SOHO RAID SR2000

User's Manual
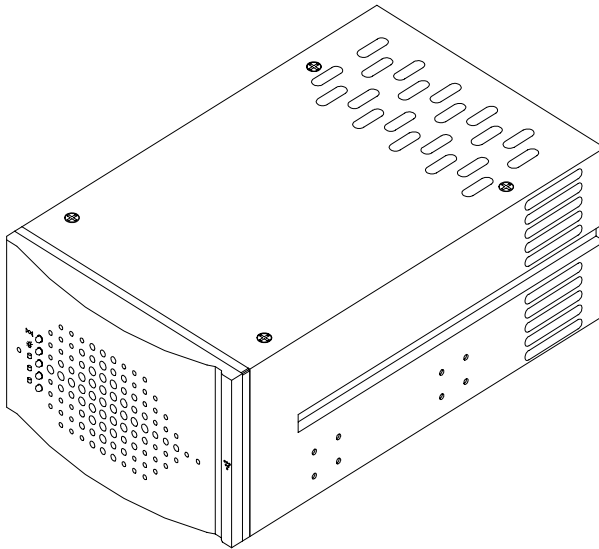
P/N: **P99649**
Version: **2.0**

Chapter 1 Introduction

SR2000 SOHO RAID (**R**edundant of **A**rray **I**ndependent **D**rives) provides disk mirror function for the internal RAID Level 1 for small offices or home offices. SR2000 SOHO RAID is an excellent low-cost, high-efficiency substitute for expensive RAID Level 5 and low-efficiency magnetic tape as a back up.

1-1 **Functions and Features**

- The two hard disks can simultaneously perform mirroring with synchronization.
- One of the two hard disks can function as source, and the other as target for back up purpose.
- Providing **on-line rebuild** function.
- **Hot plug** to replace damaged HDD without interrupting system.
- Support for IDE interface.
- Alarm for HDD failure.
- System maintains normal performance when any HDD is damaged.
- Supports most PC **Operating Systems (OS)**, no drivers required.
- **Hot plug** to EIDE connector without interface card.
- Compatible with most HDD.
- LCD screen showing HDD operating status.
- Status Indicator for HDD "reading" or "writing" modes.
- High power fan to prevent overheating.
- High quality stainless handle (SUS 302) for Removable Carrier.

1-2 Product Specifications

- System Specifications
  Host Interface   Ultra ATA
  RAID level   1
  Installation Space   2 x 5-1/4" Expansion Bay
  HDD Interface   EIDE
  HDD Selection Mode   Master/Slave
  Overheating prevention   6cm Ball Bearing Fan
- Environmental Conditions
  Operating Temperature   0   ~55
  Non operating Temperature   -20   ~70
- Power
  Input Voltage (DC)   +5V, +12V
- Reliability
  MTBF   250,000 Hours
- Dimensions
  Measures (mm)   146(W)X238(D)X85(H)
  Weight   1.5 Kg(HDD excluded)
- Safety   CE Certificate

1-3 System Requirements and support

- Hardware Requirements
  1. Intel based IBM compatible PC (Pentium III, Pentium II, Pentium MMX/Pentium, or 100% compatible).
  2. HDD with standard EIDE/IDE Interface.
  3. 2 x 5-1/4" Expansion Bay.
  4. One 4-pin DC power socket outlet.
  5. Supports all I/O chips, except ITE IT8680F-A I/O chip.

- Supports the Following **OS** (no drivers required)
  DOS, Windows NT Server, Workstation, Windows
  98/95/3.1x, NetWare**3.12/4.1x/5.x, SCO UNIX,
  LINUX (RedHat Slackware, Debian, S.U.S.E.,
  OPENLinux, TURBOLinux), Free BSD, IBM OS/2,
  Solaris 2.x.

