



IDVIEW

DIGITAL VIDEO RECORDER
IV-100CD

Installation & Operating Manual

Before trying to connect or operate this product, please read this manual complete



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SAFETY PRECAUTIONS

All the following safety and operated instructions which will prevent harm or damage to the operator and other persons should be read before the unit is operated.

WARNING

- ⊘ To prevent fire or shock hazard, do not expose this unit to rain or moisture.
- ⊘ Do not block ventilation openings.
- ⊘ Do not place anything on top of the unit that might spill or fall into it.
- ⊘ Do not attempt to service this unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Please refer all servicing to qualified service personnel.
- ⊘ Do not use liquid cleaners or aerosols for cleaning.
-  To prevent fire or electric shock, do not overload wall outlets or extension cord.
-  This unit must be grounded to reduce the risk of electric shock hazard.

CAUTION

Danger of explosion if the Lithium battery (RTC Battery) is incorrectly replaced.

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

1. PRODUCT FEATURES

1.1 Product Introduction

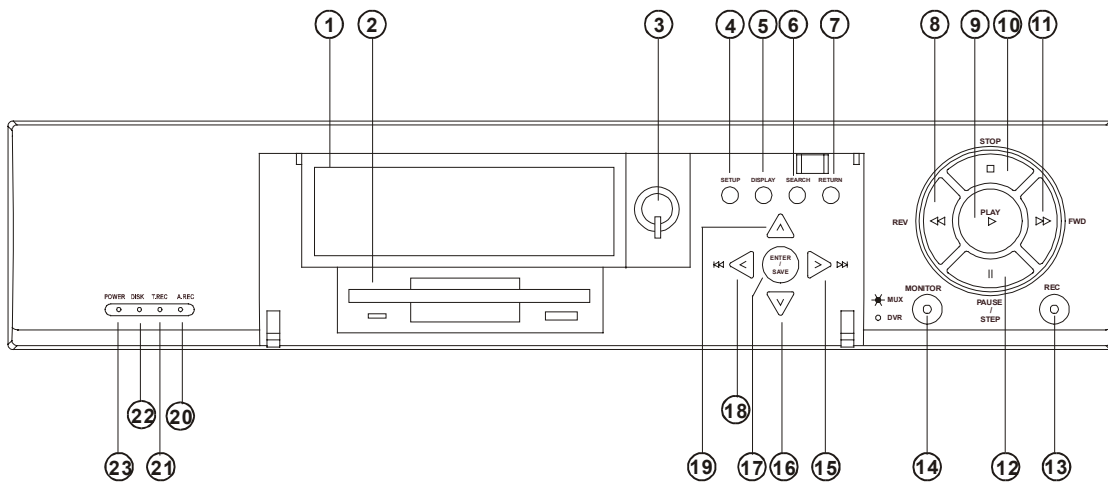
This DVR is a storage media of digital video image, which uses hard-disk drives instead of VCR tapes to store video. It enables you to enjoy the extreme flexibility of digital image archiving instead of clumsy tape management, and is absolutely compatible with most multiplexers in the market. Equipped with a range of comprehensive features, such as playback picture-by-picture, quick access video recording by time and event, the upgradable software of the system, the expandable capacities of hard drive, and much more, the DVR will make your applications far more flexible and effective than ever before. For all, the DVR is going to prove the timely substitute for Time-lapse VCR.

1.2 Product Features

- * Stores video in hard-disk drives instead of VCR tapes.
- * Maximum 3 hard-disk drive capability. (One removable)
- * Hard-disk drive hot-swapping capability.
- * Pre-alarm image recording.
- * Capable of working with various known multiplexers.
- * Time-lapse and real-time recording.
- * Refresh rate up to 60 FPS (50 FPS for PAL).
- * Image quality selectable at 3 different levels for recording.
- * Schedule/Manual/Alarm recording mode.
- * Quick search by time, alarm, event, and recording list.
- * Fast and slow playback of recorded video at various speeds.
- * Single-picture playback.
- * On-screen setup menu, title and system timer.
- * Password protection.
- * Critical image archiving through 1.44 MB floppy drive.
- * Disk-full warning and operation status LEDs.
- * RS-232 communication port.
- * Power interruption recovery.
- * Operation-status record log.
- * Distributing live and recorded images through TCP/IP network environment.

2. DESCRIPTION OF THE FRONT/REAR VIEW

2.1 Front View



① **Hard-disk drive compartment.**

This compartment allows you to install a drive mostly for backup purpose. Make sure the drive is well secured with the mounting screws in the mobile rack before you put the rack into the compartment. And remember to turn on the power of the compartment by locking it.

② **1.44 floppy disk drive.**

This 1.44 floppy disk slot is used for the system software updating and critical images archiving.

③ **Hard disk compartment lock:**

To secure a hard disk in place. Unlock this compartment before you remove the hard disk from the slot without turning off the device.

④ **SETUP** button:

Press this to enter the setup menu. Press again to exit the setup mode.

⑤ **DISPLAY** button:

Push this to show the system operation status on the screen. (Please refer to section 3.3 for details)

⑥ **SEARCH** button:

Press this to enter the search mode for accessing recorded video.

⑦ **RETURN** button:

Press to leave the current setup page and return to the previous page.

⑧ **REV** button:

Press this to play a video in the reverse direction at faster or slower speeds than the recorded speed. Each subsequent press of the REV button increases or slows the rate.

⑨ **PLAY** button:

Press to play back a recorded video from the hard disk. While playing back the recorded video at faster or slower speeds than the recorded speed, press this button to return to the regular playback speed.

⑩  **STOP** button:

Press this to stop playing back a recorded video.

⑪  **FWD** button:

Press this to play a recorded video in the forward direction at faster or slower speeds than the recorded speed. Each subsequent press of the FWD button increases or slows the rate.

⑫  **PAUSE / STEP** button:

In a playback display, press this to freeze the display. During the freeze, press this to display one frame/field of a picture at a time in the forward direction.

⑬ **REC** button:

Push this to start recording the video into hard disks while in the live display mode.

⑭ ***MUX** /  **DVR** button:

Press this to switch between the multiplexer decoded video and the encoded video to be displayed as connected with a multiplexer. When the button light is on it indicates the unit is displaying the decoded video (The pictures are not multiplexing). In this mode, the unit doesn't display the OSD message of the unit on the screen. However, it doesn't affect the unit's OSD message which is recorded into hard-disk drive. When the button light is off it indicates the unit is displaying encoded video (The picture is switching swiftly).

⑮⑯  **Right / Left** buttons:

Press these two buttons to highlight desired items in the menu setup mode. For **Key Lock** operation, press these two buttons simultaneously once; to disable **Key Lock**, press these two buttons simultaneously again.

⑰⑱  **Up / Down** buttons:

Press these two buttons to select the desired contents for programming in the menu setup mode.

⑲  **ENTER/SAVE** Button:

Press to enter the selected item and save the setting in the menu setup mode. During the playback of a video, if you wish to save a specific image to a floppy disk, press the PAUSE button to freeze the picture first and then press this button to proceed.

⑳ **Indicator of Alarm Recording Mode:**

Light up to signal the alarm record setting is on.

㉑ **Indicator of Timer Recording Mode:**

Light up to signal the scheduled record setting is on.

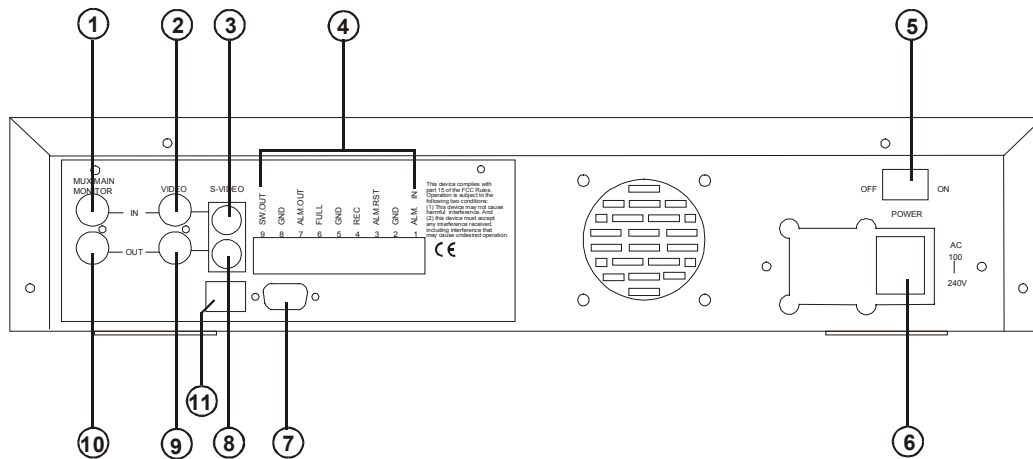
㉒ **Indicator of Hard Disk Status:**

Indicates the operation status of the hard-disk drives. Green light up indicates the hard-disk drive is storing or retrieving the data. Red light up signals the hard-disk drive is getting filled up.

㉓ **Power Indicator:**

Indicates the power status of the unit.

2.2 Rear View



① MUX MAIN MONITOR IN Connector:

This BNC connector is used to connect the live video output from a multiplexer to the DVR.

② VIDEO IN Connector:

This BNC connector is used to connect the video output from a camera or a multiplexer to the DVR.

③ S-VIDEO IN Connector:

This connector is used to connect the S-video output from a camera or a multiplexer to the DVR.

④ Terminal Block:

There are 9 exposure contacts on this terminal block including **SW. Out**, **GND**, **ALM. OUT**, **FULL**, **REC**, **ALM RST**, **GND**, and **ALM. IN** for connecting with external devices. Please refer to the next section for details.

⑤ Power Switch:

To power the unit on or off.

⑥ Plug Outlet:

For connecting with an external power supply.

⑦ RS-232 Port:

RS-232 communication port for connecting with an external control device. Please refer to APPENDIX 1 for more details.

⑧ S-VIDEO OUT Connector:

This provides the device's S-video signal to a multiplexer.

⑨ VIDEO OUT Connector:

This provides the unit's composite video signal to a multiplexer.

⑩ MONITOR Connector:

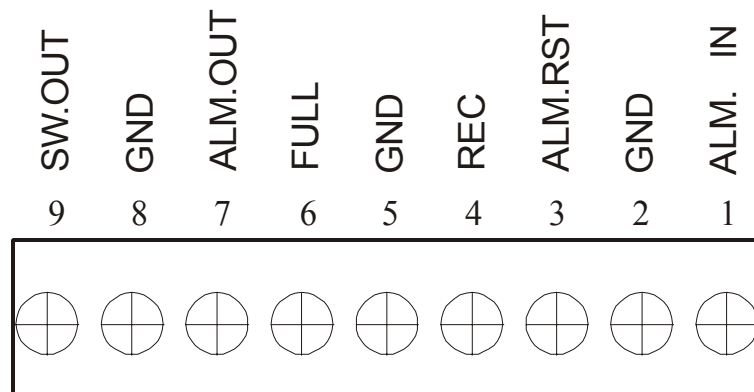
This provides the unit's composite video or a multiplexer's live signal if connected to a display device.

⑪ 10 BASE-T Connector:

This is a standard RJ-45 connector for 10 Mbps Ethernet networks.

NOTE: The DVR only processes the video signal from S-VIDEO IN ③ connectors when receiving video signals simultaneously from both "S-VIDEO IN ③" and "VIDEO IN ②" connectors.

2.3 Terminal Block



1. ALM IN: (INPUT)

This is an alarm input, which can be programmed in the menu system to Normally Open or Normally Closed. (Active low, 5V)

2. GND:

Ground Contact.

3. ALM RST: (INPUT)

This terminal connects to an alarm-clear device for clearing the alarm. (Active low, 5V)

4. REC: (INPUT)

This terminal connects an external switch to turn the recording function of the DVR on/off. (Active low, 5V)

5. GND:

Ground Contact.

6. FULL: (OUTPUT)

This terminal sends out the full-disk signal. (Active low, 5V)

7. ALM OUT: (OUTPUT)

This is an alarm output relay. Connect this to an external device like buzzers or lights. (Active low, 5V)

8. GND:

Ground Contact.

9. SW OUT: (OUTPUT)

This terminal, sending out the timing signal (falling/negative) to a multiplexer, connects to a multiplexer's trigger terminal so that the multiplexer can switch to use the same recording speed as the DVR.

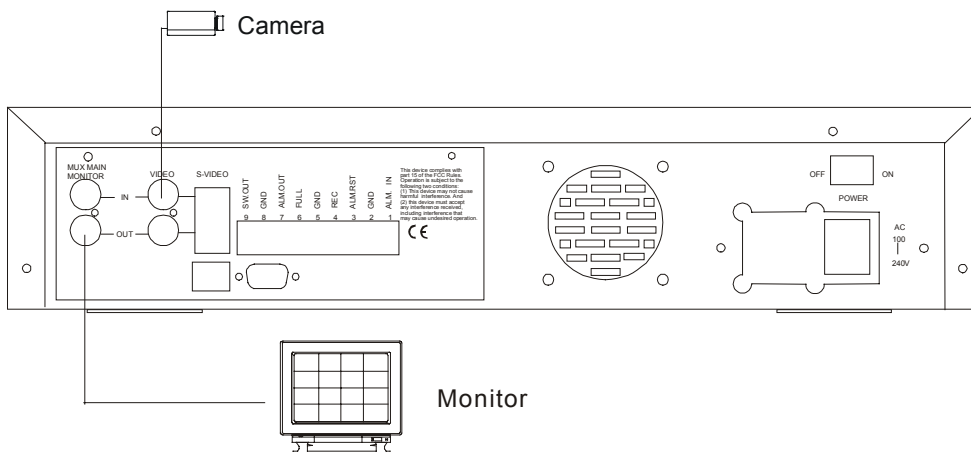
3. INSTALLATION

Please follow the instructions and the diagram below to set up the system.

3.1 Basic Connection

Please set the **MULTIPLEXER** option to **OFF** on the **REC Setting page** in the setup menu when it is connected with a single camera. (Please refer to section 5.3 MULTIPLEXER option)

CONNECTING WITH A SINGLE CAMERA

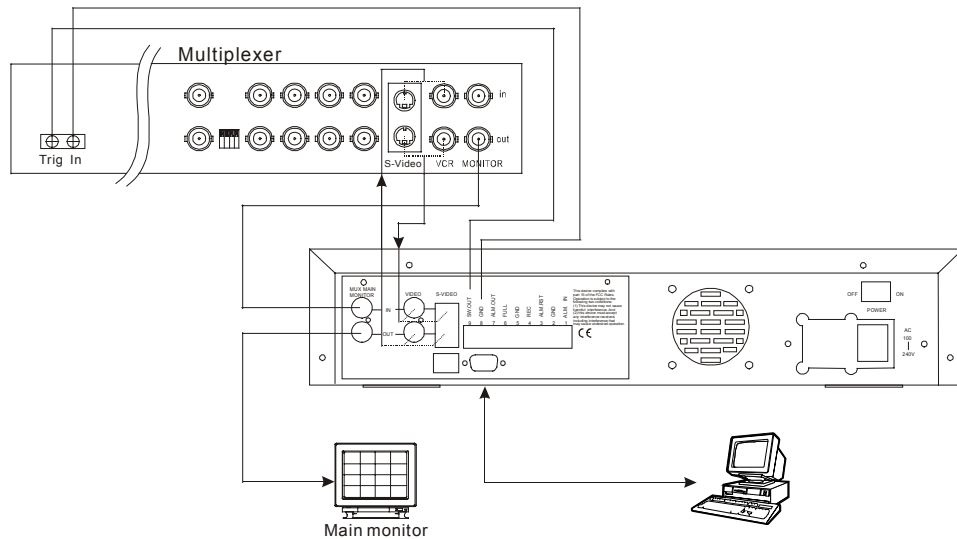


CONNECTING WITH A MULTIPLEXER

To match the multiplexer's recording speed, please set the **MULTIPLEXER** option to **ON** on the **REC Setting page** in the setup menu when it is connected with a multiplexer. (Please refer to section 5.3 MULTIPLEXER option)

When a Multiplexer is connected, you can add a RS-232 connection to synchronize the operation mode between the DVR and the MUX. The MUX will automatically switch between live or playback mode in corresponding to the state of the DVR. Follow the instructions below to establish the connection.

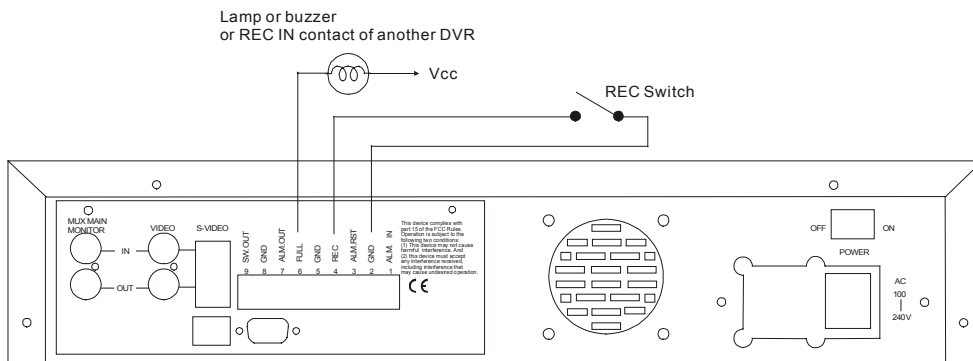
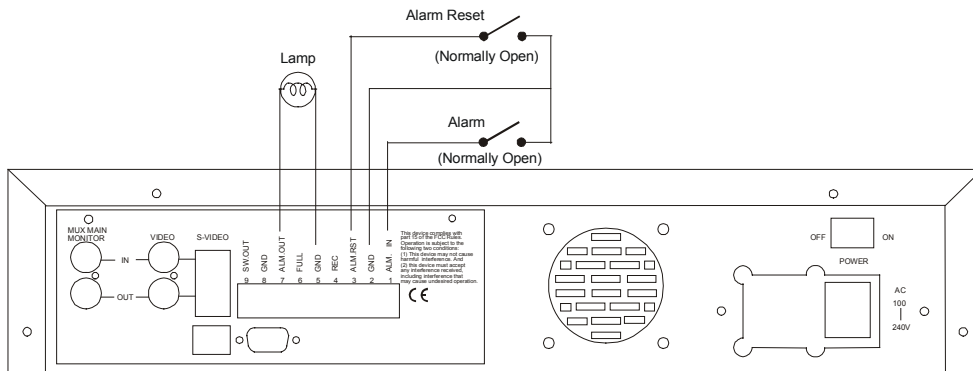
1. Connect the DVR with the multiplexer with a null modem cable. (For the details of pin configuration of RS-232 please refer to 1. Setup, Appendix 1)
2. Set the RS-232 option to MASTER in the COMMUNICATION page of the main menu. Select a communication baud rate for MUX except **Remote**.



NOTE: The DVR only processes the video signal from S-VIDEO IN ③ connector when receiving video signals simultaneously from both “S-VIDEO IN ③” and “VIDEO IN ②” connectors.

ATTACHING AN EXTERNAL DEVICE TO DVR

Connect an alarm out, alarm input, and a peripheral device as shown diagram below. Network connection please refer to APPENDIX 5 Network Function.



