

SOHO-RAID

***Realtime Hi-Speed Data
Backup Storage System
(Model : LBA-48)***

Contents

<i>Chapter 1:Introduction</i>	<i>3</i>
1-1 Function & Features	3
1-2 Data Specifications	4
1-3 General Specifications	4
<i>Chapter 2:Installation</i>	<i>5</i>
2-1 Device Descriptions	5
2-2 How to plug in/Pull out HDD Tray	7
2-3 Install HDD to the HDD TRAY	8
2-4 Install SOHO-RAID in to the Computer	8
<i>Chapter 3: How to use SOHO-RAID</i>	<i>10</i>
3-1 Jumper Setting configurations	10
3-2 Operation Instructions	11
<i>Chapter 4: HDD Auto Rebuild Function (A.R.F.)</i>	<i>13</i>
4-2 Auto rebuild function	14
<i>Chapter 5: PCB Dimensions and IC Parts</i>	<i>16</i>
5-1 Control Board	16
5-2 IC Parts	16

CHAPTER 1.

Introduction

SOHO-RAID, which supports RAID (Redundant of Array Independent Drives) level 1 mirroring and level 0 striping function, is an internal device especially designed for the professional PC and PC server users. This device will be greatly appreciated by the serious users of small and medium-sized office servers, who wish to update their backups instantly and easily.

SOHO-RAID is a low cost, high efficiency Real-time Data Backup System. It offers an alternative to the potential users of expensive SCSI RAID Level 5 or low efficiency magnetic tape backup system.

The housing of SOHO-RAID is 146mm(w) and 84mm(h), which will fit into the opening of two consecutive bays for 5.25" HDD. There are two removable trays for two identical hard disk drives in the housing. These trays are now empty. No Hard disk drives are supplied with SOHO-RAID. The users themselves must buy the hard disk drives according to their own needs.

The installation will be divided into two parts. The first part is to install the housing of SOHO-RAID into your computer or server. The second is to install the HDD into the tray and then the tray into the housing, which is now a part of your computer or server.

1-1 Function & Features

- ☛☛ Simultaneous writing to both drives in RAID level 1 function.
- ☛☛ Automatically rebuilding data in the replacement HDD in RAID level 1 function.
- ☛☛ Drives are hot swappable without turning the system off in RAID level 1 function.
- ☛☛ Support IDE interface.
- ☛☛ Audible alarm and LCD display on drive failure.
- ☛☛ System still works normally with failure in one drive in RAID level 1 function.
- ☛☛ Direct connections to host IDE interface. No add-on card needed. Just plug-N-play.
- ☛☛ Compatible to most leading brand Hard Drives.
- ☛☛ With built-in cooling fan for high-speed HDD.
- ☛☛ No software driver required.

1-2 Data Specifications

1. Support RAID level 1 (data mirror), and RAID level 0 (data striping)
Two hard disks always maintain same contents concurrently in RAID level 1 function.
2. Support bad sector recovery in RAID level 1 function.
3. Hot-Swap supported in RAID level 1 function.
Provide easy remove and install connector for each disk
4. Auto-Rebuild supported in RAID level 1 function. (Rebuild function and flag handle details please refer to Chapter 4)
5. LCD Display “**RAID 0**” when setting system to RAID 0.
6. Support PIO/UDMA/33/66/100/133
7. Device Drive independent
 - a. DOS/Windows Series
 - b. UNIX Series
 - c. Linux Series
 - d. Netware Series
8. Support Plug and Play
9. Directly connects to host IDE interface
10. Compatible with leading brand hard disk drives
11. Buzzer: To indicate any HDD is fail or empty, the buzzer will be alarming
12. Setting Jumper

