RV1004 DVR

User Manual

Version 2.4

March 28, 2005

IMPORTANT SAFETY INSTRUCTIONS

Installation Environment:

To ensure the proper use of this product, please consider following suggestions:

1. **Avoid high temperature;**
2. **Avoid high humidity;**
3. **Do not expose to direct sun light;**
4. **Avoid installing this product in a confined space, and do not block any of the ventilation;**
5. **Install the unit horizontally on a stable flat surface;**
6. **Do not install the unit in the place with extreme vibration;**
7. **Do not move the unit between the places of extreme cold and extreme hot, to avoid the frost accumulation inside the unit.**

Avoid Electric Shock and Fire:

1. **Do not touch the power switch and the unit with a wet hand;**
2. **Do not splash any liquid onto the unit, to prevent the internal electric shock or fire;**
3. **Do not put other equipment directly on top of this unit;**
4. **After the power cord is plugged into the power outlet, be cautious with the "dangerous voltage" within the product, even it is not turned on yet;**

Important Warnings:

1. **To avoid potential damage, do not open the cabinet cover. All repairs should be handled by qualified service personnel;**
2. **Do not use this unit with extreme high or extreme low voltage;**
3. **To reduce the risk of fire or electric shock, do not expose this product to rain and moisture;**

SAFETY INSTRUCTIONS FOR HARD DRIVE INSTALLATION

Pay attention when installing hard drive:

1. **It is strictly forbidden to plug/unplug the hard drive when the DVR is powered on. It will cause serious damages to the DVR and/or the hard drive.**
2. **When using single hard drive, the jumper on the hard drive can be set to either "MASTER" or "SLAVE". For double hard drives, one has to set to "MASTER", and the other must set to "SLAVE".**

Package Supply

Please check the accessory list after opening the package:

1. **Power supply cord (one)**
2. **Accessory bag (one)**
3. **Manual (one)**
4. **Installation CD (one)**
5. **IR remote control (one)**

Contents

1. System Features

The RV1004 Digital Video Recorder from Reality Commerce is a cutting-edge digital security system combining hard disk recorder, motion detector and alarm system. It provides state-of-art video quality, high performance, flexibility and cost efficiency in one system. With a wide range of advanced recording and play back functions, its versatility meets a broad spectrum of surveillance applications.

Embedded Linux Operating System

Compared with PC-based DVR solutions using Windows OS, the embedded Linux OS provides a much more reliable environment, negating frequent system crashes, and most importantly, immunizing the system from extensively-spread computer viruses when connected to the Internet.

Powerful Recording Controls

The RV1004 DVR supports four recording modes: manual recording, scheduled recording, motion triggered recording and alarm triggered recording. The user can simply press the record button to manually start the recording, or setup to start the record at a scheduled time. The user can also enable the motion-trigger mode or alarm trigger mode to start video recording when motion is detected or if the external alarm is activated.

MPEG4 Standard Video Compression

RV1004 uses MPEG-4, the latest compression technology broadly adopted by the video surveillance industry. It provides enhanced picture quality, utilizing much lower bit rates than JPEG/MJPEG, MPEG1/2, H.263 or wavelet compression technologies. The ability to operate at lower bit rates greatly enhances network streaming and storage capacity, to allow users to record more days of video data using the same hard drive.

Choice of Different Frame Rate and Video Quality

The RV1004 DVR system provides the users with full controls of recording setup, to meet different system requirements and situations. The user can select different frame rate (1 to 30 frames per second), different resolution (CIF to 4CIF), and different levels of picture quality.

Flexible Play Back Functions

The RV1004 supports various video play-back and search functions, including, fast forward (advance 1 minute), fast rewind (reverse 1 minute), fast play (2X, 4X), slow play (½ X, ¼ X), frame forward, pause etc

Powerful Searching Tool --- Video Explorer

The RV1004 provides users with a powerful searching tool, called Video Explorer (VE). VE will display the recorded data into view maps and allow the user to check data by days, hours and minutes, and index information by motion activity, audio volume, alarm counts and thumbnail images.

Checking Recorded Video While Recording

The RV1004 DVR not only provides full functionality for recoding and video play-back, but also allows the user to play recorded video while the system continues to record live data. The user does not need to interrupt or stop recording to review previously recorded video.

External Alarm Control and Record

The RV1004 DVR accepts 4 external alarm inputs including alarm signals from infrared motion detectors or glass breaking sensors. External alarms are recorded, along with video and audio data. Later, the user can search the alarm log data to find out what was happened in the video data.

Audio Recording and Play Back

Audio recording and play-back are also supported along with video data. ADPCM format is used for best audio quality.

Built-in Video Motion Detection and Pre-Motion-Recording

The RV1004 DVR provides powerful video motion detection and pre-motion recording features. The user can specify the detection region from 99 motion zones to enable motion detection, with 5 different sensitivity levels. In case of the motion is detected, the actual recording process starts 10 seconds before motion is detected, to ensure nothing is missing at the critical time.