3.2 Hard-Disk Drive Installation

The DVR is equipped with three compartments of hard disk drive. The unit usually comes with one hard-disk drive installed in the compartment HD1, which is default-configured as a master. If you need a second hard-disk drive to be installed in the compartment HD2 or compartment HD3 (Mobile), please contact your distributors or installers for specific instructions on how to install it. Please don't serve yourself before consulting your installers. If there is only one hard-disk drive in the mobile compartment, please set the **HD3 USAGE** option to **REC/PLAY** (Please refer to section 5.6) before proceed recording function. The jumper-settings arrangement of installed hard-disk drives for the system (Table 3.2 A) and the compatible hard-disk drives (Table 3.2 B), which can be used with the unit, are shown in the tables below.

Table 3.2 A. The jumper settings of hard disk drives in the system

	Location	Jumper
IDE 1	Compartment HD 1	Master (Default)
IDE 1	Compartment HD 2	Slave
IDE 2	Compartment HD 3	Master

Table 3.2 B. Compatible hard-disk drives

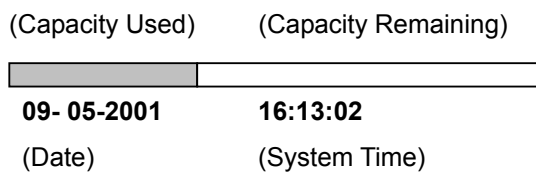
Manufacturer	Model	Capacity	Rotation
Maxtor	Diamond Max D540X-4D 4D040H2	40GB	5400 RPM
	Diamond Max D540X-4D 4D060H3	60GB	5400 RPM
	Diamond Max D540X-4D 4D080H4	80GB	5400 RPM
	Diamond Max VL40-34098H4	40GB	5400 RPM
	Diamond Max VL40-33073H3	30GB	5400 RPM
	Diamond Max VL40-32049H2	20GB	5400 RPM
	Maxtor 536DX 4W100H6	100GB	5400 RPM
	Maxtor 536DX 4W080H6	80GB	5400 RPM
	Maxtor 536DX 4W060H4	60GB	5400 RPM
	Maxtor 536DX 4W040H3	40GB	5400 RPM
	Maxtor 536DX 4W030H2	30GB	5400 RPM
	4G120J6	120GB	5400RPM
4G160JB	160GB	5400RPM	
IBM	DTLA-305040	40GB	5400 RPM
Quantum	Fireball Lct	20GB	5400 RPM
	Fireball PlusLM	20GB	5400 RPM
Seagate	ST330621A/P	30GB	5400 RPM
	ST340823A/P	40GB	5400 RPM
	ST380020A	80GB	5400 RPM
Western Digital	WD800	80GB	5400 RPM

NOTE: Hard-disk drives not shown on this list have not been tested by the engineering team and are not recommended for use with this product. For the latest updated list on the recommended hard disk drives, please contact your dealers or distributors.

3.3 System Information



You can display system settings information as shown on **Table 3.3 A** below at any time by pressing the **DISPLAY** button⁽⁵⁾. However, when the DVR is displaying a decoded image from a multiplexer, you must first switch the unit to encoded image displaying (The pictures is switching swiftly and the light of * **MUX/●DVR** button⁽¹⁴⁾ is off) by pressing the * **MUX/●DVR** button⁽¹⁴⁾. Each sequential press of the **DISPLAY** button displays a different message detailed in the following example. By default, the unit displays time, date, and an indicating bar of capacity status on a monitor as shown next.

Default display





Press the **DISPLAY** button once; the DVR will display the following sample message plus the default display. Press the **DISPLAY** button again; the unit will not display any OSD message. Press the button one more time to back to the default display.

Table 3.3 A.

1+ 2: 76G				11.2 HR  	
QUALITY: HIGH				NTSC	
RATE: 6 HR				20 F/S	
HD	P	SIZE	POS		
1	Y	38 G	2.5%R (P)		
2	Y	38 G	0%R (P)		
3	.	.			





Description of Table 3.3 A

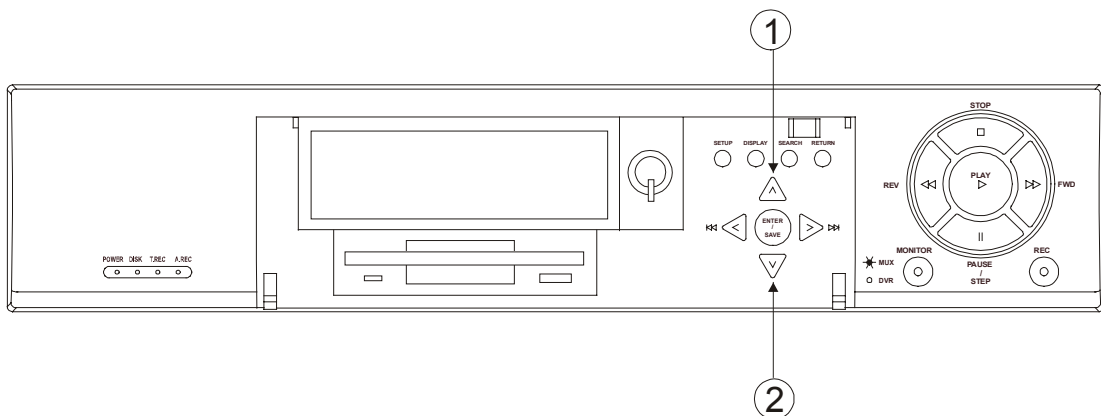
- (1+2: 76GB):** Total capacity of installed hard disk, 76 GB
- (11.2 HR):** Total 11.2 hour recording time available
- ): Timer record activated
- ): Alarm record activated
- (QUALITY: HIGH):** Record quality setting, HIGH
- (NTSC):** NTSC system
- (RATE: 6 HR):** Setting of Record time mode, 6 hours
- (20 F/S):** Record speed setting, 20 fields/sec
- (HD):** Hard disk Compartment
- (P):** Y Hard disk installed; . No hard disk installed
- (SIZE 38GB):** The capacity of the installed hard disk
- POS:** Percentage of system; **R:** Recording; **P:** Playback

3.4 Updating System Software

If the system software of the DVR needs to be upgraded, please take the following steps to safely update it.

Important: Before carrying out the following procedures, please ensure the floppy disk is working and the file of system software is intact

1. Turn off the DVR.
2. Insert the floppy disk into the built-in floppy drive of the unit.
3. Hold down the  and  buttons simultaneously, and then turn on the unit.
4. Keep holding down the buttons until the DVR sounds a tone and display the message “ **SOFTWARE UPDATE**” and an indicating percentage of proceeding against a blue background on the screen. Now the DVR is updating the system software, which will take approximately 90 seconds to process.
5. Restart the unit when the device sounds a tone twice and displays the message “ **PLEASE RESTART**”
The process is complete.
(If you have already followed the procedure 1~5, the unit, however, not being able to power on. Please first check if the floppy disk you are using is functioning and the file is intact. And then start the procedure 1 ~ 5 all over again.)
6. Verify the version of system software by entering setup menu and then press  and pause  buttons at the same time.



Warning: Don't Interrupt the process while the unit is updating itself and proceed with a floppy disk containing with no system software of the unit, which would cause the unit hang on.

4. BASIC OPERATIONS

This section shows you how to operate and manage the DVR when it gets in the way.

4.1 Configuring Recording Settings

Recording Time settings (Recording Rate and Picture Quality Setting)

Recording time will vary depending on the image size, recording rate, and the capacity of hard-disk drive. Generally, the DVR comes with a built-in hard-disk drive for continuous recording from one to four weeks under most recording conditions. The table below shows the possible recording times based on a 20GB hard-disk drive at certain refresh rates and the corresponding image quality. With one or more hard-disk drive (s) in operation, please calculate the recording time using the table below in accordance with your requirement. For a NTSC unit, for example, if the unit is set to record images with **HIGH** quality at a **60 fps** record rate, normally a 20GB hard-disk drive will be filled in 3 hours (See the gray area in the table). If the total capacity of 80GB hard-disk drives is in use under the same refresh rate and picture quality, it will be filled in 12 hours (4 times the rate of a 20GB hard-disk drive).

Set up the REC Time Mode when a multiplexer is connected

If a multiplexer is connected, for optimum image recording and playback, the record speed of the multiplexer must be correctly adjusted to match the DVR and set the **MULTIPLEXER** option on the setup menu to **ON**. This is can be done by either of methods detailed below.

- (1) If a multiplexer is connected for use, you can program the REC time mode of the multiplexer by referring to the table below (each refresh rate refers to one REC time mode).
- (2) Connect the SW. OUT terminal on the rear panel of the DVR to the multiplexer's trigger contact. The DVR will provide the timing signal (Negative/Falling) to the multiplexer. Thus, if the DVR change the recording speed, the multiplexer will automatically adjust the record to match. A 2-hour timing signal in NTSC or 3-hour one in PAL is constantly negative/falling.

NTSC System

		Possible Recording Time HDD=20 Gigabytes									
Image Quality Setting	HIGH	3 hr	9 hr	18 hr	36 hr	72 hr	144 hr	252 hr	720 hr	1080 hr	1440 hr
	STANDARD	4.5 hr	13.5 hr	27 hr	54 hr	108 hr	216 hr	378 hr	1080 hr	1620 hr	2160 hr
	BASIC	6 hr	18 hr	36 hr	72 hr	144 hr	288 hr	504 hr	1440 hr	2160 hr	2880 hr
Refresh Rate (Field/Sec)		60	20	10	5	2.5	1.25	0.63	0.25	0.16	0.13
REC Time Mode		2 hr	6 hr	12 hr	24 hr	48 hr	96 hr	168 hr	480 hr	720 hr	960 hr

PAL System (For using with single camera)

		Possible Recording Time HDD=20 Gigabytes									
Image Quality	High	3.5 hr	7 hr	14 hr	28 hr	56 hr	112 hr	196 hr	560 hr	840 hr	1120 hr
	Standard	5.5 hr	11 hr	22 hr	44 hr	88 hr	176 hr	308 hr	880 hr	1320 hr	1760 hr
	Basic	7 hr	14 hr	28 hr	56 hr	112 hr	224 hr	392 hr	1120 hr	1680 hr	2240 hr
Refresh Rate (Field/Sec)		50	25	12.5	6.25	3.13	1.56	0.89	0.31	0.21	0.16
REC Time Mode		3 hr	6 hr	12 hr	24 hr	48 hr	96 hr	168 hr	480 hr	720 hr	960 hr

PAL System (For using with a multiplexer)

		Possible Recording Time HDD=20 Gigabytes									
Image Quality	High	3.5 hr	10.5hr	24.5hr	38.5hr	73.5hr	143.5hr	248.5hr	703.5hr	1053.5hr	1403.5hr
	Standard	5.5 hr	15.8hr	36.8hr	57.8hr	110.3hr	215.3hr	372.8hr	1055.3hr	1580.3hr	2105.3hr
	Basic	7 hr	21.0hr	49.0hr	77.0hr	147.0hr	287.0hr	497.0hr	1407.0hr	2107.0hr	2807.0hr
Refresh Rate (Field/Sec) (Figures on the setup menu)		50 (50)	16.7 (25)	7.14 (12.5)	4.55 (6.25)	2.38 (3.13)	1.22 (1.56)	0.70 (0.89)	0.25 (0.31)	0.17 (0.21)	0.12 (0.16)
REC Time Mode		3 hr	6 hr	12 hr	24 hr	48 hr	96 hr	168 hr	480 hr	720 hr	960 hr




NOTE: Recording times on the tables above are estimated. For actual available recording time of a recording configuration, please refer to the system information of the DVR. (Please refer to section 3.3 system information for more details.)

4.2 Recording Operations

This section details the way to record video into hard-disk drives. Before commencing with the recording function, please configure the recording setting properly according to your needs.

4.2.1 Manual Recording

When the DVR is in live display mode, take the following steps to start recording:

- (1) In live display, press the **REC** button  to record video into a hard disk drive with the corresponding programmed recording settings. The monitor should display a flashing **REC** message and the **REC** button will light up indicating the DVR is in the recording status.
- (2) Press the  **STOP** button  to stop recording any time.
- (3) To access just recorded video, please refer to section 4.4 for more details.

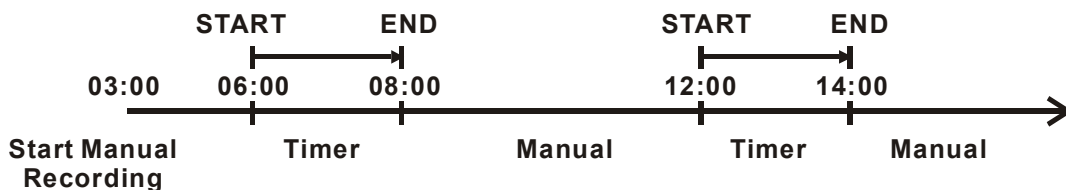
4.2.2 Timer Recording

Timer recording provides two periods of time each day in a weekly table which programs the DVR to turn on and off at specified times. This way the DVR will start and stop recording according to the programmed schedule. Please take the following steps to program the scheduled recording.

- (1) Press the **SETUP** button ④ to enter the **MAIN MENU**.
- (2) Select the **RECORD TIMER** and press the **ENTER/SAVE** button ⑰ to enter the **RECORD TIMER** page.
- (3) Select the **TIMER – SET**.
- (4) Press the **ENTER/SAVE** button ⑰ to enter the **REC SCHEDULE** table.
- (5) Use the < button ⑱ and the > button ⑮ to locate the specific day/hour/minute and use the ▲ button ⑲ and the ▼ button ⑯ to set the day/hour/minute you wish. The time is displayed in a 24-hour clock format.
- (6) After scheduling is completed, press the **ENTER/SAVE** button ⑰ and set **OK** to save the setting or select **CANCEL** to leave the page without saving the settings.
- (7) To activate the programmed recording schedule, set the **REC ENABLE** to **ON**. As the scheduled recording is on, the red indicator of the Timer Record will be on as well. To deactivate it, set to **OFF**.
- (8) Press the **STOP** button ⑩ during the scheduled recording to stop it at any time. If you wish to continue the scheduled recording, press the **REC** button ⑬ to proceed.

NOTE: You can proceed to start the scheduled recording from the current time if it is in the scheduled interlude as soon as setting is completed. Press the **REC** button to proceed.

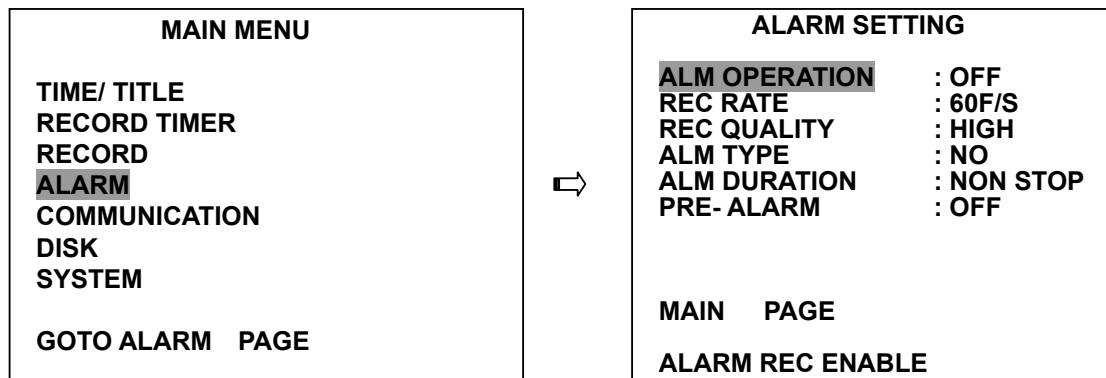
NOTE: If you activate the recording function before the scheduled recording, the unit will operate recording as showed the diagram below and keep those Images in different files.



4.2.3 Alarm Recording

Take the following steps to activate the programmed alarm recording. For **ALM REC RATE**, **ALM REC QUALITY**, **ALARM STATUS**, **ALM DURATION**, and **PRE-ALARM** settings, please refer to section 5.4 for more details.

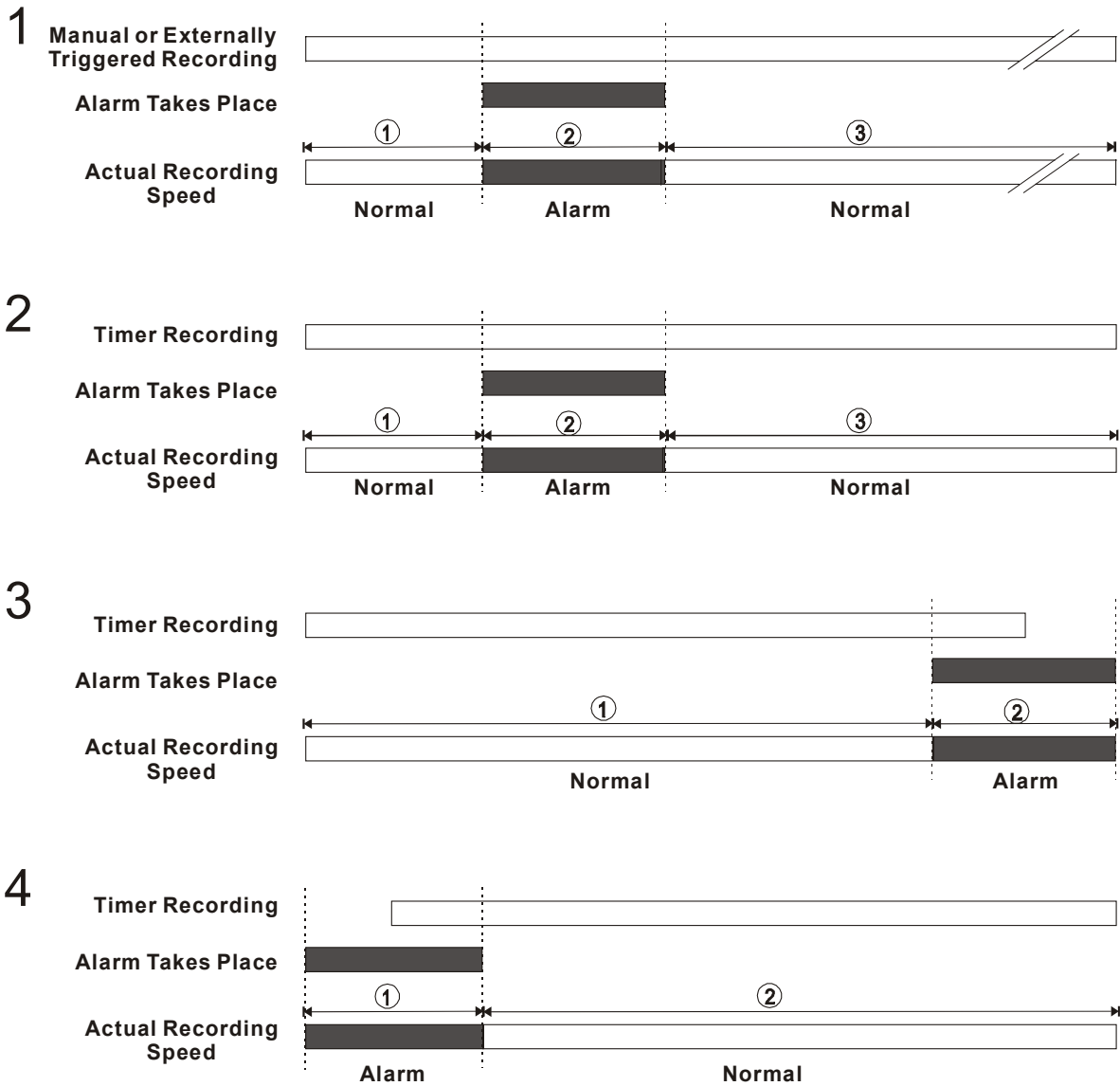
- (1) Press the **SETUP** button **4** to enter the **MAIN MENU**.
- (2) Select **ALARM** and press the **ENTER/SAVE** button **17** to enter the **ALARM SETTING**.
- (3) Set the desired **REC RATE**, **REC QUALITY**, **ALM TYPE**, and **ALM DURATION** for use. If pre-alarm recording is required, set **PRE-ALARM** to **ON**.
- (4) To activate the alarm recording, set **ALM OPERATION** to **ON**. To deactivate it, set **ALM OPERATION** to **OFF**.




