MAN-300649-000

Medley

ATA RAID SOFTWARE
to be used with the Sil 0680 & Sil 0649

User's Manual

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Silicon Image

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Medley Manual Revision History

Revision 1.0
Initial release.

Revision 1.1
Addition of SiI 0680 information.

1. OVERVIEW

Product Overview

Historically, the cost of implementing RAID in the small office or home office environment has not been cost effective. When first developed, RAID was an acronym for **R**edundant **A**rray of **I**nexpensive **D**rives. Over time, this changed to **R**edundant **A**rray of **I**ndependent **D**isks, as the more expensive SCSI disk drives with superior performance and capacity captured the dominant share of the RAID market. But as today's technology continues to change, the performance/capacity gap between SCSI and ATA is quickly getting smaller. With the increased performance and capacity of ATA host controllers and drives, the time is right to put ATA software RAID to work in the small office/home office environment and Medley is just the software to do that. Medley is an IDE/ATA Software (0+1) RAID solution currently available with the SiI 0680 and the SiI 0649.

The SiI 0680 is a PCI to ATA/100 host controller which is PCI 2.2 compliant and can transfer data up to the maximum of 133MB per second while the SiI 0649 is a PCI to ATA/100 host controller which is PCI 2.1 compliant and can transfer data up to the maximum of 100MB per second. Key features of both include two independent channels for ATA interface and 3.3V operation with 5V tolerant I/Os. The SiI 0680 has support for all existing PIO and UDMA timing modes and is available in a 144 Pin LQFP (low profile quad flat package). The SiI 0649 offers support for both native and legacy mode, and pin-to-pin compatibility with the SiI 0648 Ultra ATA/66 offering and is available in a 160 Pin TQFP (thin quad flat package).

Medley greatly enhances two main areas of data storage: performance and data integrity. By using RAID 0, also known as Striping, performance of sustained data transfer rates is greatly enhanced by simultaneously writing data to 2, 3 or 4 drives. The second benefit of RAID is data redundancy. RAID 1, Mirroring, writes identical data on two drives or sets of drives, thus protecting the data from a disk failure. If, for any reason, one drive were to fail, your data is secure and available from the mirrored second drive. For the best of both worlds, performance and data redundancy you can use RAID 0+1 that combines the performance increase of RAID 0 with the data availability of RAID 1. Medley supports RAID levels 0, 1, and 0 + 1.

Two major challenges facing the storage industry today are improving disk I/O throughput to keep pace with the increasing performance demands of the computer and providing data accessibility in the face of hard disk failures. Medley addresses both of these concerns in a straightforward easy to use way.

RAID Explained

RAID - Redundant Array of Independent Disks

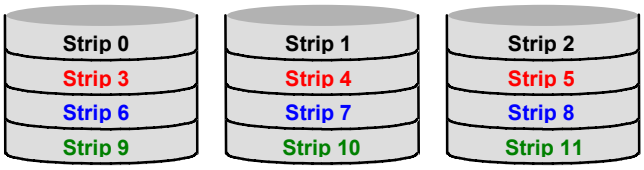
RAID technology manages multiple disk drives to enhance I/O performance and provide redundncy in order to withstand the failure of any individual member, without loss of data.

Medley provides three RAID Set types, Striped (RAID 0), Mirrored (RAID 1), and Mirrored-Striped (RAID 0+1).

Disk Striping (RAID 0)

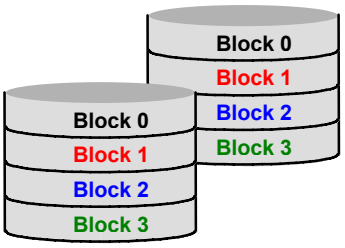
Striping is a performance-oriented, non-redundant data mapping technique. While Striping is discussed as a RAID Set type, it is actually does not provide fault tolerance. With modern ATA bus mastering technology, multiple I/O operations can be done in parallel, enhancing performance. Striping arrays use multiple disks to form a larger virtual disk.

This figure shows a stripe set using three disks with stripe one written to disk one, stripe two to disk two, and so forth.



Disk Mirroring (RAID 1)

Disk mirroring creates an identical twin for a selected disk by having the data simultaneously written to two disks. This redundancy provides instantaneous protection from a single disk failure. If a read failure occurs on one drive, the system reads the data from the other drive.



Mirrored-Striping (RAID 0+1 also known as RAID 10)

A Mirrored-Striped Set does just what it says, combining both Striping and Mirroring technologies to provide both the performance enhancements that come from Striping and the data availability and integrity that comes from Mirroring. When data is written to a Mirrored-Striped Set, instead of creating just one “virtual disk” as Striping would do, a second, Mirrored “virtual disk” is created as well.

2. INSTALLING THE SiI 0680 and SiI 0649 BOARDS

Installing the SiI 0680 Evaluation Board

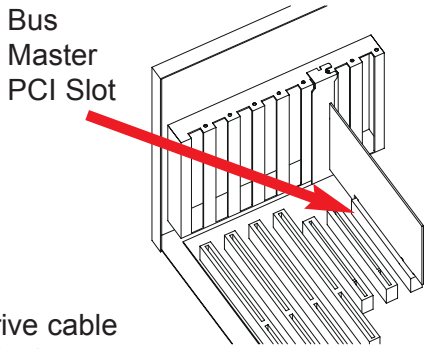
Medley Software RAID requires the SiI 0680 chip to be installed either on the computer's motherboard, or on an independent board installed in a PCI slot. To install the board:

1. Power down the computer system.

2. Confirm that the jumpers on the add-in board are set properly:

JP		Jumper Setting Description for 680.	Default
JP0	In Out	BAR5 Disable BAR5 Enable	Out
JP1	In Out	Device always RAID class	In

3. Insert the board into an available PCI slot.



4. Connect your hard disk drives to the board. Align pin 1 on the drive cable to pin one on the board's primary or secondary IDE connector. Pin 1 on the primary and secondary IDE connector is indicated on the board. Pin 1 on the drive cable is indicated by a colored stripe.

5. Power up computer.

6. Install the applicable device driver and Windows RAID monitoring utility or utility. When finished, the system will prompt "To finish setting up your new hardware, you must restart your computer." When this prompt appears, select "Yes." The system will restart at this time.

NOTE: This board has not been certified for FCC, EU, or UL

Installing the SiI 0649 Evaluation Board

Medley Software RAID requires the PCI-649 chip to be installed either on the computer's motherboard, or on an independent board installed in a PCI slot. To install the board:

1. Power down the computer system.

2. Confirm that the jumpers on the add-in board are set properly:

JP		Jumper Setting Description for 649.	Default
JP0	In Out	Non IDE Device with 0104h at PCI config. IDE Device with 0101h at PCI config.	In
JP1	In Out	IDE channels 0 and 1: Mode is fixed. IDE channels 0 and 1: Mode is programmable.	Out
JP2	In Out	IDE channels 0 and 1: Power up mode is Native. IDE channels 0 and 1: Power up mode is Legacy.	In
JP3	In Out	Disable IDE channel 0. Enable IDE channel 0.	Out
JP4	In Out	Enable IDE channel 1. Disable IDE channel 1.	In
JP5		This jumper is not valid anymore. It changes to TEST1 pin. Remove R41.	
JP6	In Out	Chip IO space access is disabled, but can be enabled. Chip IO space access is enabled, and cannot be disabled.	In
JP7	In Out	Do not overwrite System ID/Subsystem Vendor ID at PCI_RESET#. Replace SID/SVID with SiI values at PCI_RESET#.	In
JP8	In Out	Disable RAID BIOS PCI Scan for attached devices. Enable RAID BIOS PCI Scan for attached devices.	Out

3. Insert the board into a PCI slot that supports bus master DMA. Refer to Figure 1. (Your computer's manual should identify the bus-master slots.)

4. Connect your Ultra-IDE drives to the board. Align pin 1 on the drive cable to pin one on the board's primary or secondary IDE connector. Pin 1 on the primary and secondary IDE connector is indicated on the board. Pin 1 on the drive cable is indicated by a colored stripe.

5. Power up computer.

6. The system will prompt "To finish setting up your new hardware, you must restart your computer." When this prompt appears, select "Yes." The system will restart at this time.

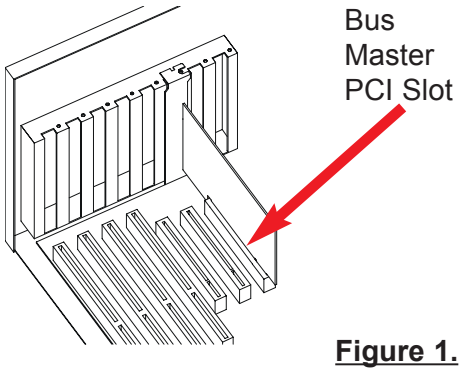


Figure 1.
Board Installation

NOTE: This board has not been certified for FCC, EU, or UL

3. INSTALLING DRIVERS AND SOFTWARE

Windows 2000 Operating System

After the board has been has been properly installed, when the computer is powered on, the OS will automatically search for new devices. When the new board is found, a window will appear asking if you will want to load a new driver.

Click **Yes**, and a window requesting the specific driver will appear. The driver is located on the provided floppy disk. Insert the floppy disk into the floppy disk drive and click **Browse.**

Most floppy disk drives are configured as **[A:]**. Choose the **[A:]** drive in your browser and the **PnP680r.sys** file for the SiI 0680 or **PnP649r.sys** file for the SiI 0649 should appear. Select the file and click **Open**:

Verify that the directly listed in this window is A: and click **OK**.

Now, a window verifying that the new Driver for the board has been properly installed. Click **Finish.**

It is always good to Restart the computer after an installation.When asked to do so, Click **Yes**.

To install Medley, use Windows InstallShield by performing the following:

1. After computer restarts, insert floppy disk in floppy disk drive.
2. Double-click on **My Computer**.
3. Double-click on **3 1/2 Floppy [A:]**.
4. Double-click on **Install SilConfig.exe**.
5. Follow on-screen instructions to complete installation. **Note:** Do **NOT** install in the Start Up folder. Choose the Default folder (normally Accessories or Administrative Tools or something similar).

Windows NT Operating System

Windows NT does not have an automatic “Find Device” setting and so after the operating system boots, click on the **Start** button located at the bottom left hand corner of the Desktop, select **Settings** and then **Control Panel**.

Find and click on the **SCSI Adapters**.

Click **Add.**

The next window is asking for the location of the driver to be installed. Since the driver is on the provided floppy disk, insert the floppy in the floppy disk drive and click **Have Disk.**

The next window is asking for the location of the driver. Most floppy disk drives are configured as **[A:]**. To verify, click on **Browse**.

The next window verifies that the appropriate file is located on **[A:]**. Select the file **Oemsetup.inf** and click **Open**.

[A:] should appear in the window. Click **OK.**

The next window allows you to select which driver to install. Only one driver should appear in this window. Select **Sil 0680 Ultra133 Raid Controller** (or **Sil 0649 Ultra100 Raid Controller**) and click on **OK**.

It is always good to Restart the computer after an installation. Click **Yes**.

To install the Medley GUI, use Windows InstallShield by performing the following:

1. After computer restarts, insert floppy disk in floppy disk drive.
2. Double-click on **My Computer**.
3. Double-click on **3 1/2 Floppy [A:]**.
4. Double-click on **InstallSilConfig.exe**.
5. Follow on-screen instructions to complete installation. **Note:** Do **NOT** install Medley in the Start Up folder. Choose the Default folder (normally Accessories or Administrative Tools or something similar).

Windows 98/Me Operating System

With the board newly installed, as Windows 98/Me boots, the New Device will be detected and the Add New Hardware Wizard window will appear. Follow the instructions in each window, using the driver installation files (PnP680r.mpd or PnP649r.mpd) on the provided floppy disk as necessary.

To install the Medley GUI, use Windows InstallShield by performing the following:

1. After computer restarts, insert floppy disk in floppy disk drive.
2. Double-click on **My Computer**.
3. Double-click on **3 1/2 Floppy [A:]**.
4. Double-click on **InstallSilConfig.exe**.
5. Follow on-screen instructions to complete installation. **Note:** Do **NOT** install in the Start Up folder. Choose the Default folder (normally Accessories or Administrative Tools or something similar).

4. CREATING/DELETING RAID SETS

Creating and deleting RAID sets is a function found in the BIOS. During bootup, the following message will appear, pausing for a few moments to allow the user to choose what to do:

```
Press F3 to enter RAID utility
```

In order to properly prepare and maintain a storage system, the user needs to be aware of which drive was installed as the Primary Master, Primary Slave, Secondary Master and Secondary Slave. Identifying these drives will not only be useful because they are reported in order in the BIOS as well in Medley, but when optimizing RAID sets, it is best to use drives from different channels. It is also helpful to know which drive is which if the disk drives are not all of equal size.

Disk Drive and Set Reporting (Numbering)

Before creating or deleting Raid Sets, it is also important to understand how each different piece of software reports both the physical disk drives and “Sets,” which could be either an independent drive or an actual RAID set consisting of two to four drives. For example, the BIOS and Medley reports the four physical disk drives as 0-3 while each Set is reported as 1-4.

“Set” numbers are assigned in the RAID utility based on the assigned disk number of the physical drives, with the lowest numbered drives being part of the lowest numbered sets.

For example, if a striped set were created with drives 1 and 2, the sets would be (the physical drive number is in the brackets):

```
Set: 1 <0>      Manufacturer Model    <PM>  19541 MB
Set: 2 <1,2>    SiI Striped Set       <PS>  39081 MB
Set: 3 <3>      Manufacturer Model    <SS>  19541 MB
```

If another striped set were created with drives 0 and 3, it would be:

```
Set: 1 <0,3>    SiI Striped Set       <PM>  39081 MB
Set: 2 <1,2>    SiI Striped Set       <PS>  39081 MB
```

Windows, on the other hand, does not report the physical disk drives, but only the Sets (even if they are representing single, independent disk drives). However, Windows calls the sets “drives.” In other words, it reports a RAID Set as a single drive of whatever size the RAID Set reports. In Windows, the numbering of each set (drive) will differ depending on which operating system is being used as well as other devices currently installed on the computer. It will almost always be different than that reported in the BIOS or Medley. However, THE ORDER of the sets reported in the BIOS and Medley will be maintained in Windows such that Set 1 in the BIOS will be the first drive reported in any of the Windows operating systems. Set 2 will always be the second drive, and so forth.

Creating Striped Sets

1. As the BIOS boots, the following message will appear, pausing for a few moments to allow the user to choose what to do:

```
Press F3 to enter RAID utility
```

2. Press **F3**.

3. If this is the first time opening the BIOS utility, or if no RAID sets exist, something similar to the following screen will appear (note that in this example FOUR disk drives have been installed to be used as RAID sets):

```
Primary Channel:
Drive Number: 0 Manufacturer Model          19541 MB
Drive Number: 1 Manufacturer Model          19541 MB
Secondary Channel:
Drive Number: 2 Manufacturer Model          19541 MB
Drive Number: 3 Manufacturer Model          19541 MB
```

The top third reports individual disk information.

```
Set: 1 <0>      Manufacturer Model    <PM>  19541 MB
Set: 2 <1>      Manufacturer Model    <PS>  19541 MB
Set: 3 <2>      Manufacturer Model    <SM>  19541 MB
Set: 4 <3>      Manufacturer Model    <SS>  19541 MB
```

The middle third reports Set information.

```
Press F1 to delete RAID set
Press F2 to create RAID set
Press F3 to create spare drive
Press F4 to resolve conflicts
Press <ESC> to exit RAID configuration utility
```

The bottom third provides function information.