DSP-based solution

The RV1004 DVR incorporates a DSP-based solution, ensuring that the system upgrades can be performed on site. The user's investment is enhanced, as the DSP-based kernel ensures that software upgrades can be made when technology improvements are realized and feature enhancements are implemented.

Recovery from Power Loss

In the event of a power loss, the RV1004 can automatically recover and initiate recording process, ensuring that all previous settings are preserved once power is restored, eliminating the need to manually reset the system.

Video Signal Loss Alarm

In case of video input signal is lost, whether through intentional cut-off or non-functioning camera input, an alarm is activated, ensuring that video content can be restored.

Mosaic Covering

The RV1004 DVR includes a mosaic covering function whereby the user can block portions of an image to hide the details that are sensitive or confidential. The size and location of the mosaic covering block can be adjusted by the user.

User Access Control

There are three levels of user access control: Admin, Advanced User and Normal User. Different user levels have different privileges to access the control and set up.

Prevents Post-Editing

Innovative Sequential Recording File format prevents post-editing, to ensure the contents integrity.

Superior Hard Drive Management

The RV1004 DVR supports up to four hard drives for continuous recording and play-back capability. In case the hard drives are full, the user has the option whether to overwrite historic video data or simply raise an alarm signal.

Network Based Remote Client

RV1004 supports remote management and live video display (on a PC), as well as remote video data backup.

Support TV and VGA display

Users can select to display the video output on a VGA monitor, instead of a TV. The VGA displays video at resolution of 800 x 600 and refresh rate of 60 frames per second, which will create flick-free and much sharper video images.

IR Remote control

RV1004 comes with a full function IR remote control. One remote can be used to control multiple DVR systems, by selecting the device ID of each DVR device.

PTZ Control Features

The RV1004 DVR provides individual camera with pan, tilt and zoom controls. The system incorporates a RS485 interface, allowing the user to remotely manipulate PTZ viewing angles and zooming factors.

Support remote video monitor inside Internet Explorer

The RV1004 DVR has built-in web server and support remote video monitoring inside Windows Internet Explore (IE). Users can just open an IE windows and type in the IP address of the DVR and will be able to login to the DVR and watch real time video.

Data Encryption

No one will send his credit card information through the internet without encrypting it. The same is for the video surveillance. Unencrypted video data can be captured on the internet, and being watched by unauthorized viewers. In RV-1004 all data, including video data and commands, are encrypted with state-of-art algorithm during network streaming, to fully protect user's privacies

Support alarm notice through email

RV-1004 can be setup to send a notice email to certain email addresses when there is an alarm triggered, so that the users can be informed in the first time when something happens.

Watermarking

RV-1004 allows the users to add watermarks into the recorded video data, which can be used to verify the ownership of the recorded video, and check the video content has be modified or not.

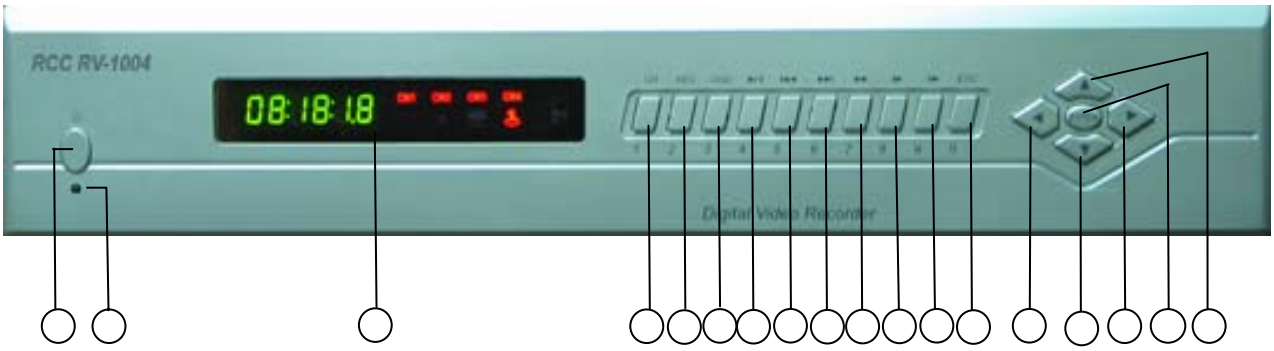
Flexible network setup

RV-1004 provides flexible network configuration tools, to set the IP address of the DVR manually or automatically through DHCP protocol.

MAC address clone

Certain ADSL ISP (Internet Service Provider) ask the users to specify MAC address of the network card in order to get connected onto the Internet. RV-1004 provides the functions to set or clone MAC address of the DVR, to help ADSL users for the remote monitoring.