4.2.4 Externally triggered Recording

By connecting the **REC** exposure contact on the rear panel of the DVR with an external switch, you can activate/deactivate the recording function of a DVR. The file will be kept with a prefixed **"R"**. Please refer to section 2.3 for more details.

NOTE: The status of recording operations as the diagrams shown below when an alarm takes place.



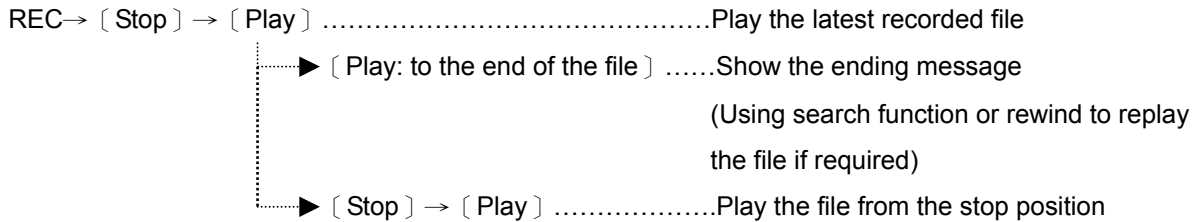
4.3 Playback Operations

This section shows you how to operate the fast, slow, and single-picture playback functions, and details how the unit is to playback a file in different operation status. Please refer to the following paragraphs specifying the relevant details. When playing a file, the monitor should display a flashing **PLAY** message and the **PLAY** button  will light up indicating that the DVR is in the playback status.

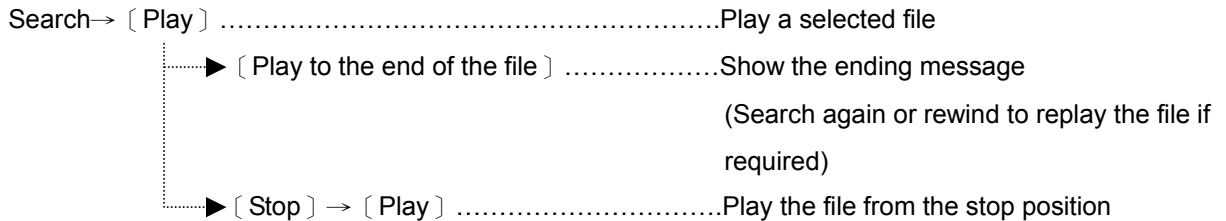
Operation Status

A. From REC mode to Playback mode

(In live mode, directly press "PLAY" button to play a latest recorded video)



B. Search to play back a particular recorded video






C. Play Back From The Oldest Data





[Stop: Press the "STOP" button for three seconds] → [Play] ..play back the oldest recorded video

4.3.1 Fast Forward/Reverse

There are 5 speeds available for playback: 2x, 4x, 8x, 16x, and 30x.

While playing back recorded video at recorded speed:

Forward: Press the  **FWD** button  to view the recorded video in the forward direction at a speed faster than the recorded speed. Each subsequent press of the  **FWD** button increases the rate.

Reverse: Press the  **REV** button  to view the recorded video in the reverse direction at a speed faster than the recorded speed. Each subsequent press of the  **REV** button  increases or slows the rate.





Normal: Press the  **PLAY** button  to return to the normal speed of playback.

NOTE: The playback speed will be displayed on the screen. However, when playing a recorded video from a multiplexer, the playback speed only display on encoding (multiplexing) mode. Press the *MUX / ●DVR button to switch between decoding and encoding mode.

4.3.2 Slow Forward/Reverse





There are 4 speeds available for a slow playback: 1/2, 1/4, 1/8, 1/16. Follow the instructions below to proceed with a slow playback.

While playing back recorded video at the recorded speed:

- (1) Press the  **PAUSE/STEP** button **12** for the slow playback mode.
- (2) **Forward:** Press the  **FWD** button **11** to view the recorded video in the forward direction at a speed faster than the recorded speed. Each subsequent press of the **FWD** button slows the rate.
- (3) **Reverse:** Press the  **REV** button **8** to view the recorded video in the reverse direction at a speed faster than the recorded speed. Each subsequent press of the **REV** button slows the rate.
- (4) **Normal:** Press the  **PLAY** button **9** to return to the normal speed of playback.

4.3.3 Play Back Picture-by-picture


While playing back recorded video at the recorded speed:

- (1) Press the  **PAUSE/STEP** button **12** for the picture-by-picture mode.
- (2) Press the  **PAUSE/STEP** button **12** to display one frame/field of a picture at a time in the forward direction. **(When playing back recorded video recorded by a multiplexer, each sequential press of the  PAUSE/STEP button 12 will display each camera in sequence.)**
- (3) Press the  **PLAY** button **9** to return to the normal speed of playback.

NOTE: If flickering condition of an image occurs during playing back picture by picture, please set the FLICKER REDUCT option to ON in the SYSTEM page of the setup menu. However, when this function is activated, the picture quality might be degraded in a way.

4.3.4 Play Back Recorded Video from a HDD of the mobile rack

To play back a recorded video from a HD3, take the following steps:

- (1) Press setup button to enter the setup menu.
- (2) Select **DISK** and press the  **ENTER/SAVE** **17** button to enter **DISK SETTING** page.
- (3) Set the **HD3 USAGE** to **REC/PLAY** and then exit the setup menu.
- (4) Use the search function to access desired recorded video. Specific operation details please refer to the next section 4.4 Search Operations.

4.4 Search Operations

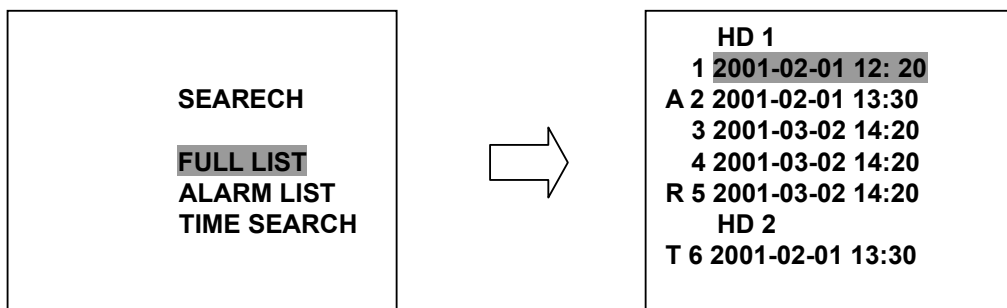
This section shows you how to access recorded video.

4.4.1 Full List Search

Take the following steps to proceed with the full list search function.

- (1) Press the **SEARCH** button **6** to enter the search mode.
- (2) Select the **FULL LIST** and press the **ENTER/SAVE** **17** button to access the complete list of recorded video.
- (3) Highlight the specific recorded video of your requirement and press the **ENTER/SAVE** button **17** to display the selected video.

(Key Operation: Press **Up/Down** buttons **19/16** to select a video; Press **Right / Left** buttons **18/15** to flip over a page.)



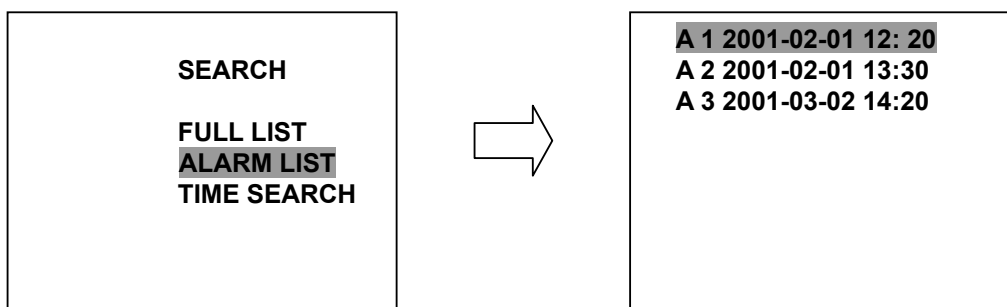
NOTE: T: Timer recording; R: External trigger recording; A: Alarm recording.

4.4.2 Alarm list Search

Take the following steps to proceed with the alarm list search function.

- (1) Press the **SEARCH** button **6** to enter the search mode.
- (2) Select the **ALARM LIST** and press the **ENTER/SAVE** button **17** to access the complete list of alarm-event recorded video.
- (3) Highlight the specific recorded video of your requirement and press the **ENTER/SAVE** button **17** to display the selected video.

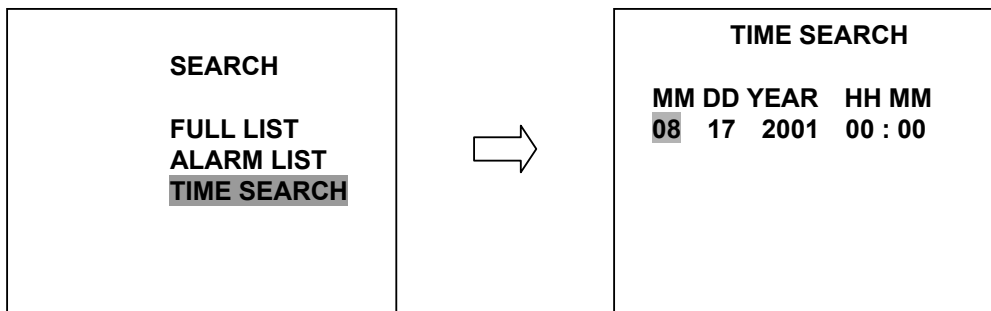
(Key Operation: Press **Up/Down** buttons **19/16** to select a video; Press **Right / Left** buttons **18/15** to flip over a page)



4.4.3 Time Search

Take the following steps to proceed with the time list search function.

- (1) Press the **SEARCH** button **6** to enter the search mode.
- (2) Select the **TIME SEARCH** and press the **ENTER/SAVE** button **17** to access the time setting page.
- (3) Set the time period you wish to search for the recorded video.
- (4) Press the **ENTER/SAVE** button **17** to start searching and displaying the concerned image.
- (5) If no video is found, please return to the time setting page and repeat steps (3) and (4) again for another search.



4.5 Data Backup

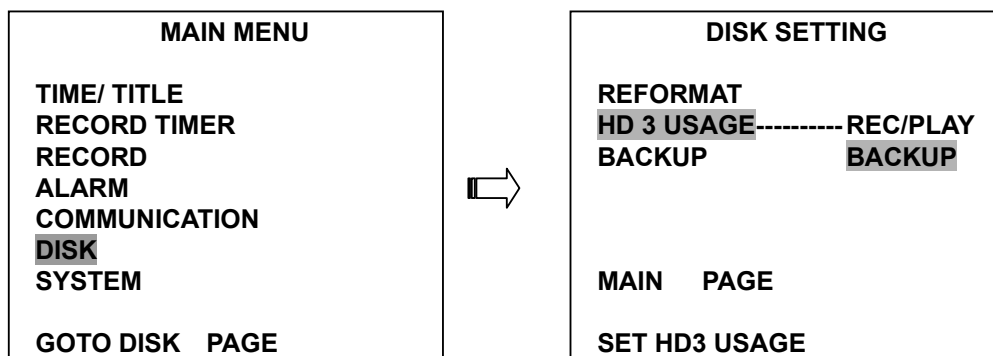
4.5.1 Backup Operations

There are three ways available to duplicate the recorded video from HD 1 and HD 2 to HD 3.


Please take the following steps to proceed.

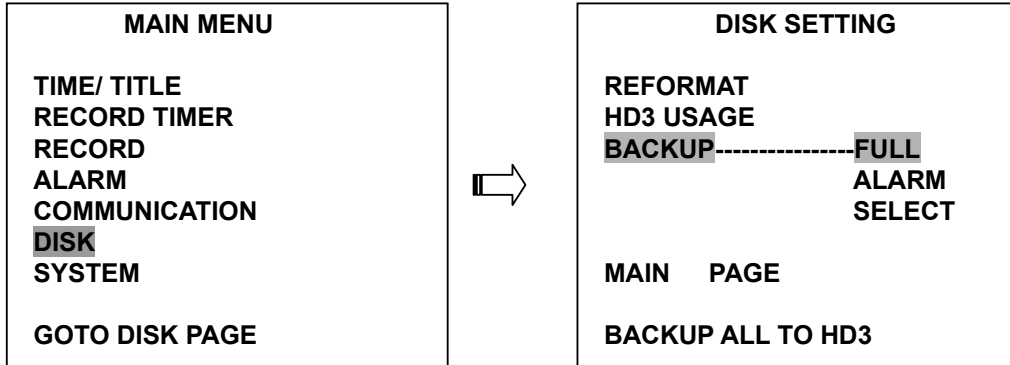
(1) **Set HD 3 to BACKUP first. Take the following steps.**

- Press the **SETUP** button **4** to enter the setup mode and select the **DISK**.
- Highlight **DISK** and press the **ENTER/SAVE** button **17** to enter the **DISK SETTING** page.
- Then set **HD 3 USAGE** to **BACKUP**.




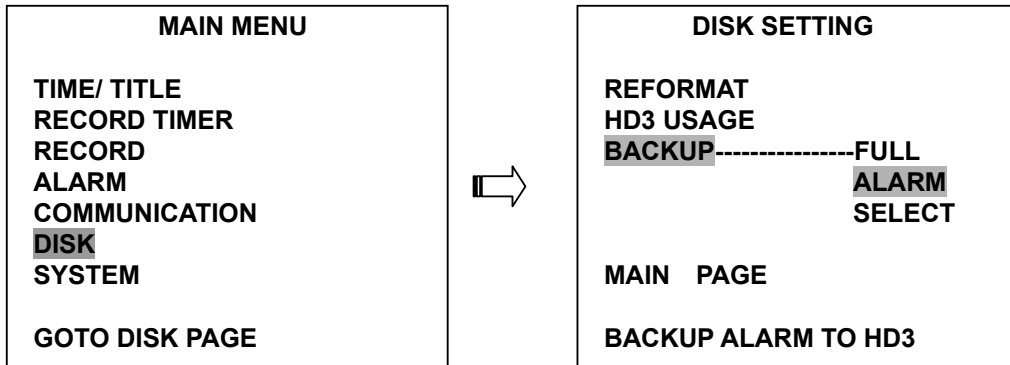
(2) **FULL:** Duplicating all the recorded video from HD1 and HD 2 to HD3.

- Stay on the **DISK SETTING** page.
- Use the \triangle/∇ **Up/Down** buttons (19)(16) to highlight **BACKUP**; select **FULL**, then press the  **ENTER/SAVE** button (17) to proceed.





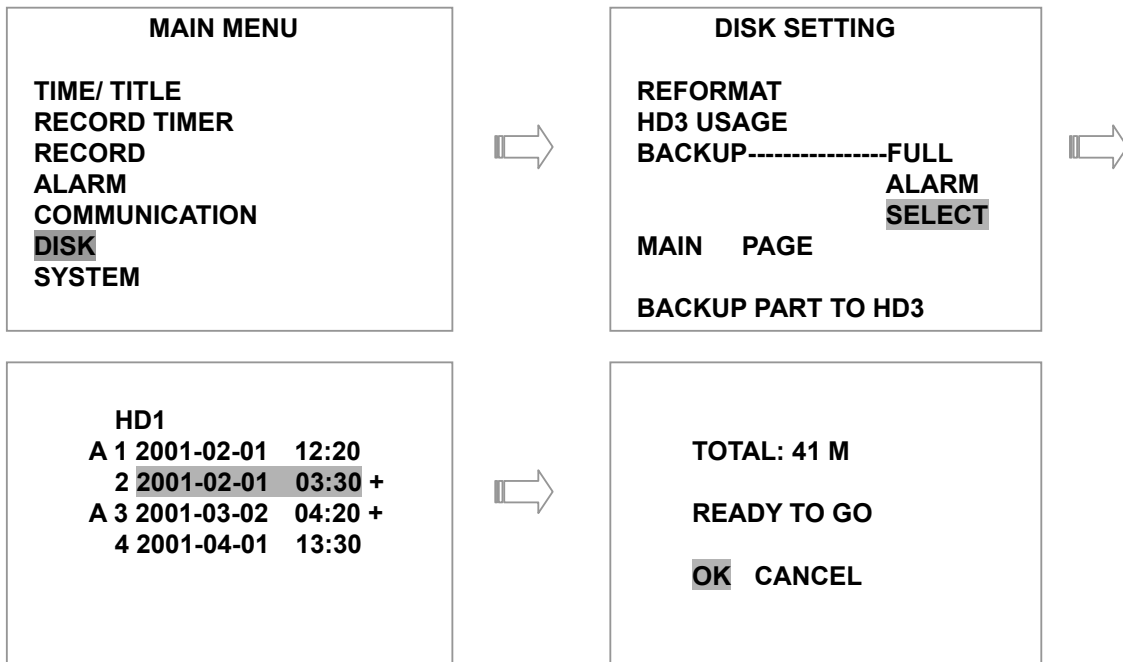
ALARM: Duplicating all the alarm-event recorded video from HD 1 and HD 2 to HD 3.

- Stay on the **DISK SETTING** page.
- Use the \triangle/∇ **Up/Down** buttons (19)(16) to highlight **BACKUP**; select **ALARM**, then press the  **ENTER/SAVE** button (17) to proceed.



SELECT: Duplicating a particular recorded video from HD1 and HD 2 to HD3.

- Stay on the **DISK SETTING** page.
- Use the \triangle/∇ **Up/Down** buttons (19)(16) to highlight **BACKUP**, select **SELECT** and then press the  **ENTER/SAVE** button (17) to list all the recorded video.
- Press the \triangle/∇ **Up/Down** buttons (19)(16) to select the desired clip and press the **SETUP** button to mark it.
- After completing the selection, press the  **ENTER/SAVE** button (17) to proceed.



NOTE: If the capacity of HD 3 is not sufficient to store all selected video, a warning message “HD3 SPACE NOT ENOUGH” will be displayed on the screen. Please, insert a larger capacity of hard-disk drive and start the process over again.

4.5.2 Archive Clips into Floppy Disk

Please take the following steps to archive a critical image in a floppy disk.

