Global Array Manager™ Server Software

Installation Guide and User Manual

P/N: 775078-01
08P4099

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Installation Guide and User Manual

Part Number 775078-01
08P4099

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This manual describes the Mylex Global Array Manager Server Software.

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About This Manual

This installation guide covers the steps involved to install and use the Mylex Global Array Manager Server Software.

In addition, this document covers installation and use of SNMP, RAID Fault Management, External RAID support enabling, use of the mylexdrv.siz file, and GAM Event Logging, creation of GAM Server diskettes, and GAM Server for Failover or Failback in MSCS.

For information on defining and setting RAID (Redundant Array of Independent Disks) levels as well as configuration of the array, consult the *Global Array Manager Client* manual and the *RAID EzAssist Configuration Utility User Reference Guide* or *RAID EzAssist Configuration Utility Quick Configuration Guide.*

Conventions

Throughout the manual, the following conventions are used to describe user interaction with the product:

`bold`	The user must enter the bold text exactly as shown
↵	Press the Enter key
Enter	Press the key labeled “Enter” (or “Delete”, etc.)
File, Run	Select the Run option from the pull-down menu activated when the File menu pad is selected

☛ **Note**

Supplementary information that can have an effect on system performance

⚠ ***Caution***

Notification that a proscribed action has the *potential* to adversely affect equipment operation, system performance, or data integrity

STOP **WARNING**

Notification that a proscribed action will *definitely* result in equipment damage, data loss, or personal injury

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Chapter 1
Introduction

Overview

This manual describes information on how to install the Global Array Manager (GAM) Server software for several supported operating systems.

This chapter describes:

- GAM Server functions
- GAM Server requirements under supported operating systems

Global Array Manager Server software is delivered on the CD-ROM. It is used to install GAM Server software on a server running a particular network operating system.

> ☛ **Note**
>
> This manual assumes that the network administrator will be performing any of the installation procedures described herein.

NetWare, Windows NT, and Windows 2000

Install GAM Server Software for Netware 4.2 / 5.x, Windows NT 4.0, or Windows 2000 directly from the CD-ROM. See the appropriate chapter in this manual.

SCO OpenServer, UnixWare, and Solaris

Use one of the following methods to obtain GAM Server software for SCO OpenServer 5.0.5, UnixWare 7.x, 2.1.2 / 2.1.3, or Solaris 7 for x86:

- Retrieve the appropriate GAM Server image file from the CD-ROM and create a GAM Server installation diskette from the DOS image file.
- Insert the CD-ROM into a system running Windows 95 / 98, Windows NT, or Windows 2000, then click on “Create Software Diskettes” from the RAID Management Software Installation menu. See Appendix F for details.

Linux

In order to use any of the supported distributions of Linux, you will need to download the driver files from the appropriate web site (see Chapter 8 “Linux”).

Global Array Manager Server Overview

Global Array Manager Server Software is used to manage disk array subsystems attached to a Mylex Disk Array Controller.

Monitoring Functions

The Global Array Manager Server software collects and disseminates information on disk array status and resource utilization. The Global Array Manager Client software organizes this information through an intuitive graphical display. GAM Server monitors the characteristics and performance of supported Mylex Disk Array Controllers.

SNMP/DMI Support

The Global Array Manager Server software includes SNMP and DMI support, allowing stand-alone monitoring of performance and fault information. This is useful if a management package is already in use. Support for these protocols includes “read only” functions. Write functions are only available through the use of the optional Global Array Manager Client software.

Management Functions

The Global Array Manager Server software executes the management instructions specified by the Global Array Manager Client. GAM Server software offers fault management, reliable messaging, and superior operating system support. Global Array Manager Client software manages or performs maintenance on individual disk arrays and drives (with the appropriate authentication), again by means of the graphical user interface.

Configuration Functions

Disk array configuration and remote TCP/IP support functions are provided through use of the Global Array Manager Client software. If your goal is monitoring and simple maintenance or messaging, Global Array Manager Server is sufficient for these tasks.

Requirements

The following information provides the hardware and software requirements for the Global Array Manager Server software under several network operating systems.

It is assumed that the hardware installation, the system configuration, and the disk array controller configuration are properly completed. If not, please see the *PCI Disk Array Controller Drivers Installation Guide and User Manual* and the *RAID EzAssist Configuration Utility User Reference Guide* or *RAID EzAssist Configuration Utility Quick Configuration Guide*. Complete the required procedures described in those manuals before proceeding with installation of GAM Server discussed herein.

The person who will be performing the installation must have Administrator access for the system onto which GAM Server will be installed.

Before starting, be sure to read through all applicable instructions to determine the specific requirements for this installation.

The correct environment must be present on the server for the Global Array Manager Server software to work properly. The environment is a combination of hardware and software which meets the following requirements:

Server Hardware and Software – NetWare

- A server running Novell NetWare 4.2 or 5.x
- 1 MB of free system memory after all volumes are mounted
- 2 MB of free hard disk space on the SYS: volume
- Properly installed and configured Mylex Disk Array Controller with the appropriate NetWare drivers
- (Optional) If SNMP participation is desired, SNMP support (available from third parties) should be installed.
- TCP/IP must be installed

Server Hardware and Software – Windows NT

- A server running Microsoft Windows NT 4.0 Workstation, Server, or Enterprise edition on x86 with SP4 or SP5 installed
- 2 MB of free hard disk space
- Properly installed and configured Mylex Disk Array Controller with the appropriate Windows NT drivers
- TCP/IP must be installed

Server Hardware and Software – Windows 2000

- A server running Microsoft Windows 2000 on x86 Professional, Server, or Advanced Server
- 2 MB of free hard disk space
- Properly installed and configured Mylex Disk Array Controller with the appropriate Windows 2000 drivers
- (Optional) If SNMP participation is desired, SNMP support (available from third parties) should be installed.
- TCP/IP must be installed

Server Hardware and Software – SCO OpenServer

- A server running SCO OpenServer (version 5.05)
- 2 MB of free hard disk space
- Properly installed and configured Mylex Disk Array Controller with the appropriate SCO UNIX drivers
- TCP/IP must be installed

Server Hardware and Software – UnixWare

- A server running UnixWare (version 7.x on x86, 2.2.1 and 2.1.3)
- 2 MB of free hard disk space
- Properly installed and configured Mylex Disk Array Controller with the appropriate UnixWare drivers
- TCP/IP must be installed

Server Hardware and Software – Solaris 7 on x86

- A server running Solaris 7 on x86
- 2 MB of free hard disk space
- Properly installed and configured Mylex Disk Array Controller with the appropriate Solaris drivers or Sun MLX driver
- TCP/IP must be installed

Server Hardware and Software – Linux

- A server running Linux version:
  - Red Hat 6.2
  - SuSe 6.4
  - Caldera 2.4
  - Turbo Linux 6.0
- 1 MB of free system memory after all volumes are mounted
- 2 MB of free hard disk space
- TCP/IP must be installed
- Inetd must be running
- SNMP (Optional)
- GAM Client software (only compatible with Windows NT, 2000, 98, and 95)

Chapter 2
NetWare

Overview

This chapter describes installation, verification, and startup of the Global Array Manager Server software for Novell NetWare. The software is provided on the CD-ROM.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Global Array Manager Server Software for NetWare 4.2 and 5.x

Installing Global Array Manager Server Software

The Global Array Manager (GAM) Server software for NetWare has an automated installation utility which is run from the NetWare *server console*. This utility places the Global Array Manager Server application in the correct server directory and modifies the NetWare startup file, AUTOEXEC.NCF, to launch the application when the server is started.

> ☛ **Note**
>
> These instructions assume that your CD-ROM drive is properly identified and that CDROM.NLM is loaded.

Follow the steps below to install the GAM server software. Note the difference between NetWare 5.x and NetWare 4.2 for the first step.

1. If you are using NetWare 5.x, simply insert the Software Kit distribution CD-ROM into the file server's CD-ROM drive; the mount function is automatic. Skip to Step 2.

   If you are using NetWare 4.2, to mount the Software Kit distribution CD-ROM, type the following command at the server console prompt:

   ```
   CD MOUNT ALL
   ```

   Make a written note of the volume label that will appear at the end of the messages that appear during the load process. You will need to use the volume label later in the installation.

2. At the console, type the following command and press **<Enter>** to run the installation.

   ```
   : <Volume Label>:gam\netware\install
   ```

   > ☛ **Note**
   >
   > Do not type **any** extension. Type only ....**\install**. Replace <Volume Label> with the actual volume label you wrote down in step 1.

3. The Global Array Manager Server software installation screen displays.
   - To install the GAM Server software, select Install.
   - To cancel the installation, select Exit.

   As the software is installed, the server's AUTOEXEC.NCF file is updated to start the Global Array Manager Server application whenever the server runs this file.
4. Press the **<Enter>** key at the Update AUTOEXEC.NCF message.
5. Installation is complete. Edit AUTOEXEC.NCF as follows:
   - Modify the GAMEVENT and GAMEVLOG lines manually. Change the GAMEVENT line to include (after each `-h` parameter) the IP addresses of the client systems you will use to record events. Modify the pathname and filename in the GAMEVLOG command line if you wish to. Refer to Appendix E, GAMEVENT, for information.
   - If you wish to enable RAID Fault Management (RAIDBUILD) and optionally change its default parameters, you need to modify the RAIDBLD command line installed in AUTOEXEC.NCF. Refer to Appendix B, RAID Fault Management, for information.
   - If you will be using drives from more than one vendor in the same RAID Group, refer to Appendix D, The MYLEXDRV.SIZ File, for information on setting drive size limits for consistency across multiple vendors' drives.
6. Be sure to remove comment markers (such as the character #) from any command line which you intend to enable.
7. Save the modified AUTOEXEC.NCF and exit.
8. Create a user account called `gamroot`. Assign administrator rights to that user account.
9. To load the GAM server components, see "Loading Global Array Manager Server Manually" on page 2-4 after verifying correct server software installation.

Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Global Array Manager Clients (if used).

Loading Global Array Manager Server Manually

The Global Array Manager Server can be loaded manually from the NetWare server console prompt by typing the following two commands:

```
load gamserv ↵

load gamevent -h <IP Address or Name of Client>
(repeat...)
```

Loading Global Array Manager Server Automatically

The Global Array Manager Server can be custom-made to start up automatically on a NetWare server, when the NetWare server is restarted after installation of Global Array Manager. This capability will be available because the following two files will be automatically copied into AUTOEXEC.NCF, at the end of the file, during the GAM installation.

```
load gamserv

load gamevent -h <IP Address or Name of Client>
(repeat...)
```

Remember that you will need to edit the IP address line. See Enabling the Event Comment Line in the next section to add an IP address line, as needed.

Enabling the Event Comment Line

To enable event notification to GAM Clients, both local and remote, add "-h DNS_NAME" or "-h IP_NUMBER" to the end of the "load gamevent" line for each GAM Client and uncomment the line. DNS_NAME and IP_NUMBER are the workstation's Computer Name or IP Address. You can add up to 50 clients.

Usage:

```
load gamevent -h <IP Address or Name of Client>
(repeat...)
```

Troubleshooting Server Software Installation

Problem: The message "Error in connecting selected server" is displayed or an error is encountered when trying to connect to a server.

Check: Is the IP address correct?

Check: Is the server software, GAMSERV.NLM, installed and loaded on the server(s)? Use the following NetWare console command to verify that the GAMSERV module is loaded:

```
modules GAMSERV ↵
```

Check: Is the Ethernet connection good?

Check: Is TCP/IP set up correctly? Try Ping to find the server.

Problem: Global Array Manager Server will not load.

Check: Is the installation complete? The files GAMSERV.NLM, GAMDRV.NLM, and GAMEVENT.NLM should be contained in the SYS:SYSTEM directory of the server.

Chapter 3
Windows NT

Overview

This chapter describes installation, verification, and startup of the Global Array Manager (GAM) Server software for Microsoft Windows NT 4.0 (SP4 or SP5). The software is provided on the Software Kit CD-ROM.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Global Array Manager Server Software for Windows NT 4.0

Installation Overview

Installation of the Global Array Manager Server component requires the Windows NT operating system. It will not work on a Windows 95 or Windows 98 operating system.

You may also choose to install GAM Client at the same time on the same system. Refer to the appropriate *Global Array Manager Client Software Installation Guide and User Manual* for GAM Client installation instructions.

File List

Global Array Manager software is shipped on an accompanying distribution CD-ROM. The file list (and path) is as follows (where X: represents the drive letter of your CD-ROM drive):

X:\GAM\WINNT

```
_INST32I.EX_      DATA.TAG          SETUP.EXE
_ISDEL.EXE        DATA1.CAB         SETUP.INI
_SETUP.DLL        DATA1.HDR         SETUP.INS
_SYS1.CAB         LANG.DAT          SETUP.LID
_SYS1.HDR         LAYOUT.BIN
_USER1.CAB        OS.DAT
_USER1.HDR
```

Installing Global Array Manager Server Software

Follow the steps below to install GAM Server software for Windows NT 4.0.

1. Make sure TCP/IP is installed and functioning properly.
2. Insert the Software Kit CD-ROM into your CD-ROM drive.

   AutoRun will cause the CD-ROM to display the Mylex RAID Management Software Installation menu (Figure 3-1).

   ☛ **Note**

   If Autorun does not automatically start, locate the Autorun.exe file on your CD-ROM drive and double-click the file.

Figure 3-1. Mylex RAID Management Software Installation Menu

3. Click the option called “Install Global Array Manager.” This option is used to install GAM Server.

Global Array Manager Setup loads the installation wizard (Figure 3-2).

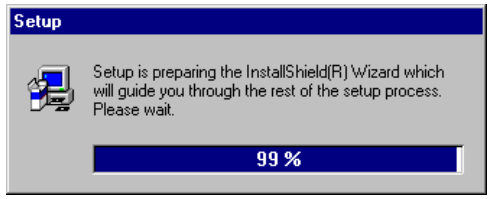

Figure 3-2. Loading the Installation Wizard

4. After a few moments, the Welcome dialog box opens (Figure 3-3). Click Next to proceed with the installation, or click Cancel to end the installation procedure and return to the menu.

Figure 3-3. Welcome Dialog Box

5. When the Mylex Software License Agreement screen displays, click Yes to accept the terms of the agreement and continue.

   If you click No, you will not be allowed to continue GAM Server installation.

The Select Components dialog box opens as shown in Figure 3-4. At this point you will select the component(s) you wish to install.

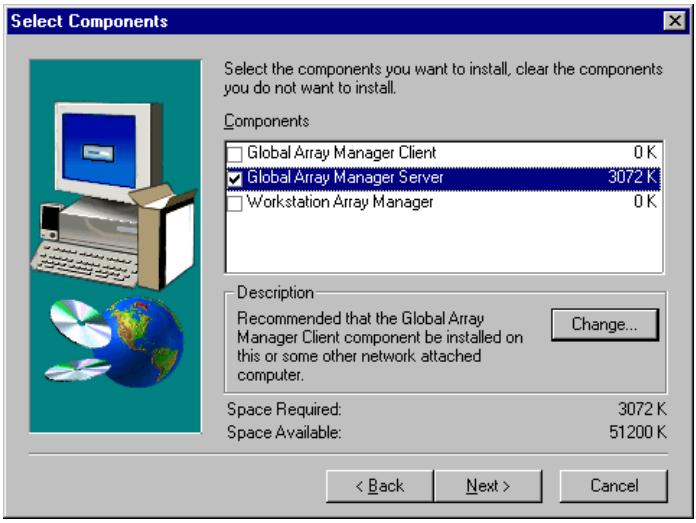

Figure 3-4. Select Components to Install

6. To select Global Array Manager Server for installation, click the box to check the Global Array Manager Server option.

> ☛ **Note**
>
> You may also choose to install Global Array Manager Client at this time. If you wish to install **both** GAM Server **and** GAM Client, please refer to the appropriate *Global Array Manager Client Installation Guide and User Manual* to install the Global Array Manager Client.

7. When you select and highlight the Global Array Manager Server option, the Change button becomes active so that you can access the Select Sub-components screen.

   If you do not wish to change the subcomponents, click Next and proceed to Step 10 on page 3-7, OR

   Click Change to see the Select Sub-components screen (Figure 3-5). Driver and Program Files should remain selected. DMI and SNMP may be selected or deselected as needed:

   - If you select DMI, Setup copies the DMI files to the server directory, but it does not configure the DMI files. Please refer to "DMI Manual Configuration" on page 3-16.
   - If you select SNMP, the SNMP files are copied to the server directory and configured automatically. For more information about SNMP support in Mylex products, see Appendix A.

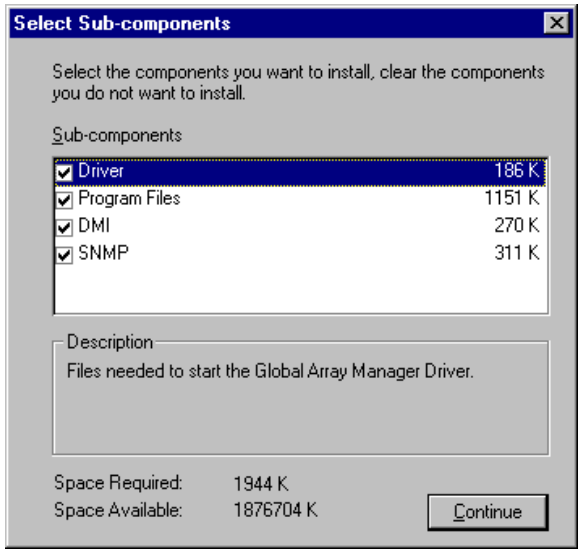

Figure 3-5. Sub-Components List

8. Make your subcomponent selections, then click Continue to return to the “Select Components” dialog box, Figure 3-4.
9. Click Next from the “Select Components” dialog box to continue with the installation.
10. ***Special Conditions: GAM Server Installation***

#1: If you have attempted to install Workstation Array Manager at the same time, you will see the following message (Figure 3-6).