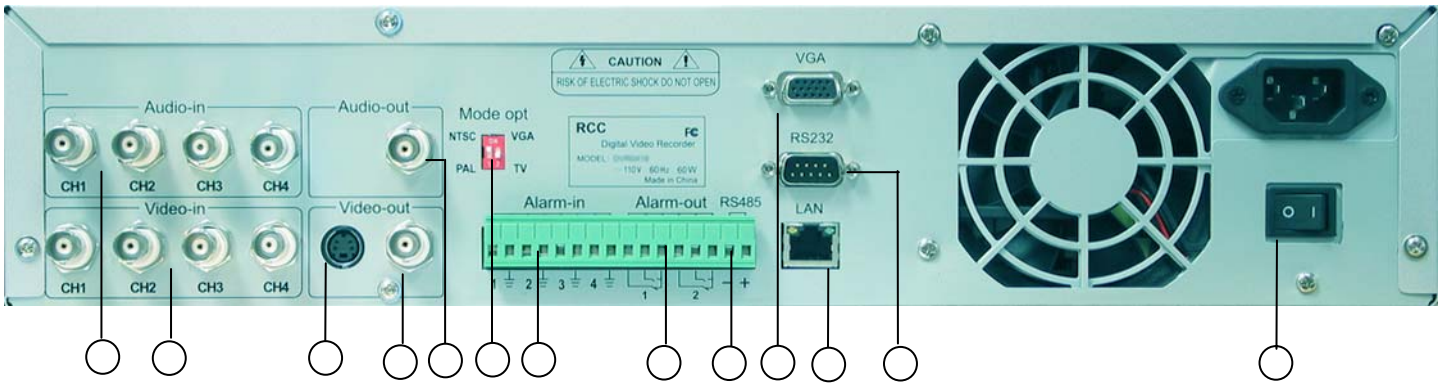
2. Front Panel



1. Digit 1 / Channel selection (Switchs among channel #1, #2, #3, #4 and quarter mode)
2. Digit 2 / Record (Start/stop record current channel if one channel is displayed. When 4 channels are all displayed, a record selection menu will pop up, to choose which channel to record)
3. Digit 3 / OSD (Turn status display On or Off, including channel number, recording mode)
4. Digit 4 / Pause (In monitor mode, pressing this key will bring up a play back menu; During play back mode, this key will be used to pause or continue playing)
5. Digit 5 / Reverse 1 minute in playing back mode
6. Digit 6 / Forward 1 minute in playing back mode
7. Digit 7 / Fast play (2X, 4X)
8. Digit 8 /Slow play (½X, ¼X)
9. Digit 9 / Frame play
10. Digit 0 / Escape and Cancel (Exit current menu during the menu selection, clear alarm after alarm triggerred, exit playing back for playing back mode)
11. Right for Menu and PTZ control
12. Down for Menu and PTZ control
13. Left for Menu and PTZ control
14. Menu Enter Key
15. Up for Menu and PTZ control
16. Power on/off switch (press this key for 4 second to shut down the box)
17. Power on indicator
18. LCD display: Including time display and status display.
    Status disply:
    - Recording status for each channel
    - Hard drive indicator
    - Alarm indicator
    - Network connection indicator
    - Key and button lock indicator

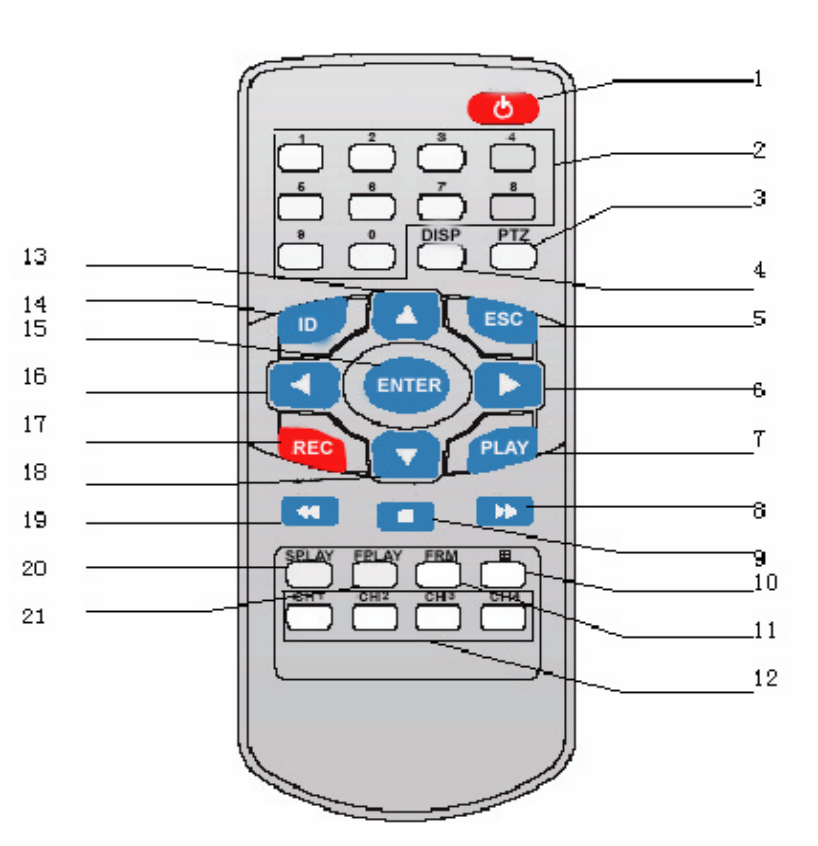
3. Back Panel

Back Panel:



1. Four BNC Audio Inputs
2. Four BNC Video Inputs
3. One S-Video Output
4. One BNC Video Output
5. One BNC Audio Output
6. VGA/TV, NTSC/PAL Select Switch
7. Four Alarm Inputs
8. Two Alarm Outputs
9. RS 485 for PTZ control
10. VGA Video Output
11. RJ45 Network Interface
12. RS 232
13. Power Switch

4. IR Remote Control



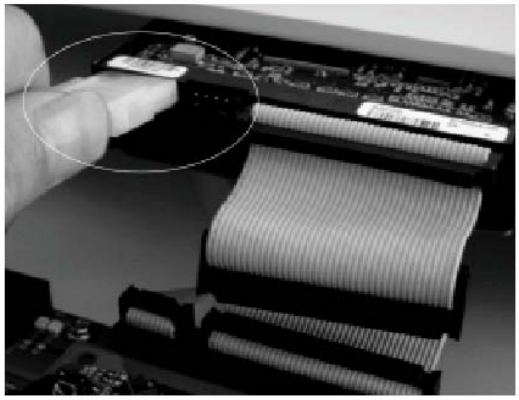
1. Power On/Off
2. Digit Keys (0 – 9)
3. PTZ Control
4. Status Display
5. Escape
6. Right for Menu and PTZ control
7. Playing Back
8. Fast Forward
9. Stop
10. 2x2 Display
11. Frame Play
12. Channel Selection
13. Up for Menu and PTZ control
14. Remote Control ID
15. Menu Enter Key
16. Left for Menu and PTZ control
17. Recording
18. Down for Menu and PTZ control
19. Fast Backward
20. Slow Play
21. Fast Play

5. Hard Drive Installation

Up to four hard drives can be installed inside this DVR box.

1. Remove the screws and open the cover.

2. Mount the hard drive on the rack.



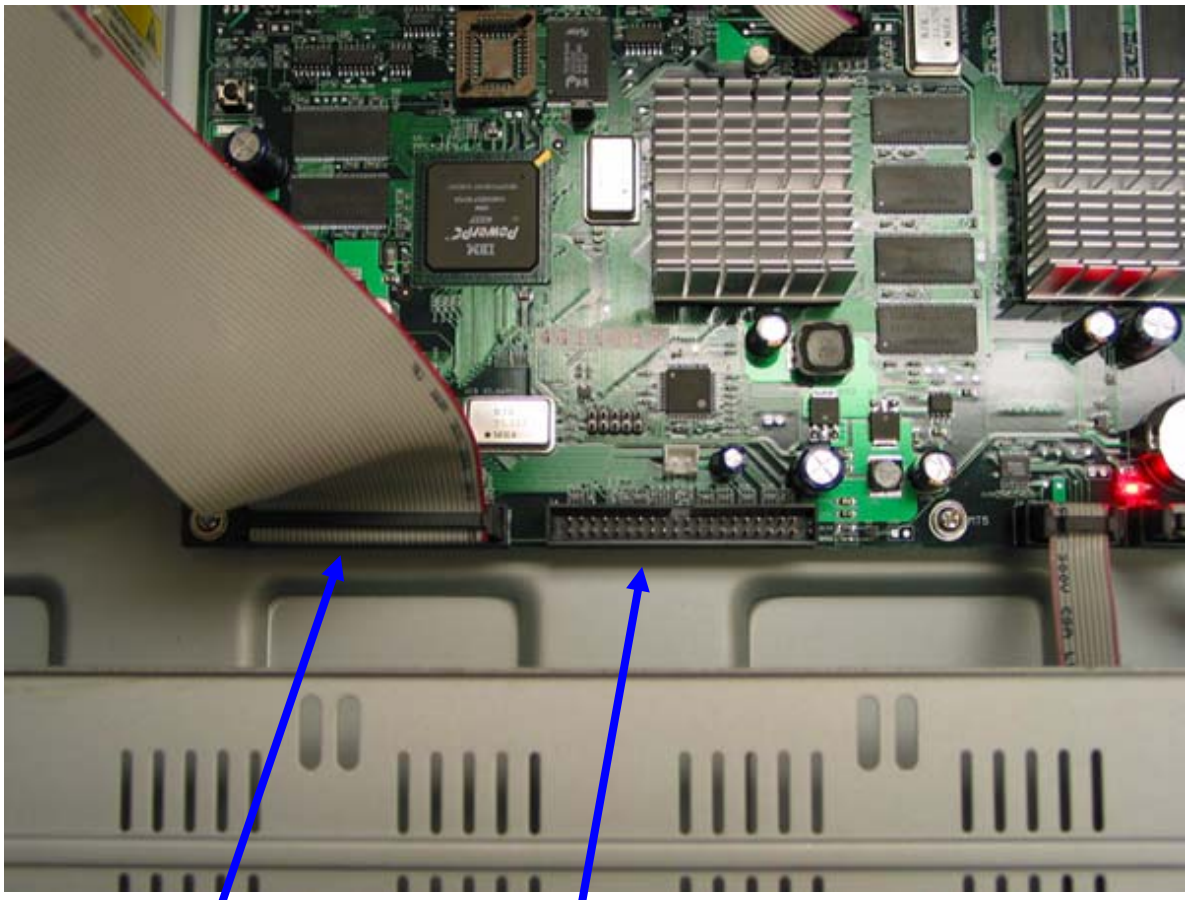
3. Plug in IDE connector and power supply cable.