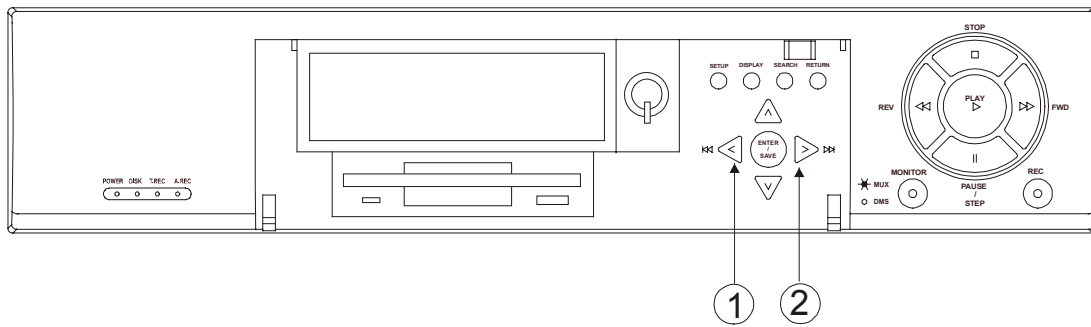
- (1) Insert a 1.44 floppy disk into the floppy slot.
- (2) Start playing back the recorded video. (When playing back recorded video made by a multiplexer, you must get into the multiplexing mode and display picture by picture to be able to select the desired image for archiving. Press the *MUX/●DVR button ⑭ to get into the multiplexing mode under this mode that the light of *MUX/●DVR button is off and the pictures is switching swiftly)
- (3) Press the PAUSE/STEP button ⑫ to freeze the desired pictures.
- (4) Press the ENTER/SAVE button ⑰ to save the image in the floppy disk.

A floppy disk can store approximately 50~100 pictures. You can have the saved images printed out in any computer. The image is stored in the JPEG compressed format. If more than one clip is stored in a floppy disk, file names will be assigned in sequence as shown below.

SAVE TO J0001.JPG
SAVE TO J0002.JPG
 ...
SAVE TO J000N.JPG

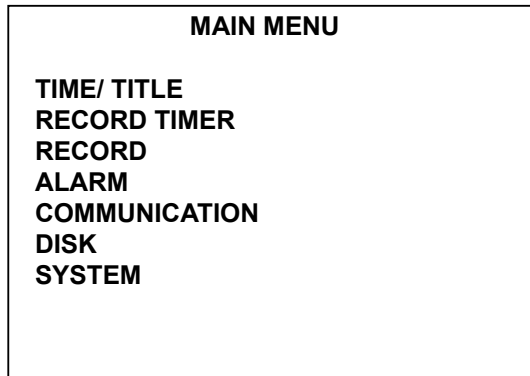
4.6 Key Lock Operation

The Key lock operation protects the unit against unauthorized use by disabling the entire front panel control. Simultaneously press these two ① ◀ and ② ▶ buttons (as shown below) for at least 3 seconds to lock the unit; to release **Key Lock**, simultaneously press these two buttons again.



5. MENU SETUP

There are 7 categories for operation setting in the setup menu system as shown below. The following sections will instruct you step by step to configure the operation setting and state each menu's purpose and options. Press the **SETUP** button ④ to access the setup menu. Once inside the menu system, the on-screen menu allows you to set up the key features of the unit. The functions of various buttons within the menu-setup mode are described in the paragraphs below.



KEY FUNCTIONS

SETUP button ④ :

Press to enter the setup menu. Press again to exit the setup mode.

RETURN button ⑦ :

Press to exit the current setup page and return to the previous page.

◀ ▶ **Right/Left** buttons ⑱⑮ :

Press to select the desired item or entry for the setting.

▲ ▼ **Up/Down** buttons ⑲⑰ :

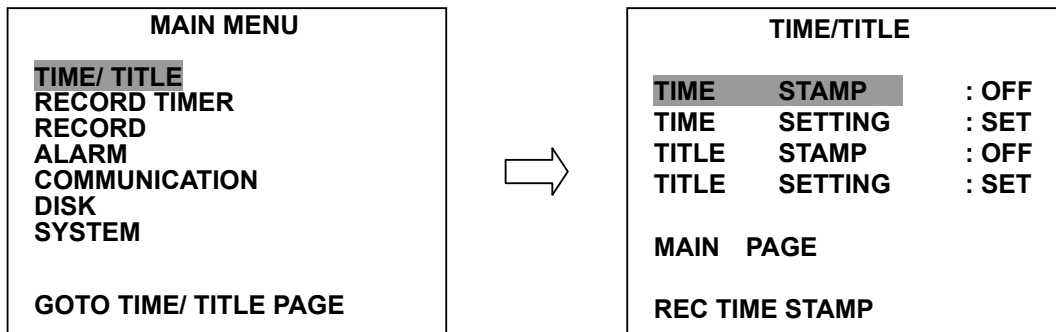
Press to highlight the desired option or to select the context for the setting.

Ⓜ **ENTER/SAVE** button ⑰ :

Press to enter the selected item and to save the settings.

5.1 TIME/ DATE

This device is able to print inerasable system time and title information directly onto images during recording. This page allows users to set the time and desired title, and to decide if the function is to be activated. The entries are listed as follows.



TIME STAMP:

This option determines the system time to be stamped onto the images during recording.

ON: Enables the device to stamp the time onto images during recording.

OFF: Disables the stamping function.

TIME SETTING:

This entry allows users to set the system time to be stamped onto images.

TITLE STAMP:

This option determines a programmed title to be stamped onto images during recording.

ON: Enables the device to stamp programmed title onto images while recording.

OFF: Disables the stamping function.

TITLE SETTING:

This entry allows users to assign a title to be stamped onto the images.

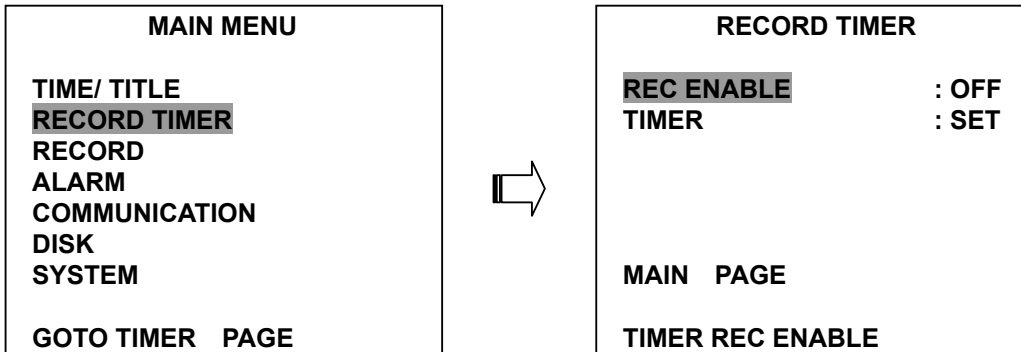
NOTE: If you wish to have system-time on an archived image in a floppy, the “TIME STAMP” option must be set to “ON” for recording.

NOTE: No matter whether the “TIME STAMP” option is set to “ON” or “OFF”, the unit will always encode the system time into the video while recording. So you can always have system time to be displayed on the screen by pressing the “ DISPLAY” button. However, if two time messages have overlapped on the screen, please press the “DISPLAY” button to stop decoding time from the video so that the unit will only display the stamped time only.

5.2 RECORD TIMER

The DVR provides a weekly table, consisting of two periods of time each day for scheduled recording.

This option allows you to set the time each day that the DVR will start and stop recording.



REC ENABLE:

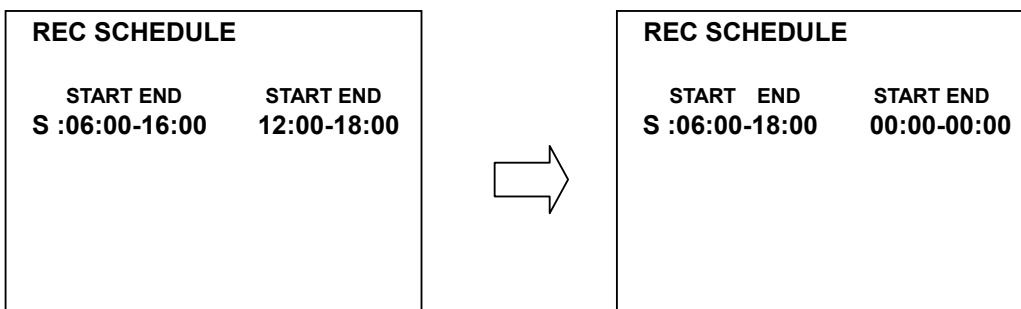
This option enables/disables the programmed scheduled recording.

ON: Enables the scheduled recording.

OFF: Disables the scheduled recording.

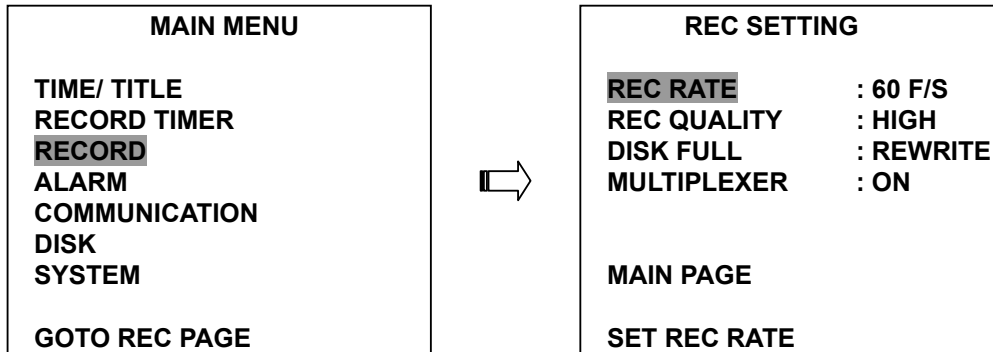
TIMER:

This entry allows users to program the time each day that the DVR will start and stop recording. There are two time periods each day available for scheduling. The time is displayed in a 24-hour clock format. If there is a time overlapping showing between two continual time period settings, the device will automatically combine the two time-period settings into one combined time period setting.



5.3 REC SETTING

This page allows you to set recording rate and recording quality, and to enable you to continue recording when the disk is full.



REC RATE:

This option is for adjusting the number of pictures recorded every second into a storage disk. The recording rate controls the frequency at which the number of video pictures can be recorded. For a NTSC unit, there are 10 different recording rates you can select from: **60F/S (60 fields per second)**, **20F/S**, **10F/S**, **5F/S**, **2.5F/S**, **1.25F/S**, **0.625F/S**, **1 F/4S**, **1F/6S**, and **1F/8S**. For a PAL unit, there are two different sets of recording rates for use with a camera or a multiplexer, respectively. Please refer to the table in section 4.1 for details.

REC QUALITY:

This option determines the image quality to be recorded. The DVR stores images in the compressed format and allows the image quality to be altered by the image size. There are 3 levels of image quality you can select from: **HIGH**, **STANDARD**, and **BASIC**. Selecting the HIGH image for use will have higher-resolution recorded images, and normally takes up more storage space than a STANDARD or BASIC image does.

DISK FULL:

This option determines the way to utilize storage media in case of a full disk.

REWRITE: When the hard-disk drive is full, the device continues recording by displacing the old data.

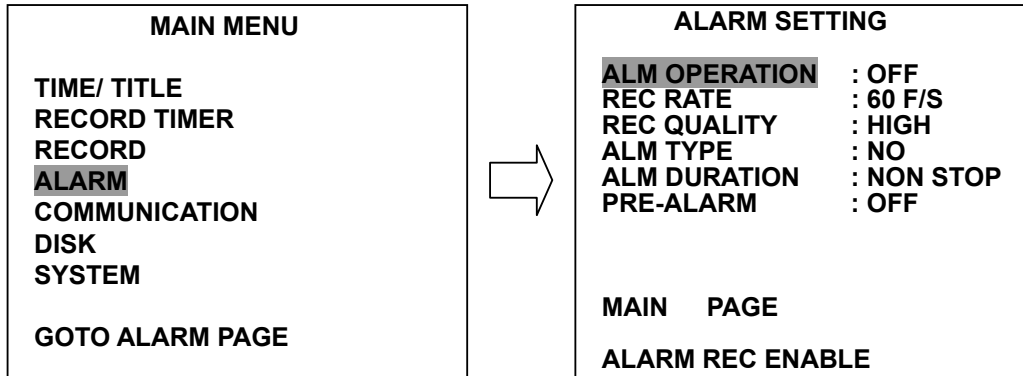
STOP: When the hard disk drive is full, the device will stop recording.

MULTIPLEXER:

For optimum image recording please set this option to **ON** when the DVR connected with a multiplexer for use. Set this option to **OFF** when only it is connected with a single camera.

5.4 ALARM SETTING

This menu allows users to program the configuration of alarm recording only when an alarm input is activated. The device will record as long as the alarm input is activated.



ALM OPERATION:

This option determines whether to activate/deactivate the alarm recording when it detects an alarm input.

ON: The device activates the alarm recording when it detects an alarm input.

OFF: The device ignores the alarm signal when it detects an alarm input.

REC RATE:

This option is for adjusting the number of pictures recorded every second into a storage disk when an alarm input is activated. For a NTSC unit, there are 5 different record speeds you can select from: **60F/S (60 fields per second)**, **20F/S**, **10F/S**, **5F/S**, and **REMAIN**. And for a PAL unit, there are 5 different record speeds you can select from: **50F/S (50 fields per second)**, **25F/S**, **12.5F/S**, **6.25F/S**, and **REMAIN**. If you select **REMAIN** for use, the device will record images at the same speed as set on the **REC** page.

REC QUALITY:

This option determines the image quality to be recorded when an alarm input occurs. There are 3 levels of image quality to choose from **HIGH**, **STANDARD**, and **BASIC**. The table below shows the level of image quality with the corresponding compression ratio and image size.

ALM TYPE:

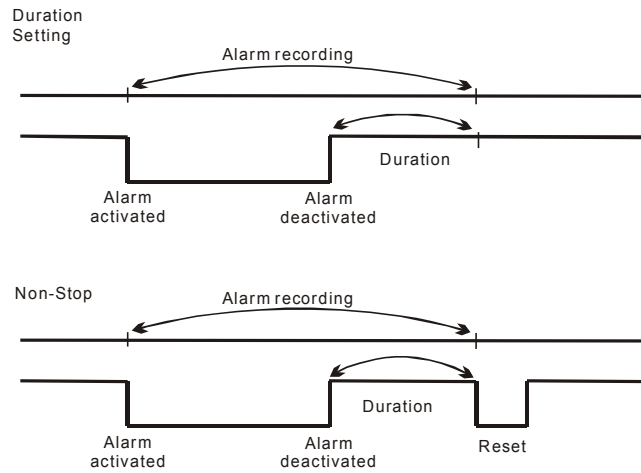
This option allows users to set a type of alarm input corresponding to the sensor signal in use.

NO: Normally Open. This is to be used with the type of alarm sensor, whose contact remain open in normal conditions and closes in case of activation.

NC: Normally Close. This is to be used with the type of alarm sensor, whose contact remain closed in normal conditions and opens in case of activation.

ALM DURATION:

This option allows users to set alarm for a certain duration. You can select one of the six following options: **0 SEC, 30SEC, 1 MIN, 5 MIN, 10 MIN, and NON-STOP.**



PRE- ALARM:

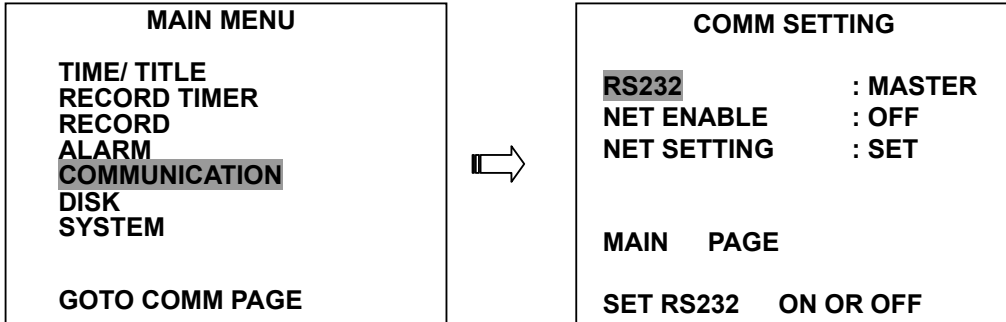
This option determines that images prior to an alarm occurs will be recorded into the hard-disk drive. If the alarm-recording rate is set to 60F/S, when an alarm is being triggered the device will record the image prior to the alarm for 3 seconds. If the rest of the available alarm-recording rate is set, the pre-alarm image recording will be extended to 5 seconds.

ON: Enables this function.

OFF: Disables this function.

5.5 COMMUNICATION

This option allows you to configure status of the RS-232 communication port when the connected with an external device, and the Ethernet communications settings. (Please refer to APPENDIX 1 RS-232 Protocol and APPENDIX 5 Network Function for more details)



RS-232:

The RS-232 communication port can be in either importing or exporting mode according to your applications.

SLAVE: Enables the RS-232 communication port to receive a signal only. When you wish the unit to be controlled by an external device, please select this entry for use.

MASTER: Enables the RS-232 communication port to send out a signal only.

NET ENABLE:

This option is to select enable or disable the Ethernet communication port.

OFF: Disable it.

ON: Enable it.

NET SETTING:

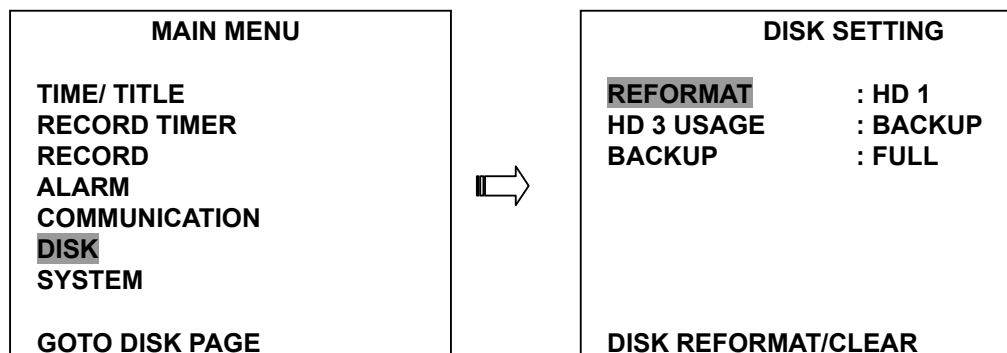
This option is used to configure the Ethernet communication settings. This is required for making a network connection. Please consult with a qualified MIS professional to configure it.

IP: XXX.XXX.XXX.XXX

MASK: XXX.XXX.XXX.XXX

GATEWAY: XXX.XXX.XXX.XXX

5.6 DISK SETTING



REFORMAT:

This option allows you to clear out all the data in the hard disk drive. You will be required to enter the pre-set password before proceeding with clearing out the data. Enter the standard password “9999” if you don’t set your individual password. To set your individual password, please refer to section 5.7 **PASSWORD** option.

HD 1: Clears out all the data stored in HD 1.

HD 2: Clears out all the data stored in HD 2.

HD 3: Clears out all the data stored in HD 3.

