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1. Introduction to the DC-200 RAID card

1.1 Understanding RAID concepts

RAID stands for **Redundant Array of Independent Disks**. RAID is a method of combining several hard drives into one logical unit. It can offer more fault tolerance and higher throughput levels than a single hard drive or a group of independent hard drives.

Benefits of RAID

- Reference Provides real-time data recovery with uninterrupted access when a hard drive fails
- EE Increases system uptime and network availability
- References Protects against data loss
- Reference Provides multiple drives working in parallel to increase system performance

1.2 Overview of DC-200 RAID card

The DC-200 RAID card delivers data protection and increased performance to individuals and companies operating ATA drives for workstations, entry-level servers, and rackmount server environments. The DC-200 RAID card supports up to 4 drives with a maximum transfer rate of 100 MBytes/sec per channel. Its low-profile form factor makes it ideal for ISP environments –offering maximum space for other server components. A user-friendly GUI interface also provides instant access to all your storage management needs.

The DC-200 is designed to take advantage of the latest Ultra ATA protocol, with TWO independent PCI IDE Bus Mastering channels. This design enables high performance RAID with inexpensive IDE devices.

You can choose either RAID 0 (striping) to improve the performance, RAID 1 (mirroring) to safeguard your important data or RAID 0+1 (striping & mirroring) to gain the performance of RAID 0 and the fault tolerance of RAID 1 at the same time.

RAID 0 stripes two independent Ultra ATA channels and therefore, doubles the throughput. RAID 1 mirrors the main operational HDD to the other and duplicates an exact copy of data to the mirrored HDD in real time. The transfer rate of RAID 1 is the same as that of regular hard disk access.

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RAID 0+1 mirrors two striped disk arrays.

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Features ?? Supports RAID 0(striping), RAID 1(mirroring),RAID 0+1 (striping and mirroring), JBOD mode ?? Two independent IDE channels supporting up to four Ultra ATA/100/66 drives ?? Supports hot-swap to automatically rebuild mirror array ?? Up to 2 cards can co-exist in one system ?? Easy-to-use GUI-based software for simple monitoring and storage management ?? RAID with ATA (2 HDDs RAID 0/1,1 HDD ATA) ?? Multi-RAID (2 HDDs RAID 0, 2 HDDs RAID 1) Mode support ?? 1 card mode: ATA-100/66.RAID 0.RAID 1,RAID 0+1,JBOD, RAID with ATA, Multi-RAID ?? 2 cards mode: ATA-100/66, RAID 0, RAID 0+1 ARS106S, a PCI Dual Channel Ultra DMA/ATA Processor 100 RAID Controller with 100MB/sec transfer rate. BIOS Flash ROM 100 MB/Sec (Ultra ATA/100) Max Transfer Rate PCI Interface PCI 2.2 and backward compatible Max Devices 4 2* ATA-100/66 cables Accessory included User's Manual Driver Diskette GUI software Windows 98SE/ME/NT/2000 Drivers Available Supported IDE Bus Width: 16-bit Devices: Supported Devices: HDD

1.2.1 Features and specifications of the DC-200 RAID card

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1.3 System requirements

The minimum system requirements for the DC-200 RAID card are: A Pentium II, 266 MHz Processor or higher system A minimum of one ATA drive 64 MB or more of system memory An available, unobstructed 5V PCI slot(PCI 2.2 or previous version compliant) that supports Bus Mastering Floppy disk drive 5 MB of free hard disk space for DC-200 RAID card

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2. Hardware installation

2.1 Install DC-200 RAID card

Before installing the DC-200 RAID card, please read through the following procedures thoroughly. Also review your computer's user manual for the procedures covering controller card installation and cover removal. Have the appropriate hand tools available so that you can remove your computer's cover and install the controller card.

To install the DC-200 RAID card in your computer, follow the steps below:

- 1. Before opening the cover, be sure that the power to the computer system and all devices connected to it is OFF to avoid the risk of dangerous electrical shock or damage to your equipment.
- 2. Carefully remove your system's cover (refer to your computer's user manual for the correct procedure).
- 3. Locate a free PCI expansion slot for the card.
- 4. If necessary, remove a system expansion slot cover by removing the retaining screws and lifting it out.
- 5. Hold the card by its top corner, and carefully line up the card with the PCI expansion slot, securely insert the controller card.
- 6. Secure the controller card with the screw that you removed in the step above.



7. Take the following steps to install hard disk drives.

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2.2 Connecting hard drives to the DC-200 RAID card

After you install the card, follow the steps below to connect HDDs:

1. Make sure the IDE cable is inserted correctly, with pin 1 of the cable to pin 1 of HDD and the card. Pin 1 is marked by a stripe on the cable and is located next to the power connector on most hard drives. If your IDE cable has one blue connector, this should be connected to the DC-200 RAID card.



