

Acuta User Manual



**1394B/USB2.0 and SATA to IDE/SATA
RAID subsystem**

Acuta User Manual

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Preface

Notice

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

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This manual version 1.03



Caution

Before starting any kind of hardware installation, please ensure that all power switches have been turned off and all power cords disconnected to prevent personal injury and damage to the hardware.

Regulatory information



This equipment is in conformity with the EMC directive.

Federal Communications Commission (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 the FCC Rules.

Those 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 a 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:

Reorient or relocate the receiving antennas.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Warning:

A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.



UL Listed

This equipment meets UL's safety requirements.



CCC certificate

This equipment is in conformity with the CCC S&E requirement.

About this manual

Intended user

This manual is designed and written for users of the ACUTA subsystem. This is an entry level product suitable for most users.

Organization of the manual

This manual consists of the following sections:

- Chapter 1: **Introduction** provides an overview of the ACUTA as well as details of key features and a list of specifications.
- Chapter 2: **Before you begin** provides a detailed illustrated package list. This chapter also contains all the information you need to decide whether to set up a RAID 0, 0+1, 5 or RAID 5+spare array and lists important pre-installation notices.
- Chapter 3: **Setting up the subsystem** gives a detailed overview of the ACUTA subsystem's features and guides you through the process of installing hard disk drives into ACUTA.
- Chapter 4: **Setting up an array** explains how to set the RAID level, create an array and connect to a host computer.
- Chapter 5: **Partitioning the array** tells you how partition the array in Windows ,Linux or Mac OS X operating systems.

- Appendix A: **FAQ** helps you deal with encountered problems in the form of Q&A.
- Appendix B: **Glossary** defines relevant technical terms used in this manual.
- Appendix C: **LCD Display Messages** lists all status and error messages that may be displayed on ACUTA's built-in display.
- Appendix D: **Updating Firmware** explains how to install new or updated firmware on ACUTA.

- Appendix E: **Contact Us** lists contact details of Accusys business units around the world.

Using this manual

This guide contains all the information you need to set up and start using your ACUTA subsystem and to monitor its performance in real time. The setup process will follow these steps:

Step 1

Prepare: Familiarize yourself with the features and capabilities of ACUTA (**Chapter 1**)
Decide whether to set up a RAID 0, 0+1, 5 or 5+spare array (**Chapter 2**)

Step 2

Set up: Install drives in ACUTA (**Chapter 3**)
Set the RAID level (**Chapter 4**)

Step 3

Create: Create a RAID array and connect it to a host computer (**Chapter 4**)

Step 4

Partition: Partition the array using the host operating system (**Chapter 5**)

When you have reached this point, your ACUTA subsystem will be ready for use. To get the most from ACUTA, you may also want to set up the AcutaView GUI on your system. With this browser you can monitor the status of your array at any time and from any computer on your LAN. You will find full installation instructions and information on the monitoring capabilities of AcutaView in the AcutaView User's Manual. Both AcutaView and the AcutaView User's Manual are included on the supplied CD-ROM.

Guide to Conventions

Important information that users should be aware of is indicated with the following icons:



Caution

This icon indicates the existence of a potential hazard that could result in personal injury, damage to your equipment or loss of data if the safety instruction is not observed.



Note

This icon indicates useful tips on getting the most from your ACUTA subsystem.

Important terms, commands and programs are put in **Boldface** font.

Screen text is given in **screen** font.

Related Products/Versions

AcutaView: A GUI application designed for use with the ACUTA subsystem. The application serves as a handy and effective tool for remote, cross-platform monitoring of arrays.

Related Documents for Reference

AcutaView User's Manual: A guide to the GUI application

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Chapter 1**Introduction**

This chapter introduces the features and capabilities of ACUTA subsystem.

You will find:

- ⇒ A full introduction to your ACUTA subsystem
- ⇒ Details of key features
- ⇒ A list of the product specifications

Overview

Congratulations on your selection of the Accusys ACUTA subsystem. The ACUTA is a high-performance and extremely flexible RAID subsystem. RAID (Redundant Array of Independent/Inexpensive Disks) is a storage technology used to improve the processing capabilities of a storage system, providing a combination of reliability and performance. The ACUTA is ideally suited for integration with databases, e-mail, web servers and imaging systems.

The ACUTA is the ultimate approach to a flexible RAID solution. It can manage three different RAID levels (0, 0+1 and 5) and also offers the option of RAID 5+hot spare. You will find detailed explanation on the features and suggested uses of these RAID levels later in this chapter.

The ACUTA subsystem features a user-friendly drive carrier design that lets you easily install four drives. Each drive carrier supports a one-inch high 3.5-inch form factor drive.

Featuring intelligent online recovery, the ACUTA lets you hot swap a failed drive: data will automatically be rebuilt to the new drive without any system down time. The four drive design allows also one drive to be designated a hot spare: if one of other drives fails, the ACUTA will seamlessly rebuild the failed drive's data on the hot spare.

Key features

The ACUTA supports the following features

- Automatic on-line rebuilding
- Drives are hot swappable
- Supports RAID levels 0, 0+1 and 5
- Optional hot spare setup for RAID 5 (5+spare)
- Hot swappable fan
- Supports four parallel ATA/Serial ATA I hard drives
- Requires no driver
- Audible alarm on drive failure & alarm mute function
- Supports multiple host interfaces
- Disk auto shutdown when system over heat for protecting ACUTA.

Hot Spare

Hot Spare allows for the automatic replacement of a failed drive without requiring intervention from the administrator. If this option is selected and a drive fails, the ACUTA will automatically replace the faulty drive with the hot spare drive.

Automatic drive rebuilding

If a member drive in a RAID 5 array is replaced on-line, the controller will automatically start to rebuild data to the new drive.

Hard drive hot swapping

Hot swapping allows for the removal and installation of disk drives without the need to power down the system while the ACUTA system is in use.

Multiple host interface support

The ACUTA is available in two hardware configurations so that users may select the host interface most appropriate for their system. The two configurations offer the following host interfaces:

- IEEE 1394A/B (also known as i.Link and FireWire) and USB 2.0
- Serial ATA

Auto disk shut down when over heat

The Acuta will shut down disks automatically when temperature is over 55°C to prevent the damage of DISK and DATA loss.



Note

This manual contains the information necessary to set up each of the two available hardware configurations of the ACUTA. Where procedures for the configurations differ, they are described separately and clearly marked.

Warranty

One year warranty

Specifications

Available host interfaces and transfer speeds

- IEEE 1394A/B 400/800 Mbps and USB 2.0, 480 Mbps; or
- SATA I, 1.5Gbps

Disk Interface Support

- 4 x ATA-100/133 or 4 x Serial ATA I

RAID Function Support

- Hardware RAID level 0, 5, 0+1, 5 + spare by switch setting
- Hot swappable disk
- Automatic on-line rebuilding

Subsystem Function Support

- Driverless
- Plug & Play for 1394/USB combo interface
- Multiple operating system support:
 - ◆ Mac OS 9 / X (10.2.8 & 10.3)
 - ◆ Windows 98/Me/NT4.0/2000/2003/XP
 - ◆ Linux 9.0
 - ◆ Fedora
- GUI support for system status monitoring
- Support up to 2TB RAID capacity
- On board 2MB buffer cache size
- LCD panel for operation status display
- Disk status LED indicators
- Fan failed LED indicator
- Power failed LED indicator
- Event notification through audible alarm or e-mail
- Alarm mute switch
- Memory for RAID level status
- One RS-232 port for terminal or GUI connection
- Removable cooling fan module

Mechanical, Environmental and Safety Specifications

Dimensions: 402mm x 200mm x 175mm

- Weight: < 6.67 Kg without disks
- Host Connectors (depending on hardware configuration):
 - ◆ Two 9-pin 1394B with power connectors and one USB2.0 connector; or
 - ◆ One Serial ATA connector
- Interface Connectors:
 - ◆ One RS-232 connector
- Operation temperature: 0 ~ 40°C
- Operation humidity: 5 ~ 95 %, non-condensing
- Storage humidity: 5 ~ 75 %, non-condensing
- 191W power supply
 - ◆ 100~250V AC input
 - ◆ Output +5V/10 A, +12V/10 A, +3.3V/5A
 - ◆ PFC support
- FCC, CE, UL , CCC _{S&E} approval



Note

Specifications are subject to change without notice.

Chapter 2

Before you begin

This chapter includes all the information you need to prepare for installation and to decide which RAID level to use. You will find:

- ⇒ A checklist of what should be in the product package
- ⇒ A full introduction to and comparison of RAID levels 0, 0+1 and 5
- ⇒ Important notices on the safe operation and installation of ACUTA

Making sure you have everything

What's in the box

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:

- ACUTA Controller Box with four drive trays (DISKS not included)



Note

ACUTA is available in two hardware configurations with the following host interfaces:

- ⇒ *IEEE 1394A/B and USB 2.0*
- ⇒ *Serial ATA I*

Package content for the two versions differ as indicated on the following page.

