

PCI-to-SATA RAID Adapter AEC-6890M

User's Manual

— Version:1.0 —



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Chapter 1 Introduction

1.1 Overview

ACARD AEC-6890M is a 32-bit, 33MHz, 2-channel, high-performance PCI-to-SATA RAID adapter. It supports RAID 0, 1 and normal modes. It also provides a window-based RAID Utility for easy management of the RAID subsystem. AEC-6890M is fit for Macintosh workstations and servers.

1.2 Features

- A PCI-to-SATA RAID controller.
- Has two independent SATA channels.
- Supports 32-bit, 33MHz PCI Bus Master (PCI 2.2 compliance).
- Supports data transfer rate of 133MB/s.
- Supports RAID 0, 1 and normal modes.
- Bootable from standard and RAID volume.
- DIP switch setting for RAID and normal modes.
- Supports Mac OS 8.5 , OS 9 and OS X.
- Supports G3 blue & white and G4 series Power Mac machines.

1.3 Specifications

- Power requirement --- Voltage: 3.3V +/- 2%
5V +/- 2%
Current: 0.5A Max.
- Environment --- Operating temperature: 0°C to 70°C
Storage temperature: -20°C to 85°C
- Humidity --- 15% to 90%
- Dimensions --- Width: 12.95cm
Height: 6.77cm
- Connectors --- Two 7-pin SATA connectors

1.4 Package

When you open the package, please examine the following items.

- AEC-6890M × 1
- Internal Serial ATA Cable × 2
- User's Manual × 1
- ACARD Support CD × 1
- Power cord for Serial ATA hard drive (optional)
- Y-splitter power cord for IDE hard drive and converter (for package with AEC-7900 enclosure only)

Chapter 2 Hardware Installation

You can install AEC-6890M and hard drives successfully to your Mac machine according to subsection 2.1. Before installing the operating system, if the hard drives connected to AEC-6890M contain important data, you had better back up.

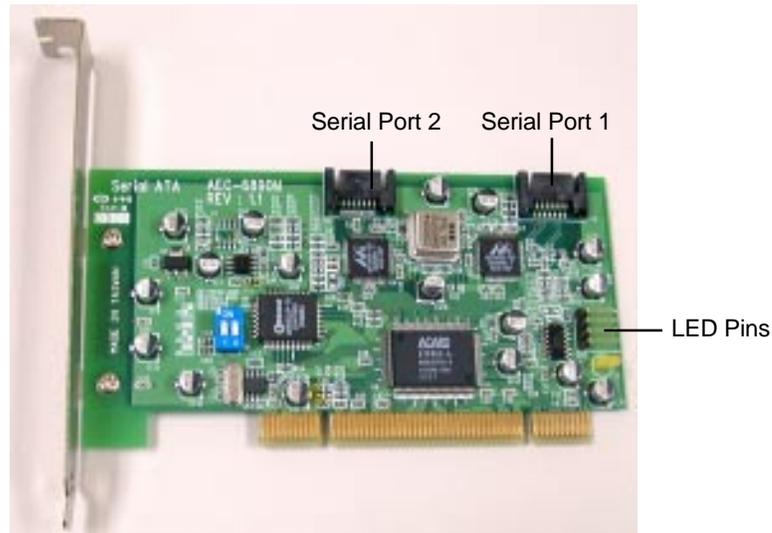
In addition, before using the hard drives, you should examine and initialize them in Normal mode with the Disk Utility no matter what RAID mode you are going to set. Thus, RAID can work normally.

2.1 Quick Installation

1. Open the Mac machine's or Power Mac's case (refer to Mac manual).
2. Choose an empty PCI slot to insert AEC-6890M.
3. Install hard drives into the Mac machine or Power Mac.
4. Connect AEC-6890M and the hard drives with serial ATA cables.
5. Close the Mac machine's or Power Mac's case.

The picture of AEC-6890M is shown on the next page.

The PCI-to-SATA RAID Adapter AEC-6890M



2.2 HDD Compatibility

AEC-6890M is specially designed for DMA hard drives. It supports most SATA hard drives of the following brands.

- Seagate
- Maxtor
- Western Digital

2.3 Before Installation

Before the installation of AEC-6890M, you need to know the following three modes in order to make the best use of the adapter. However, it is strongly recommended to use hard drives of the same model and capacity so as to get the best efficiency and stability.

Normal Mode (NON-RAID)

1. If you set the DIP switch as normal mode, you will use AEC-6890M as an ordinary SATA adapter.
2. AEC-6890M doesn't support ATAPI devices such as CD/DVD-ROM.

Striping Mode (RAID 0)

1. Striping means to divide a piece of data into several small pieces of data with the same size. The data is accessible from several hard drives at the same time. This mode can greatly enhance the overall efficiency, but it doesn't provide any fault tolerance.
2. If hard drives are different in capacity, AEC-6890M will take the hard drive of the smallest capacity as the standard, and multiply with the total number of hard drives. The value will be the total capacity of striping array.
3. RAID 0 requires two hard drives.

