

## **Notice**

Product features and specifications described in this manual are subject to change without notice.

Manufacturer shall not be liable for any damages, or for the loss of information resulting from the performance or use of the information contained herein.

Accusys, AccuSelect and the other names of Accusys products and logos referenced herein are either trademarks and/or service marks or registered trademarks and/or service marks of Accusys, Inc.

Microsoft, Windows, Windows NT, MS-DOS are either trademarks or registered trademarks of Microsoft Corporation.

Intel and Pentium are registered trademarks of Intel Corporation.

VT-100 is a trademark of Digital Equipment Corporation, a division of Compaq Computer Corporation.

Other product and company names mentioned herein may be trademarks and/or service marks of their respective owners.

All contents of this manual are copyrighted by Accusys, Inc.

The information contained herein is the exclusive property of Accusys, Inc. and shall not be copied, transferred, photocopied, translated on paper, film, electronic media, or computer-readable form, or otherwise reproduced in any way, without the express written permission of Accusys Inc.

© Copyright 2001 Accusys, Inc.

All rights reserved.

Version: 1.2

 **FCC Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/television technician for help.

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded interface cables, if any, must be used in order to comply with the emission limits.

 **CE Mark**

This equipment is in conformity with the EMC directive.

## Table of Contents

<b>CHAPTER 1 – INTRODUCTION .....</b>	<b>1–1</b>
WELCOME .....	1–1
PACKAGE CHECKLIST .....	1–2
USER-SUPPLIED ITEMS .....	1–2
<b>CHAPTER 2 – PLANNING.....</b>	<b>2–1</b>
OPERATING DESCRIPTION .....	2–2
WHAT IF A DISK FAILS?.....	2–3
RAID LEVEL.....	2–4
HOT SWAP OPERATION .....	2–8
HOT SPARE OPERATION.....	2–8
DELAYED WRITE OPERATION .....	2–8
PRE-READ OPERATION .....	2–8
ULTRA DMA-33 IDE OPERATION .....	2–8
TAGGED QUEUING .....	2–9
FIRMWARE.....	2–9
DISK DRIVES .....	2–9
<b>CHAPTER 3 – INSTALLATION .....</b>	<b>3–1</b>
HARDWARE IDENTIFICATION .....	3–1
<i>Controller Box: Overview.....</i>	<i>3–1</i>
<i>Controller Box: Front View.....</i>	<i>3–2</i>
<i>Controller Box: Rear View .....</i>	<i>3–4</i>
<i>Controller Card .....</i>	<i>3–5</i>
<i>Preparing the Controller Card.....</i>	<i>3–6</i>
HARDWARE INSTALLATION .....	3–8
<i>Installing the PCI Controller Card.....</i>	<i>3–8</i>
<i>Mounting Controller Box in System.....</i>	<i>3–9</i>
<i>Connecting Controller Card and Controller Box.....</i>	<i>3–10</i>
<i>Loading a Drive in the Drive Carrier.....</i>	<i>3–11</i>
<b>CHAPTER 4 – ACCUSELECT.....</b>	<b>4–1</b>
ACCUSELECT OVERVIEW.....	4–1
<i>Password Screen.....</i>	<i>4–2</i>
<i>Main Screen .....</i>	<i>4–3</i>
<i>AccuSelect Menu.....</i>	<i>4–4</i>
<i>Raid Configuration Utility Screen .....</i>	<i>4–5</i>
<i>Disk Configuration Utility .....</i>	<i>4–12</i>
<i>Miscellaneous Screen.....</i>	<i>4–19</i>

EXCEPTIONS HANDLING IN ACCUSELECT .....	4-20
<i>Disk is removed</i> .....	4-20
<i>Disk is added</i> .....	4-21
FIRST TIME USE.....	4-22
<i>AccuSelect Setup</i> .....	4-22
DRIVER INSTALLATION.....	4-23
<i>DOS</i> .....	4-23
<i>Windows NT 4.0</i> .....	4-23
<b>CHAPTER 5 – ACCUSELECT FOR WINDOWS NT .....</b>	<b>5-1</b>
<i>Architecture</i> .....	5-2
<i>Operation</i> .....	5-3
EXCEPTIONS HANDLING IN ACCUSELECT FOR WINDOWS NT.....	5-6
<i>Disk is removed</i> .....	5-6
<i>Disk is added</i> .....	5-7
<b>CHAPTER 6 – UPDATING FIRMWARE.....</b>	<b>6-1</b>
DOWNLOAD PROCEDURE .....	6-1
<b>CHAPTER 7 – SPECIFICATIONS .....</b>	<b>7-1</b>
<b>CHAPTER 8 – TROUBLESHOOTING.....</b>	<b>8-1</b>

# Chapter 1 – INTRODUCTION

## *Welcome*

Congratulations on your selection of the Accusys 6100 (ACS-6100). The ACS-6100 is a high-performance and flexible RAID (Redundant Array of Independent/Inexpensive Disks) controller. RAID is a storage technology used to improve the processing capabilities of a storage system, providing a combination of reliability and performance.

The ACS-6100 is a PCI-based IDE Disk Array Controller, using an Intel i960RD/66 RISC based CPU as local processor. The ACS-6100 supports 4M to 128M EDO DRAM as local memory, with the Delayed-Write/Pre-Read algorithms, the overall host access performance is greatly improved.

The ACS-6100 is the ultimate approach to a flexible RAID solution. It can manage different RAID levels (0, 1 and 5), with up to six IDE disks in a single RAID group (i.e. up to two Controller Boxes, each supporting up to three disks). With a cost-effective IDE approach, supporting Ultra DMA mode, the ACS-6100 delivers optimized performance, comparable to more costly SCSI based solutions.

Featuring intelligent online recovery, the ACS-6100 lets you hot swap a failed drive, data will automatically be rebuild to the new drive without any system down time. If one drive fails, data is secured by the other drives, and an alarm sounds to alert you.

The ACS-6100 Controller Box features a user-friendly rack design that lets you easily install up to three drives. Each drive carrier supports a one-inch high 3.5 inch form factor drive. Security is provided by a key-locking system, that prevents unauthorized access to each disk drive.

The ACS-6100 provides a BIOS level GUI setup utility called *AccuSelect*. Using *AccuSelect*, you can easily setup and maintain a RAID group configuration. In addition, you can also monitor and manage the ACS-6100 from within a Windows NT/2000 environment, through a GUI utility called *AccuSelect for Windows NT*.

Currently the ACS-6100 is supported in DOS, Windows NT 4.0, Windows 2000, Redhat 6.0, RedHat 6.1, RedHat 6.2 and SuSE 6.3 operating systems.

Other operating systems, such as Netware, SCO Unix, FreeBSD and OS2 might be supported in the future.

## ***Package Checklist***

Some vendors may ship certain components as standard, while other vendors treat the same component as optional. In its most basic configuration, your package should include the following:

- ACS-6100 PCI-to-IDE Raid Controller Card
- ACS-6100 Controller Box, with 3 disk carriers, and two keys (identical)
- Disk drive mounting screws
- 100-pin Interface Cable (50cm)
- Installation Disk
- User's Manual

The following item(s) is (are) normally optional, but some vendors may choose to include them in the basic package:

- SIMM Memory Module

### ***Caution***

*For non-proprietary accessories, such as memory modules, cables, etc., your vendor may be able to recommend compatible and reliable brands.*

## ***User-Supplied Items***

In order to setup a working system the following user-supplied items are required:

- **Case or Enclosure** (or equivalent): The proper enclosure should be able to accommodate the PCI Controller Card. The Controller Box fits into two 5 ¼ " half-height drive bays and requires a power supply.
- **Disk Drives**: Ideally you should use identical IDE hard disks. Make sure to first define the minimum drive capacity needed. The smallest device drive will determine the usable capacity of the other device drives.

### ***Note:***

*One Controller Box can hold up to three disks. If you want to build a system with 4 to 6 disks, you need to purchase an additional ACS 6100 Controller Box.*

You can learn more about the minimum requirements for your setup by reading Chapter 2, Planning.

## Chapter 2 – PLANNING

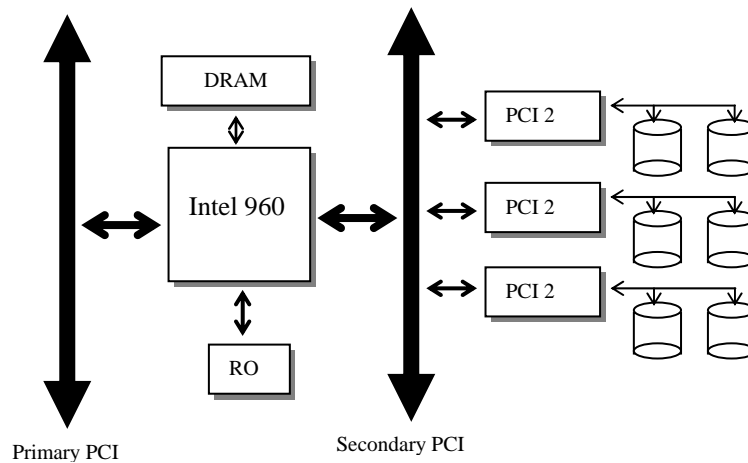
The ACS-6100 can be setup in a variety of combinations. Before you start installation, you should be familiar with the following information.

- **Operating Description**
- **What if a disk fails?**
- **RAID Levels**
- **Hot Swap Operation**
- **Hot Spare Operation**
- **Delayed Write Operation**
- **Pre-Read Operation**
- **Ultra DMA-33 IDE Operation**
- **Tagged Queuing**
- **Firmware**
- **Disk Drives**

For more information on these features, see later in this chapter.

## Operating Description

The ACS-6100 IDE RAID controller is a PCI based IDE RAID subsystem. It can use up to 6 IDE disks, which can be grouped as a RAID 0,1 or 5 array. Under RAID algorithm control, data integrity and data accessing speed is greatly improved. A full height controller box with three internal IDE disk carriers is used to hold the disk drives. To use 4 or more disks, a second controller box must be purchased.



### Basic Functions of the ACS-6100 PCI RAID Controller Card

With the high performance i960RD/66 RISC CPU and high bandwidth 32 bit 33MHZ PCI bus design, the ACS-6100 IDE RAID subsystem provides outstanding read/write performance. At the same time, the parallel data processing to and from IDE disks (RAID algorithm) and the use of a Delay Write/Pre-Read memory management algorithm, throughput is maximized when using a multitask-capable operating environment.

The I960RD processor also provides a I2O interface, with two high speed scatter/gather bus master DMA channels and 4 circular message queues for inbound/outbound command/reply operations. Using the I2O mechanism control, the i960RD provides an extremely high PCI transfer rate.

Although physically there are a maximum of 6 IDE disks divided over 2 controller boxes, the system will only recognize the ACS-6100 setup as one

logical drive. The capacity of this one logical drive depends on the number of disks used and the RAID level of the array group. To calculate the logical disk capacity, from the operating system's viewpoint, several rules should be followed.

***Disk Capacity Rules:***

**RAID Level 0 array : (number of disks)\*(capacity of the smallest disk)**

**RAID Level 1 array : Capacity of the smallest disk**

**RAID Level 5 array : (Number of disks-1)\*(capacity of the smallest disk)**

The operating system sees one single large logical disk, and treats it as any normal disk. All RAID algorithms, or online hot plug / hot spare functions, are transparent to the operating system.

The AccuSelect interface utility is designed for array easy configuration. The AccuSelect utility must be used to configure a RAID group, before the logical disk is recognized by the system. After the RAID group is successfully created using AccuSelect, the system's BIOS message will recognize the newly created logical drive, and you can proceed to partition, format or load an operating system. The logical drive, consisting of possibly up to 6 physical disk drives, acts like a normal IDE or SCSI disk drive, but provides outstanding performance and reliability.

### ***What if a disk fails?***

If a disk drive fails, or a key switch is turned off, the red LED of its disk carrier will be illuminated. When this happens, you can replace the failed IDE disk with a new one, then turn the key switch on. Whenever you replace a failed disk drive, remember the following information:

- If a RAID 5 array group exists and one IDE disk drive failed, the replaced new IDE disk should have a capacity equal or greater than the failed disk. RAID 5 rebuild will proceed automatically (during power on) as soon as you lock the disk carrier.
- If a RAID 1 array group exists, you can add disk(s) with a capacity equal of greater than the existing one. RAID 1 rebuild will proceed automatically (during power on) as soon as you lock the disk carrier.
- If a RAID 0 array fails, there is no way to recover the data of the RAID system. You should proceed by reconfiguring the new RAID with a new IDE disk.

The easiest way to monitor and manage disk drive changes is by using the AccuSelect (or AccuSelect for Windows NT) control utility. Otherwise you are not be able to see the details of failed disk events.

## ***Raid Level***

The ACS-6100 can support the following RAID levels: 0, 1 and 5.

Which Is the Right Raid Level? The answer depends on the application.

RAID Level 0 offers high transfer rates, and is ideal for large blocks of data where speed is of importance. Computer Aided Design, Graphics, Scientific Computing, Image and Multimedia applications are all good examples.

RAID Level 5 arrays offer high I/O transaction rates, and are ideal for on-line transaction processing applications, such as for banks, insurance companies, hospitals, and all manner of office environments. These applications typically perform large numbers of concurrent requests, each of which makes a small number of disk accesses. RAID Level 5 offers a good level of fault tolerance and overall system reliability at a reasonable cost for redundancy overhead.

If cost and performance are of significantly less importance than fault tolerance and reliability, then a RAID Level 1 solution may be an appropriate choice.

Conversely, if data rate performance, fault tolerance and reliability are not an important, then RAID Level 0 may be a suitable choice. Transaction processing systems are usually measured by their throughput in transactions per second (often specified as I/Os per second), rather than by the service time for individual transactions. Many engineering and office applications consist of programs that access large numbers of small files, such as the source files for a program or the font libraries for a laser printer.