- The following cables:



Power cable



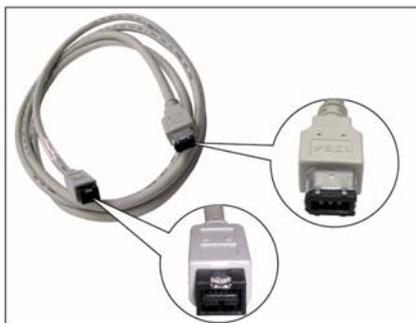
RS-232 cable



USB Cable
(IEEE 1394 and USB version only)



Serial ATA Cable (Serial ATA version only)



IEEE1394a to 1394b cable
(IEEE 1394 and USB version only)



Serial ATA external port cable bracket
(Serial ATA version only)



IEEE 1394b to 1394b cable
(IEEE 1394 and USB version only)

- Bag of 16 hard drive mounting screws
- Warranty card
- CD-ROM containing AcutaView GUI program , user's manual and ACUTA Subsystem User's Manual (this manual)

What else you need

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

- Host computer system with IEEE 1394 or USB interface (IEEE 1394 and USB host interface version)
- Host computer system with Serial ATA interface (Serial ATA host interface version)
- Four disk drives



Caution

For non-proprietary accessories, such as cables, etc., ask your vendor to recommend compatible and reliable brands.



Note

*The hard drives in a RAID should match in size and speed. All drives in any array should be identical models with the same firmware versions. RAIDs can use any size drive, **however the smallest drive will determine the size of the array.***

Pre-installation planning

Introduction to RAID levels

The ACUTA can support the following RAID levels: 0, 0+1 and 5 with the additional option of RAID 5 + hot spare. Which is the right level for you? The answer depends on the application it is used for.

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. If one drive in a RAID 0 array fails however, the data on the whole array is lost.

RAID Level 0+1 combines mirroring and striping functions on a minimum of four hard disks. Mirroring provides full redundancy and protects data in case of multiple drive failure (providing that data on one of each mirrored pair of drives is intact).

RAID Level 5 arrays offer high I/O transaction rates, and are the ideal choice when used with on-line transaction processing applications, such as those used in 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. If one drive in a RAID 5 array fails, the lost data can be rebuilt from data on the functioning disks. The ACUTA allows users to set one disk as a **hot spare** that will be activated automatically to replace a failed disk.

RAID 0

RAID 0 links each drive in the array as one huge drive. Storage capacity is determined by the smallest drive in the array. That capacity is then applied to format all other drives in the array. If using a 40 GB, 50GB, 60 GB, and 70 GB drive in a RAID 0 array, your system will see one huge drive of 160 GB (40 GB×4).

RAID 0 offers double or more performance under sustained data transfers when one drive per ATA port is used. In such a configuration, unlike SCSI, ATA drives are always available to the system. SCSI requires more management of the SCSI bus. But RAID 0 without fault tolerance, if one of disks in RAID 0 array group fails, the RAID crashed.

RAID 0: *Striped disk array without fault tolerance*

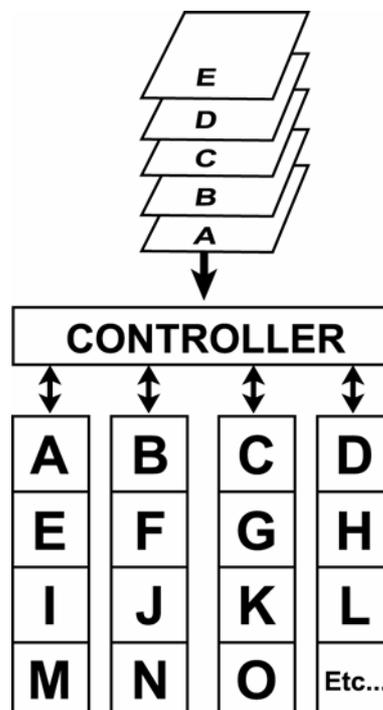
Characteristics:

- 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.
- **Storage capacity = (No. of disks) × (capacity of smallest disk)**
- If installed 40 GB, 50 GB, 60 GB and 70 GB, configured as RAID 0, the RAID capacity will be 160 GB.

Recommended use:

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

The diagram below represents the writing of data on a RAID 0 array composed of four DISKS connected to the controller. Data blocks are distributed across all disks in the array.



Arrangement of data blocks saved on a Level 0 RAID

RAID 0+1

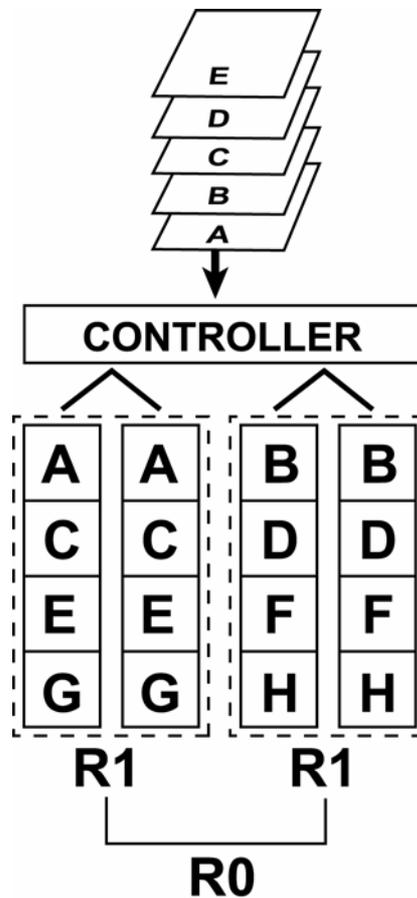
RAID 0+1 combines mirroring and striping functions on a minimum of four hard disks. Mirroring provides full redundancy and protects data in case of multiple drive failure (providing that data on one of each mirrored pair of drives is intact).

RAID 0+1: *Combination of mirroring and striping*

Characteristics:

- This configuration provides optimal speed and reliability.
- Requires even number of disks (minimum 4 disks)
- **Storage capacity = 2 x capacity of smallest of disk**
- If installed four drives each are 40 GB, 50 GB, 60 GB and 70 GB, configured as RAID 0+1, the RAID capacity will be 80 GB.

The diagram below represents the writing of data on a RAID 0+1 array composed of four DISKS connected to the controller. The controller creates two matching RAID 0 arrays on four DISKS.



Arrangement of data blocks saved on a Level 0+1 array

RAID 5 and RAID 5+hot spare

RAID 5 uses a mathematical expression that compares data from three drives and calculates a fourth piece of data called “parity” which is saved on a fourth drive. Should one of the drives fail, parity data can be used to rebuild the failed data. Under RAID 5, parity data is stored across all drives in the array. This maximizes the amount of storage capacity available from all drives in the array while still providing data redundancy. RAID 5 requires at least three drives. The ACUTA allows users to set RAID 5 with three drives and the fourth drive as a “hot spare” ready to be used for rebuilding data in case one of the other drives fails. This is RAID 5 +hot spare function.

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

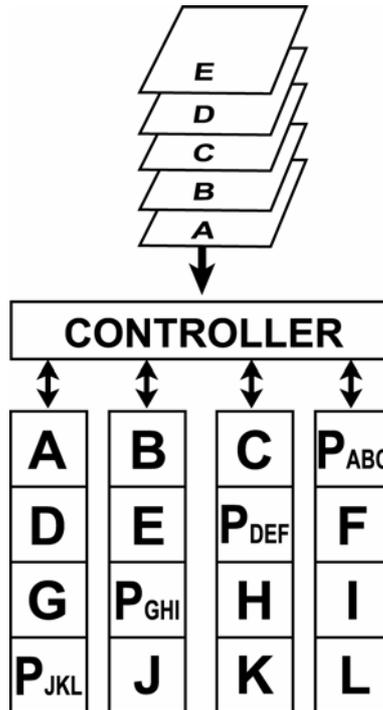
Characteristics:

- 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.
- Relatively low ratio of ECC (Parity) disks to data disks means high efficiency (compared to other RAID levels).
- Good aggregate transfer rate.
- **Storage capacity = (No. of disks – 1) × (capacity of smallest disk)**
- In RAID 5, installed drives each are 40 GB, 50 GB, 60 GB, 70 GB, the RAID capacity will be 120 GB.
- In RAID 5 + hot spare, installed 40 GB, 50 GB, 60 GB each in disk 2, 3, 4 and installed 70 GB in disk 1 as hot spare disk, the RAID capacity will be 80 GB.

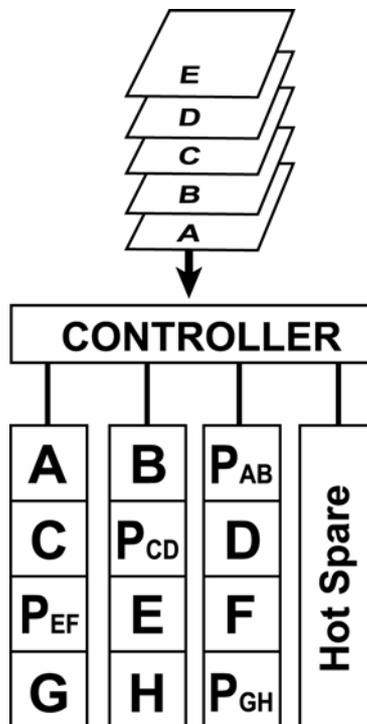
Recommended use:

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

The diagram below represents the writing of data on a RAID 5 array composed of four DISKS connected to the controller. Parity blocks are represented by the letter P.