Mirroring Mode (RAID 1)

1. Mirroring means to save every piece of data into two hard drives at the same time. The two hard drives contain the same data, therefore the efficiency of this mode is not higher than that of a general hard drive. The main function is that when one of the hard drives fails, another will keep working, and thus data won't be lost.
2. If the capacity of two hard drives is different, AEC-6890M will take the hard drive of the smaller capacity as the standard. And the whole capacity you can use is the smaller hard drive.
3. RAID 1 requires two hard drives.

2.4 Hardware Installation

It is quite easy to connect the serial ATA cable and the power cord to SATA hard drives, because they are foolproof. The methods are given below.

- (1). Connect the serial ATA cable to AEC-6890M and the serial hard drive.
- (2). Connect the power cord to the hard drive.



However, in order to let IDE hard drives usable, ACARD has designed an ATA-to-SATA converter AEC-7900. The converter doesn't need any driver. And its installation is quite easy.

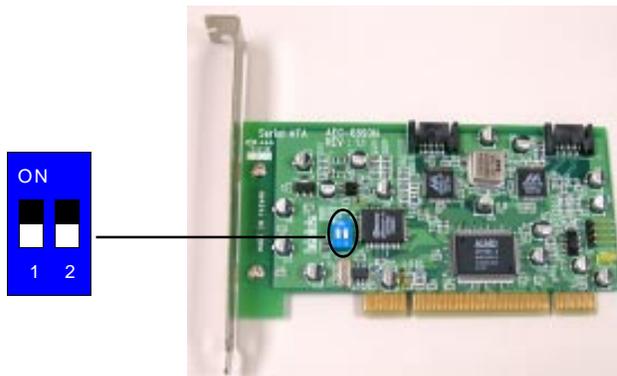
- (1). Connect one end of the serial ATA cable to AEC-6890M and another end to the ATA-to-SATA converter.
- (2). Connect the converter to the IDE hard drive, then connect them with a Y-splitter power cord.



NOTICE: The serial ATA cable is used to transfer data of very high frequency. It is suggested not to connect and disconnect it often, for the connector is easily damaged.

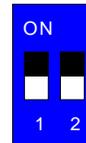
2.5 DIP Switch Setting

RAID configurations must be set on AEC-6890M's DIP switch. However, after installing hard drives to the serial ports, do not arbitrarily change the positions otherwise the adapter may misunderstand and the data may be lost.



Please follow the instructions below to get a suitable RAID DIP switch setting.

1. Normal Mode --- In this mode you should set DIP switch 1 and 2 as OFF. The default is OFF.



2. Striping Mode (RAID 0) --- RAID 0 is 2 hard drives that store striping data, but appears as a single volume in the computer. This mode is formed by setting DIP switch 1 as OFF and 2 as ON.



3. Mirroring Mode (RAID 1) --- RAID 1 is a pair of hard drives that store mirroring data, and is regarded as a single volume. This mode is formed by setting DIP switch 1 as ON and 2 as OFF.



Chapter 3 System Installation

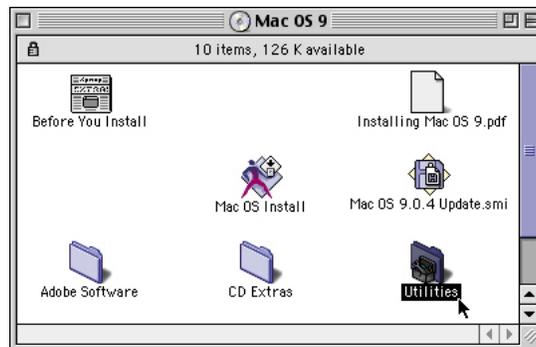
This chapter is going to tell you how to install and use the hard drives connected to AEC-6890M in different operating systems (OS 9 , OS X) and applications. The built-in driver in OS X 10.1 and 10.2 is not exclusively designed for AEC-6890M. Therefore you should update the driver before installation. The installations of OS 9 and OS X are somewhat different.

3.1 Install OS into HDD with the Adapter

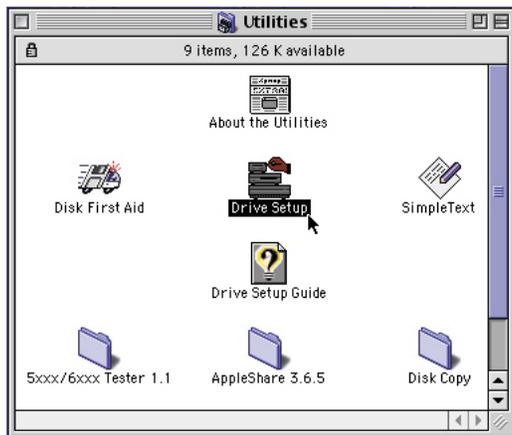
Here we will install OS 9 and OS X into the hard drive(s) connected with AEC-6890M, the adapter. After installation, you can boot from the original hard drive or the newly arrayed drives.