Here is a summary of which RAID level makes the most sense, depending upon what you are trying to do:

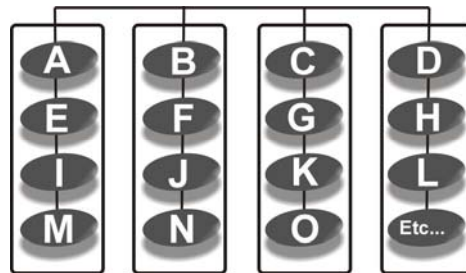
**RAID 0** *Striped disk array without fault tolerance*

**Characteristics:**

- RAID 0 implements a striped disk array, the data is broken down into blocks and each block is written to a separate disk drive.
- I/O performance is greatly improved by spreading the I/O load across many channels and drives.
- Fastest and most efficient array type but offers no fault-tolerance.
- Raid level 0 requires a minimum of one drive.

**Recommended use:**

- Video production and editing
- Image editing
- Pre-press applications
- Any application requiring high bandwidth



**RAID Level 0**

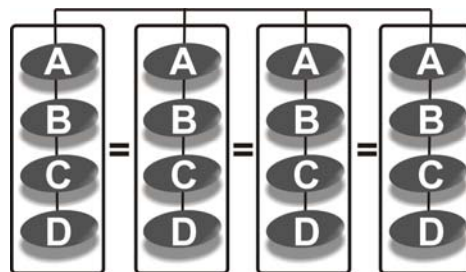
### **RAID 1 *Mirroring and Duplexing***

#### **Characteristics:**

- Better Read transaction rate than single disks, same Write transaction rate as single disks.
- 100% redundancy of data means no rebuild of data is necessary in case of disk failure, just a copy to the replacement disk.
- All the disks have the same data.
- Raid level 1 requires a minimum of two drives.

#### **Recommended use:**

- Accounting
- Payroll
- Financial
- Any application requiring high availability



**RAID Level 1**

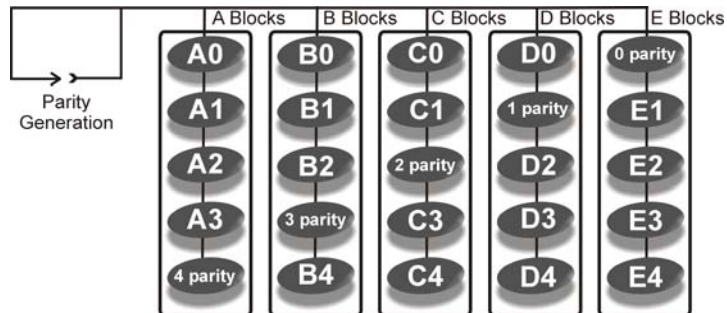
**RAID 5** *Independent data disks with distributed parity blocks*

**Characteristics:**

- Each entire data block is written on a data disk. Parity for blocks in the same rank is generated on Writes, recorded in a distributed location and checked on Reads.
- Highest Read data transaction, medium Write data transaction rate.
- Low ratio of ECC (Parity) disks to data disks means high efficiency.
- Good aggregate transfer rate.
- Raid level 5 requires a minimum of three drives.

**Recommended use:**

- File and application servers
- Database servers
- WWW, E-mail and News servers
- Intranet servers
- Most versatile Raid level



**RAID Level 5**

## ***Hot Swap Operation***

The hot swap function is available on RAID 1 or RAID 5 array groups and can be operated during run time. Therefore it is not necessary to shut down the system before replacing a hard disk. The RAID rebuilding will be processed automatically in the background and the ACS-6100 RAID subsystem will record the progressing percentage. If the host system is shut down or powered off abnormally, the ACS-6100 RAID subsystem will continue the disk-adding-process to rebuild the RAID after power turns on again.

## ***Hot Spare Operation***

In a RAID 1 or RAID 5 array group, any disk installed but not belonging to a RAID group is called a *spare drive* and will act as a hot-standby. When the controller detects a failure on an IDE drive, the hot-standby drive will replace the failed one automatically. The array will be reconfigured and rebuilt in the background, while the operating system continues to run normally.

## ***Delayed Write Operation***

The ACS-6100 RAID subsystem provides a *Delayed Write* mechanism to manage the ongoing write operations from the host. The host operating system can issue write commands to the controller back-to-back, with no need to wait for a command to be completed, offering very high performance for the overall system.

## ***Pre-Read Operation***

The ACS-6100 RAID subsystem provides a Pre Read mechanism to read ahead of the data host read command.

## ***Ultra DMA-33 IDE Operation***

The ACS6100 uses a high performance PCI to IDE ultra DMA-33 chip to achieve data transfer between the maximum of six IDE disks and the CPU. During the bus master mode and burst operation control, data throughput will be increased.

***Note:***

*Ultra DMA-66 mode is currently not supported.*

## ***Tagged Queuing***

The ACS-6100 controller provides a tagged queuing algorithm for multiple command operations when using a multitasking operating system.

## ***Firmware***

In order to be operational, proper firmware must be loaded into the ACS-6100 controller card. At the time of shipping, the ACS-6100 does already have a workable firmware preloaded.

If necessary, you can download a new or upgraded firmware version. For guidelines on downloading firmware to the controller box, see Chapter 6.

***Note:***

*Check the installation disk that came with the ACS-6100 package to find a backup firmware version. You can also check the vendor's web site to find the latest firmware version for use with the ACS-6100.*

## ***Disk Drives***

Refer to the disk drive manuals for information on the drive configuration jumpers. Prepare the drives using these guidelines:

- Drive Capacity. To calculate the logical disk capacity, from the operating system's viewpoint, follow these rules.

***Disk Capacity Rules:***

**RAID Level 0 array : (number of disks)\*(capacity of the smallest disk)**

**RAID Level 1 array : Capacity of the smallest disk**

**RAID Level 5 array : (Number of disks-1)\*(capacity of the smallest disk)**

***Note:***

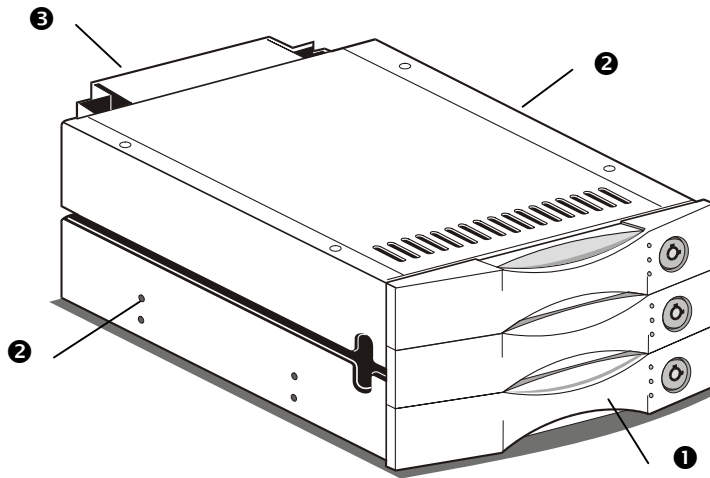
*The disk drives used in the ACS-6100 controller box has to be set to Master.*

## Chapter 3 – INSTALLATION

### *Hardware Identification*

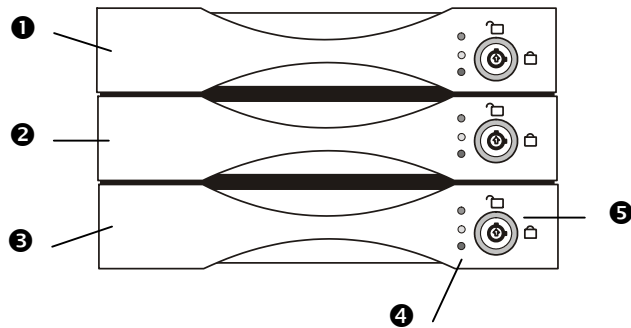
#### **Controller Box: Overview**

Each Controller Box holds a maximum of three disks.



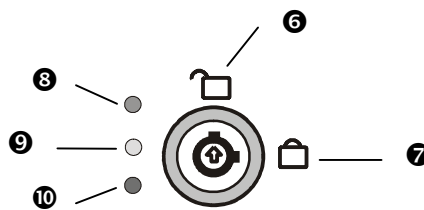
- ❶ Front/Interface with drive carriers
- ❷ Holes for Mounting Screws
- ❸ Rear/Connectors

## Controller Box: Front View



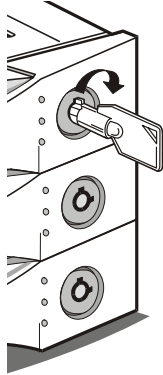
- ❶ Top Drive Carrier
- ❷ Center Drive Carrier
- ❸ Bottom Drive Carrier
- ❹ Disk Activity Indicators
- ❺ Drive Carrier Lock

Each drive carrier can hold a one-inch high 3.5-inch form factor IDE disk drive. This makes it easy to hot swap a drive in the event of a failure, without affecting the status of the remaining drives.



- ❻ Drive Carrier Lock – Unlocked
- ❼ Drive Carrier Lock – Locked
- ❸ Green Disk Activity Indicator – Disk drive is properly installed and locked
- ❹ Amber Disk Activity Indicator – Disk drive is being accessed
- ❺ Red Disk Activity Indicator – Disk drive is not present, not properly installed, failed, or disk carrier is not unlocked

The disk activity indicators show the status of each individual disk drive. In the event that a drive fails, the Red indicator turns on and an audible alarm sounds. You can turn off the alarm by unlocking the drive carrier.



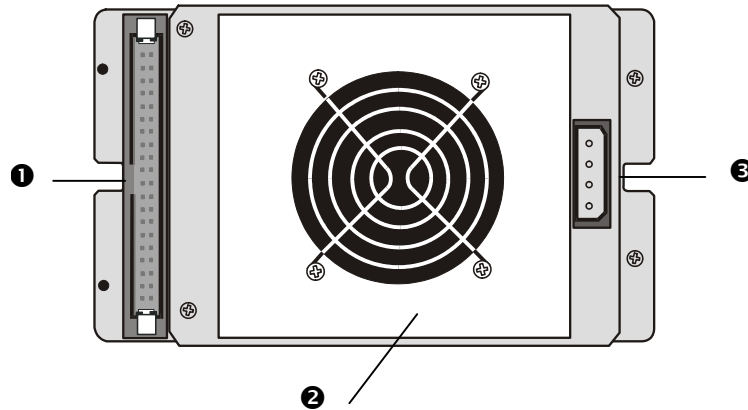
The drive carrier lock acts as an On/Off switch for the drives and provides security by preventing non-key holders from accessing the drives.

Two identical disks are provided with the system. To lock each carrier, insert the key and turn it in a clockwise direction. To unlock a carrier, turn the key in a counterclockwise direction.

**Note:**

*If you are setting up a RAID 1 array group, when you lock the drives, the first drive is designated as the source drive and the other drives become the backup drives.*

## Controller Box: Rear View



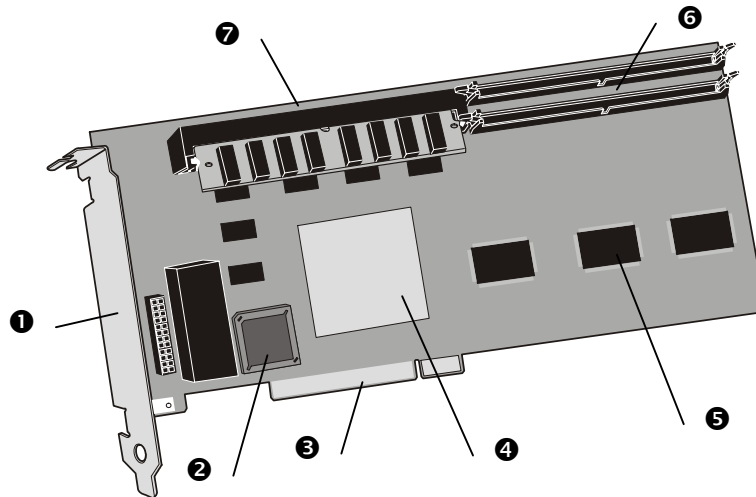
- ❶ Connector for 100-pin Interface Cable to PCI-to-IDE Raid Controller Card
- ❷ Cooling Fan Vent
- ❸ Power Connector

The connector is used to link the Controller Box with the Controller Card, using the 100-pin Interface Cable, part of the package list.

The cooling fan inside the controller box provides air circulation for the disk drives.

The power connector supplies power to the Controller Box.

## Controller Card



- ❶ Bracket for Expansion slot in Case
- ❷ BIOS ROM Chip
- ❸ PCI Card Edge Connector
- ❹ I960 RISC Processor
- ❺ PCI-to-IDE Chips
- ❻ 100-pin Connectors for Interface Cable to Controller Box
- ❼ Memory socket for EDO RAM Memory Module (8~128 MB)

Each Controller Card can connect to up to two Controller Boxes, for a support of maximum 6 hard disk drives. The 100-pin connectors on the board are for use with the interface cable to connect to the Controller Box, with each connector supporting one Controller Box.

The memory socket is for use with an EDO RAM memory module with a capacity between 8 and 128 MB. This memory provides the cache memory space available on the ACS-6100.

## Preparing the Controller Card About the Memory Module

**Note**

The ACS-6100 controller requires a minimum of 4 MB EDO RAM installed in the socket on the controller card in order to operate. The controller card is normally delivered without any memory installed.

**Memory Specifications:**

Minimum	Recommended
72-pin EDO RAM SIMM module (PC-100, 60 ns or faster).	60 ns
With or without parity.	With parity, for security
Minimum of one SIMM with 4 MB. The memory card socket can support from 4 up to 128 MB of memory.	More memory equals better performance. The size of the memory module defines the cache writing space available to the ACS-6100.

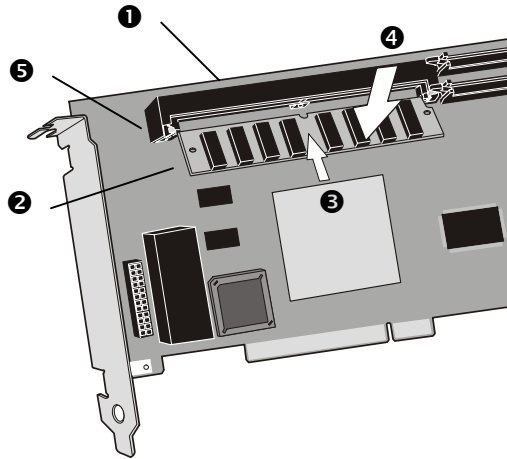
**Note**

The ACS-6100 controller card can only accept certain types of SIMM memory modules. Check the table below to find some of the supported modules.