According to installed DC-200 RAID card and HDD numbers, we suggest you connect HDDs in the following way:

In one card configuration, we suggest connecting HDDs as follows:

HDD	ID	E1	IDE2		
number	PM	PS	SM	SS	
1	Ŕ				
2	Ŕ		Ŕ		
3	Ŕ	Ľ	Ŕ		
4	Ľ	Ľ	Ŕ	Ľ	

In 2-card configuration, DC-200 supports 4 HDDs. We suggest connecting HDDs as follows:

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HDD	Card 1				C	Card 2		
number	IDI	E1	II	DE2	ID	E1	ID	E2
	PM	PS	SM	SS	PM	PS	SM	SS
4	À		Ŕ		Ŕ		Ŕ	

PM: Primary Master PM: Primary Master PS: Primary Slave SM: Secondary Master SS: Secondary Slave

2. After the steps above, please secure the system cover with the tools at hand.

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3. BIOS Configuration

3.1 Basic BIOS screen information

After you install the DC-200 RAID controller and HDDs in your computer and boot your system, you will see the screen that displays information about the cards and HDDs installed. Press <Ctrl +U> to enter the 'DC-200 ATA/100 RAID Controller Setup Utility' screen as follows:

< DC-20	0 ATA/100 RAID Controller S	Setup Utility >
	MENU	
	 SET RAID CONFIGURA' DELETE RAID CONFIG DISLAY RAID CONFIG DELETE HOD PARTITIC DELETE HOD PARTITIC HDD REBUILD EXIT 	TION URATION JURATION ON
HELP >		STATUS >
Allows to select [RAID 0, RAID 1,	function; RAID 0+1, JBOD]	0PM:ATA CO 1PM: 0PS: 1PS: 0SM:ATA DO 1SM: 0SS: 1SS:
ESC:Exit	↑,↓:Up/Down	ENTER:Select

The BIOS screen is divided into three parts: 'MENU',' HELP' and 'STATUS'.

The '**MENU**' window shows the function items from which you can select to create RAID, delete RAID, display RAID, delete partition, rebuild RAID and exit BIOS.

The '**HELP**' window shows relevant information when moving the direction keys to different function items.

The '**STATUS**' window shows the location and status of currently installed HDDs. For example: When 2 HDDs are installed with DC-200 RAID card, if RAID is not created, HDDs will be displayed as 'ATA CO', 'ATA DO'. 'CO, DO' shows that 2 HDDs work as independent ATA devices. If RAID 0 is created, HDDs will be displayed as 'RAID 0, CO', 'RAID 0, C1'. 'CO, C1' means that 2 HDDs work as one virtual disk.

You can use the guide tools at the bottom of the screen to quit, move direction keys and choose functions.

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3.2 BIOS function

3.2.1 Set RAID configuration

Choose '1. SET RAID CONFIGURATION' from the menu and press 'Enter', you will enter the 'SET RAID CONFIGURATION' screen:

< DC-2	00 ATA/100 RAID Controller Setup Uti	lity >
SET RAID CONF	GURATION >	
PRI MASTER 0	[*] Maxtor 5T020H2 UDMA5s 8	30P 19GB ATA CO
PRI SLAVE 0	Not installed	
SEC MASTER 0	[*] Maxtor 5T020H2 UDMA5s 8	30P 19GB ATA DO
SEC SLAVE 0	Not installe MODE >	ı I
PRI MASTER 1	Not installe	
PRI SLAVE 1	Not installe 1. JBOD	
SEC MASTER 1	Not installe 2. RAID 0	
SEC SLAVE 1	Not installe 3. RAID 1	
	4. RAID 0+1	
L		
< HELP >		< NOTICE >
Allows to select	function;	
[RAID 0, RAID 1,	RAID 0+1, JBOD]	
	•	
ESC:Back	+,+:Up/Down ENTER:Confirm	

The HDDs installed will be highlighted. You can move the cursor to HDDs and press the spacebar to select them. Press 'Enter' to confirm your selection and a new pop-up window will show RAID modes for you to choose, there are four modes : JBOD, RAID 0, RAID 1, RAID 0+1. The following is some guidance to create RAID arrays:

1) In a configuration with one card

We will illustrate the available functions in the following tables:

HDD installed	1 HDD	2 HDDs	3 HDDs	4 HDDs
Function				
JBOD		OK	OK	OK
RAID 0		OK	2 HDD OK	2 HDD OK,
				4 HDD OK
RAID 1		OK	2 HDD OK	2 HDD OK
RAID 0+1				OK

a). When 1 HDD is installed, the HDD is automatically set as a standard ATA, none of the RAID functions can work.

b). When 2 HDDs are installed, if both HDDs are selected, JBOD, RAID

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0, RAID 1 can be used.

c) When 3 HDDs are installed, if you select all connected HDDs at one time, JBOD can be used. You can also select 2 HDDs to create a RAID 0 or RAID 1 array. This will be a **RAID with ATA** situation. In this situation, RAID function and standard ATA can be supported at the same time. We suggest that you select PM and SM to create a RAID 0 or RAID 1 array).

d). When 4 HDDs are installed, if you choose 4 HDDs at one time, JBOD, RAID 0, RAID 0+1 can be used. You can also select 2 HDDs to create a RAID 0 array and another 2 HDDs to create a RAID 1 array. This situation is called **Multi-RAID**. We suggest that you select PM, SM to create RAID 0 and PS, SS to create RAID 1.