The diagram below represents the writing of data on a RAID 5+hot spare array composed of four DISKS connected to the controller. Parity blocks are represented by the letter P.



Arrangement of data and parity blocks saved on a Level 5+hot spare RAID

Pre-installation notices



Caution

Before starting any kind of hardware installation, please ensure that all power switches have been turned off and all power cords disconnected to prevent personal injury and damage to the hardware.



Caution

To avoid overheating, ACUTA should be installed in a well-ventilated area and in such a way that sufficient airflow is maintained across the controller chips.



Caution

Static electricity can damage electronic components. To guard against such damage:

Work in a static-free environment

Wear a grounded anti-static wrist strap

Store uninstalled components in anti-static bags

Handle PCBs by their edges and avoid touching chips and connectors.



Caution

Environmental requirements: Temperature: 0-40C

Operation humidity: 5-95%, non-condensing

Storage humidity: 5-75%, non-condensing

Chapter 3

Setting up the subsystem

This chapter gives an overview of the ACUTA and explains how to:

- ⇒ Remove the drive carriers from the controller box
- ⇒ Load hard drives into the drive carriers
- ⇒ Install the drive carriers in ACUTA

Familiarizing yourself with ACUTA



Note

ACUTA is available in two hardware configurations with the following host interfaces:

- ⇒ IEEE 1394A/B and USB 2.0
- ⇒ Serial ATA

This manual contains the information necessary to set up each of the two available hardware configurations. Where procedures for the configurations differ, they are described separately and clearly marked.

Overview

The Controller Box has four **drive carriers**, accessed from the front.

The **connectors** and **power switch** are located on the rear panel and are accessed from between the **rear fins**.



Front view

Drive carriers

Each drive carrier can hold a one-inch high 3.5-inch form factor parallel ATA IDE disk drive.

Display

The LCD displays status and configuration information for the ACUTA subsystem and arrays. A full list of LCD display messages is given in Appendix C.

Scroll button

The scroll button is used to scroll through information on the display and to select settings for the date and time.

Enter / Mute button

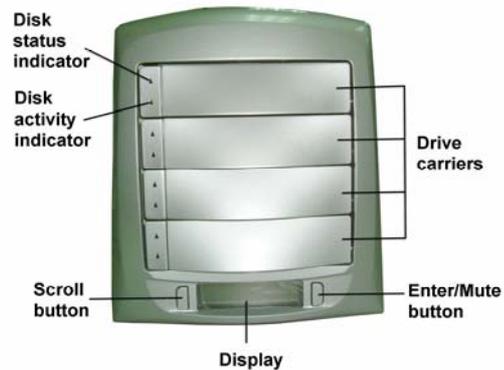
The Enter / Mute button is used to set date and time and to mute the buzzer.

Disk status indicator

Each drive carrier features an indicator that lights to show disk status

Disk activity indicator

Each drive carrier features a disk activity indicator that lights when the drive is being accessed.



Disk Status Indicator	Disk Activity Indicator	Controller Status
Alternating green & amber	Flashing blue	▪ RAID being initialized
Alternating green & amber	Flashing blue	▪ RAID being rebuilt
Solid green	Unlit	▪ RAID initialization complete
Solid green	Unlit	▪ RAID established / no activity
Solid green	Flashing blue	▪ Data being accessed
Solid red	Unlit	▪ Disk failure / disk not properly installed
Solid amber	Unlit	▪ Hot spare disk in R5+spare mode

Rear view

Rear fins

The rear fins help protect cables connected to the rear panel from being damaged or dislodged as well as ensure the **fan vent** is unobstructed.

Power switch

The power switch is the main on/off switch of the ACUTA subsystem.

Fan vent

The fan vent should be kept unobstructed.

RAID level selector

The RAID level selector consists of two switches which together are used to set the RAID level. See *Setting RAID level* in Chapter 4.

Host connection ports

The host connection ports differ depending on the host interface of your ACUTA subsystem. Two hardware configurations of ACUTA are available:

Power status indicator:

Indicating power supply status.

Normal:Green ;

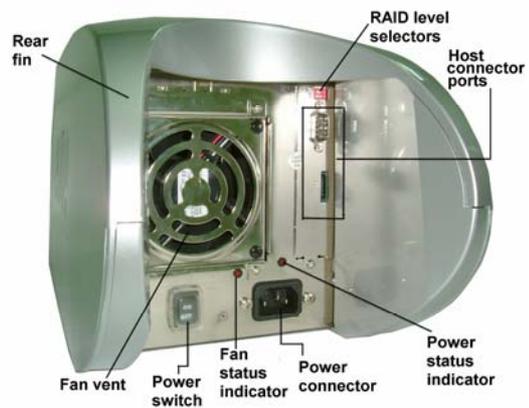
Failed: Off

FAN status indicator:

Indicating FAN status.

Normal:Off

Failed:Red



Host connection ports: IEEE 1394 and USB interface version

RS-232 port

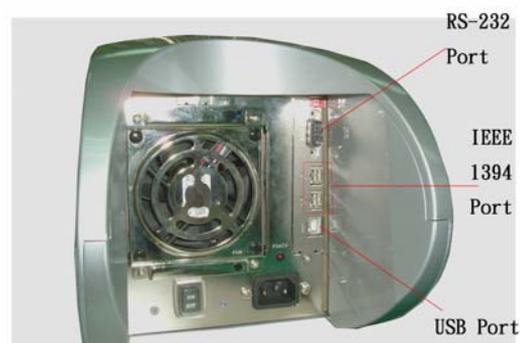
The RS-232 port is used if you want to monitor the status of your array remotely. An RS-232 cable can connect ACURA 4 to a terminal or PC equipped with terminal emulation software.

IEEE 1394 ports

The IEEE 1394 ports can be used to connect to a host machine. Each of the two IEEE ports supports IEEE 1394 A and B. IEEE 1394 allows connection of up to 63 devices.

USB port

The USB port can be used to connect to a host machine. The port supports USB 2.0, which allows connection of up to 127 devices.





Note

*The USB port cannot be used when either of the IEEE 1394 ports is in use.
2 of IEEE 1394 port are for daisy chain to connect another IEEE1394 device.
Not for connecting Acuta to 2 host at mean time for access.*

Host connection ports: Serial ATA interface version

RS-232 port

The RS-232 port is used if you want to monitor the status of your array remotely. An RS-232 cable can connect ACUTA to a terminal or PC equipped with terminal emulation software.

Serial ATA port

The Serial ATA port is used to connect to a host machine.



Loading drives into ACUTA



Note

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



Note

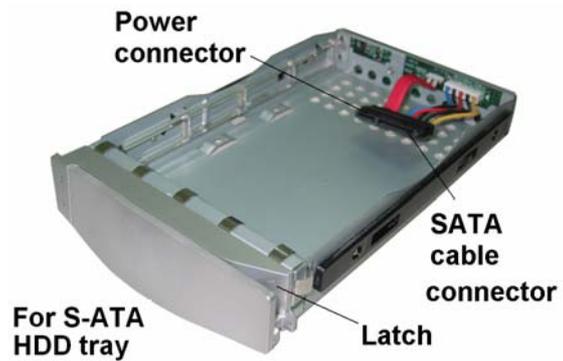
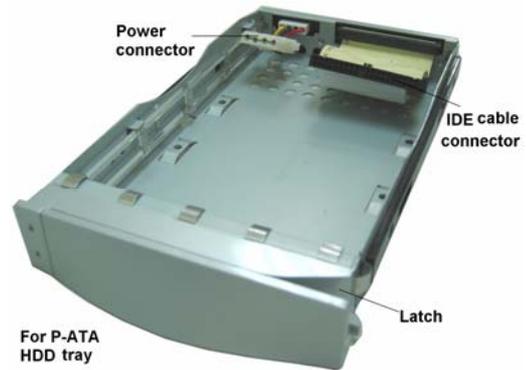
*All four hard disks should be configured as **Single Master**.*

The ACUTA should be fitted with four hard disk drives (DISKs). Load each drive into a drive carrier as follows:

1. Pull the drive carrier handle to release the latch.
2. Slide the drive carrier out of the controller box.



3. Place the disk drive at an angle in the drive carrier and connect the power connector to the disk drive
4. Carefully connect the drive's IDE connector (P-ATA HDD use only) or S-ATA(S-ATA HDD use only) connector to the drive carrier connector.



5. Slide the disk drive into position in the carrier, taking care not to damage the IDE or S-ATA or power cables.





6. Turn the disk carrier upside down and secure the disk in the carrier with four screws.



7. Slide the loaded disk drive carrier into the ACUTA Controller Box and push flat the carrier handle to lock the carrier in position.



Note

The disk carrier connector at the back of each controller box disk carrier slot can be damaged if the disk carrier is not properly aligned when inserted. Insert the disk carrier gently to avoid damage.