HD 1 2: Clears out all the data stored in HD 1 and HD 2.

HD 1 3: Clears out all the data stored in HD 1 and HD 2.

HD 123: Clears out all the data stored in HD 1, HD 2 and HD 3.

BACKUP HD: Clears out all the data stored in HD 3, which is set to backup purpose only. (This function has to be proceeded when the **HD 3 USAGE** option is set to **BACKUP**.)

HD3 USAGE:

This option determines the way to utilize the hard-disk drive in the mobile compartment.

BACKUP: Used for data backup only, which will not be part of regular recording hard-disk drive.

REC/PLAY: Used for regular recording hard-disk drive.

NOTE: When you wish to play back a recorded video from a HD3, this option must be set to **REC/PLAY**. For more details, please refer to section 4.3.4.

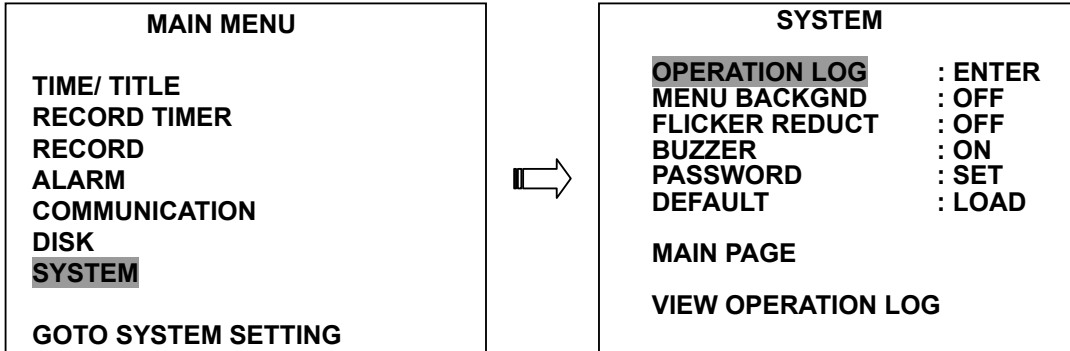
BACKUP:

This function allows you to duplicate data from HD 1 and HD 2 to HD 3.

(For operation details, please refer to section 4.5.1)

5.7 SYSTEM

This page is used for accessing the history of operation status, setting the password, resuming factory default, and determining the menu display background.



LOG:

This log shows the history of the operation status in chronological order. What the following entries represent is detailed below.

- ON:** Powers up the device.
- OFF:** Powers off the device.
- REC:** Starts recording.
- STOP:** Ceases recording.
- PLAY:** View recorded Video.
- PAUSE:** Freezes the display.
- V-IN:** Video input is connected.
- V-LOSS:** Video loss occurs.
- P-LOSS:** Power interruption occurs.

```

05/15/01 18:19:32 ON
05/15/01 18:19:32 OFF
05/15/01 18:19:32 REC
05/15/01 18:19:32 STOP
05/15/01 18:19:32 PLAY
05/15/01 18:19:32 PAUSE
05/15/01 18:19:32 V-IN
05/15/01 18:19:32 V-LOSS
05/15/01 18:19:32 P-LOSS

```

Note: The log keeps an operation history on a revolving basis because of a limit in memory space. When the log is full, the newly registered record of an operation will replace the existing records from the oldest one.

MENU BACKGND:

This option allows you to display the setup menu against a black background.

- ON:** The device displays the setup menu against a black background.
- OFF:** Disables this function.

FLICKER REDUCT:

This option allows you to eliminate the flickering condition of an image as it occurs during a playback picture by picture or a froze image display. However, when this function is activated, the picture quality might be degraded in a way.

ON: Enable this function.

OFF: Disable this function

BUZZER:

This option determines the embedded buzzer sounding a tone to signal the following situations. A tone lasts about two seconds long.

ON: Enable buzzer.

OFF: Disable buzzer.

Situation
Alarm takes place
Video loss takes place
Disk is full
Load factory default
Buzzer set to ON
Enable/disable key lock function
Power on /off mobile rack HDD
Backup operation complete
Timer activate/deactivate
Recording switching between HDD

PASSWORD:

This option allows you to set a password to prevent any unauthorized re-formatting of the hard disk drivers, and to use for network viewer. The standard password is "9999".

OLD PASSWORD: Enter the pre-set password (or the standard password if this is the initial setting) to access the password setting system.

NEW PASSWORD: Enter a 4-digit-number password of your choosing which will replace the pre-set password (or the standard password "9999").

DEFAULT:

This option allows you to reload the factory default setting.

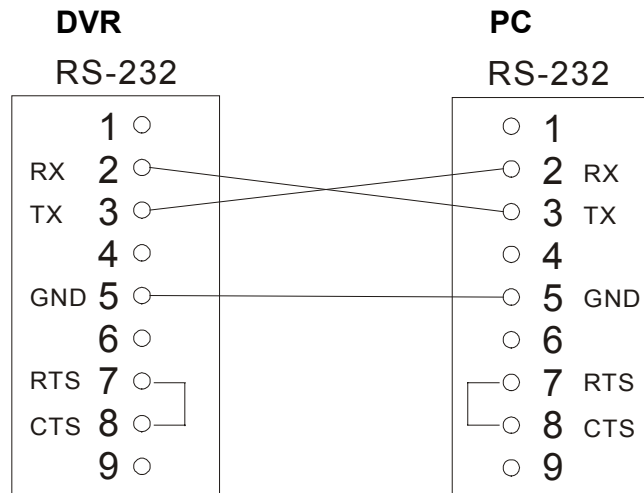
6. SPECIFICATIONS

Model Number	CL-100CD	
Image System	NTSC	PAL
Resolution	720 x 480 pixels	720 x 576 pixels
Video Input	BNC x 2, S-Video x 1	
Video Output	BNC x 2, S-Video x 1	
Storage Media	3 IDE Hard-Disk Drive (One mobile Rack)	
Image Format	M-JPEG	
Critical Image Archiving	1.44MB FDD (JPEG)	
Recording Rate	MAX. 60 fields/sec	MAX. 50 fields/sec
Image Compression	High / Standard / Basic	
Recording Mode	Schedule/ Manual/Alarm/Circular	
Pre-Alarm Recording	Yes	
Playback Speeds	Fast Forward /Reverse: 1x, 2x, 4x, 8x, 16x, 30x, Slow Forward/Reverse: 1/2x, 1/4x, 1/8x, 1/16x Picture By Picture Playback	
Access To Recording	Full List Search, Time Search, and Event Search	
Title	12 Characters	
On Screen Display & Setup	Title / Time / Date / Setup Menu	
Alarm Input	1 x NO or NC Contact Programmable	
Alarm Output	1 x NO or NC Contact Programmable	
Full-Disk Alarm Output	Yes	
Trigger Output	1	
Operation History Log	Yes	
Key Lock	Yes	
RS-232 port	Yes	
Software Upgradable	Yes	
Password Control	Yes	
Ethernet	Yes	
Power Interruption Recovery	Automatic Restart After Power Interruption / Recording Operation Resume	
Power Input	AC 100~240 V Input (50 Hz/60 Hz); 1 A Max	
Dimensions	374 x 430 x 90 mm	
Operation Temperature	5° ~ 45° C (41° ~ 113° F)	

APPENDIX 1. -- RS-232 Protocol

1.Setup

1.1 Use Null Modem cable (The standard RS-232 9 Pin Cable with Pin 2 and Pin 3 exchanged, see pin configuration chart below for details) to connect the COM 1 on the rear panel of the DVR to a PC.



1.2 Set the **RS-232** option to **MASTER** in the **COMMUNICATION** page of the setup menu.

1.3 Set communication parameters: 9600 bps, No Parity, 8 Data Bits, 1 Stop Bit.

2. Communication Protocol:

2.0 General Command Format

<Lead Code = 0x41>, <Main category >, <Second category >, {<Number of parameters>, <Parameter 1>, <Parameter 2> ...} <End Code= 0x4f>

Lead Code = 0x41

Main Category = 0x01 Keys and Signals

= 0x02 Command

Second Category = 0x01 Handshake

= 0x02 Request Time/Set Time

= 0x05 Request System State

End Code= 0x4f

The different command types and their corresponding parameters are as follows:

2.1 Keys and signals

PC Send: <0x41>, <0x01>, <Key Value>, <0x4f>

< The value for a specific front panel key >

KEY_PLAY	1
KEY_STOP	3
KEY_PAUSE	4
KEY_POWER	5
KEY_REC	6
KEY_SETUP	7
KEY_ENTER	8
KEY_CANCEL	9
KEY_SEARCH	10
KEY_DISPLAY	11
KEY_UP	13
KEY_DOWN	14
KEY_LEFT	15
KEY_RIGHT	16
KEY_SCAN_F	19
KEY_SCAN_R	20
KEY_RETURN	21
KEY_MONITOR	36

2.2 COMMAND Types

2.2.0 Command (Main Category=0x02)

2.2.1 Handshake (Second Category=0x01)

PC Request: <0x41>, <0x02>, <0x01>, <0x00>, <0x4f>

DVR Response: <0x41>, <0x02>, <0x01>, <0x00>, <0x4f>

2.2.2 Request Time (Second Category=0x02)

PC Request: <0x41>, <0x02>, <0x02>, <0x00>, <0x4f>

DVR Response: <0x41>, <0x02>, <0x02>, <0x07>, <7 Time Value >, <0x4f>

The following case is an illustration of < 7 Time Value >

2001/06/20 17:05:00 = <0xD1>, <0x07>, <0x06>, <0x14>, <0x11>, <0x05>, <0x00>

2.2.3 Set Time (Second Category=0x02)

PC Request: <0x41>, <0x02>, <0x02>, <0x07>, < 7 Time Value >, <0x4f>

The following case is an illustration of < 7 Time Value>

2001/06/20 17:05:00 = <0xD1>, <0x07>, <0x06>, <0x14>, <0x11>, <0x05>, <0x00>

DVR Act: Changing the time and date.

2.2.4 Request State (Second Category=0x05)

PC Request: <0x41>, <0x02>, <0x05>, <0x00>, <0x4f>

DVR Response: <0x41>, <0x02>, <0x05>, <0x01>, <System State = 0..>, <0x4f>

Description of <System State>:

STATE_STOP	0
STATE_REC	1
STATE_PREREC	2
STATE_PLAY	3
STATE_MENU	4
STATE_PLAYIDLE	5
STATE_SETUP	6..16
STATE_SEARCH	7..11
STATE_BACKUP	13..15
STATE_ALARMLIST	17
STATE_LOGLIST	18
STATE_RESTART	21

2.2.5 Time Search

PC send: <0x41>, <0x02>, <0x0b>, <0x06>, <6 Bytes Date/Time>, <0x4f> where < 6 bytes Date/Time >, = year(2 bytes, =LowByte + HighByte*256), month (1 byte), day (1 byte), hour(1 byte),min(1 byte)

Example: to search 06/12/2002 17:00 the Date/Time =

<0xd2>,<0x07><0x06>,<0x0b>,<0x11>,<0x00> where 2002= 210(=0xd2) + 7(=0x07) *256

NOTE: The DVR accepts RS-232 time search commands only under the live or playback Mode.

APPENDIX 2. -- IDE Hard Disk Installation

Usually, the unit comes with one hard-disk drive installed in the compartment HD 1, which is default-configured as a master. If the unit was shipped without a hard-disk drive, please install hard disk in compartment 1 first. The jumper settings configuration of the installed hard-disk drives for the unit and compatible drives which can be used with this unit are listed in the table below. To install a second hard disk drive in compartment HD 2 or exchange a larger capacity drive, please take the following steps.

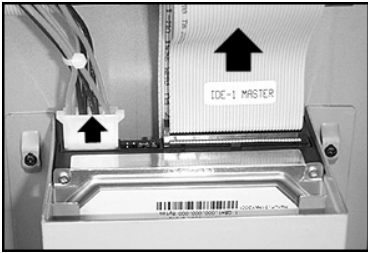
The jumper settings of hard-disk drives for the system

	Location	Jumper
IDE 1	Compartment HD 1	Master (Default)
IDE 1	Compartment HD 2	Slave
IDE 2	Compartment HD 3	Master

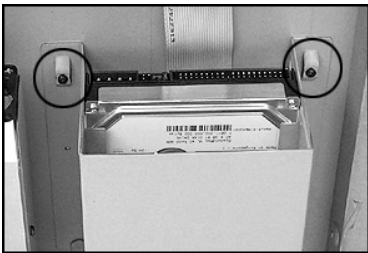
Table 3.2 B. Compatible hard-disk drives

Manufacturer	Model	Capacity	Rotation
Maxtor	Diamond Max D540X-4D 4D040H2	40GB	5400 RPM
	Diamond Max D540X-4D 4D060H3	60GB	5400 RPM
	Diamond Max D540X-4D 4D080H4	80GB	5400 RPM
	Diamond Max VL40-34098H4	40GB	5400 RPM
	Diamond Max VL40-33073H3	30GB	5400 RPM
	Diamond Max VL40-32049H2	20GB	5400 RPM
	Maxtor 536DX 4W100H6	100GB	5400 RPM
	Maxtor 536DX 4W080H6	80GB	5400 RPM
	Maxtor 536DX 4W060H4	60GB	5400 RPM
	Maxtor 536DX 4W040H3	40GB	5400 RPM
	Maxtor 536DX 4W030H2	30GB	5400 RPM
	4G120J6	120GB	5400 RPM
	4G160JB	160GB	5400 RPM
IBM	DTLA-305040	40GB	5400 RPM
Quantum	Fireball Lct	20GB	5400 RPM
	Fireball PlusLM	20GB	5400 RPM
Seagate	ST330621A/P	30GB	5400 RPM
	ST340823A/P	40GB	5400 RPM
	ST380020A	80GB	5400 RPM
Western Digital	WD800	80GB	5400 RPM

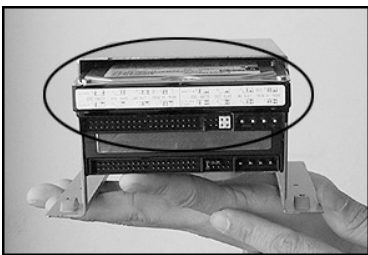
NOTE: Hard-disk drives not shown on this list have not been tested by the engineering team and are not recommended for use with this product. For the latest updated list on the recommended hard disk drives, please contact your dealers or distributors



1. Unscrew all the mounting screws on the top cover of the unit and detach it first. Unplug the interface connector and the power connector to the drive. (Go to the next step, if there is no drive in this compartment.)



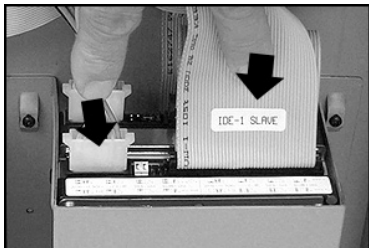
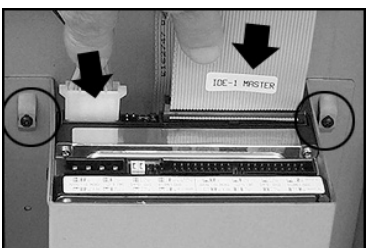
2. Unscrew the secured screws to detach the hard disk rack.



3. Setting the jumpers of your hard-disk drives:
The way to set the jumper of a drive varies between manufacturers; please refer to the instructions on the drives to configure it. Configure the drive as a **slave** which is located on the upper rack and the drive as a **master** which is located on the lower rack.

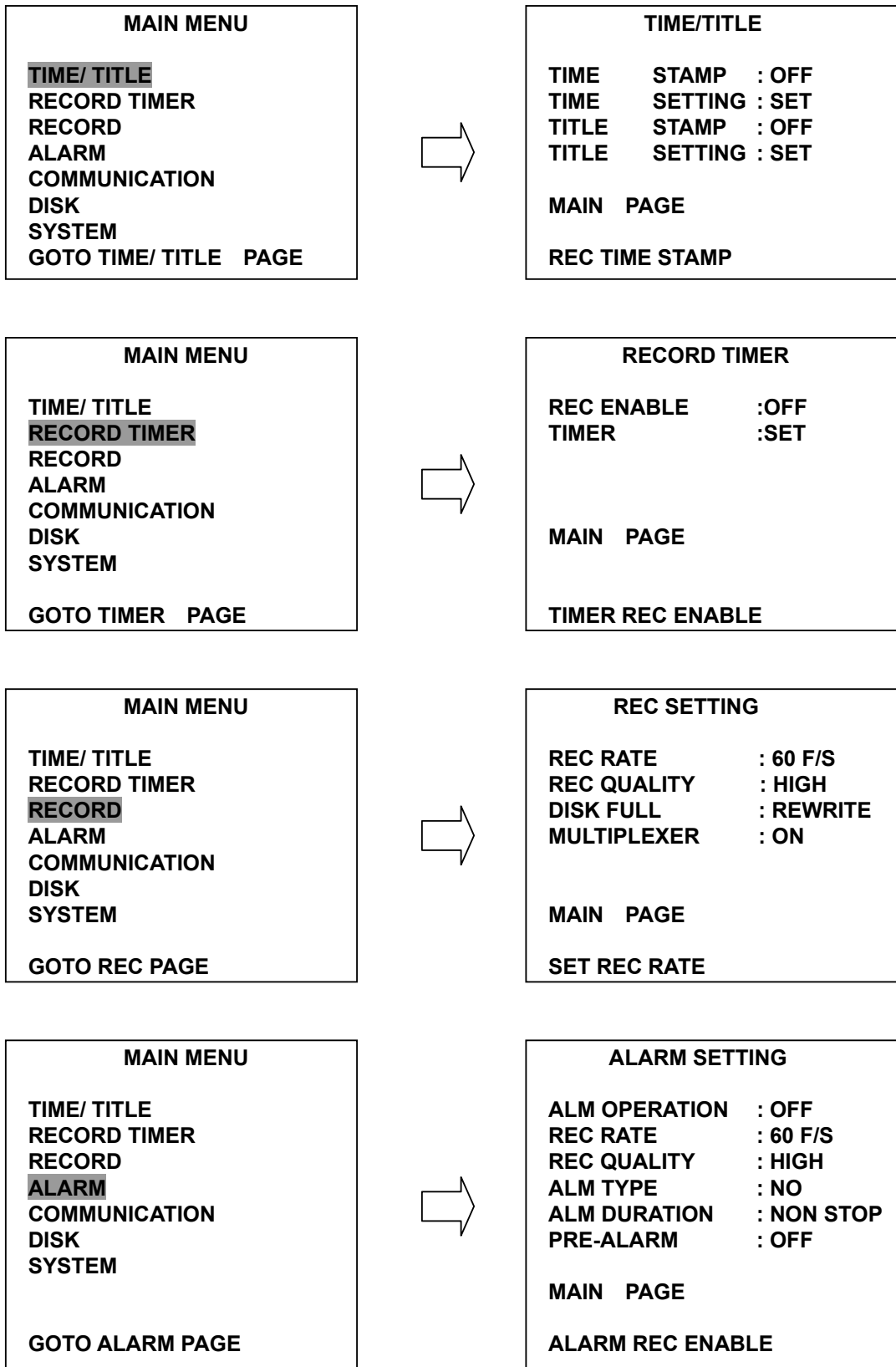


4. Secure the drive in the rack using two mounting screws in both the side-mounting holes. Please don't over tighten the screws, otherwise that may damage the drive.