2) In a configuration with two cards

In this configuration, DC-200 RAID card supports 4 HDDs. You can select all connected HDDs to create RAID 0 or RAID 0+1. We suggest that you select all connected HDDs to create RAID 0+1 array to enhance system performance and increase data safety simultaneously.

3.2.2 Delete RAID configuration

Choose '2. DELETE RAID CONFIGURATION' in the menu and press 'Enter', you will enter 'DELETE RAID CONFIGURATION' screen:

< DC-200 ATA/100 RAID Controller Setup Ut	ility >					
<pre>delete RAID CONFIGURATION >====================================</pre>						
PRI MASTER 0 [*] Maxtor 5T020H2 UDMA5s 8	BOP 19GB R1 CO					
PRI SLAVE 0 [] Not installed SEC MASTER 0 [*] Maxtor 5T020H2 UDMA5s	80P 19GB R1 C1					
SEC SLAVE 0 [] Not installed PRI MASTER 1 [] Not installed						
PRI SLA SEC MAS Do you wish to delete previous RAID Mode? (y/n)						
SEC SLA						
HELP > NOTICE >						
Deletes selected RAID configuration. Data will be lost.						
ESC:Main menu +,+:Up/Down SPACEBAR:Select E	NTER:Confirm					

Please move the cursor and press spacebar to choose the RAID array you want to delete. Then press 'Enter'.

Note: Before you delete the selected RAID array, you must delete the HDD partition based on the RAID array first. And the data on the selected

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RAID array will be damaged and can't be restored after deleting the RAID array.

3.2.3 Display configuration

Choose this function and it will display detailed information of RAID arrays:

< DC-200 ATA/100 RAID Controller Setup Utility >									
E DIS	SPLAY RAID	CONFIG	URATION >=						
PRI PRI SEC SEC PRI PRI SEC SEC	MASTER 0 SLAVE 0 MASTER 0 SLAVE 0 MASTER 1 SLAVE 1 MASTER 1 SLAVE 1	[*] [*]	Maxtor ! Not inst Not inst Not inst Not inst Not inst Not inst	TO20H2 called TO20H2 called called called called called called	UDMA5s UDMA5s	80P 80P	19GB 19GB	R1 R1	C0 C1 - - - -
	-								
Displays current RAID configuration. To return to main menu, press any key.									
ES	ESC:Main menu +,+:Up/Down SPACEBAR:Select ENTER:Confirm								

From the left to the right in the window, it will display the following information:

HDD location: Where HDDs are connected, such as PM, SM, PS, SS.

HDD type: The manufacturer and model of HDDs.

HDD working mode: In which mode HDDs work, such as UDMA, DMA and PIO.

HDD cable: Cable connected to HDDs and DC-200 card, such as 80P(ATA 100/66) and 40P(ATA 33).

HDD capacity: The capacity of connected HDDs.

HDD status: current status of HDDs, such as ATA, RAID 0, RAID 1, RAID 0+1, JBOD.

If you press any key at this screen, it will return to the main menu.

3.2.4 Delete HDD partition

Choose this function to delete a HDD partition in the selected RAID array:

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R1 C1
81 C1
lost
1030

Please move the cursor and press spacebar to choose the RAID array on which the HDD partition is created. Then press 'Enter' to delete the partition on the RAID array.

Note: All data in the selected RAID array will be lost.

3.2.5 HDD rebuild

If a Hard Disk is damaged when running RAID 1 or RAID 0+1 mode, remove the damaged HDD, connect a workable HDD, rebuild the array and restore data as needed.

After you replace a broken HDD with a workable HDD and select this item, it will enter the HDD rebuild screen.

< DC-200 ATA	/100 RAID Control	ler Setup (T ility	>	<u> </u>
REBUILD HDD (SOURCE	(HDD) >======				
PRI MASTER 0 []	Maxtor 5T020H2	UDMA5s	80P	19GB	R1 C0
PRI SLAVE 0 [] SEC MASTER 0 []	Not installed Maxtor 5T020H2	UDMA5s	80P	19GB	R1 C1
PRI MASTER 1 []	Not installed Not installed				
PRI SLAVE 1 [] SEC MASTER 1 []	Not installed Not installed				
SEC SLAVE 1 []	Not installed				
HELP >			<	NOTICE	
Rebuilds from source HDDs to target HDDs; [RAID 0+1, RAID] Select the source HDD.				source	
ESC:Cancel	†,↓:Up/Down		SPACEBA	R:Selec	t

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You can move the cursor and press the spacebar to select source HDD in the RAID array, after that, target HDD will be selected automatically. And the system will remind you that data in the target HDD will be lost if you continue this process. Press 'y' to continue and a new window will show the rebuilding speed, source HDD and target HDD.