Chapter 4

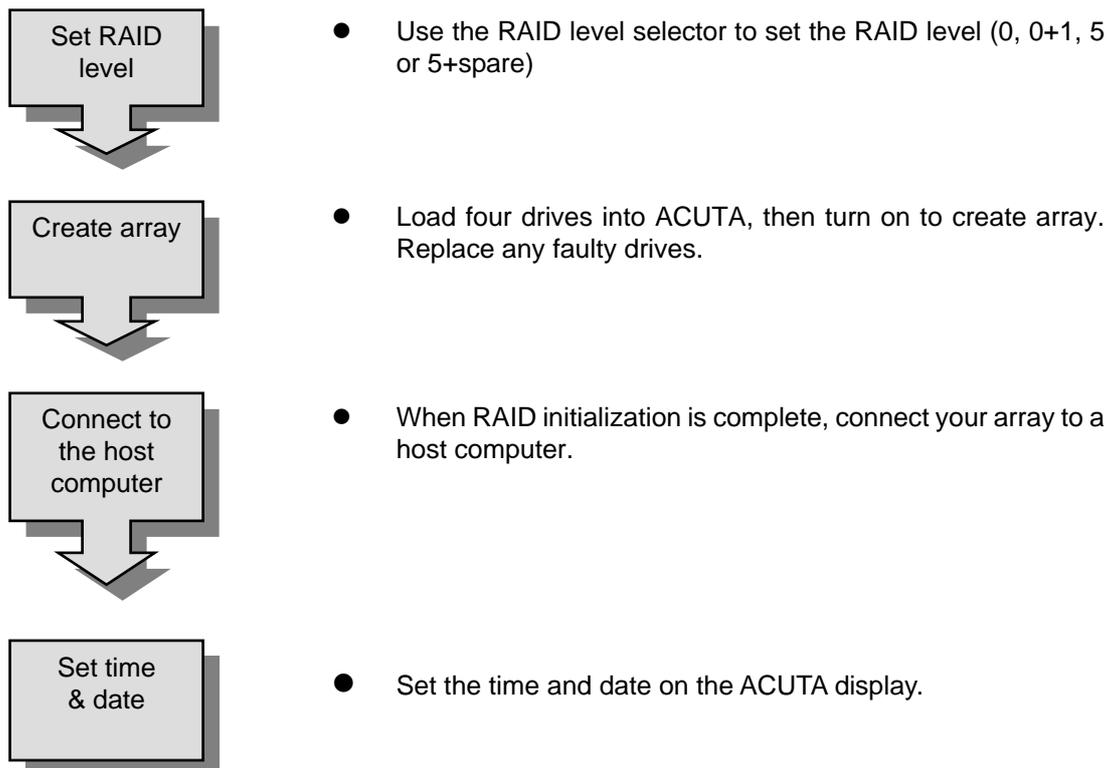
Setting up an array

This chapter explains how to:

- ⇒ Set RAID level on the controller box
- ⇒ Create an array
- ⇒ Remove and replace drives from an array
- ⇒ Connect ACUTA to a host computer
- ⇒ Set the time and date on ACUTA

Array creation flowchart

Setting up an array on ACUTA is simple. This chapter will lead you through the following steps:



Setting RAID level

RAID level is set using the RAID level selector on the rear panel of ACUTA. The RAID level selector consists of two switches. The four possible combinations of switch position correspond to the four available RAID settings: 0, 0+1, 5 and 5+spare.



If the RAID level is not matched between the disk setting and the RAID level selector setting, the LCD will display the following two messages alternatively:

- (1) "RAID level"
 "Unmatched"
- (2) "Current: Rx"
 "Original: Rx"

Note: Current Rx means the RAID level setting of current disks

Original Rx means the RAID level setting of RAID level selector

For example:

Supposed the RAID level selector is R0, but the disk setting detected from disks is R5, the LCD will display the following two messages alternatively:

- (1) "RAID Level"
 "Unmatched"
- (2) "Current : R5"
 "Original : R0"

Solution: At this situation, RAID cannot work, users should choose one of the following options :

- (1) Shut down Acuta and tune the RAID level selectors to R5.

or (2) Re-plug the four disks and re-create the Array to R0 (But data in the R5 disks will be lost due to the destructive initialization)



Note

ACUTA must be switched off to change RAID level.

To change RAID level:

- 1. Power off ACUTA*
- 2. Set the new RAID level using the RAID level selector*
- 3. Remove all four disks*
- 4. Power on ACUTA*
- 5. Install the four disks to start RAID initialization*

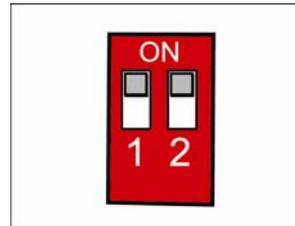


Caution

Changing RAID level may lead to the loss of all data on the array.

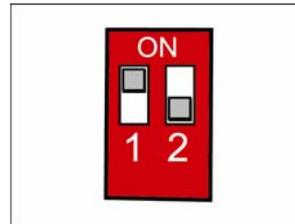
Setting RAID 0

1. Ensure ACUTA is turned off.
2. Move both selector switches 1 and 2 to **ON** as shown.



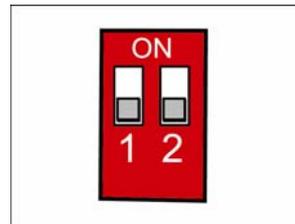
Setting RAID 0+1

1. Ensure ACUTA is turned off.
2. Move selector switch 1 to **ON** and 2 to **OFF** as shown



Setting RAID 5

1. Ensure ACUTA is turned off .
2. Move both selector switch 1 and 2 to **OFF**.



Setting RAID 5+spare

1. Ensure ACUTA is turned off.
2. Move selector switch 1 to **OFF** and 2 to **ON**.



Note

In a RAID 5+spare array, the drive in the TOP drive carrier is the hot spare and its status indicator will be shown amber for notification.



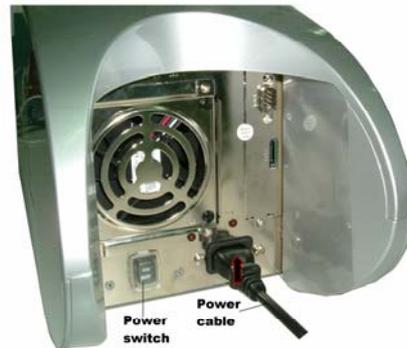
Note

In a RAID 0+1 array, disk 1 , 2 and disk 3 , 4 are two independent RAID 1group . This allows one disk from each separate R1 group to fail simultaneously.

Creating an array

To create (initialize) an array:

1. Ensure that four drives are installed.
2. Ensure that the RAID level selectors are correctly positioned for the desired RAID level.
3. Connect a power cable.
4. Turn on the power switch.
5. Install drives to begin initialization



ACUTA will check the status of the installed drives. If all of four drives are brand new or never been used in Acuta then the initialization of the desired RAID level array will begin automatically.

If any one of DISKS you installed has been used in Acuta before, then Acuta will have a notification on LCD to remind if you really want to initialize a new RAID with previously used DISK to prevent wrong operation caused DATA loss.

Acuta confirms with you that "Create New RAID" and you can select "Yes" by button to re-create new RAID or "No" to retrieve existing RAID according to current drives



Note

Four drives should usually be installed for initialization to begin. If four drives are not installed when the power is turned on, the alarm will sound. A "RAID Fail" message will also display unless:

- ⇒ *RAID 5+hot spare has been set*
- ⇒ *The bottom three drive carriers have drives installed.*

In this case, the initialization of a RAID 5 array will take place.



Note

The RAID capacity determined on the RAID level and the capacity of drives you installed in Acuta , for an example:

If configuring as R5 and install 4 drives each of them are 10 GB, 20 GB, 30 GB, 40 GB to create an array then the total RAID capacity will be 30 GB.

The upper disk status indicator and low disk activity indicator on each drive carrier indicate the following:

Disk Status Indicator	Disk Activity Indicator	Controller Status
Alternating green & amber	Flashing blue	▪ RAID being initialized
Alternating green & amber	Flashing blue	▪ RAID being rebuilt
Solid green	Unlit	▪ RAID initialization complete
Solid green	Unlit	▪ RAID established / no activity
Solid green	Flashing blue	▪ Data being accessed
Solid red	Unlit	▪ Disk failure / disk not properly installed
Solid amber	Unlit	▪ Hot spare disk in R5+spare mode

If a red disk status indicator shows, check to make sure the appropriate drive is:

- Locked
- Installed correctly
- Not faulty (if necessary, the drive should be replaced).



Note

The alarm will sound in case of RAID failure. Press the Enter / Mute button to the right of the display to silence the alarm.

Initialization of an array may take up to 15 minutes depending on the capacity of disks and the RAID level selected.