3.1.1 Install OS 9 into HDD with the Adapter

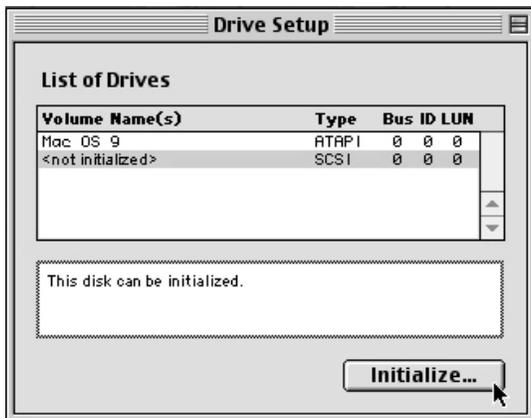
1. Be sure that the hardware is installed correctly.
2. Insert the OS 9 source CD into CD/DVD-ROM.
3. Power on and press “C” key.
4. Wait for the appearance of OS 9.
5. Double click “Utilities”.



6. Double click "Drive Setup".



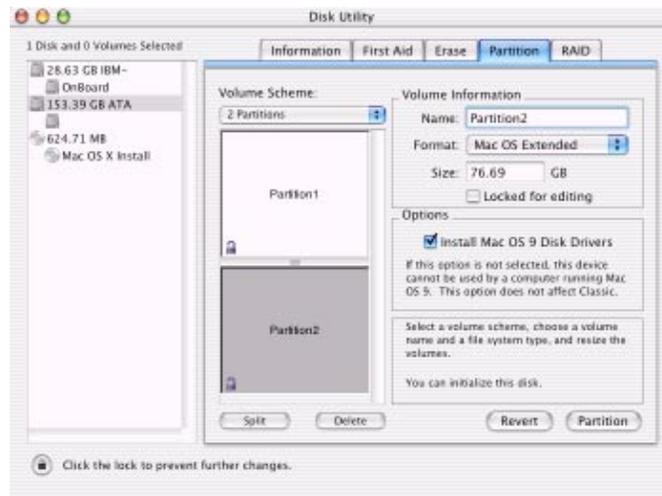
7. Choose the hard drive connected to AEC-6890M, then click "Initialize". For detailed information of "Drive Setup", please refer to Mac OS manual.



8. Quit "Drive Setup Utility" and start to install OS 9 into the hard drive(s) or array.
9. Then install RAID Utility (refer to 3.3) to monitor RAID volume and hard drives.

3.1.2 Install OS X into HDD with the Adapter

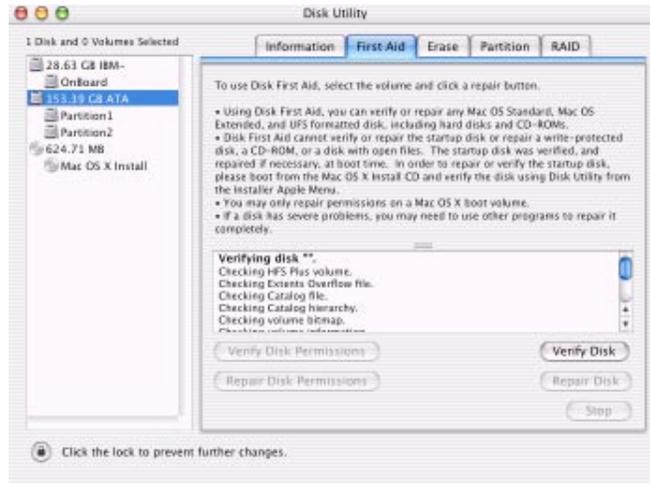
1. Be sure that the hardware is installed correctly.
2. Insert the OS X source CD into CD/DVD-ROM.
3. Power on, press “option” key, and choose to boot from CD/DVD-ROM.
4. Before installation,click “Installer” on the top selection row.
5. Click “Open Disk Utility”.
6. Choose the hard drive you want to initialize, and click “Partition” to decide the number of partitions you need.



NOTICE: Do not skip step 3 otherwise AEC-6890M may wrongly detect the RAID mode. However, if you're an OS X 10.3 user, you can just press "C" key to boot from CD/DVD-ROM.

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- After partitioning or erasing the volume, you can click “First Aid” to verify the disk partition into which you are about to install OS X.



- Quit “Disk Utility” and start the OS X installation.
- Update the driver of AEC-6890M to the newest version, which is in the ACARD support CD. Or download the driver from <http://www.acard.com>.
- Install RAID Utility (refer to 3.3) to monitor RAID volume and hard drives.

NOTICE: If you're an OS X 10.3 user, you don't need to update, because the newest version of driver is already built in the OS.

