Onboard IDE RAID
Onboard LAN
User's Guide

RIOWORKS™

The Reliable Building Block

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Onboard IDE RAID

1. Overview

The onboard AMI HyperDisk 100 is a high performance PCI Bus Master IDE RAID controller. Compare with present SCSI RAID controllers, it simply provides a cost-effective way to achieve higher data transfer rate (100MB/s in UDMA mode 5) and fault-tolerant data redundancy during Sever/Workstation applications by using low cost Ultra ATA drives. In the drive support, it provides two IDE channels with Ultra DMA ATA/100 capability and the maximum of connected devices can be up to four IDE drives. For IDE drive model, It supports PIO 0-4 and Ultra 0-5. Therefore, it is backward compatible with previous ATA specifications and you can directly use your present HDD into onboard IDE RAID connectors. Besides these, AMI onboard IDE RAID controller supports RAID level 0/1/10. You can use striping (RAID 0) to improve performance, mirroring (RAID 1) to improve data security or take the both advantages of RAID 0 and RAID 1 by using RAID 10 configuration.

About This User Guide

This manual explains how to install onboard IDE RAID channel in detail. Please follow the installation procedures carefully and pay special attention

to the IMPORTANT, WARNING, NOTE Tip advisories.

Features Highlight

**BIOS
Features**

- RAID support before operating system loads.
- Automatic detection and configuration.
- Drive roaming capability.
- Ability to handle configuration changes.
- Support for Interrupt 13, and Enhanced Disk Drive Specification
- Special handling of error log, spare drive, and rebuilding
- Support for BBS (BIOS boot specification)

Controller

- Onboard HyperDisk100 MG80649 controller provides a single chip solution for a PCI to IDE/ATA controller. It receives PCI commands and data, which it processes and sends to the IDE/ATA bus

**Drive
Features**

- Automatic detection of the highest mode of data transfer
- Handling of both RAID and non-RAID drives
- Support for RAID levels 0/1/10
- Error logging in NT event log and on disks
- Support for online mirror rebuilding
- Support for consistency check for mirrored disks. Support for PIO modes 0-4, DMA modes 0-2, and Ultra DMA modes 0-5

**Manageability
/Disk Console**

- Configuration information display
- Online mirror rebuilding
- Online consistency checks
- Error logging and notification
- Control panel, property sheet, and MMC (Microsoft Management Console) plug-in
- DMI agent

IDE Channels

- Support two ATA/100IDE channels

NOTE

- Power management features are not available on this onboard IDE RAID controller.

1.1. RAID Introduction

RAID (Redundant Array of Independent Disks) is an array of multiple independent hard disk drives and able to provide high system performance and data fault tolerance in the strict requirements in the Server/Workstation environment. For a host computer, the RAID array is as a single storage unit or as multiple logical units. I/O is expedited because several disks can be accessed simultaneously. As known, RAID systems dramatically improve data storage reliability, stability and fault tolerance compared to single-drive data system. Data loss because of a disk drive failure can be prevented by reconstructing missing data from the remaining data and parity drives.
In general, a RAID system can be implemented in a number of RAID Levels. The standard RAID levels are 0, 1, 3, 5,10,30,50.

RAID Benefits

RAID has gained popularity as it dramatically improves I/O performance and increases storage subsystem reliability. RAID also provides data security through fault tolerance and redundant data storage.

Improved I/O   Although disk drive capabilities have improved dramatically, actual performance has improved only three to four times in the last decade. Computing performance has improved over 50 times during the same time period. RAID allows you to access several disks simultaneously.

Increased Reliability

The electromechanical components of a disk subsystem operate more slowly, require more power, and generate more noise and vibration than electronic devices. These factors reduce the reliability of data stored on disks. RAID systems improve data storage reliability and fault tolerance compared to single-drive computers. The additional drives make it possible to prevent data loss from a disk drive failure. You can reconstruct missing data from the remaining data and parity drives

1. RAID 0 (Disk Striping)

RAID 0 writes data across multiple disk drives instead of just one disk drive. Disk striping involves partitioning each drive storage space into Stripes that can vary in size. These Stripes are interleaved in a repeated sequential manner. The combined storage space is composed of Stripes from each drive. Onboard HyperDisk100 controller supports Stripe sizes of 32 KB to 4 MB.

RAID 0 does not provide any data redundancy, but does offer the best performance of any RAID level. RAID 0 breaks up data into smaller blocks and then writes a block to each drive in the array. Therefore, HyperDisk100 can use multiple IDE channels and drives to read or write the file faster. The size of each block is determined by the Stripe size parameter, set during the creation of the RAID set. RAID 0 offers high bandwidth. This makes RAID 0 ideal for applications that require high bandwidth but do not require fault tolerance.

For examples, in a four-disk system using only disk striping (RAID level 0), segment 1 is written to disk 1, segment 2 is written to disk 2, and so on. Disk striping enhances performance because multiple drives are accessed simultaneously.

Segment 1
Segment 5
Segment 9
Segment 13

Data

Segment 1
Segment 2
Segment 3
Segment 4
.
.
Segment 15
Segment 16

Onboard AMI IDE RAID Controller

Segment 2
Segment 6
Segment 10
Segment 14

Segment 3
Segment 7
Segment 11
Segment 15

Segment 4
Segment 8
Segment 12
Segment 16
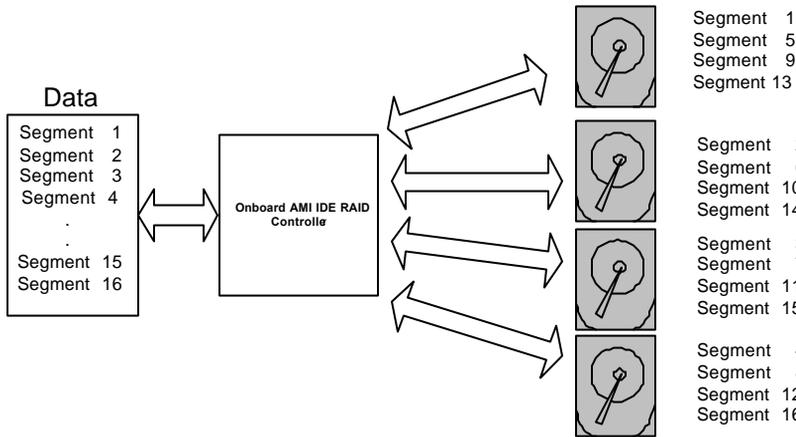
Stripe Width
Stripe width is the number of disks involved in an array where striping is implemented. For example, a four-disk array with disk striping has a Stripe width of four.

Stripe Size
The Stripe size is the length of the interleaved data segments that are written across multiple drives.

RAID 1 (Disk Mirroring)

With mirroring (RAID 1), the same data written to one disk drive is simultaneously written to another disk drive. If one disk drive fails, the contents of the other disk drive can be used to run the system continuously and simultaneously reconstruct the failed drive. The primary advantage of disk mirroring is that it provides 100% data redundancy although double the required data storage capacity. Since disk drive is completely written to a second drive, it does not matter if one of the drives fails. Both drives contain the same data at all times. Either drive can act as the operational drive.

The following sections explain words associated with RAID.

Data

Segment   1
Segment   2
Segment   3
Segment   4.

**Onboard AMI IDE RAID
Controlle**

Segment   1
Segment   2
Segment   3
Segment   4

Segment   1 Duplicate
Segment   2 Duplicate
Segment   3 Duplicate
Segment   4 Duplicate
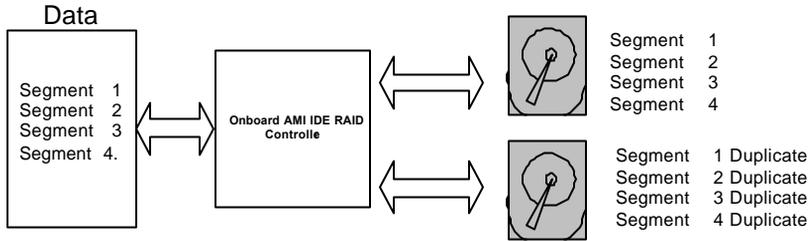
**Physical
Drive**

The physical drive is the IDE hard disk that is connected by cable to the onboard HyperDisk100 controller. The hard drive contains platters which are coated with material so that allows them to record data magnetically. Another important feature is the read/write head, which hovers over the surface of the platter. You can store and access data much more quickly on a hard disk than on a floppy disk.

**Physical
Drive State**

A physical disk drive can be in one of these states

State	Description
Online	The drive is functioning normally and is a part of a configured logical drive.
Spare	The drive is powered up and ready for use as a spare in case an online drive fails.
Failed	A fault has occurred in the drive placing it out of service.
Rebuilding	The drive is being rebuilt with data from a failed drive.

Array Status

A RAID array is a collection of physical disk drives governed by the RAID management software. A RAID array appears to the host computer as one or more logical drives.

State	Description
Online	The drive operating condition is good. All configured drives are online.
Degraded	The drive operating condition is not optimal. One of the configured drives has failed.
Failed	The drive has failed.
Offline	The drive is not available to HyperDisk100.

Logical Drive

A logical drive is a partition in a physical array of disks that is made up of contiguous data segments on the physical disks. A logical drive can consist of an entire physical array or part of an array.

Rebuild

You rebuild a disk drive by recreating the data that had been stored on the drive before the drive failed. Rebuilding can be done only in arrays with data redundancy, such as RAID level 1. HyperDisk100 automatically and transparently rebuilds failed drives with user-definable rebuild rates. If a hot spare is available, the rebuild starts automatically when a drive fails. Rebuilding can start automatically at boot up also if the mirror drive is degraded and a spare is available. If a hot spare is not available, the failed disk drive must be replaced with a new disk drive so that the data on the failed drive can be rebuilt.