The name of the manufacturer and model number should actually appear. Also the size of each drive/set appears (in this example, these are 20GB drives with 19541MB space available).

4. Press **F2** to create a RAID set. The following screen appears:

```
Primary Channel:
Drive Number: 0 Manufacturer Model          19541 MB
Drive Number: 1 Manufacturer Model          19541 MB
Secondary Channel:
Drive Number: 2 Manufacturer Model          19541 MB
Drive Number: 3 Manufacturer Model          19541 MB

Set: 1 <0>      Manufacturer Model    <PM>  19541 MB
Set: 2 <1>      Manufacturer Model    <PS>  19541 MB
Set: 3 <2>      Manufacturer Model    <SM>  19541 MB
Set: 4 <3>      Manufacturer Model    <SS>  19541 MB

Press F1 to create Striped set
Press F2 to create Mirrored set
Press F3 to create Mirrored-Striped set

Press <ESC> to exit

Your selection?
```

5. Choose which type of RAID set to create.

   If a Striped Set is desired, press **F1**. The following screen appears:

```
Select the chunk size to be used in RAID0 set:
A=Auto Configure; 0=1k 1=2k 2=4k 3=8k 4=16k 5=32k 6=64k 7=128k 8=256k
9=.5M

Your selection?
```

   What is Auto Configure? Auto Configure allows the Medley to choose the chunk size and drives to be used in the desired RAID set. It will always choose a 64k chunk size as the default, and will always use drives from different channels if possible. Like the rest of the utility, if Auto Configure is selected, simply follow the prompts given.

6. Choose the chunk size desired (for example, press 6 for 64K chunk size). Once done, the following screen appears:

```
Enter the total number of drives in RAID0 set:
```

7. A Striped set must have between 2 and 4 drives as members. Choose the number of drives and the following screen appears (for example, choose 2):

> ***NOTE:*** *The TOTAL size of a Striped set is the size of the smallest drive multiplied by the number of drives included in the set.*

```
Enter the first drive number in Striped set:
```

8. Choose which drives to be used in Striped set. For optimal throughput, choose drives from both channels (Primary and Secondary). After entering the first drive (for example, choose 0), the following screen appears:

```
Enter the second drive number in Striped set:
```

9. Enter the second disk drive number (for example, press 2). After all drives for the Striped set are entered, the following screen appears:

```
Are you sure? (Y/N)
```

10. Enter **Y** to create Striped set. The following screen appears:

```
Primary Channel:
Drive Number: 0 Manufacturer Model          19541 MB
Drive Number: 1 Manufacturer Model          19541 MB
Secondary Channel:
Drive Number: 2 Manufacturer Model          19541 MB
Drive Number: 3 Manufacturer Model          19541 MB

Set: 1 <0,2>    SiI Striped set       <PM>  39081 MB
Set: 2 <1>      Manufacturer Model    <PS>  19541 MB
Set: 3 <3>      Manufacturer Model    <SS>  19541 MB

Press F1 to delete RAID set
Press F2 to create RAID set
Press F3 to create spare drive
Press F4 to resolve conflicts
Press <ESC> to exit RAID configuration utility
```

Creating Mirrored Sets

1. To create a Mirrored set, at the opening screen press **F2**. The following screen appears:

```
Press F1 to create Striped set
Press F2 to create Mirrored set
Press F3 to create Mirrored-Striped set

Press <ESC> to exit

Your selection?
```

2. A Mirrored set uses 2 disk drives. To create a Mirrored set, press **F2**. The following screen appears:

```
Set up Mirrored set
Do you want automatic set up (No copy operation)? (Y/N)
```

3. If you want the Mirrored set created automatically, press **Y** and follow directions. If you wish to enter each drive and all pertinent information, press **N**. The following screen appears:

```
Enter the first drive number (source drive) in Mirrored set:
```

4. In a Mirrored set, the source drive needs to be EQUAL TO OR SMALLER than the destination drive. For optimal performance, the source drive and destination drive should be from different channels. After entering the source drive (for example, enter 1), the following screen appears:

> ***NOTE:*** *The TOTAL size of a Mirrored set is the size of the source drive included in the set.*

```
Enter the second drive
number (destination drive) in Mirrored set:
```

5. Enter the second drive (for example, enter 3). The following screen appears:

```
Do you want to copy from the source to destination drive? (Y/N)
```

What does this question mean? If the disk assigned as the source disk already has been partitioned and has data stored on it, and then a second disk is added for redundancy, the data on the source drive can be copied to the destination drive, so the disks are identical, and all subsequent data will be written to both drives as a Mirrored set.

If, however, the source disk does not have data already stored on it, answer **N**.

6. After answering, the following screen appears:

```
Auto-Rebuild enabled? (Y/N)
Are you sure? (Y/N)
```

7. Answer **Y** to create Mirrored set. The following screen appears:

```
Primary Channel:
Drive Number: 0 Manufacturer Model          19541 MB
Drive Number: 1 Manufacturer Model          19541 MB
Secondary Channel:
Drive Number: 2 Manufacturer Model          19541 MB
Drive Number: 3 Manufacturer Model          19541 MB

Set: 1 <0,2>    SiI Striped set       <PM>  39081 MB
Set: 2 <1> <3>  SiI Mirrored set      <PS>  19541 MB

Press F1 to delete RAID set
Press F2 to create RAID set
Press F3 to create spare drive
Press F4 to resolve conflicts
Press <ESC> to exit RAID configuration utility
```

Note that the size of the RAID set is still 19541 as there is only half the available space of the combined disks since the second half is used for mirroring.

The brackets around the drive numbers in a Mirrored set represent different drives statuses, such as:

`<1> <3>` represents the status of drives 1 and 3 as current
`<1> (3)` represents the status of drive 1 as current and drive 3 as rebuild
`<1> [3]` represents the status of drive 1 as current and drive 3 as dropped
`<1> [?]` represents the status of drive 1 as current and drive 1's mirror as missing

In other words:
`< >` represents a drive in a current status
`( )` represents a drive in a rebuild status
`[ ]` represents a drive in a dropped status

For a valid Mirrored set, at least one drive must be in current status. Therefore, each of the four Mirrored sets listed above are all valid.

Creating a Mirrored-Striped Set

1. To create a Mirrored-Striped RAID set press **F2**. A Mirrored-Striped set needs all four disk drives. The following screen appears:

```
Primary Channel:
Drive Number: 0 Manufacturer Model          19541 MB
Drive Number: 1 Manufacturer Model          19541 MB
Secondary Channel:
Drive Number: 2 Manufacturer Model          19541 MB
Drive Number: 3 Manufacturer Model          19541 MB

Set: 1 <0>      Manufacturer Model    <PM>  19541 MB
Set: 2 <1>      Manufacturer Model    <PS>  19541 MB
Set: 3 <2>      Manufacturer Model    <SM>  19541 MB
Set: 4 <3>      Manufacturer Model    <SS>  19541 MB

Press F1 to create Striped set
Press F2 to create Mirrored set
Press F3 to create Mirrored-Striped set

Press <ESC> to exit

Your selection?
```

2. Choose **F3** and the following screen appears:

```
Select the chunk size to be used in RAID0 set:
A=Auto COnfigure 0=1k 1=2k 2=4k 3=8k 4=16k 5=32k 6=64k 7=128k 8=256k
9=.5M
Your selection?
```

3. Choose desired chunk size. The following screen appears:

```
Enter the first source drive number in Mirrored-Striped set:
```

4. To optimize throughput, have both source drives be from different channels. It also must be remembered that the total capacity of the source drives must be LESS THAN OR EQUAL TO the total capacity of the destination drives (for example, choose 0). The following screen appears:

> ***NOTE:*** *The TOTAL size of a Mirrored-Striped set is twice the size of the smaller source drive.*

```
Enter the second source drive number in Mirrored-Striped set:
```

5. For example, choose 2. The following screen appears:

```
Enter the first destination drive number in Mirrored-Striped set:
```

6. For example, choose 1. The following screen appears:

```
Enter the second destination drive number in Mirrored-Striped set:
```

7. For example, choose 3. The following screen appears:

```
Are you sure? (Y/N)
```

8. Enter “Y” to create Mirrored-Striped set. The following screen appears:

```
Primary Channel:
Drive Number: 0 Manufacturer Model                19541 MB
Drive Number: 1 Manufacturer Model                19541 MB
Secondary Channel:
Drive Number: 2 Manufacturer Model                19541 MB
Drive Number: 3 Manufacturer Model                19541 MB

Set: 1 <0,2><1,3>     SiI Mirrored-Striped  <PM>  39081 MB

Press F1 to delete RAID set
Press F2 to create RAID set
Press F3 to create spare drive
Press F4 to resolve conflicts

Press <ESC> to exit RAID configuration utility
```

As with Mirrored sets, the brackets around the drive numbers in a Mirrored set represent different drives statuses, such as:

`<0,2> <1,3>`	represents the status of all four drives as current
`<0,2> (1,3>`	represents the status of drives 0, 2, and 1 as rebuild and drive 3 as current
`<0,2> (1,3)`	represents the status of drives 0 and 2 as current and drives 1 and 3 as rebuild
`<0,2> <1,3)`	represents the status of drives 0, 2, and 1 as current and drive 3 as rebuild
`<0,2> <1,3]`	represents the status of drives 0, 2, and 1 as current and drive 3 as dropped
`<0,2> [1,3]`	represents the status of drives 0 and 2 as current and drives 1 and 3 as dropped
`<0,2> <1,?]`	represents the status of drives 0, 2, and 1 as current and drive 2’s mirror missing
`<0,2> [?,?]`	represents the status of drives 0 and 2 as current but their mirrors missing

In other words:

- `< >` represents a drive in a current status
- `( )` represents a drive in a rebuild status
- `[ ]` represents a drive in a dropped status

In order for a Mirrored-Striped set to be valid, at least one of the striped sets must have both drives in current status. In other words, in the example above, either `<0,2>` must be current or `<1,3>` must be current.

Deleting RAID Sets

1. To remove one or more RAID sets, Press **F1** and the following screen appears:

```
Enter the set number for the RAID set to be deleted
Press <ESC> to exit

Your selection:
```

2. Choose the set number of the RAID set to be deleted.

```
Are you sure? (Y/N)
```

3. Answer **Y** to remove the RAID set. If the RAID set being deleted is a Striped set, then all of the data will be lost. If the set being deleted is a Mirrored set, then the data will remain intact and accessible on both drives.

Creating a Spare Drive

After configuring a Mirrored set, it may be desirable to assign a third drive as a "spare" which can automatically replace a failed drive.

> ***NOTE:*** *The size of a valid spare drive must be equal to, or greater than, the Mirrored set size.*

1. To create a spare drive, press F3 and the following screen appears:

```
Enter the drive number for the spare drive:
Press <ESC> to exit

Your selection:
```

2. Choose the drive number of the drive to be designated as a spare.

```
Are you sure? (Y/N)
```

3. Answer **Y** and the spare drive will be created and listed as the last Set.

Deleting a Spare Drive

To delete a spare drive, use the same procedure as deleting a RAID set.

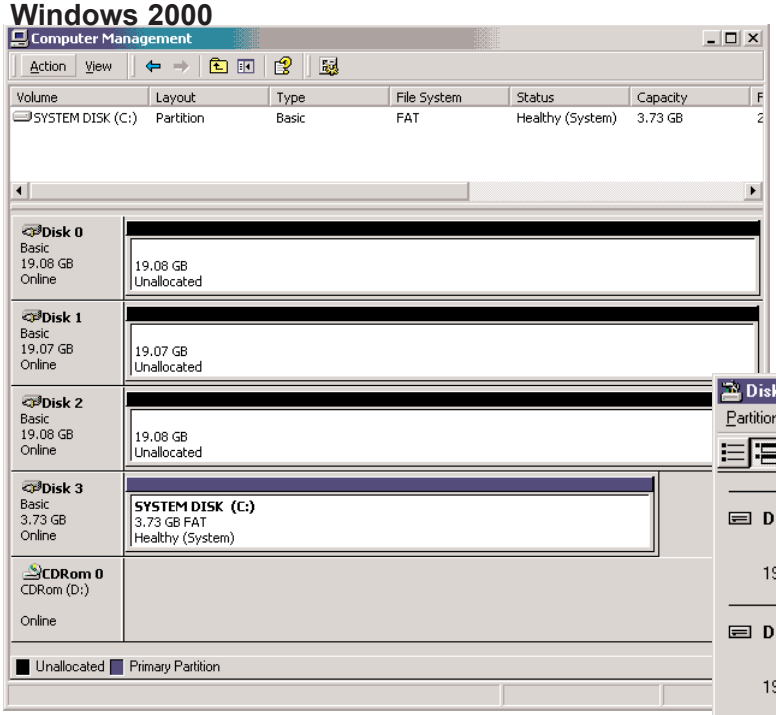
Resolving Conflict

When a RAID set is created, the metadata written to the disk includes drive connection information (Primary Master, Primary Slave, Secondary Master, Secondary Slave). If, after a disk failure, the replacement disk was previously part of a RAID set (or used in another system), it may have conflicting metadata, specifically in reference to the drive connection information. If so, this will prohibit the RAID set from being either created or rebuilt, In order for the RAID set to function properly, this old metadata must be first overwritten with the new metadata. To resolve this, press **F4**, and the correct metadata, including the correct drive connection information, will be written to the replacement disk.

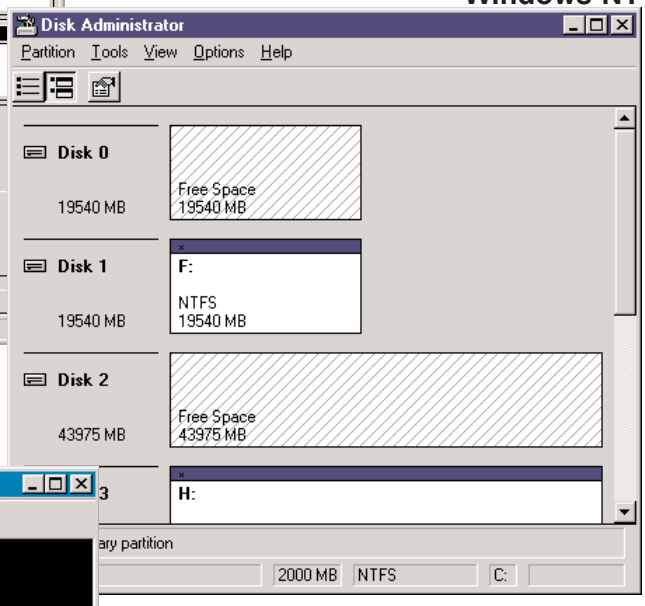
5. CREATING/NAMING PARTITIONS

The creating and naming of partitions is something done within the Windows operating system. And while Windows 2000 and Windows NT both use the Disk Management window, there are enough nuances that make it important to follow the procedure specifically for the appropriate operating system. The procedure for Windows 98/Me is significantly different than the others.