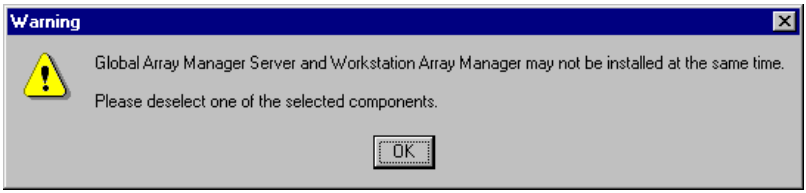

Figure 3-6. Error – Must Choose GAM Server OR WSAM

Click OK to return to the previous screen, then deselect Workstation Array Manager and click Next.

#2: If you are attempting to install Global Array Manager Server under Windows 95 (or Windows 98), you will see a message of the following type (Figure 3-7):

Figure 3-7. Error – SERVER Must Be Installed Under Windows NT/2000

Click OK, then do one of the following:
a) deselect Global Array Manager Server and install GAM Client, OR,
b) click Cancel and then click Exit to quit the installation of GAM Server. You must install GAM Server on Windows NT or 2000.

#3: If setup finds a previous installation of GAM Server software, you will see the following message (Figure 3-8).

Figure 3-8. Previous GAM Server

Click OK to proceed with replacing the existing GAM Server and GAM Driver with the new installation, OR

Click Cancel to retain your existing GAM Server/GAM Driver installation. Since only one GAM Server/GAM Driver can be present on a server system, setup will exit if you click Cancel.

11. The Installation Summary screen (Figure 3-9) summarizes the components and subcomponents you've selected for installation. Click Next to continue, or click Back to change selected components.

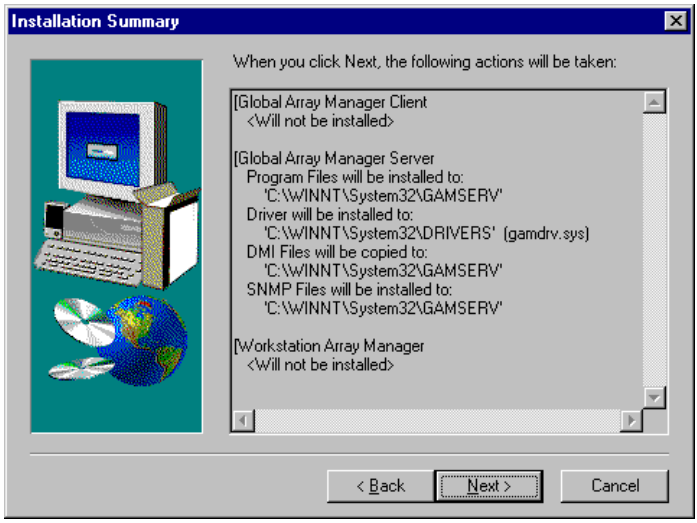

Figure 3-9. Installation Summary Screen

12. *Special Condition: Old PCI Controller Drivers*

If setup finds that an installed PCI driver for any of your Mylex PCI RAID Controllers is older than version 6.00-00, you will see a message of the following type[1] (Figure 3-10):

Figure 3-10. Error – PCI Driver Must Be Version 6.00-00 or Higher

If you will use GAM Server only with Mylex *External* RAID Controllers, you should choose to continue installation by clicking OK.

However, if you will use GAM Server with Mylex *PCI* RAID Controllers, your PCI Controller Drivers must be version 6.00-00 or higher in order to install and run GAM Server. Click Cancel and setup will exit.

After clicking Cancel, follow the instructions in the *PCI Disk Array Controller Drivers Installation Guide and User Manual* to update your PCI driver(s). Then rerun GAM Server installation as described herein.

If the above Special Condition does not apply, installation will continue. Go on to Step 13.

1. The actual driver identified in the message will depend on which driver is found to be older than version 6.00-00.

13. During installation, files are decompressed and copied from the installation CD-ROM to the destination folder (Figure 3-11).

    Wait for this process to complete.

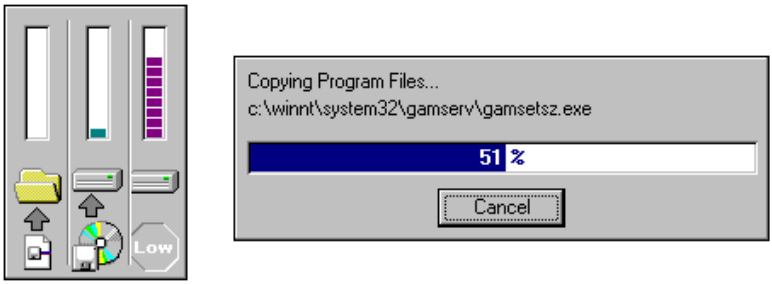

Figure 3-11. Installation Progress Display

14. If the Setup function detects an existing Global Array Manager Server configuration file, the following Configuration File Selection/ Modification dialog box opens so that you can select whether to modify the existing file or not (Figure 3-12).

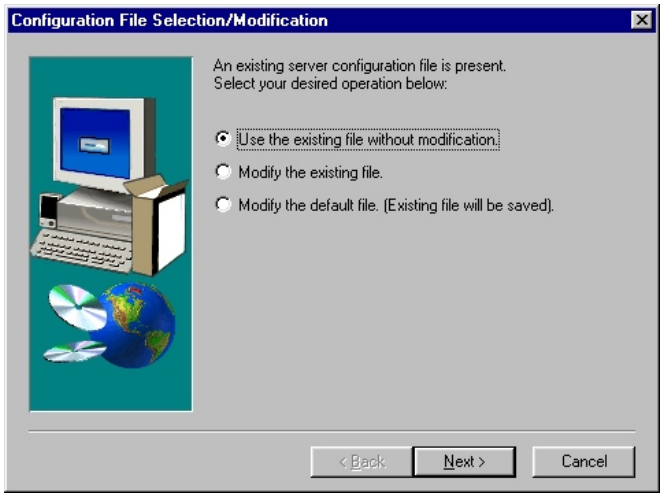

Figure 3-12. Modify Server Configuration File Dialog Box

If no existing configuration file is found, Setup will create one. Proceed to Step 15.

- If you select “Use the existing file without modification” and click Next, your existing configuration file will continue to be used. Skip ahead to Step 16.
- If you select “Modify the existing file” and click Next, your configuration file will be changed to include features new to this version of GAM Server. Proceed to Step 15.
- If you select “Modify the default file (Existing file will be saved)” and click Next, a new default configuration file will be used which includes features new to this version of GAM Server. Your original file will also be saved unchanged. Proceed to Step 15.

15. The Enter Event Recipients dialog box opens (Figure 3-13). Add IP addresses or node names of client workstations that will receive event notifications from this server. Enter up to 25 IP addresses or node names with a space separating each entry.

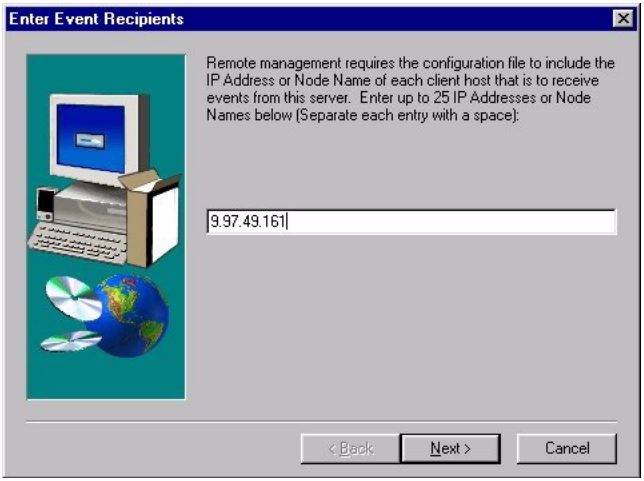

Figure 3-13. Enter Event Recipients Dialog Box

☛ **Note**

Event notifications cannot be received by a client unless its IP address or node name is identified. You may include additional IP addresses or node names by editing the GAMSCM.INI (configuration file) later. See Appendix E “GAMEVENT.”

Click Next and the Server Event Logging dialog box opens (Figure 3-14). Select “Enable event logging on the server machine” and click Next to enable event logging. See Appendix E “GAMEVENT” to configure event logging.

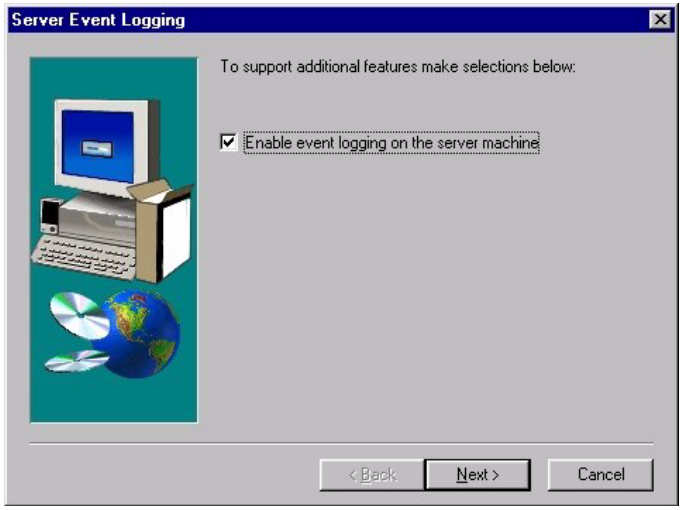

Figure 3-14. Server Event Logging Dialog Box

16. The full path for the configuration file is identified for future reference (Figure 3-15).

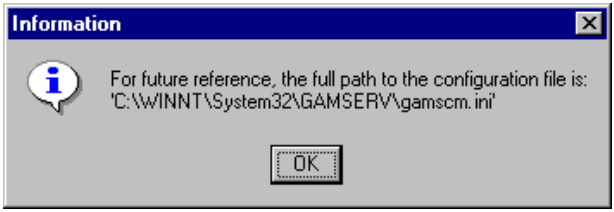

Figure 3-15. Directory Path Information for gamscm.ini File

Click OK.

17. The View Readme Files dialog box displays (Figure 3-16).

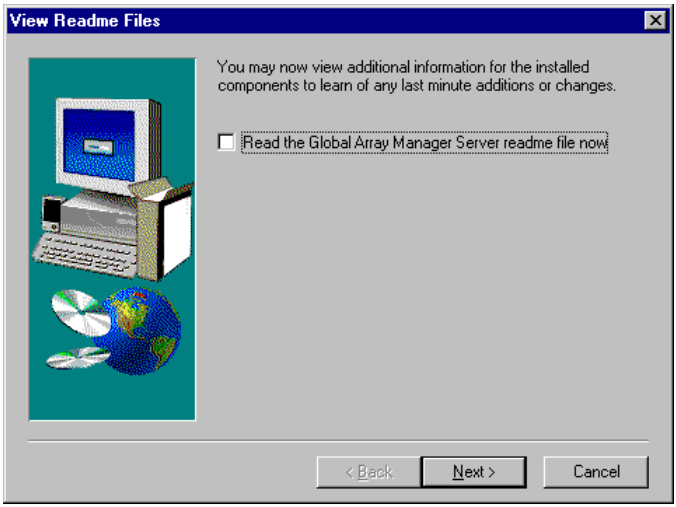

Figure 3-16. View Readme Files

If you also installed Global Array Manager Client, your screen will display the names of both readme files.

To view changes and updates to the program or installation guide, check the box that reads “Read the Global Array Manager Server readme file now,” then click Next.

If you do not check the box, click Next and skip ahead to Step 20.

18. If you choose to view the ReadMe file, the Notepad accessory will open and the file will be displayed.

    Read the contents of this file for the most up-to-date information about Global Array Manager Server. Much of this information may not appear in this installation guide, as sometimes last-minute modifications to the software are done after completion of the guide. You may also print the contents of this file to refer to later.

19. Close the Notepad accessory after reading and/or printing.

20. The Setup Complete dialog box displays (Figure 3-17).

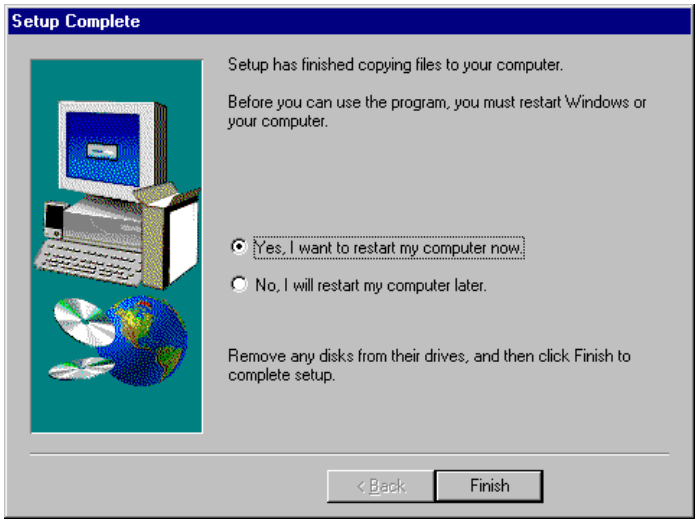

Figure 3-17. Setup Complete.

Setup has finished copying files to your computer.

- Select Yes and click Finish if you are ready to reboot your computer, OR
- Select No and click Finish if you want to exit setup and perform other tasks before rebooting.

> ☛ **Note**
>
> You need not reboot immediately, but you must reboot your system before the Global Array Manager Server software will be available for use.

21. Create a user account called `gamroot`. Assign Administrator access privileges to that user account.

> ☛ **Note**
>
> GAM Client only allows account `gamroot` to have Administration rights on Mylex controllers.

Setup of Global Array Manager Server is complete.

Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Global Array Manager Clients (if used).

The automatic installation procedure for Windows NT's Global Array Manager Server loads the GAM Server component as a "service." This service will load automatically at system startup. No special procedure is required to run the GAM Windows NT Server.

To verify that this service has started, go to Start->Control Panel->Services. Find the Mylex GAM Server name. The word "Started" should appear beside it.

Setup automatically installs the GAM driver. To verify that it is installed and running, go to Start->Control Panel->Devices. Scroll to the gamdrv device. It should read Started and Boot.

Troubleshooting Server Software Installation

Problem: **The message "Error in connecting selected server" is displayed or an error is encountered when trying to connect to a server.**

Check: Is the IP address of the Server correct?

Check: Is the Ethernet connection good?

Check: Is TCP/IP set up correctly? Try Ping to find the server.

Problem: **Global Array Manager Server does not load.**

Check: Did all of the server files load to the destination directories? Do you have sufficient disk space for the installation? A list of files needed for operation is given in Chapter 1. If necessary, reinstall the software.

DMI Manual Configuration

DMI files are available for the Mylex Disk Array Controller running under Windows NT. The DMI will act as a general monitor to locate events such as, hard disk status, driver identification, etc.

DMI files must be manually configured after they are copied into the server directory by the GAM server installation.

DMI is selected in the sub-component dialog box during the Global Array Manager Server installation. The DMI subcomponent can also be installed by itself via the server installation utility.

Use the SRVCCFG.EXE utility to configure the DMI files.

You will need to run the following command line from the GAMSERV directory to install the mdacci service manually:

```
srvccfg mdacci "Mylex DMI Service" %SystemRoot%\system32\gamserv\mdacci.exe
```

DMI Files

There are three DMI files:

- MDAC.MIF
- MDACCI.EXE
- SRVCCFG.EXE

These files will be copied into the appropriate directory path during the GAM Server installation process:

- %SystemRoot%\system32\gamserv\mdac.mif
- %SystemRoot%\system32\gamserv\mdacci.exe
- %SystemRoot%\system32\gamserv\srvccfg.exe

If the GAM Server installation detects the system environment variable (**%win32dmipath%**) created by Intel's LANDesk Server Manager, these files will also be copied into the following locations:

- %win32dmipath%\mifs\mdac.mif.
- %win32dmipath%\bin\mdacci.exe.

> ☛ **Note**
>
> If you are using Intel LANDesk Service Manager, you do not need to manually configure mdacci.exe. Intel's application will take care of this.

Chapter 4
Windows 2000

Overview

This chapter describes installation, verification, and startup of the Global Array Manager (GAM) Server software for Microsoft Windows 2000. The software is provided on the Software Kit CD-ROM.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Global Array Manager Server Software for Windows 2000

Installation Overview

Installation of the Global Array Manager Server component requires the Windows 2000 operating system. It will not work on a Windows 95 or Windows 98 operating system.

Reminder: This chapter assumes that the network administrator for this site will be performing these installation procedures.

You may also choose to install GAM Client at the same time on the same system. Refer to the appropriate *Global Array Manager Client Software Installation Guide and User Manual* for GAM Client installation instructions.

File List

Global Array Manager software is shipped on an accompanying distribution CD-ROM. The file list (and path) is as follows (where X: represents the drive letter of your CD-ROM drive):

X:\GAM\WIN2K

```
_INST32I.EX_      DATA.TAG          SETUP.EXE
_ISDEL.EXE        DATA1.CAB         SETUP.INI
_SETUP.DLL        DATA1.HDR         SETUP.INS
_SYS1.CAB         LANG.DAT          SETUP.LID
_SYS1.HDR         LAYOUT.BIN
_USER1.CAB        OS.DAT
_USER1.HDR
```

Installing Global Array Manager Server Software

Follow the steps below to install GAM Server software for Windows 2000.

1. Make sure TCP/IP is installed and functioning properly.
2. Insert the Software Kit CD-ROM into your CD-ROM drive.

   AutoRun will cause the CD-ROM to display the Mylex RAID Management Software Installation menu (Figure 4-1).

Figure 4-1. Mylex RAID Management Software Installation Menu

3. Click the option called “Install Global Array Manager.” This option is used to install GAM Server.

   Global Array Manager Setup loads the installation wizard (Figure 4-2).

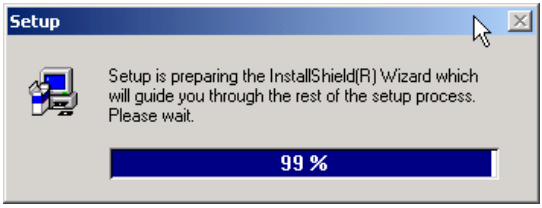

Figure 4-2. Loading the Installation Wizard

4. After a few moments, the Welcome dialog box appears (Figure 4-3). Click Next to proceed with the installation, or click Cancel to end the installation procedure and return to the menu.

Figure 4-3. Welcome Dialog Box

5. When the Mylex Software License Agreement screen appears, click Yes to accept the terms of the agreement and continue.