Hot Spare   A hot spare is an extra, unused disk drive that is part of the disk subsystem. It is usually in standby mode, ready for service if a drive fails. Hot spares permit you to replace failed drives without system shutdown or user intervention. HyperDisk100 implements automatic and transparent rebuilds using hot spare drives, providing a high degree of fault tolerance and zero downtime. The HyperDisk100 BIOS configuration allows you to specify physical drives as hot spares. When a hot spare is needed, HyperDisk100 automatically selects the spare and include it in the configuration. Please note that Spare drives are applicable only in arrays with redundancy, such as RAID level 1.

Consistency Check   In RAID, check consistency verifies the correctness of redundant data in an array. It also helps to find disk errors. For example, in a system with a mirrored drive, checking consistency means making sure that both the member-drives of the mirror contains the same data.

Fault Tolerance   Fault tolerance is achieved through the use of mirroring (RAID 1.) Mirroring provides 100% redundancy. See Disk Mirroring on page for more information.

RAID 10 (Disk Mirroring/Striping)

Data divided in blocks and distributed sequentially and each block is duplicated to another disk.

How to choose the RAID Level

To ensure the best performance, you should select the optimal RAID level when you create a system drive. The optimal RAID level for your disk array depends on a number of factors.

- The number of drives in the disk array
- The capacity of the drives in the array
- The need for data redundancy
- The disk performance requirements
- The factors you need to consider when selecting a RAID level are listed below

RAID Level	Description	Advantage	disadvantage	Max. Drives	Fault Tolerant
0	Data divided in blocks and distributed sequentially (pure striping). Use for non-critical data that requires high performance. RAID 0 provides high data throughput, especially for large files.	High data throughput for large files. Provides increased data throughput for large files. No capacity loss penalty for parity.	No fault tolerance. All data lost if any drive fails.	One to four	No
1	Data duplicated on another disk (mirroring). Use for read-intensive, fault-tolerant, small database systems.	100% data redundancy.	Doubles disk space. Reduced performance during rebuilds.	Two or four	Yes
10	Data divided in blocks and distributed sequentially and each block is duplicated to another disk.	100% data redundancy & High data throughput	Disadvantages of RAID 0 and RAID 1.	Minimum 4 drives required.	Yes

Getting Help

If a problem arises with yours system during installation or OS operating, you should ask your dealer for help first as your system has most likely be configured by them. They always have the best idea and quick response for your symptoms. If your dealer is near to your locations, you should bring your system to them to have it quickly serviced instead of attempting to solve the problem by yourself. Besides these, RIOWORKS also provide some helpful resources to help you.

1. Select RIOWORKS ™ 's website at www.rioworks.com and navigate to this product page which contains links to product updates such as Jumper settings or BIOS updates.

2. FAQ sections on RIOWORKS Website are often helpful since other user's questions are often your own.

3. Email us at: sales @rioworks.com and we will try to answer your questions within 24 hours.

4. Filling in the system configuration form that is in the RIOWORKS Setup CD kit and email it to sales@rioworks.com.

Chapter 1
Hardware Installation

This chapter will explain how to connect IDE hard drives to the onboard IDE RAID connectors in detail.

1. The installation procedures

Step 1: Power off the system and remove the cover. - Make sure the computer is turned off and disconnected from any networks during installing your system.

Step 2: Prepare the host system. See the host system technical documentation - Please refer to the motherboard documentation provided by RIOWORKS.

Step 3: Configure system BIOS. - Make sure the system BIOS is configured correctly for Onboard AMI HyperDisk100. Normally no special setting is required for onboard AMI HyperDisk100.

Step 4: Perform a safe check. - Make sure the both ends of all IDE cables are properly attached to the IDE hard drives and IDE RAID connector

✳ IMPORTANT

▪ System throughput problems and malfunctioning may occur if not use proper IDE cables. RIOWORKS™ and AMI strongly recommend that you use 80-conductor, 40-pin Ultra ATA/100 cables for all drives. and the length of the cable must not exceed 18 inches for minimize noise level

▪ **Correct Order for Attaching the drives:**

Total Number of Drives	Primary IDE RAID Channel	Secondary IDE RAID Channel
1	Master	---
2	Master	Master
3	Master and Slave	Master
4	Master and Slave	Master and Slave

▪ **The correct connection between IDE hard drives and system :**

Line 1

Black Color is for connect to IDE Ultra DMA 100/666Device

Slave devices

Master devices

Blue Color is for connect to onboard connector

Ultra ATA/100 80-wire Cable

Line 1
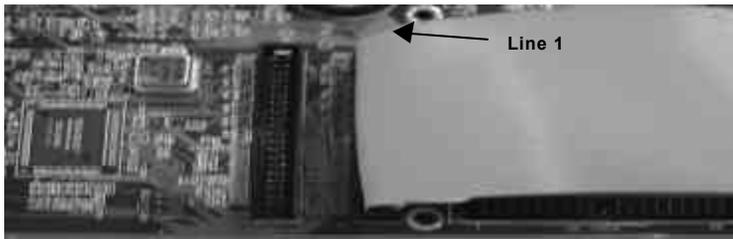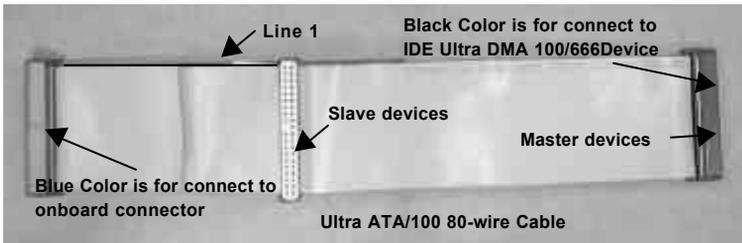
🔺WARNING

- **DO NOT** attach any ATAPI drive to onboard IDE RAID connectors. Onboard AMI HyperDisk100 controller does not support ATAPI devices, such as CD-ROM, LS120, and Zip drives. Only connect hard disk drives to the onboard IDE RAID connector. If you need to use ATAPI devices in your system, connect ATAPI devices to the onboard IDE channels on the motherboard or to any other offboard IDE/ATAPI adapters

Step 5: Replace the computer cover and reconnect the AC power cords. Power on the host computer. Be sure the IDE devices are powered up before or at the same time as the host computer. If the computer is powered up before an IDE device, the device might not be recognized.

Step 6: Press <Ctrl><M> to go to the AMI Setup utility and configure the drives to form Arrays. Save the configuration and reboot.

During booting, the HyperDisk100 Adapter ROM BIOS message appears:

HyperDisk100 BIOS Version x.*x.x*
(c) Copyright 1985-1999 American Megatrends Inc., USA
HyperDisk100 Adapter Card found at PCI Bus No:xx Dev No:xx

The BIOS may take a few second to find out the connected devices and show the following message.

Scanning for Primary Master . . . . found xxxx   xx MB
Scanning for Primary Slave . . . . not found
Scanning for Secondary Master . . . . found xxxx   xx MB
Scanning for Secondary Slave . . . . not found
HyperDisk100 not configured!
Press Ctrl-M to run Configuration Utiltiy

Step 7: **Install Operating System and the onboard AMI HyperDisk100
Driver as needed.**

Step 8: **Run HyperDisk100** - Optional.
Configuration Utility.

Step 9: **Install HyperDisk100
Console.**

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Chapter 2
Configuring IDE RAID

This chapter explains how to configure onboard AMI HyperDisk100 controller, arrays, and logical drives in detail.

2.1. Configuring Arrays

Organize the physical disk drives in arrays after the drives are connected to onboard RAID connectors properly. Onboard AMI HyperDisk100 controller supports up to four IDE hard drives and up to three array level, RAID 0, RAID 1 and RAID10.The number of drives in an array determines the RAID levels that can be. After you have attached all physical disk drives to the onboard RAID connectors properly, perform the following procedures for creating a RAID disk array.

Step 1   Press <Ctrl> <M> to run the AMI Setup Utility for HyperDisk100 controller during system POST.

Step 2   Define and configure one or more logical drives.

Step 3   Create and configure one or more system drives (logical drives). Select the RAID level, cache policy, read policy, and write policy.

Step 4   Save the configuration.

Step 5   Initialize the system drives. After initialization, you can install the operating system.

Section 2.1

Setup Window

The Setup Window has following selections: Array information, physical drive information, help information and toolbar. Only the array information area is active. You can navigate this fields and edit it. If a user wants to access this

```
                    HyperDisk Setup Utility Ver 2.4.1002A
                 ┌─── Array Information ────┐        ┌──── Help ────┐
─ Array #0        [ONLINE, 32 MB]          Press ENTER or → to
   Array Type          RAID 10              view/modify the Array
   Stripe 1            1 & 3                properities.
   Stripe 2            2 & 4
   Stripe Size         64K
   Bootable            Yes
   ►► Build Array      PRESS ENTER ►►        TAB - Switch Windows
                                            F1  - Auto Config Stripe
                                            F2  - Auto Config Mirror
                                            F3  - Auto Config RAID10
                                            F4  - Create Array
                                            F5  - Delete Array
                                            F6  - Restore Old Config
                                            F7  - Edit Options
                                            F10 - Save & Exit

            ┌─ Physical Drives Information ─┐   WC-OFF VP-ON DMA-OFF
Drv#  Drive ID              Array#  Model          Size(in MB) Status
 1    Cntlr-0 Primary Master    0   Seagate Hard Dri  1179648   ONLINE
 2    Cntlr-0 Primary Slave     0   Fujitsu Hard Dri       16   ONLINE
 3    Cntlr-0 Secondary Master  0   Quantum Fireball  1048576   ONLINE
 4    Cntlr-0 Secondary Slave   0   Quantum Fireball  1212416   ONLINE
```

screen, press <Ctrl> <M> during system booting up.

Array Information

This section of the screen displays all the disk arrays configured. Use this section to create, delete or edit the existing configurations. The disk arrays are displayed as a node in a tree, like Windows Explorer. When opened each node displays the properties of the array. Please refer to the section 2.2 for detailed information.