3.1.3 Verify System Profiler

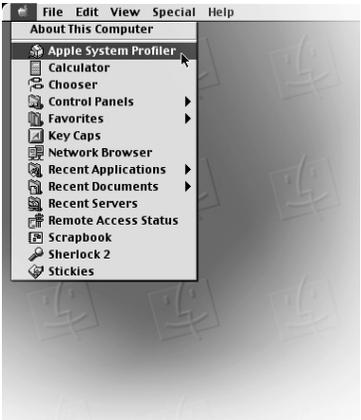
For Mac OS 9

After you initialize the hard drive successfully, a new “Untitled” hard drive icon will appear on the Mac window. Of course you can give the hard drive a name.

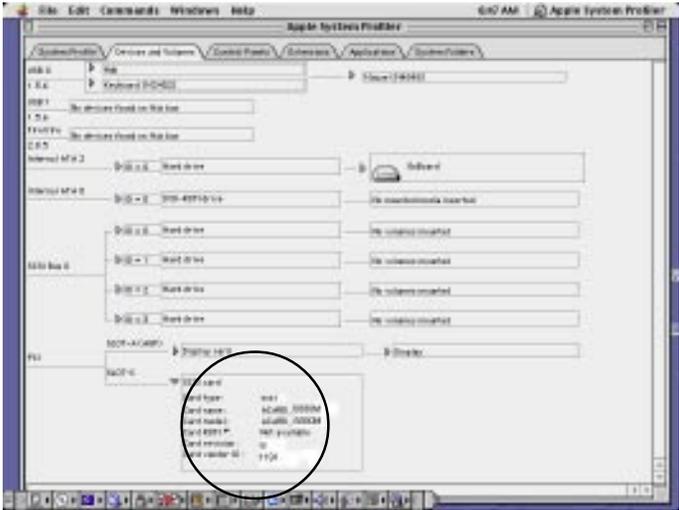


You can find the information of AEC-6890M under the Apple Logo. Please follow the instructions below to read the system information.

- 1. Click Apple Logo and choose "Apple System Profiler".

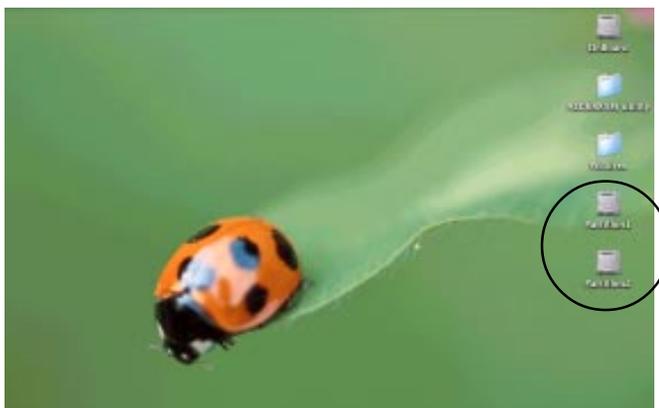


- 2. Under "Apple System Profiler" click "Devices and Volumes" to read the status of devices. And choose "PCI" to find the SCSI card and hard drives. (Owing to the same chipset in 6890M and 6880M, 6890M is regarded as 6880M. In fact, apart from the different display, 6890M's functions are all right.)



For Mac OS X 10.3

Basically if you have installed the hard drive and AEC-6890M successfully, and have partitioned or erased the hard drive, one or more hard drive icons will appear on the desktop. You can use the built-in Disk Utility to verify or repair the hard drive when it has something wrong.



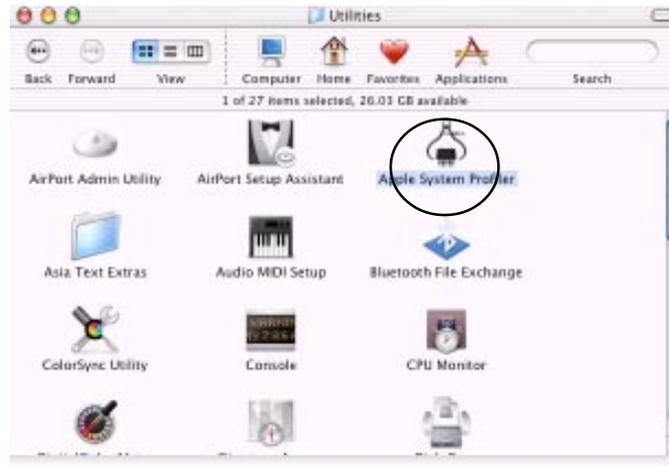
You can find the information of AEC-6890M under the Apple Logo. Please click "About This Mac" and then "More Info".

Another way of finding the system information is described below.