EDO RAM Architecture	
128 MB	16 (8M x 8)
64 MB	8 (8M x 8), or 8 (4M x 16)
32 MB	4 (8M x 8)

## Installing a SIMM Module

Follow the directions below to install a memory card on the controller board.



1. Power off the system and disconnect the power connector.
2. Locate the SIMM socket ❶ on the controller card.
3. To install a memory module, hold the memory module ❷ with the edge connector side towards the slot. The edge connector is divided into two equal lengths.
4. Hold the module at a shallow angle (about 25 degrees) and insert the edge connector into the connector slot ❸. The “gold teeth” of the edge connector should no longer be visible when the card is fully inserted.
5. Press the module downwards so that it is flat inside the compartment ❹. You can hear an audible click as the latches ❺ of the connector lock the module in place.
6. To remove a module that is already in place, unhook the latches on both side of the module. Put the card in vertical position., and lift it out of the socket.

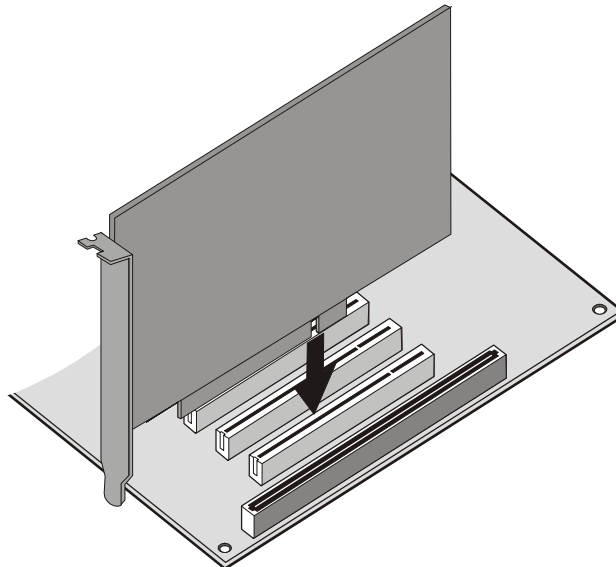
## ***Hardware Installation***

### ***Caution***

*Turn off and disconnect all electrical power from the system before beginning any installation procedure.*

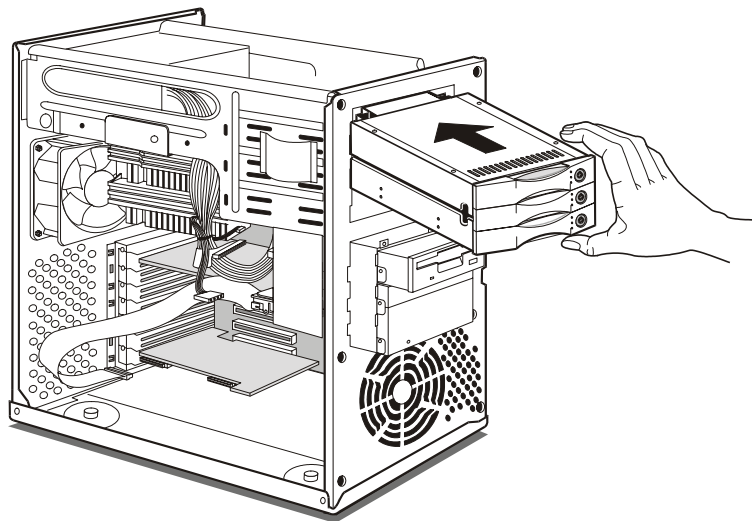
### **Installing the PCI Controller Card**

1. Identify which expansion slot you are going to use for your controller card.
2. In the system case, remove the blanking plate from the slot in the system case that corresponds to the expansion slot that you are going to use.
3. Position the edge connector of the controller card over the PCI expansion slot. Position the metal bracket of the card in the empty slot in the system case.
4. Install the edge connector of the add-in card into the expansion slot. Press down quite firmly so that you are sure that the edge connector is correctly seated in the slot.
5. Secure the metal bracket of the card in the empty slot in the system case with a screw.

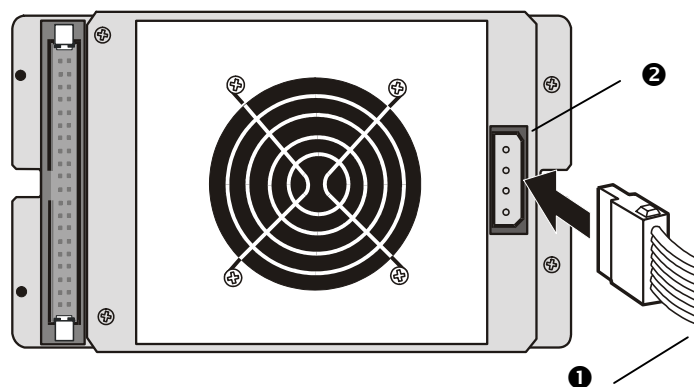


## Mounting Controller Box in System

1. Remove the cover and front bezel from the system case.



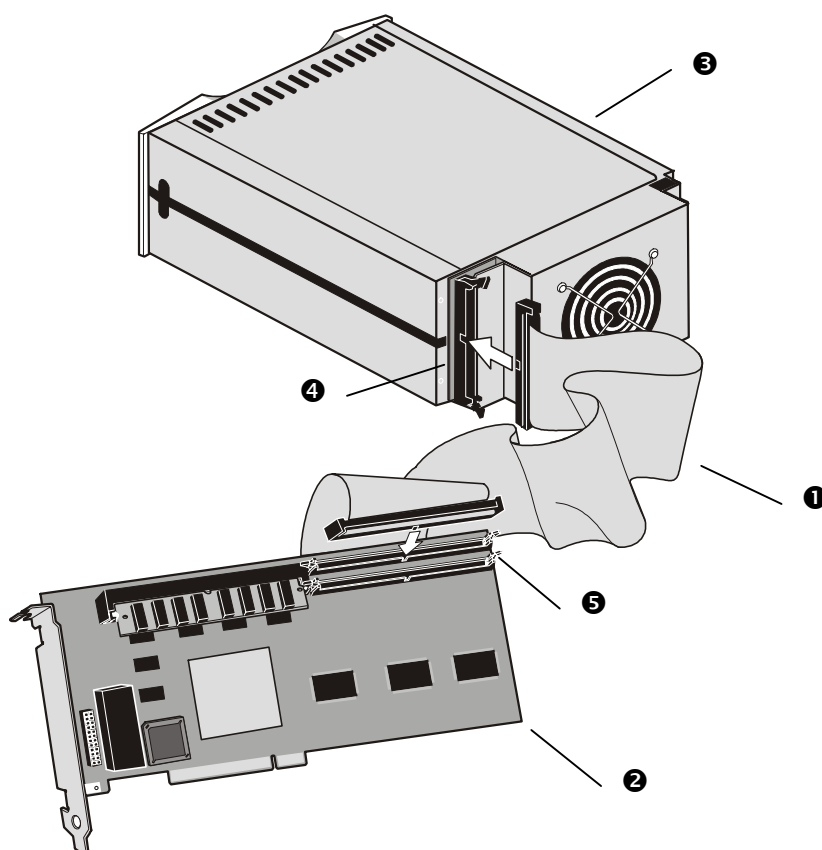
2. Insert the ACS-6100 Controller Box into the space of two half-height 5 ¼" drive bays, and secure it in place with the screws provided. (If your case uses guide rails to install 5 ¼" devices, you can use them on the Controller Box.)
3. Connect a free power cable **1** to the power connector on the rear side of the Controller Box **2**.



4. Reassemble your system.

## Connecting Controller Card and Controller Box

1. Using the 100-pin Interface Cable **1**, connect the Controller Card **2** with the Controller Box **3**.
2. Identify the 100-pin connector on the rear side of the Controller Box **4**. Plug the Interface Cable in the connector, making sure that the red stripe of the cable is at the top. Lock the cable in place using the latches on both sides of the connector.

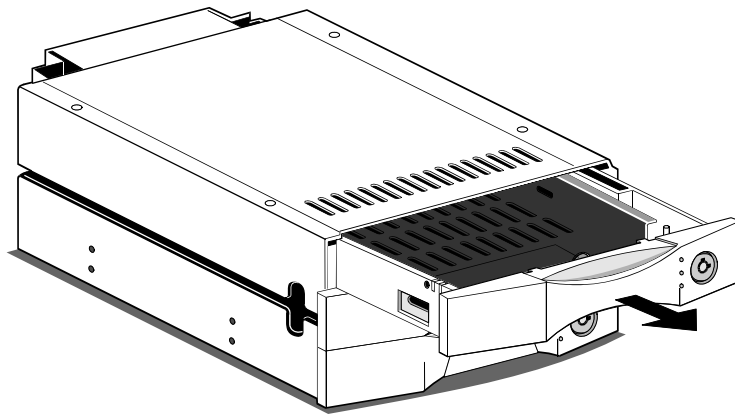


3. Identify the 100-pin connectors on the Controller Card **5**. Plug the Interface Cable in one of the two available connectors, making sure that the red stripe of the cable is closest to the bracket. Lock the cable in place using the latches on both sides of the connector.

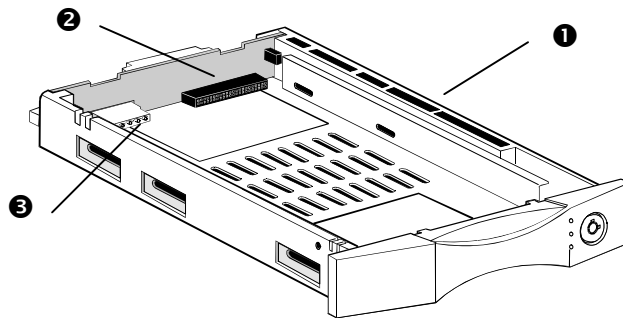
## Loading a Drive in the Drive Carrier

**Note**

*We recommend that you use one of the following hard disk brands: Fujitsu, IBM, Maxtor, Quantum, or Seagate.*

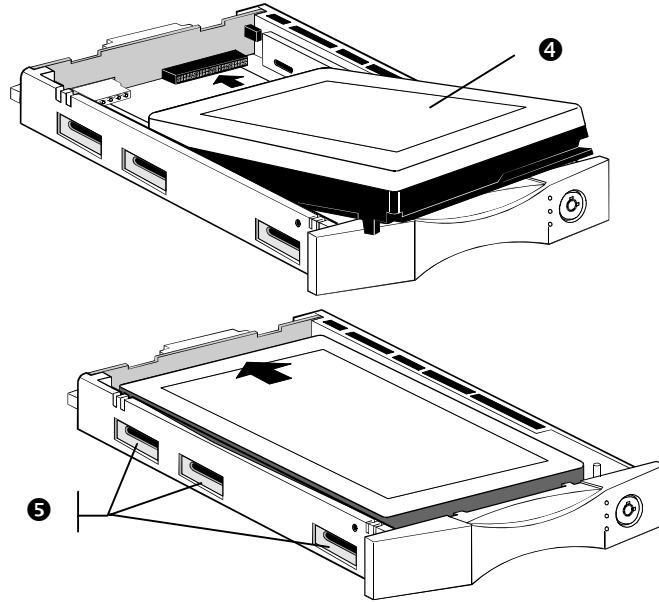


1. Unlock the drive carriers and slide them out of the Controller Box.

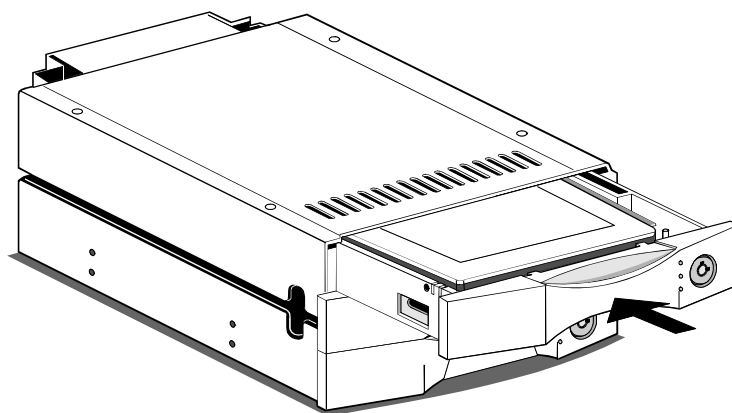


- ① Drive Carrier
- ② IDE Connector
- ③ Power Connector

2. Place the first disk drive in the drive carrier, so that the power and IDE connectors correspond with the connectors inside the carrier.



3. Connect the power connector to the disk drive 4 first, then carefully push the disk drive so that the drive's IDE and power connectors seat into the IDE and power connectors in the disk carrier. Make sure the connectors are firmly seated, secure the disk drive in with the screws provided 5, then slide the loaded disk drive carrier into the ACS-6100 Controller Box and lock it.



4. Repeat steps 1 to 3 for the remaining disk drives.

## Chapter 4 – ACCUSELECT

After you finished the hardware installation, as discussed in Chapter 3, you can then use the AccuSelect utility to quickly setup the ACS-6100 in your system.

**Note:**

*After the initial configuration, if you are running the Windows NT 4.0 operating system, you can use the AccuSelect for Windows NT, discussed later in this manual, to monitor and manage the ACS-6100. See Chapter 5 for more information.*

We will first review the AccuSelect utility, later in this chapter we will then provide steps for first time use.

### *AccuSelect Overview*

The configuration procedures described in this section are performed using the AccuSelect utility, which you can access after the system restarts. After the standard POST messages, you are prompted to start the AccuSelect utility, using the **CTRL + F1** key combination.