4. Put back the cover after hard drive(s) installed.
Note: plug the front part of the cover into the slot on the box and then push down the cover.

5. Put back all the screws.

Hard drive Cable connection

The following is the top view of the DVR after the cover is removed. There are two IDE connectors used to connect up to four hard drives. The two IDE connectors are located on the edge of the mother board, shown below. Each IDE connectors can link two hard drives, one is master one is slave.



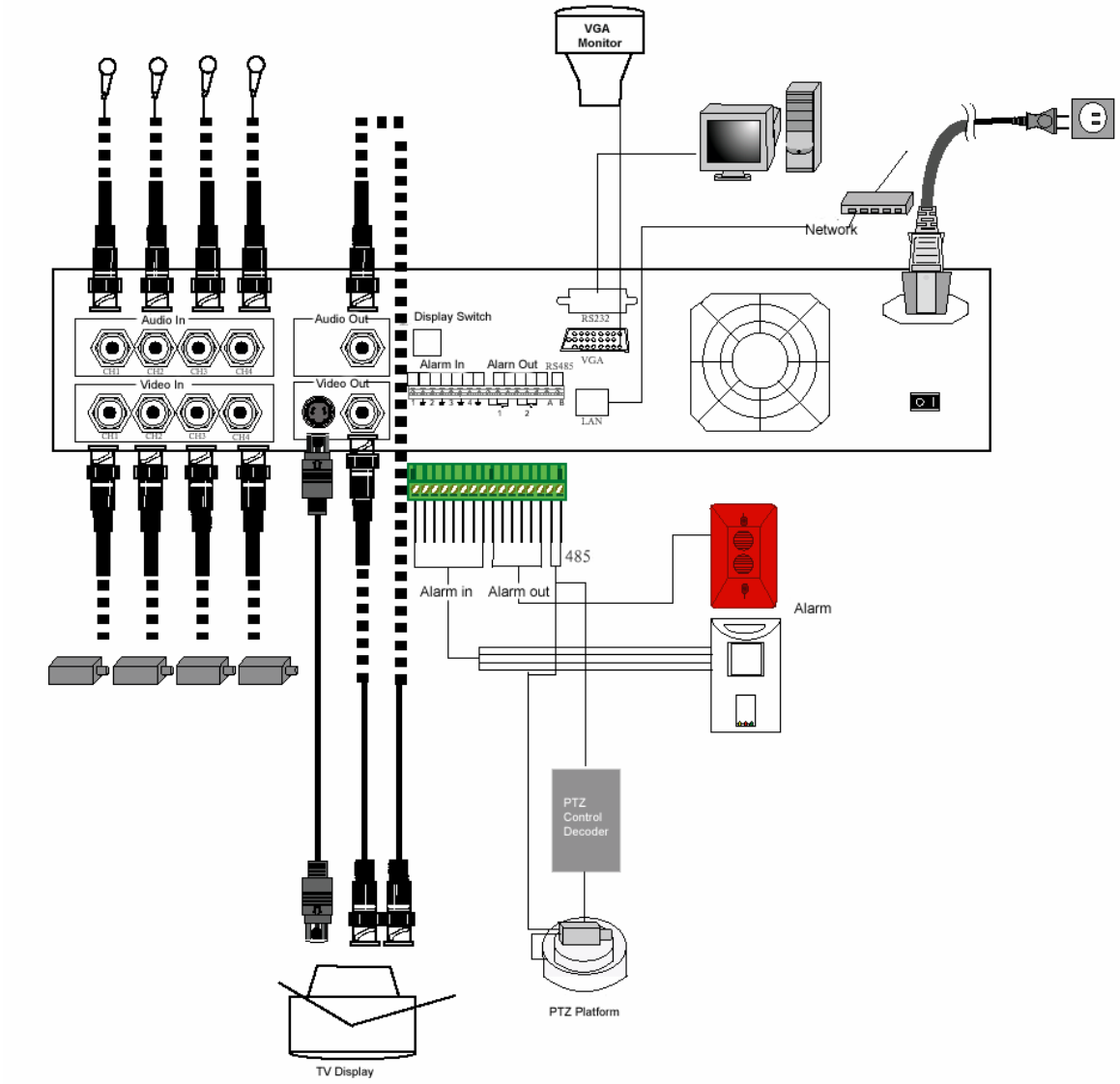
First IDE connector, used to connect to the first (master) and second (slave) hard drive

Second IDE connector, used to connect to the third (master) and forth (slave) hard drive

Please note: The setting for master and slave can be configured by the jumpers on the hard drive. Please refer to the manual or diagrams on the back of the hard drive for the set up. You have to set the hard drive either master or slave, not other settings, like “Cable Selection”.