The status of the controller and array is given by the LCD display. Press the scroll button to the left of the display to scroll through information about the array. The following information is available:

- ⇒ RAID level and Capacity
- ⇒ Disk model
- ⇒ Disk DMA mode and capacity
- ⇒ Firmware Version
- ⇒ Serial Number
- ⇒ Fan Status and Temperature Status



Note

A full list of LCD display messages is given in Appendix C



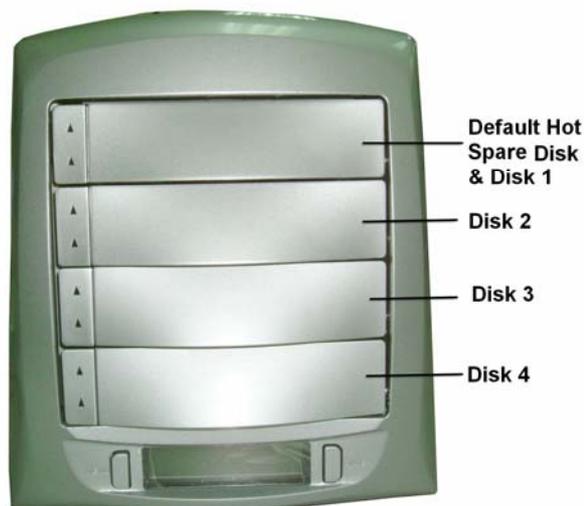
Note

If system power is turned off midway through array initialization, the process will continue from its point of interruption when power returns.



Note

In a RAID 5+spare array, the disk in the TOP drive carrier is the hot spare initially. And disk status indicator of the hot spare one will be shown amber for notification. But after disk hot swapping, the hot spare disk will be changed. For example: when hot swap disk 3 , then the top disk (disk 1) will be auto-rebuilt. If you plug disk 3 afterward, disk 3 will be the new hot spare disk, it's no longer the TOP disk. It can be recognized by disk status indicator.



Removing / replacing a drive

What if a disk fails?

If a disk drive fails, the disk status indicator of the disk carrier will light red and the alarm will sound. When this happens, you should replace the failed IDE disk.



Note

*The failure or removal of a single drive in a **RAID5** array **will not** lead to failure of the array. The failure or removal of a single drive in a **RAID0** array **will** lead to loss of all data on the array and the entire array must be re-initialized.*



Note

*There is no need to immediately replace a failed disk in a **RAID 5+spare** array. The hot spare disk will be brought on line automatically.*



Note

*The alarm can be silenced by pressing the **Enter / Mute** button to the right of the display.*

Swapping drives

The hot swap function for RAID 5 arrays enables failed disks to be swapped while the array is powered on. RAID rebuilding will be processed automatically in the background and the ACUTA RAID subsystem will record its progress. If the host system is shut down or powered off abnormally, the ACUTA RAID subsystem will continue the disk rebuilding process after power is turned on again.



Note

*A hard disk in a **RAID 5** array should not be replaced when the system is turned off. Doing so may leads to loss of data. Always hot swap disks in a **RAID5** array.*

Removing a drive

1. Pull the drive carrier handle to release the latch.
2. Slide the drive carrier out of the controller box.



3. Place the drive carrier face down and remove four screws from the base that are securing the drive inside the carrier.



4. Lift the disk drive slightly out of the carrier and detach the power and IDE or SATA connectors.
5. Lift out the disk drive.



Connecting to a host computer

Once the array is initialized, you can connect ACUTA to a host computer. Host connection procedures differ for the two host interface configurations.



Note

The RAID cannot be recognized by Operating System before initialization complete.

IEEE 1394 and USB host interface version

The IEEE 1394 ports support IEEE 1394A which enables transmission speeds up to 400 Mbps and IEEE 1394b which enables transmission speeds up to 800 Mbps. The USB port supports USB 2.0 which enables transmission speeds up to 480 Mbps.

These interfaces are compatible with the following host operating systems (SATA drive interface same)

Operating System	1394 A	1394 B	USB 2.0
Windows 98	●	●	
Windows ME	●	●	
Windows NT4.0	●	●	●
Windows 2000*	●	●	●
Windows 2003	●	●	●
Windows XP	●	●	●
Linux Red Hat 7.3	●		
Linux Red Hat9.0	●	●	●
MAC OS 9	●	●	●
MAC OS X	●	●	●
Fedora	●	●	●



Note

Windows 2000 users should upgrade their operating system to at least Windows Service Pack 3 for the operating system to be able to recognize ACUTA on an IEEE 1394 host connection.

To check whether you should upgrade, right click on the My Computer icon on your desktop and select Properties. The System Properties dialog box appears. The front tab, General, lists which version of Windows you are running.

To upgrade your Windows operating system free of charge, select Windows Update from the Start menu. You will be directed to the Microsoft Windows Update website.

This notice applies only to users of an IEEE 1394 host interface and the Windows 2000 operating system.

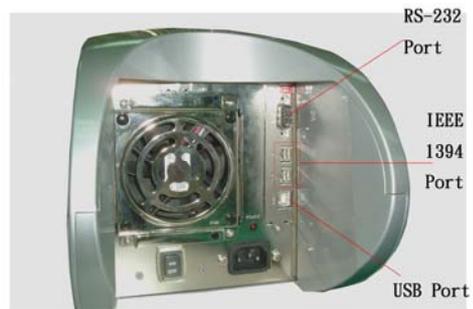


Note

1. The USB port cannot be used at the same time as either of the IEEE 1394 port.
2. 2 of IEEE 1394 port are for daisy chain to connect another IEEE1394 device,not for connecting Acuta to 2 host at mean time for access.

To connect to the host:

1. Power on ACUTA and follow the instructions earlier in this chapter to establish a RAID array.
2. Either:
 - ⇒ Connect one end of the supplied USB cable to the USB port and the other end to a spare USB port on your host computer, or,
 - ⇒ Connect one end of one of the supplied IEEE 1394 cables to one of the IEEE 1394 ports.



Note

Advanced users wishing to remotely monitor the status of their array should connect ACUTA via an RS-232 cable to a terminal or computer hosting a terminal emulation program.

3. The host computer should detect the presence of the ACUTA subsystem. Turn to the next chapter for instructions on formatting your array.

Serial ATA host interface version

Serial ATA allows transmission up to 1.5 Gbps. Serial ATA is compatible with the following host operating systems:

Operating System	SATA
Windows 98	●
Windows ME	●
Windows NT4.0	●
Windows 2000	●
Windows XP	●
Windows 2003	●
Linux Red Hat 7.3	
Linux Red Hat 9.0	●
MAC OS 9	
MAC OS X	
Fedora	●

To connect to the host:

1. Power on ACUTA and follow the instructions earlier in this chapter to establish a RAID array.
2. Connect one end of an SATA cable to the SATA port and the other end to a spare SATA port on your host computer.



Note

If the SATA port of the host computer is embedded in the motherboard, use the SATA external port cable with bracket to convert this SATA port into an external port. You will then be able to connect Acuta4 directly to the host computer.



Note

Advanced users wishing to remotely monitor the status of their array should connect ACUTA via an RS-232 cable to a terminal or computer hosting a terminal emulation program.

3. The host computer should detect the presence of the ACUTA subsystem. Turn to the next chapter for instructions on formatting your array.

Setting the Display Time & Date

Press down the right hand (Enter) button for over five seconds to enter or change the time and date displayed on the display. When you release the button, the date and time setting screen will show:

1. First enter the year. Change the displayed value by pressing the left hand (Scroll) button. When the correct value is displayed, press the Enter button to move to the next field.
2. Enter the month in the same way then move to and enter the date.
3. Press the Enter button to move to the hour field. Enter the time in the 24-hour clock format.
4. Press Enter when you have entered the correct minute value to complete time and date entry.

YY/MM/DD HH: MM
03/11/23 19: 27

Chapter 5

Partitioning the array

This chapter explains how to partition the array in Windows , Linux and Mac OS X operating systems.

Partitioning the array - Windows

The array must be partitioned before it can be used. To do this on a Windows operating system:

1. Establish the array and connect to the host computer following the instructions in the preceding chapter. Make sure no error messages are showing on the LCD display.
2. Turn on the host computer.
3. On the desktop, right click the **My Computer** icon.
4. Select **Manage**. The Computer Management dialog box appears.



5. In the Computer Management dialog box, select Disk Management from the left hand menu. The array will appear in the lower right section of the dialog box as a disk marked unallocated.

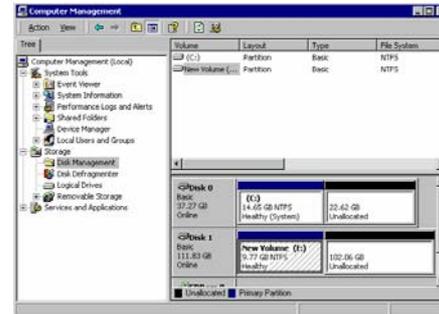
Other disks attached to the host machine, such as the main drive of the machine, will have an assigned letter (e.g. C:) for the parts of the disk (partitions) that are accessible to the operating system. These are listed in the upper right part of the dialog box. You must partition the disk and make it accessible to the operating system.



- Right click on the disk representing the array and select Create Partition. Follow the wizard to create one or more partitions on the array.



- When you have completed creating a partition, the array will appear as a disk in the disk management section of the Computer Management dialog box.