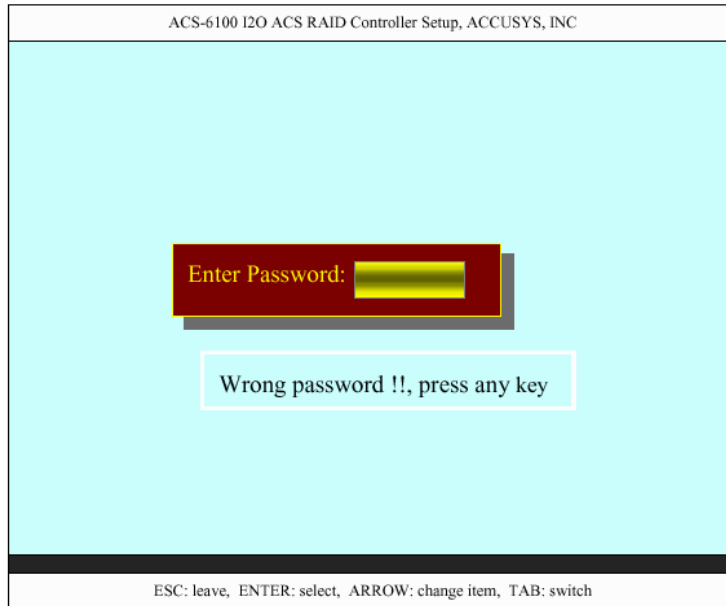
**Copyright Accusys Technology, Inc, 1995-2000**  
**ACS-6100 I2O RAID Controller.**  
**I2O Subsystem Works Normally!**

<i>ID</i>	<i>Device String</i>	<i>Status</i>	<i>RAID</i>
<i>ID 0</i>	<i>ACCUSYS RAID DISK Ver 0.53 980210340</i>	<i>found(80h)</i>	<i>READY</i>

**Press <Ctrl-F1> to enter AccuSelect...**

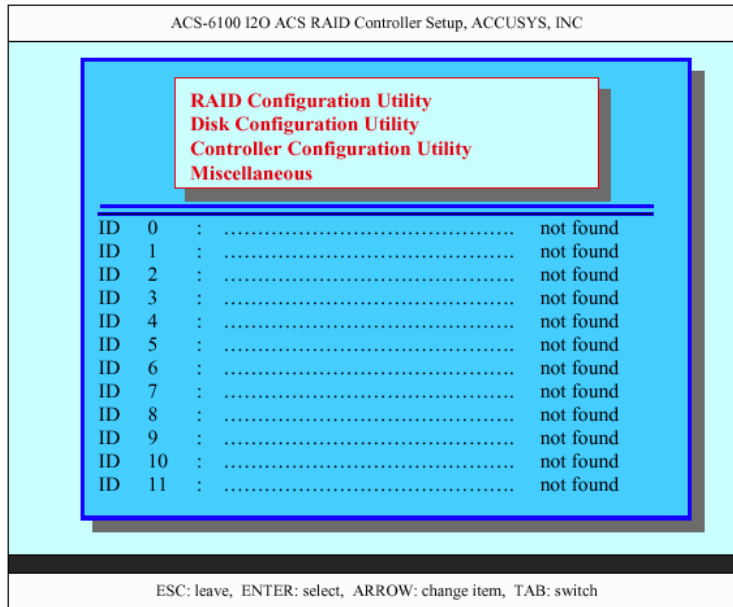
The first column of the table provides the RAID disk ID. The next column provides information on the vendor string. The Status column provides information on the logical disk, while the RAID column provides the status of the RAID configuration.

## Password Screen



The first screen to appear after you enter the AccuSelect utility is the Password Screen. To proceed, you need to input an 8-character password. The default password is '**ACS-6100**'. You can change the default password by using the 'password change' utility. If you ever forget the modified password, you need to contact your ACS-6100 vendor.

## Main Screen



After your password is accepted, the Main screen of the AccuSelect utility appears. The main menu shows a list of the options that are available. A highlight shows which option is currently selected. You can use the **TAB** key to move the highlight to other options. When an option is highlighted, you can select the option by pressing the **Enter** key, and then use the **cursor** keys to change the value of the selected item. Use the **ESC** key to cancel an operation or to return to the previous level.

Available options are:

***RAID Configuration Utility***  
***Disk Configuration Utility***  
***Controller Configuration Utility***  
***Miscellaneous***

The list of ID 0~11 represents the maximum of 12 installed IDE disks. Each ACS-6100 controller card can support up to 6 IDE disks.

## AccuSelect Menu

Below is a quick overview of the complete AccuSelect menu.

---

### RAID Configuration Utility

- Custom Array Configuration
- Quick Array Configuration
- RAID 5 Group Maintain
  - Init R5 Group
  - Check R5 Group
  - Rep Check R5

---

### Disk Configuration Utility

- Automatic Detection
- Advanced User Setting
- Low Level Format
- Ultra DMA Mode
  - Enable
  - Disable

---

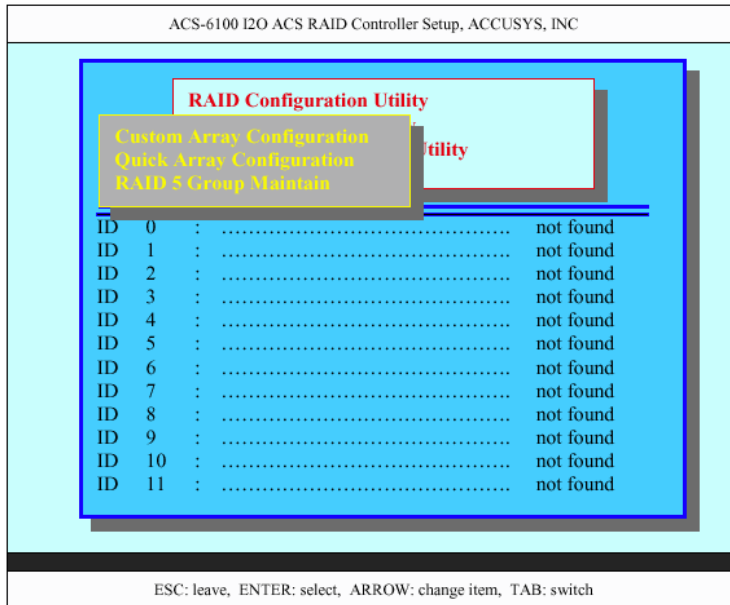
### Controller Configuration Utility

- Non-Volatile Memory Maintain
  - Update Non- Volatile Memory
  - Erase Non-Volatile Memory
  - Load Previous Setup
  - Restart System
- Controller Function Setup
  - Write Buffer
    - Enable
    - Disable
  - INT 13h Extension
    - Enable
    - Disable
- Controller Diagnostics
  - Processor Internal Test
  - Bus Master Channel Test
  - DRAM Stability Test
  - Forever Loop
- Password Change
- Serial Number

---

### Miscellaneous

## Raid Configuration Utility Screen



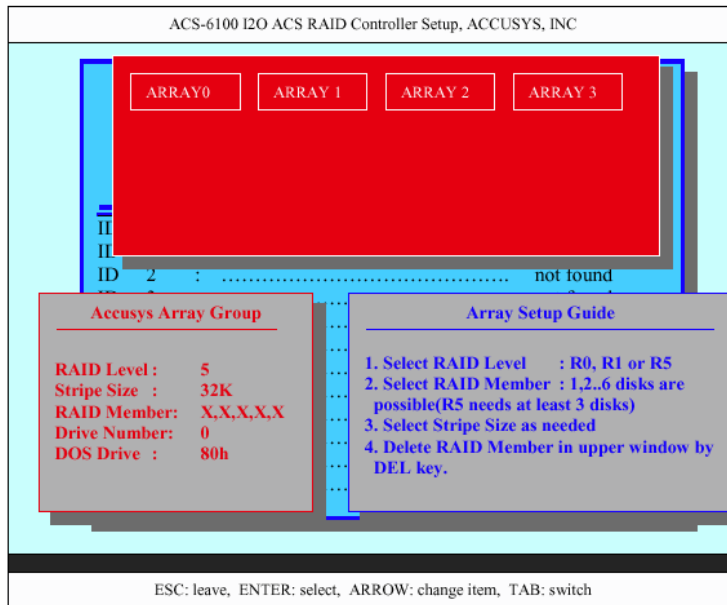
The Raid Configuration Utility can be used to configure a new RAID or maintain a previously configured RAID. The RAID levels available are RAID 0, 1 or 5.

Available options are:

*Custom Array Configuration*  
*Quick Array Configuration*  
*RAID 5 Group Maintain*

There are two ways to configure a new RAID group. You can use the “**Custom Array Configuration**” utility to customize a new RAID by yourself, or you can select the “**Quick Array Configuration**” utility, which will automatically configure a new RAID for you. The “RAID 5 Group Maintain” option allows you to quickly setup or maintain a RAID 5 group array.

## Custom Array Configuration Screen



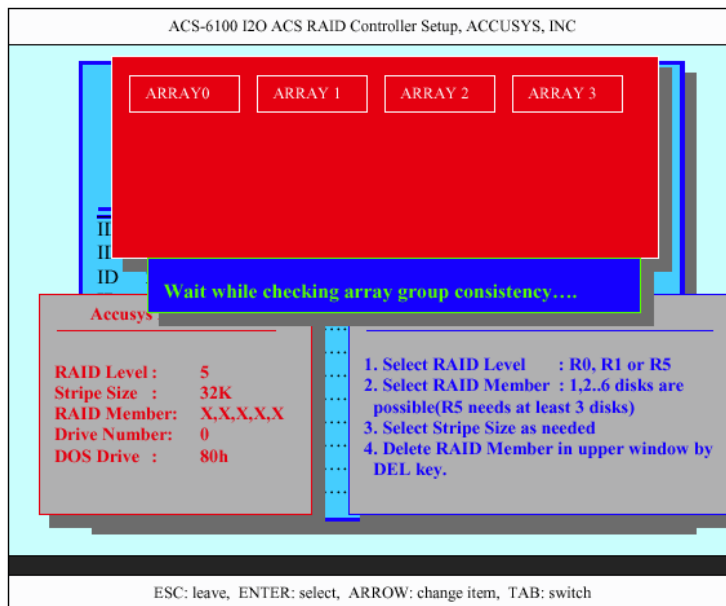
There are three main windows on the Custom Array Configuration screen. The upper window shows four array groups, which may have a maximum of 6 members, i.e. disks, each. You can delete members of each array by using the **DEL** key.

By using the **TAB** key, you can move between the upper window and the lower-left window. In the lower-left window (*Accusys Array Group*), you can configure the value of the following items:

**RAID Level: 0, 1 or 5**  
**Stripe Size: 4k, 8k, 16k, 32k or 64k**  
**RAID member: ID 0~ID 5 (Max. of six disks in current version)**  
**Drive Number: ???**  
**DOS Drive: ???**

The lower-right window provides simple instructions detailing how to configure a new RAID group.

After you have successfully configured a RAID group, you can press the **ESC** key to leave the current setup windows group. Before leaving the custom array setup windows group, AccuSelect will automatically check the array settings.



The setting rules for the array are:

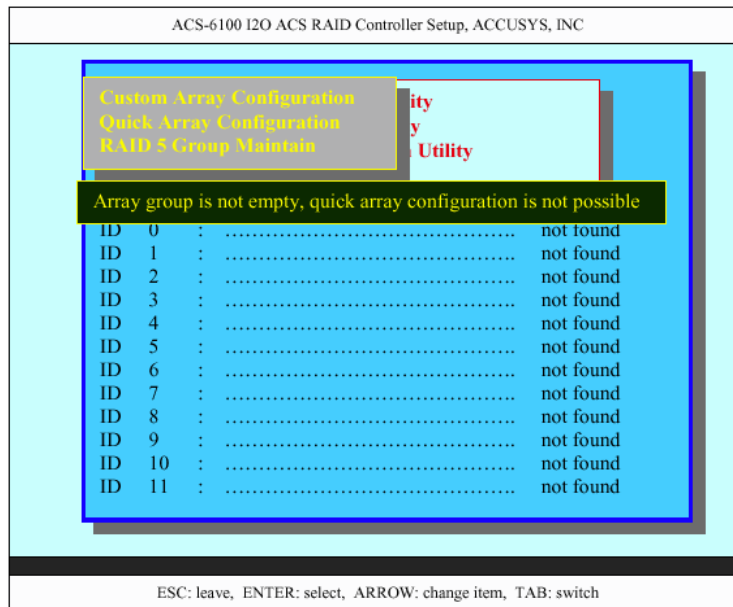
- *No item can be left blank.*
- *At least 3 disks are needed for RAID 5 group.*

After all the rules are checked and passed, you will see a blue screen, which states “Check passed, array group configured but not saved”. It reminds you to save the configurations into non-volatile memory before you leave the AccuSelect. See the Non-volatile memory maintain section later in this chapter.

**Note:**

*If you fail to save the configuration to non-volatile memory, your modifications will get lost after you close the AccuSelect utility.*

## Quick Array Configuration



After you choose Quick Array Configuration, AccuSelect will check to see if an array exists in the system. Quick configuration is only possible when the array group is empty. If a message appears stating that the array group is not empty, you need to go to Custom Array Configuration Screen to delete any existing arrays, before you return to automatically set up a new one.

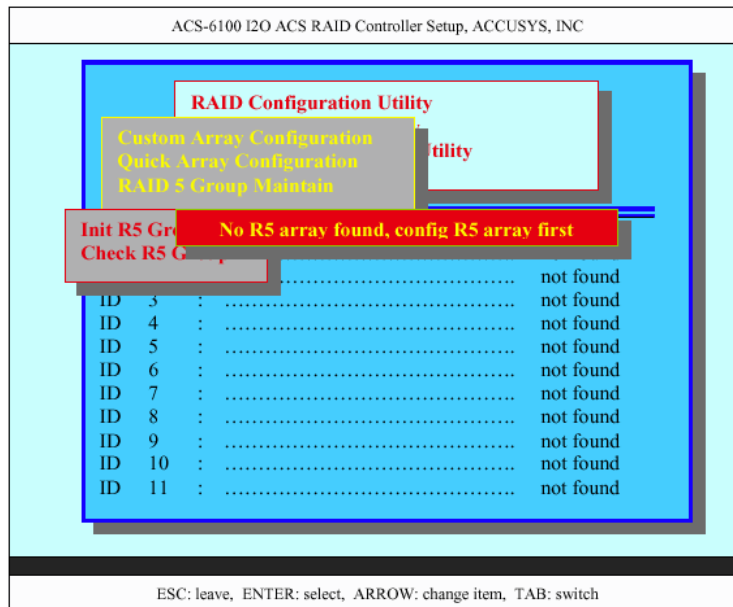
**Note:**

*Using the Quick Array Configuration utility, you can only set up a RAID 0 or RAID 5 array group.*

AccuSelect uses the following rules to automatically set up an array:

- If three or more disk drives are installed: RAID 5 is the only choice, and 32K-stripe size is chosen.
- If less than 3 disk drives are installed: RAID 0 is the only choice, and 32K-stripe size is chosen.