1-4 **Note (Read carefully before using SR2000)**

1. Use two identical hard disks (same brand name and model) for optimum performance and greatest convenience.
2. To obtain optimum performance, use two brand new hard disks or hard disks in perfect conditions without any damaged sectors.
3. Use hard disks with a minimum capacity of 3.2GB Ultra DMA 33/66.
4. Easy to use with hard disks manufactured by QUANTUM, IBM, MAXTOR, or Western Digital. (see Chapter 6 Certified HDD for SR2000)
5. Whether it is the upper or lower deck, please set up both Hard Disks in SR2000 to **MASTER** mode. (Drive Mode: HDD Factory Default), or else HDD won't be detected.
6. If replacing an old HDD with a new one, please purchase the same brand and choose a disk capacity greater than or equal to the original one.
7. SR2000 will automatically format a new HDD. No need to use FDISK or FORMAT. Use the **Auto-Rebuild** Function or manual **Back Up** to copy data to the new target HDD.
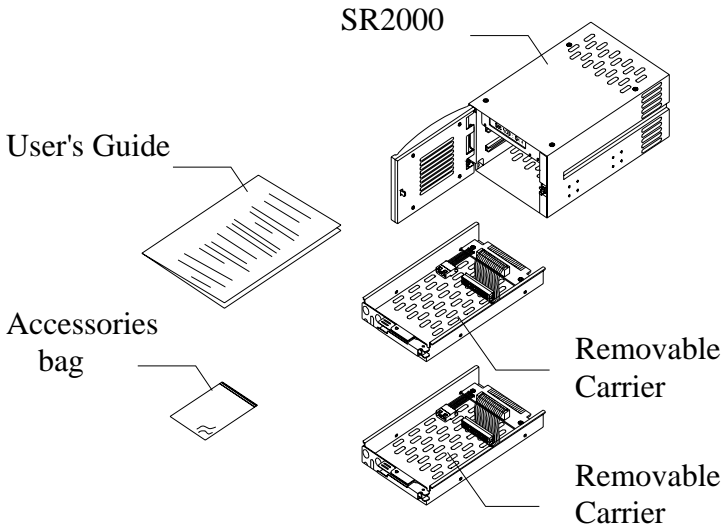
8. Normal HDD mode for SR2000 is Ultra DMA. In the event of failure to work with EIDE connector, HDD will automatically configure itself in PIO mode 4 or with lower speed.

9. There is a 6mm Ball Bearing Fan integrated in the SR2000 to prevent overheating for 7200 rpm HDD. When two 7200rpm Hard Disks are installed in a very busy server, we suggest adopting a PC case with optimal design for overheating prevention in order to avoid PC or RAID crashes.

10. In case of power failure during the **Auto-Rebuild** Function, controller will remember the rebuilding progress percentage and carry on the operations when the power is restored.

11. In case of power failure during **Back up,** restart **Back up** when power is restored.

12. Under normal conditions, set Operation Mode Switch to **NORMAL** position, or else your PC will not detect the SR2000 and it will have to be reset.

Chapter 2 Installation

2-1 Package Contents

Your SR2000 SOHO RAID package includes the following: please contact our distributors in case of any missing or damaged items.

Item	Quantity
SR-2000	1
Removable Carrier	2
User's Guide	1
Accessories bag	1 (including 8 x 6#-32 screw and 8 x M3×6 screw)

SR2000

User's Guide

Accessories bag

Removable Carrier

Removable Carrier

2-2 **Part Description**
- Front Panel

Buzzer On/Off Switch

System Access LED
Upper deck HDD Access LED

Lower deck HDD Access LED

Buzzer On/Off Access LED

Lock/Unlock Switch

DC 12V Fan

SUS 302 Handle
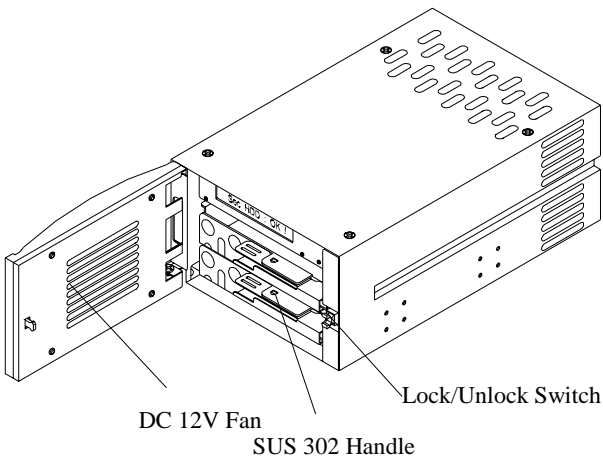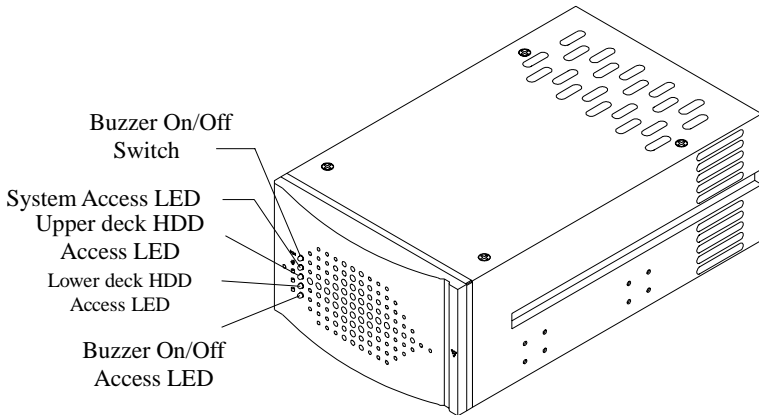
Buzzer On/Off switch:
Alarm functions when buzzer switch is on. To release the function, please push the button. Push the button again to recover the function.
LED displays **Red** when buzzer switch is **Off**.