   If you click No, you will not be allowed to continue GAM Server installation.

The Select Components dialog box is displayed as shown in Figure 4-4. At this point you will select the component(s) you wish to install.

Figure 4-4. Select Components to Install

6. To select Global Array Manager Server for installation, click the box to check the Global Array Manager Server option.

> ☛ **Note**
>
> You may also choose to install Global Array Manager Client at this time. If you wish to install **both** GAM Server **and** GAM Client, please refer to the appropriate *Global Array Manager Client Installation Guide and User Manual* to install the Global Array Manager Client.

7. When you select and highlight the Global Array Manager Server option, the Change button becomes active so that you can access the Select Sub-components screen.

   If you do not wish to change the subcomponents, click Next and proceed to Step 10 on page 4-7, OR

   Click Change to see the Select Sub-components screen (Figure 4-5). Driver and Program Files should remain selected. DMI and SNMP may be selected or deselected as needed:

   - If you select DMI, Setup copies the DMI files to the server directory, but it does not configure the DMI files. Please refer to "DMI Manual Configuration" on page 4-16.
   - If you select SNMP, the SNMP files are copied to the server directory and configured automatically. For more information about SNMP support in Mylex products, please refer to Appendix A.

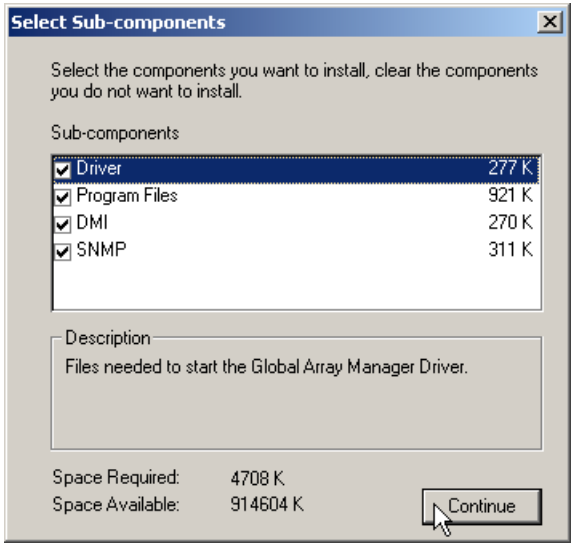

Figure 4-5. Sub-Components List

8. Make your subcomponent selections, then click Continue to return to the “Select Components” dialog box, Figure 4-4.
9. Click Next from the “Select Components” dialog box to continue with the installation.
10. ***Special Conditions: GAM Server Installation***

#1: If you have attempted to install Workstation Array Manager, you will see the following message (Figure 4-6).

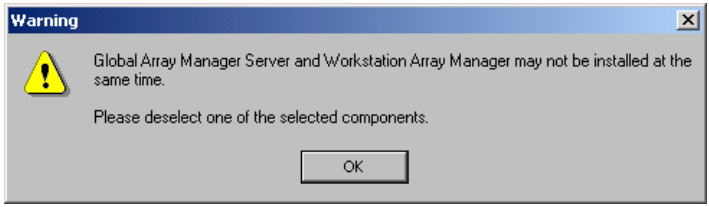

Figure 4-6. Error – Must Choose GAM Server OR WSAM

Click OK to return to the previous screen, then deselect Workstation Array Manager and click Next.

#2: If you are attempting to install Global Array Manager Server under Windows 95 (or Windows 98), you will see a message of the following type (Figure 4-7):

Figure 4-7. Error – SERVER Must Be Installed Under Windows NT/2000

Click OK, then do one of the following:
a) deselect Global Array Manager Server and install GAM Client, OR,
b) click Cancel and then click Exit to quit the installation of GAM Server. You must install GAM Server on Windows NT or 2000.

#3: If setup finds a previous installation of GAM Server software, you will see the following message (Figure 4-8):

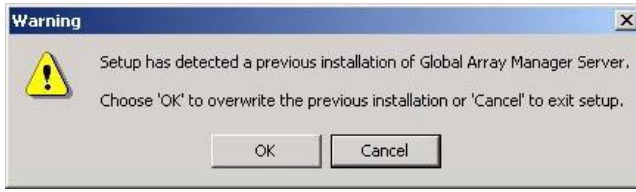

Figure 4-8. Previous GAM Server or GAM Driver Found

Click OK to proceed with replacing the existing GAM Server and GAM Driver with the new installation, OR

Click Cancel to retain your existing GAM Server/GAM Driver installation. Since only one GAM Server/GAM Driver can be present on a server system, setup will exit if you click Cancel.

11. The Installation Summary screen (Figure 4-9) summarizes the components and subcomponents you've selected for installation. Click Next to continue, or click Back to change selected components.

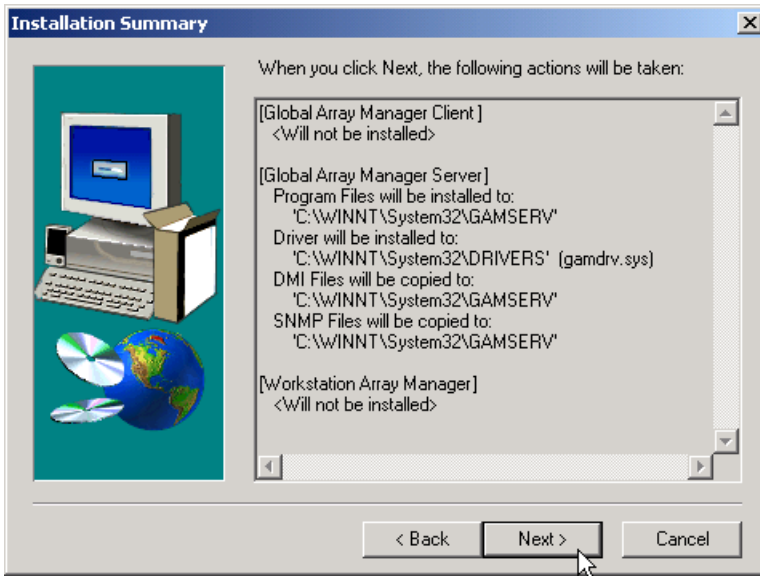

Figure 4-9. Installation Summary Screen

12. *Special Condition: Old PCI Controller Drivers*

If setup finds that an installed PCI driver for any of your Mylex PCI RAID Controllers is older than version 6.00-00, you will see a message of the following type[1] (Figure 4-10):

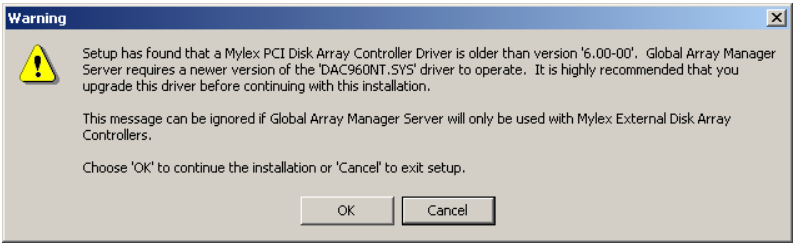

Figure 4-10. Error – PCI Driver Must Be Version 6.00-00 or Higher

If you will use GAM Server only with Mylex *External* RAID Controllers, you should choose to continue installation by clicking OK.

However, if you will use GAM Server with Mylex *PCI* RAID Controllers, your PCI Controller Drivers must be version 6.00-00 or higher in order to be able to install and run GAM Server. Click Cancel and setup will exit.

After clicking Cancel, follow the instructions in the *PCI Disk Array Controller Drivers Installation Guide and User Manual* to update your PCI driver(s). Then rerun GAM Server installation as described herein.

If the above Special Condition does not apply, installation will continue. Go on to Step 13.

1. The actual driver identified in the message will depend on which driver is found to be older than version 6.00-00.

13. During installation, files are decompressed and copied from the installation CD-ROM to the destination folder (Figure 4-11).

    Wait for this process to complete.

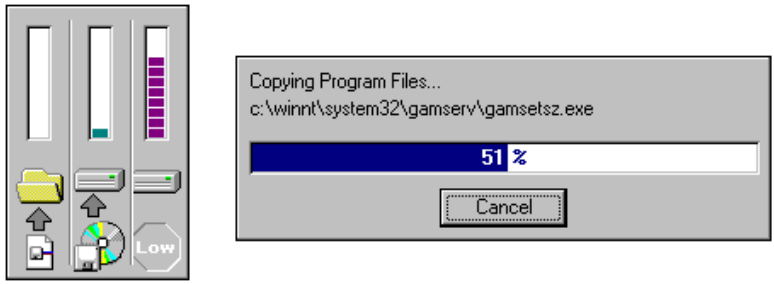

Figure 4-11. Installation Progress Display

14. If the Setup function detects an existing Global Array Manager Server configuration file, the following Configuration File Selection/ Modification dialog box opens so that you can select whether to modify the existing file or not.(Figure 4-12).

Figure 4-12. Modify Server Configuration File Dialog Box

If no existing configuration file is found, Setup will create one. Proceed to Step 15.

- If you select “Use the existing file without modification” and click Next, your existing configuration file will continue to be used. Skip ahead to Step 16.
- If you select “Modify the existing file” and click Next, your configuration file will be changed to include features new to this version of GAM Server. Proceed to Step 15.
- If you select “Modify the default file (Existing file will be saved)” and click Next, a new default configuration file will be used which includes features new to this version of GAM Server. Your original file will also be saved unchanged. Proceed to Step 15.

15. The Enter Event Recipients dialog box opens (Figure 4-13). Add IP addresses or node names of client workstations that will receive event notifications from this server. Enter up to 25 IP addresses or node names with a space separating each entry.

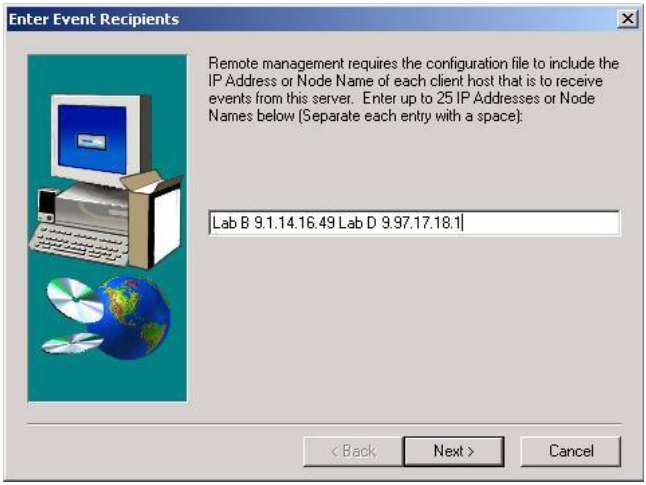

Figure 4-13. Enter Event Recipients Dialog Box

Note

Event notifications cannot be received by a client unless its IP address or node name is identified. You may include additional IP addresses or node names by editing the GAMSCM.INI (configuration file) later. See Appendix E “GAMEVENT.”

Click Next and the Server Event Logging dialog box opens (Figure 4-14). Select “Enable event logging on the server machine” and click Next to enable event logging. See Appendix E “GAMEVENT” to configure event logging.

Figure 4-14. Server Event Logging Dialog Box

16. The full path for the configuration file is identified for future reference (Figure 4-15).

Figure 4-15. Directory Path Information for gamscm.ini File

Click OK.

17. The View Readme Files dialog box displays (Figure 4-16).

Figure 4-16. View Readme Files

If you also installed Global Array Manager Client, your screen will display the names of both readme files.

To view changes and updates to the program or installation guide, check the box which reads “Read the Global Array Manager Server readme file now,” then click Next.

If you do not check the box, click Next and skip ahead to Step 20.

18. If you choose to view the ReadMe file, the Notepad accessory will open and the file will be presented.

    Read the contents of this file for the most up-to-date information about Global Array Manager Server. Much of this information may not appear in this installation guide, as sometimes last-minute modifications to the software are done after completion of the guide. You may also wish to print the contents of this file.

19. Close the Notepad accessory after reading and/or printing.

20. The Setup Complete dialog box displays (Figure 4-17).

Figure 4-17. Setup Complete.

Setup has finished copying files to your computer.

- Select Yes and click Finish if you are ready to reboot your computer, OR
- Select No and click Finish if you want to exit setup and perform other tasks before rebooting.

> ☛ **Note**
>
> You need not reboot immediately, but you must reboot your system before the Global Array Manager Server software will be available for use.

21. Create a user account called `gamroot`. Assign Administrator access privileges to that user account.

> ☛ **Note**
>
> GAM Client only allows account `gamroot` to have Administration rights on Mylex controllers.

Setup of Global Array Manager Server is complete.

Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Global Array Manager Clients (if used).

The automatic installation procedure for Windows 2000's Global Array Manager Server loads the GAM Server component as a "service." This service will load automatically at system startup. No special procedure is required to run the GAM for Windows 2000 on the Server.

Troubleshooting Server Software Installation

Problem:	**The message "Error in connecting selected server" is displayed or an error is encountered when trying to connect to a server.**
Check:	Is the IP address of the Server correct?
Check:	Is the Ethernet connection good?
Check:	Is TCP/IP set up correctly? Try Ping to find the server.
Problem:	**Global Array Manager Server does not load.**
Check:	Did all of the server files load to the destination directories? Do you have sufficient disk space for the installation? A list of files needed for operation is given in Chapter 1. If necessary, reinstall the software.

DMI Manual Configuration

DMI files are available for the Mylex Disk Array Controller running under Windows 2000. The DMI will act as a general monitor to locate events such as hard disk status, driver identification, etc.

DMI files must be manually configured after they are copied into the server directory by the GAM server installation.

DMI is selected in the sub-component dialog box during the Global Array Manager Server installation. The DMI subcomponent can also be installed by itself via the server installation utility.

Use the SRVCCFG.EXE utility to configure the DMI files.

You will need to run the following command line from the GAMSERV directory to install the mdacci service manually:

srvccfg mdacci "Mylex DMI Service" %SystemRoot%\system32\gamserv\mdacci.exe

DMI Files

There are three DMI files:

- MDAC.MIF
- MDACCI.EXE
- SRVCCFG.EXE

These files will be copied into the appropriate directory path during the GAM Server installation process:

- %SystemRoot%\system32\gamserv\mdac.mif
- %SystemRoot%\system32\gamserv\mdacci.exe
- %SystemRoot%\system32\gamserv\srvccfg.exe

If the GAM Server installation detects the system environment variable (**%win32dmipath%**) created by Intel's LANDesk Server Manager, these files will also be copied into the following locations:

- %win32dmipath%\mifs\mdac.mif.
- %win32dmipath%\bin\mdacci.exe.

> ☛ **Note**
>
> If you are using Intel LANDesk Service Manager, you do not need to manually configure mdacci.exe. Intel's application will take care of this.

Chapter 5
SCO OpenServer

Overview

This chapter describes information about the following installation, verification, and startup of the Global Array Manager Server software for SCO OpenServer Release 5.0.x. The software is provided on the appropriate Software Kit CD-ROM with a file to create a diskette.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Global Array Manager Server Software for SCO OpenServer 5.0.x

Creating the Global Array Manager Server Diskette

Before installing the GAM Server for SCO UNIX, a diskette must be created according to the instructions in Appendix F, "Creating a GAM Server Installation Diskette."

This diskette will be used wherever instructed to insert the "GAM Server diskette for SCO UNIX."

> ☛ **Note**
>
> After creating this diskette, DOS is not able to read it.

Installing Global Array Manager Server Software

Use *pkgadd* to install the Global Array Manager Server software for SCO UNIX. Complete the following procedure.

> ☛ **Note**
>
> These instructions assume the installation diskette is in the first diskette drive. If a different source is used, substitute that location for "/dev/rfd0" in step 3.

1. Log in as root.
2. Insert the GAM Server diskette for SCO UNIX in the file server's diskette drive.

3. Type the following (match case exactly as shown):

   pkgadd -d /dev/rfd0 GAM ↵

   The files are copied. The Kernel is rebuilt.

4. A prompt to boot this Kernel by default is shown:

   ```
   Do you want this kernel to boot by default? (y/n)
   ```

   Select "**y**" to boot from this Kernel.

5. You are prompted to rebuild the Kernel environment as shown:

   ```
   Do you want the kernel environment rebuilt? (y/n)
   ```

   Select "**y**."

6. Installation is complete.

   - Modify the GAMEVENT and GAMEVLOG lines manually. Do this by editing the S99GAM file found in the directory /etc/rc2.d, changing the GAMEVENT line to include (after each `-h` parameter) the IP addresses of the client systems you will use with this server. Modify the pathname and filename in the GAMEVLOG command line if you wish to. Refer to Appendix E, GAMEVENT, for more information.
   - If you wish to enable RAID Fault Management (RAIDBUILD) and optionally change its default parameters, you need to modify the RAIDBLD command line installed in S99GAM. Refer to Appendix B, RAID Fault Management, for information.
   - If you will be using drives from more than one vendor in the same RAID Group, refer to Appendix D, The MYLEXDRV.SIZ File, for information on setting drive size limits for consistency across multiple vendors' drives.

7. Be sure to remove comment markers (such as the character #) from any command line which you intend to enable.
8. Save the modified S99GAM and exit.
9. Create a user account called `gamroot`. Assign Root access privileges to that user account.
10. Reboot the system using the following command from the root directory (match case exactly as shown):

    shutdown -y -i6 -g0 ↵

Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Global Array Manager Clients (if used).

The installation of Global Array Manager Server for SCO UNIX causes the appropriate drivers to load automatically at system startup. No additional actions are required to start GAM Server beyond a system boot.

Troubleshooting Server Software Installation

Problem:	**An error is encountered when trying to connect to a server.**
Check:	Is the IP address of the Server correct?
Check:	Is the installation complete? Was the software successfully loaded on the server?
Check:	Is the Ethernet connection good?
Check:	Is TCP/IP set up correctly? Try Ping to find the server.
Problem:	**Global Array Manager Server does not load.**
Check:	Do you have login rights to the root?
Check:	Did all of the server files load to the destination directory? Do you have sufficient disk space for the installation? If necessary, reinstall the software.

Uninstalling the Server Software

To remove the Global Array Manager Server software, complete the following procedure.

1. Type the following command (match case exactly as shown):

   pkgrm GAM ↵

2. You are prompted for confirmation as shown:

   ```
   Do you want to remove this package? [y,n,?,q]
   ```

   Select “y.” The files are removed. The Kernel is rebuilt.