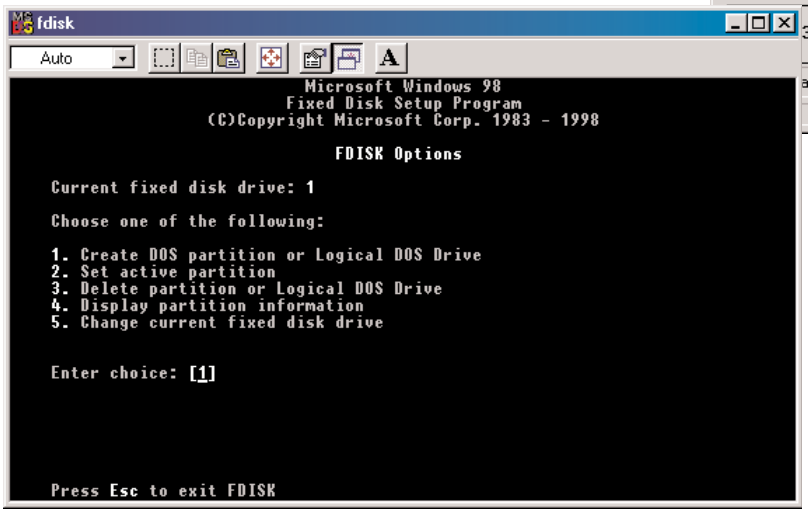
Windows 2000



Windows NT



Windows 98/Me



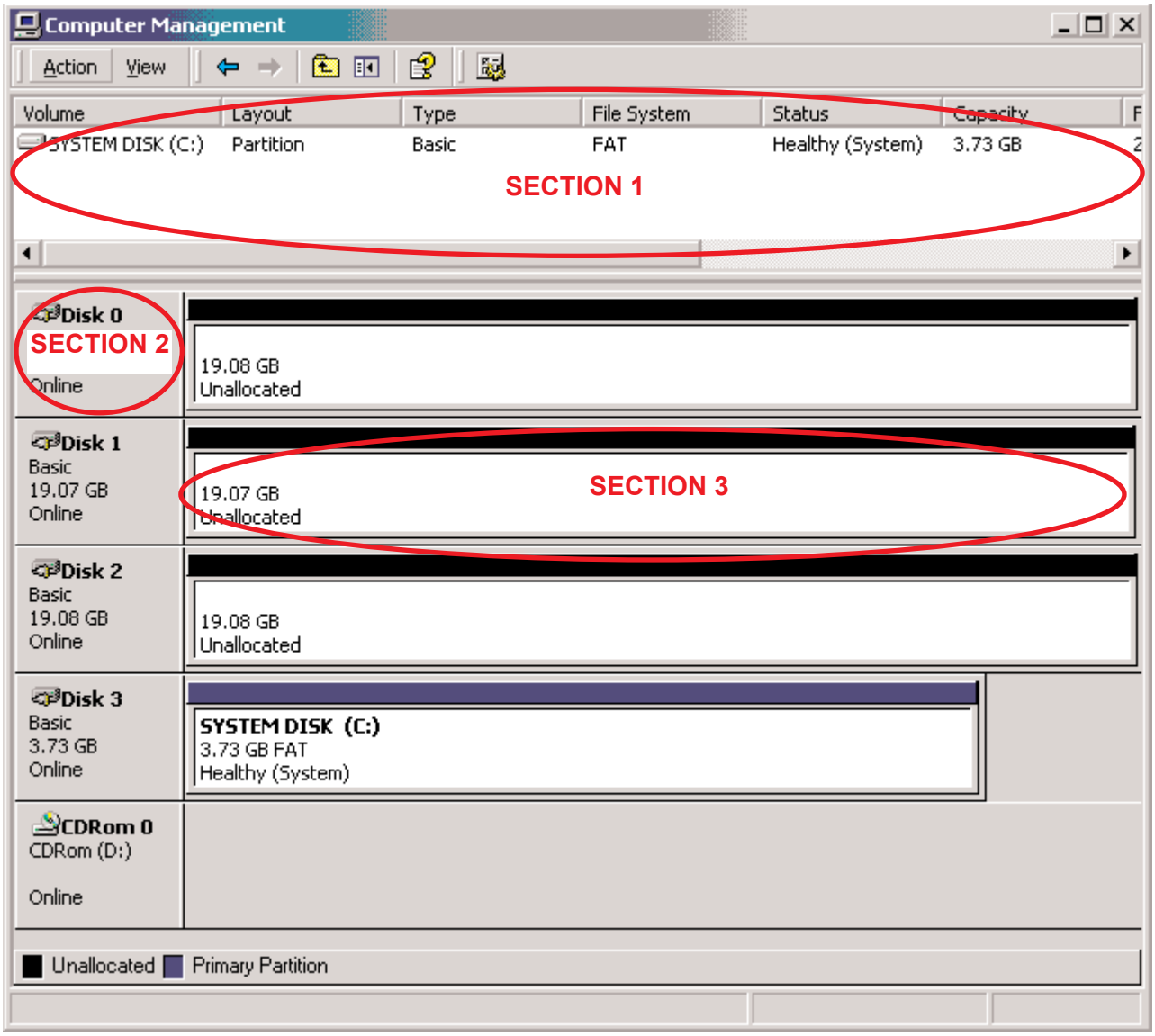
Windows 2000 Operating System

Before creating any partitions, RAID sets must first be created/dissolved using the BIOS RAID Utility. Once completed, continue booting Windows.

Once Windows is running, open the Disk Management window located at:

Control Panel ▸ Administrative Tools ▸ Computer Management ▸ Storage ▸ Disk Management

Something similar to the following window should appear:



This window has three main sections:

SECTION 1: System listing of all formatted and available disks/RAID Sets.
SECTION 2: Report of physical connection of disks/RAID Sets.
SECTION 3: Report of partition status, disk letter, and volume name.

Initial Window

In **SECTION 2**, every disk should report as:

Basic
Disk Size (the actual available disk space will be reported here)
Online

Instead of "**Basic**," a disk may also report as either "Unknown" or "Dynamic."

If the disk reports as "Unknown," right-click on the disk (**SECTION 2**) and click on **Write Signature**.

At this point, a window will appear with the disk in question (all "Unknown" disks may appear in this window). Make sure the box next to each disk is checked, then click OK.

The disk should now report as "**Basic**."

If a disk reports as "**Dynamic**," right-click on **SECTION 2** of that disk, and click on "**Return disk to Basic...**" Within seconds the disk should report as **Basic**.

Creating Partitions

In **SECTION 2**, the disk order corresponds directly to the order the Sets appear in the BIOS. Therefore, the first Unallocated Partition represents Set 1, and so on.

1. At this point, there should be three disks with Unallocated partitions. Right-click on the partition of the first disk and click on "Create Partition." The "Create Partition Wizard" should appear.

    1. The first window is an introductory window to the Wizard. Click **Next**.

    2. The second window designates the partition as a primary partition. Click **Next**.

    3. The third window designates the partition size. Since this is a Striped RAID set, utilizing 2 disk drives, the size of the partition should be approximately double the size of a single disk drive (assuming all disks are of identical size). Click **Next**.

    4. The fourth window designates the drive letter of the partition.

5. The fifth window allows the user to label the volume name, and choose the type of formatting to take place upon the creation of the partition. Choose which ever drive letter is desired (the lowest possible value is automatically entered), name the volume whatever is desired (suggestions being something generic such as STRIPED SET or something specific to use such as FINANCIAL, CRITICAL, MISCELLANEOUS, etc.) then check the box next to “quick format.” Click **Next**.

6. The sixth window is a summary window listing all of the selections made. Click **Finish**.

Depending on the size of the disk drive(s) included in the partition, the partition should change from “Unallocated” to “Healthy” with its name and drive letter reported as well in a matter of minutes or less. Do not attempt to create a partition for the next disk until the disk currently being formatted is complete and reports **Healthy**.

Also note that once the disk reports Healthy, it appears in the listing in **SECTION 1** with all of its pertinent information as well.

2. Repeat this procedure for the partition of the second and third disk.

3. Close the Data Management window by clicking on the small boxed “X” in the top right corner of the window.

4. Click on the “My Computer” icon on the Desktop. The three new drives should now be visible and properly named. Data may now be stored to each of these disks if desired.

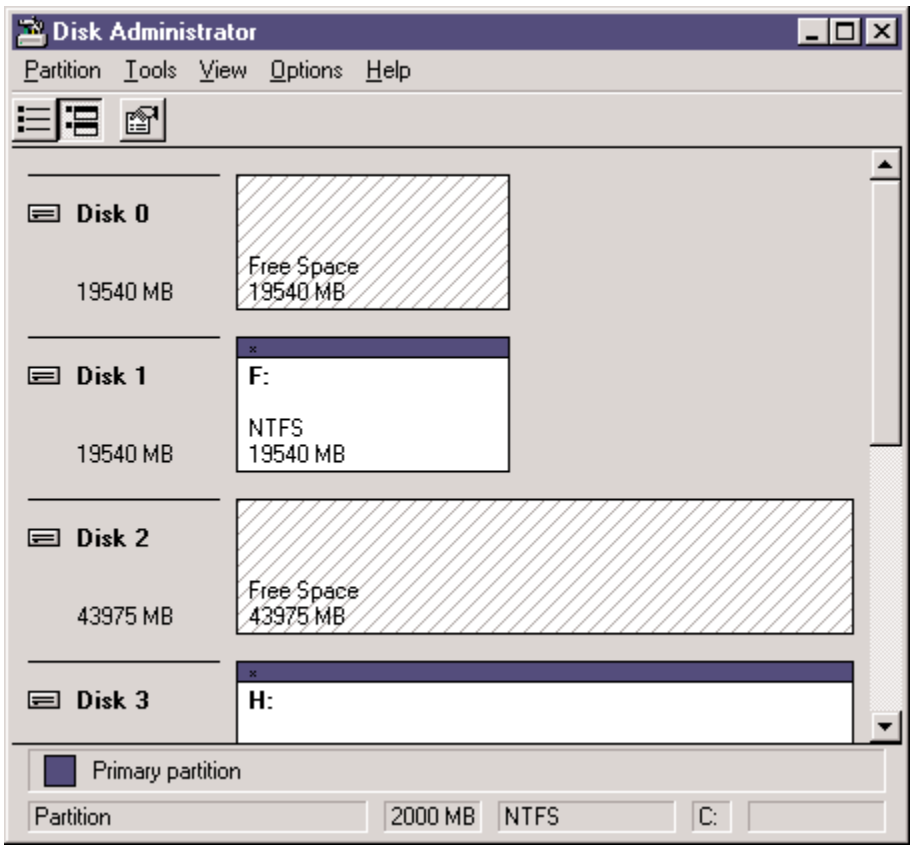
Windows NT Operating System

Before creating any partitions, RAID sets must first be created/dissolved using the BIOS RAID Utility. Once completed, continue booting Windows.

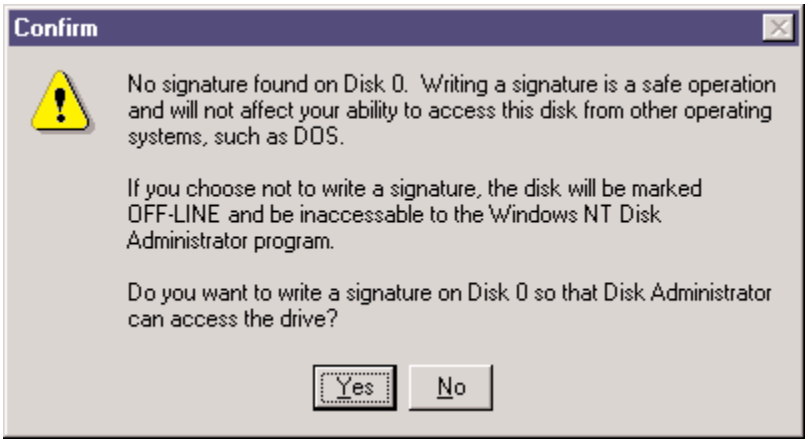
Once Windows is running, open the **Disk Administrator** window. The **Disk Administrator** window is located at:

Start ▸ Programs ▸ Disk Administrator (Common)

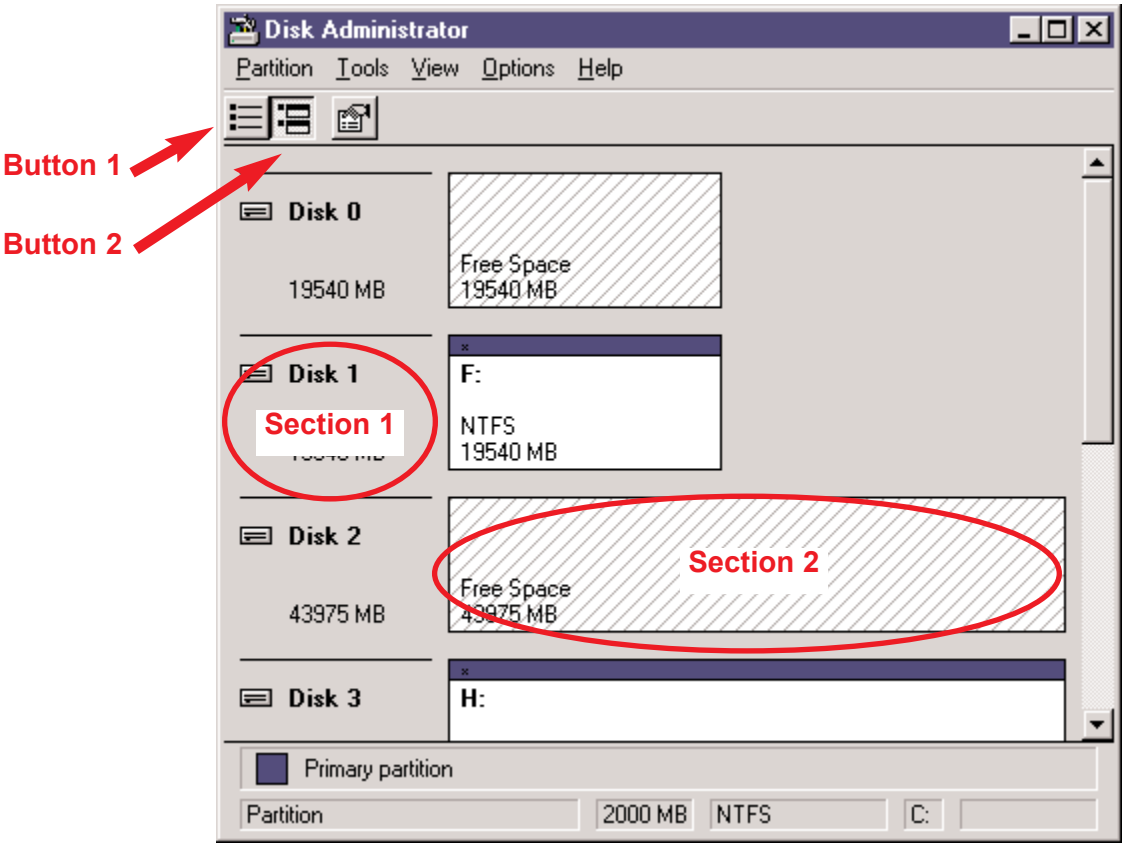
Something similar to the following window should appear:



However, this **Write Signature** window may appear first:



If so, answer **YES** for each disk reported with no signature found. Afterwards, something similar to the following should appear:



Button 1 opens the Disk Administrator Volumes window which lists the recognizable Volumes, their capacity, free space, type of format, etc.

Button 2 opens the Disk Configuration window (shown above), detailing all disks (or RAID Sets), partitions, and allows he suer to format and name each partition and volume.

Section 1 reports the size of each disk (or RAID Set).

Section 2 reports on each partition, and allows the user to format or delete partitions.