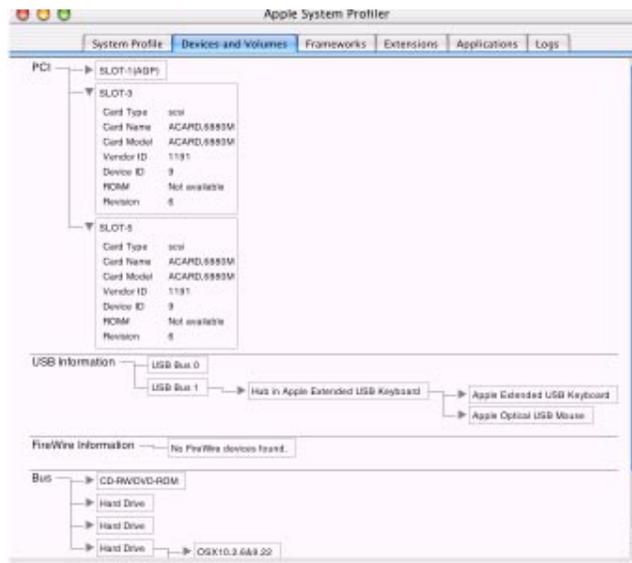
1. Click "Finder" at the bottom of the Mac OS screen.



2. Click “Applications” on the tool row.
3. Under “Applications” click “Utilities”.
4. Under “Utilities” click “Apple System Profiler”.

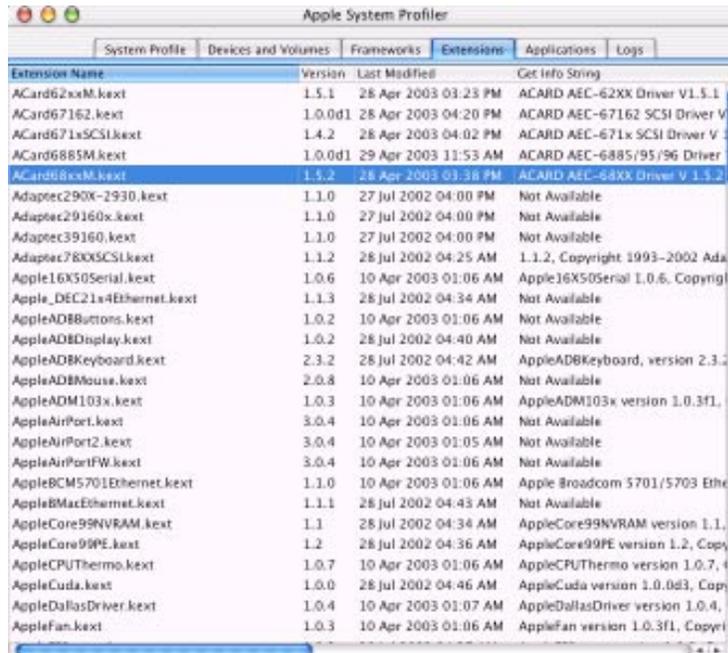


5. Under “Apple System Profiler” click “Devices and Volumes” to read the detailed information of AEC-6890M and disk array. (Owing to the same chipset in 6890M and 6880M, 6890M is regarded as 6880M. In fact, apart from the different display, 6890M's functions are all right.)



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6. Click “Extensions” to see the version of AEC-6890M's driver.



Extension Name	Version	Last Modified	Get Info String
ACard62xxM.kext	1.1.1	28 Apr 2003 03:23 PM	ACARD AEC-62XX Driver V1.1.1
ACard67162.kext	1.0.0d1	28 Apr 2003 04:20 PM	ACARD AEC-67162 SCSI Driver V
ACard671xSCSI.kext	1.4.2	28 Apr 2003 04:02 PM	ACARD AEC-671x SCSI Driver V
ACard6885M.kext	1.0.0d1	29 Apr 2003 11:53 AM	ACARD AEC-6885/95/96 Driver
ACard68xxM.kext	1.1.2	28 Apr 2003 03:38 PM	ACARD AEC-68XX Driver V 1.1.2
Adapte290X-2930.kext	1.1.0	27 Jul 2002 04:00 PM	Not Available
Adapte29160x.kext	1.1.0	27 Jul 2002 04:00 PM	Not Available
Adapte39160.kext	1.1.0	27 Jul 2002 04:00 PM	Not Available
Adapte780XSCSI.kext	1.1.2	28 Jul 2002 04:25 AM	1.1.2, Copyright 1993-2002 Ada
Apple16X50Serial.kext	1.0.6	10 Apr 2003 01:06 AM	Apple16X50Serial 1.0.6, Copyrig
Apple_DEC21x4Ethernet.kext	1.1.3	28 Jul 2002 04:34 AM	Not Available
AppleADBButtons.kext	1.0.2	10 Apr 2003 01:06 AM	Not Available
AppleADBDisplay.kext	1.0.2	28 Jul 2002 04:40 AM	Not Available
AppleADBKeyboard.kext	2.3.2	28 Jul 2002 04:42 AM	AppleADBKeyboard, version 2.3.2
AppleADBMouse.kext	2.0.8	10 Apr 2003 01:06 AM	Not Available
AppleADM103x.kext	1.0.3	10 Apr 2003 01:06 AM	AppleADM103x version 1.0.3f1,
AppleAirPort.kext	3.0.4	10 Apr 2003 01:06 AM	Not Available
AppleAirPort2.kext	3.0.4	10 Apr 2003 01:05 AM	Not Available
AppleAirPortFW.kext	3.0.4	10 Apr 2003 01:06 AM	Not Available
AppleBCM5701Ethernet.kext	1.1.0	10 Apr 2003 01:06 AM	Apple Broadcom 5701/5703 Ethe
AppleMacEthernet.kext	1.1.1	28 Jul 2002 04:43 AM	Not Available
AppleCore99NVRAM.kext	1.1	28 Jul 2002 04:34 AM	AppleCore99NVRAM version 1.1,
AppleCore99PE.kext	1.2	28 Jul 2002 04:36 AM	AppleCore99PE version 1.2, Copy
AppleCPUThermo.kext	1.0.7	10 Apr 2003 01:06 AM	AppleCPUThermo version 1.0.7, 4
AppleCuda.kext	1.0.0	28 Jul 2002 04:46 AM	AppleCuda version 1.0.0d3, Copy
AppleDallasDriver.kext	1.0.4	10 Apr 2003 01:07 AM	AppleDallasDriver version 1.0.4,
AppleFan.kext	1.0.3	10 Apr 2003 01:06 AM	AppleFan version 1.0.3f1, Copyr