## RAID 5 Group Maintain



When you select RAID 5 Group Maintain, and if a RAID 5 group does not exist, a red window of “No R5 array found, config R5 array first” appears. You should configure a RAID 5 group first, using either the Custom or Quick Array Configuration features, save the array, and restart the system to activate the RAID group operation.

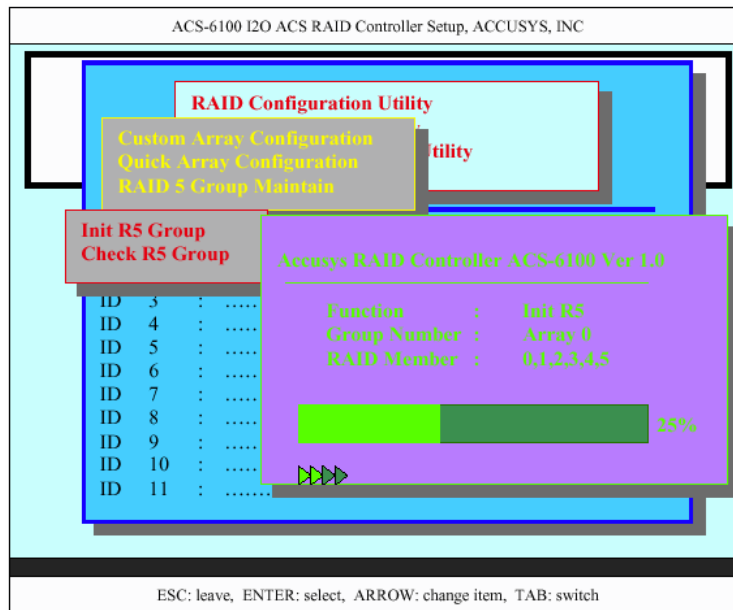
**Note:**

*If you fail to save the configuration to non-volatile memory, your modifications will get lost after you close the AccuSelect utility.*

If an RAID 5 group exists, you can use the RAID 5 Group Maintain feature to:

***Init R5 Group***  
***Check R5 Group***

## Init R5 Group



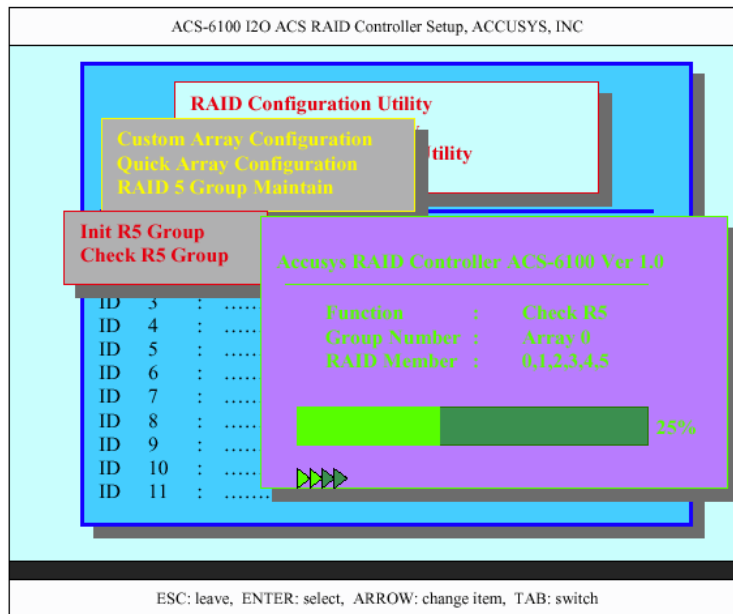
You can initialize a RAID 5 group by using this feature. This utility needs to generate RAID 5 parity disk data before the RAID 5 algorithm can work normally.

**Note:**

*RAID 5 group parity will be initialized automatically after a RAID 5 group is saved and the system has restarted. The Init R5 Group allows you to reinitialize it again.*

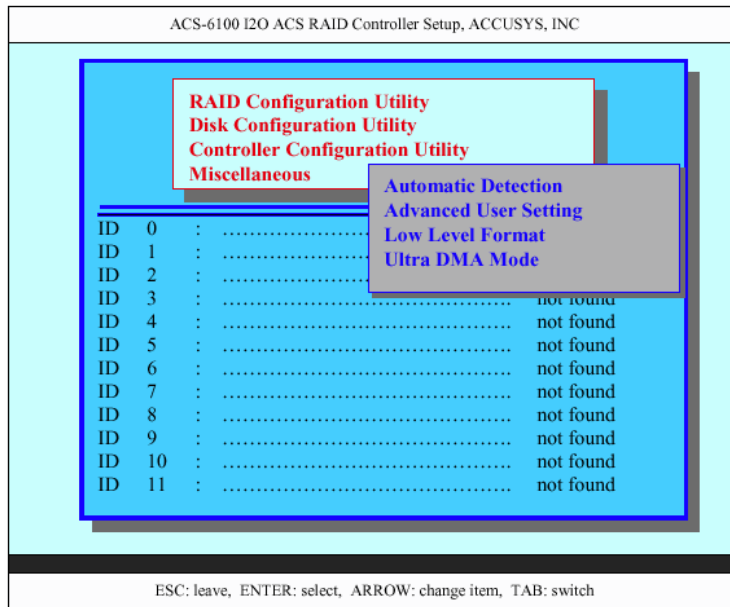
As the initialization starts, a new screen pops up, allowing you to monitor the ongoing process.

## Check R5 Group



After the RAID 5 group parity is established, you can use the Check R5 Group feature to check on the result.

## Disk Configuration Utility



The Disk Configuration Utility is used to configure the IDE disk drive parameters, such as DMA/Ultra DMA mode, low-level formatting, etc.

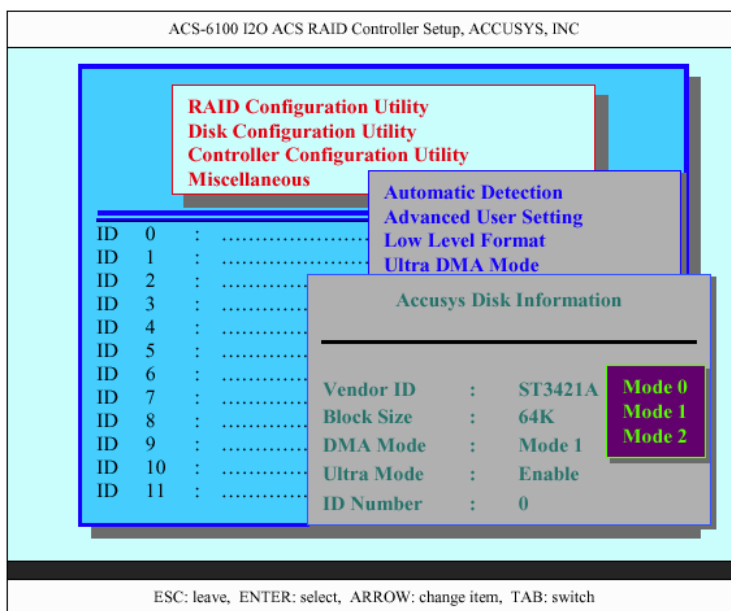
Options include:

*Automatic Detection*  
*Advanced User Setting*  
*Low Level Format*  
*Ultra DMA Mode*

## Automatic Detection

This feature automatically detects all the IDE disk drives installed in the system, and reloads the configuration into AccuSelect.

## Advanced User Setting



The advanced user setting allows the user to setup the IDE disk ultra mode parameter and DMA mode number. The default setting of all IDE disks is Ultra Mode set to disabled and DMA mode set to 0.

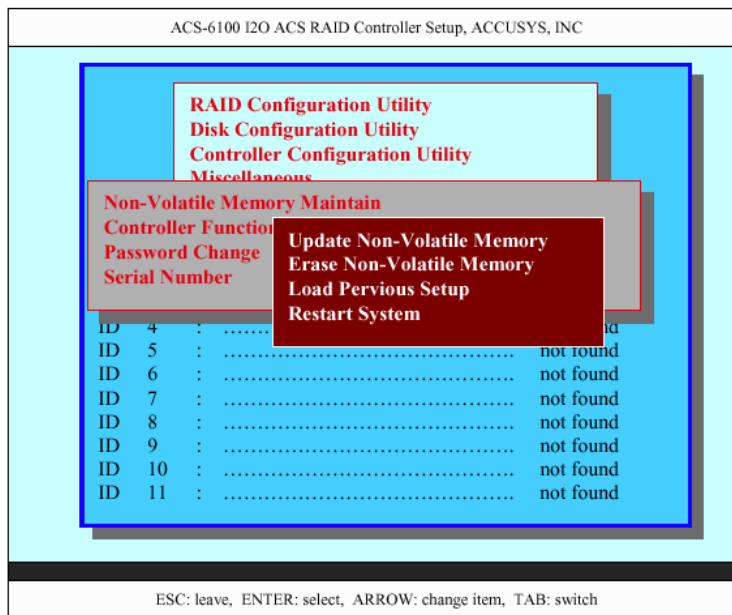
## Controller Configuration Utility

The controller configuration utility deals with the functions that are not directly related to RAID algorithms.

Options include:

- Non-Volatile Memory Maintain*
- Controller Function Setup*
- Password Change*
- Serial Number*

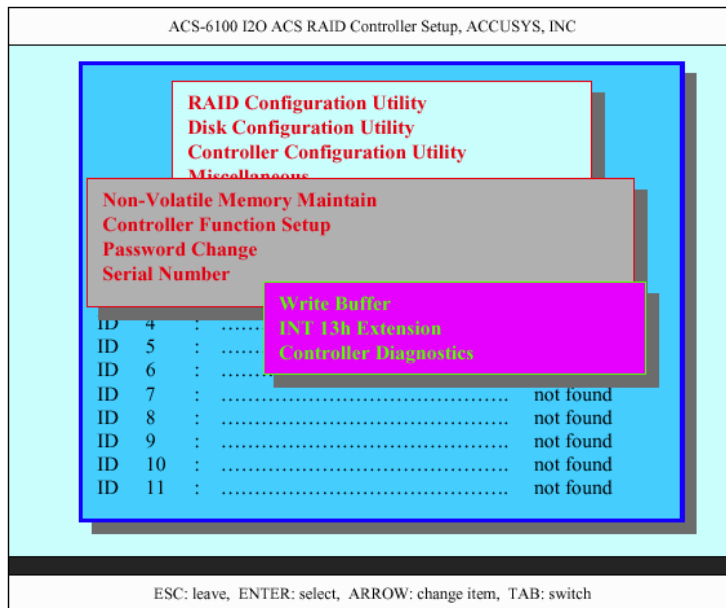
### *Non-Volatile Memory Maintain*



Every time RAID information is saved, i.e. updated, into non-volatile memory via this utility, it is necessary to restart the system to activate the RAID configuration.

You can also use this feature to erase the memory and to load the previous settings.

## Controller Function Setup



Use the Controller Function Setup feature to define the maintenance functions.

Options include:

*Write Buffer*  
*INF 13h Extension*  
*Controller Diagnostics*

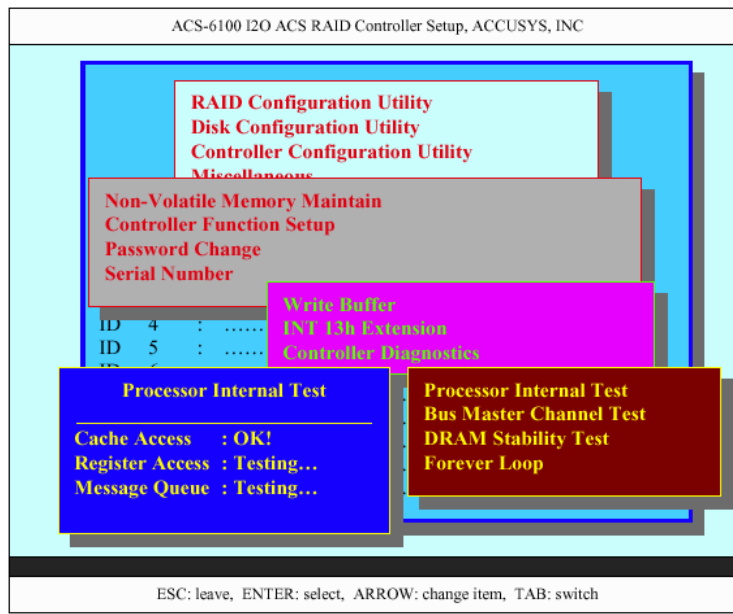
### **Write Buffer**

This feature is used to enable or disable writing to buffer after data is saved to NVRAM and the system is restarted. The default is enabled.

### **INF 13h Extension**

This feature is used to enable or disable INF 13h Extension after data is saved to NVRAM and the system is restarted. The default is enabled.