Physical Drive Information	These section displays all the physical drives connected to the IDE channels and their properties. Please refer to the section 2.3 for detailed information.
Help	The section <Help> displays hints on available options. This section also provides a list of keys that you can use to perform tasks, such as auto configuring, creating a logical drive, or deleting a logical drive. Please refer to the section 2.4 for detailed information.
Toolbar	The Toolbar displays icons that you can use to select an area on the screen, copy, paste, display full screen, and change font. Please refer to the section 2.5 for detailed information.

Configuring IDE RAID

Section 2.2

Array Information

Once you enter the HyperDisk100 setup utility, the Setup Windows will appear on the screen. This section of the screen displays all the disk arrays configured. Use this section to create, delete or edit the existing configurations. The disk arrays are displayed as a node in a tree, like Windows Explorer. When opened, each node displays the properties of the

```
                    HyperDisk Setup Utility Ver 2.4.1002A
             ┌──────── Array Information ────────┐  ┌─────── Help ───────┐
             │ - Array # 0      [ONLINE, 32 MB]  │  │Press ENTER or → to │
             │  Array Type         RAID 10       │  │view/modify the Array│
             │  Stripe 1           1 & 3         │  │properies.          │
             │  Stripe 2           2 & 4         │  │                    │
             │  Stripe Size        64K           │  │                    │
             │  Bootable           Yes           │  │                    │
             │  ►► Build Array     PRESS ENTER ►►│  │TAB - Switch Windows│
             │                                   │  │F1  - Auto Config Stripe│
             │                                   │  │F2  - Auto Config Mirror│
             │                                   │  │F3  - Auto Config RAID10│
             │                                   │  │F4  - Create Array  │
             │                                   │  │F5  - Delete Array  │
             │                                   │  │F6  - Restore Old Config│
             │                                   │  │F7  - Edit Options  │
             │                                   │  │F10 - Save & Exit   │
             └───────────────────────────────────┘  └────────────────────┘
             ┌──────── Physical Drives Information ── WC-OFF VP-ON DMA-OFF┐
             │Drv#  Drive ID          Array# Model          Size(in MB) Status│
             │ 1    Cntlr-0 Primary Master   0   Seagate Hard Dri  1179648  ONLINE│
             │ 2    Cntlr-0 Primary Slave    0   Fujitsu Hard Dri  16       ONLINE│
             │ 3    Cntlr-0 Secondary Master 0   Quantum Fireball  1048576  ONLINE│
             │ 4    Cntlr-0 Secondary Slave  0   Quantum Fireball  1212416  ONLINE│
             └────────────────────────────────────────────────────────────┘
```

array.

Array Type　By default an array is created in Stripe mode. When you select this field a pop-up window displays the following options and Select the intended RAID mode by using arrow navigation keys and pressing <Enter>key

```
                        ┌─────────────────────┐
                        │      RAID Mode      │
                        │       STRIPE        │
                        │       MIRROR        │
                        │      RAID 10        │
                        │       SPARE         │
                        └─────────────────────┘
```

STRIPE	Disk striping writes data across multiple disk drives instead of just one disk drive
MIRROR	The same data written to one disk drive is simultaneously written to another disk drive. If one disk drive fail, the contents of the other disk drive can be used to run the system continuously and simultaneously reconstruct the failed drive.
RAID 10	The same data written to one disk drive is simultaneously written to another disk drive in the same channel. Then Disk striping writes data across multiple disk drives instead of just one disk drive
SPARE	The SPARE mode is not a RAID mode, but a way to assign physical drive(s) as hot spare to be used in case of a mirror failure. When a mirror configured array has a drive fail, a spare drive can be used to replace the failed drive and rebuild the array.

Configuring IDE RAID

Configuring IDE RAID

Drive(s)   There is no default setting for this field. You must select the drives for the configured array. When this field is selected, a pop-up window display all the available physical drives with check-boxes. Use the arrow navigation keys and press the Spacebar to select or deselect the drive or drives to be part of the array. Press <Enter> when done.

`
[   ] Primary Master
[   ] Primary Slave
[   ] Secondary Master
[   ]Secondary Slave

NOTE

- If you select mirror mode as the array type, you **MUST** select two drives to be in the array
- If you select RAID10 mode as the array type, you **MUST** have four drives connected to IDE RAID channel.

Stripe Size   Stripe size field applies to Stripe mode arrays only. By default, an array is set up with 64 KB Stripes. Edit this field to change the default Stripe size.

NOTE

- You cannot change the Stripe size of an array that has already been configured.

Bootable   This field determines which the configured arrays should be used for booting the system when onboard HyperDisk100 is selected as the boot device. The options are *Yes* or *No*.

>>Build Array   If spare HDDs are connected to IDE RAID channel. A user can use option to disk rebuilding in the mirror mode .

Drive Size   This field cannot be edited. It displays the size of the array. When the array type is Stripe, the drive size is the total of all the drives selected (one or more drives.) When mirror, drive size is shown by individual drive, and when spare pool, drive size shows the total drive capacity.

**Configuring
IDE RAID**

Section 2.3

Physical Drive Information

This section only displays all the physical drives connected to the IDE RID channels and their properties.
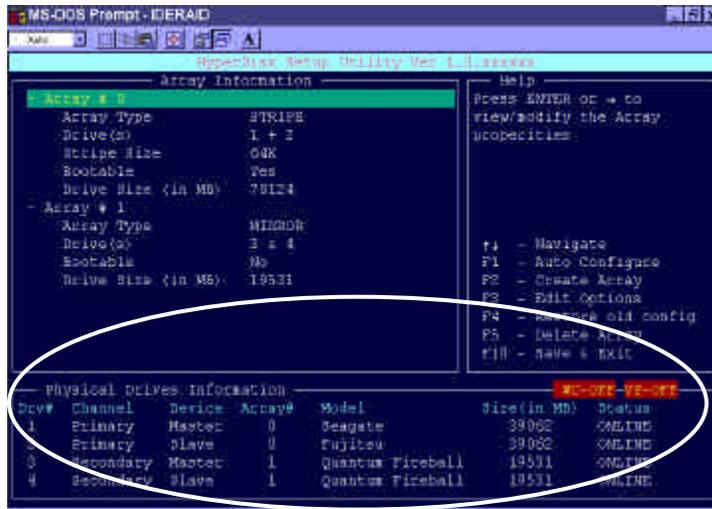
Drive#	The field displays the number of total connected devices.
Drive ID	The field displays the device ID of the connected drive.
Array#	The field displays the array status of the connected drive

Model	This field displays the model number of the connected drive
Size (in MB)	This field displays the capacity of the connected drive
Status	This field displays the operating status of the connected drive(online, failed or rebuilding)

**Configuring
IDE RAID**

Section 2.4

Help

The section <Help> displays hints on available options. This section also provides a list of keys that you can use to perform tasks, such as auto

configuring, creating a logical drive, or deleting a logical drive.

HOT keys	Descriptions
<- > or <¯>Key	Move to previous/next item and navigate the item.
<Enter> Key	View/Modify the array properties.

HOT keys	Descriptions
<F1> key **Auto Config** **STRIPE**	Press <F1> to automatically configure the attached hard drives to be arrays. When you select this option, the HyperDisk100 setup utility automatically creates arrays based on the available physical drives.
<F2> key **Auto Config** **Mirror**	Press F2 to create a disk array. When you create an array, a default array template is created. You must edit the array properties to complete the array creation. Use arrow navigation keys to highlight a property field and press <Enter> to edit that property. See the following section for information about setting each property field.
<F3> key **Auto Config** **RAID 10**	Press F3 to create a RAID10, When you create an array, a default array template is created. You must edit the array properties to complete the array creation. Use arrow navigation keys to highlight a property field and press <Enter> to edit that property. See the following section for information about setting each property field.
<F4> key **Create Array**	Press F4 to restore the configuration that was there before you entered the HyperDisk100 setup utility
<F5> key **Delete Array**	Press F5 to delete a currently configured array. Use arrow keys to go over to the array you want to delete and then press <F5>. **Caution** **Use this option with caution. When you delete and array, you lose the array configuration and the data saved in the array.**
<F6> key **Restore Old** **Configuration**	Press F6 to restore the configuration that was there before you entered the HyperDisk setup utility.

\<F7\> key **Edit Option**	Press F7 to set the options which applies to all the drives in the system. The available options are Enable/Disable Drive Write Cache, Boot Sector Virus Protection and DMA transfers. To select an option, press F3, move the cursor to the desired option and press the spacebar. This puts a check by the option. Press Enter to activate new set of options. A status box for each item displays in the Physical Drives Information section of the screen. The box shows whether the option is on or off. The Write Cache displays WC-ON or WC-OFF, Virus Protection box displays VP-ON or VP-OFF and DMA Read/Write box displays DMA-ON or DMA OFF. When you turn the option on, the status box changes color, from red to green. The window for the Write Cache, Virus Protection & DMA options is shown below.
\<F10\> key **Save and Exit**	When you have completed the array configuration, press \<F10\> to save the configuration and exit. If you do not want to save the configuration or any changes that you have made, press \<Esc\>. Subsequent message boxes display for confirmation; respond to them appropriately. Note that when a new array is configured, its partition record is invalidate

.

Chapter 3
Driver Installation

The onboard AMI HyperDisk100 IDE RAID controller can operate in various operating systems through either onboard BIOS or software drivers. Hence, in this chapter, the installation procedures of the RAID drivers in the various operating systems are going to be described in detail. AMI and RIOWORKS provide Windows 95/98/NT/2000 drivers for different operating systems.

NOTE

- For DOS, no driver installation is necessary. The HyperDisk100 ROM BIOS contains the low-level driver for HyperDisk100 that is good for DOS

Section 3.1

Windows 95/98 Driver installation

1. Installing the drivers during first OS installation

Use the following procedures to install Windows 95/98 onto RAID-configured drives connected to onboard AMI HyperDisk100 connectors.