1-3 General Specifications

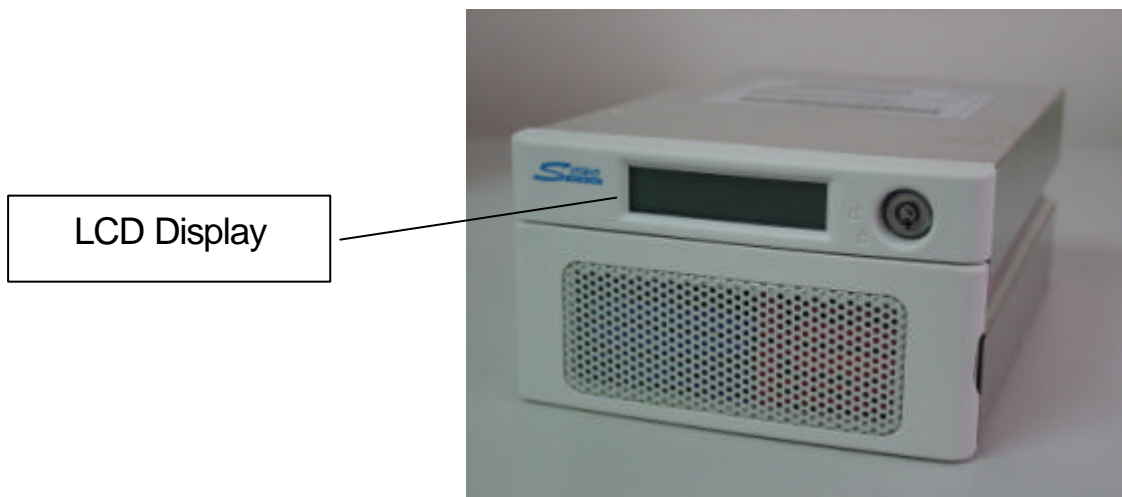
Host Interface	Ultra ATA
RAID level	1, 0
HDD Select Mode	Master/Slave
Cooling Fan	5x5x1.5cm Ball Bearing
Operating temperature	0 ~55
Non-Operating temperature	-20 ~70
Supply Voltages	+5V, +12V
MTBF	>250,000 Hr
Size (mm)	146(W) x 232-(D) X84 (H)
Weight (Kg)	1.6Kg(without drives)
System certification	CE

CHAPTER 2.