## Controller Diagnostics

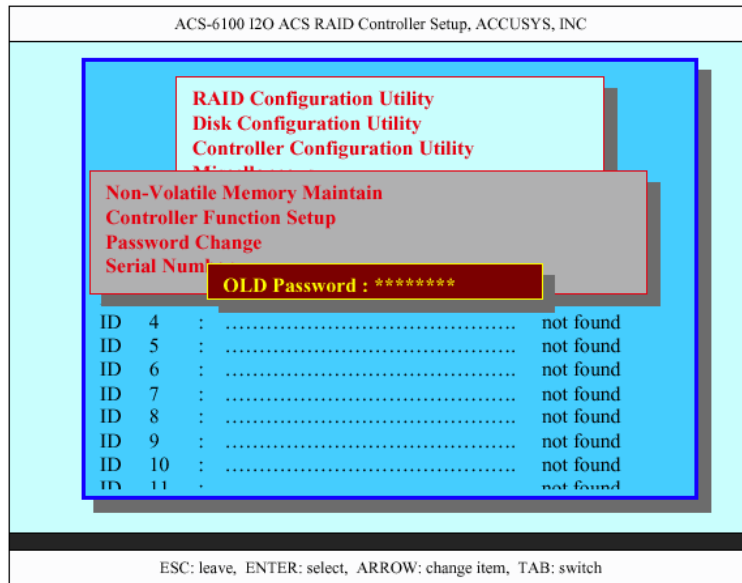


The Controller Diagnostics feature can be used to initiate several controller tests and verify the controller internally. These main functions are provided for the controller tests:

*Processor Internal Test*  
*Bus Master Channel Test*  
*DRAM stability Test*  
*Forever Loop*

The *Forever Loop* will disable or enable the forever flag during the first three tests above. If the forever loop flag is disabled, only one test loop will run. The **ESC** key will stop the forever loop test of each item.

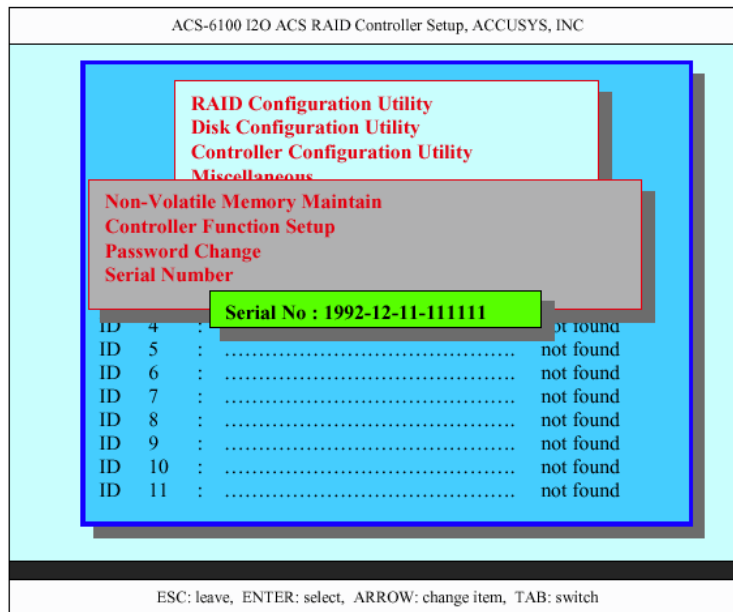
## Password Change



This feature allows you to change the password for entering the AccuSelect utility. First you are prompted to enter the existing password. The default password for accessing AccuSelect is 'ACS-6100'. After entering the existing password, you can enter a new password, which you need to confirm.

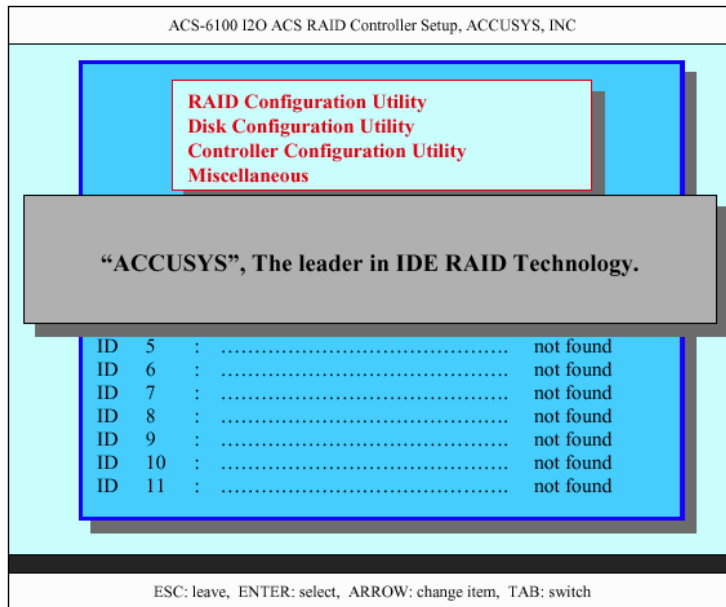
If you have changed and forgotten the default password, you need to contact your vendor for help.

## Serial Number



The Serial Number feature provides the unique serial number of your ACS-6100 system.

## Miscellaneous Screen



The Miscellaneous screen is currently empty and not supported. Upcoming versions might use this area to include extra features.

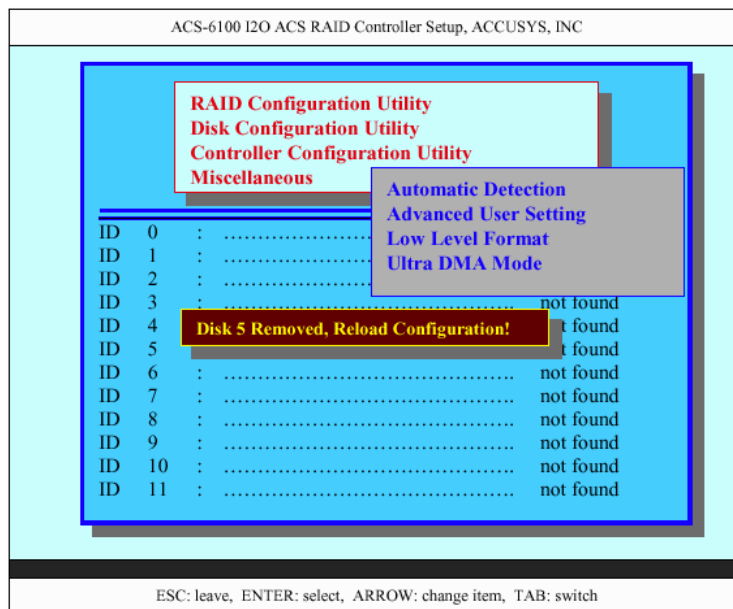
## *Exceptions Handling in AccuSelect*

If a disk is added or removed while AccuSelect is running, e.g. by using the key to lock or unlock a disk carrier, the RAID subsystem will notify AccuSelect to reload the new configuration. Since the RAID subsystem may have some RAID maintenance functions to process after a disk is added or removed, such as Init R5, Check R5, R5 Rebuild and R1 Add, the RAID subsystem will automatically provide information on the ongoing processes.

### **Disk is removed**

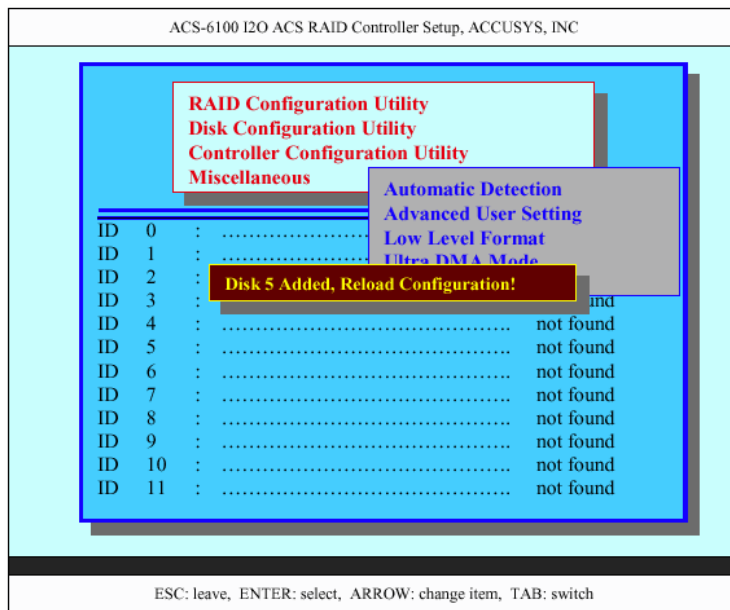
Whenever AccuSelect is running, and one or more disks are removed by one of the following situations, a warning message will appear on screen.

1. User unlocks a disk carrier
2. A disk failure occurs during run time.



## Disk is added

A new disk is added by locking the drive carrier containing the new disk drive. After the disk is properly added, RAID 5 rebuild or RAID 1 add will begin automatically (if a RAID 5 or RAID 1 array exists). If AccuSelect is running, the RAID subsystem will automatically provide information on the ongoing processes.



If a RAID 5 group disk member has been removed, RAID 5 group rebuild will progress automatically as soon as a new disk is properly installed.

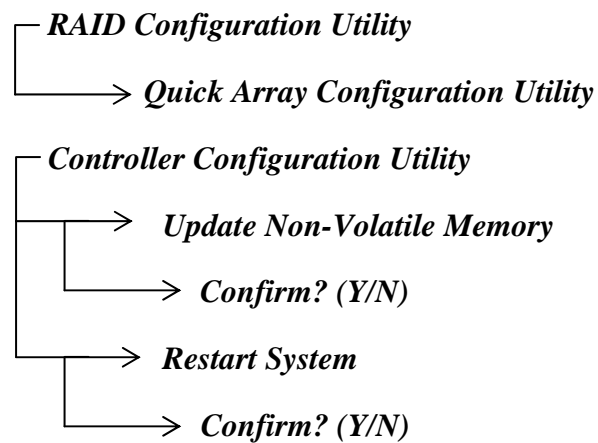
If a RAID 1 group disk member has been removed, a new RAID 1 array group member will be added as soon as a new disk is properly installed.

The RAID 5 and RAID 1 array group member reinstallation happens automatically in the background, but we recommend you monitor this process using AccuSelect or AccuSelect for Windows NT.

## *First Time Use*

### **AccuSelect Setup**

Start the AccuSelect utility. After the password check has been approved, the following procedure will enable you to quickly setup a RAID array.



Note that, since you are using the automatic configuration feature, the result will differ depending on the number of disk drives installed:

- If 3 or more are installed: RAID 5 is the only choice, and 32K-stripe size is chosen.
- If less than 3 disks are installed: RAID 0 is the only choice, and 32K-stripe size is chosen.

If RAID 5 group is automatically selected, the Init R5 function will be executed automatically, after the system is restarted. The AccuSelect utility will display the ongoing Init R5 process.

## ***Driver Installation***

Depending on the operating system you are using, you might need to install some additional software.

### ***Note***

*Currently the ACS-6100 is supported in DOS, Windows NT 4.0, Windows 2000, RedHat 6.0, RedHat 6.1, RedHat 6.2 and SuSE 6.3 operating systems. Other operating systems, such as Netware, SCO UNIX, FreeBSD and OS2 might be supported in the future.*

## **DOS**

DOS drivers (Int 13h service) are built into the ACS-6100 RAID controller. There is no need for installing drivers. Some virtual 86 machine host drivers should not be installed. These are:

HIMEM.SYS  
EMM386.EXE  
QEMM386.EXE

## **Windows NT 4.0**

### ***Note***

*Currently the ACS-6100 has been tested with Windows NT version 4.0. Other versions are not supported yet.*

You should see two folders and several files in floppy disk as following:

- **\nt40** –Folder
- **\nt40 \acxxxx.sys** – File
- **\nt40 \oemsetup.inf** – File
- **\nt40 \Txtsetup.oem** – File
- **\util** –Folder
- **\util \DOWNLOAD.EXE** – File
- **\acxxxx.sys**– File
- **\disk1**– File
- **\Txtsetup.oem**– File

## Installing the ACS-6100 driver into an existing Windows NT system

If Windows NT 4.0 is already installed, use the following instructions:

1. Click the **Start** button on the Windows NT task bar. Then click **Settings**, next select **Control Panel**.
2. In the **Control Panel** window, double-click on **SCSI Adapters**.
3. In the **SCSI Adapters** window, click the **Drivers** tab, next click the **Add** button.
4. In the **Install Driver** window, click the **Have Disk** button.
5. Insert the Installation Disk, labeled 'Accusys ACSXXX RAID family driver', in your system drive.
6. In the **Copy manufacturer's files from:** text box, type: **A:\NT40**, then click the **OK** button.
7. In the next screen, select the proper driver, e.g. **Accusys ACXXXX RAID Controller(NT4.0)**.
8. When prompted to '**Do you want to use the currently installed drivers(s) or install new one(s)**', select the **New** button.
9. Again type **A:\NT40**, then click **Continue**.
10. The driver is now installed. You must restart your computer for the changes to take effect.

## Installing Windows NT on a RAID logical drive

To install Windows NT on a logical drive managed by the ACS-6100 RAID Controller, follow these steps:

1. Start the Windows NT installation procedure using Windows NT Setup diskettes.
2. After the standard devices have been detected and configured, use the **Specify Additional Device** option by pressing **S**.
3. Select **Other** and press **Enter**.
4. Insert the ACS-6100 installation disk and press **Enter**.
5. Select '**ACXXXX for windows NT(ver 4.0)**' and press **Enter**.
6. Continue with the standard installation procedure. Refer to the installation instructions that come with the Windows NT software package for more information.

## Windows 2000

**Note**

*If you finished the ACS-6100 Hardware setup and array plan, you can follow up those procedure to setup for Windows 2000 drivers..*

You should see four files in floppy disk as following:

- \acxxxx.inf –File
- \acxxxx.sys – File
- \GINFD0 – File
- \TXTSETUP.OEM – File

### **Installing the ACS-6100 driver into an existing Windows 2000 system**

If Windows NT 2000 is already installed, use the following instructions:

1. **Power on when RAID disk ready.**
2. During system booting, windows 2000 automatic **found New Hardware** and show Wizard on the screen. Please click and **follow up operation**.
3. **Choose** “ Device so that I can choose a specific “and click “ other devices “ button
4. **Insert** Floppy Diskette (**ACS-6100 for Windows 2000 driver**)
5. **Follow up instructions** procedure you can finished ACS-6100 device setup.
6. When setup finished, you must **restart** your computer now for the changes to take effect.