Driver Installation

Step 1	Install Windows 95/98 in the normal way. When Windows discovers the onboard HyperDisk controller, it displays a dialog box titled <New Hardware Found>. In Windows 98 and Windows 95 4.00.950B, the detected device is called <PCI RAID Controller>. In older versions of Windows 95, the detected device is called <Unknown PCI Device>.
Step 2	If you do not see the dialog box described above, follow the procedure listed below in the table under the heading <Update Windows 95/98 Driver>.
Step 3	Proceed with the Add New Hardware Wizard. Press <Next>.
Step 4	Select the radio button <Display a list of all drivers…> and press <Next>.
Step 5	Select the button <Have Disk>. Insert the driver disk into the floppy drive.
Step 6	Select drive letter A: and press <OK>.
Step 7	Select <AMI HyperDisk100 Controller> and press <OK>.

Step 8 After Windows copies the driver, reset the system.

2. Updating the Windows 95/98 driver

Use the following procedures to update the HyperDisk100 driver or install the HyperDisk100 driver in an existing Windows 95/98 system.

Step 1 Click the right button of mouse on icon <My Computer>.of the desktop. A menu displays.

Step 2 Select the selection <Properties>. The System Properties window displays.

Step 3 Select the tab <Device Manager> A list of devices display.

Step 4 If the HyperDisk100 driver is already installed, it will display under SCSI Controllers as AMI HyperDisk100 Controller.
Select AMI HyperDisk100 Controller.

Step 5 If HyperDisk100 is not installed, it will appear as PCI RAID Controller or Unknown PCI Device under Other Devices.
Select PCI RAID Controller or Unknown PCI Device, whichever displays.

Step 6 Select the Properties button. The Disk drives Properties window displays.

Step 7 Select the tab <Driver>.

Step 8 Select the button <Update Driver>.

**Driver
Installation**

Step 9   Proceed with the "Update Device Driver Wizard". Press <Next>.

Step 10   Select the radio button Display a list of all drivers and press <Next>.

Step 11   Select the Have Disk button. Insert the disk into the floppy drive.

Step 12   Select the drive letter A: and press <OK>. Then Select AMI HyperDisk100 Controller and press <OK>.

Step 13   After Windows copies the driver, reset the system.

3. Confirming Windows 95/98 Driver

Use the following procedure to confirm whether the HyperDisk100 driver is installed properly

Step 1   Click the right mouse button on icon <My Computer> of the desktop. A menu displays.

Step 2   Select the item <Properties>. The System Properties window displays.

Step 3   Select the tab<Device Manager>. A list of devices displays.

Step 4   If the HyperDisk100 driver is installed, it will appear under SCSI Controllers as AMI HyperDisk100 Controller.

Step 5   Double click on the icon <Disk Drives> or click on the plus sign (+) to the left of the icon. The disk drives display.

Step 6 If drives are connected to HyperDisk100 controller and configured properly, you will see one or more entries as "AMI HyperDisk100 # xx".

Section 3.2

Windows NT4.0/2000 Driver installation

1. Installing the drivers during first OS installation

Use the following procedures to install Windows NT 4.0/Windows 2000 onto RAID-configured drives connected to HyperDisk100.

Step 1	Boot the system with the NT4.0/Windows 2000 Boot Installation CD or diskette.
Step 2	Press <F6> when following message displays: Setup is inspecting your computers hardware configuration.
Step 3	When installation prompts for a key after copying some files, press <S> to add a SCSI adapter.
Step 4	Select Other from the list that displays.
Step 5	Insert the HyperDisk100 driver floppy diskette and press <Enter>.
Step 6	Select AMI HyperDisk100 driver from the list and click <OK>.
Step 7	Continue with the rest of installation procedure.

2. Updating the Windows NT4.0/2000 driver

Use the following procedure to update the HyperDisk100 driver or install the HyperDisk100 driver in an existing system

Step 1   Click on the Windows <Start> button. The Windows menu displays.

Step 2   Select <Settings>. The Settings menu displays to the right.

Step 3   Click on <Control Panel>. The Control Panel window displays.

Step 4   Select <SCSI Adapters>.

Step 5   Select <Drivers> tab.

Step 6   If HyperDisk100 driver is already installed, it will appear in the list as <AMI HyperDisk100 Controller>. Select it and remove by pressing <Remove> button.

Step 7   Press the <Add> button.

Step 8   Select the <Have Disk> button. Insert the disk into the floppy drive.

Step 9   Select drive letter A: and press <OK>.

Step 10   Select AMI HyperDisk100 Controller and press <OK>.

Step 11   After Windows NT/2000 copies the driver, reset the system.

Driver Installation

3. Confirming the Driver Installations

Use the following procedures to confirm that the HyperDisk100 driver is installed properly

Step 1   Click on the Windows <Start> button. The Windows menu displays.

Step 2   Select <Settings>. The Settings menu displays to the right.

Step 3   Click on <Control Panel>. The Control Panel window displays.

Step 4   Select <SCSI Adapters>.

Step 5   Select the <Drivers> tab. If HyperDisk100 driver is installed, it will appear in the list as AMI HyperDisk100 Controller.

Step 6   Select the <Devices> tab. If drives are connected to HyperDisk100 and configured properly, you will see one or more entries as AMI HyperDisk100 #xx under AMI HyperDisk100 Controller.

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Driver Installation

Chapter 4
Software Utility

Once the disk arrays of onboard AMI HyperDisk100 are installed and RAID driver is installed successfully. A user can continuously install the software utility. Software Utility is used to get information about configuration, health of the arrays and physical disks, and do a rebuild, and perform a consistency check. Visual and audible messages are available to warn of possible problems with the disk array or controller. In addition, Software Utility visually identifies the physical location of attached drives on the IDE RAID connectors of M/B by IDE channel and identifies which drives are included as part of individual arrays. Finally, administrators can customize this Software Utility to maintain operating logs and event notification, set password access to the utility, and schedule maintenance on Mirror (RAID 1) or a STRIPE/Mirror (RAID 10) arrays

1. Prerequisite

You need to install items for some of the operating systems before you install the HyperDisk100 software utilities, as shown bellow

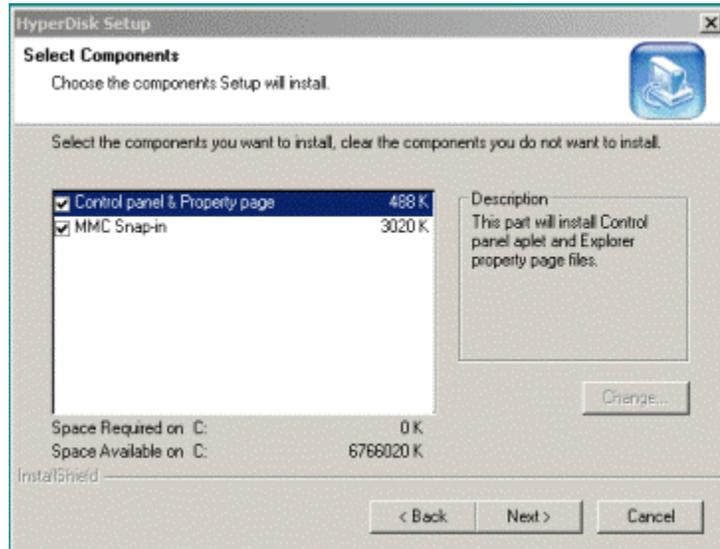| Operating System	Service Pack 5	Internet Explorer 5	MMC
Windows 95	N/A	Yes	Yes
Windows 98	N/A	Yes	Yes
Windows 98 SE (Second Edition)	N/A	No	Yes
Windows NT 4	Yes	Yes	Yes
Windows 2000	No	No	No

2. Installation Procedures

Step 1   Insert the CD in your computer and run the following program:
d:/RAID/amiutils/HyperDisk/HyperDsk/setup.exe (use the drive letter for your CD-ROM)

Step 2   The first installation screen displays. Follow the instructions on the installation screens
To install HyperDisk100 software utilities, follow the instructions on the installation screens
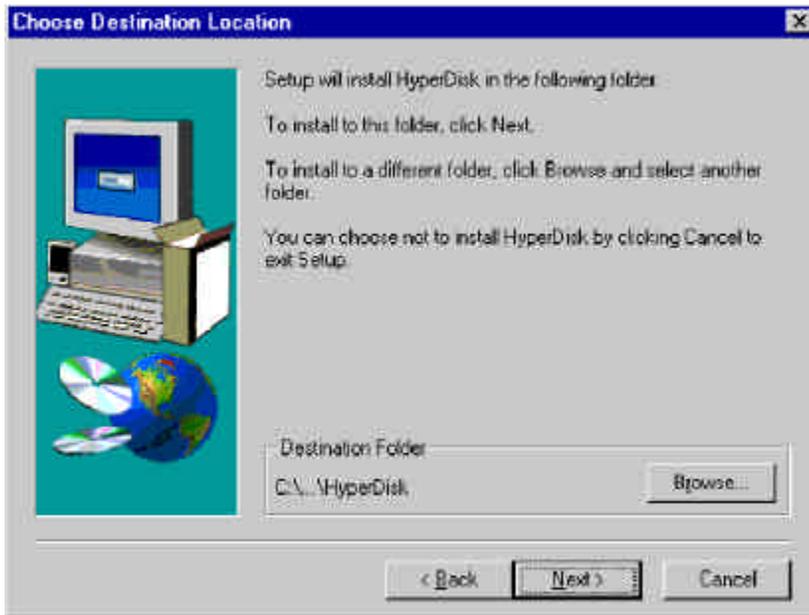
Step 3   Click on Next. The second installation screen displays

Step 4 On the second installation screen, select the components that you want to install. The components are:

- Control panel applet and Property page,
- MMC Snap-in
- DMI Agent

When you select a component from the list, a description of the component displays below the list, as shown below. After you select components, click on Next to continue. Complete the instructions to finish installation.