Partitioning the array - Linux

The array must be partitioned before it can be used. To do this on a Linux operating system:

- Establish the array and connect to the host computer following the instructions in the preceding chapter. Make sure no error messages are showing on the LCD display.
- Turn on the host computer.
- Check to confirm the operating system has detected the array: type "df"

```
[root@localhost tmp]# df
Filesystem            1K-blocks    Used Available Use% Mounted on
/dev/hda2              78163044   4979204 69213376   7% /
/dev/hda1              101089      9399    86471    10% /boot
none                  127652      0       127652   0% /dev/shm
/dev/hde               35584272   20      33776656  1% /tmp
```

The array will be listed as shown at a temporary location (/tmp). The code given the array depends on the host interface type. Arrays connected through a USB or IEEE 1394 interface will be assigned a code **sda** (**sdb**, **sdc** etc.). Arrays connected through a serial ATA interface will be assigned a code **hde** (**hdf**, **hdg** etc.) as in the example shown.

When you have confirmed that the array has been detected:

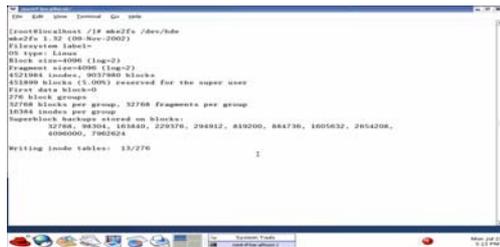
4. Enter the command to format the disk (array): **fdisk /directory/device name** (e.g. **fdisk /dev/hde**).
5. When the disk is formatted, you should partition the disk. Call up the help screen as shown to identify the correct command to add a partition.
6. Enter the command to add a partition (in the example given, the command is “n.”)
7. Enter the command to create a primary partition then enter the number of primary partitions you wish to create.
8. Enter the command to create a Linux second extended file system on the array. In the example, the command is **mke2fs /directory/device** (**mke2fs /dev/hde**).
9. Assign the array a location: Enter **mount /directory/device /location** (**mount /dev/hde /tmp**).

```
[root@localhost ~]# fdisk /dev/hde

The number of cylinders for this disk is set to 4500.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
 1) software that runs at boot time (e.g., old versions of LILO)
 2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)

Command (m for help): m
Command action
  a toggle a bootable flag
  b edit bsd disklabel
  c toggle the dos compatibility flag
  d delete a partition
  l list known partition types
  m print this menu
  n add a new partition
  o create a new empty DOS partition table
  p print the partition table
  q quit without saving changes
  s create a new empty Sun disklabel
  t change a partition's system id
  u change display/entry units
  v verify the partition table
  w write table to disk and exit
  x extra functionality (experts only)
```

```
Command (m for help): n
Command action
  e extended
  p primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-4500, default 1): 1
Last cylinder or +size or +sizeM or +sizeK (1-4500, default 4500): 4500
```



Partitioning the array – Mac OS X

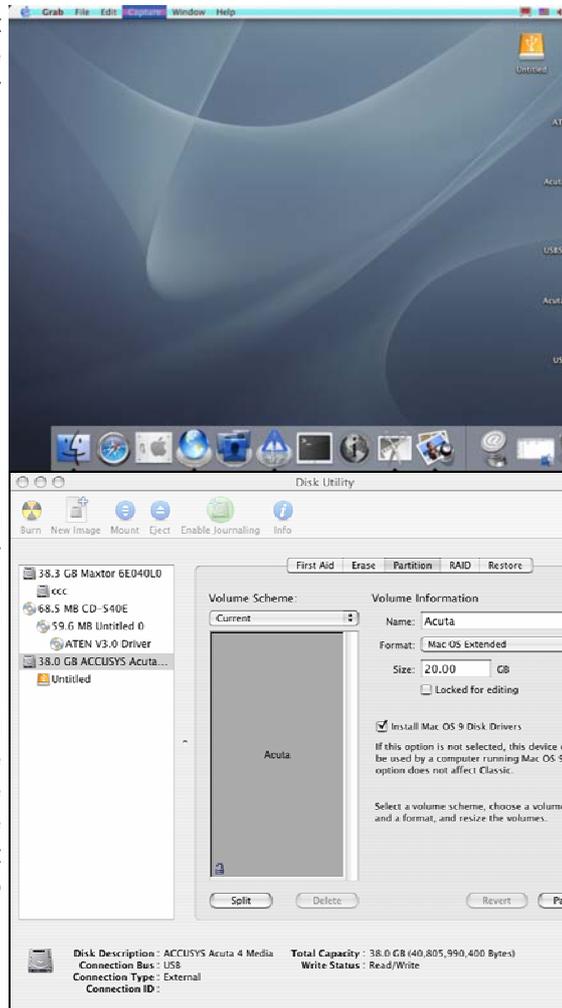
The array must be partitioned before it can be used. To do this on a Mac operating system:

1. Establish the array and connect to the host computer following the instructions in the preceding chapter. Make sure no error messages are showing on the LCD display.
2. Turn on the host computer.
3. When the array is detected by system, it will be shown as an untitle device on desktop.

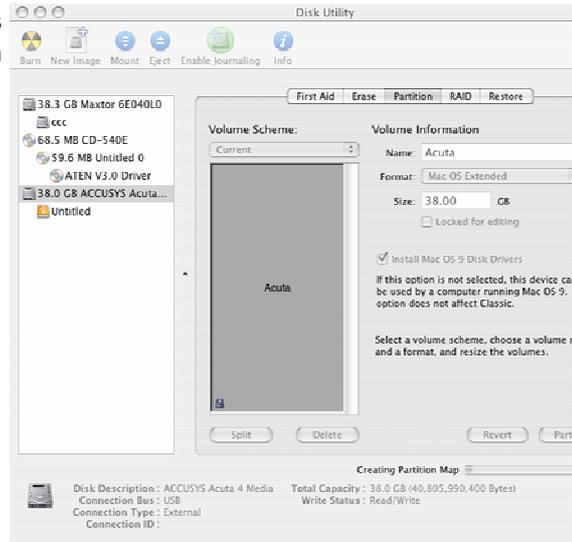
4. Executing **Disk utility** to begin partitioning array, (**Disk utility** is located **Applications/Utilities**). The **Disk utility** dialog box appears, and the array will appear in the left menu of window as an untitle disk.

Other disks attached to the host machine, such as main drive of the machine, will have an assigned name for the parts of the disk (partition) that are accessible to the operating system. These are listed in the left hand menu of dialog box. You must partition the disk and make it accessible to the operating system.

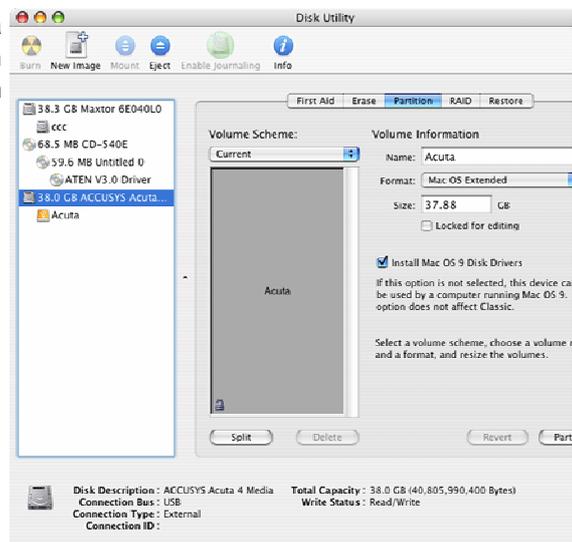
5. Choosing Acuta by click in left menu and click on tag "**partition**" to fill the **name** and **size** of the array. The array could be created to be a single volume or several volumes, determined by intention of user. Then click **Partition**, which located lower right corner of dialog box.
6. The confirmation dialog will be pop out to confirm again. Click **Partition** to continue procedure.



- The partition will then begin, and process is shown as **creating partition map** in lower right corner of dialog box.



- When you have completed creating a partition, the array will appear as a disk in storage list in left menu, and be put on desktop as shortcut.



Appendix A**FAQ**

If you encounter a problem while using the ACUTA, check this section for help.

- 1. When I lock a drive carrier with a disk drive in place, the red disk activity indicator turns on and an alarm beep sounds. Why?**
 - ⇒ Make sure the IDE and power connectors of the DISK are connected firmly to their counterparts inside the drive carrier.
 - ⇒ Ensure the DISK is set as single-master.
 - ⇒ Change the disk drive with a new one and try again.
 - ⇒ Exchange the top and bottom drive carriers and try again to determine if the carrier itself is faulty.
 - ⇒ If all of the above steps fail, contact your vendor.

- 2. How can I turn off the alarm beep sound when there is a hard disk failure?**
 - ⇒ Unlock the drive carrier of the failed disk, or
 - ⇒ Press the mute button.

- 3. I have connected the ACUTA subsystem, but it does not appear in the motherboard BIOS. Why?**
 - ⇒ Ensure that an array is initialized completely.

- 4. Why does ACUTA not recognize the DISKs?**
 - ⇒ There may be an DISK jumper-setting problem. Make sure all drive jumpers are set to "Single-master". Please refer to FAQ 1.

- 5. How should I react to disk failure?**
 - ⇒ For a RAID 5/RAID 0+1 array, you should replace the failed disk. Data rebuilding will then begin.
 - ⇒ For a RAID 5+hot spare array, data will be rebuilt automatically to the hot spare disk. There is no need to immediately replace the failed drive.
 - ⇒ The capacity of new DISK you installed must equal or larger than the smallest DISK in Acuta. Otherwise, it will be rejected by Acuta, though it has no any damage.