### **Installing Windows 2000 on a RAID logical drive**

To install Windows 2000 on a logical drive managed by the ACS-6100 RAID Controller, follow these steps:

1. Power on and do **BIOS setting** (Boot sequence from CD-ROM first)
2. **Insert Windows 2000 Compact Disk** in CD-ROM
3. When CD-ROM boot and run setup program, You can **press F6** key to setup special device.
4. **Insert** Floppy Diskette (**ACS-6100 for Windows 2000 driver**) and press Enter key.
5. Screen will show “ *find ACS-XXXX driver ...* “, **follow up instructions** procedure you can finished ACS-6100 device setup.

## Red hat 6.0

You need to decompress it before installation.

**acsrt60i is a installation disk**

**acsrt60b is a boot disk**

Watch out **space** between description in command line

### Installing the ACS-6100 driver into an existing Red Hat 6.0 system

#### -----Decompress-----

1. put floppy into drive
2. mount -t msdos /dev/fd0 /mnt
3. mkdir /acs
4. cp /mnt/acsrt60i.gz /acs
5. cd /acs
6. gzip -d acsrt60i.gz
7. ls (a file to be found named "acsrt60i")
8. umount /mnt
9. change another file disk "acsrt60b.gz"
10. mount -t msdos /dev/fd0 /mnt
11. cp /mnt/acsrt60b.gz /acs
12. gzip -d acsrt60b.gz
13. ls (a file to be found named "acsrt60b")
14. umount /mnt

#### -----Create an installation disk-----

1. put a new floppy disc into floppy drive
2. dd if=/acs/acsrt60i of=/dev/fd0
3. label this disk "**label-acsr60i**"

#### -----Create a boot disk-----

- 1 put another new floppy disc into floppy drive
- 2 dd if=/acs/acsrt60b of=/dev/fd0
- 3 label this disk "**label-acsr60b**"

### Installing Red Hat 6.0 on a RAID logical drive

Install Red Hat Linux (procedure done by user)

1. put floppy "**label-acsr60i**" into drive
2. power on

3. change BIOS, booting from floppy
4. begin Red Hat installation( done by user )
5. The Red Hat linux install to finish and the system will auto reboot

### -----**boot linux system**-----

1. put floppy "**label-acsr60b**" into drive to boot
2. login

A prompt signal "#" you can see

### -----**Change Kernel**-----

"**label-acsr60b**"disk into drive

1. mount /dev/fd0 /mnt (You may see a "EXT2-fs warning" message.  
Don't care this message.)
2. mv /boot/vmlinuz-2.2.12-20 /boot/vmlinuz-2.2.12-20.org
3. cp /mnt/ vmlinuz-2.2.12-20 /boot/ vmlinuz-2.2.12-20
4. lilo

You can see "Added linux \*"

5. umount /mnt
6. remove floppy
7. press "CTRL-ALT-DEL" to reboot your system

### -----**Check Result**-----

1. power on
  2. change BIOS booting from **SCSI** device
- If you can see "Login and Password" then

**Congratulation**

## **RedHat 6.1**

### **Installing the ACS-6100 driver into an existing Red Hat 6.1 system**

1. **Prepare a blank disk** for ACS-6100 device driver.(see append A)
2. **Make sure** you have installed the LINUX **kernel** source code. If not, see the RedHat 6.1 installation manual to install the kernel source code package.
3. Mount the ACS-6100 Driver Disk into the system. eg. mount -t msdos /dev/fd0 /mnt.
4. **Change** to the **kernel** source code directory. eg. cd /usr/src/linux
5. **Patch the kernel source code** with the patch file "redhat61.pat", which is stored in the ACS-6100 Driver Disk. eg. patch -p1 < /mnt/redhat61.pat

6. **Copy the ACS-6100 driver object file**, "acxxx.acs" "acxxxm.acs", to the SCSI device driver directory. eg. cp /mnt/acxxx.acs /mnt/acxxxm.acs /usr/src/linux/drivers/scsi
7. **Configuarition the kernel option** to make a kernel image. eg. make menuconfig
8. **Set the ACS6100 option**, "ACS6100 support", "Y" or "M". The option is below. "SCSI support" "SCSI low-level drivers".
9. **Exit and Save the kernel** configuration.
10. **Build the kernel image**.(see RedHat 6.1 installation manual)
11. **Replace the old kernel image** with the new one.(see RedHat 6.1 installation manual)
12. **Reboot** you system.

### Installing Red Hat 6.1 on a RAID logical drive

1. **Prepare three blank disks** before installing RedHat 6.1. (see append A)
  2. **Start your system with the Installation Disk**. And following the prompt install RedHat 6.1. (see RedHat 6.1 Installation Manual)
- Note:** You must remember which partition the RedHat 6.1 installed.  
Usually, RedHat 6.1 is installed in /dev/sda1.
3. System will **reboot**, after installation has finish.
  4. Boot the system with the Boot Disk. IN prompt, **type** mount root<partition>. eg. mount root=/dev/sda1.
  5. **Rebuild a kernel** to fit your system. (see Installing the ACS-6100 Driver for RedHat 6.1 has installed)

### Append A. Prepare Installation Disk for RedHat 6.1

1. **Make the RedHat 6.1 Installation Disk**  
In DOS prompt, run rawrite program putting the "redhat61.ins" disk image into disk.  
eg. rawrite redhat61.ins a:  
In Linux, use dd command.  
eg. dd if=redhat61.ins of=/dev/fd0
2. **Make the RedHat 6.1 Boot Disk**  
In DOS prompt, run rawrite program putting the "redhat61.bot" disk image into disk.  
eg. rawrite redhat61.bot a:  
In Linux, use dd command.  
eg. dd if=redhat61.bot of=/dev/fd0
3. **Make the ACS-6100 Driver Disk**  
Copy "redhat61.pat", "acxxx.acs", and "acxxxm.acs" files to a blank disk.

## RedHat 6.2

### Installing the ACS-6100 driver into an existing Red Hat 6.2 system

1. **Prepare a blank disk** for ACS-6100 device driver.(see append A)
2. **Make sure** you have installed the LINUX **kernel** source code. If not, see the RedHat 6.2 installation manual to install the kernel source code package.
3. Mount the ACS-6100 Driver Disk into the system. eg. `mount -t msdos /dev/fd0 /mnt`
4. **Change** to the **kernel** source code directory. eg. `cd /usr/src/linux`
5. **Patch the kernel source code** with the patch file "redhat62.pat", which is stored in the ACS-6100 Driver Disk. eg. `patch -p1 < /mnt/redhat61.pat`
6. **Copy the ACS-6100 driver object file**, "acxxx.acs" "acxxxm.acs", to the SCSI device driver directory. eg. `cp /mnt/acxxx.acs /mnt/acxxxm.acs /usr/src/linux/drivers/scsi`
7. **Configuartion the kernel option** to make a kernel image. eg. `make menuconfig`
8. **Set the ACS6100 option**, "ACS6100 support", "Y" or "M". The option is below "SCSI support" "SCSI low-level drivers"
9. **Exit and Save the kernel** configuration.
10. **Build the kernel image**.(see RedHat 6.2 installation manual)
11. **Replace the old kernel image** with the new one.(see RedHat 6.2 installation manual)
12. **Reboot** you system.

### Installing Red Hat 6.2 on a RAID logical drive

1. **Prepare three blank disks** before installing RedHat 6.2. (see append A)
  2. **Start your system with the Installation Disk**. And following the prompt install RedHat 6.2. (see RedHat 6.2 Installation Manual)
- Note:** You must remember which partition the RedHat 6.2 installed.  
Usually, RedHat 6.2 is installed in /dev/sda1.
3. System will **reboot**, after installation has finish.
  4. Boot the system with the Boot Disk. IN prompt, **type** `mount root<partition>`. eg. `mount root=/dev/sda1`.

5. **Rebuild a kernel** to fit your system. (see Installing the ACS-6100 Driver for RedHat 6.2 has installed)

## **Append A. Prepare Installation Disk for RedHat 6.2**

### **1. Make the RedHat 6.2 Installatin Disk**

In DOS prompt, run rawrite program putting the "redhat62.ins" disk image into disk.

eg. rawrite redhat62.ins a:

In Linux, use dd command.

eg. dd if=redhat62.ins of=/dev/fd0

### **2. Make the RedHat 6.2 Boot Disk**

In DOS prompt, run rawrite program putting the "redhat62.bot" disk image into disk.

into disk.

eg. rawrite redhat62.bot a:

In Linux, use dd command.

eg. dd if=redhat62.bot of=/dev/fd0

### **3. Make the ACS-6100 Driver Disk**

Copy "redhat61.pat", "acxxx.acs", and "acxxxm.acs" files to a blank disk.

## **SuSE 6.3**

### **Installing the ACS-6100 driver into an existing SuSE 6.3 system**

1. **Prepare a blank disk** for ACS-6100 device driver.(see append A)
2. **Make sure** you have installed the LINUX **kernel** source code. If not, see the SuSE 6.3 installation manual to install the kernel source code package.
3. **Mount the ACS-6100 Driver Disk** into the system. eg. mount -t msdos /dev/fd0 /mnt
4. **Change** to the **kernel** source code directory. eg. cd /usr/src/linux
5. **Patch the kernel source code** with the patch file "suse63.pat", which is stored in the ACS-6100 Driver Disk. eg. patch -p1 < /mnt/suse63.pat
6. **Copy the ACS-6100 driver object file**, "acxxx.acs" "acxxxm.acs", to the SCSI device driver directory. eg. cp /mnt/acxxx.acs /mnt/acxxxm.acs /usr/src/linux/drivers/scsi
7. **Configuartion the kernel option** to make a kernel image. eg. make menuconfig

8. **Set the ACS6100 option**, "ACS6100 support", "Y" or "M". The option is below "SCSI support" "SCSI low-level drivers".
9. **Exit and Save the kernel** configuration.
10. **Build the kernel image**.(see SuSE 6.3 installation manual)
11. **Replace the old kernel image** with the new one.(see SuSE 6.3 installation manual)
12. **Reboot** you system.

### **Installing SuSE 6.3 on a RAID logical drive**

1. **Prepare two blank disks** before installing SuSE 6.3.(see append A)
2. **Start your system with the Installation Disk**. And following the prompt install SuSE 6.3.(see SuSE 6.3 Installation Manual)
3. After installation, installer will ask you which kernel you want to use. **Choose the kernel image** where in the Installation Disk.
4. **Rebuild a kernel** to fit your system.(see Installing the ACS-6100 Driver for SuSE 6.3 has installed)

### **Append A. Prepare Installation Disk for SuSE 6.3**

1. **Make the SuSE 6.3 Installatin Disk**  
In DOS prompt, run rawrite program putting the "suse63.ins" disk image into disk. eg. rawrite suse63.ins a: In Linux, use dd command. eg. dd if=suse63.ins of=/dev/fd0
2. **Make the ACS-6100 Driver Disk**  
Copy "suse63.pat","acxxx.acs",and "acxxxm.acs" files to a blank disk.

## **Chapter 5 – ACCUSELECT FOR WINDOWS NT**

AccuSelect for Windows NT is a client-server architecture monitor. System administrators of Windows NT who want to know the status of a RAID controller in the Windows NT system can use this utility. The administrator does not need to sit by the NT server to monitor it. He can simply run the client side of AccuSelect for Windows NT (RAID.EXE) in a Windows 95/98/NT system with network support, and can then monitor the status of the RAID controller. AccuSelect for Windows NT administrators can have the following status:

1. Disk is removed by the RAID subsystem.
2. Disk is added.
3. RAID rebuilding percentage.
4. Installed drive information.
5. Installed RAID information.
6. Installed controller information.

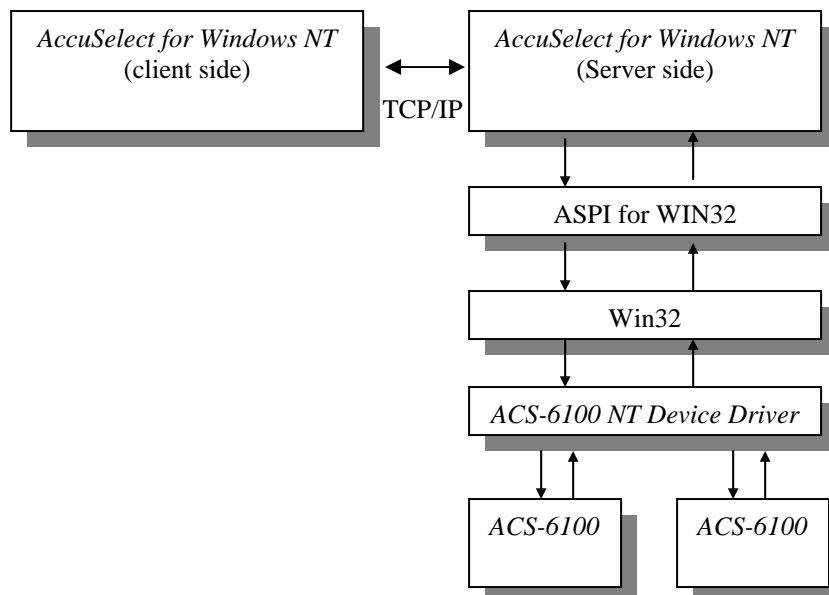
The administrator can also carry out the following procedures with the RAID controller (might not yet be available in current version):

1. Initialize RAID 5 group.
2. Check RAID 5 group.
3. Reconfigure a new RAID.

## Architecture

AccuSelect for Windows NT is a WIN32 based GUI utility, which uses the ASPI protocol to handle the device driver interface. As shown in the figure below, this utility is separated into two parts, server side and client side.

The server side program acts as a background process (or demon). After the system powers up, it will check the installed ACS-6100 controller(s) on the machine and setup a database for it. The client side program will scan the network domain (user specified) for installed ACS-6100 controller(s). A database is created for RAID controller information after the scan is complete.