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- Inside the SR2000

LCD Panel   Controller

Operation mode switch

Pri HDD : OK
Sec HDD : Fail

NOMAL
BACK UP
SELECT

Select button

Upper Deck Removable Carrier

Lower Deck Removable Carrier

- Back Panel

CE

EIDE Controller

Master/Slave Jumper

BZ.ON
BZ.OFF
Master
Slave

DC POWER

CHANNEL IN

Master   Slave

DC Power Socket Outlet

8   SOHO RAID
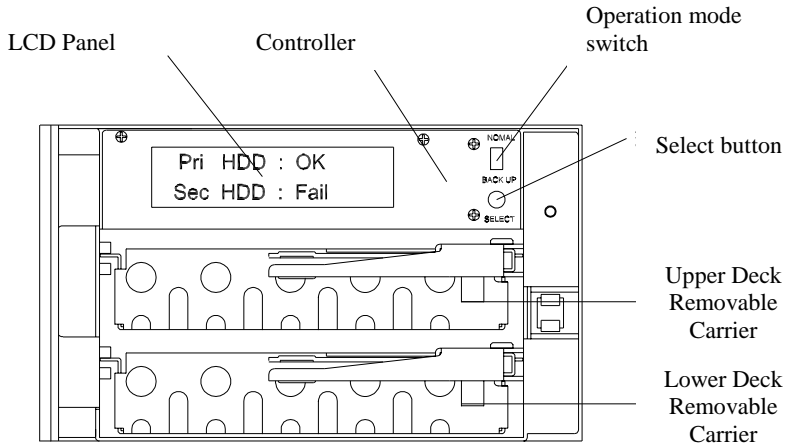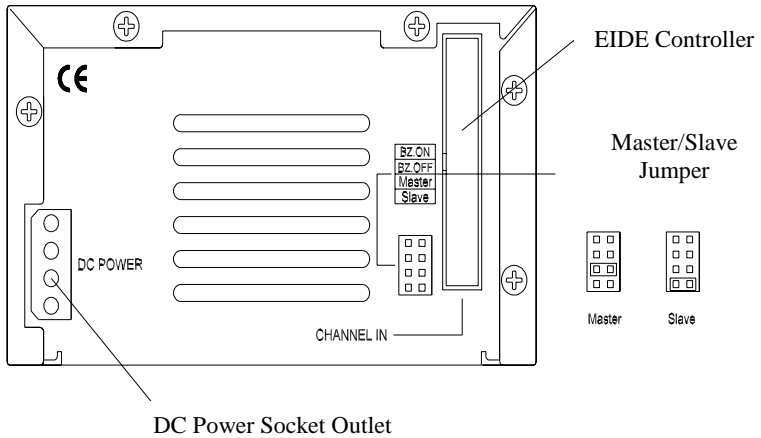
2-3 How to open/close the front panel
- Opening the front panel
    1. Touch the right side center of the front panel with your finger as indicated by the arrow. There is a trigger to open the panel.

Press
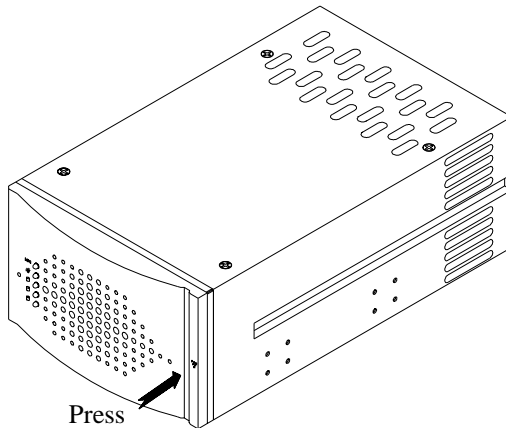
- Closing the front panel
    1. Turn the panel in the direction indicated by the arrow to connect it with the trigger until it clicks inside, which means the front panel is closed.