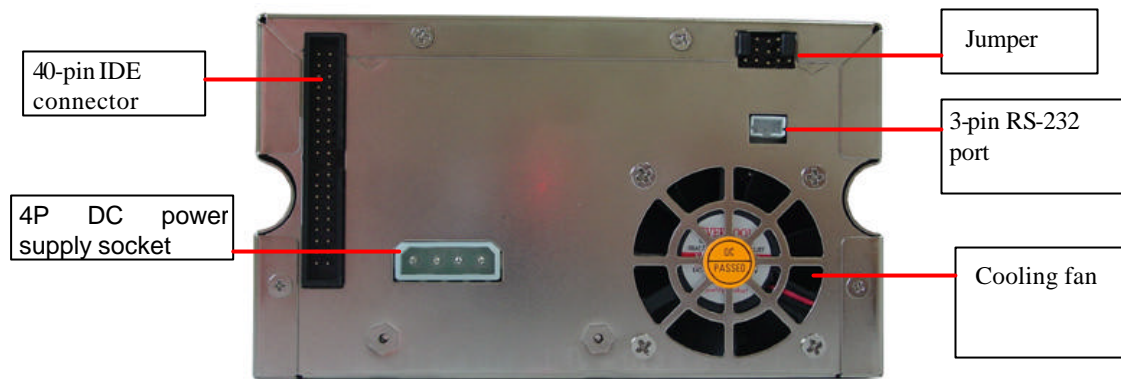
2-1 Device Descriptions

The front panel

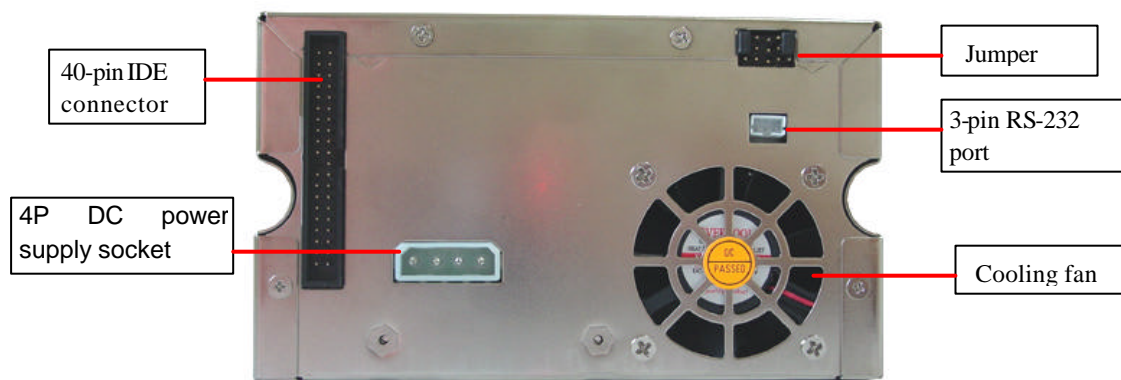
There is a LCD Display on the front panel and inner with a LCD display module to display the status of RAID system.



The Rear Panel



Rear Panel



2-2 How to Plug in and Pull out the HDD TRAY

· Pull out the HDD TRAY

1. After open the front panel, pull the handle of HDD Tray.
2. The HDD TRAY will slide out of the housing. Take out the HDD TRAY.



· Plug in the HDD TRAY

1. Plug the HDD TRAY into the upper/lower tracks and push it to the base.
2. Push back the HDD TRAY handles until lock it. (*Indicator by pictures as followed*)

(step 1)



(step 2)

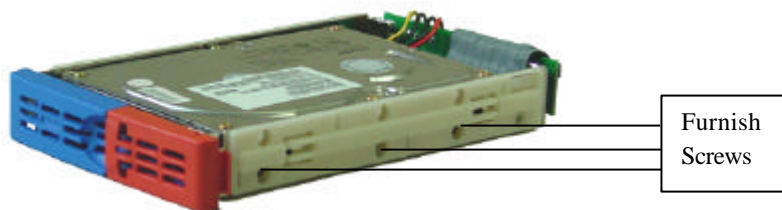


(finished)



2-3 Install Hard Drives to HDD Trays

- 1. Set the hard disk drives to the **MASTER mode only**.
- 2. Connect the 4-pin power socket and the 40-pin EIDE/IDE socket of Hard disk drive to the connectors on the HDD tray of SOHO-RAID.
- 3. Install the Hard Drive into the HDD tray
- 4. Fix the Hard Drive on the HDD tray with the furnished screws, and then put the power lines and EIDE/IDE cable in place, such as not to be in the way when you push the HDD Tray in.



2-4 Install SOHO-RAID into the Computer (Server)

- 1. Turn the computer off and pull off the power plug.
- 2. It takes the space of 5.25" Bay x 2 to install the SOHO-RAID into the computer.
- 3. The SOHO-RAID can be set as MASTER (DEFAULT) or SLAVE Mode. You can change the SOHO-RAID as SLAVE Mode by set up the Jumper. (Refer to 3-1 SOHO-RAID configuration)
- 4. Remove the Computer case and mount the SOHO-RAID unit into the computer.
- 5. Connect the power line and EIDE/IDE cable to the PCB on the back of the SOHO-RAID. Fix the SOHO-RAID on the computer with screw.
- 6. Put back the cover(s) of the computer's metal case and fix it.

(Indicator by pictures as next page:)



There are two different cases to install the HDD on the SOHO-RAID.

1. Install 2 brand-new Hard Drives into SOHO-RAID.

- ✍ After installing the two brand-new and identical Hard Drives into the HDD Tray, plug the HDD Trays in the SOHO-RAID, and push the trays all the way in. Then close the HDD Tray's handle and the front panel.
- ✍ If the two drives are different in capacity, put the smaller one at first and follow the step as "Install an original Hard Drive which contains the system software and data, and also a new Hard Drive into SOHO-RAID" (see next paragraph). The SOHO-RAID will limit its capacity to that of the smaller hard disk drive.