3. You are prompted to boot this Kernel by default:

   ```
   Do you want this kernel to boot by default? (y/n)
   ```

   To boot this kernel by default, select “y.”

4. You are prompted to rebuild the Kernel environment:

   ```
   Do you want the kernel environment rebuilt? (y/n)
   ```

   Select “y” to rebuild the Kernel environment.

5. Removal is complete. Reboot the system, using the following command from the root directory (match case exactly as shown):

   shutdown -y -i6 -g0 ↵

Chapter 6
UnixWare

Overview

This chapter describes information about the following installation, verification, and startup of the Global Array Manager Server software for UnixWare 7.x and UnixWare 2.1.2 and 2.1.3. The software is provided on the appropriate Software Kit distribution CD-ROM with a file to create a diskette.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Global Array Manager Server Software for UnixWare 2.1.2, 2.1.3, and 7.x

Creating the Global Array Manager Server Diskette

Before installing the GAM Server for UnixWare, a diskette must be created according to the instructions in Appendix F, "Creating a GAM Server Installation Diskette."

This diskette will be used in the next section wherever instructed to insert the "GAM Server diskette for UnixWare."

☛ **Note**

After creating this diskette, DOS is not able to read it.

Installing Global Array Manager Server Software

Use *pkgadd* to install the Global Array Manager Server software for UnixWare. Complete the following procedure.

☛ **Note**

These instructions assume the installation diskette is in disk drive 1. If a different source is used, substitute that location for "diskette1" in step 3.

1. Log in as root.
2. Insert the GAM Server diskette for UnixWare in the file server's diskette drive.

3. Type the following (match case exactly as shown):

   pkgadd -d diskette1 GAM ↵

4. You are prompted to insert the diskette and confirm installation as shown:

   ```
   Insert diskette into Floppy Drive 1.
   Type [go] when ready.
     or [q] to quit: (default: go)
   ```

   To begin installation, type:

   go ↵

   The files are copied and the Kernel is rebuilt.

5. Installation is complete.

   - Modify the GAMEVENT and GAMEVLOG lines manually. Do this by editing the S99GAM file found in the directory /etc/rc2.d, changing the GAMEVENT line to include (after each `-h` parameter) the IP addresses of the client systems you will use with this server. Modify the pathname and filename in the GAMEVLOG command line if you wish to. Refer to Appendix E, GAMEVENT, for information.
   - If you wish to enable RAID Fault Management (RAIDBUILD) and optionally change its default parameters, you need to modify the RAIDBLD command line installed in S99GAM. Refer to Appendix B, RAID Fault Management, for information.
   - If you will be using drives from more than one vendor in the same RAID Group, refer to Appendix D, The MYLEXDRV.SIZ File, for information on setting drive size limits for consistency across multiple vendors' drives.

6. Be sure to remove comment markers (such as the character #) from any command line which you intend to enable.

7. Save the modified S99GAM and exit.

8. Create a user account called `gamroot`. Assign Root access privileges to that user account.

9. Reboot the system using the following command from the root directory (match case exactly as shown):

   ```
   shutdown -y -i6 -g0 ↵
   ```

Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Global Array Manager Clients (if used).

The installation of Global Array Manager Server for UnixWare causes the appropriate drivers to load automatically at system startup. No additional actions are required to start GAM Server beyond a system boot.

Troubleshooting Server Software Installation

Problem:	**An error is encountered when trying to connect to a server.**
Check:	Is the IP address of the Server correct?
Check:	Is the installation complete? Was the software successfully loaded on the server?
Check:	Is the Ethernet connection good?
Check:	Is TCP/IP installed?
Check:	Is TCP/IP set up correctly? Try Ping to find the server.
Problem:	**Global Array Manager Server does not load.**
Check:	Do you have login rights to the root?
Check:	Did all of the server files load to the destination directory? Do you have sufficient disk space for the installation? If necessary, reinstall the software.

Uninstalling the Server Software

To remove the Global Array Manager Server software, complete the following procedure.

1. Type the following command (match case exactly as shown):

   pkgrm GAM ↵

2. You are prompted for confirmation as shown:

   ```
   Do you want to remove this package [yes,no,?,quit]
   ```

   At the prompt, type:

   y ↵

   The files are removed. The Kernel is rebuilt.

3. When you see the following message, removal is complete.

   ```
   Removal of <GAM> was successful.
   ```

4. Reboot the system using the following command from the root directory (match case exactly as shown):

   shutdown -y -i6 -g0 ↵

Chapter 7
Solaris

Overview

This chapter describes information about the following installation, verification, and startup of the Global Array Manager Server software for Solaris 7.0. The software is provided on the appropriate Software Kit distribution CD-ROM with a file to create a diskette.

The Solaris driver for the Mylex Disk Array Controller supports disk drives, tape drives and CD-ROM drives under Solaris 7.0. The driver supports up to 16 controllers. Also, the driver supports secondary system drives larger than 8GB.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Global Array Manager Server Software for Solaris 7.0

Creating the Global Array Manager Server Diskette

Before installing the GAM Server for Solaris, a diskette must be created according to the instructions below using a DOS or Windows operating system.

This diskette will be used in the next section wherever instructed to insert the "GAM Server diskette for Solaris."

1. Insert a DOS formatted diskette into drive A.
2. Insert the Software Kit CD-ROM into the CD-ROM drive.
3. From the DOS prompt type
   F:\gam\solaris\x86\diskimg\gamssolx a: <Enter>

   where F: identifies the CD-ROM drive.
4. You will get a message asking if you want the disk to be overwritten to continue. Type Y for Yes and press **<Enter>**.
5. Label this disk as "GAM Server diskette for Solaris" and save until needed.

> ☛ **Note**
>
> After creating this diskette, DOS is not able to read it.

An alternative method to create this diskette is described in Appendix F.

Installing Global Array Manager Server Software

1. Access the root directory.
2. Insert the GAM Server diskette for Solaris in the file server's disk drive.
3. Type the following command to see if the Volume Management software is running on the computer you are updating:

   ```
   ps -ef | grep vold
   ```

☛ **Note**

For more information about managing diskettes and drives, see the System Administration Guide for Solaris.

4. If Volume Management is running, temporarily stop it by typing the following command line at the system prompt.

   ```
   # /etc/init.d/volmgt stop
   ```

5. Insert the GAM Server diskette into the disk drive.

6. Mount the GAM Server diskette at the /mnt mount point by typing the following command:

   ```
   # mount -F pcfs /dev/diskette /mnt
   ```

   ☛ **Note**

   You must mount the GAM Server diskette at this point in the file structure to update your computer successfully.

7. Execute the install script on the diskette, using the appropriate Solaris release directory (sol_27 for Solaris 7). For example:

   ```
   # /mnt/DU/sol_27/i86pc/Tools/install.sh -i
   ```

   The install.sh script searches for all new or updated drivers on the diskette. When a new or updated driver is found, the following messages and prompt are displayed:

   ```
   Unconditionally installing ITUs <gamdrv>
   Installing package <MYLXgam>

   Do you want to continue with the installation of
   <MYLXgam>?
   ```

   If the driver is the one you want to install, at the prompt, type Y for Yes or press the **Enter** key. If the driver is not the one you want, type N for No.

   If you select Y for Yes, the install.sh script installs the driver. You will see the following message:

   ```
   Installation of <MYLXgam> was successful.
   ```

8. When you're done and the install.sh script exits, unmount the diskette by typing the following command lines:

   ```
   # cd /
   # umount /mnt
   ```

9. Remove the GAM Server diskette from the disk drive.
10. Reboot your computer, type in the following command lines.

    ```
    # touch /reconfigure
    # reboot
    ```

11. Turn off your computer, add the new hardware, and turn on your computer again.
12. When the autoboot sequence prompt is displayed, quickly press **<Escape>**.

    The autoboot sequence is interrupted. The Solaris Device Configuration Assistant screen is displayed.

13. Press **<F2>** to continue and the following message will display:

    ```
    Determining buses..."
    ```

    The Scanning Devices screen is then displayed. System devices are scanned. When scanning is complete, the Identified Devices screen is displayed.

14. Press **<F2>** to continue and the following message will display:

    ```
    Loading driver com.bef...
    ```

    The boot Solaris screen is then displayed.

15. On the boot Solaris screen, select the device controller attached to the device that contains your install medium, in this case the main system disk.

    The following script is displayed.

    ```
    /etc/bootrc
    ```

16. At the prompt, type: (reboot)

    ```
    b -r
    ```

17. Installation of GAM Server is complete.
    - Modify the GAMEVENT and GAMEVLOG lines manually. Do this by editing the S99GAM file found in the directory /etc/rc2.d, changing the GAMEVENT line to include (after each `-h` parameter) the IP addresses of the client systems you will use with this server. Modify the pathname and filename in the GAMEVLOG command line if you wish to. Refer to Appendix E, GAMEVENT, for information.
    - If you wish to enable RAID Fault Management (RAIDBUILD) and optionally change its default parameters, you need to modify the RAIDBLD command line installed in S99GAM. Refer to Appendix B, RAID Fault Management, for information.
    - If you will be using drives from more than one vendor in the same RAID Group, refer to Appendix D, The MYLEXDRV.SIZ File, for information on setting drive size limits for consistency across multiple vendors' drives.
18. Be sure to remove comment markers (such as the character #) from any command line which you intend to enable.
19. Save the modified S99GAM and exit.
20. Create a user account called `gamroot`. Assign Root access privileges to that user account.
21. Reboot the system and at the prompt type in the following command from the root directory (match case exactly as shown):

    ```
    # init 6 ↵
    ```


Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Global Array Manager Clients (if used).

The installation of Global Array Manager Server for Solaris causes the appropriate drivers to load automatically at system startup. No additional actions are required to start GAM Server beyond a system boot.

Troubleshooting Server Software Installation

Problem:	**An error is encountered when trying to connect to a server.**
Check:	Is the IP address of the Server correct?
Check:	Is the installation complete? Was the software successfully loaded on the server?
Check:	Is the Ethernet connection good?
Check:	Is TCP/IP installed?
Check:	Is TCP/IP set up correctly? Try Ping to find the server.
Problem:	**Global Array Manager Server does not load.**
Check:	Do you have login rights to the root?
Check:	Did all of the server files load to the destination directory? Do you have sufficient disk space for the installation? If necessary, reinstall the software.

Uninstalling the Server Software

To remove the Global Array Manager Server software, complete the following procedure.

1. Type the following command (match case exactly as shown):

   pkgrm GAM ↵

2. You are prompted for confirmation as shown:

   ```
   Do you want to remove this package [yes,no,?,quit]
   ```

   At the prompt, type:

   y ↵

   The files are removed. The Kernel is rebuilt.

3. When you see the following message, removal is complete.

   ```
   Removal of <GAM> was successful
   ```

4. Reboot the system using the following command from the root directory (match case exactly as shown):

   shutdown -y -i6 -g0 ↵

Chapter 8
Linux

Overview

This chapter describes installation, startup, and troubleshooting of the Global Array Manager Server software for the Linux operating system with the following distributions:

- Red Hat 6.2
- SuSe 6.4
- Caldera 2.4
- Turbo Linux 6.0

The software is provided on the appropriate Software Kit distribution CD-ROM.

> ☛ **Note**
>
> This chapter assumes that the network administrator for this site will be performing these installation procedures.

Go to the following web sites to download the appropriate Disk Array Controller Drivers:

- For PCI Controllers:

  http://www.dandelion.com/Linux/DAC960.html

- For External Controllers:

  http://www.qlc.com/bbs-html/csg_web/adapter_pages/driver_pages/21xx/21linux.html

For instructions on how to install the disk array controller drivers, see the appropriate instructions on each web site and refer to the appropriate Linux OS distribution reference manual.

Global Array Manager Server Software for Linux

Installation Overview

This section covers the following for the Global Array Manager (GAM) Server software:

- "Installing Global Array Manager Server Software"
- "Running Global Array Manager Server"
- "Troubleshooting Server Software Installation"
- "Uninstalling the Server Software"

This process assumes that the network administrator for this site will be performing this installation procedure.

Installing Global Array Manager Server Software

1. Log in as root.
2. Mount the CD:

   ```
   mount /dev/cdrom /mnt/cdrom
   ```

   ☛ **Note**

   The mount point for SuSE is `/cdrom` .

Before Installing the GAM Server Software, you need to determine if there is already a version installed (Step 3) and then remove it (Step 4). If you are certain that no other version is installed, skip to Step 5.

3. To query the rpm database for GAM:

   ```
   rpm -qa | grep gam
   ```

4. If gam is listed, remove it:

   ```
   rpm -ev <gam file name>
   ```

5. To install the GAM Server Software:

   ```
   rpm -iv /mnt/cdrom/gam/linux/gamdrv3i.rpm
   ```

Note

The rpm -iv will make a backup of any previous */etc/mylexdrv.siz* or */etc/rc.d/init.d/Gam* files before installing new files. Check that the new files contain correct information if the saved version was modified.

To query rpm about the contents of the gam file, type:

```
rpm -qpi <gam file name>
```

6. Stop the GAM server in order to unmount the CD-ROM:

   ```
   /etc/rc.d/init.d/Gam stop
   ```

7. Unmount the CD-ROM:

   ```
   unmount /mnt/cdrom
   ```

The GAM server installation is complete.

Running Global Array Manager Server

The Global Array Manager Server runs on the server and performs the following functions:

- Monitors the controller(s) and disks in the server.
- Manages the controller(s) and associated disk subsystems in the server.
- Sends information to Web Array Manager Clients (if used).

Note

The device driver (e.g., DAC960 or qla2x00) must be loaded prior to starting Global Array Manager Server software.

To run the GAM Server software, follow these steps:

1. Log in as root.
2. Stop the GAM Server:

   ```
   /etc/rc.d/init.d/Gam stop
   ```

3. Verify that all GAM Server components are gone:

   ```
   ps -A | grep gamserv
   ```

4. If you see several process IDs left behind, you will need to remove them by typing:

   ```
   kill -g gamserv
   ```

   If necessary, you can also remove process IDs individually by typing:

   ```
   kill -9 <process ID #>
   ```

5. To restart the GAM Server type:

   ```
   /etc/rc.d/init.d/Gam start
   ```

Troubleshooting Server Software Installation

Problem: An error is encountered when trying to connect to a server.

Check: Is the HBA device driver loaded?

If the device driver is not loaded manually (via insmod qla2100) or at boot time, the server connection will not be established since “gamdrvd” was started before the HBA device driver was loaded.

Check: Is the IP address of the Server correct?

Check: Is the installation complete? Was the software successfully loaded on the server?

Check: Is the Ethernet connection good?

Check: Is TCP/IP installed?

Check: Is TCP/IP set up correctly? Try Ping to find the server.

Problem: Client won’t detect controller, but events will appear on client event log viewer.

Check: Is inetd running?

☛ **Note**

When Red Hat 6.2 is installed on a workstation, inetd is not installed. The inetd may be installed as an rpm, an upgrade, or as part of a custom installation.

Problem:	**Global Array Manager Server does not load.**
Check:	Do you have login rights to the root?
Check:	Did all of the server files load to the destination directory? Do you have sufficient disk space for the installation? If necessary, reinstall the software.

Uninstalling the Server Software

1. To query the rpm database for GAM:

   ```
   rpm -qa | grep gam
   ```

2. Locate the GAM file name within the list. Type the following to remove GAM:

   ```
   rpm -ev <gam file name>
   ```

Appendix A
SNMP Installation, Operation, and Definition

Introduction

The Global Array Manager includes a Simple Network Management Protocol (SNMP) agent for the RAID controller and connected arrays. An SNMP-based management application (also known as an SNMP manager) can monitor and manage the disk arrays. An example of an SNMP management application is Hewlett-Packard's Open View. The SNMP agent can be used to augment the Global Array Manager Client if you are already running an SNMP management application at your site.

SNMP Installation Overview

The installation of the SNMP agent is accomplished in several phases:

- Installing the agent software on the server
- Placing a copy of the management information base (MIB) in a directory which is accessible to the management application
- Compiling the MIB description file with the management application

SNMP Installation for NetWare

During installation of the Global Array Manager Server, the SNMP file was copied to its appropriate directory as shown in the table below. The file can also be copied to the server directory from a workstation's floppy disk drive (with the appropriate NetWare access rights to the server directory).

Table A-1. NetWare SNMP File

Operating system	Agent filename	Server directory
NetWare	GAMAGENT.NLM	SYS:SYSTEM

Depending upon the SNMP management application used, the MIB (an ASCII text file named MLXRAID.MIB) must be placed in a specific directory on the network management station running the management application. The MLXRAID.MIB file must be manually copied to this directory. For example:

Table A-2. Location for MIB

SNMP Application	MIB location
OpenView	\OV\MIBS
NetWare NMS	\NMS\SNMPMIBS\CURRENT

☛ **Note**

Your management application may have a different target directory. Consult the management application's user guide for the correct location.

Starting the NetWare Agent

To start the agent, enter the appropriate command from the system console:

```
LOAD GAMAGENT ↵
```

About the NetWare Agent

The GAMAGENT NLM assumes that SNMP support for NetWare servers (SNMP.NLM) is already installed on the server.

The GAMAGENT NLM will attempt to autoload the SNMP.NLM. If the SNMP.NLM file is not present, the agent will not load.

The command to load the agent can be incorporated into the AUTOEXEC.NCF or other operating system startup files as well.

SNMP Installation for Windows NT or Windows 2000

To enable the SNMP agent for Windows NT or Windows 2000, configure Windows NT or Windows 2000 for TCP/IP and SNMP services. The Mylex SNMP Extension Agent file is GAMAGENT.DLL.

Install the SNMP Agent

The Global Array Manager Server installation will copy the necessary files for the Mylex SNMP Extension Agent DLL to be added to the Windows NT registry. If the SNMP agent is required, you should make sure that TCP/IP and Windows NT SNMP services are configured correctly.

> ☛ **Note**
>
> If SNMP was NOT checked during the original installation, you should *re-run* the GAM Server installation with SNMP checked before SNMP will be usable. The SNMP option can be selected without the other three components (Driver, Program Files, DMI).