3.2 Install the Adapter in Current OS

We are going to install AEC-6890M in the current OS 9 and OS X 10.3.

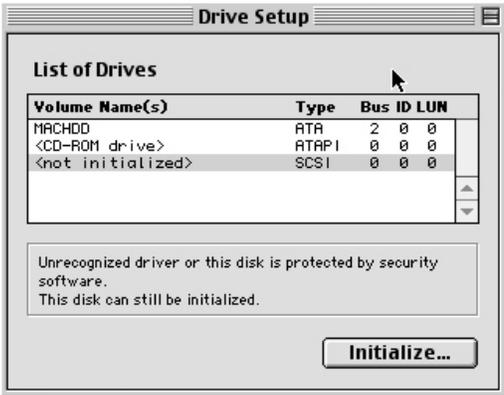
3.2.1 In OS 9

1. Be sure that the hardware is installed correctly.
2. Decide the RAID mode you need and set it by DIP switch.
3. Power on.
4. Double click “Utilities” under OnBoard/Applications.

5. Double click "Drive Setup".



6. Choose the newly installed hard drive, and click "Initialize".



7. You can see the initialized or partitioned volume on the desktop.

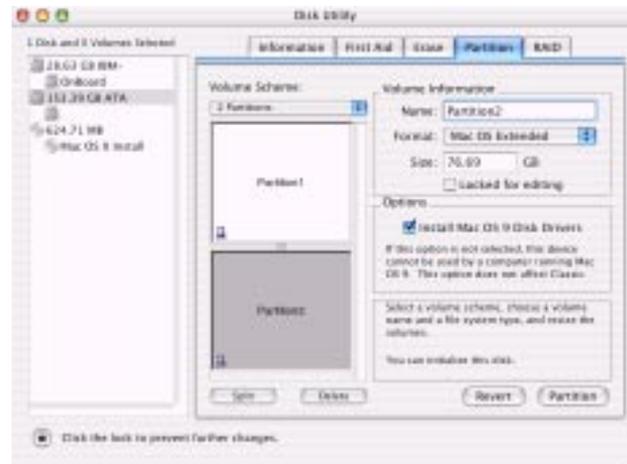
8. Then install RAID Utility (refer to 3.3) to monitor RAID volume and hard drives.

3.2.2 In OS X

1. Be sure that the hardware is installed correctly.
2. Decide the RAID mode you need and set it by DIP switch.
3. Power on.
4. Update the driver of AEC-6890M to the newest version, which is in the ACARD support CD. Or download the driver from <http://www.acard.com>. (If you're an OS X 10.3 user, you can skip this step.)
5. Double click "Disk Utility" under OnBoard\Applications\Utilities. (OnBoard represents the OnBoard Mac hard drive.)



6. Initialize the newly installed hard drive by clicking "Partition".



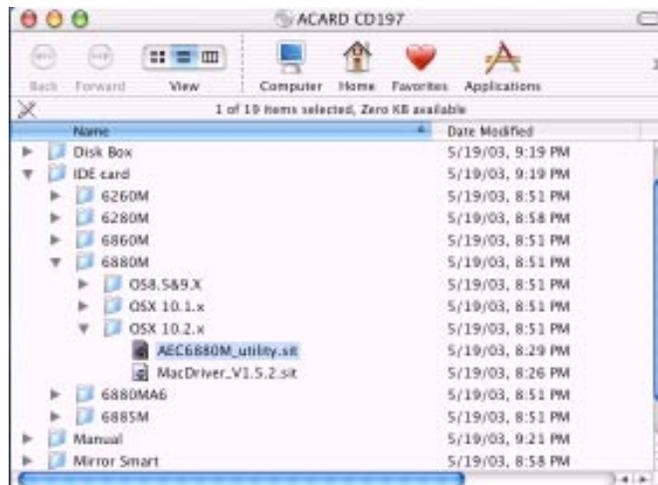
- 7. You can see the partitioned or erased volume on the desktop.
- 8. Then install RAID Utility (refer to 3.3) to monitor RAID volume and hard drives.