Turn

9   SOHO RAID
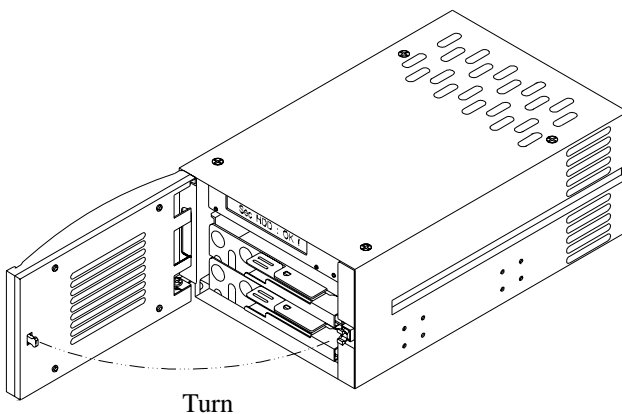
2-4 **How to remove/insert the Removable Carrier**

- Removing the Removable Carrier
  1. Following the indicated direction, press down and hold the Removable Carrier Handle to unlock the spring from its button.
  2. Turn the Removable Carrier Handle in the direction indicated by the arrow to remove the Removable Carrier.
  3. Pull out the Removable Carrier along the direction shown in the figure.

1. Push in
2. Turn
3. Pull out
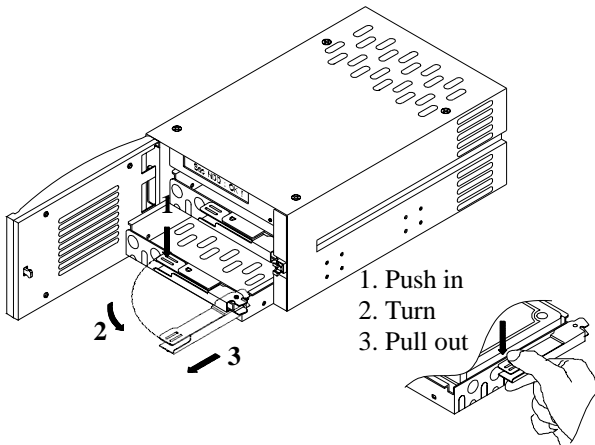
- To insert the Removable Carrier
  1. Following the direction indicated by the arrow, slide the Removable Carrier along the rail into the slot end of the upper or lower deck.
  2. Following the direction indicated by the arrow, turn the Removable Carrier Handle to the end in order to fix it with the spring.

1. Push in
2. Turn to the end

11   SOHO RAID
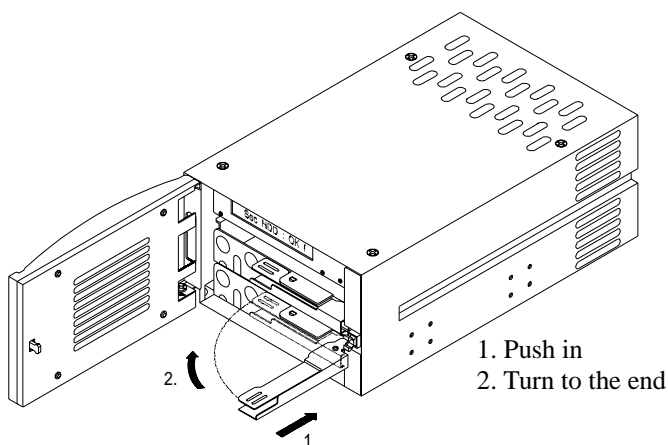
2-5 Installing HDD in the Removable Carrier

- Set Master/Slave jumpers to **MASTER** (factory default).
- Connect the power cord and the Removable Carrier's EIDE/IDE interface cable to the HDD.
- Inset the HDD into the Removable Carrier.
- Fasten the HDD with the attached 6#-32 screws in their four locations. Place the power cord and the EIDE/IDE interface cable lower than the surface of the HDD in order to avoid any hindrance when taking out the HDD. Please refer to the following illustration.

6#32 –
4 screws
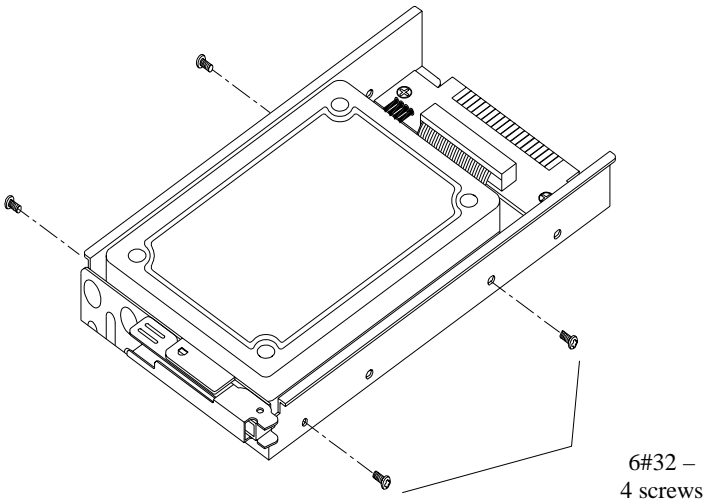
2-6 Installing the SR2000 in your Computer