Note:

In RAID 0+1 array with 1 card, the RAID structure is PM-SM, PS-SS RAID 0, PM-PS, SM-SS RAID 1.

In RAID 0+1 array with 2 cards, the RAID structure is 0PM-0SM, 1PM-1SM RAID 0, 0PM-1PM, 0SM-1SM RAID 1. (0, 1 means card 1 and card 2 respectively).

When you rebuild RAID 0+1, you must choose the mirrored HDD of the failed HDD to be source HDD, otherwise, system will have problem.

3.2.6 Exit

Select this item to exit DC-200 RAID card BIOS configuration screen.

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4. Installing drivers with an existing Operating System

If you are adding the DC-200 RAID card to a computer where there is already an operating system installed, follow these instructions to install the drivers.

Note: You shall install the device driver twice when 2 cards are installed with an existing operating system. (It will automatically detect the cards installed).

4.1 Installing the DC-200 RAID card driver in Windows 2000

1. After installing the DC 200 RAID card and rebooting your system, Windows 2000 will show a 'Found New Hardware' dialog box. A short moment later, the 'Welcome to the Found New Hardware Wizard' will be displayed. Click 'Next'.

Found New Hardware Wizard	
	Welcome to the Found New Hardware Wizard This wizard helps you install a device driver for a hardware device.
	< Back

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2. Choose 'Display a list of known drivers for this device so that I can choose a specific driver' and click 'Next'.



3. Choose 'SCSI and RAID Controllers' and click 'Next'.

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Select a hardware type, a	and then click Next.	
Hardware types:		
Hemory technology of	driver	
Modems		
🔊 Multi-port serial adap	ters	
Network adapters		
💡 Other devices		
PCMCIA adapters		
Ports (COM & LPT)		
💕 Printers		
CSI and RAID cont	rollers	-

4. In the 'Select a Device Driver' dialog box, press 'Have disk...'

Found New Hardware Wizard	
Select a Device Driver Which driver do you war	nt to install for this device?
Select the manufactur have a disk that conta	rer and model of your hardware device and then click Next. If you ains the driver you want to install, click Have Disk.
Manufacturers: Adaptec BusLogic Compaq Future Domain Corporation Mylex NCR	Models: Adaptec AHA-1502 SCSI Host Adapter Adaptec AHA-1505 SCSI Host Adapter Adaptec AHA-1510 SCSI Host Adapter Adaptec AHA-1512 SCSI Host Adapter Adaptec AHA-1512 Adapter Adaptec AHA-1512 Adapter Adaptec AHA-1512 CSI Host Adapter Adaptec AHA-1512 Ad
	< <u>B</u> ack <u>N</u> ext> Cancel

5. Insert DC 200 RAID card diskette in drive A:

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6. Click 'Browse', find '2000.inf' in directory '2000'in drive A and click 'Open', then. Click 'OK'.



7. Choose 'Tekram DC 200 ATA-100/RAID Controller', then click 'Next'.

Found New Hardware Wizard	
Select a Device Driver Which driver do you want to install for this	: device?
Select the manufacturer and model of y have a disk that contains the driver you	our hardware device and then click Next. If you a want to install, click Have Disk.
Models: Tekram DC-200 ATA/100 RAID Controller	Have Disk
	< <u>B</u> ack <u>N</u> ext > Cancel

8. In the 'Start Device Driver Installation' dialogue box, click 'Next'.

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9. The 'Digital Signature Not Found' dialogue box will appear, ignore it and click 'Yes' to continue the installation.

Digital Signature Not Fou	und 🛛 🗙
	The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested. The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows. Tekram DC-200 ATA/100 RAID Controller If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available. Do you want to continue the installation?
	Yes <u>No M</u> ore Info

10. Click 'Finish', remove the floppy disk from the computer and restart the computer.

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11. After you restart your computer. Choose 'My computer' and click right button of the mouse, choose 'System Properties', click 'Hardware' and then 'Device Manager'.



If you can see 'Tekram DC-200 ATA/100 RAID Controller' under 'SCSI and RAID Controllers', it means DC-200 RAID card driver is installed successfully.

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4.2 Installing the DC-200 RAID card driver in Windows 98 or Windows

ME

The DC-200 RAID card driver installation will be the same with Windows 98 and Windows ME. We will illustrate driver installation procedure in Windows 98 as an example.

- 1. After installing the DC 200 RAID card and rebooting your system, the 'Add New Hardware Wizard' dialog box will be displayed. Click 'Next'.
- 2. Choose 'Display a list of all the devices in a specific location, so you can select a driver you want' and click 'Next'.

What do you want Windows to do? Search for the best driver for your device. [Recommended]. Signal of all the drivers in a specific location, so you can select the driver you want.
∢ <u>B</u> ack Next> Cancel

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3. Choose 'SCSI Controllers' and click 'Next'.