6. Connection Diagram

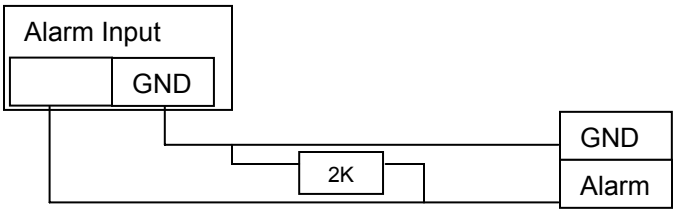
Before connecting all the cables, make sure DVR is shut down. Read the manuals of other equipments carefully, including TV set, Cameras, PTZ controls, Alarms etc.



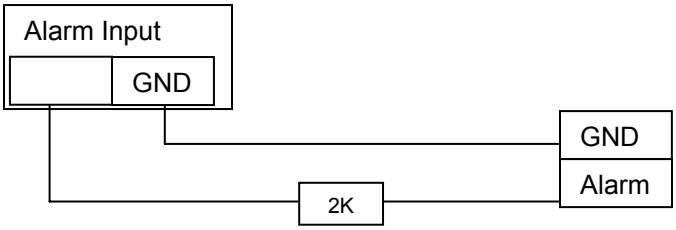
Note:

- This DVR can connect up to 4 alarm inputs, and 2 alarm outputs.
- Each alarm input has two connectors, with automatically adopted Often-Open or Often-Close inputs:

Connection diagram for type of Often-Open alarm input:



Connection diagram for type of Often-Close alarm input:



- Each alarm relay output has three connectors. Connector 1 and 3 are Often-Close output; Connector 2 and 3 are Often-Open output.

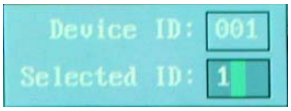
Parameters of Relays:

Contact Material:	AuAg
Contact Rating:	1A24VDC/120VAC
Max Switching Voltage:	30VDC/220VAC
Max Switching Current:	2A
Max Switching Power:	120VA, 30W
Contact Resistance:	< 50mΩ (6VDC 1A)
Life Expectancy:	Electrical: 100,000 operations
	Mechanical: 100,000,000 operations

7. Operations

7.1 Introduction

- The buttons on the DVR front panel are used as both digit keys and function keys. In the mode of menu selection, they are treated as digit keys; otherwise, they are used as function keys.
- During the operation of the OSD menu, current input focus will be displayed with light green as the background color. Use the directional keys to change input focus. For multiple selection menus (such as rate control type, which shows choices of VBR or CBR), continue pressing the ENTER button for the selection. Press ESC to exit the current sub-menu without saving. ***Please note***: ESC button on the front panel will be treated as digit 0 if the current input is a digit type, otherwise, it will be treated as ESC key.
- One IR remote control can control multiple DVR boxes. Press ID key on the remote control to select which DVR to connect to.



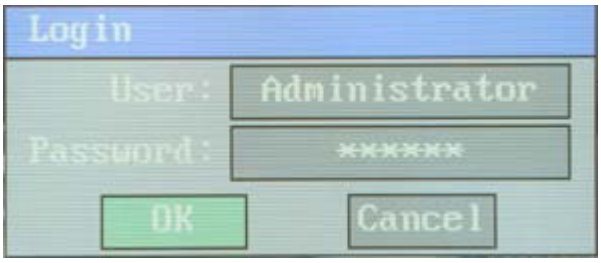
Then press ENTER key to confirm. A small remote control logo  will be displayed on screen when connected to the DVR.

7.2 Power On/Off

- Before turning on the power, check if the power-supply voltage is set correctly. RV1004 supports only 110V. And make sure the power cord is tightly connected.
- Turn on manually:
  After the power supply is connected, the power indicator will turn to red, showing that the DVR is ready to use. When pressing the power switch, the LED will start to flash and the power indicator will be off. After the system is started, the LED will stop flashing, display the current system time, and the screen should display the preview video images. By default, 4 channels will be displayed in 2x2 mode.
- Auto power on after losing power:
  If the system lost the power and did not shut down normally, the system will reboot automatically after the power supply is back, and will recover to the state before power is lost.
- Scheduled power on or off:
  You can set up the time to automatically turn on/off the power of the DVR. See "***Scheduled power on/off*** " in Section ***7.4.6 Advanced Features.***
- To manually power off the unit, press and hold the power on/off button for 5 seconds.