- Turn the power off.
- Make sure there are two 5-1/4" Expansion bays available for the SR2000.
- Set up MASTER or SLAVE positions of SR2000 according to your needs. (Factory default: **Master**). If you need to set it to SLAVE, please modify the jumpers on the back panel of the SR2000.
- Remove computer case and insert the SR2000 into the Expansion bay.
- Connect power cord and EIDE/IDE interface cable to the right connector.
- Fasten SR2000 at four places with attached M3×6mm screws, according to the following illustration.
- Replace and fasten computer case.

M3x6 mm
8 pcs
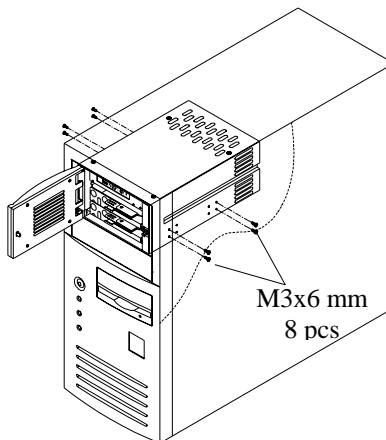
Chapter 3 RAID Use

- After proper installation, the SR2000 can be considered as one HDD.
- Both FDISK and FORMAT commands have the same function on the two Hard Disks inside the SR2000.
- Some OS can perform self partitioning and formatting without going through the above mentioned process.
- After turning PC power on, SR2000's two hard disks maintain synchronized operation unless one of them stops working.

3-1 **Factory Default**

- Buzzer On/Off switch   ON
- Operation Mode Switch   NORMAL
- MASTER/SLAVE JUMPER   MASTER

3-2 **Installation**

- Installing two new Hard Disks in Auto-Rebuild mode
    1. Push the switch on the right side center of the SR2000 to open its front panel. (Refer to Section 2-3 How to open/close the front panel)
    2. Insert two Removable Carriers into the SR2000. (HDD assembled) (Refer to Section 2-4 How to remove/insert the Removable Carrier.)
    3. For handling convenience, open the panel as wide as possible. Set Operation Mode Switch to NORMAL on the upper right corner of controller.
    4. Turn the power on. In the BIOS setting screen, change HDD type to AUTO. This will enable the computer system to automatically detect the type and model of your Hard Disks.
    5. After restarting the computer, the SR2000 will

automatically format HDD synchronously. In addition, it will install the OS and other required software. (Refer to OS Installation Guide)

6. When the two installed hard disks have different capacities, SR2000 will auto detect and set the capacity according to the smaller one. This way your Computer will suppose that the SR2000 has a smaller capacity.

- **Installing one new HDD in Auto-Rebuild mode**
    1. Locate the original HDD in either the upper or lower deck of SR2000.
    2. In the event of no HDD inside, SR2000's buzzer begins to sound after computer is started. To switch off the alarm, use a sharp pointed object to turn off the buzzer on the front panel. The Access LED on the lower part of the panel will be on. (Note 1)
    3. After loading the OS, insert the Removable Carrier with the new HDD into the upper or lower deck of the SR2000. The capacity of the new HDD should be equal to or greater than the original one.
    4. Wait a few minutes, after which the SR2000 will automatically perform the **Auto-Rebuild** function. (Refer to Chapter 4 Automatic Rebuild Function).
    5. After the **Auto-Rebuild**, use a sharp pointed object to turn on the buzzer on the front panel. The Access LED on the lower part of the panel will be off. (Note 2)

- **Hot plug and data on-line rebuild**
    1. In the event of any installed HDD's operation failure, the SR2000 buzzer will sound. Pull out the Removable Carrier together with the damaged HDD without turning the power off.
    2. PC will continue normally to store data into the other HDD; no data loss will happen.

3. First follow the reverse order of the steps described in Section 2-5 Installing HDD in Removable Carrier to remove the damaged HDD, and then replace it with a new HDD.
4. Insert the Removable Carrier with the new HDD into the SR2000.
5. Wait a moment. The SR2000 will automatically perform rebuild function on the new HDD. (Refer to Chapter 4 Automatic Rebuild Function)
6. Use a sharp pointed object to turn on the buzzer on the front panel. The Access LED on the lower part of the panel will be off. (Refer to Note 2).
7. After the rebuild process is over, any data on the newly installed HDD will be overwritten.