3.2.3 Verify System Profiler

Please refer to 3.1.3.

3.3 AEC-6890M RAID Utility

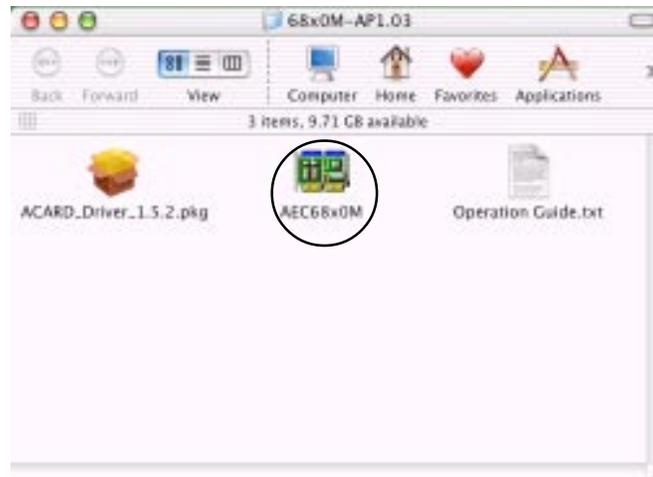
It is very easy to install AEC-6890M RAID Utility. You can find it in the support CD. After decompression, you can clearly see the utility and quick guide (Readme file) in a folder. Double clicking the icon to execute the utility. If the version of support CD is 1.97, it hasn't included 6890M RAID Utility yet. Therefore, you can use 6880M Utility or download the newest utility from ACARD's web site.



Since OS 9 and OS X are different in structure, ACARD has developed two sets of utilities. But the utilities are not too different, so users won't feel inconvenient. Here we take the utility of OS X as an example to explain all functions.

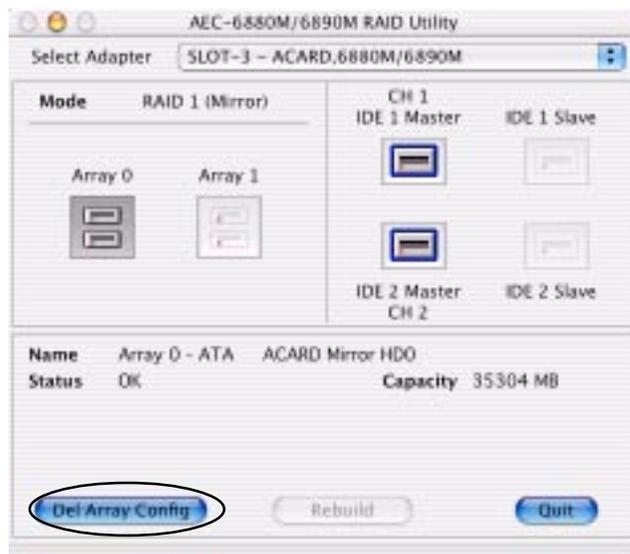
NOTICE: The OS X utility of AEC-6890M only supports OS X 10.2 and later version. It doesn't support OS X 10.1.

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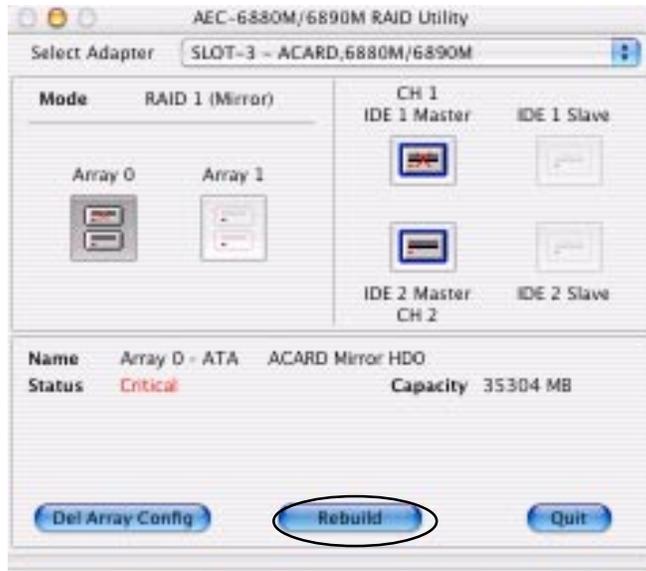
Del Array Config

When a hard drive fails in the disk array of RAID 0, please replace it with a new one, then delete the original array configuration. Restart the computer to detect the new array. If you want to change RAID mode, please delete the current RAID and shut down. Then adjust the DIP switch to the RAID mode you like.



Rebuild

When a hard drive fails in the disk array of RAID 1, this function will be activated. It is to copy data from a normal hard drive to a new one.