MIB Compilation and Definition File Creation

The next step in the installation involves the integration of 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 that the compilation process successfully integrates the contents of the MLXRAID.MIB file (known as the MYLEXRAID_MIB object when viewed from within the SNMP application), into the traps database.

MYLEXRAIDMIB Object Definitions

Traps

All traps are defined under this object according to the following table:

Table A-3. Traps and Trap Numbers

Trap	Trap number
Traps 1-127 are physical device traps	
physicalDeviceOnline	1
physicalDeviceHotspare	2
physicalDeviceHardError	3
physicalDevicePFA	4
physicalDeviceAutoRebuildStarted	5
physicalDeviceManualRebuildStarted	6
physicalDeviceRebuildDone	7
physicalDeviceRebuildCanceled	8
physicalDeviceRebuildError	9
physicalDeviceRebuildNewDeviceFailed	10
physicalDeviceRebuildSystemDeviceFailed	11
physicalDeviceDead	12
physicalDeviceFound	13
physicalDeviceGone	14
physicalDeviceUnconfigured	15
physicalDeviceExpandCapacityStarted	16
physicalDeviceExpandCapacityDone	17
physicalDeviceExpandCapacityError	18
physicalDeviceCommandTimeout	19
physicalDeviceCommandAborted	20
physicalDeviceCommandRetried	21
physicalDeviceParityError	22
physicalDeviceSoftError	23
physicalDeviceMiscellaneousError	24
physicalDeviceReset	25
physicalDeviceActivespare	26
physicalDeviceWarmspare	27
physicalDeviceRequestSense	28
[RESERVED]	29-57
physicalDevicevRebuildStartFailed	58
[RESERVED]	59-127
Traps 128-255 are logical drive (system device) traps	
systemDeviceCheckStarted	128
systemDeviceCheckDone	129
systemDeviceCheckCanceled	130
systemDeviceCheckError	131
systemDeviceCheckSystemDeviceFailed	132

Table A-3. Traps and Trap Numbers

Trap	Trap number
systemDeviceCheckPhysicalDeviceFailed	133
systemDeviceOffline	134
systemDeviceCritical	135
systemDeviceOnline	136
systemDeviceAutoRebuildStarted	137
systemDeviceManualRebuildStarted	138
systemDeviceRebuildDone	139
systemDeviceRebuildCanceled	140
systemDeviceRebuildError	141
systemDeviceRebuildNewDeviceFailed	142
systemDeviceRebuildSystemDeviceFailed	143
systemDeviceInitializationStarted	144
systemDeviceInitializationDone	145
systemDeviceInitializationCanceled	146
systemDeviceInitializationFailed	147
systemDeviceFound	148
systemDeviceGone	149
systemDeviceExpandCapacityStarted	150
systemDeviceExpandCapacityDone	151
systemDeviceExpandCapacityError	152
systemDeviceBadblock	153
systemDeviceSizeChanged	154
systemDeviceTypeChanged	155
systemDeviceBadDataBlocksFound	156
systemDeviceWriteLUNMap	157
systemDeviceDataReadfromBlockinBDT	158
[RESERVED]	159-255
Traps 256-271 are FMT fan traps	
fmtFanFailed	256
fmtFanOK	257
aemiFanFailed	258
fmtFanNotPresent	259
[RESERVED]	260-271
Traps 272-287 are FMT power traps	
fmtPowerFailed	272
fmtPowerOK	273
aemiPowerSupplyFailed	274
fmtPowerNotPresent	275
[RESERVED]	276-287
Traps 288-303 are FMT temperature traps	
fmtHeatBad	288
fmtHeatCritical	289
fmtHeatOK	290
aemiOverTemperature	291
fmtHeatNotPresent	292

Table A-3. Traps and Trap Numbers

Trap	Trap number
[RESERVED]	293-303
Traps 304-306 are StorageWorks traps	
fmtStorageWorksFailed	304
fmtStorageWorksCritical	305
fmtStorageWorksOK	306
Traps 307-383 are FMT enclosure traps	
[RESERVED]	307-319
fmtEnclosureFanFailed	320
fmtEnclosureFanOK	321
fmtEnclosureFanNotPresent	322
fmtEnclosurePowerFailed	323
fmtEnclosurePowerOK	324
fmtEnclosurePowerNotPresent	325
fmtEnclosureHeatSensorFailed	326
fmtEnclosureHeatSensorCritical	327
fmtEnclosureHeatSensorOK	328
fmtEnclosureHeatSensorNotPresent	329
fmtEnclosureAccessCritical	330
fmtEnclosureAccessOK	331
fmtEnclosureAccessOffline	332
[RESERVED]	333-383
Traps 384-511 are miscellaneous traps	
systemStarted	384
writebackError	385
stateChangeTableFull	386
[NOT USED]	387
adapterDead	388
adapterReset	389
adapterFound	390
adapterGone	391
batteryBackupUnitFound	392
batteryBackupUnitPowerLow	393
batteryBackupUnitPowerOK	394
[RESERVED]	395-403
controllerFirmwareMismatch	404
controllerBBUNotRespond	405
[RESERVED]	406-413
controllerECCEror	414
controllerHardECCError	415
[RESERVED]	416-417
controllerBBUDead	418
[RESERVED]	419-511
Traps 512-640 are system traps	
gamSystemStarted	512
systemSizeTableFull	513

Table A-3. Traps and Trap Numbers

Trap	Trap number
systemUserLoggedIn	514
systemUserLoggedOut	515
[RESERVED]	516-640
Reserved Traps	641-(16^7)

Controller Information Group

This object is used to find information about any or all of the controllers present in the system.

Table A-4. Controller Information Group

Table object	Data Type	Description	
a2ControllerNumber 1.3.6.1.4.1.1608.1.1.1.2.1.1	Integer	References a particular controller by its controller number	
a2OperationalState 1.3.6.1.4.1.1608.1.1.1.2.1.2	Integer	Operational state of the controller:	
		Value	Meaning
		1	Functional
		2	Non-Functional
		128	Not Present
a2FirmwareRevision 1.3.6.1.4.1.1608.1.1.1.2.1.3	Display String	A displayable ASCII string containing the firmware version of the controller	
a2ConfiguredChannels 1.3.6.1.4.1.1608.1.1.1.2.1.4	Integer	The maximum number of SCSI channels that can be configured on the controller	
a2ActualChannels 1.3.6.1.4.1.1608.1.1.1.2.1.5	Integer	Actual number of SCSI channels present	
a2MaximumLogicalDrives 1.3.6.1.4.1.1608.1.1.1.2.1.6	Integer	Maximum number of logical drives supported by the controller	
a2MaximumTargetsPerChannel 1.3.6.1.4.1.1608.1.1.1.2.1.7	Integer	The maximum number of targets (SCSI IDs) supported per channel	
a2MaximumTaggedRequests 1.3.6.1.4.1.1608.1.1.1.2.1.8	Integer	The maximum number of tagged requests per target	
a2MaximumDataTransferSizePerIoRequestInK 1.3.6.1.4.1.1608.1.1.1.2.1.9	Integer	The maximum data transfer size supported (in KB)	
a2MaximumConcurrentCommands 1.3.6.1.4.1.1608.1.1.1.2.1.10	Integer	The maximum number of concurrent commands that are supported	
a2RebuildRate 1.3.6.1.4.1.1608.1.1.1.2.1.11	Integer	The priority of rebuild versus system I/Os; Value is 0 to 50; 0 = lowest rebuild priority, 50 = highest rebuild priority	

Table A-4. Controller Information Group

Table object	Data Type	Description
a2LogicalSectorSizeInBytes 1.3.6.1.4.1.1608.1,1,1,2,1,12	Integer	The logical sector (block) size in bytes (Default: 512 bytes)
a2PhysicalSectorSizeInBytes 1.3.6.1.4.1.1608.1.1.1.2.1.13	Integer	The physical sector (block) size in bytes (Default: 512 bytes)
a2CacheLineSizeInBytes 1.3.6.1.4.1.1608.1.1.1.2.1.14	Integer	The cache line size in bytes
a2CacheSizeInMb 1.3.6.1.4.1.1608.1.1.1.2.1.15	Integer	The memory size of the controller cache in MB
a2CacheMemoryType 1.3.6.1.4.1.1608.1.1.1.2.1.16	Integer	Numerical identification of the controller cache memory type: Value – Meaning 1 – DRAM 2 – EDRAM 3 – EDO 4 – SDRAM 65 – DRAM with parity protection 66 – EDRAM with parity protection 67 – EDO with parity protection 68 – SDRAM with parity protection 129 – DRAM with ECC protection 130 – EDRAM with ECC protection 131 – EDO with ECC protection 132 – SDRAM with ECC protection 255 – Unknown
a2EpromSizeInKb 1.3.6.1.4.1.1608.1.1.1.2.1.17	Integer	The flash EPROM size in KB
a2BusType 1.3.6.1.4.1.1608.1.1.1.2.1.18	Integer	Numerical identification of the controller's bus type: Value – Meaning 1 – EISA 2 – MCA

Table A-4. Controller Information Group

Table object	Data Type	Description	
		3	PCI
		4	VESA
		5	ISA
		255	Unknown
a2ControllerClass 1.3.6.1.4.1.1608.1.1.1.2.1.19	Integer	The class of the controller:	
		Value	Meaning
		1	RAID controller
		96	SCSI-SCSI
		128	HBA controller
		255	Unknown
a2ControllerModel 1.3.6.1.4.1.1608.1.1.1.2.1.20	Integer	Numerical identification of the controller model:	
		Value	Meaning
		1	DAC960E
		8	DAC960M
		16	DAC960PD
		17	DAC960PL
		18	DAC960PDU
		19	DAC960PE
		20	DAC960PG
		21	DAC960PJ
		22	DAC960PTL0
		23	DAC960PR
		24	DAC960PRL
		25	DAC960PT
		26	DAC1164P
		27	DAC960PTL1
		28	EXR2000P
		29	EXR3000P
		30	AR352
		31	AR170
		32	AR160
		96	DAC960S
		97	DAC960SU
		98	DAC960SX
		99	DAC960SF
		100	DAC960SS

Table A-4. Controller Information Group

Table object	Data Type	Description	
a2ControllerModel (continued)		101	DAC960FL
		102	DAC960LL
		103	DAC960FF
		104	FC ARRAY
		105	DAC960MFL
		106	DAC960MFF
		107	DAC960FFX
		255	Unknown
a2SystemBusNumber 1.3.6.1.4.1.1608.1.1.1.2.1.21	Integer	The system bus number for the controller, this value is supplied by the Operating system and may not be defilned for all operating systems	
a2SlotNumber 1.3.6.1.4.1.1608.1.1.1.2.1.22	Integer	The slot number where the controller resides, defined for EISA and MCA controller only	
a2InterruptVectorNumber 1.3.6.1.4.1.1608.1.1.1.2.1.23	Integer	The interrupt vector number being used by the controller. This value is a mapped IRQ supplied by Operating System and may not be same as the actual Interrupt Vector	
a2InterruptMode 1.3.6.1.4.1.1608.1.1.1.2.1.24	Integer	Numerical identification of the interrupt mode (edge/level):	
		Value	Meaning
		0	EDGE
		1	LEVEL
		255	Unknown
a2NumberOfPhysicalDevices 1.3.6.1.4.1.1608.1.1.1.2.1.25	Integer	The number of SCSI devices detected	
a2NumberOfPhysicalDevicesOffline 1.3.6.1.4.1.1608.1.1.1.2.1.26	Integer	The number of SCSI devices with an operational state of DEAD	
a2NumberOfLogicalDevices 1.3.6.1.4.1.1608.1.1.1.2.1.27	Integer	The number of logical devices currently configured	
a2NumberOfLogicalDevicesCritical 1.3.6.1.4.1.1608.1.1.1.2.1.28	Integer	The number of logical devices in a “critical” state	
a2NumberOfLogicalDevicesOffline 1.3.6.1.4.1.1608.1.1.1.2.1.29	Integer	The number of OFFLINE logical devices	

Table A-4. Controller Information Group

Table object	Data Type	Description
a2FaultManagementType 1.3.6.1.4.1.1608.1.1.1.2.1.30	Integer	The controller's fault management type: Value: Meaning 1: AEMI 2: OEM1 4: OEM2 8: OEM3 16: CONNER 32: SAFTE 64: SES 0: Not Present
a2ArrayInformation 1.3.6.1.4.1.1608.1.1.1.2.1.31	Display String	A displayable ASCII string containing the array information. The information is of the form: A(ch-targ ch-targ) B(ch-targ), where A,B = Array List, ch = channel number, targ = SCSI target number
a2LogicalDriveReadRequestsCount 1.3.6.1.4.1.1608.1.1.1.2.1.32	Integer	The total number of read requests to all logical drives
a2DataReadFromLogicalDrivesInMb 1.3.6.1.4.1.1608.1.1.1.2.1.33	Integer	The amount of data that was read from all logical drives in MB
a2LogicalDriveWriteRequestsCount 1.3.6.1.4.1.1608.1.1.1.2.1.34	Integer	The total number of write requests to all logical drives
a2DataWrittenToLogicalDrivesInMb 1.3.6.1.4.1.1608.1.1.1.2.1.35	Integer	The amount of data that was written to all logical drives in MB
a2LogicalDrivesReadCacheHit Percentage 1.3.6.1.4.1.1608.1.1.1.2.1.36	Integer	The percentage rate of read cache hits for all logical drives
a2PhysicalDriveReadRequestsCount 1.3.6.1.4.1.1608.1.1.1.2.1.37	Integer	The total number of read requests to all physical drives
a2DataReadFromPhysicalDrivesInMb 1.3.6.1.4.1.1608.1.1.1.2.1.38	Integer	The amount of data that was read from all physical drives in MB
a2PhysicalWriteRequestsCount 1.3.6.1.4.1.1608.1.1.1.2.1.39	Integer	The total number of write requests to all physical drives

Table A-4. Controller Information Group

Table object	Data Type	Description	
a2DataWrittenToPhysicalDrivesInMb 1.3.6.1.4.1.1608.1.1.1.2.1.40	Integer	The amount of data that was written to all physical drives in MB	
a2StorageWorksCabinetStatusOn Channel0 1.3.6.1.4.1.1608.1.1.1.2.1.41	Integer	StorageWorks cabinet status on channel 0	
		Value	Meaning
		1 2 3	Ok Not Ok Not Present
a2StorageWorksCabinetStatusOn Channel1 1.3.6.1.4.1.1608.1.1.1.2.1.42	Integer	StorageWorks cabinet status on channel 1	
		Value	Meaning
		1 2 3	Ok Not Ok Not Present
a2StorageWorksCabinetStatusOn Channel2 1.3.6.1.4.1.1608.1.1.1.2.1.43	Integer	StorageWorks cabinet status on channel 2	
		Value	Meaning
		1 2 3	Ok Not Ok Not Present
a2BatteryBackupUnitStatus 1.3.6.1.4.1.1608.1.1.1.2.1.44	Integer	BBU status	
		0 1	Not Present Present
a2PartnerControllerNumber 1.3.6.1.4.1.1608.1.1.1.2.1.45	Integer	Dual Active Partner Controller Number	
a2WWName 1.3.6.1.4.1.1608.1.1.1.2.1.46	Display String	Controller World-Wide Name	

Notes:

- *a2ControllerNumber* is the index for any search operations against this object.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object whose MIB ID is in the query.

- A GETNEXT operation returns the object's information which is next to the MIB ID given in the query.
- Controller numbers start at 0.

Logical Drive Information Group

This object is used to determine information about any or all the logical drives present in the system.

Table A-5. Logical Drive Information Group

Table object	Data Type	Description	
a3ControllerNumber 1.3.6.1.4.1.1608.1.1.1.3.1.1	Integer	References a particular controller by its controller number	
a3LogicalDriveNumber 1.3.6.1.4.1.1608.1.1.1.3.1.2	Integer	The logical drive number	
a3OperationalState 1.3.6.1.4.1.1608.1.1.1.3.1.3	Integer	Numerical identification of the logical drive state:	
		Value	Meaning
		3 4 255 128	ONLINE CRITICAL OFFLINE NotPresent
a3RaidLevel 1.3.6.1.4.1.1608.1.1.1.3.1.4	Integer	The RAID level selected for the logical drive	
		0 1 3 5 6 7	RAID0 RAID1 RAID3 RAID5 RAID0+1 JBOD
a3WritePolicy 1.3.6.1.4.1.1608.1.1.1.3.1.5	Integer	Numerical identification of the write policy setting for the logical drive:	
		Value	Meaning
		0 128	WRITE THRU WRITE BACK
a3SizeInMb 1.3.6.1.4.1.1608.1.1.1.3.1.6	Integer	The logical drive capacity in MB	
a3PhysicalSizeInMb 1.3.6.1.4.1.1608.1.1.1.3.1.7	Integer	The total physical capacity used by this logical drive in MB	
a3StripeSizeInBytes 1.3.6.1.4.1.1608.1.1.1.3.1.8	Integer	The value of the stripe size in bytes, valid only for RAID levles 0, 5, and 6	

Table A-5. Logical Drive Information Group

Table object	Data Type	Description
a3PhysicalDriveMap 1.3.6.1.4.1.1608.1.1.1.3.1.9	Display String	A displayable ASCII string containing the list of all physical drives that make up the logical drive. This information is provided in Channel Target combination form. For example, (0-1, 0-2, 1-3, 1-11)
a3ArrayList 1.3.6.1.4.1.1608.1.1.1.3.1.10	Display String	The list of arrays across which this logical drive spans. For example, A, B, etc.
a3RaidLevelString 1.3.6.1.4.1.1608.1.1.1.3.1.11	Display String	RAID Level associated with Logical Drive

Notes:

- *a3ControllerNumber* and *a3LogicalDriveNumber* compose the Index for a search operation.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object at the address (a3ControllerNumber/a3LogicalDriveNumber) specified in the argument.
- A GETNEXT operation returns information about the next object at the smallest address greater than the address specified in the argument.
- The lowest address of a drive (a3ControllerNumber/ a3LogicalDriveNumber) is defined as 0/0, followed by 0,1... 1/0, 1/1 and so on.
- Controller numbers start at 0. Logical drive numbers start at 0.

Physical Device Information Group

This object is used to find information about any or all of the physical devices present in the system.