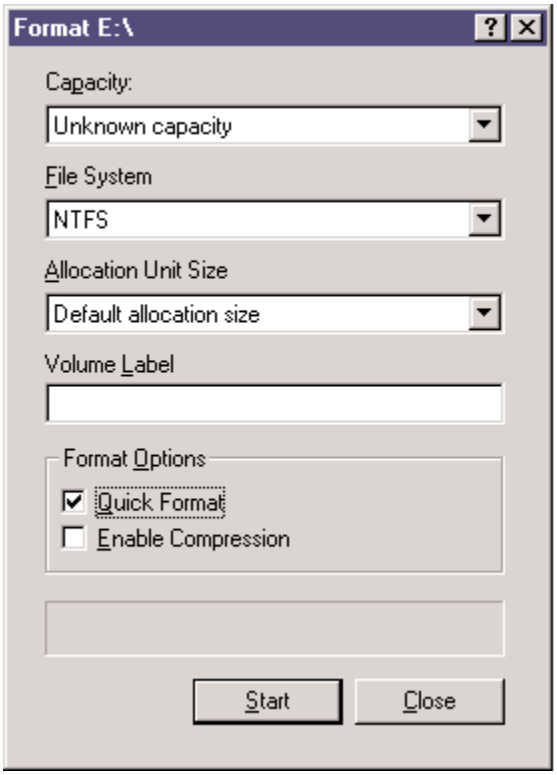
Creating Partitions

1. If any disk (besides the SYSTEM DISK) appear to be formatted, right click on that partition (Section 2) and select **Delete**.

WARNING: Be sure to identify the System Disk, that which has the Operating System installed on it. This disk should always report correctly. ***NEVER*** **CHANGE OR DELETE THIS DISK OR PARTITION.**

2. Once all disks are reporting as Free Space, right-click on each partition and select **Create...**
3. A **Create Primary Partition** window should now appear. Click **OK**.
4. Click **Confirm**.
5. Repeat this step for each disk.
6. Now, right-click on the first disk and select **Mark Active**.
7. A window will appear stating that this will take place on the next reboot. Click **OK**.
8. Repeat this step for each disk.
9. Close window. Confirm saving changes. Click **Yes**.
10. Disk Administrator will report that the disks were updated successfully. Click **OK**.
11. Re-open **Disk Administrator**.
12. Right-click on the first disk (this should now be the Striped Set).
13. Select **Format...**

Something similar to the following window should appear:



14. While **Capacity** can not be changed, make sure that **File System** has **NTFS** selected, don't change **Default Allocation Size**, and since it is the Striped Set that is being formatted, enter **Striped Set** for **Volume Label**. Make sure that **Quick Format** is selected as the **Format Option**.

15. Repeat this procedure for the other two disks, but name them something else.

16. Close **Disk Administrator** and open **My Computer** (icon should be on Desktop).

17. The new disks should now appear in **My Computer** window.

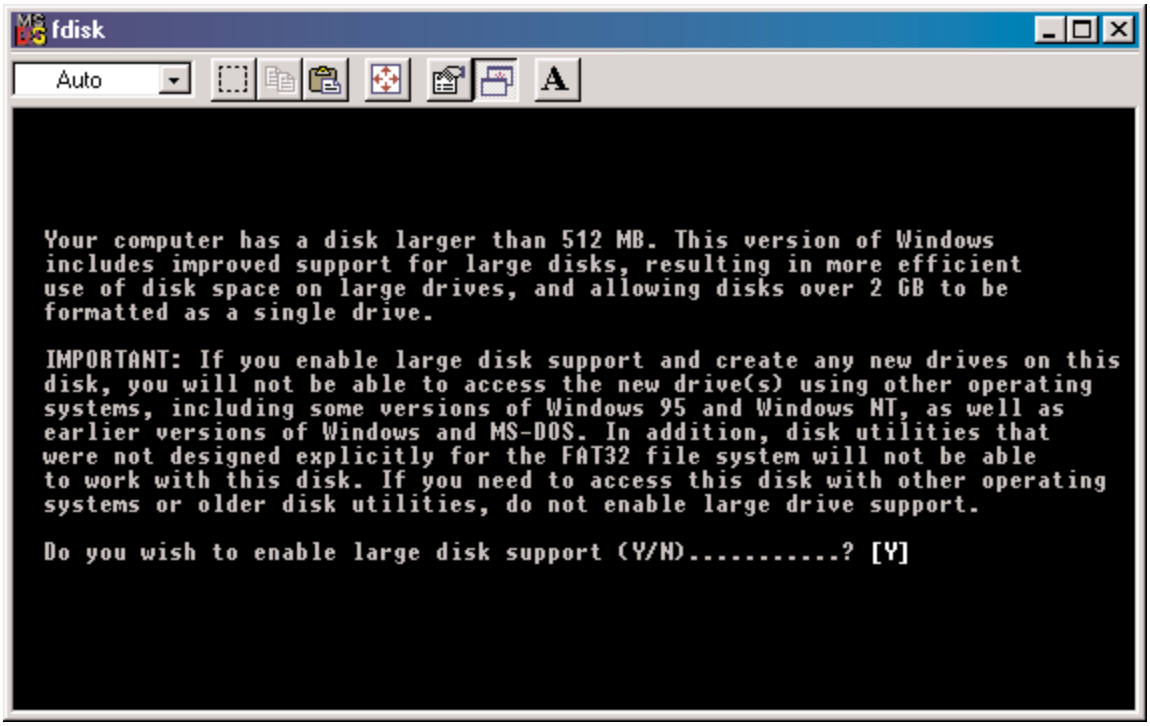
18. Close all windows and applications and **Restart** computer.

Windows 98/Me Operating System

Windows 9x does not have a Disk Administrator or Disk Management window. Instead, after creating RAID sets using the BIOS RAID utility and booting Windows, start fdisk by:

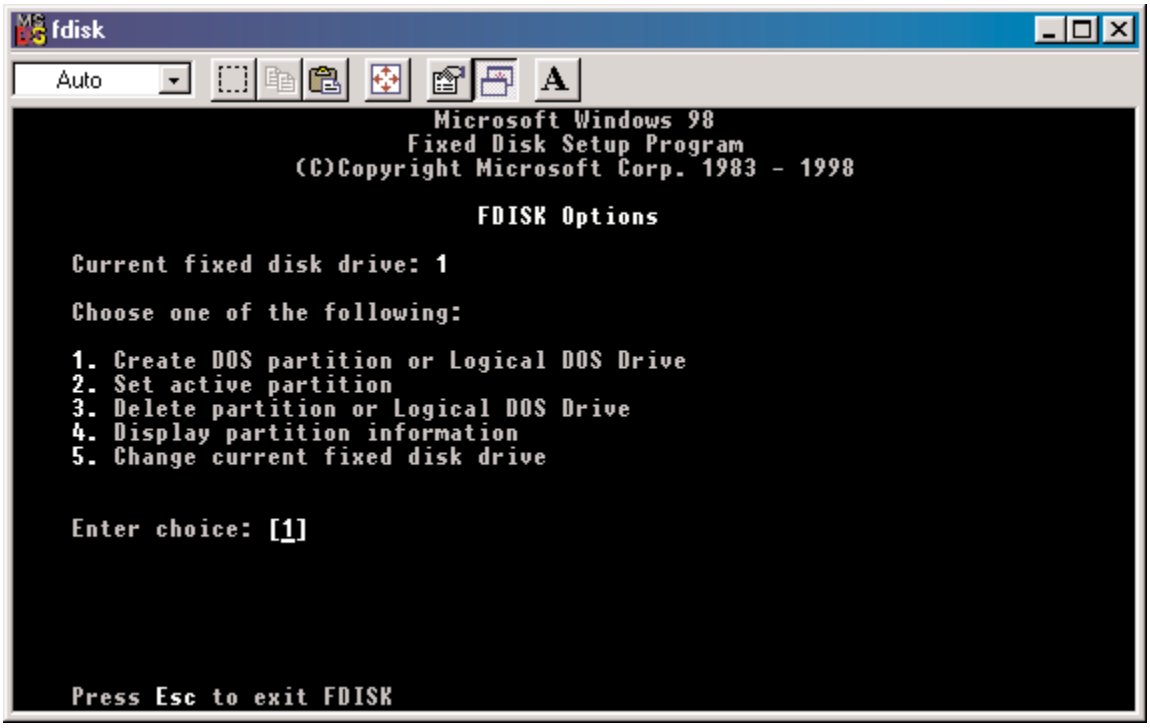
1. Click on the **START** button
2. Select **Run...**
3. Type **fdisk**
4. Click **OK**

The following window will probably appear:

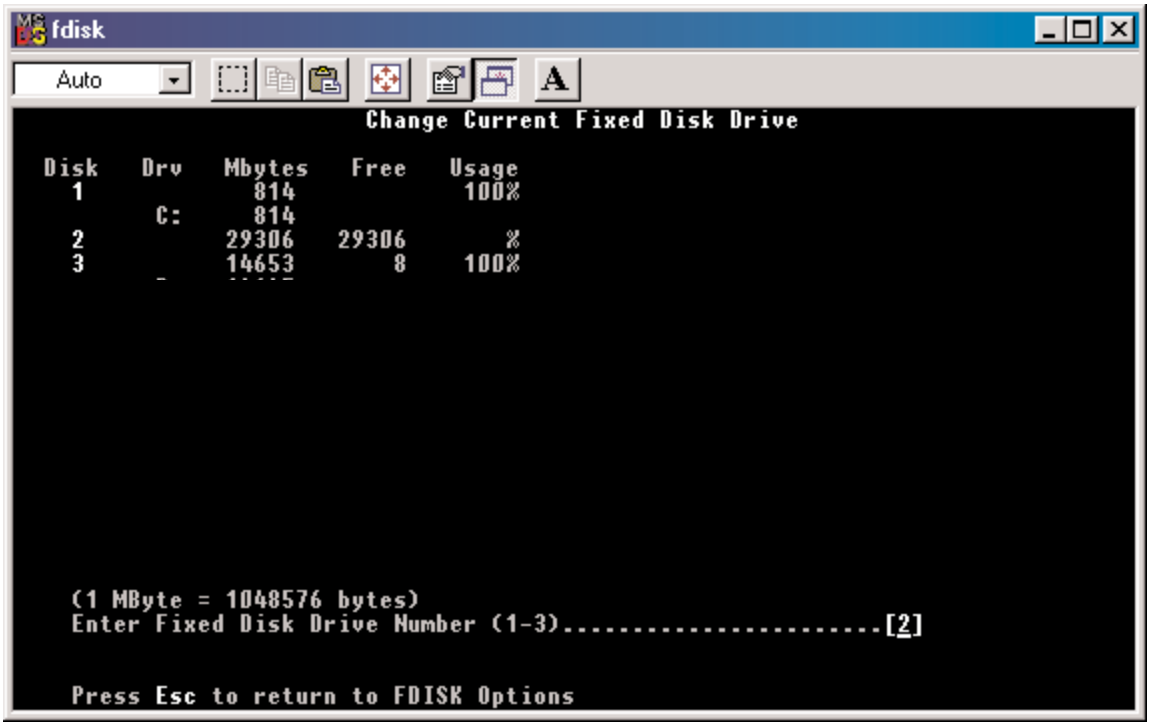


Press **Enter** for yes.

The **FDISK Options** window will appear:

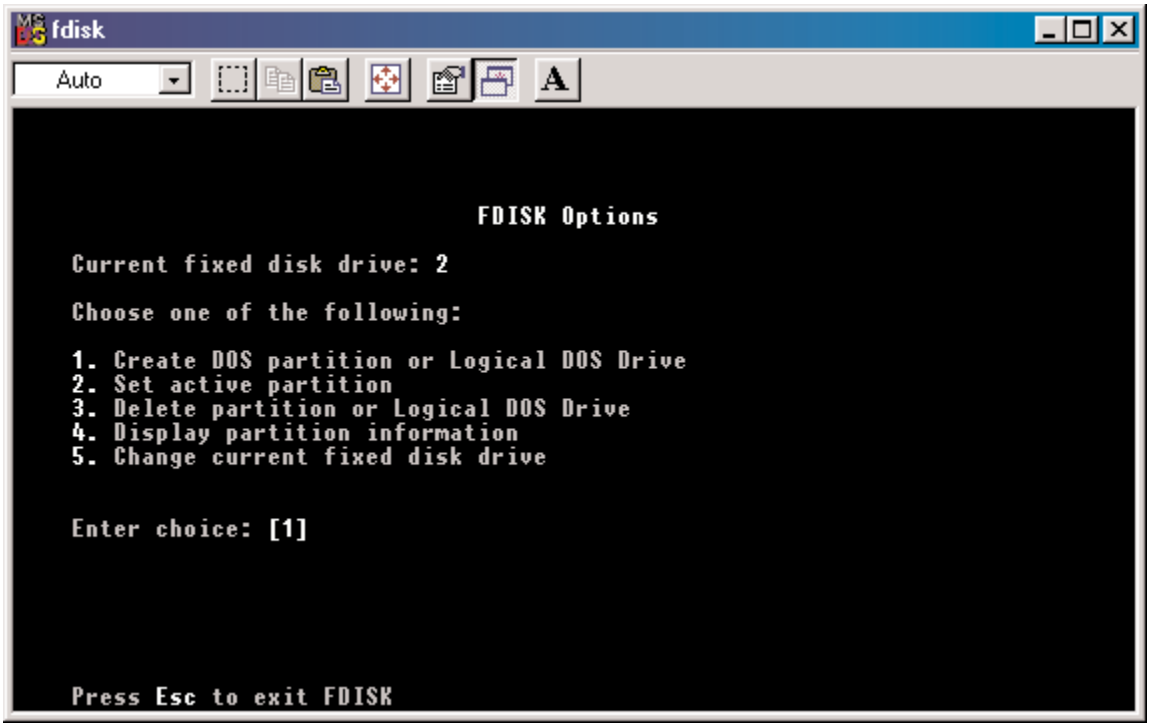


The Current Fixed Drive will be the System Drive (normally C:\). In order to create partitions, the fixed drive needs to be changed. Select **5** and press **Enter**.

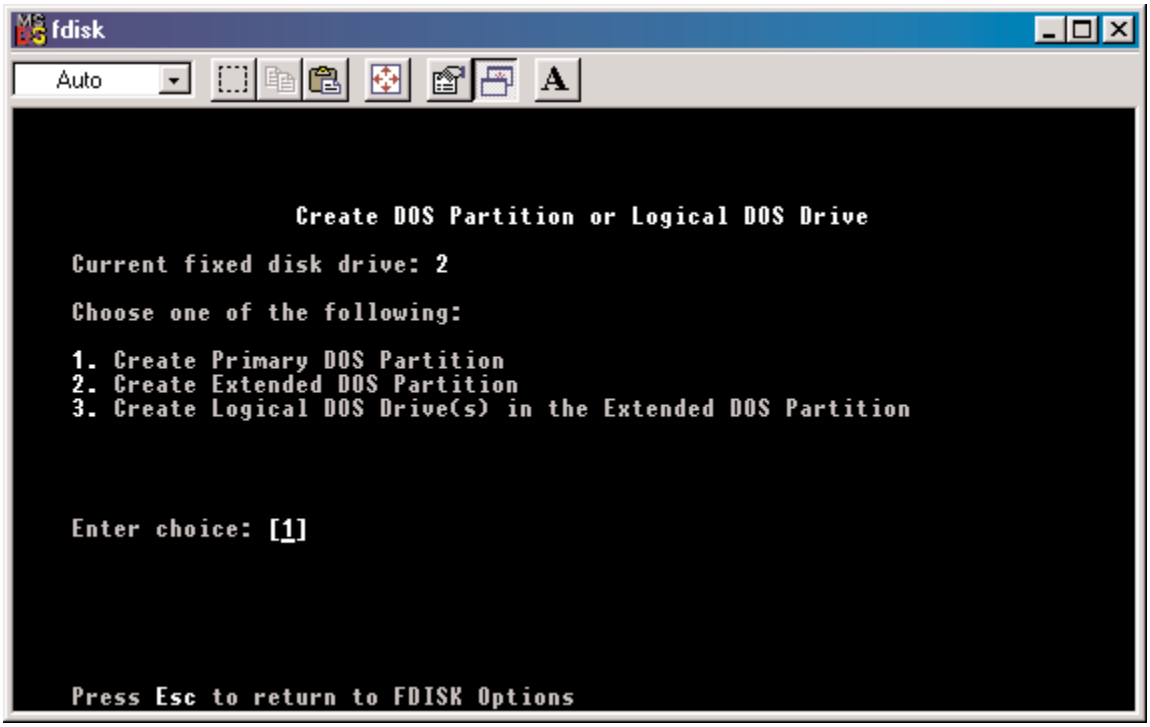


Enter the disk number to partition and press **Enter**.