7.3 Log In

- Users must log in before operating the DVR. There are three types of users, Administrator, Advanced User and Normal User. Administrator has the highest privileges. Advanced User and Normal User can be disabled by an administrator. Please keep the administrator password in a safe place.
- Press any key on the front panel (except power switch key), a login menu will pop up:



After selecting the user, enter the numbers for the password to login. Different users have different access privileges:

- Administrator has full access and control of the DVR device;
- Advanced User has a similar level of access except following three: changing the system clock, managing user accounts and advanced features.
- Normal User cannot change any settings of the DVR, and cannot start or stop recording process. Only three operations are allowed for normal user: playing back record video (including remote online monitoring if logged in through NetViewer), information query (disk, record, alarm and system information) and remote backup through NetViewer.

If the password is entered incorrectly, or the user is disabled, system will give error message. The default password of factory setting is “123456” for admin user. Advanced user and normal user are disabled.

7.4 System Setup Menus

Pressing the “ENTER” key will bring up the main setup menu on the screen. There are 12 sub-menus. Different types of users have different levels of access restriction. Normal User can only access Info Query sub-menu. Advanced User can access all sub-menus except three: System Clock, User Management and Advanced Options. Administrator can access all sub-menus.

Use the four directional keys to navigate through the menu. Use the “ENTER” key to select and enter sub-menu, and use the “ESC” key to exit current sub-menus or the main menu.

7.4.1 System Setup

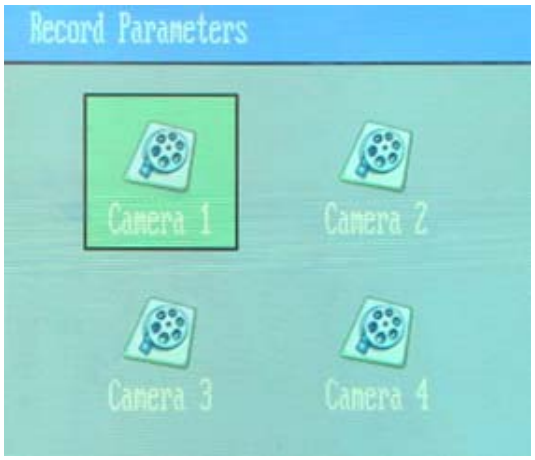
From the main menu, highlight sub-menu item "***System***" and press "ENTER" to select it:

- Set DVR box ID: Each IR remote can control up to 999 DVR boxes. Every DVR box will be signed different ID (000 to 999). The remote control will use this number to specify which DVR to connect to.
- Disk Full Option: You have two choices in case of the hard drive(s) are full, to overwrite older video data or give an alarm and stop recording process.
- Beep Alarm: Two options are available, ON or OFF, which enables or disables the alarm siren in side this DVR box.
- Beep Duration: Set the time length (minute: second) of the alarm siren when it goes off.
- Video Lost Alarm: Select ON or OFF to indicate whether the video signal lost alarm is enabled or disabled.
  Please note: this option can only take affect only Alarm Siren is enabled. Video lost Alarm will not output to external Alarm Output Connectors.
- Language: This DVR supports English and Chinese, use the "ENTER" key to switch between the two languages. After confirmed, all the menu displays will be changed to the selected language.
- Rolling Duration: During real time preview, the four channels can be switched automatically for the display. You can set the display duration for each channel. For example, if you set to 10, then channel 1 will be displayed for 10 seconds, then channel 2 for another 10 seconds, then channel 3, channel 4 and back to channel 1 again.

7.4.2 Record Settings

The record setting in this sub-menu will be used as default parameters for Manual Recording, Alarm Triggered Recording and Motion Triggered Recording. Scheduled recording will use its own record settings.

From main menu, highlight sub-menu item "***Record***" and press "ENTER" to select it. The channel selection dialog will pop up:

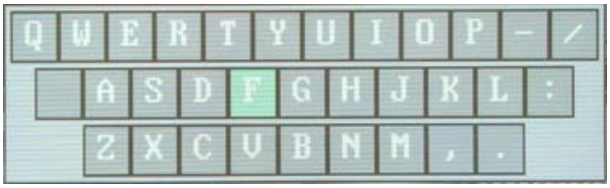


Use directional keys to select the channel that needs to be configured, press "ENTER" to bring up a setting dialog as follows:

- Resolution: There are four choices for image size of the recorded video.
- Rate Control: There are two options for the rate control; VBR (Variable Bit-rate Control) and CBR (Constant Bit-rate Control). VBR (variable bit rate) will not maintain a constant bit rate, but rather to keep the video is suitable for local disk storage, bit rate will be very low if no motion in the scene and will jump higher when something happens, always make sure the scene is recorded in good quality, without care about the bit rate. On the other hand, for network streaming, CBR (constant bit rate) should be applied, and make sure the DVR product a constant bit stream, easier to be transferred on the network.
- Video Quality: There are five different levels of video quality, Very High, High, Medium, Low and Very Low. The higher of video quality, the clear picture but shorter recording time. Please refer to the recording time table in Section 8.2

- Frame Rate: The number of frames per second can be configured based on the surveillance environment. For PAL, frame rate can be set to 1, 5, 10, 15, 20 or 25 fps; For NTSC, it can be 1, 6, 12, 18, 24 or 30 fps. In the case where there is not very much motion in the images, you can choose a lower frame rate to save disk space, thus a longer recording time. Press "ENTER" to switch and select among the numbers.
- Audio: During the recording process, audio data can be enabled or disabled. Select On to include audio data; Choose Off for no audio recorded.
- Watermark String: A character string used as a watermark to be embedded into the encoded bit stream. The default watermark string is "MARK-ABC". This is an 8-character string and can be changed to different character strings for different video channels on different DVR devices.