6. How should I react to an DISK failure while creating a RAID 5?

- ⇒ Replace the failed DISK with another of equal or larger capacity. The array will re-initialize from starting.

7. If I only have two or three DISKs, can I create a RAID?

- ⇒ 2 DISKs : No. Acuta need at least 3 disks to configure R5+hot spare
- ⇒ 3 DISKs :Yes, but you can only choose R5+hot spare. The three DISKs must be installed in the bottom three disk carriers with the top layer – the hot spare location, left empty.

8. Why does the display read “unmatched”?

- ⇒ The RAID level selector is not set to the level of the existing array. Please choose one of the following options :

Supposed the RAID level selector is R0, but the disk setting detected from disks is R5.

(1) Shut down Acuta and tune the RAID level selector to R5.

or (2) Re-plug the four disks and re-create the Array to R0 (But data in the R5 disks will be lost due to the destructive init)

9. If I really want to re-create a new RAID. How should I do?

- ⇒ Remove all disks.
- ⇒ Power off Acuta, set up RAID level by selector switch than power on Acuta.
- ⇒ Plug in all of disks to initialize new RAID.
- ⇒ If you use previous disks, Acuta will show a message “Create New RAID?” to confirm with you if you really want to create a new RAID. Please choose “Yes” by right button, the initialization will then begin.
- ⇒ Please notice that the procedure will erase all data of the four disks.

10. The host computer cannot detect ACUTA. What should I do?

- ⇒ Make sure the host interface connection cable is attached securely to ports on ACUTA and the host and is not damaged.
- ⇒ Check the display for error messages.

11. A disk has failed. What should I do?

- ⇒ Swap the failed disk with one of the other three disks and turn on. If the same disk fails, replace the disk. If the failure reappears at the same drive carrier, either the drive carrier or ACUTA is faulty. Perform the next step.

- ⇒ Swap the position of the drive carrier that failed twice and turn on. If the same drive carrier fails, replace it. If the failure reappears at the same drive carrier slot, ACUTA is faulty. Perform the next step.
- ⇒ ACUTA appears to have an internal malfunction. Consults your dealer.

12. Two disks have failed. What should I do?

- ⇒ Swap the positions of the failed disks with the remaining two disks. If the same disks fail, replace them. If the failures reappear at the same drive carriers, either the drive carriers or ACUTA is faulty. Perform the next step.
- ⇒ Swap the position of the drive carriers that failed twice with the working drive carriers and turn on. If the same drive carriers fail, replace them. If the failures reappear at the same drive carrier slots, ACUTA is faulty. Perform the next step.
- ⇒ ACUTA appears to have an internal malfunction. Consult your dealer.

13. Three disks have failed. What should I do?

- ⇒ Swap the single functioning disks with each of the failed disks in turn. If the functioning disk continues to function at its new location, the original disk was faulty and should be replaced. If the functioning disk does not function at any of the three other locations, the drive carriers for those location or ACUTA is faulty. Perform the next step.
- ⇒ Swap the functioning drive carrier in the same way to find out if the drive carriers or ACUTA. Replace any malfunctioning drive carriers.
- ⇒ Consult your dealer if ACUTA appears to be faulty.

14. Four disks have failed. What should I do?

- ⇒ If four disks have failed, you will need to use another disk that you know is functioning. Use this disk in the same way as outlined in the previous answer to find out if the malfunction is with the original disks, the drive carriers or ACUTA.

15. I loaded four disks and turned on the subsystem to set up an array but the display shows "RAID fail" and the alarm is sounding. How do I solve the problem?

- ⇒ Remove all four disks carriers then reinstall the carriers. If an array still does not initialize, check the disk indicators (refer to the table on page 22) and replace any failed disks.

⇒ You also could see below message from the LCD:

“RAID Fail”

“Code:0” or “Code :1 <---->”

The descriptions of the codes are:

Code 0: not enough number of function disks for a RAID to operate

Code 1: represents disk sequence is wrong , and the current sequence displayed within
<>

Example:

<2134>: disk 2 and disk 1 sequence is reversed.

<13x4>: the original disk 3 is put into tray 2 and the original disk 2 is not plugged or failed.

<423s>: the spare disk is put in the tray 4 and original disk 4 is put in the tray 1Disk order error,

16. Why can't I use Acuta with Windows 98 on a USB2.0 host interface ?

⇒ We recommend user **NOT** to use Windows 98 because Windows 98 is too old and not compatible with many cards. Please refer to Chapter 4, the OS compatible list table.

Appendix B**Glossary****Array**

See Disk Array.

Array Management Software

The body of software that provides common control and management for a disk array. Array Management Software most often executes in a disk controller or intelligent host bus adapter, but may also execute in a host computer. When it executes in a disk controller or adapter, Array Management Software is often referred to as Firmware.

Cache

Controller memory used to speed up data transfer to and from a disk.

Disk Array

A collection of disks from one or more commonly accessible disk controllers, combined with a body of Array Management Software. Array Management Software controls the disks and presents them to the array operating environment as one or more virtual disks.

Firmware

See Array Management Software.

Host Computer

Any computer system to which disks are directly attached and accessible for I/O. Mainframes, and servers, as well as workstations and personal computers, can all be considered host computers in the context of this manual, as long as they have disks attached to them.

IEEE 1394

IEEE 1394 is a standard for transmitting data between devices at high speed - up to 400 Mbps (in 1394a) and 800 Mbps (in 1394b). IEEE 1394 also supports isochronously data transfer, which is ideal if you need to transfer large amounts of data in real time. The standard is also known as FireWire and i.Link. A single port can be used to connect up to 63 external devices.

Parallel ATA (Parallel Advanced Technology Attachment)

Formerly referred to simply as ATA, now known as parallel ATA to differentiate it from Serial ATA. Various versions exist, including ATA (also called IDE), ATA-2 (Fast ATA or Enhanced IDE /EIDE) and Ultra ATA (Ultra DMA).

Parity

Parity information is redundancy information calculated from actual data values. If any single piece of data is lost, the data remaining and the parity information can be used together to compute the lost data. Parity information can either be stored on a separate, dedicated drive, or be mixed with the data across all the drives in the array.

RAID (Redundant Array of Independent / Inexpensive Disks)

A disk array in which part of the storage capacity is used to store redundant information about user data stored on the remainder of the storage capacity. The redundant information enables regeneration of user data in the event that one of the array member disks or the access path to it fails. See Parity. Different RAID levels offer different data throughput speeds and fault tolerance (data redundancy). RAID 0 does not feature redundant information but is nonetheless considered a special type of RAID.

SCSI (Small Computer System Interface)

An interface standard for attaching external devices to computers. SCSI interfaces provide for data transmission at up to 80 Mbps. You can attach many devices to a single SCSI port.

Serial ATA (Serial Advanced Technology Attachment)

Serial ATA (often abbreviated as SATA or S-ATA) is an advance on the commonly used Parallel ATA interface for data storage devices. Serial ATA allows data transfer up to 1.5 Gbps. It has an additional advantage parallel ATA in that cables are thinner, so airflow within computer cases is less impeded, and can extend to one meter in length (against only 40 cm for parallel ATA).

USB (Universal Serial Bus)

USB is a standard for transmitting data between devices at high speed - up to 480 Mbps for USB 2.0. USB supports hot swapping of devices. USB 2.0 is an extension of the original USB 1.1 standard and uses the same connectors. A single port can be used to connect up to 127 external devices.

Appendix C

LCD Display Messages

Initialization messages

Meaning	LCD display	Message cleared when
New RAID being created	<pre>RAID INIT xx.x% Total: xxx GB</pre>	<ul style="list-style-type: none"> Initialization completed successfully Initialization failure
Re-create a new RAID	<pre>Create New RAID? (No) (Yes)</pre>	<ul style="list-style-type: none"> If the DISK have been installed in Acuta and created RAID.
Initialization completed successfully	<pre>RAID INIT 100% xxx GB INIT OK!</pre>	<ul style="list-style-type: none"> Button pressed
Disk x failed during initialization and cannot be accessed	<pre>RAID INIT Failed Dx offline</pre>	<ul style="list-style-type: none"> Disk replaced
Too many bad sectors on disk x. Initialization cannot proceed	<pre>RAID INIT Failed Dx Bad sectors</pre>	<ul style="list-style-type: none"> Disk replaced

Rebuild messages

Meaning	LCD display	Message cleared when
Rebuilding data to new disk following disk failure	Dx Rebuild xx.x Total: xxx xGB	<ul style="list-style-type: none"> ■ Rebuild completed successfully ■ Rebuild failure
Rebuild completed successfully	Dx Rebuild 100% xxx x GB OK! !	<ul style="list-style-type: none"> ■ Button pressed
Capacity of new disk too small	Dx Rebuild Fail xxx xGB < YYY YGB	<ul style="list-style-type: none"> ■ Disk replaced
<p>xxx xGB = capacity of newly installed disk YYY YGB = Minimum acceptable capacity</p>		
Disk x cannot be accessed	Dx Rebuild Fail Dx offline	<ul style="list-style-type: none"> ■ Disk replaced
Too many bad sectors on disk x. Rebuilding cannot proceed	Dx Rebuild Fail Dx Bad sectors	<ul style="list-style-type: none"> ■ Disk replaced