With the Current fixed drive set at the disk needing to be partitioned, Select **1** and press **Enter**.

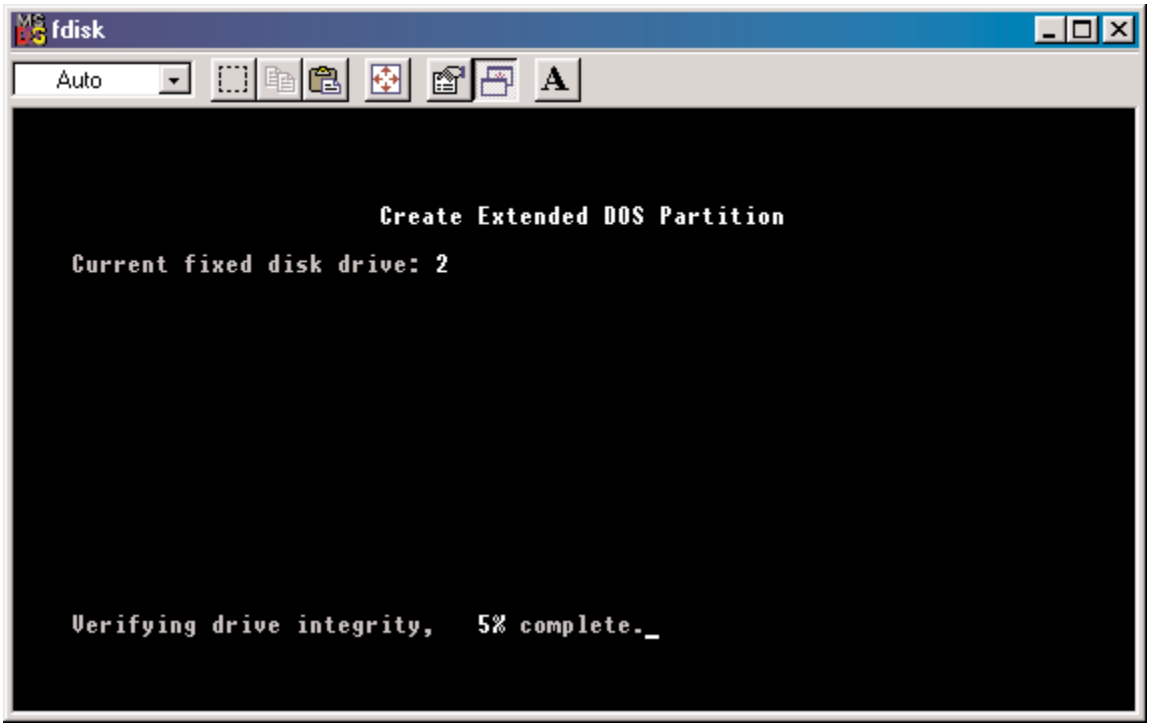


The following window will appear:

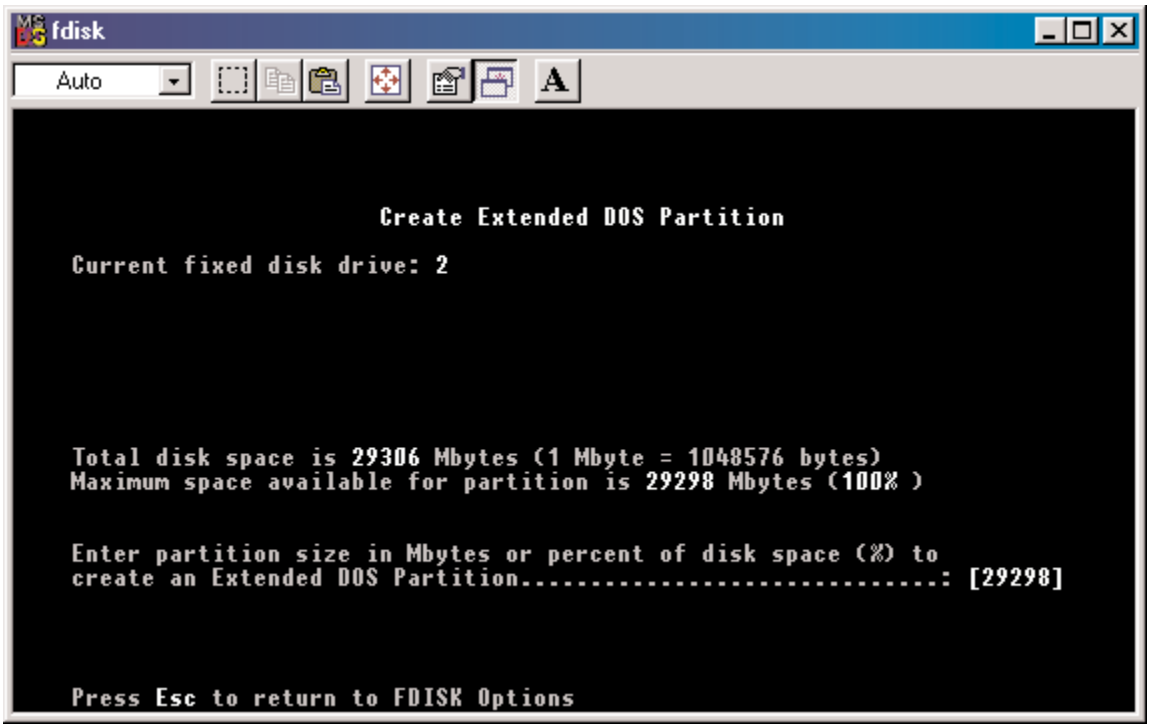


Select **2** to create an extended partition and press **Enter**.

The following window will appear:

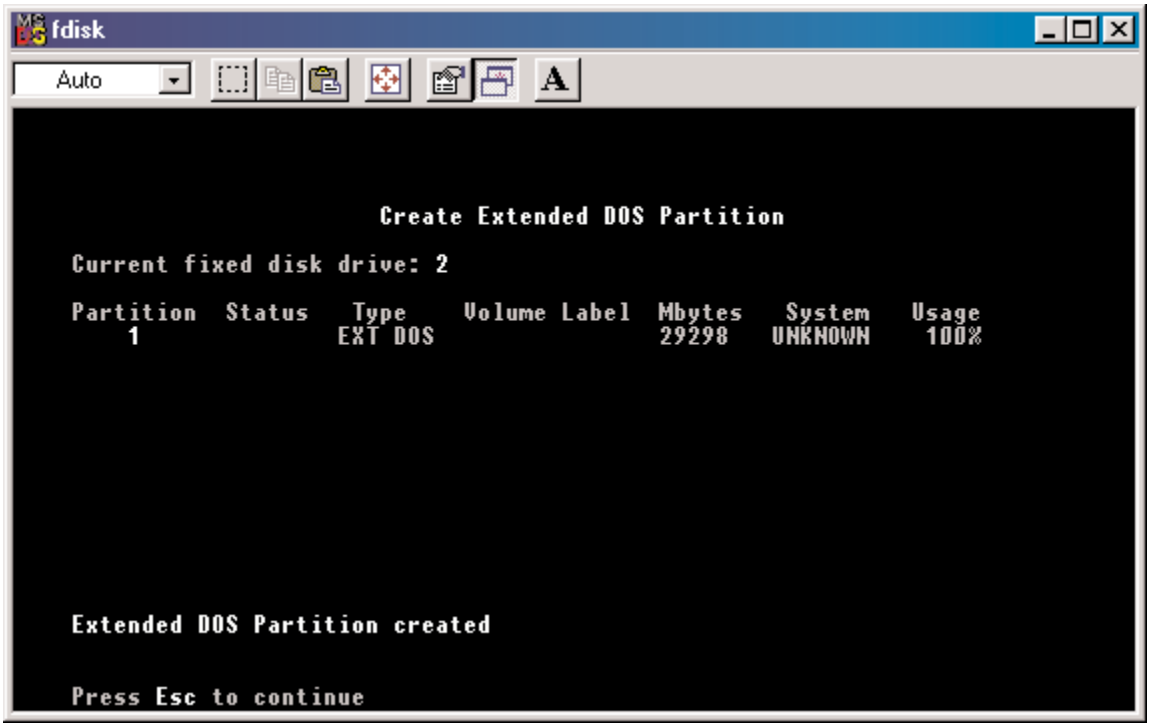


Once the percentage counter reaches 100%, the following window will appear:

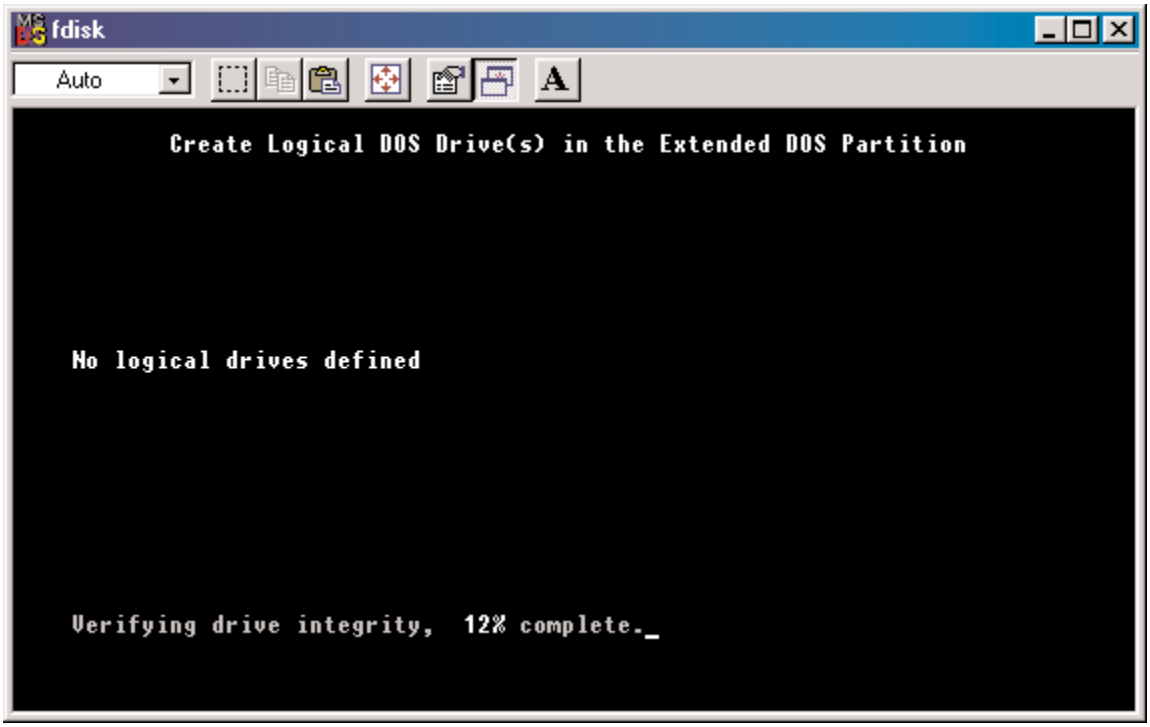


This window explains how much space will be available in the partition. Press **Enter**.

This window shows that the partition has been created. Press **Esc**.

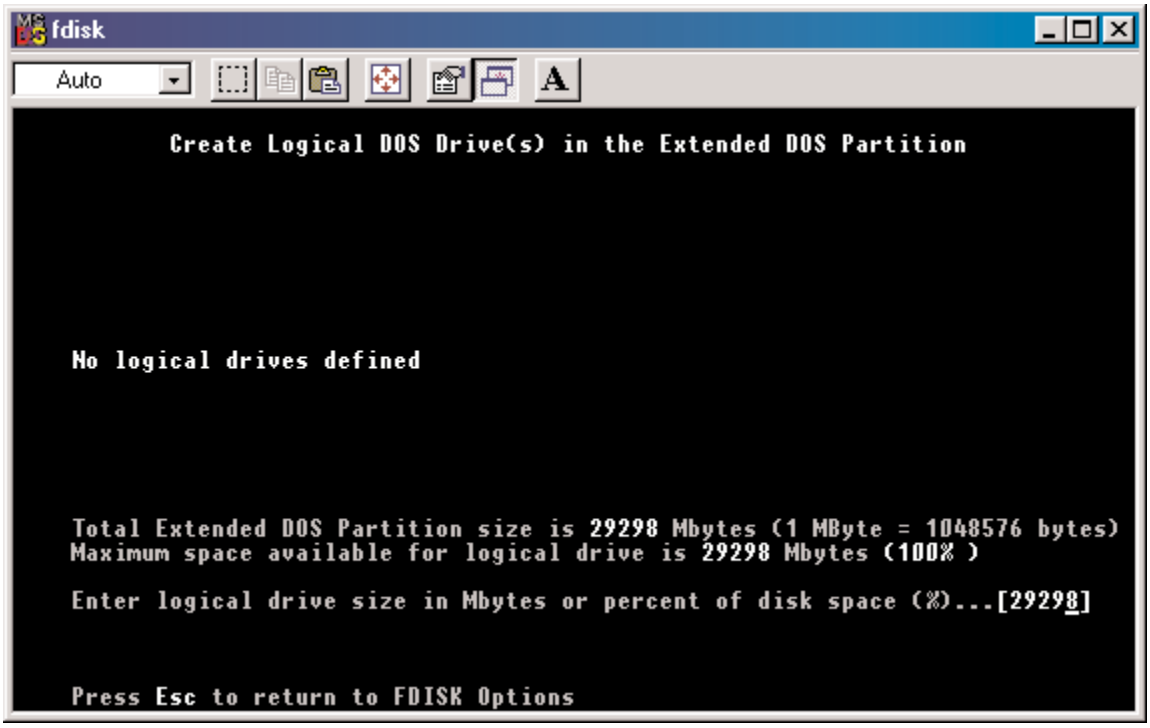


FDISK is now creating a logical drive.