4. Press 'Have disk...'

Select the manuf disk that contains driver, click Finish	acturer and model of your hardware device. If you have a the updated driver, click Have Disk. To install the updated h
danufacturers:	Models
Adepted Advanced Micro Devices AdvanSys Always Technology BusLogic	Adaptec AHA-150X/1510/152X/AIC-6X60 SCSI Adaptec AHA-1510 SCSI Host Adapter Adaptec AHA-152X/AHA-1510 SCSI Host Ada Adaptec AHA-152X/AHA-1510 SCSI Host Adapte Adaptec AHA-152X/AIC-6370 Plug and Play SCSI Adaptec AHA-152X/AIC-5370 Plug and Play SCSI
	Have Disk

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- 5. Insert DC 200 RAID diskette in drive A:
- 6. Click 'browse' and find 'DC200.inf' in directory 'win9x' in Drive A, click 'OK', then click 'OK'.



7. Choose 'Tekram DC 200 ATA/100 RAID Controller', then click 'Next'.

<	disk that contains the updated driver, click Have Disk. To install the updated driver, click Finish.
Models	
Tekrar	n DC-200 ATA/100 RAID Controller [9-19-2001]
	Have Disk
	Have Disk

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8. The dialogue box 'Windows driver file search for the device' will appear on the screen, click 'Next'.



9. Click 'Finish', remove the floppy disk from the computer and restart the computer.



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10. Choose 'My computer', click right button of the mouse, go to 'System Properties' and then 'Device Manager'.

ieneral	Device Ma	nager Hard	ware Pro	files P	erformanc	æ]
 Vie 	w devices b	y type	C View	devices	by <u>c</u> onne	ection
Co	mputer			_		
H 🚨	CDROM					
H (Disk drive:	S				
1 2	Elegended	apters				
100) Floppy dist	controllers				
	Keuboard	CONTROLLERS				
H (Monitore					
1 B	Mouse					
H	Network a	dapters				
• §	Ports (CON	4 & LPT)				
	SCSI conti	rollers				
11	🔶 Tekrar	m DC-200 AT	A/100 R.	AID Cor	itroller	
🕀 🛄	, System de	vices				
± 4	 Universal (Serial Bus co	ntrollers			
Dea	auna T	Detecto	i i	Deme	a 17	Think
- FIO	perties	neitesh		n <u>e</u> mo	/e	Pn <u>n</u> c

If you can see 'Tekram DC-200 ATA/100 RAID Controller' under 'SCSI Controllers', it means DC-200 RAID card driver is installed successfully.

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4.3 Installing the DC-200 RAID card driver in Windows NT

1. After installing the DC 200 RAID card and rebooting your system, click 'SCSI Adapters' in 'Control Panel'. 'SCSI Adapters' window will appear on the screen, click 'Drivers' at the top of the window.

CSI Adap	ters	-				1	
Devices	Drivers						
🖉 In	stalled S	CSI Adapter	r drivers a	re listed b	elow.		
IDE CD-F	IOM (AT	API 1.2)/Du	ial-chann	el PCI IDE	Co	(Started)	
	54 m						
Add.	•]]	<u>R</u> emove					
					OK.	Cancel	į,

- 2. Click 'Add' to install driver for Windows NT.
- 3. Click 'Have disk...'.

nstall Driver	×
Click the driver you t If you have an instal Disk.	want to install, and then click OK. Jation disk for a driver that is not in the list, click Have
Manufacturers:	SCSI Adapter
[Standard mass storage co A Adaptec Advanced Micro Devices [AMI BusLogic Compaq	IDE CD-ROM (ATAPI 1.2)/Dual-channel PCI IDE Cor
	Have Disk
	OK Cancel
	Bunnand

4. Insert DC-200 RAID card Installation diskette and click 'Browse...'

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5. Open 'NT4' directory, then click 'nt4.inf' and click 'Open', then click 'OK'.

.ocate File			? ×
Look jn:	🔄 NT4	· · ·	* 🔠 🎹
mt4			
File <u>n</u> ame:	nt4		<u>O</u> pen

6. Click 'Tekram DC-200 ATA/100 RAID Controller' and click 'OK'.

~~	Children and the second s
¢,	Lick the driver you want to install, and then click UK. If you have an installation disk for a driver that is not in the list, click Have
	UISK.
CSI Ac	lapter
Fekran	n DC-200 ATA/100 RAID Controller

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7. Click 'Yes' to reboot your system.

System	Settings Change	×
ৃ	You must restart your computer before the new settings will take affect.	
	Do you want to restart your computer now?	
	Yes No	

After Rebooting, if you can see 'Tekram DC-200 ATA/100 RAID Controller' at 'SCSI Adapters' of 'Control Panel', installation of DC-200 Driver is successful.

vices D	river:
SCS	SI adapters and connected devices are listed below.
	E CD-ROM (ATAPI 1.2)/Dual-channel PCI IDE Controller E CD-ROM (ATAPI 1.2)/Dual-channel PCI IDE Controller
Ğ 🖪	kram DC-200 ATA/100 RAID Controller
	_
Propertie	es
Propertie	es

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5. Installing drivers when installing the Operating System

If you are installing a new operating system on a freshly created array or hard drive connected to the DC-200, follow these procedures.