2. Install an original Hard Drive which contains the system software and data, and also a new Hard Drive into SOHO-RAID

- ✍ Install the tray with the original Hard Drive into either tracks of the SOHO-RAID.
- ✍ Then install the other tray follow the Operation Instruction in Chapter 3.

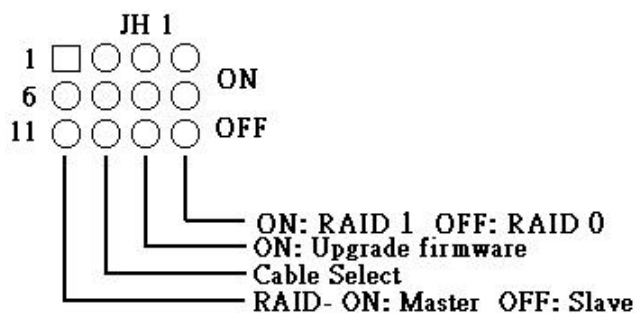
CHAPTER 3.

How to use SOHO-RAID

As a matter of fact, the two hard disk drives in the SOHO-RAID start working simultaneously as one right after the installation. Not only all commands from FORMAT, and FDISK will be performed on the two hard drives simultaneously, but all things including the booting system you will install from the CD ROM, are also written on the two hard disk drives at the same time, if you choose the SOHO-RAID as MASTER. (If you choose it to be SLAVE, the two hard disk drives will act together exactly like a “D:”

3-1 Jumper setting Configurations

Except support RAID 1 mirroring and RAID 0 striping function by setting different jumper configuration on its Rear Panel. You can configure the SOHO-RAID by setting the jumpers as below.

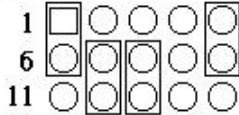


How to set up the jumpers

The definitions of the jumper on the rear panel of SOHO-RAID:

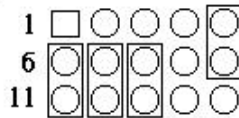
RAID Mirroring:

Master



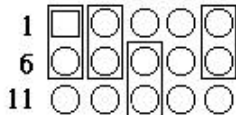
*SOHO-RAID As Master

Slave



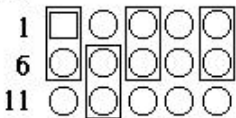
* SOHO-RAID As Slave

CSEL



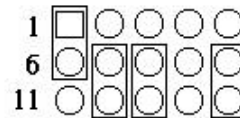
* Cable Select

Upgrade

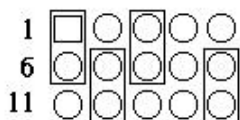


* Upgrade Firmware

RAID Striping



Upgrade



* Upgrade Firmware

3-2 Operation Instruction

Install 2 brand-new Hard Drives into SOHO-RAID

1. Switch on the Computer. Go to the BIOS Setup and enter the Standard CMOS Setup. Set the HDD (the position of the SOHO-RAID) type on AUTO, save and exit. **The system will automatically detect the SOHO-RAID.**
2. After the boot-up is through, SOHO-RAID will start formatting and Fdisk the Hard Drives.

3. The next step will be the installation of the operation system and other software required.

Install an original Hard Disk Drive which contains the system software and data, and also a new Hard Drive into SOHO-RAID

1. Install a HDD tray with Hard Disk Drive, which contain **system software and data** into either upper or lower HDD tray track of SOHO-RAID before switch on the computer. The computer is bootable now and the SOHO-RAID will work without the back-up function.
2. Then install a HDD tray containing a new Hard Disk Drive or a bigger capacity Hard Disk Drive which with Data into another HDD tray track. (Please notice the original data will be rewrite.) The SOHO-RAID will start rebuilding and copying the contents of the original drive. When this step is done, the SOHO-RAID is ready with the back-up function.