5. Attach the interface connector and the power connector to the drive. Please make sure that you attach the interface connector labeled **IDE Slave** to the drive in the upper rack and the interface connector labeled **IDE Master** to the drive in the lower rack.

APPENDIX 3. -- System Default



MAIN MENU

TIME/ TITLE
RECORD TIMER
RECORD
ALARM
COMMUNICATION
DISK
SYSTEM

GOTO COMM PAGE



COMM SETTING

RS232 : MASTER
NET ENABLE : OFF
NET SETTING : SET

MAIN PAGE

SET RS232

MAIN MENU

TIME/ TITLE
RECORD TIMER
RECORD
ALARM
COMMUNICATION
DISK
SYSTEM

GOTO DISK PAGE



DISK SETTING

REFORMAT : HD 1
HD 3 USAGE : REC/PLAY
BACKUP : FULL

MAIN PAGE

DISK REFORMAT/CLEAR

MAIN MENU

TIME/ TITLE
RECORD TIMER
RECORD
ALARM
COMMUNICATION
DISK
SYSTEM

GOTO SYSTEM SETTING



SYSTEM

OPERATION LOG : ENTER
MENU BACKGND : OFF
FLICKER FILTER : OFF
BUZZER : ON
PASSWORD : SET
DEFAULT : LOAD

MAIN PAGE

VIEW OPERATION LOG

APPENDIX 4. -- O.S.D Message

No.	O.S.D Message	Meanings
1	NO DISK	No hard disk detected after power on
2	BATTERY LOW	Suggest to change battery and reset system time
3	LOADING	System Boot up
4	VIDEO LOSS	Video loss
5	VIDEO IN n	Video input source
6	KEY LOCKED	Key lock function is on
7	KEY UNLOCKED	Key lock function is off
8	BACKUP n1 / n2 NOW	BACKUP n1/n2 NOW n3 %
9	BACKUP COMPLETE	Backup complete
10	HD3 SPACE NOT ENOUGH	HD3 has not enough space for backup
11	NO ENTRY FOR BACKUP	Nothing can be backup
12	BACKUP INCOMPLETE	Backup incomplete, since user press STOP key to stop it
13	NOT FOUND	In Time Search function, system can not find the corresponding video
14	END	Playback of recorded video reached end point
15	DISK FULL	Hard disks are full, it happened only when the DISK FULL item in setup menu was set to STOP
16	EMPTY	User press PLAY key or use SEARCH function, but no video could be play.
17	SET TO NTSC, PLS RESTART	System has be set to NTSC, please reboot (PAL is similar)
18	SOFTWARE UPDATE	Software update
19	PLEASE RESTART	System should be reboot after software updated
20	NO DISK	User press save key without putting in a floppy disk, or disk error
21	DATA NOT CONTINUOUS	System finds data in installed HDs cannot be used contiguously. Suggest to remove HD2 and HD3 from system.
22	DISK ATTACHED	HD3 was attached
23	DISK REMOVED	HD3 was removed
24	FAN STOPPED	Chassis fan stopped over 2 minutes
25	HDn ERROR AT xxxxx	Hard disk error during recording, where n is hard disk number and xxxxx is hexadecimal location.
26	NOT PRESENT	When user try to clear a disk (in setup menu) that was not attached
27	SAVE TO DISK	Start saving JPEG file
28	SAVE TO Fnnn. JPG	Save to Fnnn. JPG (where nnn= 0..999)
29	SAVE OK	Save JPEG ok
30	WRITE PROTECT	Floppy is protected or error

APPENDIX 5. -- Network Viewer, Image Viewer, and Image Convert program

This section provides instructions for installing and using the Network Viewer, Image Viewer, and Convert Image, which are included with the DVR. The programs can be operated in a chosen PC equipped with the following requirements.

1. Intel Pentium 233MHz at least.
2. 32 MB RAM
3. Window 95, 98, NT, and ME.
4. 4 MB Video card capable of 24-bit true color display.
5. 5 MB free hard-disk space for software installation.
6. 10-base T network for LAN operation.

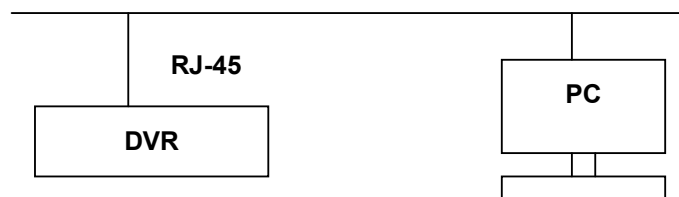
1. The Network Viewer

1.1 Introduction to Network Viewer

The Network Viewer allows you to possibly access 16 units of the DVR from a remote desktop or a laptop over a TCP/IP networking environment. It can perform the following functions.

- View live images from the DVR
- Store, search, and review recorded video from the DVR HDD.
- Change regular record, event record, and timer properties.

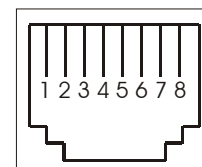
Before ready to view images from a desktop, you need to have your DVR networked, you must obtain a 10 base Ethernet data cable (Standard RJ-45) to connect the DVR to your LAN/WAN. And then enter the communication in the main menu to set the IP address.



RJ-45 PIN configuration for Ethernet

PIN NO.	PIN Assignment
1.	TX +
2.	TX -
3.	RX +
4.	Not Connected
5.	Not Connected
6.	RX -
7.	Not Connected
8.	Not Connected

RJ-45 socket



Physical specification for Ethernet

Wire Type	Cat. 5
Connector Type	RJ-45
Max. Cable Length	30 M
Hub Wiring Configuration	Straight Through
PC Wiring Configuration	Cross Over


NOTE: For more details on network connections, please refer to **APPENDIX 7**

1.2 Install the Network Viewer to your PC

Install the Network Viewer from the supported CD-W.

1. Exit all applications currently running on the chosen PC.
2. Insert the supported CD to CD-ROM drive; the program will execute installation automatically and then follow the on-screen instructions to proceed with the rest of the installation procedures when it appears.
3. After installation is complete, pop up the **START** menu from your computer, point to **Programs/ Picture Viewer** to open up the program selection page as shown below. Click the **Network Viewer** tag to start the **Network Viewer** program.

Install the Network Viewer for the ZIP file.

1. Save the ZIP file to your PC and extract the file to a designated directory.
2. Open the extracted folder. The folder contains 5 files.
3. Click on the  to execute installation and then follow the on-screen instructions to proceed with the rest of the installation procedure when it appears.
4. After installation is complete, pop up the **START** menu from your computer, and point to **Programs/ Picture Viewer** to open up the program selection page as shown below. Click the **Network Viewer** tag to start the **Network Viewer** program.



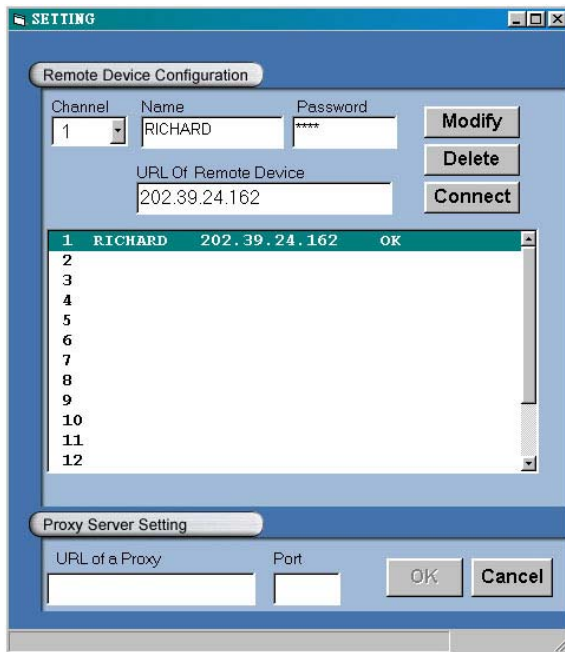
NOTE: Please make sure the TCP/IP communication software has been properly set and configured in your computer. To check your TCP/IP settings, refer to **APPENDIX 7**

1.3 View DVR Video From A Remote PC

Follow the instructions below to use the Network Viewer to browse a DVR video from a remote location. Upon entering the Network Viewer; the connection box will appear as follows.

1. Choose a channel number from the Channel drop-down list.
2. Assign a name for the chosen DVR.
3. Type in the password and IP of the device and click **Add** tag to add the device to the connection list.
4. Click the **Connect** tag to establish the connection between devices and the computer. To begin viewing images, click OK.

NOTE: Upon connection, the connection status box indicates the name and IP address of the selected device. If unable to connect, a “Fail” message appears on the screen right after the device IP address; otherwise an “OK” appears. To add more connections or units of the DVR, please repeat the above instructions.

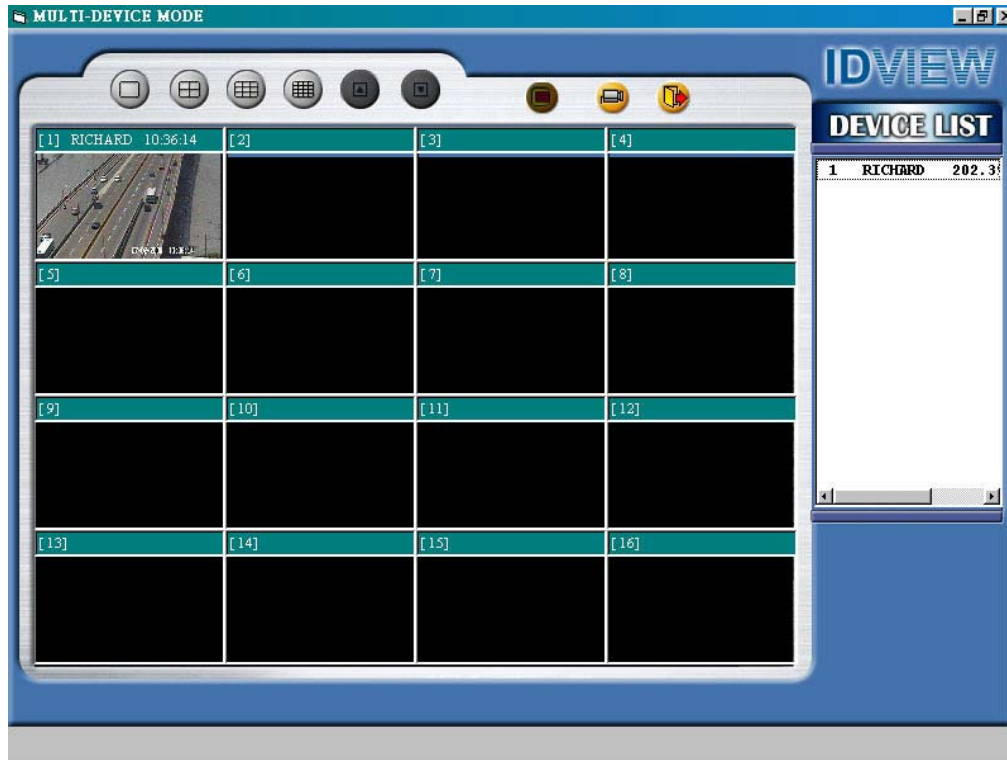








Functions	Description
● Channel	Assign a display location when you have multiple devices connected.
● Name	This box allows you to assign a name to the chosen device.
● Password	Type the preset password for making a connection.
● URL of the Remote Device	Type the IP address which you preset for the device
● URL of a Proxy	Type your proxy server address when accessing the Internet via a proxy server.
● Port	Enter the designated port setting of your proxy server.
● Modify	Click to change the settings of a chosen device.
● Delete	Click to remove the connection of a chosen device
● Connect	Click to establish the connection between devices and the computer.
● OK	Click to access the display page of the Network Viewer
● Cancel	Click to exit the program of the Network Viewer.

Viewing images

View all the connected devices


Once the connection has been established, click OK to enter the Multi-device mode window. (See the sample screen below) This window displays all the connected devices in sequence which has been arranged when you established the connection.

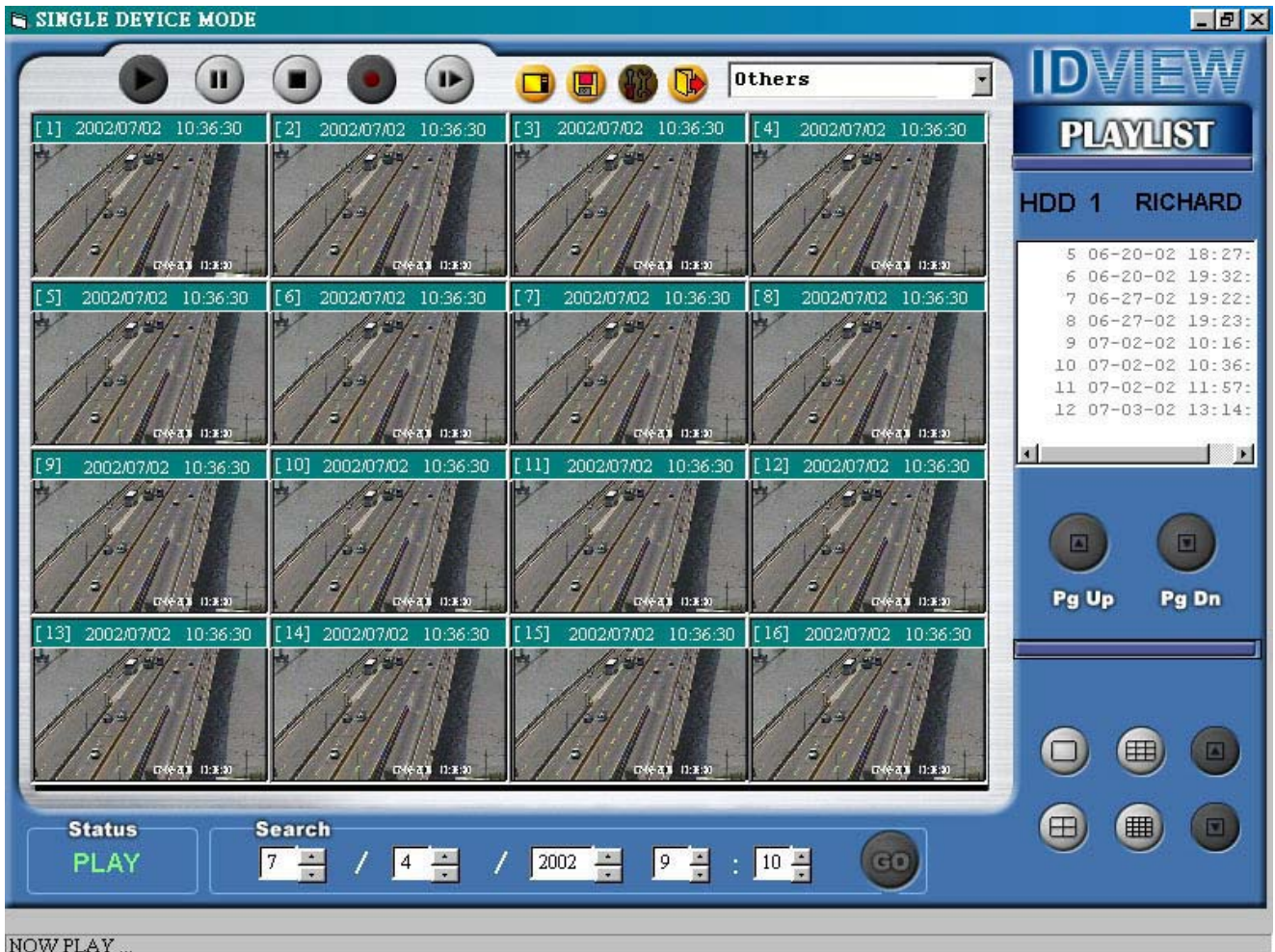








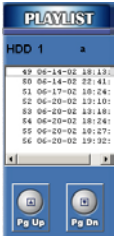





Function Buttons	Description
	Split-Screen display function bar. This allows you to display the connected device in a multi-format screen 1, 2x2, 3x3, and 4x4.
	Press to enter the selected device (Single device display mode) Select a device from the DEVICE LIST box to enable this button.
	Press to open the device setting page to add more devices for viewing.
	Press to leave the Network Viewer program.
	Connected devices display box. This box indicates the title and IP address of all connected devices.
	Device title and image display area. Display the title of each connected device and the time/day information of each displayed image on the top blue bar.

View single device

Follow either of the following instructions to get into the single device mode.

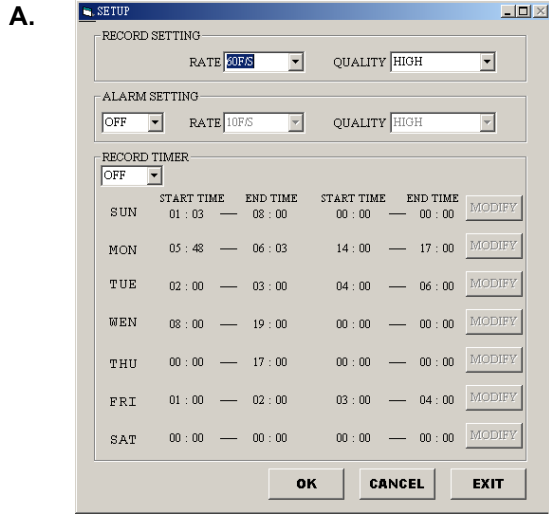
1. Select the desired device from the DEVICE LIST box on the Multi-device Mode. The  button will enable. Click the button to view the image of the selected device and have access to certain functional operations of the device via the network. (See the sample screen below.)
2. Double click the image display area of each screen.



Function Buttons	Description
	<p>Playback function bar.</p> <ul style="list-style-type: none"> ● Play- Click to a recorded video from the PLAY LIST. ● Pause- Click to freeze the image. ● Stop- Click to stop playing back the recorded video or cease recording. ● REC- Click to activate recording function of the device. ● Step- Click to view images picture-by-picture.
	<p>Click to return to the Multi-Device mode.</p>
	<p>Click to save a viewing image into the local computer.</p>
	<p>Click to enter the SETUP page, which allows you to program the recording time, recording quality, and schedule recording.</p>
	<p>Click to exit the Network Viewer program.</p>
	<p>Multiplexer format list box. Select a MUX from the drop-down list that is connected with the DVR, so the Network Viewer will be able to display cameras in corresponding to the camera input of the Multiplexer. If your MUX isn't available, please select the Others option for use. The Viewer will display cameras in thumbnail format. (Sequentially displaying images one after another in the adjacent display window)</p>
	<p>Recorded video list box. This box allows you to access all recorded video, which are stored in the HDD of the connected devices. To review a recorded video, just click a entry from the list and click the  button. PgUp/PgDn: To scroll up and down the list.</p>
	<p>DVR Status Box. This box indicates the selected device status. PLAY: The device is in the playback mode. LIVE: The device is in the live display mode. WAIT: The device is processing the command. PAUSE: Pause the image.</p>
	<p>This allows you to search a recorded video kept in the HDD of the device. Enter the MONTH/DAY/YEAR HOUR: MINUTE you wish to search and click GO to proceed.</p>
	<p>Split-Screen display function bar. This allows you to display the selected device in a multi-format screen 1, 2x2, 3x3, and 4x4.</p>
	<p>Image display area. Display the images of each camera and the title and time/date information on the top blue bar. Double click the image to view a full screen of the camera.</p>

1.4 Change the Record & Timer Properties Via the network

Follow the instructions below to reconfigure the record and schedule recording settings via the network.