5.1 Installing the DC-200 RAID card driver when installing Windows 98

or Windows ME

Install the operating system first. When the Windows 98 or Windows ME setup is finished, the installation procedure for the DC-200 driver will be the same as in an existing Windows 98 or Windows ME operating system. (Please refer to 4.1)

5.2 Installing the DC-200 RAID card driver when installing Windows

2000 or Windows NT

You will install the driver during the operating system installation. Please take the following steps to install the driver with the operating system.

1. Begin with the diskette installation or CD-ROM installation. You will see a message like that underlined below when booting:

'Setup is inspecting your computer's hardware configuration...' Press 'F6' a few times at this screen.

- 2. Press 'S' at the following screen, then select 'Other' and press 'Enter'.
- 3. Insert the DC-200 RAID card driver Installation diskette and the system will search for the drivers automatically and show them on the screen.
- 4. Select drivers for the operating system (Windows NT or Windows 2000), then install the driver.
- 5. After the driver installation procedure is complete, the installation of Windows NT or Windows 2000 can continue normally. After installing operating system and rebooting, if you can see 'Tekram DC-200 ATA/100 RAID Controller' at 'SCSI Adapters' of 'Control Panel', installation of DC-200 Driver is successful.

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6. GUI (Graphic User Interface)

GUI stands for **Graphic User Interface**. GUI function offers user-friendly graphics in Windows operating systems for easy RAID array monitoring and storage management. After you install the DC-200 RAID card and HDDs, create RAID arrays in BIOS configuration, execute 'FDISK' and 'format' command in DOS mode and install drivers for your operating system, you can take the following steps to setup the GUI in Windows operating systems and execute GUI functions.

6.1 GUI setup

You'd better set your screen display resolution rate as 800X600 or 1024X768 to avoid display abnormality during GUI setup.

- 1. After you power on your computer and bootup Windows, insert the GUI disk into drive A.
- 2. Click 'floppy (A:)' at 'my computer'.
- 3. Execute Setup.exe which is located in the root directory.

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4. Click 'Next'



- 5. If you want to install 'DC-200 GUI Program' to a different directory, click 'Browse...'. 6. Click 'Next'

Selay-will invit D.C.2004 IA/200 FAID in the following deciday. To initial to this directory, click Next. To initial to this directory, click Nexternal elect another directory. You can choose nor to initial DC-200 ATA/100 FAID by clicking Caroli for el Situp.					
To rintid to the directory, cick lead. To rintid a different directory, cick discovers and select another directory. Vac on choose not to initial DC-200 ATA/100 RAID by cicking Caroli to exit Setup.		A/100 RAID in the following direc	Setup will install DC-200 A		
To intuit loa a different directory, click Browne and relect another directory. You can choose not to instal DC-200 ATA-100 BAID by clicking Cancel to and Setup		ck Next.	To install to this directory, o		
You can chose not to instal DC 200 ATA/100 FAID by obtains Carcol to ext Setue		ory, click Browse and select anot	To install to a different dire directory.		
		I DC-200 ATA/100 RAID by click	You can choose not to ins Cancel to exit Setup.	S	
Destination Directory C:_SOC_200 ATA-100 RAIDBrowne		ID Browse	Destination Directory C.\\DC-200 ATA-100 F	<u></u>	
(parts) (Shodk)		Eancel	< Back		

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7. Complete the installation by clicking 'Next'



8. Choose 'Yes, I want to restart my computer now', click 'finish' and then restart the computer.

Lange Longerte	Setup has finished copying files to your computer.
	Before you can use the program, you must restart Windows or your computer.
	C [Yes, I want to restart my computer now]
	C No, I will restart my computer later.
2	Remove any disks from their drives, and then click Finish to complete setup.
(natalähyde)	< Eggs Firidh

9. Click the 'Start' button at the left bottom of your computer and go to the directory 'Program (P) -> Startup'.

You can see the 'DC-200_GUI' icon in the 'Startup' directory. It starts automatically each time when you power on your computer.

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6.2 GUI function

The DC-200 GUI helps you monitor RAID function and status in Windows operation systems. The DC-200 GUI has several functions such as: Monitoring the RAID arrays ,Rebuilding RAID arrays in RAID 1 or RAID 0+1 mode. The basic functions, including monitoring and warning messages, are similar in all RAID modes. Here we will use a '**1 card**, **2 HDDs**, **RAID 1 array**' configuration as an example to explain the functions of the GUI.

6.2.1 GUI administrator



After you install one DC-200 RAID card and connect two HDDs with PM and SM, create RAID 1 in BIOS configuration and start windows system, GUI will start automatically. An administrator (shown as above) and the monitor window(we will explain it later) will be displayed on the screen.

In the administrator, there are 4 icons which stand for PM, PS, SM and SS from the left to the right. In the administrator above, the first icon and third icon are green, it shows 2 HDDs are connected to PM and SM respectively.