Update Firmware

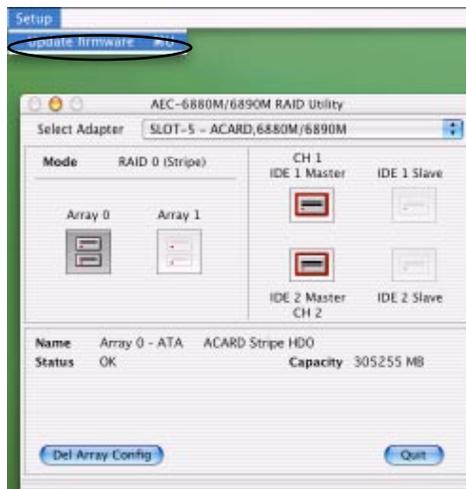
It is placed under Setup on the top function row. You can go to ACARD's web site to download the newest version of firmware. But if there is nothing wrong during operation, you are recommended not to update the firmware.

This function is somewhat different in OS 9 and OS X. In OS 9, it is independent. You can see the updated utility in the same folder when you decompress the downloaded new firmware.

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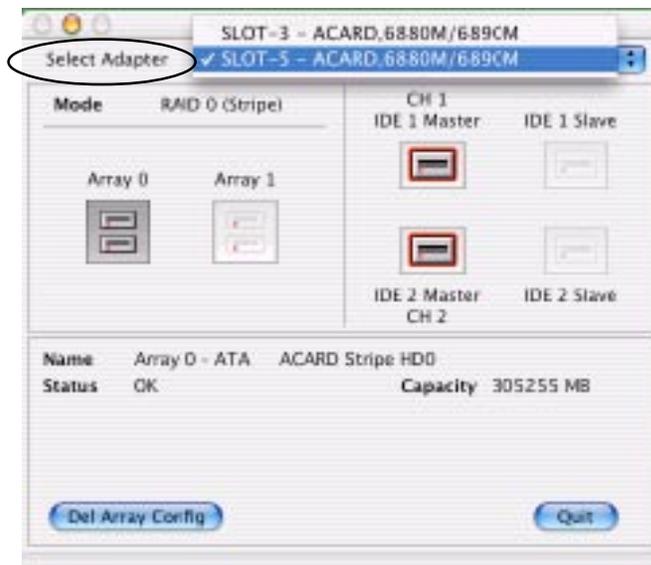
in OS 9 (Please update one adapter's firmware and then another's.)



in OS X

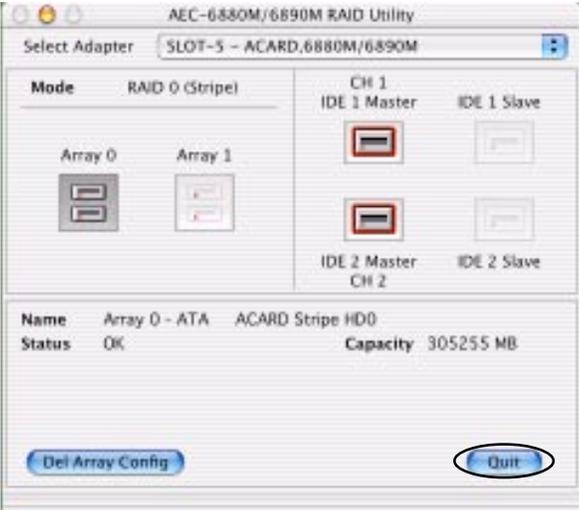
Select Adapter

When you insert two or more AEC-6890M adapters, this function lets you monitor the status of all adapters.



Quit

Quitting the utility does not affect all RAID operations.



NOTICE: When rebuilding is running, you can still quit the utility by clicking "Don't Stop". The rebuilding process won't be affected.



Chapter 4 Troubleshooting

After installation, if AEC-6890M cannot work smoothly, please troubleshoot it according to the methods given below.

1. Inspect power supply

When the device is malfunctioned, inspect the power status (ON/OFF) first. If you connect more than 4 hard drives, you had better prepare another set of power source in order not to affect the stability of hard drives.

2. Inspect the SATA devices

Always let the SATA devices function in a proper mode before installing the adapter. You are suggested to inspect if every hard drive is normal in access via the adapter's normal mode or Mac's built-in SATA port.

3. Inspect the adapter

Inspect if the adapter is firmly inserted into the slot on the motherboard. If the connection is not good, try to clean the edge connector with an eraser.

4. Inspect all connectors and cables

Inspect if SATA connector, device power connector and cables are connected well. Cables are easily damaged because of improper folding. Try a new cable when the old one is bad.

5. Inspect the DIP switch setting

Inspect if the DIP switch is set correctly on the adapter.

Technical Support Form

Email: support@acard.com

<http://www.acard.com>

Model	AEC-6890M	F/W Version	
System Configuration			
Motherboard			
BIOS version			
SCSI adapter			
Chipset			
Memory			
Display card			
Other I/O card			
OS version			
Hard Disk Configuration			
Hard Disk Model/type			
Capacity			
Firmware version			
Others			
Problem Description			

MALAE6890ME10-0