Note1   Alarm functions when buzzer switch is "On".

Note2   Buzzer access LED displays red when buzzer switch is "Off".

Chapter 4 Automatic Rebuild Function (A.R.F.)

- A.R.F. supports Windows NT4.0 Server & Workstation, Windows 98*/95*/3.1X, Dos 6.22, SCO UNIX System V, Linux (RedHat, Slackware, Debian, S.u.S.E., OPEN, Turbo), Novell NetWare** V3.12, V4.1X, V5.X.
- In most OS, the A.R.F. is performed in the background in order to restore rapidly a HDD to its normal read/write operation.
- When the A.R.F. runs under Windows 95/98 during active DMA, if mouse operation or foreground response should slow down, please close the DMA and start the A.R.F. once again.
- Please choose optimal hardware and SR2000 compatible OS. (Refer to Chapter 6 Certified HDD for SR2000).
- Please set Operation Mode Switch to **NORMAL** position on the control panel before use.
- The HDD on the upper deck is designated as the **Primary**, the one on the lower deck as the **Secondary**.

4-1 **Installing an extra HDD for rebuilding**

- While the HDD with data is on the upper deck of the SR2000, start the computer. The computer will automatically detect the HDD on the lower deck of the SR2000. In case of abnormal operation, the buzzer will sound and the LCD will show the following:

```
Pri HDD    OK
Sec HDD    Fail
```

1. Insert a new HDD correctly on the lower deck of the SR2000. Screen will display and buzzer will sound in case of abnormal operation. If the HDD is properly set up, the LCD will show the following:

```
Pri HDD    OK
Sec HDD    OK
```

2. A few seconds later, the LCD will show:

```
Rebuilding …
Pri    Sec   XXX%
```

The data in the upper deck's HDD will be rebuilt in the lower deck's HDD.
XXX%: Percentage completed, ranging from 0~100.

3. When the rebuild is completed, LCD will show:

```
Pri HDD    OK
Sec HDD    OK
```

- While data is in the HDD on the upper deck of the SR2000, start up the computer. The computer system will automatically check the status of the HDD on the upper deck of the SR2000. In case of failure, the buzzer will sound and the LCD will show the following:

```
Pri HDD    Fail
Sec HDD    OK
```

1. Set up a new HDD on the lower deck of the SR2000. If the HDD is properly set up, the LCD will show the following:

```
Pri HDD    OK
Sec HDD    OK
```

2. A few seconds later, the LCD will show:

```
Rebuilding …
Sec      Pri    XXX%
```

The data in the lower deck's HDD will be rebuilt in the upper deck's HDD.
XXX%: Percentage completed, ranging from 0~100.

3. When the rebuild function is completed, the LCD will show:

```
Pri HDD    OK
Sec HDD    OK
```

4-2 **LCD display showing HDD status**

- Disk on the upper deck (Primary Disk):   Fail
  Disk on the lower deck (Secondary Disk): OK

```
Pri HDD    Fail
Sec HDD    OK
```

- Disk on the upper deck (Primary Disk):   OK
  Disk on the lower deck (Secondary Disk): Fail

```
Pri HDD    OK
Sec HDD    Fail
```

- Disk on the upper deck (Primary Disk):   Fail
  Disk on the lower deck (Secondary Disk): Fail

```
Pri HDD    Fail
Sec HDD    Fail
```

- Disk on the upper deck (Primary Disk):   OK
  Disk on the lower deck (Secondary Disk): OK

```
Pri HDD    OK
Sec HDD    OK
```

- Primary Disk capacity > Secondary Disk capacity

```
Wrong Capacity
PRI > SEC
```

- Secondary Disk capacity > Primary Disk capacity

```
Wrong Capacity
SEC > PRI
```

Chapter 5 Manual Back Up

- Manual back up shall be performed from the upper deck (**SOURCE**) to the lower deck (**TARGET**). Do not invert the sequence.
- Target HDD can be a brand new or an unformatted HDD.
- Open the front panel during use, set Operation Mode Switch to **BACK UP** position in the upper right corner of control panel. (Press down)
- Insert the SR2000 into your computer. Turn the power on. If you have an external SR2000, insert DC power plug into the outlet on the back panel of SR2000.
- No interface card is required for computer connection.
- When the yellow HDD Access LED on the front panel is on, system enters BACK UP mode. Follow the instructions displayed on the LCD for options and operations.
- BACK UP mode won't be completed unless you turn the power off, Shortcut keys will be ineffective during the BACK UP process.
- BACK UP Procedure
    1. When the SR2000 is turned on, the LCD will show its model name and version number as follows:

        ```
        SR2000
        SOHO RAID Rev200
        ```

    2. The SR2000 will auto detect the installation of Hard Disks. When the Source HDD capacity is larger than the Target one, the LCD will alternately display the two screens below and the Buzzer will sound; please turn off the power and start your PC again.