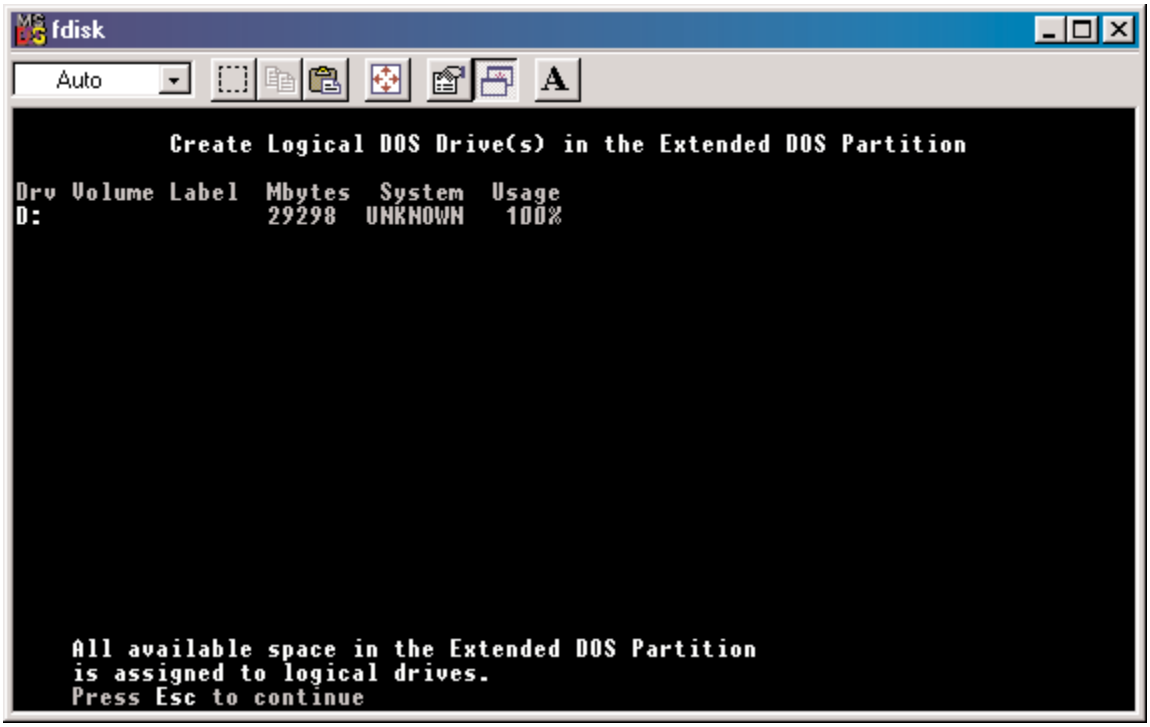


Once the percentage counter reaches 100% the following window appears:

Once again, this window reports size.

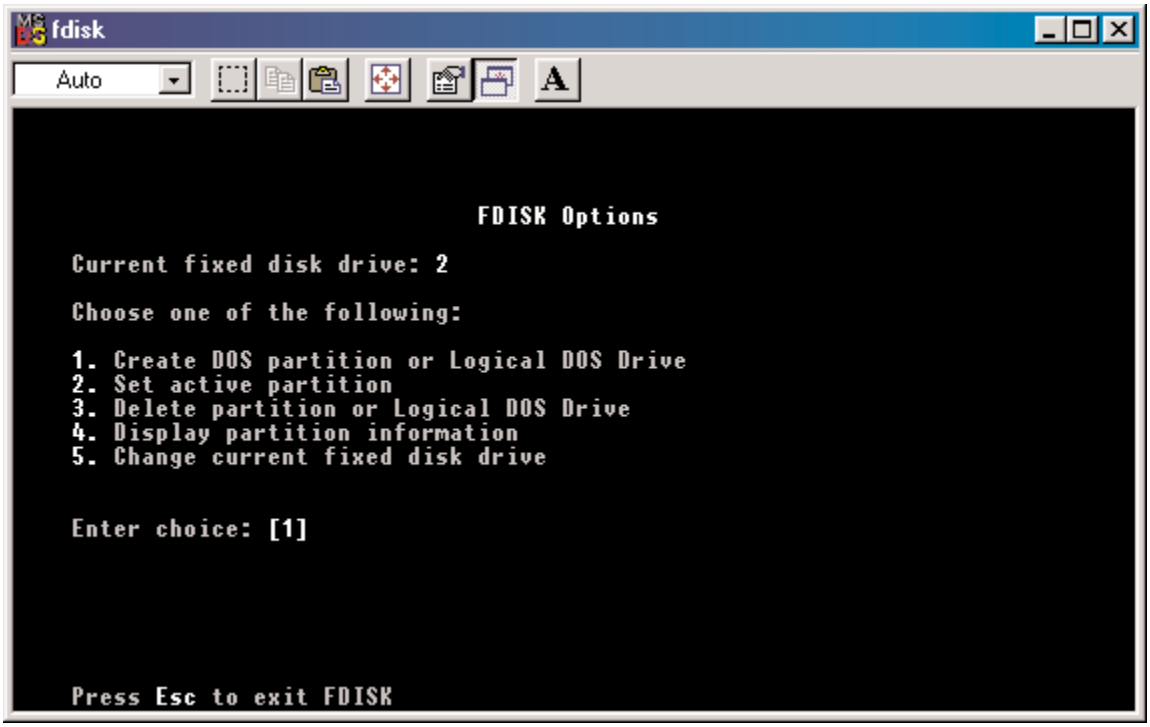


Press **Enter** and the following window appears:

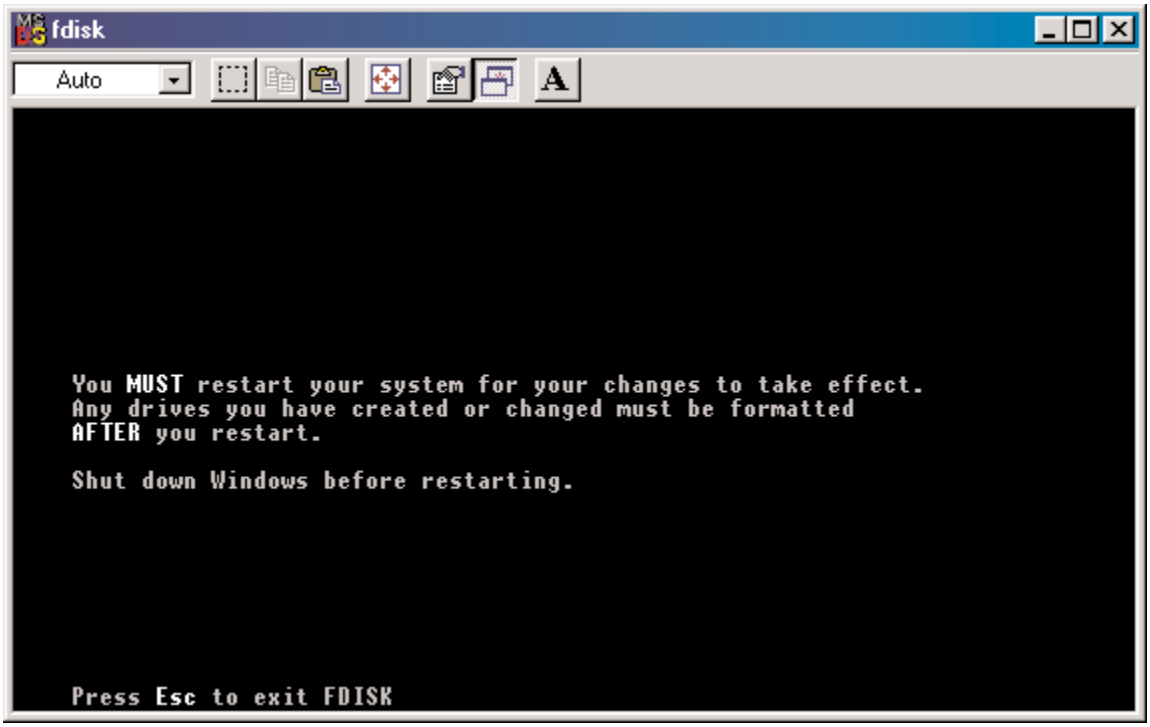


This window now shows the drive and its drive letter and size. Press **Esc**.

If another drive (RAID set) needs to be partitioned, repeat the process, starting by changing the fixed disk drive (Press **5**). If done, press **Esc**.



The following window will appear:



This window is a reminder to **RESTART** the computer.

After restarting the computer, and booting Windows 9x, double-click on the **My Computer** icon.

Right-click on each new drive and select **Format**.

Only a **FULL** format will be accepted at this point. Select Full Format, enter the Label Name for the drive or RAID set (if desired) and click **OK**.

Once the drive has been formatted, repeat for each new drive. The new drives should now be ready to be used.

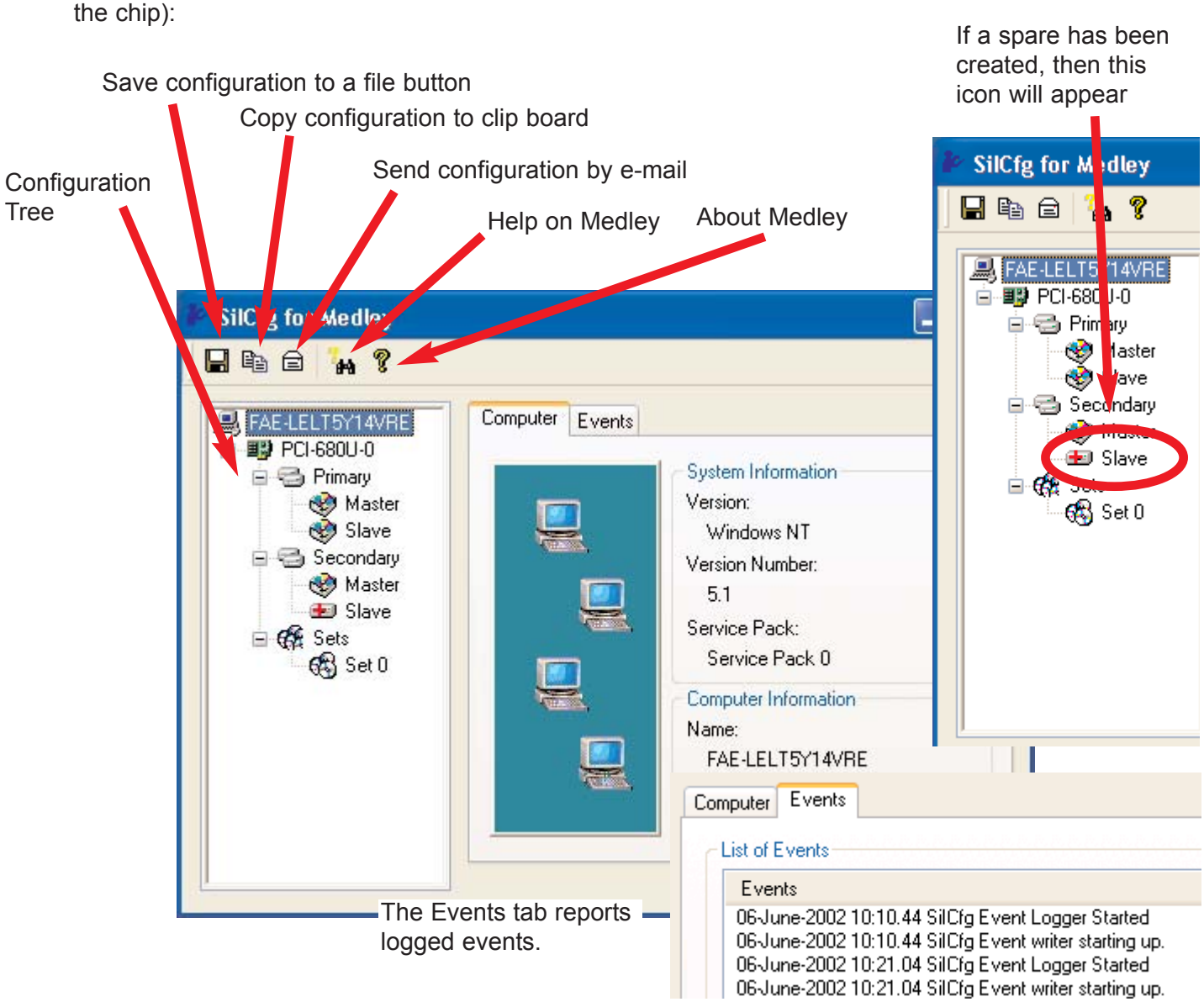
6. USING SILICON IMAGE MEDLEY GUI

Overview

Medley provides the ability to Remove a member of a Mirrored or Mirrored-Striped RAID set; Rebuild a Mirrored RAID set; use Spare Disk Drives to automatically rebuild a Mirrored RAID set; save, copy, or send via e-mail the current configuration.

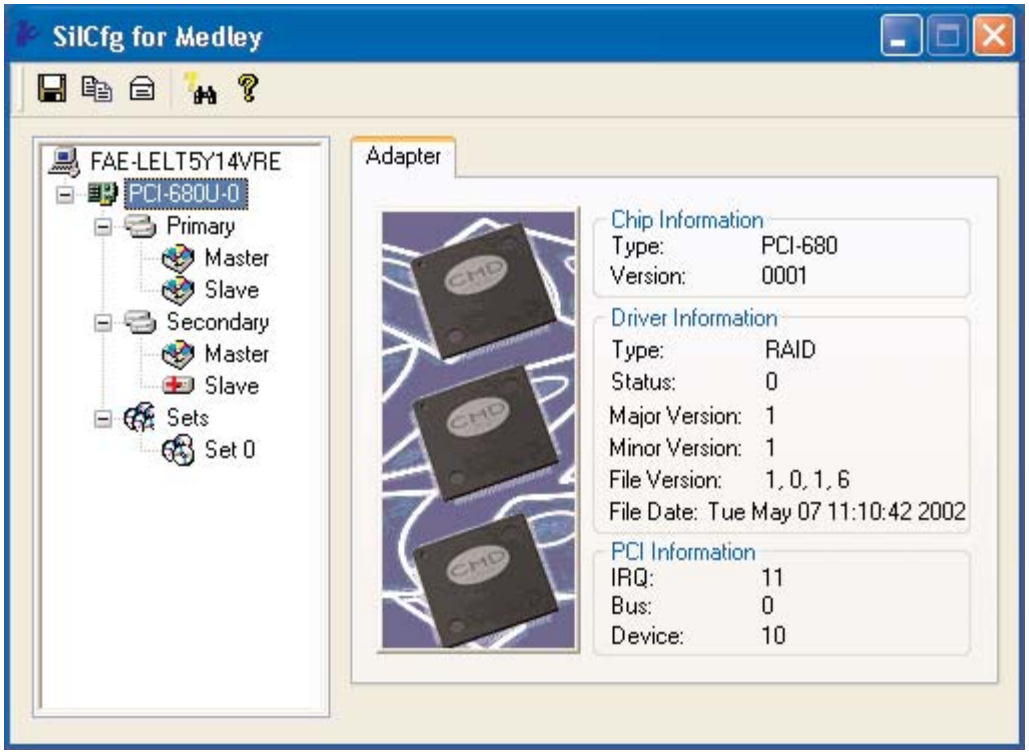
To launch the GUI, simply double-click on the Medley icon located in the bottom right hand corner of the Desktop. If the Medley icon does not appear in the bottom right hand corner of the desktop, find where the application was saved and launch from there.