Control Panel and property page	You can use the Control Panel to start or stop the HyperDisk100 Console program or check the status of the program. The property applet is used to view the property windows, which you can use to set options for error checking, rebuilding, and using the activity log file.
MMC Snap-in	MMC (Microsoft Management Console) is a common platform for launching management applications in the Windows environment. HyperDisk100 Console plugs into MMC to provide the ability to manage arrays, physical drives, and the activity log.

Software Utilities

Spy Services

Overview

After installing Software Utilities and restart the system, The Spy service will automatically when enter the OS. The Spy Service program looks for errors, failed drives, and status changes. It can mark drives as failed after the error threshold is reached and start automatic rebuilds. It starts automatically and runs in the background of HyperDisk100 Console.

Spy Service icon

An icon for the Spy Service displays in the bottom right corner of the HyperDisk100 Console screen (in the tray bar). The icon is the figure wearing sunglasses on the left side of the screen below:

Green color-coded	There is no system problems
Yellow color-coded	There are errors
Red color-coded	The warnings of a critical problem which could cause the system to fail.

Software Utilities

Start Spy Service

Spy Service starts automatically and runs in the background of HyperDisk100 Console. You can use the <Control Panel> to start or stop the program or display its status .. Click on <Start> and select <Control Panel>. Click on the <Services> icon (two gears) in Control Panel.

The following screen displays. The Spy Service program displays as SpySer in the list. This window displays the status of the program and whether the program starts automatically or manually.
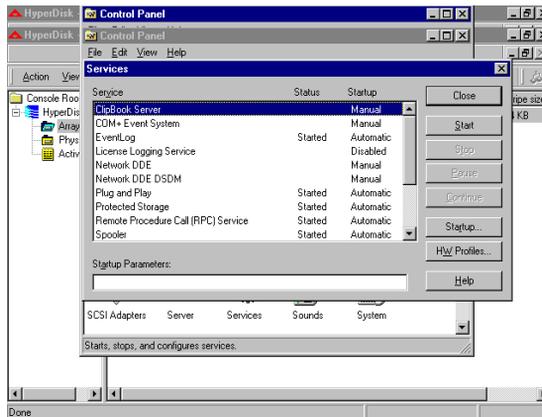
HyperDisk100 Console

1. Overview

HyperDisk100 Console is a MMC (Microsoft Management Console) snap-in. MMC is a common platform for launching management applications in the Windows environment.

2. Starting HyperDisk100 Console

To activate HyperDisk100 Console, go to <Start> <Programs> <HyperDisk100> and select <HyperDisk100 Utility>. The HyperDisk100 Console window displays

Software Utilities

Object Frame   The object frame (the left frame) displays the objects in a tree in the same way as Windows Explorer.

The objects presented are **IDE Controllers, arrays, physical drives, and the activity log.**
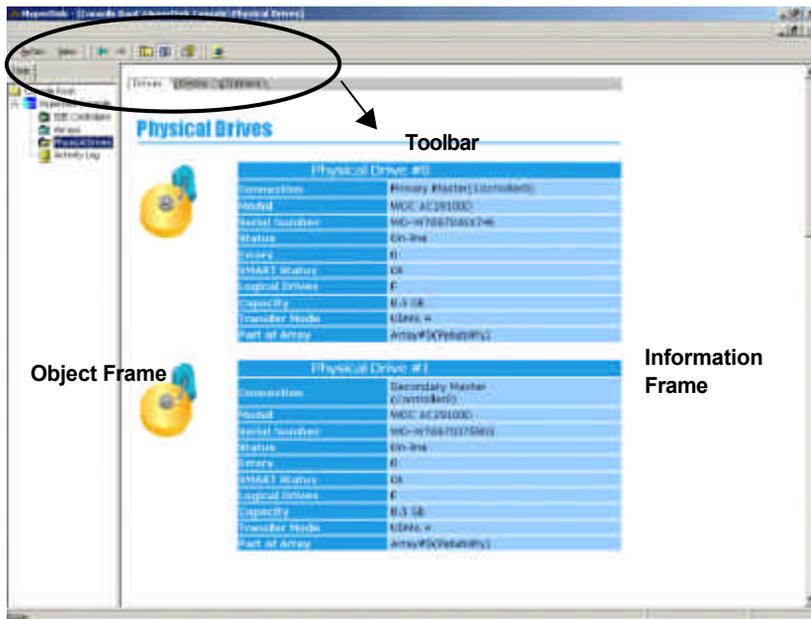
Information Frame   The information frame (the right frame) displays information corresponding to the object selected

in the left frame. This window can be viewed as small Icons, large Icons, list, or details, as in Windows Explorer.

Context menu
The context menu displays when you right click on the items in the object or information frames. You can use the menus to perform actions or access help.

Toolbar
The Toolbar displays menus, such as Action and View, and icons you can use to perform actions or access help. The toolbar is located over the object and information frames

HyperDisk100 Console Properties
To view general settings and tool settings, right click on the HyperDisk100 Console directory tree in the left frame. The context menu displays, as shown below. The context menu contains the Properties menu item

Select Properties from the context menu. The HyperDisk100 Console Properties window displays two available tabs: **General settings and Tools**

2.1. General Setting

You can use the General settings tab to set how often HyperDisk100 Console checks the arrays for errors
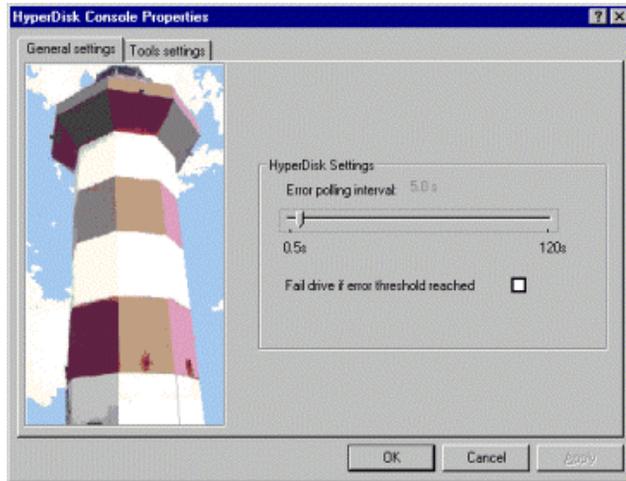
| **Error polling interval**	You can set the interval between checks from 0.5 seconds to 120 seconds
Fail drive if error threshold reached	You can choose whether to fail a drive if it has more than a specified number of errors.

 NOTE

- If you use a short interval between error checks, the workload on the system is greater. If you use a long interval between checks, there is a delay in updating the system information.

2.2. Tools Setting

Select the Tools setting tab for options for rebuilding, and the activity log file. Check the settings that you want to use
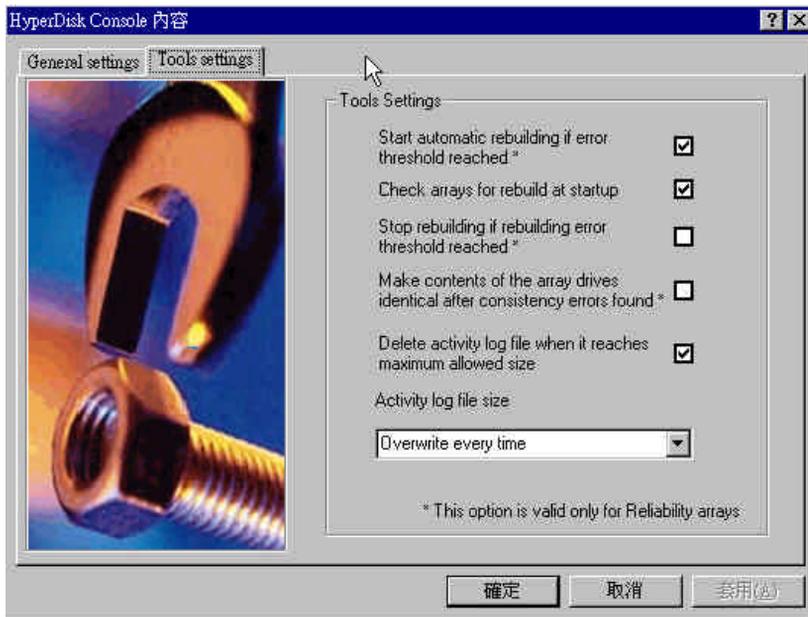
| **Start automatic rebuilding if error threshold reached** | HyperDisk100 Console begins an automatic rebuild if the array has more than a specified number of errors. If so, it starts an automatic rebuild. |

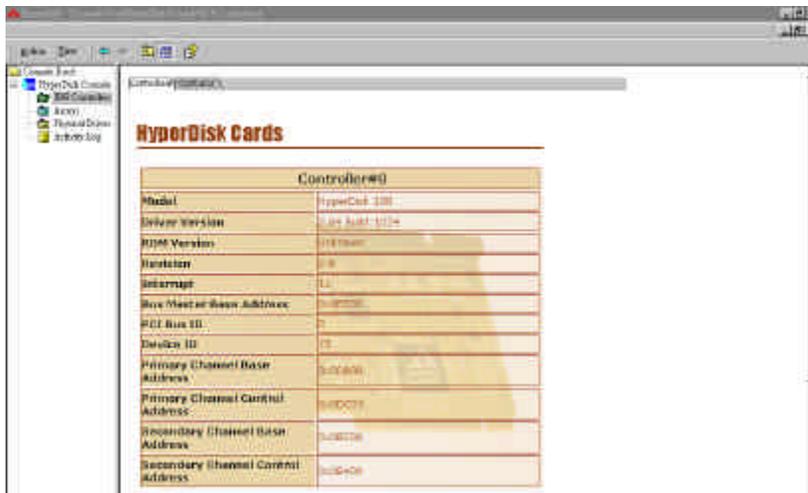|	
Check arrays for rebuild at startup	HyperDisk100 Console checks the number of errors in the arrays to see if they need rebuilding.
Stop rebuilding if rebuilding error threshold reached	If the maximum number of errors allowed is found in an array during rebuild, HyperDisk100 Console will stop the rebuild.
Make contents of the array drives identical after consistency errors found	If HyperDisk100 Console finds mismatches between two mirrored (RAID 1) arrays, it will copy the data from one drive to the other to make them identical.
Delete activity log file when it reaches maximum allowed size	This deletes the activity log file if it reaches the maximum allowable size (as set in the box below this item.) If checked, the activity log file is overwritten when it reaches the maximum size. If not checked, the file stops updating when it reaches the maximum size and is not updated anymore.
Activity log file size	Use this box to select the maximum size for the activity log file.