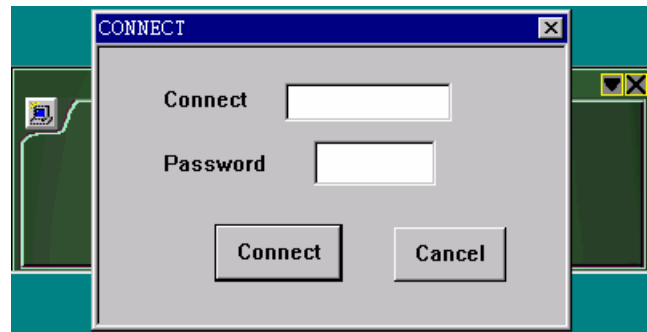
## Operation

As the AccuSelect for Windows NT starts, the following logo pops up:



Shortly after that you are prompted to enter the following information:

- **Connect:**
- **Password:** Type the password for entering the utility. The default password is 'ACS-6100'.

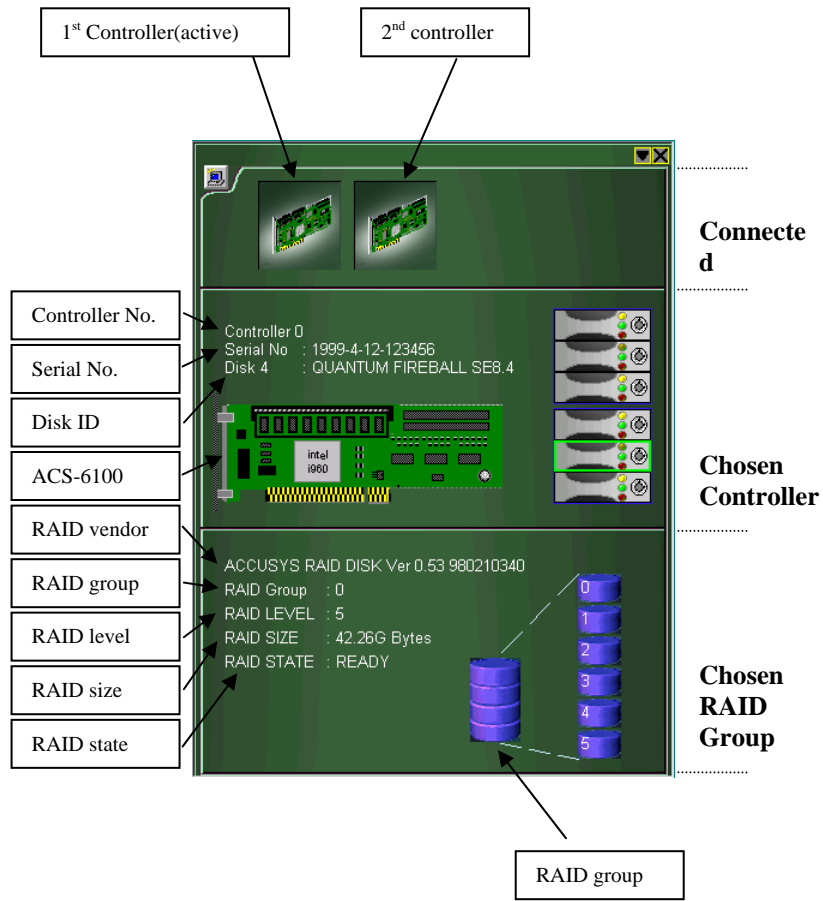


After the information is checked, the main screen of the utility appears.

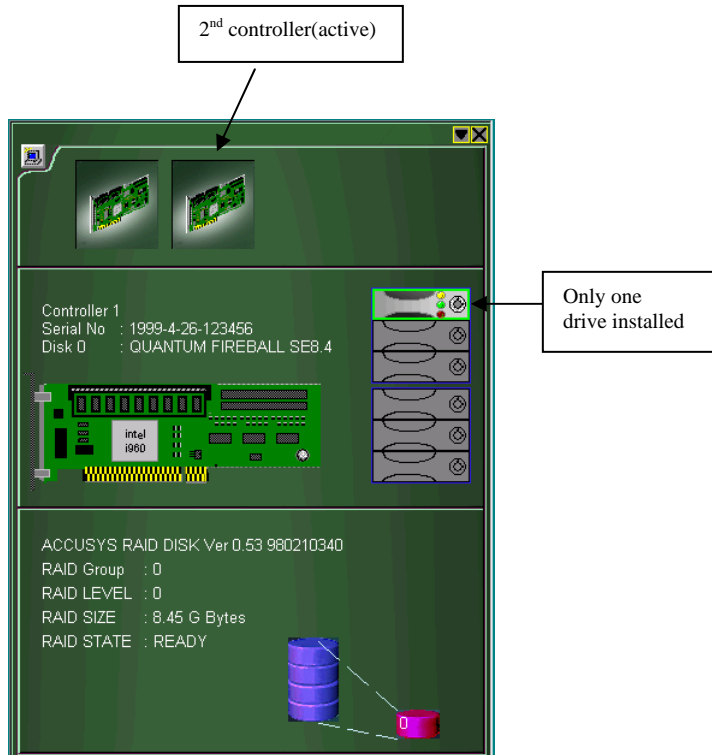
The main screen of AccuSelect for Windows NT (client side) is separated into three areas:

- Connected controller(s).*
- Chosen controller.*
- Chosen RAID group.*

*Example of 1<sup>st</sup> controller*



*Example of 2<sup>nd</sup> Controller*



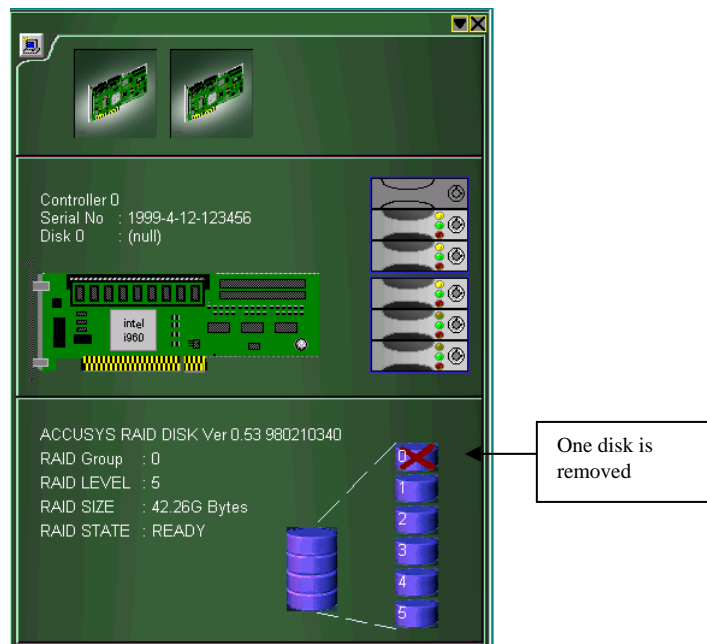
## ***Exceptions Handling in AccuSelect for Windows NT***

If a disk is added or removed while AccuSelect for Windows NT is running, e.g. by using the key to lock or unlock a disk carrier, the RAID subsystem will notify AccuSelect to reload the new configuration. Since the RAID subsystem may have some RAID maintenance functions to process after a disk is added or removed, such as Init R5, Check R5, R5 Rebuild and R1 Add, the RAID subsystem will automatically provide information on the ongoing processes.

### **Disk is removed**

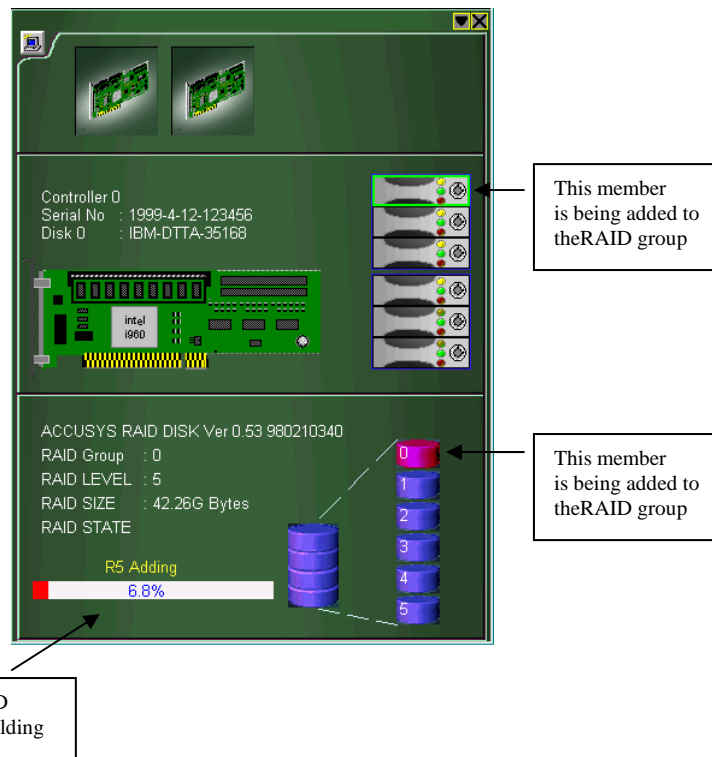
Whenever AccuSelect for Windows NT is running, and one or more disks are removed by one of the following situations, a warning message will appear on screen.

1. User unlocks a disk carrier
2. A disk failure occurs during run time.



## Disk is added

A new disk is added by locking the drive carrier containing the new disk drive. After the disk is properly added, RAID 5 rebuild or RAID 1 add will begin automatically (if a RAID 5 or RAID 1 array exists). If AccuSelect for Windows NT is running, the RAID subsystem will automatically provide information on the ongoing processes.



**Note**  
*The exceptions handling monitoring of AccuSelect and AccuSelect for Windows NT are ver similar – refer to the chapter on AccuSelect for more information.*

## Chapter 6 – UPDATING FIRMWARE

The firmware download utility (download.exe) is included on the installation disk. If you need to download new firmware for the ACS-6100 PCI RAID controller, you can use this utility to update the flash ROM on the Controller Card.

### *Download Procedure*

1. Make sure the ACS-6100 RAID system is properly installed in your computer.
2. Prepare a bootable floppy disk. Do not include any virtual 86 mode drivers on the disk, i.e. EMM386.EXE, QEMM386.EXE, HIMEM.SYS, etc.
3. Copy the download utility and the new firmware version to the bootable disk.
4. Make sure that your floppy disk drive is the first boot device for your system. Insert the bootable disk that you prepared in your system's floppy disk drive and restart your system.
5. As your system restarts, the command prompt appears.
6. At the command prompt, type the following:  
**C:\box.hex**  
Next press **Enter**
7. Follow the instructions on the screen. After the firmware is properly updated, remove the disk from the diskette drive, and restart your system.

**Note:**

*The 'box.hex' command is the only command line typed while using the download utility*

## Chapter 7 – SPECIFICATIONS

CPU	Intel i960RD 64-bit RISC microprocessor
RAID Level	0, 1, or 5
Cache Memory	One 72-pin SIMM 4~128 MB EDO RAM
Tagged Command Queuing	Yes, up to 256 Commands
I20	Hardware Ready
Disk Bus Interface	E-IDE with Ultra DMA support
User friendly GUI manager	User friendly GUI manager
Maximum fault tolerance capacity	> 120 GB
Hot Swap	Yes
Hot Spare	Yes (Rebuilding is transparent & automatic)
Remote Alarm	On screen GUI display
Beeper Alarm	Yes, built-in buzzer on board

**Note**  
*Specifications subject to change without notice.*

## Chapter 8 – TROUBLESHOOTING

If you encounter a problem while installing or using the ACS-6100, check this section for help.

**1. I cannot connect a Western Digital hard drive into the connectors of the drive carrier.**

There is a special design drive carrier for use with Western Digital disk drives. Please specify it before you order.

The location and distance between IDE and Power connector in ACS-6100 drive carriers follow the specification in AT Attachment (ATA spec). The IDE connector of Western Digital disk drive has a 1-2 mm alignment difference from that of other brand's.

ACS-6100 supports hard disk drives from Fujitsu, IBM, Maxtor, Quantum, Seagate and Western Digital.

**2. When I lock a drive carrier with a disk drive in place, the red disk activity indicator turns on and an alarm beep sounds.**

- (a) Make sure you firmly connect the IDE and Power connectors of hard disk to their counterparts inside the drive carrier and try again. If this does not solve the situation, go to (b)
- (b) Change the disk drive with a new one and try again.
- (c) Exchange the top, center and bottom drive carriers and try again.
- (d) If all of the above steps fail, contact your vendor.

**3. How can I turn off the alarm beep sound when there is a hard disk failure?**

Unlock the drive carrier of the failed disk. This will turn off the alarm beep sound.

**4. Why is there no display after system startup, even though the ACS-6100 is installed in the system?**

The ACS-6100 PCI RAID controller will hang up the system if there is no memory module installed on the controller card, or if you are using the wrong type of memory (60 ns or faster, and 4 to 128 MN EDO DRAM is required).

- 5. How many PCI RAID controllers can be installed on one system?**  
There are no limitations when installing the PCI RAID controllers under DOS, however under Windows NT 4.0, a maximum of two controllers are supported.
- 6. I forgot my password for accessing AccuSelect, what should I do?**  
The default password for accessing AccuSelect is 'ACS-6100'. If you have changed the default password, contact your vendor for help.
- 7. Can I configure a RAID using the AccuSelect for Windows NT utility?**  
*AccuSelect for Windows NT* is designed to monitor the RAID subsystem. We are planning to add some extra features in upcoming versions.
- 8. Why does my computer hang while booting from the ACS-6100 RAID disk?**  
The ACS-6100 PCI RAID subsystem does not support virtual 86 machine operations. You should remove any virtual 86 machine host drivers from the system, such as EMM386.EXE, QEMM386.EXE, etc.
- 9. What does the ACS-6100 controller look like under Windows NT 4.0?**  
It looks like a SCSI device and comes complete with a SCSI miniport driver.
- 10. ACS-6100 is currently supported under the DOS, Windows NT 4.0, Windows 2000, RedHat 6.0, RedHat 6.1, RedHat 6.2 and SuSE 6.3 operating systems. When will other operating systems be supported?**  
Other operating systems, such as Netware, SCO Unix, FreeBSD and OS2 might be supported in the future.