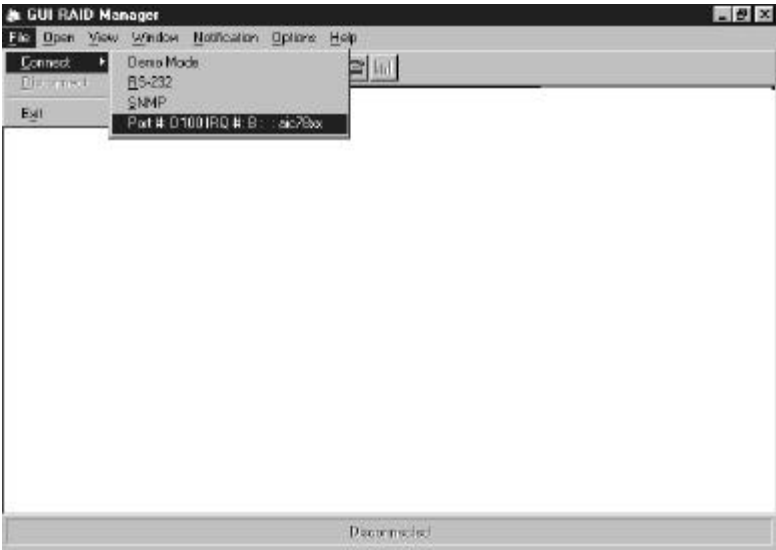
The RAID controller adjustments necessary to use In-band SCSI have been completed. For locally accessing the host computer (see section 4.10.3.1, *Local Connection – SNMP Not Required*), all steps have been completed. For remotely accessing the host computer, further

adjustments must be made (see section 4.10.3.2, *Remote Connection – SNMP Required*).

4.10.3 Using In-band SCSI in GUI RAID Manager

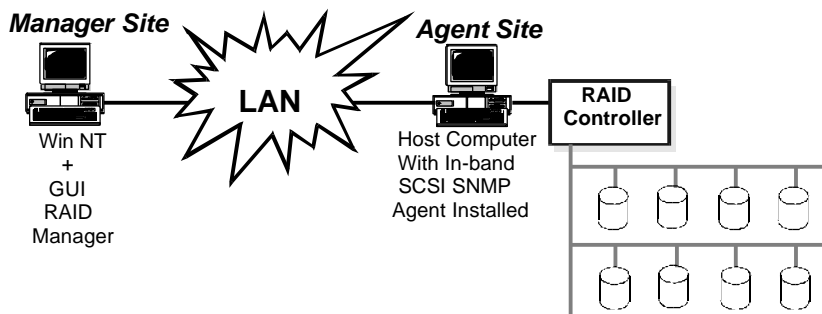
4.10.3.1 Local Connection —SNMP Not Required

If you are using the GUI RAID Manager on the host computer that is using In-band SCSI -- ie., “Local access” -- SNMP service is not required. You may now connect by going to FILE>CONNECT and selecting the port address.



4.10.3.2 Remote Connection —SNMP Required

SNMP Service is required to administrate a RAID controller installed in a remote computer. This passage describes how to establish a connection from the GUI RAID Manager to a RAID controller that is connected to a remote host via In-band SCSI. For information regarding other operations and of the GUI RAID Manager, please refer to the *GUI RAID Manager User Guide*.



In the figure above, the "Agent Site" is a host computer connected to a RAID controller via a SCSI cable. The "Manager Site" is a Windows NT system with the GUI RAID Manager. The Agent Site could be running an operating system other than Windows NT. ASUS provides the In-band SCSI SNMP agents for the following operating systems:

- ◇ Windows NT
- ◇ NetWare
- ◇ SCO Unix OpenServer
- ◇ SCO UnixWare
- ◇ Sun Solaris

The Manager Site should be a Windows NT Workstation or Server with SNMP service and the GUI RAID Manager installed.

Basic Procedures to Establish the Connection

The following criteria must be met for the Agent Site and Manager Site:

Checklist for Agent Site

1. The host computer is connected to the RAID controller via the host SCSI cable (the cable which is used to transfer data between the host computer and the RAID – there's no need for an extra SCSI cable.)
2. The host computer's operating system has SNMP service installed.

3. The host computer has the In-band SCSI SNMP agent installed for the corresponding operating system. (The example described herein is Windows NT.)
4. The host computer is up and running.

IMPORTANT:



This following applies to Windows NT 4.0 with Service Pack 3: if the “SNMP Service” is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

Checklist for Manager Site

1. The system is running Windows NT (Workstation or Server) and has SNMP Service installed.
2. The ASUS GUI RAID Manager was installed with the “SNMP Manager Site” option selected.
3. The GUI RAID Manager is running.