IDE Controllers

Select <IDE Controllers > from the Console tree in the object frame to view the following information about the IDE RAID s in the information frame.

1.Controller

Model	This field only displays the model name of onboard AMI IDE RAID controller
Driver version	This field only displays the revision of AMI IDE RAID driver.
ROM Version	This field only displays the revision of ROM.

Revision	This filed displays information only.
Interrupt	This field only displays the occupied interrupt number of IDE RAID controller.
Bus Master Base Address	This field only displays the address of onboard AMI IDE RAID controller
PCI Bus ID	This field only displays the bus ID of onboard AMI IDE RAID controller
Device ID	This field only displays the device ID of onboard AMI IDE RAID controller
Primary/Secondary Channel Base Address	This field only displays the base address of Primary/Secondary Channel of onboard AMI IDE RAID controller
Primary/Secondary Channel Control Address	This field only displays the control address of Primary/Secondary Channel of onboard AMI IDE RAID controller

2.Options

Stop rebuilding if error threshold reached	If the maximum number of errors allowed is found in an array during rebuild, HyperDisk Console will stop the rebuild.
Make contents of the array drives identical after consistency errors found	If HyperDisk Console finds consistency errors between two mirrored (RAID 1) arrays, it will copy the data from one drive to the other to make them identical. * - This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays.)
Delete Activity log file when it reaches maximum allowed size	This deletes the activity log file if it reaches the maximum allowable size (as set in the box below this item.) <O:P></O:P> If checked, the activity log file is overwritten when it reaches the maximum size. If not checked, the file stops updating when it reaches the maximum size and is not updated anymore.
Activity log file size	Use this box to select the maximum size for the activity log file.
Enable SMART on physical drives	Enables S.M.A.R.T. monitoring on all drives connected to HyperDisk cards
SMART poll interval	Allows to change S.M.A.R.T. polling interval, this means how often Spy will check for drive S.M.A.R.T. status. Two options are available, once per hour and once per 6 hours.

Software Utilities

Arrays

This information displays in the information frame. The RAID mode for a striped array (RAID 0) is called performance, and for a mirrored array (RAID 1) is called reliability.

You can select the Menu option below the graphic to access the menu. The option available on this menu is Consistency Check (used to check the correctness of the data on the redundant drive.) The array screen is shown below:

1. <Arrays> Tab
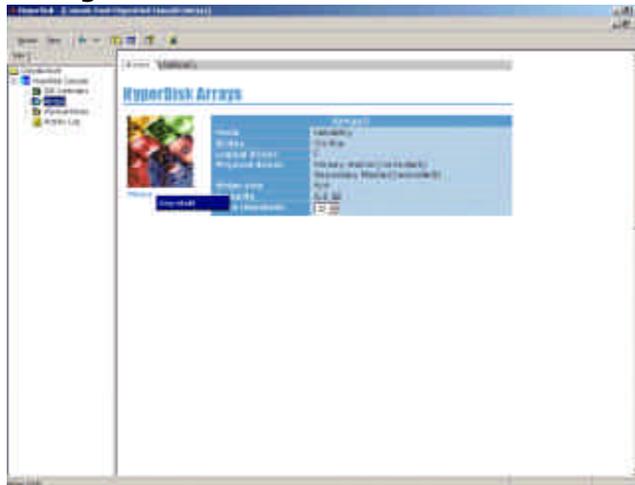
Name	This filed displays the array name.
Mode	This field displays the array mode. There are two mode.

Performance	For a Striped array (RAID 0),the mode is called *performance*
Reliability	For a mirrored array (RAID 1), the mode is called *reliability*.

Status   This field displays the status of a RAID.

On-line	It shows the array operated properly.
Degraded	A mirrored array contains a drive that has failed or disconnected. The remaining drive member in the array is on-line. When this field shows "Degraded", array will continue to save and retrieve data from the remaining working drive(s). However, the array has temporarily lost its ability to provide fault tolerance The user should identify the failed drive though the AMI configuration utility, and then replace the problem drive. **RIOWORKS^{TM} recommends** replacing the failed drive as soon as possible since a "Degraded "array offers no data redundancy
Off-line	A mirrored array has 2+ drives or a Striped array has 1+ drives that have failed or have been disconnected. When the array condition is "offline," the user must replace the failed drive(s), then restore data from a backup source.

Software Utilities

Logical Drives	This field displays all connected logical drives of the array.
Physical drives	This field displays the all connected drive ID of the array.
Stripe Size	When your RAID level is RAID 0, this filed will display the stripe size if RAID.
Capacity	Storage capacity of the array
Error Threshold	Select this icon to display the array settings, and error threshold. The error threshold shows how many errors an array can have before the drive fails. The choice:1 to 32.

NOTE

- The icon next to the array name in the Information frame is color coded. Green means no system problems, yellow means there are errors, and red warns of a critical problem which could cause the system to fail.

2. <Options> Tab

Fail physical drive if error threshold reached	HyperDisk Console fails the physical drive if it has more errors than you allowed on the Arrays screen, in the Error Threshold field. You can select from 1 to 32 errors as the threshold.
Start rebuilding if error threshold reached	HyperDisk Console begins an automatic rebuild if the array has more than a specified number of errors. If so, it starts an automatic rebuild. * - This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays.)
Check arrays for rebuild at start up	HyperDisk Console checks the number of errors in the arrays to see if they need rebuilding.
Stop rebuilding if error threshold reached	If the maximum number of errors allowed is found in an array during rebuild, HyperDisk Console will stop the rebuild.
Make contents of the array drives identical after consistency errors found	If HyperDisk Console finds consistency errors between two mirrored (RAID 1) arrays, it will copy the data from one drive to the other to make them identical. * - This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays.)
Delete Activity log file when it reaches maximum allowed size	This deletes the activity log file if it reaches the maximum allowable size (as set in the box below this item.) <O:P></O:P> If checked, the activity log file is overwritten

Software Utilities

	when it reaches the maximum size. If not checked, the file stops updating when it reaches the maximum size and is not updated anymore.
Activity log file size	Use this box to select the maximum size for the activity log file.
Enable SMART on physical drives	Enables S.M.A.R.T. monitoring on all drives connected to HyperDisk cards
SMART poll interval	Allows to change S.M.A.R.T. polling interval, this means how often Spy will check for drive S.M.A.R.T. status. Two options are available, once per hour and once per 6 hours.

Software Utilities

Physical Drives

The screen below shows the physical drive information. In the list view , the icon next to the drive name (such as Primary Master) in the Information frame is color coded. Green means no system problems, yellow means there are errors, and red warns of a critical problem which could cause the system to fail..

1.<Physical Drives> Tab

Physical Drive	This field displays the all connected drive ID of the connected physical drives.

Connection	This field displays the IDE RAID channel that the HDD connect to.
Model	This field displays the model name of the connected drives..
Serial Number	This field displays the model number of the connected drives..
Status	This field displays the status of the drive (online or offline).

On-line	It shows the array operated properly.
Off-line	A mirrored array has 2+ drives or a Striped array has 1+ drives that have failed or have been disconnected. When the array condition is "offline," the user must replace the failed drive(s), then restore data from a backup source.

Error	This field displays how many errors an array can have before the drive fails.
SMART Status	This field displays the SMART status of connected IDE drive.
Logical Drives	These field displays the logical drives contained in the physical drive (by drive letter).
Capacity	This field displays the capacity of the drive.
Transfer Mode	This field will display the transfer mode of the connected hard drive.

Part of Array   This field displays the array number.

![] NOTE

▪ The icon next to the drive name (such as Primary Master) in the Information frame is color coded. Green means no system problems, yellow means there are errors, and red warns of a critical problem which could cause the system to fail.

2.<Error>Tab

Selected drive   This field allows a user to check the error information on the specific IDE drive.

Error   This field will display the error type.
Error 01 -Media read error. Physical drive surface has damages
Error 02 -Media write error. Physical drive surface has damages
Error 03 -Media verify Error.
Error 04 -Missing drive type.

Disk Sector   This field will display the disk sector error occurs.

Date	This field will display the date error occurs.

Time	This field will display the time error occurs.

3.<Options>Tab

Fail physical drive if error threshold reached	HyperDisk Console fails the physical drive if it has more errors than you allowed on the Arrays screen, in the Error Threshold field. You can select from 1 to 32 errors as the threshold.
Start rebuilding if error threshold reached	HyperDisk Console begins an automatic rebuild if the array has more than a specified number of errors. If so, it starts an automatic rebuild. * - This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays.)
Check arrays for rebuild at start up	HyperDisk Console checks the number of errors in the arrays to see if they need rebuilding.

Software Utilities

|	
Stop rebuilding if error threshold reached	If the maximum number of errors allowed is found in an array during rebuild, HyperDisk Console will stop the rebuild.
Make contents of the array drives identical after consistency errors found	If HyperDisk Console finds consistency errors between two mirrored (RAID 1) arrays, it will copy the data from one drive to the other to make them identical. * - This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays.)
Delete Activity log file when it reaches maximum allowed size	This deletes the activity log file if it reaches the maximum allowable size (as set in the box below this item.) <O:P</O:P If checked, the activity log file is overwritten when it reaches the maximum size. If not checked, the file stops updating when it reaches the maximum size and is not updated anymore.
Activity log file size	Use this box to select the maximum size for the activity log file.
Enable SMART on physical drives	Enables S.M.A.R.T. monitoring on all drives connected to HyperDisk cards
SMART poll interval	Allows to change S.M.A.R.T. polling interval, this means how often Spy will check for drive S.M.A.R.T. status. Two options are available, once per hour and once per 6 hours.