Table A-6. Physical Device Information Group

Table object	Data Type	Description
a4ControllerNumber 1.3.6.1.4.1.1608.1.1.1.4.1.1	Integer	References a particular controller by its controller number
a4ScsiBusId 1.3.6.1.4.1.1608.1.1.1.4.1.2	Integer	SCSI channel number
a4ScsiTargetId 1.3.6.1.4.1.1608.1.1.1.4.1.3	Integer	SCSI target number
a4ScsiLunId 1.3.6.1.4.1.1608.1.1.1.4.1.4	Integer	SCSI logical unit number (LUN) of the SCSI device
a4OperationalState 1.3.6.1.4.1.1608.1.1.1.4.1.5	Integer	Numerical identification of the physical device state: Value — Meaning 0 — UnConfigured 1 — ONLINE 3 — REBUILDING 4 — INSTABORT 6 — NOT PRESENT 8 — DEAD 33 — HOT SPARE 130 — REBUILD CANCELLED
a4VendorId 1.3.6.1.4.1.1608.1.1.1.4.1.6	Display String	The SCSI device vendor ID. This is the vendor ID from the SCSI INQUIRY data
a4ProductId 1.3.6.1.4.1.1608.1.1.1.4.1.7	Display String	The SCSI device product ID. This is the product ID from the SCSI INQUIRY data
a4ProductRevisionLevel 1.3.6.1.4.1.1608.1.1.1.4.1.8	Display String	The SCSI device product revision level. This is the revision level from the SCSI INQUIRY data
a4SizeInMb 1.3.6.1.4.1.1608.1.1.1.4.1.9	Integer	The physical device capacity in MB

Table A-6. Physical Device Information Group

Table object	Data Type	Description	
a4DeviceType 1.3.6.1.4.1.1608.1.1.1.4.1.10	Integer	Numerical identification of the SCSI device type. The value matches the device type value of the SCSI INQUIRY data:	
		Value	Meaning
		0	FIXED DISK
		1	TAPE
		2	PRINTER
		3	PROCESSOR
		4	WORM
		5	CDROM
		6	SCANNER
		7	MO
		8	CHANGER
		9	COMMUNICATION DEVICE
		10	GRAPHICS-0
		11	GRAPHICS-1
		12-30	Reserved
		31	Unknown
		199	SCSI HOST
		204	Ctrl Channel
a4SoftErrorsCount 1.3.6.1.4.1.1608.1.1.1.4.1.11	Integer	The number of soft errors that occurred	
a4HardErrorsCount 1.3.6.1.4.1.1608.1.1.1.4.1.12	Integer	The number of hard errors that occurred	
a4ParityErrorsCount 1.3.6.1.4.1.1608.1.1.1.4.1.13	Integer	The number of parity errors that occurred	
a4MiscErrorsCount 1.3.6.1.4.1.1608.1.1.1.4.1.14	Integer	The number of miscellaneous errors that occurred	
a4ArrayList 1.3.6.1.4.1.1608.1.1.1.4.1.15	Display String	The list of arrays to which this physical drive belongs. For example, A, B, etc.	
a4LogicalDriveList 1.3.6.1.4.1.1608.1.1.1.4.1.16	Integer	The list of logical drives that depend on this physical drive. For example, 0, 1, etc.	

Notes:

- *a4ControllerNumber*, *a4ScsiBusId,* and *a4ScsiTargetId* comprise the Index for the search operation.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object at the address (a4ControllerNumber/a4ScsiBusId/a4ScsiTargetId) specified in the argument.
- A GETNEXT operation returns information about the next object at the smallest address greater than the address specified in the argument.
- The lowest address of a device (a4ControllerNumber/a4ScsiBusId/ a4ScsiTargetId) is defined as 0/0/0, followed by 0/0/1... 0/1/0, 0/1/1... 1/0/0,1/0/1 and so on.
- Controller numbers start at 0. Channel numbers start at 0. Target IDs start at 0.

RAID Management Software Group

This object contains the build date and version number for the Global Array Manager driver, Disk Array Controller device driver, and SNMP agent.

Table A-7. RAID Management Software Group

Table object	Data Type	Description
a5ManagementSoftwareRevision 1.3.6.1.4.1.1608.1.1.1.5.1.1	Display String	A displayable string that shows the revision level of the SNMP agent
a5ManagementSoftwareBuildDate 1.3.6.1.4.1.1608.1.1.1.5.1.2	Display String	A displayable string that shows the build date for the SNMP agent
a5MylexDacDeviceDriverRevision 1.3.6.1.4.1.1608.1.1.1.5.1.3	Display String	A displayable string that shows the revision level of the controller device driver
a5MylexDacDeviceDriverBuildDate 1.3.6.1.4.1.1608.1.1.1.5.1.4	Display String	A displayable string that shows the build date for the controller device driver
a5GamDriverRevision 1.3.6.1.4.1.1608.1.1.1.5.1.5	Display String	A displayable string that shows the revision level of the Global Array Manager (GAM) driver
a5GamDriverBuildDate 1.3.6.1.4.1.1608.1.1.1.5.1.6	Display String	A displayable string that shows the build date for the Global Array Manager (GAM) driver

Notes:

- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object at the address specified in the argument.
- A GETNEXT operation returns information about the next object at the smallest address greater than the address specified in the argument.

Logical Drive Statistics Group

This object is used to determine statistics about all logical drives configured on a controller.

Table A-8. Logical Drive Statistics Group

Table object	Data Type	Description
a6ControllerNumber 1.3.6.1.4.1.1608.1.1.1.6.1.1	Integer	References a particular controller by its controller number
a6LogicalDriveNumber 1.3.6.1.4.1.1608.1.1.1.6.1.2	Integer	The logical drive number
a6ReadRequestsCount 1.3.6.1.4.1.1608.1.1.1.6.1.3	Integer	The total number of read requests
a6DataReadInMb 1.3.6.1.4.1.1608.1.1.1.6.1.4	Integer	The total amount of data that was read in MB
a6WriteRequestsCount 1.3.6.1.4.1.1608.1.1.1.6.1.5	Integer	The total number of write requests
a6DataWrittenInMb 1.3.6.1.4.1.1608.1.1.1.6.1.6	Integer	The total amount of data that was written in MB
a6ReadCacheHitPercentage 1.3.6.1.4.1.1608.1.1.1.6.1.7	Integer	The percentage rate of read cache hits

Notes:

- *a6ControllerNumber* and *a6LogicalDriveNumber* compose the Index for a search operation.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object at the address (a6ControllerNumber/a6LogicalDriveNumber) specified in the argument.
- A GETNEXT operation returns information about the next object at the smallest address greater than the address specified in the argument.
- The lowest address of a drive (a6ControllerNumber/ a6LogicalDriveNumber) is defined as 0/0, followed by 0,1... 1/0, 1/1 and so on.
- Controller numbers start at 0. Logical drive numbers start at 0.

Physical Drive Statistics Group

This object is used to determine statistics about all physical drives configured on a controller.

Table A-9. Physical Drive Statistics Group

Table object	Data Type	Description
a7ControllerNumber 1.3.6.1.4.1.1608.1.1.1.7.1.1	Integer	References a particular controller by its controller number
a7ScsiBusID 1.3.6.1.4.1.1608.1.1.1.7.1.2	Integer	SCSI channel number
a7ScsiTargetId 1.3.6.1.4.1.1608.1.1.1.7.1.3	Integer	SCSI target number
a7ScsiLun 1.3.6.1.4.1.1608.1.1.1.7.1.4	Integer	SCSI logical unit number (LUN) of the SCSI device
a7ReadRequestsCount 1.3.6.1.4.1.1608.1.1.1.7.1.5	Integer	The total number of read requests
a7DataReadInMb 1.3.6.1.4.1.1608.1.1.1.7.1.6	Integer	The total amount of data that was read in MB
a7WriteRequestsCount 1.3.6.1.4.1.1608.1.1.1.7.1.7	Integer	The total number of write requests
a7DataWrittenInMb 1.3.6.1.4.1.1608.1.1.1.7.1.8	Integer	The total amount of data that was written in MB

Notes:

- *a7ControllerNumber*, *a7ScsiBusId,* and *a7ScsiTargetId* comprise the Index for the search operation.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object at the address (a7ControllerNumber/a7ScsiBusId/a7ScsiTargetId) specified in the argument.
- A GETNEXT operation returns information about the next object at the smallest address greater than the address specified in the argument.
- The lowest address of a device (a7ControllerNumber/a7ScsiBusId/ a7ScsiTargetId) is defined as 0/0/0, followed by 0/0/1, ... 0/1/0, 0/1/ 1,... 1/0/0,1/0/1 and so on.
- Controller numbers start at 0. Channel numbers start at 0. Target IDs start at 0.

Fault Management Cabinet Information Group

This object is used to obtain information about the fault management cabinet that is in use.

Table A-10. Fault Management Cabinet Information Group

Table object	Data Type	Description
a8ControllerNumber 1.3.6.1.4.1.1608.1.1.1.8.1.1	Integer	References a particular controller by its controller number
a8ScsiBusId 1.3.6.1.4.1.1608.1.1.1.8.1.2	Integer	SCSI channel number
a8CabinetNumber 1.3.6.1.4.1.1608.1.1.1.8.1.3	Integer	The cabinet number
a8ScsiTargetId 1.3.6.1.4.1.1608.1.1.1.8.1.4	Integer	SCSI target number
a8ScsiLun 1.3.6.1.4.1.1608.1.1.1.8.1.5	Integer	SCSI logical unit number (LUN) of the SCSI device
a8CabinetType 1.3.6.1.4.1.1608.1.1.1.8.1.6	Integer	Numerical identification of fault management cabinet type: Value – Meaning 1 – CONNER CR6 2 – CONNER Smart Cabinet 3 – Safte 32 – SAFTE 64 – SES 255 – Unknown
a8NumberOfFans 1.3.6.1.4.1.1608.1.1.1.8.1.7	Integer	The number of fans housed in the cabinet
a8NumberOfPowerSupplyUnits 1.3.6.1.4.1.1608.1.1.1.8.1.8	Integer	The number of power supply units installed
a8NumberOfHeatSensors 1.3.6.1.4.1.1608.1.1.1.8.1.9	Integer	The number of heat sensors
a8NumberOfDriveSlots 1.3.6.1.4.1.1608.1.1.1.8.1.10	Integer	The number of drive slots
a8NumberOfDoorLocks 1.3.6.1.4.1.1608.1.1.1.8.1.11	Integer	The number of door locks
a8NumberOfSpeakers 1.3.6.1.4.1.1608.1.1.1.8.1.12	Integer	The number of speakers
a8NumberOfFansCritical 1.3.6.1.4.1.1608.1.1.1.8.1.13	Integer	The number of fans in a “critical” state

Table A-10. Fault Management Cabinet Information Group

Table object	Data Type	Description
a8NumberOfPowerSupplyUnitsCritical 1.3.6.1.4.1.1608.1.1.1.8.1.14	Integer	The number of power supply units in a “critical” state
a8NumberOfHeatSensorsCritical 1.3.6.1.4.1.1608.1.1.1.8.1.15	Integer	The number of heat sensors in a “critical” state
a8NumberOfFansFailed 1.3.6.1.4.1.1608.1.1.1.8.1.16	Integer	The number of fans in the “failed” state
a8NumberOfPowerSupplyUnitsFailed 1.3.6.1.4.1.1608.1.1.1.8.1.17	Integer	The number of power supply units in the “failed” state
a8NumberOfHeatSensorsFailed 1.3.6.1.4.1.1608.1.1.1.8.1.18	Integer	The number of heat sensors in the “failed” state

Notes:

- *a8ControllerNumber*, *a8ScsiBusId,* and *a8CabinetNumber* comprise the Index for the search operation.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object at the address (a8ControllerNumber/a8ScsiBusId/a8ScsiTargetId) specified in the argument.
- A GETNEXT operation returns information about the next object at the smallest address greater than the address specified in the argument.
- The lowest address of a device (a8ControllerNumber/a8ScsiBusId/ a8CabinetNumber) is defined as 0/0/0, followed by 0/0/1... 0/1/0, 0/1/ 1... 1/0/0,1/0/1, and so on.
- Controller numbers start at 0. Channel numbers start at 0. Target IDs start at 0.

RAID Event Information Group

This object is used to obtain information on events that occur for any or all of the controllers. This group's information is used to send SNMP traps to the SNMP Manager workstation.

Table A-11. RAID Event Information Group

Table object	Data Type	Description
a9EventTableIndex 1.3.6.1.4.1.1608.1.1.1.9.1.1	Integer	The index to the Event Table
a9EventCode 1.3.6.1.4.1.1608.1.1.1.9.1.2	Integer	Numerical identification of the event codes for events. (For event codes, see "Traps" beginning on page A-6)
a9EventTimeStamp 1.3.6.1.4.1.1608.1.1.1.9.1.3	Integer	The time associated with the event. This is provided as the number of seconds since midnight, January 1, 1970
a9ControllerNumber 1.3.6.1.4.1.1608.1.1.1.9.1.4	Integer	References a particular controller by its controller number
a9ChannelNumber 1.3.6.1.4.1.1608.1.1.1.9.1.5	Integer	SCSI channel number; valid for physical drive events and fault management events
a9TargetNumber 1.3.6.1.4.1.1608.1.1.1.9.1.6	Integer	SCSI target ID; valid for physical drive events
a9LunNumber 1.3.6.1.4.1.1608.1.1.1.9.1.7	Integer	SCSI logical unit number (LUN) of the physical device; valid for physical drive events
a9LogicalDriveNumber 1.3.6.1.4.1.1608.1.1.1.9.1.8	Integer	The logical drive number; valid for logical drive events
a9FmtCabinetNumber 1.3.6.1.4.1.1608.1.1.1.9.1.9	Integer	The fault management cabinet number; valid for fault management events
a9FanUnitNumber 1.3.6.1.4.1.1608.1.1.1.9.1.10	Integer	The fan unit number in the fault management cabinet; valid for fault management events
a9PowerSupplyUnitNumber 1.3.6.1.4.1.1608.1.1.1.9.1.11	Integer	The power supply unit number in the fault management cabinet; valid for fault management events
a9HeatSensorUnitNumber 1.3.6.1.4.1.1608.1.1.1.9.1.12	Integer	The heat sensor unit number

Notes:

- The value -1 in any of the object fields signifies that the field is not valid for the event being considered.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object whose MIB ID is in the query.
- A GETNEXT operation returns the object's information which is next to the MIB ID given in the query.

Battery Backup Unit Information Group

This object is used to obtain information about the Battery Backup Unit (BBU).

Table A-12. Battery Backup Unit Information Group

Table object	Data Type	Description	
a10ControllerNumber 1.3.6.1.4.1.1608.1.1.1.10.1.1	Integer	References a particular controller by its controller number	
a10OperationalState 1.3.6.1.4.1.1608.1.1.1.10.1.2	Integer	Operational state of the Battery Backup Unit (BBU)	
		Value	Meaning
	Integer	1	No recondition since power on
	Integer	2	Recondition needed
	Integer	4	First warning on low battery charge
	Integer	8	Last warning on low battery charge
	Integer	16	Reconditioning active
	Integer	32	Discharging
	Integer	64	Fast charging
	Integer	128	Low power alarm
	Integer	255	No battery backup present
a10BatteryType 1.3.6.1.4.1.1608.1.1.1.10.1.3	Integer	The battery type	
	Integer	0	Unknown
	Integer	1	Nickel Cadmium
	Integer	2	NiMh
	Integer	3	Lithium Ion
	Integer	254	No battery backup present
a10CurrentPowerInHours 1.3.6.1.4.1.1608.1.1.1.10.1.4	Integer	Current battery power in hours	
a10MaximumPowerInHours 1.3.6.1.4.1.1608.1.1.1.10.1.5	Integer	Maximum battery power in hours	
a10ThresholdValueInHours 1.3.6.1.4.1.1608.1.1.1.10.1.6	Integer	Battery threshold value in hours	
a10ChargeLevelInPercentage 1.3.6.1.4.1.1608.1.1.1.10.1.7	Integer	Current charge level of the battery (%)	

Table A-12. Battery Backup Unit Information Group

a10Version 1.3.6.1.4.1.1608.1.1.1.10.1.8	Integer	The battery hardware version
a10OperationalStateString 1.3.6.1.4.1.1608.1.1.1.10.1.9	Display String	Operational State of Battery Backup Unit

Notes:

- *a10ControllerNumber* is the index for any search operations against this object.
- This is a READ-ONLY object. No SET operations are allowed.
- A GET operation returns information about the object whose MIB ID is in the query.
- A GETNEXT operation returns the object's information which is next to the MIB ID given in the query.
- Controller numbers start at 0.

Appendix B
RAID Fault Management

RAIDBUILD Utility Overview

The RAIDBUILD (RAIDBLD) utility, available for all GAM Server supported operating system platforms, offers more user control over the following RAID fault management activities:

- Scanning for failed hot spare drives and/or inactive online physical devices, and defining the interval between scans.
- Changing the path and filename of the file which will hold all RAIDBLD message log information.
- Setting the device name of a console which will display all RAIDBLD message log information with an audible tone as each message is displayed.
- Performing an "automatic rebuild," which starts a drive rebuild process as soon as a failed drive is replaced.
- Performing background "consistency checks," specifying the start time, interval between consistency checks, and whether or not to fix errors on-the-fly.

RAIDBLD Command Line

The RAIDBLD utility file is installed during normal GAM Server installation under all supported operating systems. During installation of GAM Server, there is an instruction to modify the GAMEVENT and GAMEVLOG command lines in the system startup file to specify the IP addresses of client systems and the path and name of the message log file. Within this same startup file, the RAIDBLD command line (disabled by default) must be enabled if you wish to achieve any RAID fault management.

> ☛ **Note**
>
> RAIDBLD is not supported with external controllers, such as: DACSF, DACFL, FFx, Meteor FF, etc.

The following RAIDBLD command line and part of the gamscm.ini file is installed during GAM Server installation:

```
# raidbld.exe -s 7 -S 1 -r -R 1 -T 0 -t 24 -l [path]raidbld.log [bk]
```

where:

: signifies that the following text line is a disabled command line or is a comment;

[path] : is the directory path to the raidbld utility file or the raidbld.log file;

[bk] : is an operating system-specific parameter which runs RAIDBLD in the background. [bk] is & for Unix operating systems and is blank for all other operating systems.