6.2.2 GUI function menu

Move the cursor onto the administrator and click the right botton of the mouse, the function menu will appear as follows:

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Hard Disk Rebuik Auto Rebuild Che Always on top	
 Auto Rebuild Che Always on top 	d
 Always on top 	ecł
Elash Update	
<u>G</u> UI Tray Icon	

There are seven items in this menu:

6.2.2.1 Monitor Open

Click this item and the monitor window will open. Each time when GUI starts, monitor window will open automatically.

Monitor		×
Toler	Mode Info HDD Info HDD Rebuild About	1
RAIDI WDCWD100BB-32AL WDCWD100BB-32AL WDCWD100BB-32AL	FAID Mode FAID1 Array capacity 1000B HDD base capacity 1000B HDD Number 2 Array Number 0 BAID 1: Card 1 FM	_
· · · · ·	Card 1 SM	
C Status		
HDD Location Even Gerd 1 Primary Master Card 1 Secondary Master Card 1 Conne Card 1	* TIME LBA ected 9/26/2015 52:516 PM ected 9/26/2001 5:25:16 PM	

In the monitor window, it is divided into three parts:

In the left part, it shows the RAID array mode, HDD number and HDD model.

In the right part, there are four sub-windows:

'Mode Info': This sub-window shows the information of current RAID array, when you click the RAID array in the left of the window, it will display in 'Mode Info' sub-window:

RAID mode: The mode of disk arrays, such ATA, RAID 0, RAID 1, RAID 0+1, JBOD.

Array capacity: Capacity of the RAID array.

HDD base capacity: Capacity of the smallest HDD in the RAID array.

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HDD number: HDD numbers in the RAID array.

Array number: the order of RAID array, for example, if 3 RAID arrays are created, 'Array number' of the arrays are respectively 0, 1 and 2.

'HDD mode': When you click the HDD logo in the left of the window, this sub-window will show the detailed information of the HDD, such as it's location, cylinders, heads, sectors, model, serial number, HDD size, UDMA support.

Monitor				
T -1	Mode Info	HDD Info HDI	D Rebuild	About
	Card Numbe IDE Channel Cylinders Heads Sectors Model Serial Numbe HDD Size UDMA Support	r : 1 : Secondary Ma : 16383 : 16 : 63 : WDC WD1008 er : DWW-AMY66- : 10.068 ort : UDMA 5	ster B-32AUA1 14886	
Status				
HDD Location Even Card 1 Primary Master Card 1 Conr Card 1 Secondary Master Card 1 Conr	nt 9/21 rected 9/21 rected 9/21	TIME 5/2001 5:25:16 PM 5/2001 5:25:16 PM	LBA	

'HDD rebuild': In RAID 1 or RAID 0+1 configuration, if one HDD crashes in RAID 1, one or two HDDs crash in RAID 0+1, you can do RAID rebuild to restore data and recover RAID array in GUI. (We will illustrate this function in detail in passage 6.2.2.2 Hard Disk Rebuild).

Monitor				×
Tekr	Mode Info	HDD Info	HDD Rebuild	About
E RAID1	Selec	ct Source HD	D from list on	left side
WDC WD100BB-32AU	So	urce HDD	None	
	Ta	rget HDD	None	
Status				
HDD Location Ever	x I	TIME	LBA	
Card 1 Secondary Master Card 1 Conn	ected	9/26/2001 5:25:16 Pt	4	
			·	

'About': This sub-window shows some information about Tekram Technology Co.,Ltd, DC-200 RAID card, GUI version and the type of

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In the lower part, it shows the status of RAID array, such as HDD location, Event, Time and LBA.

6.2.2.2 Hard Disk Rebuild

If a Hard Disk is damaged when running RAID 1 or RAID 0+1 mode, a warning message will remind you of the failed HDD, please remove the damaged HDD, connect a workable HDD and rebuild the array.

After you replace a broken HDD with a workable HDD and select 'Hard Disk Rebuild' function, the 'HDD Rebuild' sub-window in the monitor window will pop up for you to select a source HDD, after source HDD is selected, target HDD will be automatically detected. Please click a HDD in the left of the window to be source HDD, then press the 'START' botton to start this process.

This function can work only in RAID 1 and RAID 0+1 configuration. **Note:**

In RAID 0+1 array with 1 card, the RAID structure is PM-SM, PS-SS RAID 0, PM-PS, SM-SS RAID 1.

In RAID 0+1 array with 2 cards, the RAID structure is 0PM-0SM, 1PM-1SM RAID 0, 0PM-1PM, 0SM-1SM RAID 1. (0, 1 means card 1 and card 2 respectively).

When you rebuild RAID 0+1, you must choose the mirrored HDD of the failed HDD to be source HDD, otherwise, system will have problem.

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6.2.2.3 Auto Rebuild Check.