IMPORTANT:



This following applies to Windows NT 4.0 with Service Pack 3: if the “SNMP Service” is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

Example Settings for Agent Site Using Windows NT

1. Install SNMP Service in Windows NT. Look for the “Network” icon in the Control Panel. Double click on the “Network” icon to open it.



The Properties window appears. Choose the "Service" tab. If the SNMP Service is already installed, please go ahead to step called "Install the SNMP Agent and GUI RAID Manager." If the SNMP Service is not yet installed, click on "Add" and choose "SNMP Service" to install.

IMPORTANT:



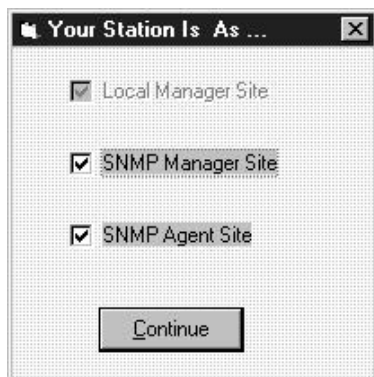
This following applies to Windows NT 4.0 with Service Pack 3: if the "SNMP Service" is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

2. Install the SNMP Agents and GUI RAID Manager. The GUI RAID Manager can install the In-band SCSI SNMP Agent during installation. During GUI RAID Manager installation, be sure to select both the "SNMP Manager Site" and "SNMP Agent Site"

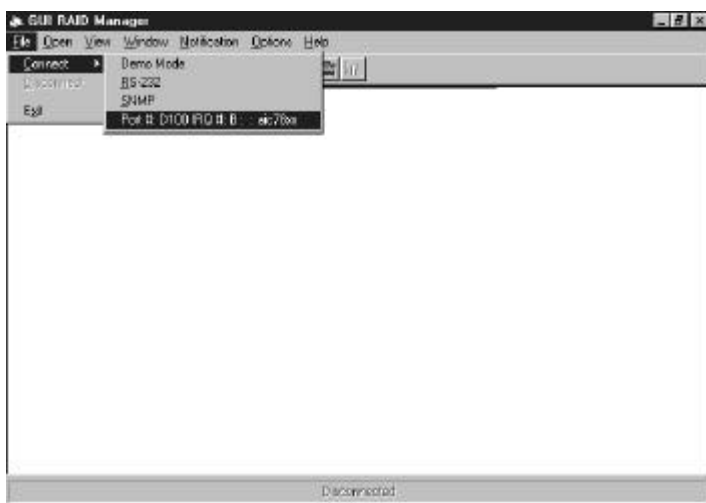
options. Complete the installation by following the on-screen instructions.

Example Settings for Manager Site

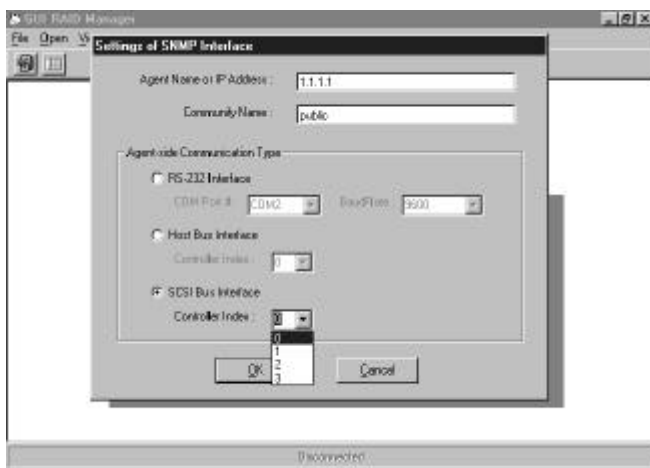
1. Install the SNMP manager and GUI RAID Manager. During the installation of GUI RAID Manager, click to select the option “SNMP Manager Site.” Complete the installation by following the on-screen instructions.



1. Run the GUI RAID Manager. Start the connection by choosing FILE>CONNECT>SNMP.



2. The “Setting of SNMP Interface” window appears. Enter the IP address and community name of the Agent Site. For “Agent-site Communication Type,” choose “SCSI Bus Interface.” The “Controller Index” refers to the sequence of the RAID controller which is going to be administrated. If only one RAID controller is installed in the agent site computer, choose “0”. If there is more than one RAID controller installed in the agent site computer, choose “1” to administrate the second RAID controller. Choose “2” to administrate the third RAID controller, etc.



3. After the connection is established, all of the operations in the GUI RAID Manager are the same as before (please refer to the *GUI RAID Manager User Guide* for complete details on its operation.)