On-line Hot swap and Data Real-time automatic rebuilding

1. The SOHO-RAID alarm will sound when either Hard Drive fails. Pull out the tray containing the defective hard disk drive and take it out.
2. The alarm will be stop, but the computer will keep on working with the functional Hard Drive. Hence no data is lost.
3. Replace the defective hard disk drive (right away if the user has one at hand) and plug the tray back.
4. All the above process can be done with the running continuously. A few seconds later, the SOHO-RAID will start rebuilding data automatically. (Please refer to **INSTALLATION** in Chapter 2, and also **HDD Auto Rebuild Function** in Chapter 4.) Everything contained in the hard disk drive will automatically be copied to the new hard disk drive.

CHAPTER 4.

4-1 HDD Auto Rebuild Function (A.R.F.)

SOHO-RAID (LBA-48) Module will provide auto rebuild function. For handle the rebuild function, a HDD flag will be put in the HDD to record different condition. Please references following for detail rebuild function and flag handle.

Case 1: When system power on

a. Only one HDD in RAID Module

✂✂ LCD Display **“PRI HDD: OK”**
“SEC HDD: Fail”

✂✂ LED Display **“PRI HDD: In Use & Good”**
“SEC HDD: Fail”

b. Two HDD in RAID 1 Module -> Check rebuild flag

X-Drive	YDrive	Active	LCD display	LED display
S (Source)	S (Source)	System Failed	Rebuild Flag ERR PRI: S SEC: S	PRI: Fail SEC: Fail
S (Source)	T (Target)	Rebuilding	Rebuilding ... PRI => SEC ??%	PRI: In Use, Good => SEC: In Use, Good, Rebuilding
S (Source)	N (No Flag)	Rebuilding Y-Drive be Target	Rebuilding ... PRI => SEC 00%	PRI: In Use, Good => SEC: In Use, Good, Rebuilding
S (Source)	U (Unknown)	System Failed	Rebuild Flag ERR PRI: S SEC: X	PRI: Fail SEC: Fail
T (Target))	S (Source)	Rebuilding	Rebuilding... SEC => PRI ??%	PRI: In Use, Good, Rebuilding <= SEC: Good
T (Target)	T (Target)	System Failed	Rebuild Flag ERR PRI: T SEC: T	PRI: Fail SEC: Fail
T (Target)	N (No Flag)	System Failed	Rebuild Flag ERR PRI: T SEC: N	PRI: Fail SEC: Fail
T (Target)	U (Unknown)	System Failed	Rebuild Flag ERR PRI: T SEC: X	PRI: Fail SEC: Fail
N (No Flag)	S (Source)	Rebuilding X-Drive be Target	Rebuilding... SEC => PRI 00%	PRI: In Use, Good, Rebuilding <= SEC: In Use, Good
N (No Flag)	T (Target)	System Failed	Rebuild Flag ERR PRI: N SEC: T	PRI: Fail SEC: Fail
N (No Flag)	N (No Flag)	Normal operation	PRI HDD: OK SEC HDD: OK	PRI HDD: Good SEC HDD: Good
N (No Flag)	U (Unknown)	System Failed	Rebuild Flag ERR Unknown Flag	PRI: Fail SEC: Fail
U (Unknown)	S (Source)	System Failed	Rebuild Flag ERR PRI: X SEC: S	PRI: Fail SEC: Fail
U (Unknown)	T (Target)	System Failed	Rebuild Flag ERR	PRI: Fail

			PRI: X SEC: T	SEC: Fail
U (Unknown)	N (No Flag)	System Failed	Rebuild Flag ERR Unknown Flag	PRI: Fail SEC: Fail
U (Unknown)	U (Unknown)	System Failed	Rebuild Flag ERR Unknown Flag	PRI: Fail SEC: Fail

Case 2: HDD Swap Out or Failed

Set another HDD flag to “Rebuild-Source” and “Rebuild-Percentage” = 0

~~LED~~ LCD Display **“PRI HDD: OK”**
 “SEC HDD: Fail”
~~LED~~ LED Display **“PRI HDD: Good”**
 “SEC HDD: Fail”