When the RAID array is RAID 1 or RAID 0+1, if a HDD fails, 'Auto Rebuild Check' funciton can detect the failed HDD automatically and notify you to replace it with a workable HDD to rebuild the RAID array. This is a method to rebuild RAID arrays automatically. There are hint messages to guide you through the process. You can enable or disable this funciton by clicking this item in the function menu.

6.2.2.4 Alwarys on Top

This item can make the administrator which illustrate the connected HDD location always on the top of the screen. You can enable or disable this function by clicking this item in the function menu.

6.2.2.5 Flash Update

You can update your BIOS to a new version in GUI. This is a more easy and user-friendly operation than BIOS update in DOS mode. After you select this item, the 'Flash ROM Update' window will appear, you can choose the new BIOS file and press 'Flash ROM Update' bar to ugdate old version BIOS.

6.2.2.6 GUI Tray Icon

Click this item and the administrator on top of the screen will become a small tray icon in the task bar. Click the tray icon in the task bar and it will become administrator on top of the screen again.

6.2.2.7 Exit

Click this item to close all GUI display sreens and functions.

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7. Troubleshooting tips:

The following tips are general troubleshooting procedures:

- 1. Check that the DC-200 RAID card is seated evenly all the way into the PCI slot.
- 2. Check that the PCI expansion slot is 5V and compliant with PCI 2.2 or previous version and supports Bus Mastering.
- 3. Check that DC-200 ATA 100 RAID card is detected during booting by looking for the BIOS message from the screen. If it is not detected, try to move it to another free PCI slot.
- 4. Check that all ATA cables and power cables are connected properly.

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8. Technical support guide

Tekram Technical Support provides several support options for our users to access information and updates. We encourage you to use one of our electronic services which provide product information updates with the most efficient service and support.

If you want to contact us, please have the following information available:

- ?? Product model and serial number
- ?? BIOS and driver version numbers
- ?? A description of the problem / situation
- ?? System configuration information, including: mainboard and CPU type, hard drive model(s), ATAPI drives & devices, and other controllers.

The following is our technical support guide:

Website support

Taiwan(headquarters)	http://www.tekram.com.tw	
US	http://www.tekram.com	
Europe	http://www.tekram.de	
We provide tech documents, drivers, utilities, etc in our websites.		

E-mail Support

Taiwan(headquarters)	complaint@tekram.com.tw	
US	sales@tekram.com	
Europe	Technical-support@tekram.de	
Any question concerned with our products will be given a quick response.		

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9. Glossary about DC-200 RAID card functions

RAID:

Abbreviation of Redundant array of independent disks. It is a set of disk array architectures that provides fault-tolerance and improve performance.

RAID 0(striping):

An array where data is distributed, or striped, across the disks in the array.

If 2 HDDs are configured as RAID 0, data can be processed into 2 HDDs simultaneously to double system throughput rate, if 4 HDDs are configured as RAID 0, data can be processed into 4 HDDs simultaneously to make system throughput rate 4 folds. It offers the best performance but no fault-tolerance. The capacity of RAID 0 will be double the size of the smaller HDD when 2 HDDs create one RAID 0 and 4 times the size of the smallest HDD when 4 HDDs create one RAID 0, so we suggest you connect HDDs of the same sizes to save HDD space.

RAID 1(mirroring):

An array which uses a single pair of disks. Both disks in the pair contain the same data It provides the best data protection but can't improve system performance. And storage space for the same data capacity should be double than in general cases. Hence storage cost doubles. The capacity of RAID 1 will be the size of the smaller HDD, so we suggest you connect HDDs of the same sizes to save HDD space.

RAID 0+1(striping and mirroring):

When 4 HDDs are configured as RAID 0+1, it will do striping and mirroring simultaneously, hence, it has double function of increasing system performance and enhancing data safety. But storage space for the same data capacity should be double than in general cases. Hence storage cost doubles. The capacity of RAID 0+1 will be double the size of the smallest HDD, so we suggest you connect HDDs of the same sizes to save HDD space.

Rebuild:

In RAID 1 or RAID 0+1 mode, if one HDD fails, it can be replaced with a workable HDD to restore data and recover RAID array to protect data safety.

JBOD:

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It is the abbreviation of "Just a Bundle of Disks". In JBOD mode, several physical devices are mapped as one virtual device. When processing data, data will not be saved in the following disk until current disk space is completely occupied. JBOD can't increase fault tolerance or improve data access performance, but it avoids waste of disk space

Multi-RAID:

Installing one DC-200 card and connecting 4 HDDs, it allows creating two RAID arrays. For example, configure 2HDDs in RAID 0 and configure the remaining 2HDDs in RAID1.

RAID with ATA:

Installing one DC-200 card and connecting 3 HDDs, two HDDs can be set as RAID 0 or RAID 1 and the rest one HDD is used as a standard ATA disk.

Hot swap:

While the system is still operating, if a HDD fails, it can be removed and replaced with a workable HDD without powering off the system. This function only works in RAID 1 or RAID 0+1 configuration.

Website: www.tekram.com.tw

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