Software Utilities
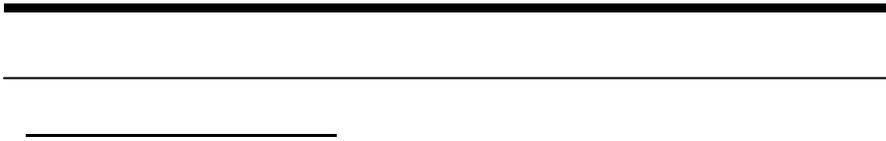
Activity Log

The Activity Log object displays information about activity related to the arrays and physical drive.

Activity Log Context Menu

The following context menu displays when you right click on the Activity Log File. The menu items are:

- Delete log file
- Help.

Activity Log Toolbar Icons

The following icon displays in the toolbar only when you select Activity Log file in the Console tree directory.

Icons	Description
Delete log file	Select this item to delete the Activity Log file.

Software Utilities

Section 4.6
Toolbar

Context menu items display in the Toolbar. These include items such as actions, display options, and help. You can also use the items on the toolbar to go to a previous screen, open a file, and save a file. There are some
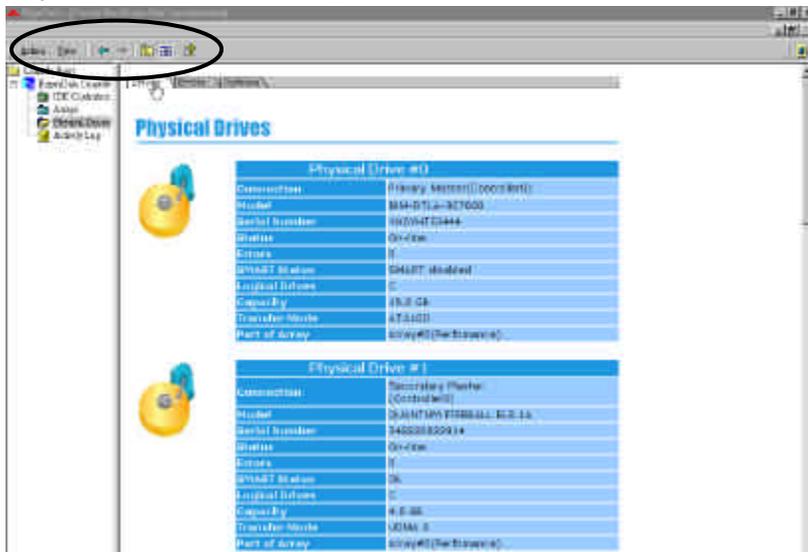
toolbar icons available only if you select an array or physical drive in the right frame. The following toolbar icons always appear

Icons	Description
Action Action	This item has three menu options, Properties, Help, and Delete log file, depending on which item you select in the Console tree.

View View	Use this icon to display the array or physical drive information in large icons, small icons, a list or in detail.
Back ⇐	This takes you back one screen.
Forward →	This takes you forward one screen.
Up one level	This takes you one level higher on the tree directory in the left frame. For example, if you select Physical Drives in the tree and click on this icon, the cursor will move to the Arrays item.
Show/Hide Console Tree	Use this icon to hide or display the tree directory in the left frame.
Help	Use this icon to display help information, such as help for the Microsoft Management Console.

Software Utilities

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Onboard LAN

Chapter 5
Onboard LAN

1.Overview

RIOWRKS uses Intel 82559 Fast Ethernet Multifunction LAN controller as the onboard network interface controller. As known, Intel® 82559 fast Ethernet Controller can provide IEEE 802.3/802.3u 10 Base-T and 100 Base-TX compatible network environment. A user can achieve advanced manageability of the Alert on LAN II Specification by using this Intel® 82559 chip.

2.Hardware Installations

Step 1 Connect a twisted pair Ethernet (TPE) cable to the LAN port of M/B as shown below.

Onboard LAN

Mainboard

RJ 45 Connector

A Switch or A Hub
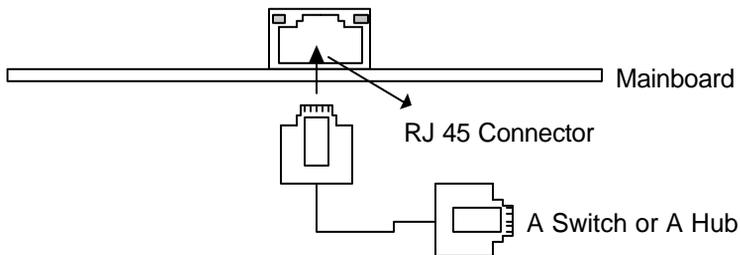
NOTE

- For 100BASE-TX,your network cable **MUST** be Category 5,twisted-pair wiring. If you plan to run your network connection at 100Mbps, it **MUST** be connected to a 100 BASE-TX hub or switch (not a 100BASE-T4 hub).

- For 10BASE-T,use Category 3,4, or 5 Category, twisted-pair wring. If you want to use the onboard LAN in a residential environment, you **MUST** use a Category 5 cable.

> **Step 2** To configure the onboard LAN controller, continue with the procedures specific to your operating system

Onboard LAN

Windows 95/98/ME Driver Installations

1. Windows 95/98 Automatic Configuration

PCI computer automatically detects and configures PCI-compliant onboard LAN controller (adapter) while booting. The LAN controller IRQ level and I/O address are automatically set by the BIOS each time you start your computer.

Start your computer to automatically configure the adapter. Configuration is complete when Windows NT starts or when the DOS prompt appears.

If your computer displays an error while booting, it may require additional steps to configure. See the Troubleshooting.

.

2. Install Windows 95/98 Drivers from Disk

Have your setup CD or diskettes provided by RIOWORKS when you attempt to install onboard LAN drivers

Step 1	After connect the cable, start Windows 95/98. You will see the <New Hardware Found> dialog box.
Step 2	Follow the installation procedures. Inserted setup CD or onboard LAN driver disk in the appropriate drive (D: for CD-ROM)or (A: for floppy drive) and specify the path. Then click <OK>.
Step 3	Restart the Windows 95/98 when prompted.

Onboard LAN

3. Install Windows 95/98 Drivers manually

Step 1   After connect the cable, start Windows 95/98.

Step 2   Double-click the <System> icon in the <Control Panel>.

Step 3   Click the <Device Manager> tab.

Step 4   Double-click < Network Adapters> in the list area.

Step 5   Double-click < Intel PRO/100+>. Then Update Device Wizard appears.

Step 6   Select <Search for a better driver than the one your device is using now>. Inserted setup CD or onboard LAN driver disk in the appropriate drive (D: for CD-ROM)or (A: for floppy drive) and specify the path. Then click <Next>

Step 7   Specify the appropriate path and click <Next>

Step 8   Select <Choose the update driver (Recommended)> and continue to click <Next> at each dialog until the driver files are copied.

Step 9   When Windows has finish copying drivers, click <Close> and restart your system.

Onboard LAN

Section 5.2

Windows NT4.0/3.51 driver installation

1. Windows NT Automatic Configuration

PCI computer automatically detects and configures PCI-compliant onboard LAN controller (adapter) while booting. The LAN controller IRQ level and I/O address are automatically set by the BIOS each time you start your computer.

Start your computer to automatically configure the adapter. Configuration is complete when Windows NT starts or when the DOS prompt appears.

If your computer displays an error while booting, it may require additional steps to configure. See the Troubleshooting

2. Windows NT Version 4.0

Step 1 Double-click the <Network> icon in the <Control Panel> selection.

Step 2 Click <Adapters> tab.

Step 3 Click <Add> tab. You will see a list of adapters.

Step 4 Insert the driver disk or CD provided by RIOWORKS into your disk drive and click <Have Disk> instead of selecting an adapter from this list.

Step 5 Specify the appropriate drive in the dialog box and click <OK>. Then follow the prompts to compete the installation. When the driver is added successfully, you will see one adapter listed in the Network adapter list.

Onboard LAN

Step 6   The adapter now appear on the list in the <Network> window. Click <Close> to finish.

Step 7   Restart Windows NT when prompt.

TIP

- PROSet is a enhance utility that you can easily use to configure and test the onboard LAN port in Windows NT. PROSet also displays the computer resources that were assigned to each installed LAN chip.
- To set duplexing options, continue the Select Duplex Mode

3. Windows NT Version 3.51

Step 1   Double-click the <Network> icon in the <Control Panel> selection.

Step 2   Click <Add Adapter>

Step 3   When the list of adapters appears, scroll the end of list and select <Other> Requires disk from manufacturer.

Step 4   Insert the Driver Disk provided by RIOWORKS in the drive and click <OK>. Drivers and PROSet utility are installed. To start PROSet, click <Continue>.

Step 5   Click <OK> in the PROSet main window to return to Window NT. You will see the <Network Setting> dialog box..

Step 6   Click <OK> and remove the installation disk. When prompted, restart Windows NT.

Onboard LAN

TIP

- PROSet is a enhance utility that you can easily use to configure and test the onboard LAN port in Windows NT. PROSet also displays the computer resources that were assigned to each installed LAN chip.

Onboard LAN

Novell NetWare 4.1x/5.0

Use the NetWare* Install program to install the onboard LAN driver in the Novell NetWare 4.1X/5.0. For 3.11 and 3.12, see the readme files. For DOS ODI, see the section DOS and Windows 3.1 Setup for Novell NetWare DOS ODI Client. The following procedure is a condensed description of the installation process

Step 1 From the NetWare console, type <LOAD NWCONFIG> and press < Enter>.