Case 3: New Swap in

Set new HDD flag to “Rebuild-Target” and Rebuilding

~~LED~~ LCD Display **“Rebuilding...”**
 “PRI => SEC HDD: 00%”
~~LED~~ LED Display **“PRI HDD: In Use, Good”**
 “SEC HDD: In Use, Good, Rebuilding”

Case 4: After Rebuild finish:

After rebuild finish, both HDD flag set to “No Flag”

~~LED~~ LCD Display **“PRI HDD: OK”**
 “SEC HDD: OK”
~~LED~~ LED Display **“PRI HDD: Good”**
 “SEC HDD: Good”

4-2 LCD Message List when Hard Drive Auto Rebuild

LCD Message List :

" PRI HDD : OK ";
" SEC HDD : OK "; **When both HDD are good.**

" PRI HDD : OK ";
" SEC HDD : Fail "; **When Secondary HDD is fail.**

" PRI HDD : Fail ";
" SEC HDD : OK " " When Primary HDD is fail.

" PRI HDD : Fail ";
" SEC HDD : Fail "; **When both HDD are fail.**

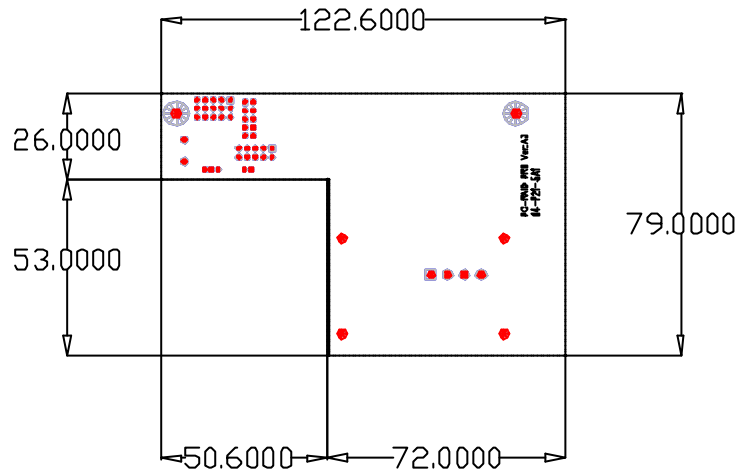
" Rebuilding ... "; **When rebuilding from Primary to Secondary**
" PRI => SEC 00%"; **finished percentage.**

" Rebuilding ... "; " SEC => PRI 00%";	When rebuilding from Secondary to Primary finished percentage.
" Wrong Capacity "; " PRI > SEC ";	When source HDD is Secondary, Primary capacity larger than Secondary.
" Wrong Capacity "; " SEC > PRI ";	When source HDD is Primary, Secondary capacity larger than Primary.
" Source Fail "; " PRI > SEC ";	When source HDD is Primary, Source data fail during rebuilding.
" Source Fail "; " SEC > PRI ";	When source HDD is Secondary, Source data fail during rebuilding.
"Rebuild Flag ERR "; " PRI:S SEC:S ";	Both HDD are marked "Source".
"Rebuild Flag ERR "; " PRI: T SEC:T ";	Both HDD are marked "Target".

CHAPTER 5.

PCB Dimension and Version

Control Board



IC List

<u>Item</u>	<u>Description</u>	<u>Brand Name</u>
1.	Flash ROM/PLCC32 1M	Winbond & SST & ICE a) Winbond: W29C011AP-15 b) SST: SST29EE010 c) ICE: ICE28LF010
2.	Microprocessor/8032 PLCC44 40MHZ	Winbond & ICSI a) Winbond: W78C32CP-40 b) ICSI: IS80C32-40
3.	SRAM/64K*16 SOJ44	ICSI & G-Link & Eureka a) ICSI: IS61C6416-12T b) G-Link: GLT710016-15J4 c) Eureka: EK681016J-15