> ☛ **Note**
>
> Individual command line parameters will be discussed in a later section. The correct background run parameter [bk] will already be present in the RAIDBLD command line after GAM Server installation.

Enabling and Running RAID Fault Management (RAIDBLD)

To enable RAID fault management using the RAIDBLD utility, simply remove the "#" (comment line indicator) from the beginning of the RAIDBLD command line.

Once you have removed the "#" you may wish to change one or more of the command line parameter default settings (the information after raidbld on the command line). The next section introduces the command line parameters, identifies the installed defaults, and indicates other options, if available.

RAIDBLD Command Line Parameters

For a list of available parameters while online, type:

raidbld -? ↵

The basic structure of the RAIDBLD command line is as follows:

```
raidbld -[param] [value, (if required)] -[param] [value]..., etc.
```

Each parameter must be preceded by a dash "-". Several parameters require a value which directly follows the parameter. Parameters and values are separated by a space.

Table C-1, beginning on the next page, displays the following information for each RAIDBLD parameter:

- The parameter switch (such as -s, -R, etc.)
- Valid parameter values, as well as the default value
- An example of the use of the parameter [value]
- A description of the parameter's function

Table B-1. Command Line Parameters and Their Functions

Param	Value(s) / Default / Example	Description
-s	Values = 1,2,3,4, etc. Default = -s 7 Example = raidbld -s 10	**Define Scan Interval**: Sets the number of seconds between each scan for failed devices, device state changes, controller errors, etc. The number must be an integer.
-S	Values = 0 = no scan 1 = scan for failed hot spares 2 = scan for inactive online physical devices 3 = both 1 and 2 Default = -S 1 Example = raidbld -S 3	**Scan For Failed Devices**: Allows scanning for failed hot spares, inactive online physical devices, or both. A value of 0 (or the absence of the -S parameter in the command line) will disable this automatic scanning.
-l	Value = [path][filename] Default = -l [path]raidbld.log Example = raidbld -l c:\myfile.log	**Log All RAIDBLD Information to a File**: If you choose, you may change the default log file name, or remove the -l (lowercase L) parameter to disable logging to a file.
-c	Value = [path][devicename] Default = OFF (param not set) Example = raidbld -c /dev/tty07	**Display All RAIDBLD Information on a Console**: If you choose, you may add the path and name of a console device on which the log messages will be displayed.
-r	Value = none Default = -r Example = raidbld -r	**Perform Automatic Rebuild**: Initiates a rebuild automatically if a failed drive is replaced with an unconfigured, valid drive.
-R	Values = 0 = fix errors 1 = do not fix errors Default = -R 1 Example = raidbld -R 0	**Specify Whether or Not Errors Will Be Fixed Automatically During Consistency Check**: You can specify whether automatic consistency check should fix consistency errors as it finds them, or leave errors as they are. This parameter is required in order to activate background consistency checking. Set start time and interval with the parameters below.

Table B-1. Command Line Parameters and Their Functions

Param	Value(s) / Default / Example	Description
-T	Values = 0 = 12:00 A.M. ...to... 23 = 11:00 P.M. Default = -T 0 Example = raidbld -T 19	**Set Start Time For Background Consistency Check**: If you wish to run automatic consistency checks, use this parameter to specify the time of day (on the hour only) to begin the first consistency check. To turn OFF the automatic consistency check function, remove the -R parameter and its value.
-t	Values = 1,2,3,4, etc. Default = -t 24 Example = raidbld -t 12	**Set Interval Between Background Consistency Checks**: If you wish to run multiple, ongoing consistency checks, specify the time interval (in hours) between the end of one consistency check and the start of the next one. To turn OFF the automatic consistency check function, remove the -R parameter and its value.

Running RAIDBLD

The default RAIDBLD command line is set to do the following when RAIDBLD runs:

- Use a scan interval of seven (7) seconds [-s 7];
- Scan for failed hot spares only [-S 1];
- Perform automatic rebuilds when failed drives are replaced [-r];
- Perform automatic consistency checks beginning tonight at midnight [-T 0], every midnight [-t 24], but do not automatically fix consistency errors [-R 1];
- Log RAIDBLD messages to a specified log file, [-l [pathname] raidbld.log];
- Do NOT specify a console device to display RAIDBLD messages (-c parameter not set).

If you accept these settings and require no changes, simply save the file and reboot the server. RAIDBLD will run automatically at system startup with the default settings.

If you wish to change one or more settings, do the following:

1. Refer to the RAIDBLD Command Line Parameter Table above and note which parameters and or values you wish to change.
2. Modify the raidbld command line to specify your options.

   Modifying the RAIDBLD command line involves doing one or more of the following:

   - Adding a parameter and value to the command line to turn ON a new RAIDBLD function (e.g.: Adding -c /dev/tty07 to define a display console)
   - Deleting a parameter (and value, if present) to turn OFF a particular RAIDBLD function (e.g.: Removing -r to disable automatic rebuild; removing -R [value] to turn off background consistency checks; removing -l [value] to turn off RAIDBLD message logging to a file, etc.)
   - Changing a parameter's value to alter a time interval or select a different setting (e.g.: -R 1 becomes -R 0 to allow consistency errors to be fixed; -s 7 becomes -s 60 to increase the scan interval to 60 seconds; -S 1 becomes -S 3 to scan for both failed hot spares AND inactive online physical devices, etc.)
3. After modifying the RAIDBLD command line, save the file.
4. Reboot your server. RAIDBLD will run automatically with the settings you selected.

Appendix C
External RAID Support Enabling

External RAID Support Enabling Overview

The GAMCONFG utility is used for the following activities:

- To enable External RAID support in GAM Server. If you are using Mylex External RAID Controllers (such as the DAC960SX) connected to standard SCSI Host Bus Adapters anywhere in your configuration and you wish to use GAM to configure, monitor, and maintain disk arrays installed on these controllers, you must manually enable External RAID support.

  ☛ **Note**

  By default, External RAID support for GAM Server is *enabled*. The system will not prompt you to enable or disable the external controller support.

- (Optionally) To define specific and/or a range of channels and targets to be scanned on a generic SCSI Host Bus Adapter. This allows you to direct GAM Server to scan only those channels and targets where External RAID Controllers and their disk drives reside.

GAMCONFG Command Line

The External RAID enabling function is installed during normal GAM Server installation under supported operating systems. During installation of GAM Server, there is an instruction to modify the GAMEVENT and GAMEVLOG command lines in the system startup file to specify the IP addresses of client systems and the path and name of the message log file. Within this same startup file, the GAMCONFG command line (disabled by default) is found at the bottom of the section called “SCSI - SCSI GAM support,” and must be enabled if you wish to use Mylex External RAID Controllers with GAM.

The following GAMCONFG command line is installed during GAM Server installation:

```
#@[path]gamconfg -c 6 -t 32 -T 11111111111111111111111111111111
```

where:

: signifies that the following text line is a disabled command line or is a comment;

[path] : is the directory path to the gamconfg utility file.

> ☛ **Note**
>
> Individual command line parameters will be discussed in a later section.

Enabling External RAID Support (GAMCONFG)

To enable External RAID support and use the default settings, simply remove the "#" (comment line indicator) from the beginning of the GAMCONFG command line.

Once you have removed the "#," you may wish to change one or more of the command line parameter default settings (the information after gamconfg on the command line). The next section introduces the command line parameters, identifies the installed defaults, and indicates other options, if available.

GAMCONFG Command Line Parameters

Within the system startup file which contains the GAMCONFG command line (called "SCSI - SCSI GAM support"), you will find a brief description of the command line parameters and how they are used. Refer to that description or to the information in this appendix for details while configuring the GAMCONFG command line.

The basic structure of the GAMCONFG command line is as follows:

```
gamconfg -[param] [value(s)] -[param] [value(s)]..., etc.
```

Each parameter must be preceded by a dash "-". Parameters require a value which directly follows the parameter. Parameters and values are separated by a white space.

Table D-1 beginning on the next page displays the following information for each GAMCONFG parameter:

- The parameter switch (such as -c, -T, etc.)
- Valid parameter values, as well as the default value
- Examples of the use of the parameter [value]
- A description of the parameter's function

Table C-1. Command Line Parameters and Their Functions

Param	Value(s) / Default / Example	Description
-c	Values = 1,2,3... Default = -c 6 Examples: gamconfg -c 1 (scans 1 channel, which is channel 0) gamconfg -c 3 (scans 3 channels, which are channels 0, 1, and 2)	**Define Max Channels to Scan**: Defines a range of channels that will be scanned on the generic controller beginning with channel 0. The number must be an integer.
-C	Values = 1 = scan 0 = do not scan Default = N/A Examples: gamconfg -C 100 (do not scan channel 0, do not scan channel 1, *scan* channel 2) gamconfg -C 01 (*scan* channel 0, do not scan channel 1)	**Define Specific Channels to Scan**: Defines specific channels that will be scanned on the generic controller. Each placeholder in the value represents a specific channel, with the right-most placeholder representing channel 0. The value at each position determines whether that channel will be scanned (1) or not scanned (0).

Table C-1. Command Line Parameters and Their Functions (Continued)

-t	Values = 1,2,3... Default = -t 32 Examples: gamconfg -t 16 (defines 16 targets, which are all target IDs from 0 through 15) gamconfg -t 5 (defines 5 targets, which are target IDs 0, 1, 2, 3, and 4)	**Define Max Targets to Scan**: Defines a range of targets that can be scanned on the generic controller beginning with target ID 0. The number must be an integer.
-T	Values = 1 = scan 0 = do not scan Default = -T `11111111111111111111111111111111` Examples: gamconfg -T 1111111101111111 (scan targets 0 through 6, *do not scan* target 7[a], scan targets 8 through 15) gamconfg -T 00110 (do not scan target 0, *scan* targets 1 and 2, do not scan targets 3 and 4)	**Define Specific Targets to Scan**: Defines specific target IDs that *will* be scanned on the generic controller. Each placeholder in the value represents a specific target ID, with the right-most placeholder representing target ID 0. The value at each position determines whether that target will be scanned (1) or not scanned (0).

a. Target ID 7 is usually the target ID of the SCSI Host Bus Adapter itself and need not be scanned unless a different target ID is used for the HBA.

Running GAMCONFG

The default GAMCONFG command line is set to do the following when GAMCONFG is enabled:

- Scan only to channel 5 of the SCSI HBA [-c 6];
- Defines 32 targets that can be scanned (IDs 0 through 31) [-t 32];
- Of the 32 total target IDs, scan all target IDs. [-T `11111111111111111111111111111111`]

If you accept these settings and require no changes, simply save the file and reboot the server. GAMCONFG will run automatically at system startup with the default settings.

If you wish to change one or more settings, do the following:

1. Refer to the GAMCONFG Command Line Parameter Table and note which parameters and or values you wish to change.
2. Modify the GAMCONFG command line to specify your options.
3. After modifying the command line, save the file.
4. If the file was edited during GAM Server installation, complete the installation process according to instructions. If the file was edited outside of GAM installation, close the file.
5. Reboot your server. GAMCONFG will run automatically to enable External RAID support with the settings you selected.

Appendix D
The MYLEXDRV.SIZ File

Drive Size Limits Overview

One of the common characteristics of disk drives grouped into disk arrays or RAID groups is that each disk drive in the logical group is generally the same size (capacity). While it is not strictly required that this be so, it is most beneficial for the following reasons:

- If physical disk drives defined in a logical group are of different sizes, the drive initialization process sees to it that the usable capacity of each physical disk drive will be the same. This can lead to capacity being unused or unavailable for use, and wasted capacity usually means wasted cost.

  EXAMPLE: If three physical drives are of capacity 3 GB, 3 GB, and 4 GB respectively, and they are grouped together into one RAID 5 logical drive, initialization will result in three drives using 3 GB of capacity each. One GB on the 4 GB drive is unused.

- If hot spare (standby drives) is to be used in a configuration to take over for a failed drive, the hot spare drive's capacity must be equal to or greater than the capacity of the smallest drive in the configuration. Therefore, using physical disk drives of different capacities can actually interfere with proper drive rebuild operation.

When using multiple physical disk drives from the same drive vendor, it's usually not difficult to ensure that the drives to be used together in a logical group all have the same capacity. The challenge arises when attempting to use disk drives of similar capacity from *multiple* disk drive vendors.

For example, a 4 GB disk drive from a particular vendor may actually be 4.01 GB. A 4 GB drive from another vendor may actually be 4.12 GB. Even though the drives capacities are similar, they are not exact, and the problems described above can occur. If the 4.01 GB drive from Vendor A is used as a hot spare in a RAID 5 array consisting of 4.12 GB drives from Vendor B, the rebuild process will fail because the hot spare drive is smaller than the size of the drive it's trying to replace.

The Drive Size Limits function provides a resolution to this problem. You can manually set the maximum, usable size of particular disk drives from particular vendors such that they are equivalent across vendors' drives.

EXAMPLE: Vendor A's 4.01 GB drive can be manually set to 4 GB. Likewise, Vendor B's 4.12 GB drives can also be manually set to 4 GB. For GAM, the capacities of the drives would be considered equivalent and no complications should arise when using hot spares or when mixing drives from different vendors in a single logical group.

GAMSETSZ Command Line

The Mylex Drive Size Limit function is installed during normal GAM Server installation under supported operating systems. During installation of GAM Server, there is an instruction to modify the GAMEVENT and GAMEVLOG command lines in the system startup file to specify the IP addresses of client systems and the path and name of the message log file. Within this same startup file, the gamsetsz command line (disabled by default to use settings stored in the file MYLEXDRV.SIZ) is found at the bottom of the section called "DRIVE SIZING."

The following gamsetsz command line is installed during GAM Server installation:

```
#@[path]gamsetsz -f [path]mylexdrv.siz
```

where:

[path] : is the directory path to the GAMSETSZ utility file;

& : indicates that you may include additional drive size settings filenames after the '&' (perhaps from a drive vendor) which also define specific drive size information.

☛ **Note**

If you have particular SIZ files available from one or more drive vendors, add the filename(s) to the end of the gamsetsz command line. Refer to the next section for information on modifying the contents of the Mylex-supplied SIZ file (MYLEXDRV.SIZ).

Using the MYLEXDRV.SIZ File

The gamsetsz command line makes reference to the MYLEXDRV.SIZ file. This is a Mylex-supplied text file containing instructions for defining drive size limits. It is also the text file in which you actually store the drive size information that will be read by GAMSETSZ and used in GAM configurations.

> ☛ **Note**
>
> We recommend that you print and/or view online the MYLEXDRV.SIZ file at your earliest convenience. The structure of a drive size limit data line is somewhat complex, and advance study of the byte definitions can be helpful.
>
> A summary of the byte definitions is provided in the next section of this appendix.

MYLEXDRV.SIZ Byte Definitions

The MYLEXDRV.SIZ file contains detailed byte definitions for construction of data lines to be read by GAMSETSZ. Constructing a valid data line consists of providing the requested information correctly at each of the appropriate byte positions in the data line.

Use only what is referred to as the “New Format.”

The basic structure of a New Format data line is as follows:

```
[+/-][vendor ID][product ID][revision] [capacity][units][comments]
```

Table D-1 beginning on the next page displays the following information:

- The byte position range for a data item (such as 0..0, 1..28)
- The number of bytes used for the data item
- Valid values for the data item
- A brief description of the data item

Table D-1. Byte Positions and Their Functions

Byte Range	# Bytes Used	Byte Values	Description
0..0	1	+ = Adds the new entry - = Removes old entries	**Add/Remove Entry**: First character in the data line indicates whether this is a new or changed entry for the GAM driver (+), or whether an entry is to be removed or disabled (-) while keeping its settings available for future use.
1..28	28	1..8 = Specific vendor name up to eight characters in length 9..24 = Product name up to 16 characters in length. 25..28 = Revision identifier up to four characters in length Use "?" as a wildcard character.	**Vendor/Product/Revision**: These 28 bytes are used to specify the drive vendor, particular product ID, and revision using the format defined in the SCSI specification. You will need to obtain this information from your drive vendor or a supplied vendor SIZ file.
29..29	1	Any character	**Separator**: One character as a separator. This can be a space, a ":" or any character you choose.
30..39	10	0 through 9999999999	**Capacity as Integers**: Up to 10 bytes are used to specify the capacity as a whole number using integers only. The value assigned to the capacity numbers depends on the units selected in the next byte.
40..40	1	g, G = Gigabytes (GB) m, M = Megabytes (MB) k, K = Kilobytes (KB)	**Capacity Units**: One character defines the units of the number in the previous 10 bytes
41..nn	variable	Any characters	**Comments**: Additional bytes can be used for comments.

Refer to the contents of the MYLEXDRV.SIZ text file for examples of correctly formatted data lines. Enter new data lines there as well.

Appendix E
GAMEVENT

Introduction

GAMEVENT refers to the concept of "Event Notification" in Global Array Manager. Event Notification involves the following:

1. The Global Array Manager Server (GAM Server) runs on the server computer in which the Mylex controllers and third-party disk drives are installed. When an informational event or error occurs, GAM Server generates an "event."
2. These events can be sent to client workstations running Global Array Manager Client (GAM Client) for display in GAM Client's Log Information Viewer when the particular server is accessed.

   In order to do this, a command line in the GAM Server configuration file must be modified to enable event logging to clients, AND to identify the client workstations by IP address or name.
3. Events generated by GAM Server can also be saved to a log file (GAMEVLOG.LOG, by default), which is stored on the system running GAM Server and can be viewed or printed later.

   In order to do this, another command line in the GAM Server configuration file must be enabled to generate the event log file. The name of the log file or its path can also be changed if desired.

This appendix discusses how GAMEVENT works for various operating systems.

NetWare

Enabling Event Notification

To enable event notification to GAM clients, both local and remote, edit the LOAD GAMEVENT command line in the AUTOEXEC.NCF file.

1. Open the AUTOEXEC.NCF configuration file in a text editor.
2. Navigate to the command line of the configuration file called #LOAD GAMEVENT.

   ```
   #LOAD GAMEVENT -h <enter client ip address>
   ```

3. Replace <enter client ip address> with a desired system name or IP address.

   ```
   For example:

   #LOAD GAMEVENT -h 10.97.49.189 -h fabd_test
   ```

   where: -h <address> sets address as a receiver of events. Address may be an IP address or a network system name.