Failure and error messages

RAID failure message

Meaning	LCD display	Message cleared when
RAID failed. Not enough number of function disks for a RAID to operate	RAID Fail code : 0	<ul style="list-style-type: none"> ■ Disk reinstalled
RAID failed. Represents disk sequence is wrong , and the current sequence displayed within <>	RAID Fail code : 1 < - - - - >	<ul style="list-style-type: none"> ■ Replace the sequence of disk as original

Disk failure message

Meaning	LCD display	Message cleared when
Disk x failed	DISKx Fail	<ul style="list-style-type: none"> ■ Failed disk replaced

RAID configuration error message

Meaning	LCD display	Message cleared when
Setting of RAID level selectors does not correspond to existing RAID level	RAID Level Unmatched	<ul style="list-style-type: none"> ■ Shut down Acuta and turn the RAID level selector to original RAID level setting
	Current : Rx Original : Rx	<ul style="list-style-type: none"> ■ If intend to initial a new RAID, re-plug 4 disks and re-create a new RAID

Fan failure message

Meaning	LCD display	Message cleared when
Fan failure xxxx rpm = current speed of fan	FAN Fail xxxx rpm	<ul style="list-style-type: none"> ■ Fan repaired or replaced

Overheating error message

Meaning	LCD display	Message cleared when
Temperature has exceeded 53°C	T e m p e r a t u r e ! ! x x ° C > 5 3 ° C	<ul style="list-style-type: none"> Temperature drops beneath 53°C
Temperature has exceeded 55°C	O v e r T e m p e r a t u r e D i s k S h u t d o w n !	<ul style="list-style-type: none"> Shut down all disks and replace FAN module.

RAID and disk status messages

Power on

Meaning	LCD display	Message cleared when
Power ON	A C U T A B o o t . . .	<ul style="list-style-type: none"> ACUTA has completed boot up process

Disk initialization

Meaning	LCD display	Message cleared when
Disks spinning up	A C U T A I n i t i a l i z e D i s k s	<ul style="list-style-type: none"> ACUTA has completed initializing disks

Ready

Meaning	LCD display	Message cleared when
ACUTA turned on successfully	A C U T A R e a d y h h : m m	<ul style="list-style-type: none"> ACUTA has completed initializing disks

RAID level

Meaning	LCD display	Message cleared when
RAID level	L e v e l X x x x x G B	<ul style="list-style-type: none"> Scroll button pressed

RAID and disk information messages

The following messages display when the scroll button is pressed when a RAID has been established. Press the scroll button to move between the information messages in the order shown.

Disk information

Meaning	LCD display	Message cleared when
Disk 1 information	<pre>D i s k 1 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y</pre>	■ Scroll button pressed
YYYYYY = Production ID		
Disk 1 ATA mode & capacity information	<pre>A T A m o d e X x x x x x G B</pre>	■ Scroll button pressed. Scroll in turn through displays for disks 2, 3 and 4
Disk 1 Serial ATA 1 & capacity information	<pre>S e r i a l A T A 1 x x x x x G B</pre>	■ Scroll button pressed. Scroll in turn through displays for disks 2, 3 and 4

Firmware version

Meaning	LCD display	Message cleared when
Firmware version	<pre>F i r m w a r e V e r : x . x x</pre>	■ Scroll button pressed

Fan and temperature information

Meaning	LCD display	Message cleared when
Fan and Temperature information	<pre>F a n : x x x x r p m T e m p e r a t u r e : x x ° C</pre>	■ Scroll button pressed

Serial number

Meaning	LCD display	Message cleared when
Serial Number of this Acuta subsystem	<pre>s e r i a l n u m b e r x x x x x x x x x x x x x x x x</pre>	■ Scroll button pressed

Appendix D

Updating Firmware

The ACUTA is shipped with firmware installed. You may however wish to install new or upgraded editions of the firmware. Ask your vendor about the latest firmware edition or refer to the website www.accusys.com.tw

Once new or updated firmware has been obtained, it can be downloaded to ACUTA from a host PC with third party communication software, such as HyperTerminal, that supports ANSI terminal emulation. Other terminal programs may be used in place of HyperTerminal to communicate with ACUTA. However, the setup process for other terminal software may differ from that outlined in this chapter.



Note

Array data and configurations are not affected by updating of firmware.



Note

HyperTerminal is bundled as standard with Microsoft Windows operating systems. It will be found in the Communications folder. The program can also be downloaded from Hilgraeve Software at <http://www.hilgraeve.com/hipe/>

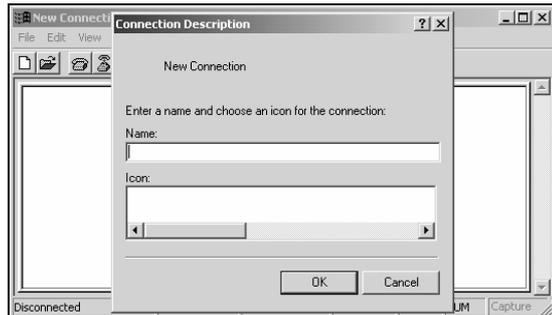
1. Ensure ACUTA is turned off.
2. Connect one end of the supplied RS-232 cable to the RS-232 port on the rear of ACUTA and connect the other end to one of the host computer's COM ports.



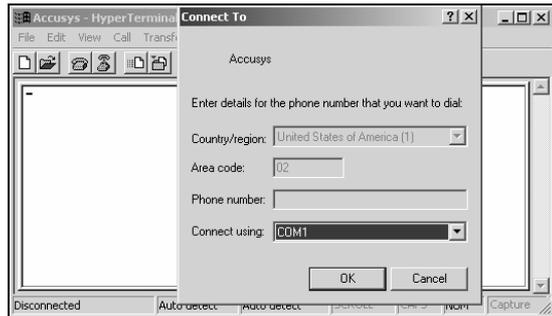
3. Launch HyperTerminal from the desktop of the host computer (**Start > Programs > Accessories > Communications > HyperTerminal**).



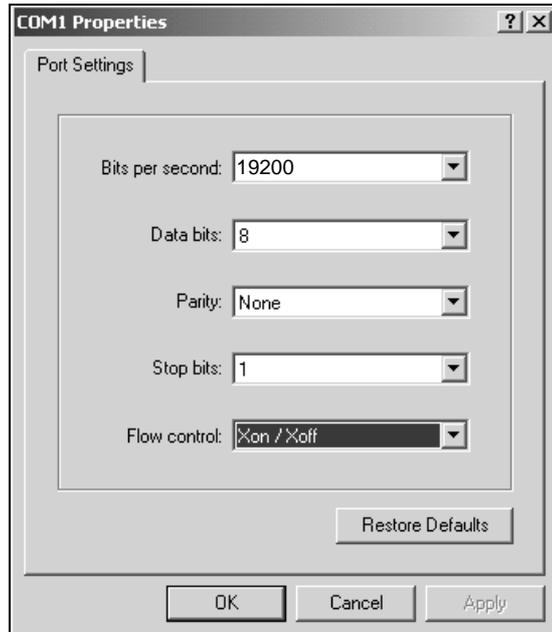
4. The **Connection Description** dialog box will appear (if this is the first time you have run HyperTerminal, you will first be prompted to enter information about your location). Enter a name to identify the ACUTA connection (e.g. **ACUTA**) and select an icon to represent the connection. Press **OK**.



5. The **Connect to** dialog box appears. Select **COM1** or **COM2** from the **Connect using:** dropdown menu, depending on which port is linked to ACUTA. Click **OK**.



6. The **COM Properties** dialog box will appear. Set the following values:
 Bits per second: 19,200
 Data bits: 8
 Parity: None
 Stop bits: 1
 Flow Control: Xon/Xoff
7. Click **OK**. The HyperTerminal connection to ACUTA is now established.



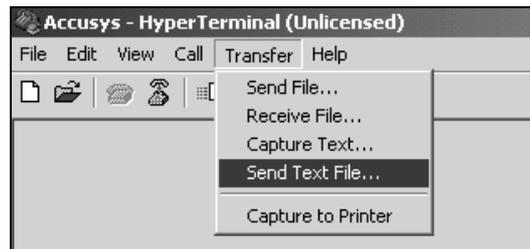
8. Turn on ACUTA and press Esc on the host computer keyboard. The >>>> prompt will appear.
9. Type in the command "download".
10. When prompted **Enter '1'** to **Download Code** type "1".

```
=== Acuta4 Download Mode =====  
*****Choose "1" to download firmware.
```

```
Enter '1' to Download Firmware  
'ESC' exit  
'r' reset
```

```
- Version: Boot--- 01 (a)--- 04  
Downloading Code!
```

11. Locate the updated firmware file to send. If using HyperTerminal, go to the **Transfer** menu and select **Send Text File...**
12. Send the firmware file as a text file. The file will start to download.
13. When the file has downloaded, After Acuta restarted, the firmware updating is finished, and you can check it on LCD panel.



Appendix E

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