Upon launching the GUI, the the first window which identifies the computer running Medley should appear similar to the following (the SiI 0680 and SiI 0649 screens will look alike except for the name of the chip):

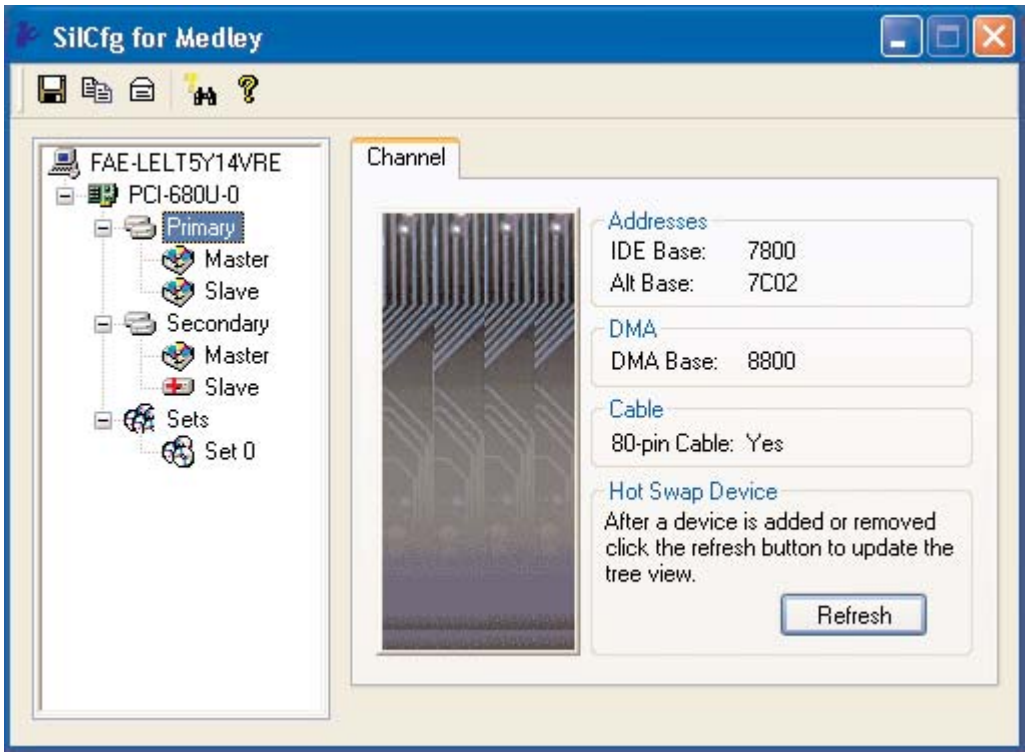


The Events tab reports logged events.

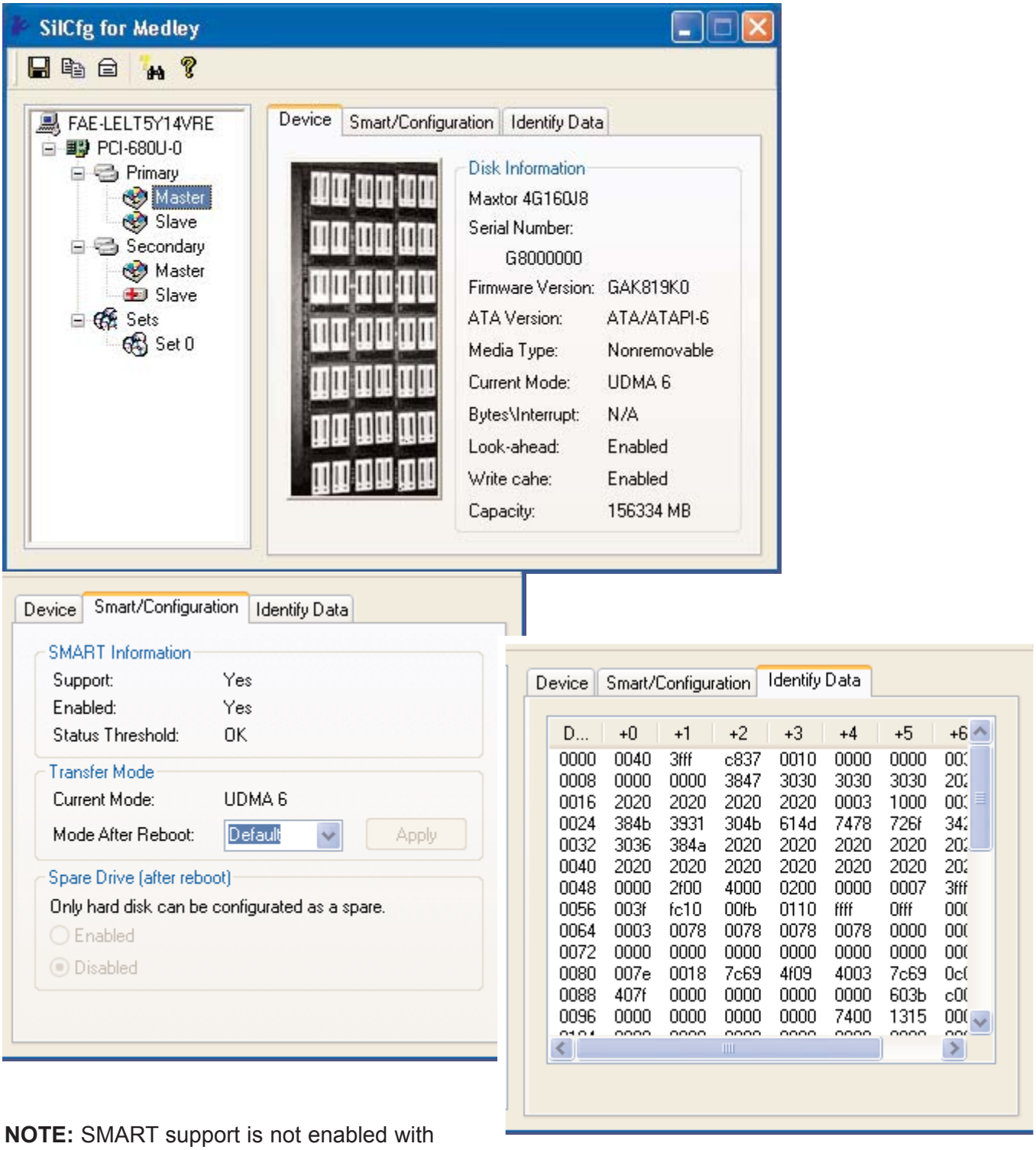
By selecting each different component in the configuration tree provides specific information for that component, such as the chip.



By selecting a specific channel, either Primary or Secondary, the following information is reported:

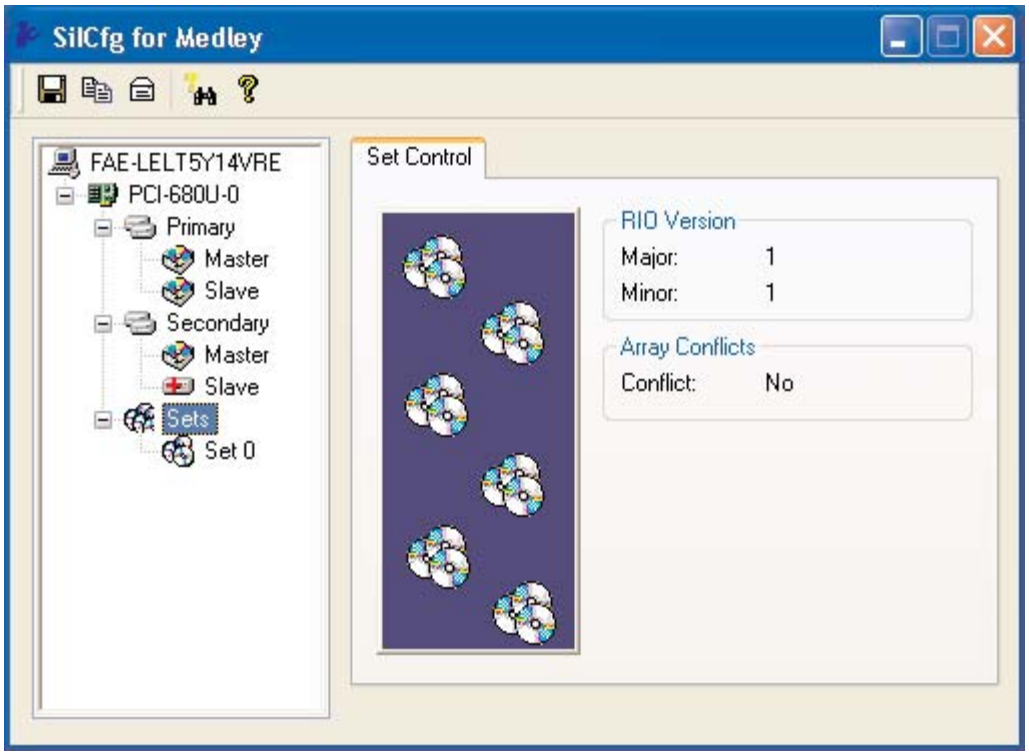


Selecting a specific drive reports all pertinent information to that drive, including Configuration and Disk Identification information.

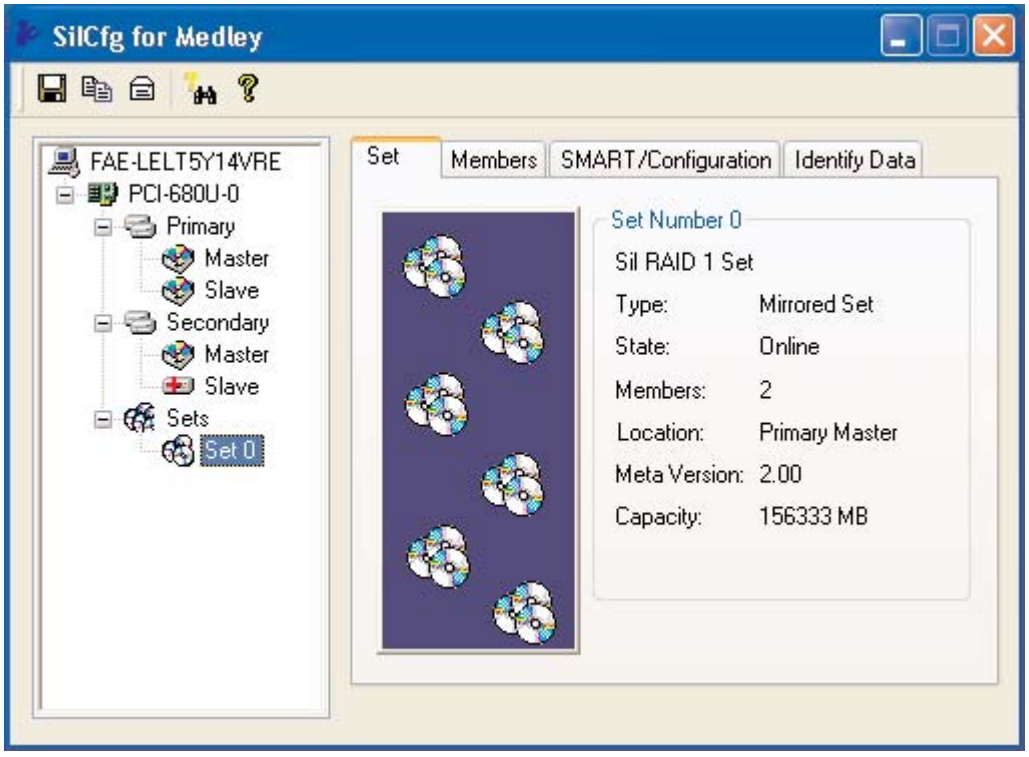


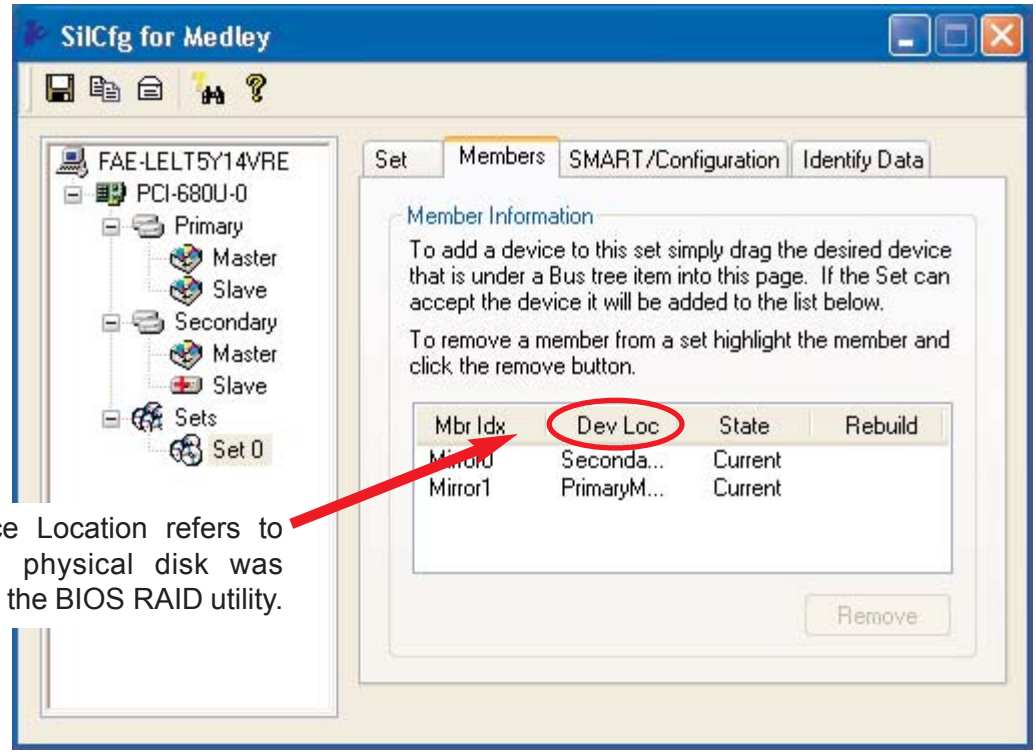
NOTE: SMART support is not enabled with Version 1.0 of Medley GUI.

Selecting Sets lists the Sets in the configuration tree and provides information on RIO Version:



By selecting a specific RAID set, such as Set 0, the type of RAID set, the number of members and capacity is reported.