        ```
        Wrong Capacity
        Please Check!
        ```

```
┌─────────────────────────────┐
│                             │
│     Turn off power          │
│                             │
└─────────────────────────────┘
```

3. After confirmation, the LCD will display options for BACK UP Mode and the cursor will blink and display "F." Use key **selector** to choose File, Sector, or Auto mode. Every time you press the selector key, cursor will move to next mode and blink; cursor sequence is F→S→A→F.

4. Press down SELECT key for 5 seconds to enter the selected mode.

```
┌─────────────────────────────┐
│        Copy Mode?           │
│    File   Sector   Auto     │
└─────────────────────────────┘
```

5. SR2000 will confirm the selected mode. Cursor blinks and displays "**Y**" Select YES or NO with Key selector. Every time the SELECT key is pressed, cursor moves to the next option in the sequence Y→N→Y. When the selected mode is confirmed, press down SELECT key for 5 seconds to enter the selected option.

```
┌─────────────────────────────┐
│       Ready to start ?      │
│       Yes   /   No          │
└─────────────────────────────┘
```

6. If "**No**" is selected, the LCD will show the following to confirm operation, If "Yes" is selected, refer to next sections.

```
┌─────────────────────────────┐
│       Copy Aborted !        │
│       Continue/Quit         │
└─────────────────────────────┘
```

7. If " **Continue**" is selected, it will go back to the screen indicated by **step 4** as follows.

```
Copy Mode?
File   Sector   Auto
```

8. If "**Quit**" is selected, Buzzer will alarm; please turn off the power and start PC again.

```
Copy Aborted !!!
Turn Off POWER
```

5-1 **File Copy**

- Supports FAT, FAT32, and NTFS (DOS, WINDOWS 3.1X/95/98/NT).
- In COPY mode, it will copy all files from the Source Disk and system to the Target Disk, included every partition, boot sector, MBR, and FAT.
- File Copy ignores blank sectors and only copies data sectors.
- In this mode, a smaller capacity disk's content can be copied to another larger one. (If Target Disk is larger than Source Disk)
- Should there be a difference in brand name, capacity, RPM, Transmission rate (UDMA 33/66) between Source and Target Disks, it is suggested to change one of them temporarily.

- File Copy Procedure
  1. After entering File mode and starting operations, the LCD will show the following:

    > Copy is being
    > processed…

  2. A few seconds later, the LCD will show the completed percentage of the process:

    > IIIII   1/N
    > XXX %

    I: 1% is completed.
    N: number of HDD partitions, ranging from 1~N.
    XXX%: Percentage completed, ranging from 0~100.

  3. The LCD will show the following after completing File Copy:

    > Copy is done !!

    The LCD will blink and the HDD Access LED on the front panel will turn green.

  4. To continue operations, please turn off the power and start PC again.

5-2 Sector Copy

- Supports UNIX, LINUX, Free BSD, NetWare, and Mixed.
- For Sector Copy, use source disk and target disk of the same brand name and model.
- Shouldn't you have two identical disks, please use disks with the same number of disk heads. (EX:an ordinary HDD has 16 disk heads)
- On same specifications disks, copy by means of

track-by-track and sector-by-sector.

- Average copy speed is 4~10 min/GB (or 6~15GB/hour, according to HDD efficiency).
- Sector Copy is faster than the Auto-Rebuild Mode. (Back Up mode operates at full speed in the SR2000, while Auto-Rebuild operates in PC background).
- **Sector Copy Procedure**
  1. After entering Sector mode and starting operation, the LCD will show the following:

    ```
    Copy is being
    processed…
    ```

  2. A few seconds later, the LCD will show the following:
     I: 1% is completed.

    ```
    IIIII           Wait!
    XXX %
    ```

    XXX: percentage completed, ranging from 0~100.

  3. The LCD will show the following after Sector Copy is completed:

    ```
    Copy is done !!
    ```

    The LCD will blink and the indicator on the front panel will turn green.
  4. To continue operations, please reset the SR2000.

5-3 **Auto Copy**

- Please refer to Section 5-2 **Sector Copy** for more details.