Step 2 From the <Configuration Options> screen, choose <Driver option> and press <Enter>.

Step 3 Choose<Configure network driver> and press<Enter>. If any drive is already loaded, a list of them appears.

Step 4 Choose <Select an additional driver> and press <Enter>. A list of drivers appears.

Step 5 Insert the onboard LAN driver disk or setup CD provided by RIOWORKS and press <Insert> key to install an unlist driver.

Step 6 Specify the correct path to your media if necessary by pressing <F3> key. Press <Enter> to search the floppy or CD-ROM drive.

Step 7 Highlight the <Intel(R)PRO PCI Adapter> and press <Enter> to select it.

Onboard LAN

Step 8 The next screen asks for the frame and protocol types. Use the arrow keys to select specific items or choose the defaults. Select <Save parameters and load driver> to continue.

Step 9 To complete the driver installation process, go back to the <Installation Option> by pressing <Esc> key until you see it.

Step 10 Choose <Exit> to return the console prompt.

Onboard LAN

DOS and Windows 3.1 Setup for Novell NetWare DOS ODI Client

1. DOS and Windows 3.1 Automatic Configuration

PCI computer automatically detects and configures PCI-compliant onboard LAN controller (adapter) while booting. The LAN controller IRQ level and I/O address are automatically set by the BIOS each time you start your computer.

Start your computer to automatically configure the adapter. Configuration is complete when Windows NT starts or when the DOS prompt appears.

If your computer displays an error while booting, it may require additional steps to configure. See the Troubleshooting.

2. Run Setup to install Network Drivers

Step 1   If your computer already has network drivers installed, restart the computer without loading them. If the drivers are loaded from the AUTOEXEC.BAT or CONFIG.SYS file, type REM in front of each line that load a network driver. Or, with DOS 6.x or later press <F5> as DOS starts, to bypass the drivers.

Step 2   Insert the LAN driver disk in a drive, switch to that drive and at the DOS prompt, type SETUP and press <Enter>.

Step 3   Select the adapter from menu.

**Onboard
LAN**

Step 4   Select <Automatic Setup> from the Main menu. Then
              follow the instructions on the screen. Setup displays the
              LAN controller's configuration and then runs a series of
              diagnostics test that make sure the onboard LAN chip
              and network are functioning properly. If Setup finds a
              problem, it displays the results and some possible
              solution.

Step 5   When Setup finish the tests, you will see the <Install
              Network Drivers> screen.

Step 6   Select the driver you want to install. Setup can install a
              NetWare client driver for you, If you want to install other
              drivers, Setup displays a readme file with installation
              instructions.

**Onboard
LAN**

Troubleshooting

A: Onboard AMI HyperDisk100
Drive Connection Tips

1. If you have two drives, connect one per channel.

2. The performance of HyperDisk100 is best with one drive per channel.

3. Use the same type of drives or drives with similar capability (in terms of speed and capacity).

4. Do not use dissimilar drives on the same channel.

5. Always use 80-conductor Ultra ATA 100 cables.

6. Ensure that proper jumper settings are used for Master and Slave in each channel.

7. Do not connect any ATAPI devices (CD, ZIP, LS120 etc.) to HyperDisk100

Configuration and Setup Tips

1. Before installing any OS, switch Virus Protection OFF. This is required in order to prepare the partition sector (Master Boot Record.)

2. Set Drive Write Cache to ON for better performance.

Troubleshooting

3. If you need to change array configuration, back up your data first. When an array configuration changes, previous data in that array is lost

4. If you get an unexpected message, such as "Drives Missing" or "Configuration Mismatch", switch off the system and verify all connections, IDE cables and power cables.

5. Before taking a drive off, always clear the configuration in that drive. If all drives are to be taken out, you can press <Ctrl><Q> after boot up to clear the configuration. If you want to clear configuration in a single drive, use the "HyperFix" program.

6. If you get a "Configuration Mismatch" message after adding new drives, that is because the new drives had been used before and the configuration on the drives was not cleared. If this occurs, press <Ctrl-M> to go to the setup and create the array configuration as needed.

7. When you press <Ctrl><Q>, remember that you will lose all data in all the drives

HyperDisk100 Console Tips

1. Install Internet Explorer 5.x or higher before you install HyperDisk100 Console.

2. Install NT Service Pack 5 or higher for Windows NT 4.0 before you install HyperDisk100 Console.

3. Note that if you uninstall Internet Explorer, HyperDisk100 Console will not work properly.

4. To track errors and invoke the Rebuilding option automatically when you use the Mirror (Reliability) configuration, the background program "HyperDisk100 Spy" is required. The background program is represented by an Icon in the System Tray (bottom right of desktop

window).

5. You can stop HyperDisk100 Spy by clicking the right mouse button on the tray icon and then selecting the stop option.

6. It is recommended that you keep HyperDisk100 Spy running all the time.

7. When HyperDisk100 Console is invoked, it automatically starts HyperDisk100 Spy.

8. If you do not want a drive to be marked as Failed in the Mirror configuration, click the right mouse button on HyperDisk100 Console, select Properties and uncheck the option in the General Settings tab.

9. Note that the physical drives errors are not erased once detected. If you want to clear the log for any reason, use the "HyperFix" program.

10. You do not need to run Consistency Check unless you want to find errors throughout the entire disk. The HyperDisk100 driver ensures the Mirror disks are always consistent.

11. The error log shows errors on the physical locations of hard disks. The errors are potential problems, but don't necessarily cause data loss immediately, as the File System can take care of the error sector or the errors could fall outside of all partitions.

12. Run ScanDisk in Windows 95/98 or Chkdsk in Windows NT for all partitions to take care of the errors

Troubleshooting

Check List

Problem	Suggested Solution
The HyperDisk100 sign on message does not appear during boot up (If HyperDisk100 card is properly installed, you should see this message.)	1. Check whether the HyperDisk100 card is inserted all the way down to the PCI slot. 2. Move the card to PCI slot. 3. If System BIOS is set for silent boot, then no message will appear on screen. This is not a problem. To make sure, set the silent boot option to disabled in the system BIOS.
Drive(s) connected to HyperDisk100 are not detected OR The system hangs when HyperDisk100 adapter ROM scans the IDE channels.	1. Make sure the Ultra ATA100 cables are used. 2. Make sure that the cable ends are connected properly. 3. Make sure that the power cables to the drives are connected properly. 4. Make sure that the Master/Slave jumpers are used properly. 5. Change cables. 6. If everything fails, change the drive(s).
BIOS reports that a mirrored array is in degraded mode.	Make sure all physical drives are properly connected and are powered on. Reconnect, replace, or rebuild any drive that has failed.

Troubleshooting

Hardware Installation

Problem	Suggested Solution
One of the hard drives in a mirrored array has failed.	Replace the drive with another drive that has the same capacity.
If this message displays while booting: "NO ROM BASIC SYSTEM HALTED"	There are no active partitions. Run FDISK to set the active partition.
Operating system does not boot.	Check the system BIOS configuration for PCI interrupt assignments. Make sure some Interrupts are assigned for PCI.

B: Onboard Intel 82599 LAN Chip

1.If the onboard LAN can not connect to the network.

1. Make Sure the cable is installed properly

The network cable must be securely attached at both RJ-45 connections (onboard LAN and hub). The maximum allowable distance from onboard LAN port to hub is 100 meters. If the cable is attached and the distance is within acceptable limits but the problem persists, try a different cable.
If you are directly connecting two computers without a hub or switch, use a crossover cable.

Troubleshooting

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2. **Check the LED lights on the onboard LAN port**		The onboard LAN has two diagnostic LEDs, one on each side of the cable connector. The lights help indicate if there is a problem with the connector, cable, or switch/hub.
3. **Make sure you are using the correct drivers**		Make sure you are using the drivers that come from with M/B.
4. **Make sure the switch port and the onboard LAN have the same duplex setting**		If you configured the onboard LAN for full duplex, make sure the switch port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections

LED Function indicators Tip

100Mbps LED (Yellow) ◄———————   ———————► ACK/LNK LED (Green)

Mainboard

RJ 45 Connector
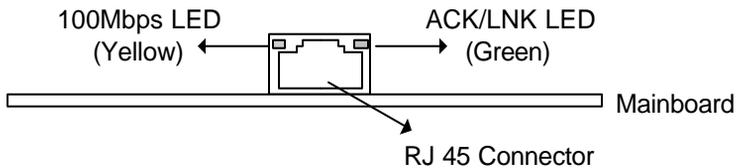
LED		Meaning
ACK/LNK -On		The onboard LAN and switch are receiving power; the cable connection between the switch and onboard LAN is good.
ACK/LNK -Off		The onboard LAN and switch are not receiving power or there is a driver configuration problem. If the LED is off: ▪ Make sure power is connected to the PC. If

Troubleshooting

		power is connected and the LED is still off, make sure the network cable is attached at both ends. ▪ Make sure you have loaded the network drivers. ▪ Check all connections at the onboard LAN port and switch and make sure both ends are connected. ▪ Try another port on the switch or the hub. ▪ Make sure the duplex mode setting on the onboard LAN matches the setting on the switch. ▪ Make sure you have the correct type of cable between the onboard LAN and the hub. 100BASE-TX requires two pairs. Some hubs require a cross-over cable, while others require a straight through cable. ▪ Make sure you have loaded the correct network drivers. ▪
ACK/LNK - Flashing		The onboard LAN is sending or receiving network data. The frequency of the flashes varies with amount of network traffic. If the ACK/LNK LED does not flash, the cause could be: The network may be idle. Try accessing a server. The onboard LAN may not be transmitting or receiving data. Make sure you are using twist pair Ethernet cable for TX wiring.
100Mbps -On		Operating at 100Mbps
100Mbps- Off		Operating at 10Mbps

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