4. Additional entries require that you extend the command line. Type -h then an IP address or system name for each additional entry you need.

   ☛ **Note**

   The argument list is limited to 1028 bytes. Therefore, there is a practical maximum of about 50 event notification addresses. If you need to add more event notification addresses than can fit on one line, add a second line and continue adding IP addresses or system names preceded by the “-h” switch.

5. Delete the comment marker "#" from the command line to enable event notification:

   ```
   LOAD GAMEVENT -h 10.97.49.189 -h fabd_test
   ```

Enabling a GAM Event Log File

1. Navigate to the section of the AUTOEXEC.NCF file called #LOAD GAMEVLOG.

   ```
   #LOAD GAMEVLOG -f sys:\public\gamevlog.log
   ```

2. If necessary, delete the comment marker "#" from the command line to enable event logging to a file:

   ```
   LOAD GAMEVLOG -f sys:\public\gamevlog.log
   ```

3. The file shown (gamevlog.log) is the default file name for the GAM event log. If you want to change this file name, replace "gamevlog" with your desired log file name.

4. The file path shown (sys:\public\) is the default file path for the GAM event log. If you want to change this path, replace "sys:\public\" with your desired file path name.

   The log file will be saved to the appropriate directory.

Saving and Restarting

1. Save the .NCF file in your text editor.

2. Restart your system to start the GAM Server service and activate event notification to the specified IP addresses or system names.

> ☛ **Note**
>
> To start the event notification and/or logging without restarting the system, type the command with the parameters at the command prompt.

Windows NT and Windows 2000

Enabling Event Notification

To modify or add event notification to GAM clients, both local and remote, edit the GAMEVENT command line in the GAMSCM.INI file.

1. Open the GAMSCM.INI configuration file in a text editor.
2. Navigate to the section of the configuration file called GAMEVENT.

   ```
   gamevent.exe -k 119 -s7 -p 158 -h host1 -h host2
   ```

3. Replace host1 and host2 with a desired system name or IP address.

   For example:

   ```
   gamevent.exe -k 119 -s7 -p 158 -h 192.9.11.246 -h anyname
   ```

   where: -h <address> sets address as a receiver of events. Address may be an IP address or a network system name.

Some systems may already be identified in the GAMEVENT command line, either because they were previously identified in your existing GAMSCM.INI file, or because they were automatically registered when you entered IP addresses or system names during GAM Server installation.

> ☛ **Note**
>
> It is recommended NOT to change the default setting for the these options: -k 119 -s7 -p158.

4. Additional entries require that you extend the command line. Type -h then an IP address or system name for each additional entry you need.

> ☛ **Note**
>
> The argument list is limited to 1028 bytes. Therefore, there is a practical maximum of about 50 event notification addresses. If you need to add more event notification addresses than can fit on one line, add a second line and continue adding IP addresses or system names preceded by the “-h” switch.
>
> When entering IP addresses make sure to use the proper spacing. Improper spacing may cause one name to be entered as two separate server names.

5. Delete the comment marker "#" from the command line to enable event notification:

```
gamevent.exe -k 119 -s7 -p 158 -h 192.9.11.246 -h anyname
```

Enabling a GAM Event Log File

1. Navigate to the section of the GAMSCM.INI file called GAMEVENT LOG.

```
#gamevlog.exe -f .\gamserv\gamevlog.log -s 0
```

2. If necessary, delete the comment marker "#" from the command line to enable event logging to a file:

```
gamevlog.exe -f .\gamserv\gamevlog.log -s 0
```

3. The file shown (gamevlog.log) is the default file name for the GAM event log. If you want to change this file name, replace “gamevlog” with your desired log file name.
4. The file path shown (`.\gamserv\`) is the default file path for the GAM event log. If you want to change this path, replace “`.\gamserv\`” with your desired file path name.

   The log file will be saved to the appropriate directory.

Saving and Restarting

1. Save the .INI file in your text editor.
2. Restart your system to start the GAM Server service and activate event notification to the specified IP addresses or system names.

SCO UNIX and UnixWare

Enabling Event Notification

To enable event notification to GAM clients, both local and remote, edit the GAMEVENT command line in the S99GAM file.

1. Open the S99GAM configuration file in a text editor.
2. Navigate to the section of the configuration file called GAMEVENT.

   ```
   #/usr/bin/gamevent -k 119 -s7 -p 158 -h gamclient1
   -h gamclient2 -h gamclient3 &
   ```

3. Replace `gamclient1 gamclient2 gamclient3` with a desired system name or IP address.
   For example:

   ```
   #/usr/bin/gamevent -k 119 -s 7 -p 158 -h 10.97.49.189
   -h 10.97.49.190 -h fabd_test
   ```

   where: -h <address> sets address as a receiver of events. Address may be an IP address or a network system name.

   ☛ **Note**

   It is recommended NOT to change the default setting for the these options: -k 119 -s7 -p158.

4. Additional entries require that you extend the command line. Type -h then an IP address or system name for each additional entry you need.

   ☛ **Note**

   The argument list is limited to 1028 bytes. Therefore, there is a practical maximum of about 50 event notification addresses. If you need to add more event notification addresses than can fit on one line, add a second line and continue adding IP addresses or system names preceded by the “-h” switch.

5. Delete the comment marker "#" from the command line to enable event notification:

   ```
   /usr/bin/gamevent -k 119 -s7 -p 158 -h 10.97.49.189
   -h 10.97.49.190 -h fabd_test
   ```

Enabling a GAM Event Log File

1. Navigate to the section of the S99GAM file called GAMEVENT LOG.

   ```
   #/usr/bin/gamevlog -f /etc/log/gamevlog.log &
   ```

2. If necessary, delete the comment marker "#" from the command line to enable event logging to a file:

   ```
   /usr/bin/gamevlog -f /etc/log/gamevlog.log &
   ```

3. The file shown (gamevlog.log) is the default file name for the GAM event log. If you want to change this file name, replace “gamevlog” with your desired log file name.

4. The file path shown (`/etc/log/`) is the default file path for the GAM event log. If you want to change this path, replace “`/etc/log/`” with your desired file path name.

   The log file will be saved to the appropriate directory.

Saving and Restarting

1. Save the modified S99GAM file and exit.

2. Reboot the system using the following command from the root directory (match case exactly as shown):

   `shutdown -y -i6 -g0 ↵`

Solaris

Enabling Event Notification

To enable event notification to GAM clients, both local and remote, edit the GAMEVENT command line in the S99GAM file.

1. Open the S99GAM configuration file in a text editor.
2. Navigate to the section of the configuration file called GAMEVENT.

   ```
   #/usr/opt/MYLXgam/bin/gamevent -k 119 -s7 -p 158
   -h gamclient1 -h gamclient2 -h gamclient3 &
   ```

3. Replace `gamclient1 gamclient2 gamclient3` with a desired system name or IP address.
   For example:

   ```
   #/usr/opt/MYLXgam/bin/gamevent -k 119 -s 7 -p 158
   -h 10.97.49.189 -h 10.97.49.190 -h fabd_test
   ```

   where: -h <address> sets address as a receiver of events. Address may be an IP address or a network system name.

   ☛ **Note**

   It is recommended NOT to change the default setting for the these options: -k 119 -s7 -p158.

4. Additional entries require that you extend the command line. Type -h then an IP address or system name for each additional entry you need.

   ☛ **Note**

   The argument list is limited to 1028 bytes. Therefore, there is a practical maximum of about 50 event notification addresses. If you need to add more event notification addresses than can fit on one line, add a second line and continue adding IP addresses or system names preceded by the “-h” switch.

5. Delete the comment marker "#" from the command line to enable event notification:

   ```
   /usr/opt/MYLXgam/bin/gamevent -k 119 -s7 -p 158
   -h 10.97.49.189 -h 10.97.49.190 -h fabd_test
   ```

Enabling a GAM Event Log File

1. Navigate to the section of the S99GAM file called GAMEVENT LOG.

```
#/usr/opt/MYLXgam/bin/gamevlog -f /usr/opt/MYLXgam/log/gamevlog.log &
```

2. If necessary, delete the comment marker "#" from the command line to enable event logging to a file:

```
/usr/opt/MYLXgam/bin/gamevlog -f /usr/opt/MYLXgam/log/gamevlog.log &
```

3. The file shown (gamevlog.log) is the default file name for the GAM event log. If you want to change this file name, replace “gamevlog” with your desired log file name.
4. The file path shown (`/usr/opt/MYLXgam/log/`) is the default file path for the GAM event log. If you want to change this path, replace “`/usr/opt/MYLXgam/log/`” with your desired file path name.

   The log file will be saved to the appropriate directory.

Saving and Restarting

1. Save the modified S99GAM file and exit.
2. Reboot the system using the following command from the root directory (match case exactly as shown):

```
shutdown -y -i6 -g0 ↵
```

Linux

Enabling Event Notification

To enable event notification to GAM clients, both local and remote, edit the GAMEVENT command line in the Gam file to remove the initial comment marker.

To enable the Event Comment Line, follow these steps:

1. Log in as root.
2. Stop the GAM Server, type:

   ```
   /etc/rc.d/init.d/Gam stop
   ```

3. Using a text editor such as gnotebook+, open the Gam file located in the following path:

   ```
   /etc/rc.d/init.d/Gam
   ```

4. Navigate to the section of the file called GAMEVENT.
5. Near the bottom of this section you will see a command line such as the following (the command line parameters may differ, especially if IP addresses or node names were previously added):

   ```
   #/usr/bin/gamevent -k 119 -s 7 -p 158 -h host1 -h host2 &
   ```

6. Replace host1 and host2 with a desired DNS_NAME or IP address.

   ```
   For example:

   #/usr/bin/gamevent -k 119 -s 7 -p 158 -h 10.97.49.189
   -h 10.97.49.190 -h fabd_test &
   ```

   where: -h <address> sets address as a receiver of events.
   Address may be an IP address or a network node name.

7. Additional entries require that you extend the command line. Type -h then an IP address or node name for each additional entry you need.

☛ **Note**

The argument list is limited to 1028 bytes. Therefore, there is a practical maximum of about 50 event notification addresses. If you need to add more event notification addresses than can fit on one line, add a second line and continue adding IP addresses or node names preceded by the “-h” switch.

8. Save the Gam file in your text editor.
9. Delete the comment marker "#" from the command line to enable event notification:

```
/usr/bin/gamevent -k 119 -s 7 -p 158 -h 10.97.49.189
-h 10.97.49.190 -h fabd_test &
```

Enable GAM Event Logging

To enable event logging, follow these steps:

1. Navigate to the section of the file called GAMEVENT LOG.

   ```
   #/usr/bin/gamevlog -f /var/log/gamevlog.log &
   ```

   where: -f sets the event log file name

2. If necessary, delete the comment marker "#" from the command line to enable event logging:

   ```
   /usr/bin/gamevlog -f /var/log/gamevlog.log &
   ```

3. The file shown (gamevlog.log) is the default file name for the GAM log. If you need to change this file name replace “gamevlog” with your desired log file name.
4. The file path shown (`/var/log/`) is the default file path for the GAM event log. If you want to change this path, replace “`/var/log/`” with your desired file path name.

   The log file will be saved to the appropriate directory.

Saving and Restarting

1. Save the modified Gam file and exit.
2. Start the Global Array Manager Server Service and activate event logging and notification to the specified IP addresses or node names:

```
/etc/rc.d/init.d/Gam start
```

Additional GAMEVENT Parameters

It is recommended not to change the settings for the following options:

```
-k 119 -s 7 -p 158
```

where:

-k <seconds>: Sets the “heart beat” frequency. An “I'm alive” message is sent every "seconds" period. The default is 0 which means no heartbeat. In that case if the server goes down the client will not know it until the user does something to make the client interact with the server.

-s <seconds>: Sets the polling rate. Each controller is polled for new events every “seconds” period. Default is 7.

-p <port>: Sets the port number for event reporting. Used only by special proprietary programs. The value must not be changed for normal programs. Default is 158.

GAMEVENT LOG Options

The server sends event activity (EVENT LOG) to other hosts computers, which can be another server or a client system. Events can be written to a file and/or to your local terminal screen. There are two options associated with the GAMEVENT LOG.

Usage:

-f File : : Sets the event log file name

Note: The event log file will be created in the

%SystemRoot%\system32\gamserv directory

☛ **Note**

Option **-s** is valid for only Windows NT and Windows 2000. This setting will send the events to the NT/ Windows Event Viewers Application Log.

-s Value : : Sets the Severity Level to report.

Value 0 = Critical

1 = Serious

2 = Error

3 = Warning

4 = Information

NOTE: If a parameter is not specified, no information will be reported.

gamevlog.exe -f .\gamserv\gamevlog.log -s 0

Appendix F
Creating a GAM Server Installation Diskette

Introduction

The Global Array Manager (GAM) Server Software package provides RAID Management functions for your Mylex Disk Array Controller. You can create your own GAM Server installation diskette from the RAID Management Software Installation menu under Windows. See table F-1 for information about GAM Server Installation Diskettes.

When to Create a GAM Server Installation Diskette

Table F-1. GAM Server Installation Diskettes

Operating System	GAM Server Diskette Required?
Netware 4.2/5.x	**NO**. GAM Server installs from the CD-ROM. See Chapter 2.
Windows NT 4.0 Windows 2000	**NO**. GAM Server installs from the CD-ROM RAID Management Software Installation menu (autorun). See Chapter 3 or Chapter 4.
SCO OpenServer 5.0.x UnixWare 7.x, Solaris 7 x86	**YES**. Follow the instructions in this appendix to create a GAM Server diskette.
Linux (all installations)	**NO**. GAM Server installs from the CD-ROM. See Chapter 8.

Creating a GAM Server Software Installation Diskette

Create a GAM Server installation diskette in six easy steps:

1. Insert the CD-ROM provided in your Mylex package.
2. From the RAID Management Software Installation menu, click Create Software Diskettes.

Figure F-1. RAID Management Software Installation Menu

3. Click Global Array Manager.

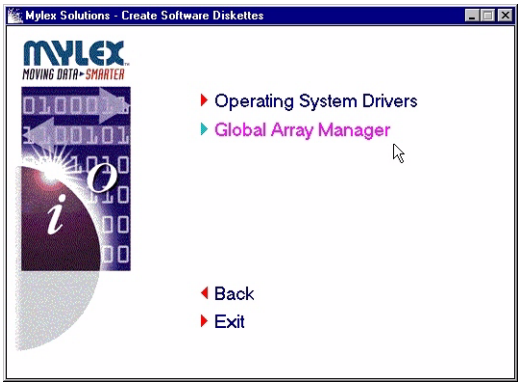

Figure F-2. Create Software Diskette Menu

4. Click the appropriate operating system corresponding to the GAM Server installation diskette you wish to create.

Figure F-3. Global Array Manager Menu

5. When the operating system has been selected, you will be prompted with a DOS shell requesting that you insert a blank diskette.

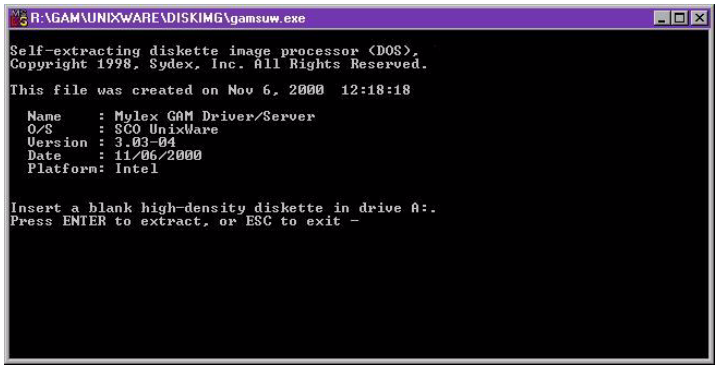

Figure F-4. DOS Shell

6. Insert the blank diskette and press Enter to extract the image onto the diskette.

Use your newly created diskette to install your GAM Server. Refer to the appropriate chapter in this manual.

Appendix G
Installation of GAM Server for Failover or Failback in MSCS

Preparation

When preparing to use Clustering on external products, you need to install GAM Server to utilize the failover or failback in Microsoft Clustering Service™ (MSCS). However, you must first complete the installation of Windows NT 4.0 on both servers.

Using Virtual Cluster IP Address

GAM login fails when using the virtual cluster IP address. This is resolved by starting GAM as a service instead of an application. The Global Array Manager Server should be started as a generic service, and not a generic application. An application does not have the NT privileges to use the Login call.

Installing GAM Server for Failover or Failback in MSCS

To install GAM Server as a resource for failover or failback in MSCS, use the following procedure.

1. Install GAM Server on both nodes.
2. Disable the GAM Server Services on both nodes.
3. Select **Cluster Administrator** and right-click **Cluster Group**.
4. Create a new resource under Cluster Group called GAM Service with the following properties:

- **Resource type:** Generic Service
- **Group:** Cluster Group
- **Possible Owners:** “Both Nodes”
- **Resource Dependencies:** Cluster IP Address
- **Service Name:** gamscm

- **Startup Parameters:** leave blank

5. Bring the GAM Service resource online.
6. Go into GAM Client and the following configuration will be seen on the virtual IP.

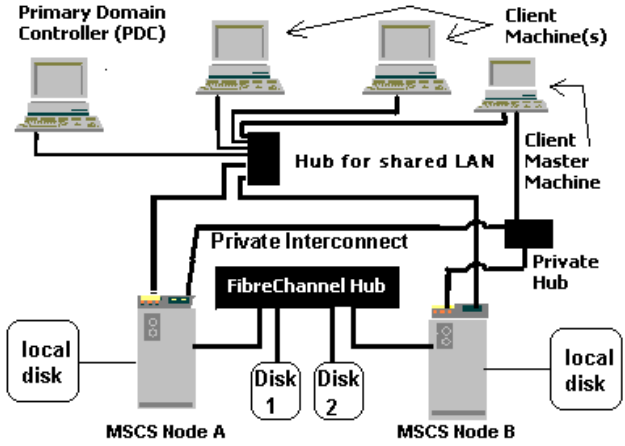

Figure G-1. GAM Configuration

Note

Disk 1 and Disk 2 are connected to an external unit not shown in this illustration.

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