5-4 Note

- After completing the copy mode above, it is necessary to turn the power off and set Operation Mode Switch to **NORMAL** position on the control panel in order to restart your PC and restore RAID.
- In case of damage or improper insertion, the LCD will display related error messages. Refer to Section 4-2 LCD Display showing HDD Status.

Chapter 6 Certified HDD for SR2000

Brand Name	Type	Model No.	Capacity (GB)	Note
Quantum	SE	2100AT	2.1	
	ST	3240AT	3.2	
	EX	5100	5.1	
		6400	6.4	
		10200	10.2	
		12700A	12.7	
	CR	4300A	4.3	ATA66
		6400A	6.4	
		8400A	8.4	
	CX	6400A	6.4	
		10200A	10.2	
		13000A	13.0	
IBM	DHEA	34330	4.3	
	DTTA	350640	6.4	
		351010	10.1	
		371010	10.1	7200rpm
	DJNA	370910	9.1	7200rpm, ATA66
		371350	13.5	
	DTNA	371800	18.0	
		372200	22.0	
Maxtor		90432D2	4.3	
		90648D3	6.4	
Western Digital	AC	26400	6.4	
		28400	8.4	ATA66
Seagate	ST	313620A	13.6	
		36421A	6.4	
		34321A	4.3	
Fujitsu	MPD	3091AH	9.1	
		3064A	6.4	
		3043A	4.3	

Remark: all of the above listed hard disks run in Ultra DMA mode 2 (33MB/sec) or mode 1.

SOHO RAID

Chapter 7 Questions & Answers

Q1: Why is the computer system unable to reboot or re-configure after SR2000 is installed?

A:1. SR2000 supports IDE I/O interface. However, it is not compatible with motherboards building the ITE IT8680F-A chip. Replace it with another I/O chip compatible with the SR2000.

2. Check if IDE bus connector is connected properly.

3. Check if Operation Mode Switch is set to NORMAL position on the control panel for copy mode.

Q2: What happens if power is shut down while the SR2000 is running?

A:1. In case of power failure during the **Auto-Rebuild** Function, controller will remember the rebuilding progress percentage and carry on the operations when the power is restored.

2. In case of power failure during **BACK UP**, copied data will be incomplete and you will have to restart **BACK UP** when power is restored.

Q3: What is the configuration for SR2000 (with 1 or 2 hard disks) when one HDD is already installed?

A:1. On the same IDE buses, set the jumper for SR2000 to MASTER and the original disk to SLAVE. Otherwise, the original HDD cannot be detected.

2. On different IDE buses, set MASTER or SLAVE for SR2000 and original HDD respectively.

Q4: When using the SR2000, the computer system is unable to read/write properly.

A:1. Check if IDE bus connector is inserted properly.

2. Check if IDE bus length is 46cm or 18". (Compliant to ATA 4 specification.)

Q5: The buzzer alarm keeps sounding during SR2000 operation.

A: Check if both Removable Carriers (hard disks installed) on the upper and lower decks are inserted into the right position. Please refer to section 2-5 Installing HDD in Removable Carrier and section 2-4 Remove/insert Removable Carrier.

Q6: How to turn on/off the buzzer?

A: 1. The factory default of the buzzer on/off switch is ON.
   2. Use a sharp pointed object to turn off buzzer alarm on the front panel (Refer to Section 2-2 Part Description)
   3. Use a sharp pointed object to turn on buzzer alarm on the front panel.

Q7: Why do the responses of the computer system slow down when SR2000 is under rebuilding?

A: 1. The performance of computer system is related to CPU, motherboard design and peripherals. SR2000 can slow down PC performance.
   2. To save time from new HDD installation, **Manual Back Up** is suggested to rebuild data (This process is not controlled by your PC system)

Q8: Is it possible to lose data or disable performance when performing BACK UP in the SR2000?

A: 1. To avoid data loss from overwriting on source disk, make sure the source disk is on the upper deck, target disk on the lower deck.
   2. The capacity of the target disk must be larger than the source disk.
   3. Refer to Chapter 5 Manual Back Up.
   4. Refer to Chapter 6 Certified HDD for SR2000.

Q9: How is the HDD capacity configured when replacing with a new disk?

A: 1. SR2000 is configured to the least capacity detected when SR2000 is installed for the first time.

2. When larger capacity is replaced in SR2000, the HDD capacity of SR2000 remains unchanged.

APPENDIX

1. Although the SR2000 is structured to be compatible with other HDD main brands, we will not be responsible for any data loss resulting in any damages or defects.

2. The brand names and products used in this manual are trademarks, registered trademarks, trade names of their respective holders. Cremax is not associated with any vendor or product mentioned in this manual.

3. Specification and feature is subject to change without notice.

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