Set the regular record settings

1. When in the single –device mode, click to enter SETUP page. (See the sample screen as above A)
2. Select a desired recording rate and Quality from the respective drop-down list
3. Click the **OK** tag to proceed.

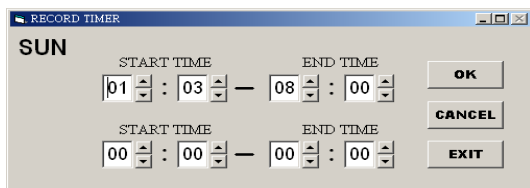
Set the Alarm record settings

1. When in the single –device mode, click to enter SETUP page. (See the sample screen as above A)
2. Set the ALRM SETTING to ON to enable the drop-down list in the ALARM SETTING area.
3. Select a desired recording rate and Quality from the respective drop-down list.
4. Click the **OK** tag to proceed.

Set the record timer


1. When in the single –device mode, click to enter SETUP page. (See the sample screen as above A)
2. Set the **RECORD TIMER** to **ON** to enable the **RECORD TIMER** setting area. All of **MODIFY** button will appear.
3. Click the **MODIFY** button to set the schedule for recording for each day. (See the sample screen below)
Enter in both the **START TIME & END TIME** boxes a specific **Hour: Minute** and click **OK** to return to the **SETUP** page.

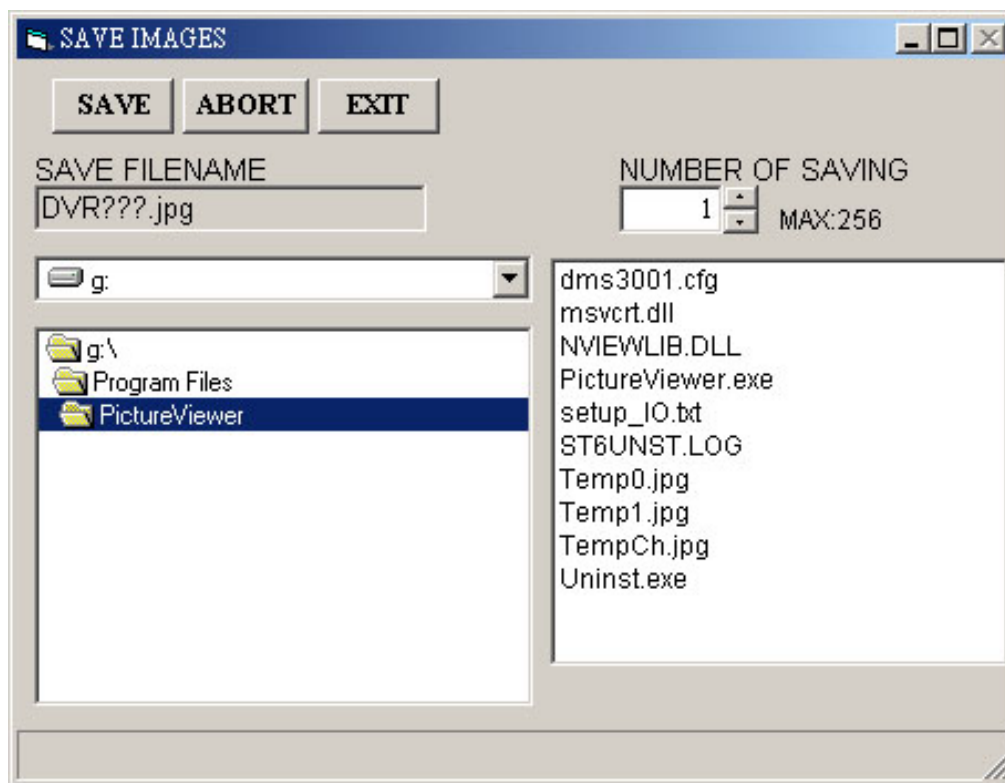
4. When all required settings are done, click **OK** to proceed.



1.5 Archive Images To The Computer

Single live or playback images can be stored into a local PC in the JPEG format. Follow the following instructions to save the viewed images to your PC.

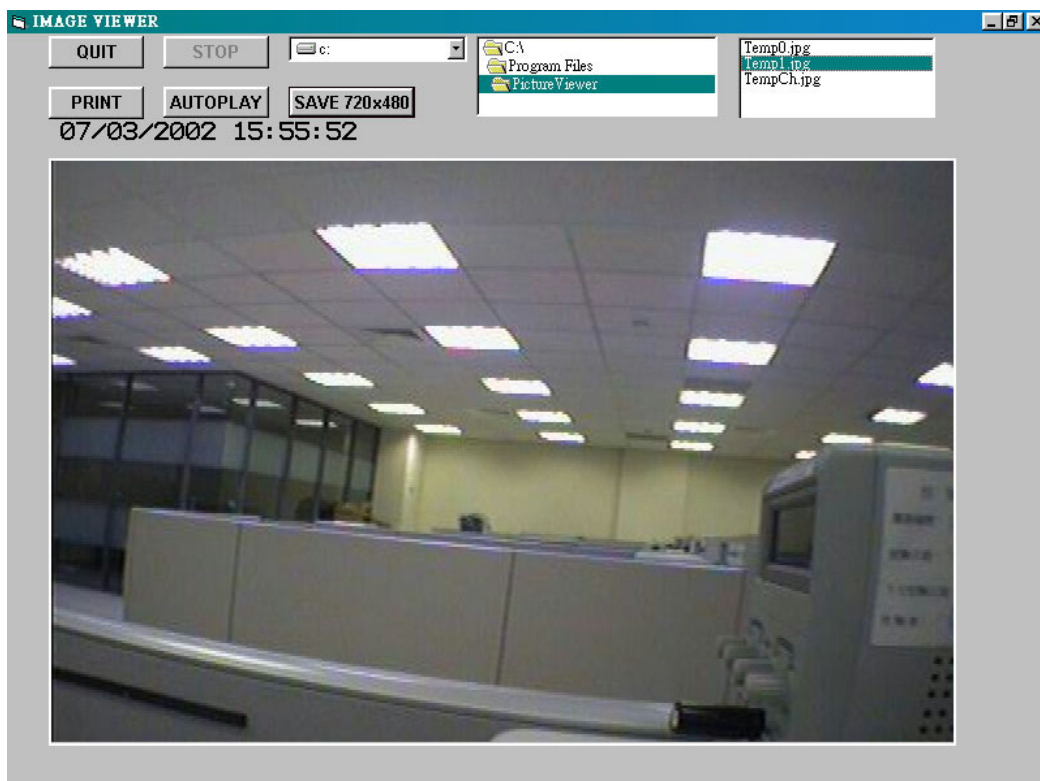
1. Press  to enter the following sample screen whenever in the live or playback mode.
2. Select a folder on the computer for copying images in.
3. Enter the number of images into the **NUMBER OF SAVING** box you wish to save.
4. Click the **SAVE** tag; the program will automatically copy the displayed images into the designated folder. The images are saved in the DVRxxx.jpg file name, which are displayed in the on lower-right box. To view a saved image, please follow the instructions in the next section to proceed.



2. View a still JPEG image

This is image integrity-protect software. It doesn't only allow you to view an archived image from a floppy or a HDD of a computer, but to also protect an archived image from reproduction or interpolation. If an image isn't in the original format made by a DVR, the Image Viewer will not display the image and instead send a warning message "Wrong File, Can't Open". Follow the following instructions to open an archived image from a floppy disk or a HDD.

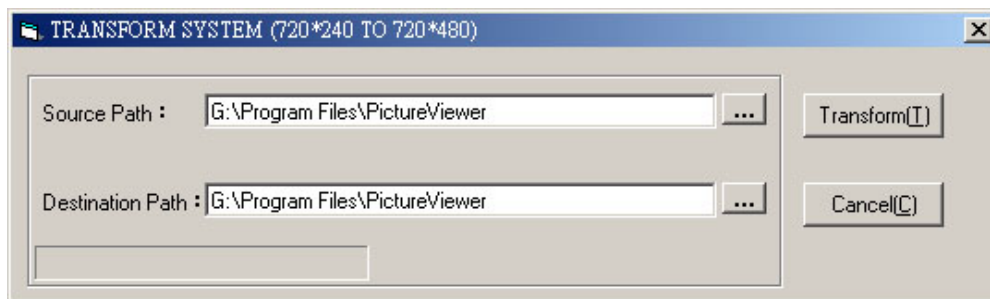
1. Pop up the **START** menu from your computer, and point to **Programs/Picture Viewer** to open up the program selection page. Click the **Image Viewer** tag to start the **Image Viewer** program. (See a sample screen below.)
2. Select a folder where the files are kept and click on a file you wish to display from the upper-right box or click on the **AUTOPLAY** tag to display automatically all the files in the selected folder. Each file will be displayed for 2 seconds on the screen.
3. Click the **PRINT** tag to get a displayed image printed out from a printer.
4. If you wish to transfer a displayed image into a 720x480 format, click the **SAVE 720x480** to proceed.



3. Convert Image Program

This program allows you to convert archived images into a 720x480 format, which allows you view the archived images via a computer with a JPEG compatible program. Please follow the instructions below to proceed.

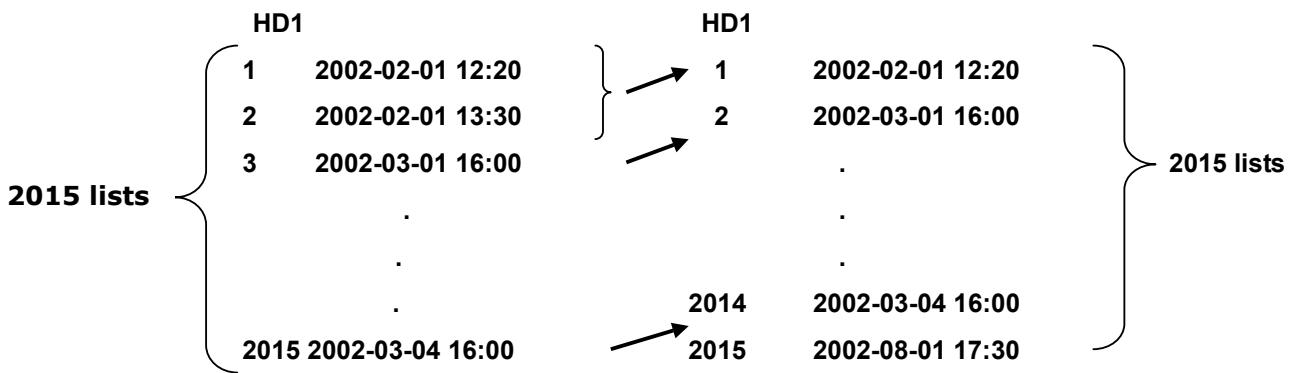
1. Pop up the **START** menu from your computer, and point to the **Programs/Picture Viewer** to open up the program selection page. Click the **Convert Image** tag to start the **Convert Image** program. (The Image Viewer is shown as a sample screen below.)
2. Click the **...** tag to select a folder where files are kept you wish to convert from the **Source Path** box.
3. Click the **...** tag to select a folder where you wish to convert files in from the **Destination Path** box.
4. Click the **Transform[T]** tag to proceed.
5. Click the **Cancel[C]** tag to stop processing at any time while converting.



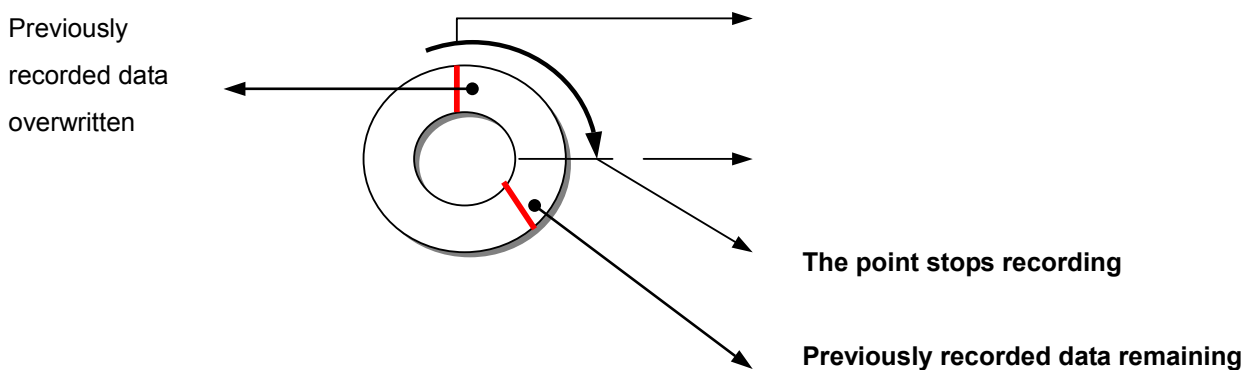
APPENDIX 6. -- Index Table

The following description details how the DVR manages an index table issue.

The DVR will generate a time index table indicating recorded data kept in a respective HDD. This allows to individually select record data to be displayed via alarm list search and full list search. The maximum number of lists, for a respective HDD, is 2015. When the list of any given HDD is used up and the disk is not full, for a new recording the unit will still use the rest of the space for recording. In such a case, an index for the recent recorded data will be generated and the index of the next oldest data will be erased so that the list in total does remain 2015. And the next oldest data should be kept under the index of the oldest data. For any new-recorded data, this approach will be applied until the disk becomes full.



In the rewrite recording mode, when the archived hard disk drive is full, the DVR will start overwriting the oldest data recorded. As a previous recorded data was partially overwritten by a recent recording, the indicating time index of that data will be changed corresponding to the starting time of the session remaining. The index of the session should be dismissed from the table when it is fully overwritten.



APPENDIX 7 -- Network Configuration

1. Cable Connections

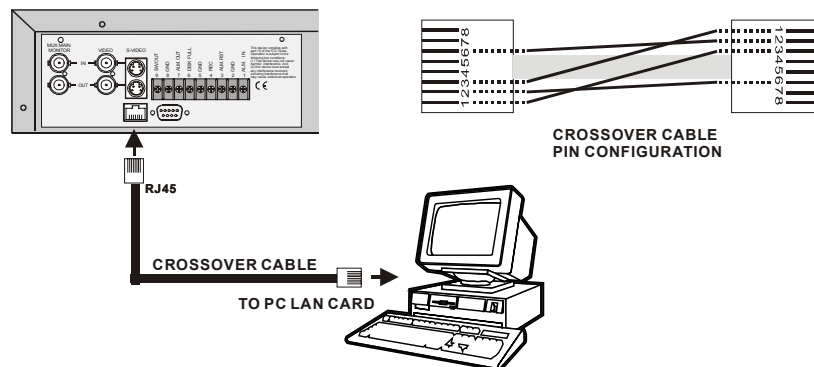
Please follow the instructions below to connect your DVR to a computer or a network and to choose a proper RJ-45 cable configuration for connections.

Physical specification of RJ-45 cable for Ethernet

Wire Type	Cat. 5
Connector Type	RJ-45
Max. Cable Length	30 M
Hub Wiring Configuration	Straight Through
PC Wiring Configuration	Cross Over

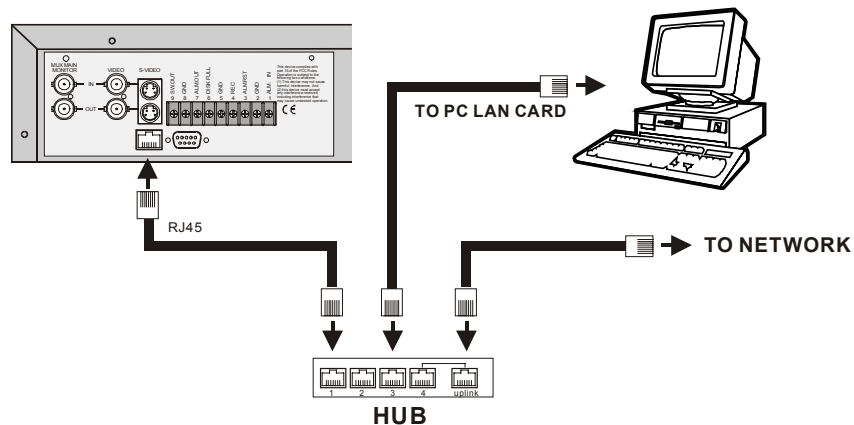
1.1 Connect With A Computer

For connecting directly to a computer, use a crossover LAN cable.



1.2 Connect with a LAN Hub (INTRANET)

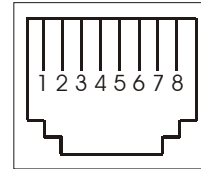
The RJ-45 PIN configuration for connecting with a LAN Hub is shown as below.



RJ-45 PIN configuration for LAN Hub

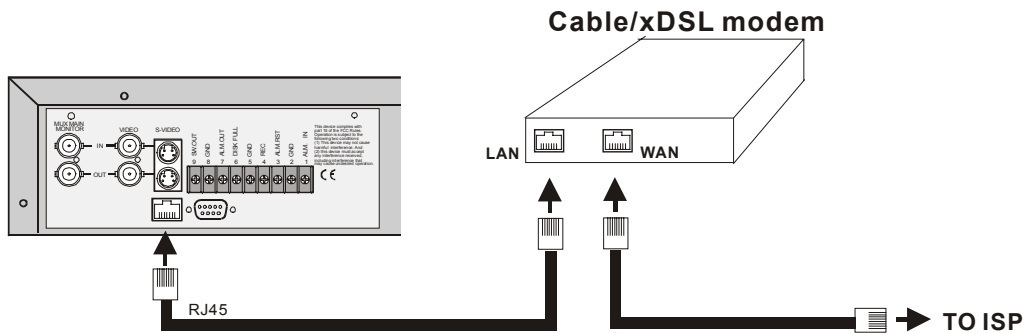
PIN NO.	PIN Assignment
1.	TX +
2.	TX -
3.	RX +
4.	Not Connected
5.	Not Connected
6.	RX -
7.	Not Connected
8.	Not Connected

RJ-45 socket



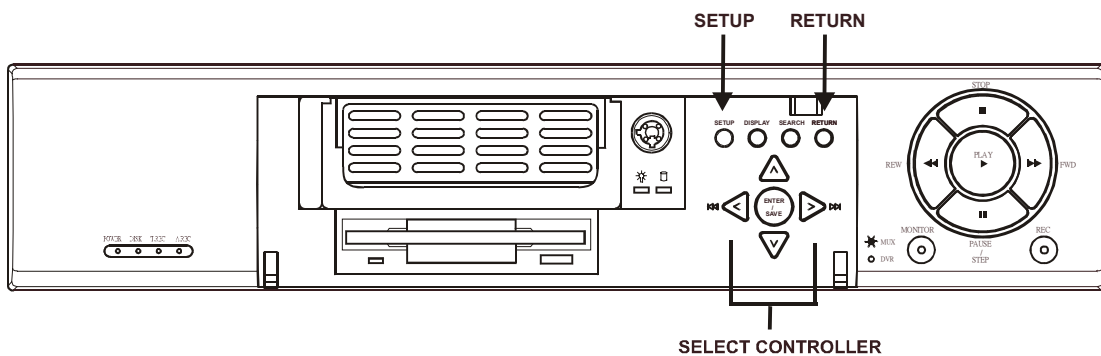
1.3 Connect with WAN (INTERNET)

The RJ-45 PIN configuration for connecting with a WAN is the same as connecting with a LAN.