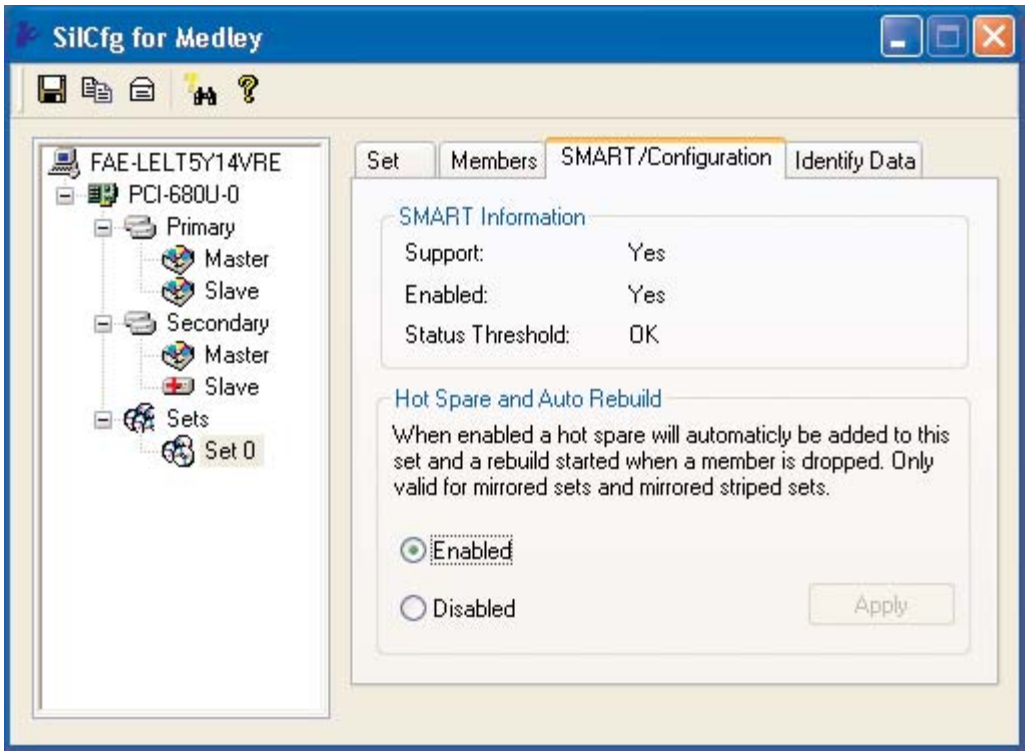


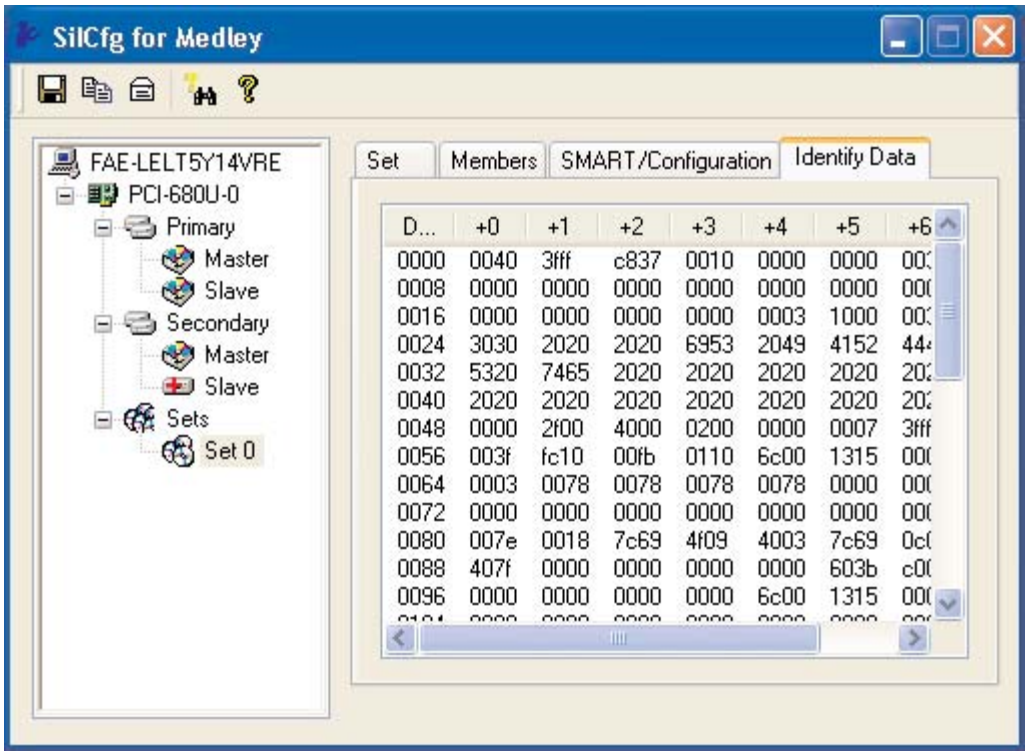
The Device Location refers to how each physical disk was reported in the BIOS RAID utility.

The Members tab of this window reports the device identification (corresponding with the information in the BIOS) and the State of each device.

Besides reporting information, the Members tab of a Mirrored set allows the user to remove a specific drive from that set, as well as add a designated Spare drive to a Mirrored set that has experienced a disk failure. A drive can NOT be removed from a Striped set as this would destroy all data. If more than one set exists, clicking on each Set in the Configuration Tree provides specific information for that Set. Note that when a Mirrored Set is first created, the State of the “destination” drive may report as Rebuild for as much as 30-90 minutes depending on the size of the disk.

SMART and Configuration information, as well as Data Identification is again provided for each Set.





Medley Configuration Menu

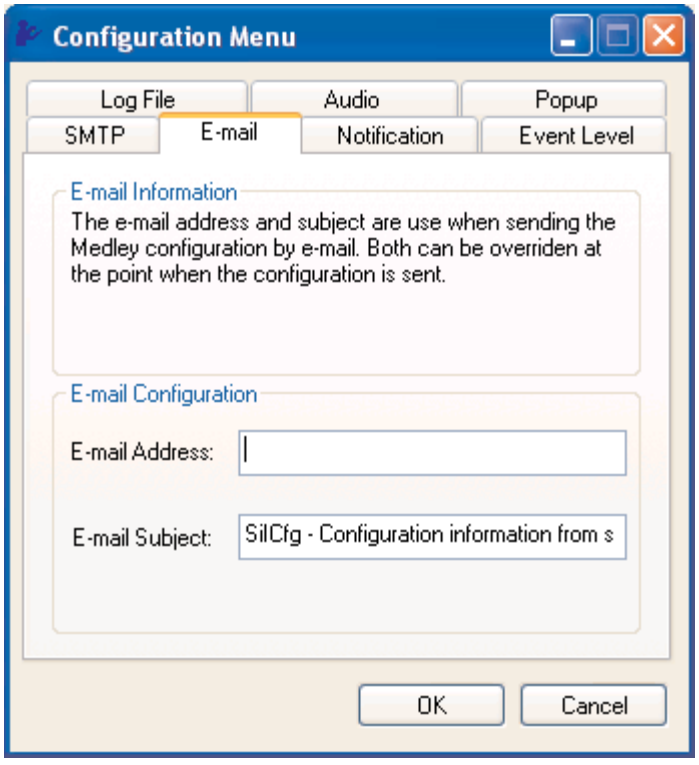
By clicking on the toolbox icon in the top left of the Medley GUI window, or right-clicking on the conductor icon in the bottom right of the computer screen (with other start-up icons), the user may configure Medley including customizing the settings for SMTP, E-mail, Notification, Event Level, Log File, Audio, and Popup.

SMTP

The SMTP server is the server that is used to send e-mails. Normally, the network administrator knows what this name is. Both the name and domain must be entered.

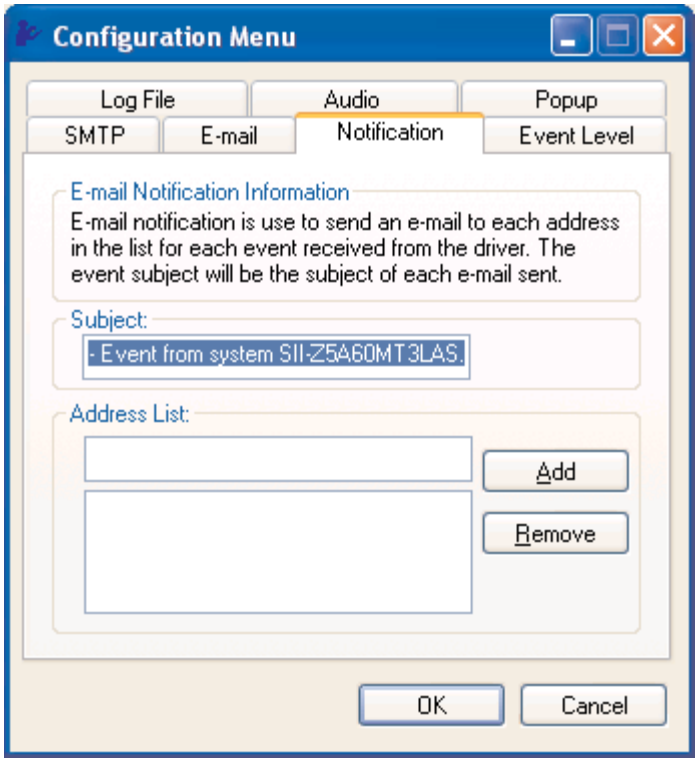
E-Mail

The current Medley configuration may be sent via e-mail. Using the e-mail tab in the Medley Configuration Menu, the user may set the default e-mail address and subject line to where the configuration would be sent. This, however, can be overridden at the time of sending the email.



Notification

When different types of events occur, Medley may be configured to send notices to assigned individual e-mail addresses. Using the Notification tab, all e-mail addresses desired to receive the notices may be entered.



Event Level

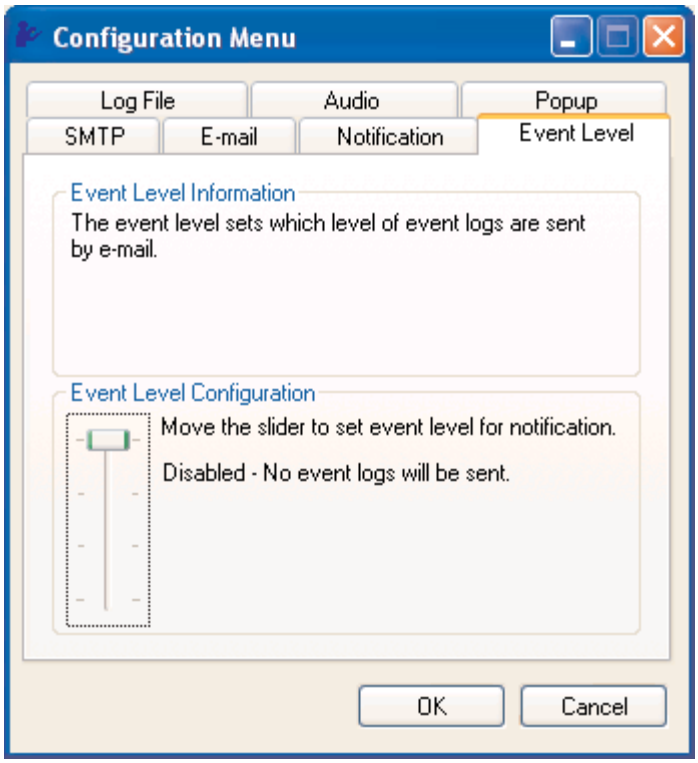
There are different types of e-mail notifications that may be sent which are set with the Event Level tab. The different levels are:

Disabled - No event logs will be sent.

Informational - The following events will be sent:
- Informational
- Warnings
- Errors

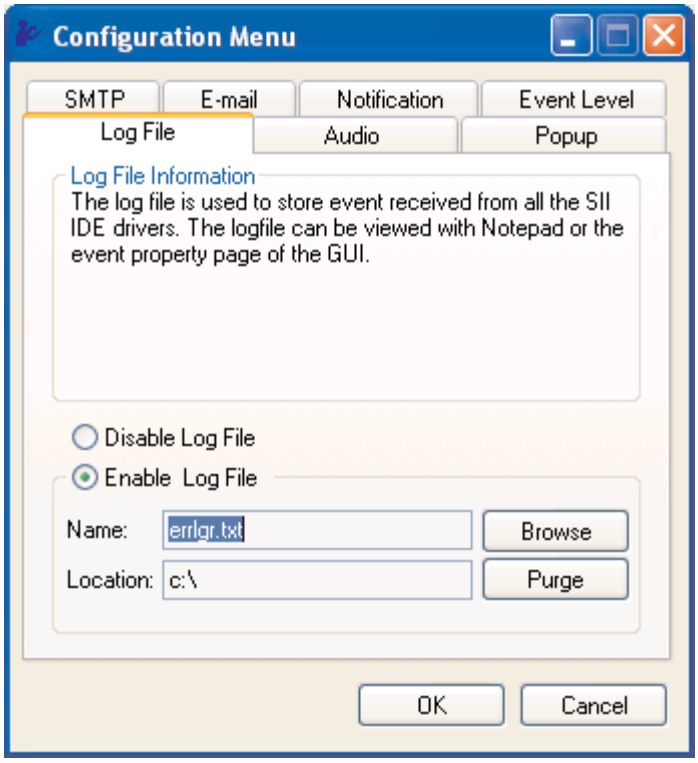
Warning - The following events will be sent:
- Warnings
- Errors

Errors - The following events will be sent:
- Errors



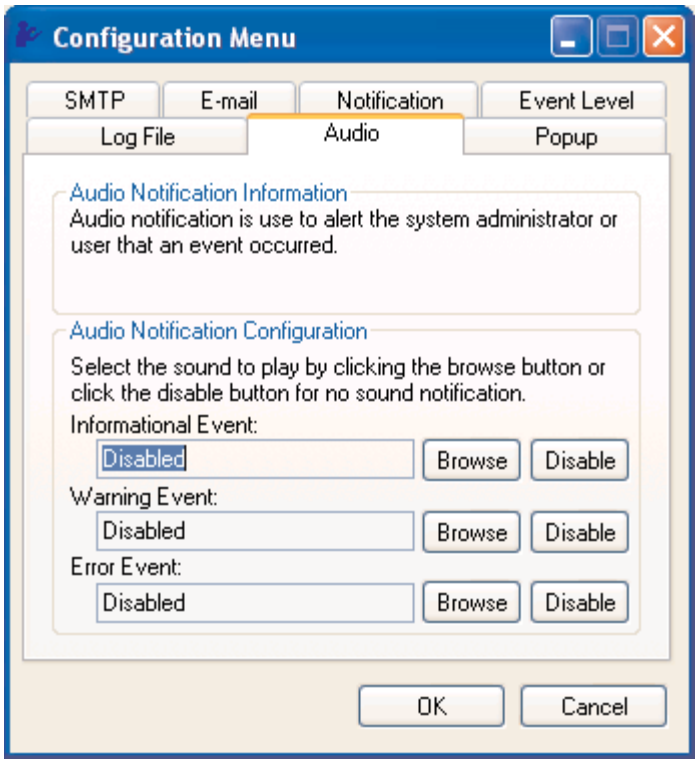
Log File

The log file is used to store event information received from all the Silicon Image IDE RAID drivers. The log file is a text file and can be viewed with Notepad or Medley. Use the Log File tab to set where the log file should be stored and the name of the file as well.



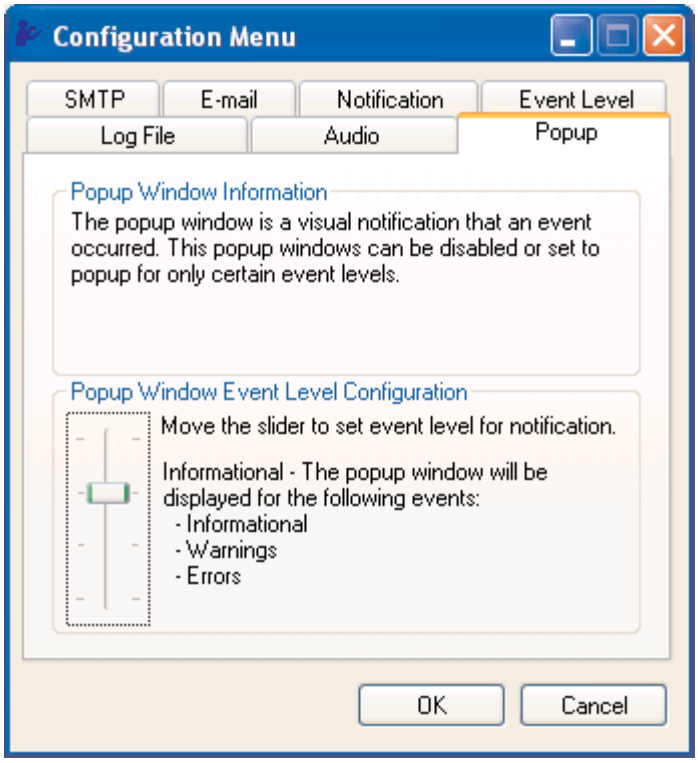
Audio

The user may set different audio alerts for the different levels of events.



Popup

The popup window is a visual notification that an event occurred. The popup window can be disabled or set to popup for only certain event levels. The different levels are:



Disabled - No popup will occur.

Informational - The popup window will be displayed for the following events:
- Informational
- Warnings
- Errors

Warning - The popup window will be displayed for the following events:
- Warnings
- Errors

Errors - The popup window will be displayed for the following events:
- Errors