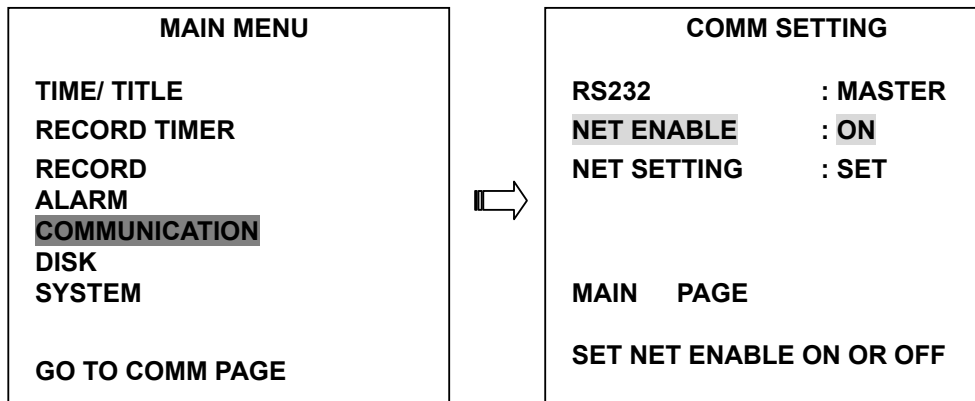
2 Configure Your DVR Network Settings

Upon network hardware connection, you need to activate the network function and configure the proper network settings of the DVR.







2.1 Enable DVR Network Function

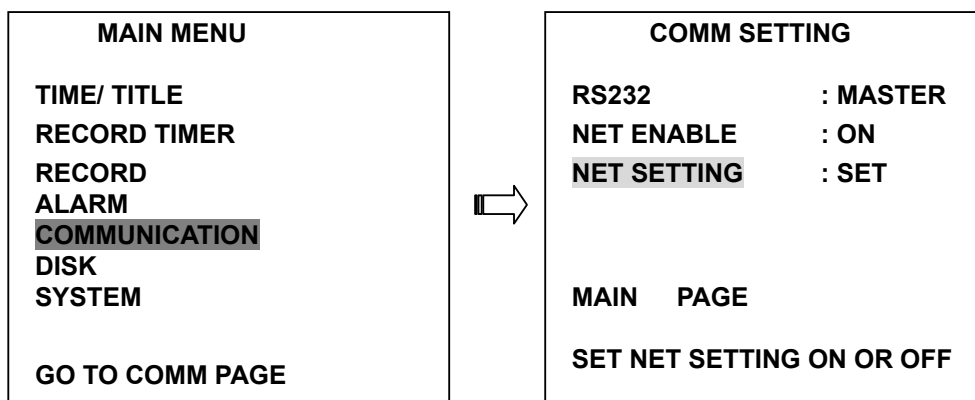
- Press the **SETUP** button to enter the OSD MAIN MENU. Please use the   **Right / Left** buttons to highlight COMMUNICATION; then press the  **ENTER/SAVE** button to enter the COMM SETTING page.
- Use the   **Up / Down** buttons to highlight NET ENABLE; select ON. Then press the  **ENTER/SAVE** button to proceed.



2.2 Set IP Address

- Use the   **Up / Down** buttons to highlight NET SETTING. And press the  **ENTER/SAVE** button to enter the NET SETTING page
- Set IP, MASK and GATEWAY. Then press the  **ENTER/SAVE** button to proceed. Press the **RETURN** button to return to the MAIN MENU. The following is a sample settings.

IP: 192.168.0.1
 MASK: 255.255.255.0
 GATEWAY: 0.0.0.0



NOTE: When only one unit of the DVR is connected with a computer or LAN, you can freely assign an IP address for the DVR. For example, there is a range of DVR IP addresses from 192.168.0.1 to 192.168.0.255. You can pick one for use from the range of IP. It's not necessary to set MASK and GATEWAY; leave the settings as default.

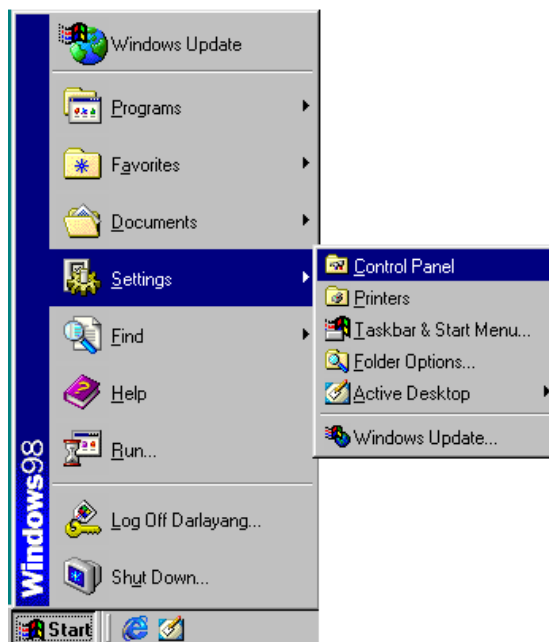
When a DVR is connected to a WAN, you must acquire a unique, permanent IP address and correctly configure the MASK and GATEWAY settings according to your network architecture. If you have any questions regarding those settings, please contact a qualified MIS professional or your ISP.

NOTE: When connecting with a network, each connected DVR must be assigned a unique IP, which must be in the same class type as your network address. IP addresses are written as four sets of numbers separated by periods; for example, 314.278.74.8. Therefore, if the connected network is identified as Class C, for example, the first three sets' numbers of the DVR IP address must be the same as the network address. If the connected network is identified as Class B, the first two sets' numbers of the DVR IP address must be the same as the network address. If you have any questions regarding those settings, please contact a qualified MIS professional or your ISP.

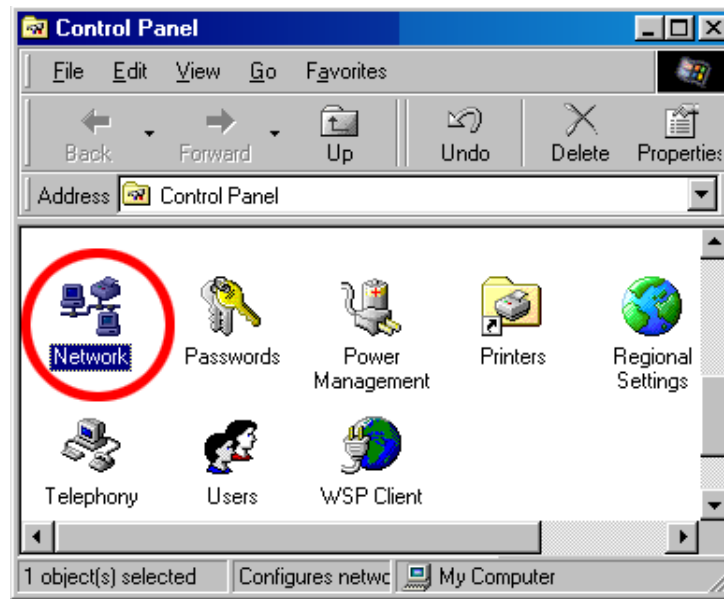
3 TCP/IP Communication Software

Follow the instructions below to install the TCP/IP communication program into your computer.

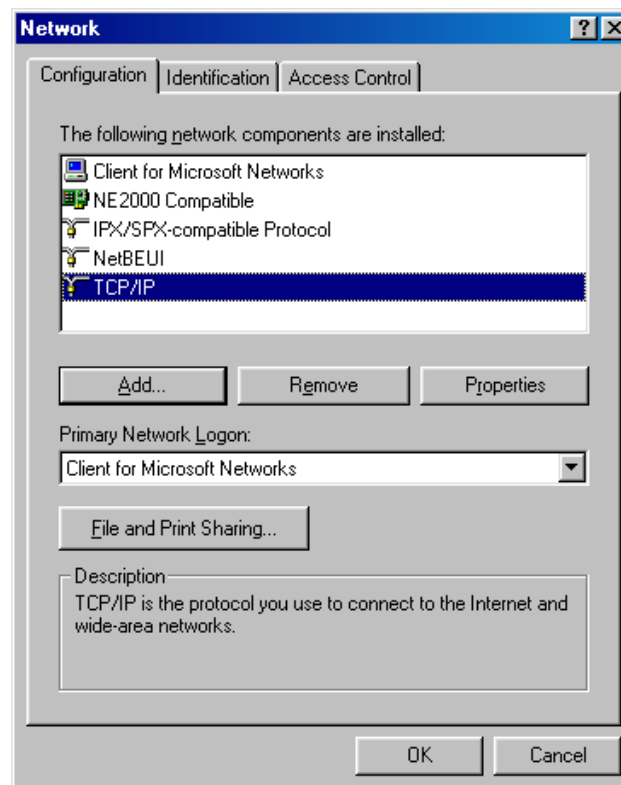
- Click the **Start** Menu from your computer, and point to the **Settings/Control panel**.



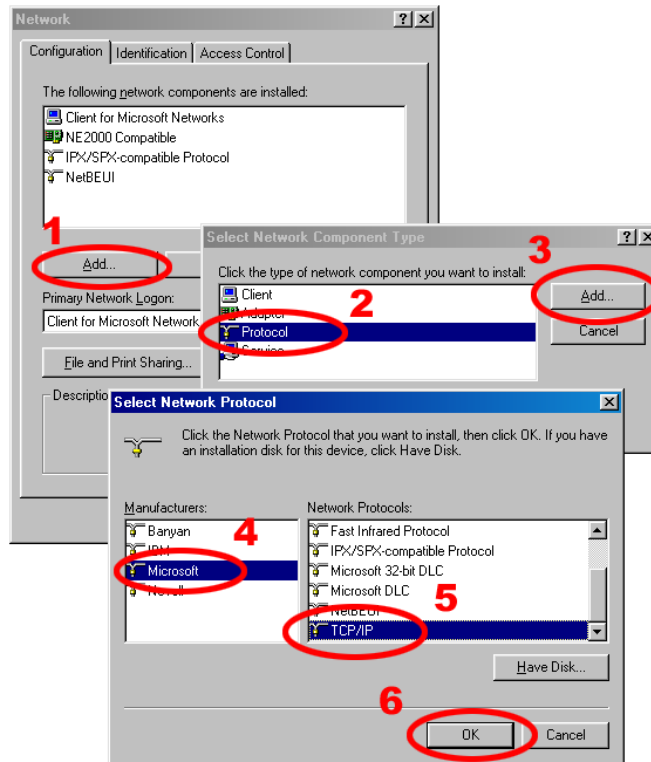
- Click the **NETWORK** icon twice to enter the **NETWORK** setting windows.



- Click on the **Configuration** tag; check if the TCP/IP is included among the network components list. If the TCP/IP is included, please process step 5. If it is not included, please follow step 4 to install the TCP/IP.



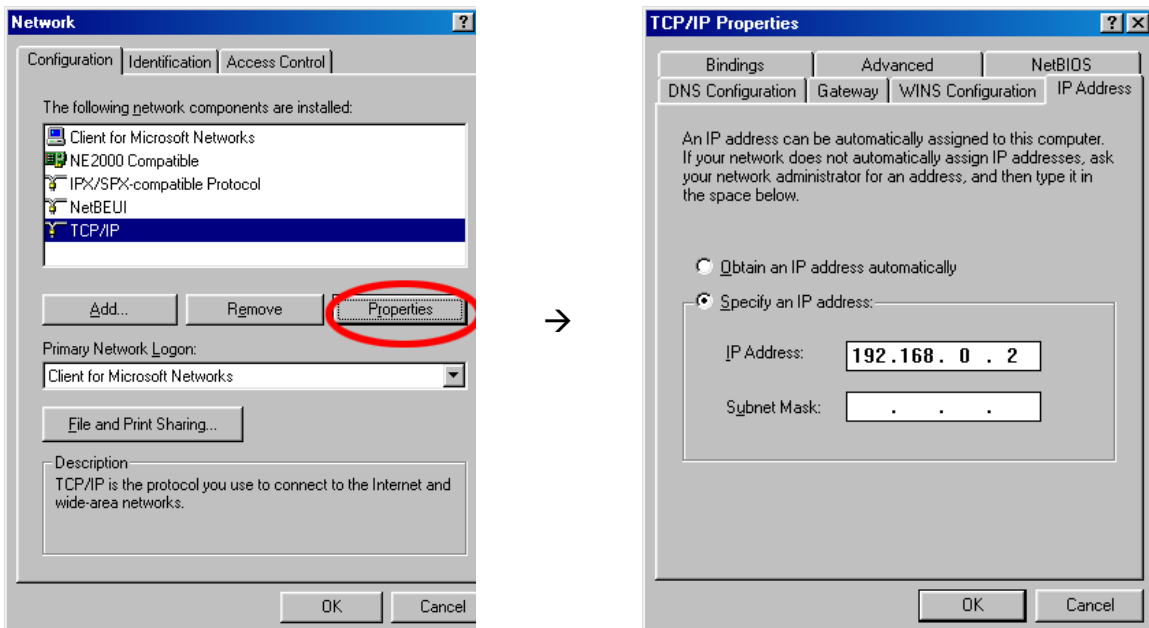
4. TCP/IP installation



During the installation, you will be requested to insert the windows 98 CD ROM. After installation, the PC will be restarted.

5. TCP/IP Configuration setting

- Click **Start → Settings → Control Panel → Network.**
- Select **TCP/IP**, and then click **Properties.**
- Before processing the DVR installation in a WAN, please make sure the Internet connection works properly. If not, please contact your ISP provider.



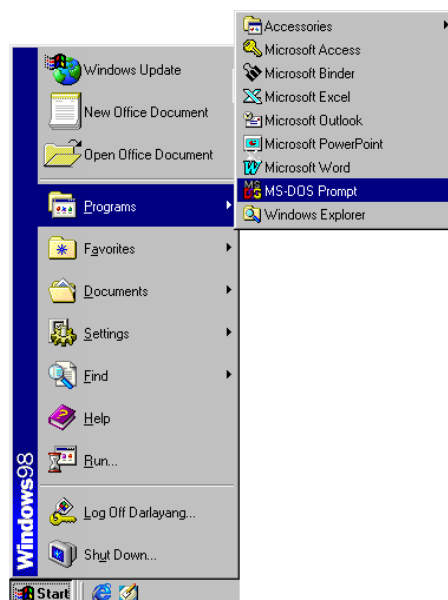
If you are using a DHCP server, please select **Obtain an IP address automatically**. Any assigned IP address for the connected DVRs must be in the same class type as the server. If there is no DHCP server, please select **specify an IP address** and type in the IP address of your PC. This IP address must be different from the DVR IP but in the same class type.

NOTE: The IP address of a DVR in a network must be unique to other chosen PCs' but in the same class type.

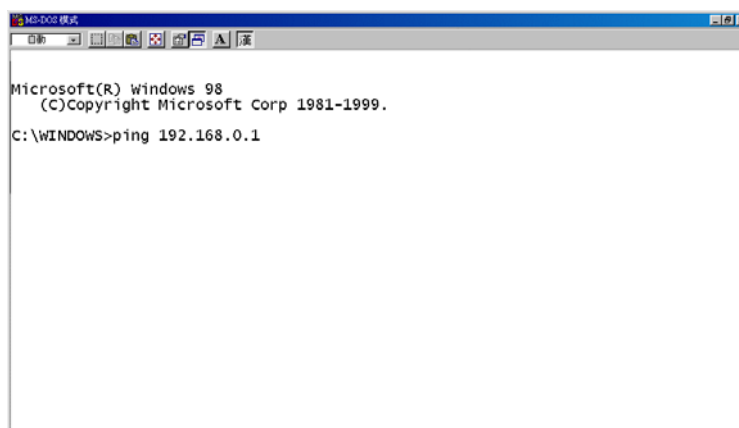
6. Connection Testing

With the previous settings, follow the instructions below to insure whether you have established the connection successfully.

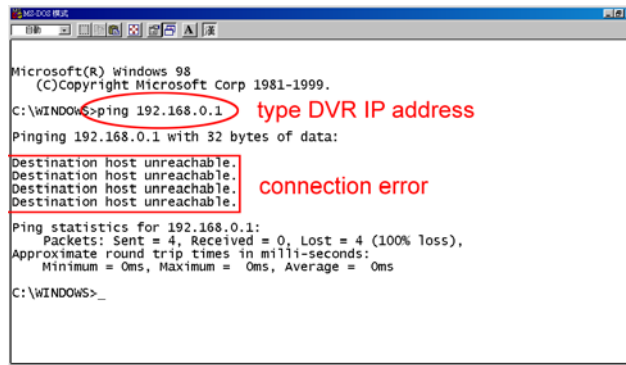
- Click **Start → Programs → MS-DOS Prompt**



- Type in **ping 192.168.0.1** then Enter. (See sample screen below)
*** This IP is the DVR IP address which is assigned for the connected DVR in step 2.*

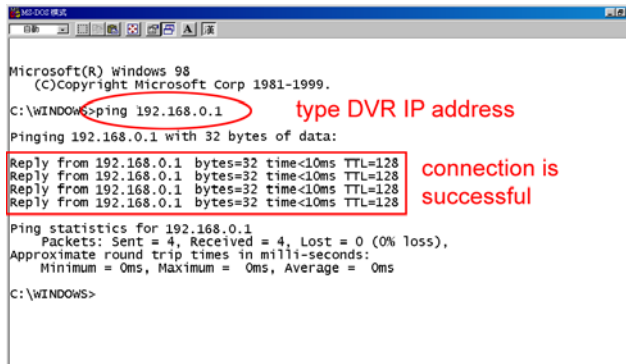


- If you receive a response as in the sample screen below, the connection hasn't been successfully established. Please re-check all the hardware and software installation by repeating steps 1 to 5. If you still can't establish the connection after rechecking, please contact your dealer.



```
Microsoft(R) Windows 98
(C)Copyright Microsoft Corp 1981-1999.
C:\WINDOWS>ping 192.168.0.1 type DVR IP address
Pinging 192.168.0.1 with 32 bytes of data:
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable. connection error
Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\WINDOWS>
```

- If you receive a response as in the sample screen below, you have successfully built the connection.



```
Microsoft(R) Windows 98
(C)Copyright Microsoft Corp 1981-1999.
C:\WINDOWS>ping 192.168.0.1 type DVR IP address
Pinging 192.168.0.1 with 32 bytes of data:
Reply from 192.168.0.1 bytes=32 time<10ms TTL=128
Reply from 192.168.0.1 bytes=32 time<10ms TTL=128
Reply from 192.168.0.1 bytes=32 time<10ms TTL=128
Reply from 192.168.0.1 bytes=32 time<10ms TTL=128 connection is successful
Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\WINDOWS>
```