  To type in different watermark string, move the focus to the line of "Watermark String", you can directly type in digit characters by press 0,1, 2…,9 keys, or press "ENTER" to bring up a soft keyboard:



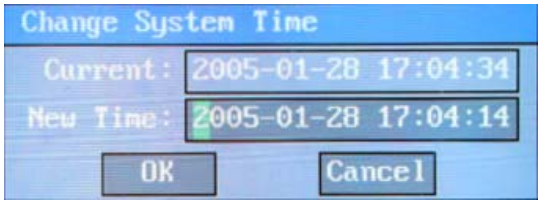
  You can select one of the character and press "ENTER" to "type in" it into the watermark string.

  The watermark character string will be replicated to cover the whole video image. To verify the watermark, you need the PC side application ***"DPlayer"*** to display it. Here is a snapshot of the watermark being overlaid on top of video image:

  Please refer to document "RCC_NetViewer_Manual.pdf", for how to use ***"DPlayer"*** to verify the watermark.

7.4.3 System Time

From main menu, highlight the third sub-menu item "***Time***" and press "ENTER" to select it:



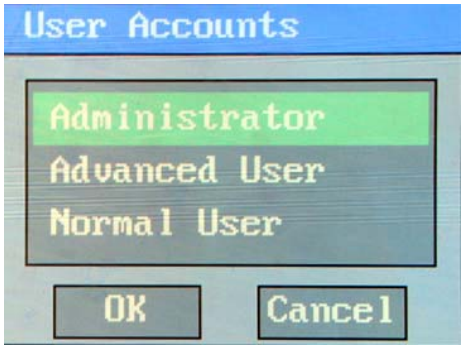
The format of the system clock is:

yy-mm-dd hh:mm:ss (Year-Month-Day Hour:Minute:Second).

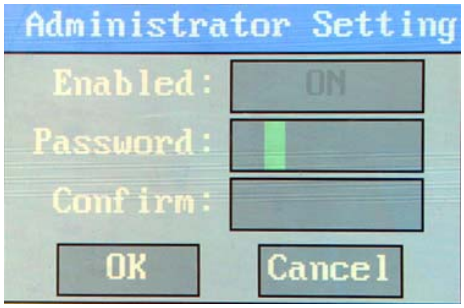
Move the focus to the line of "New Time" and use digit keys to type in the new time. Then move the focus to "OK" button and press "ENTER" to finalize the change.

7.4.4 User Management

From main menu, highlight the sub-menu item "***User***" and press "ENTER" to bring up a dialog for user type selection:



After selecting the user type, the user setting dialog will pop up as following:



First, you can enable or disable this user. Administrator cannot be disabled. To change the password, you need type in the new password twice. The password should be **6** digits.
Please note: Try to avoid using directional key to move the focus back and forth on the password input line, as it can cause confusion about what was typed in.

7.4.5 Alarm Triggered Recording

This is the function to set the DVR to automatically start to recording when the external alarm signal(s) are triggered. On the back panel of the DVR, there are four alarm inputs connectors, to connect to the external alarm signals, which can be from smoke detectors, glass broken detectors, etc.

From the main menu, highlight the sub-menu item "***Alarm***" and press "ENTER" to select it. There are four alarm inputs, corresponding to the four alarm input connectors on the back panel.

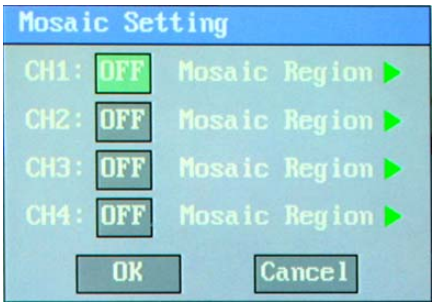
For each alarm inputs, following settings can be used to define the action when there is an external alarm:

- Time: alarm triggered recording can be enabled or disabled for different times of the day. You can specify two time segments in the day to enable the alarm detection, by giving the time duration (Hour:Minute – Hour:Minute) and marking as ☑ after each time interval.
- Video Channels: When the alarm is triggered, you can select which channel(s) (camera) will start to record, by marking ☑ after each channel.
- Recording Duration: Specify how long to record when the alarm triggered.
- Alarm Outputs: This is an alarm relay function. There are two alarm output connectors at the back panel. You have the choice to send the alarm signal(s) to these output connectors.

7.4.6 Advanced Features

From the main menu, highlight the sub-menu item "***Advanced***" and press "ENTER" to select it. There are four advanced features:

- ***Mosaic covering:*** This is a function to allow you to select certain regions in the scene and make the video contents blocky, if these regions are not intent to be clearly visible.

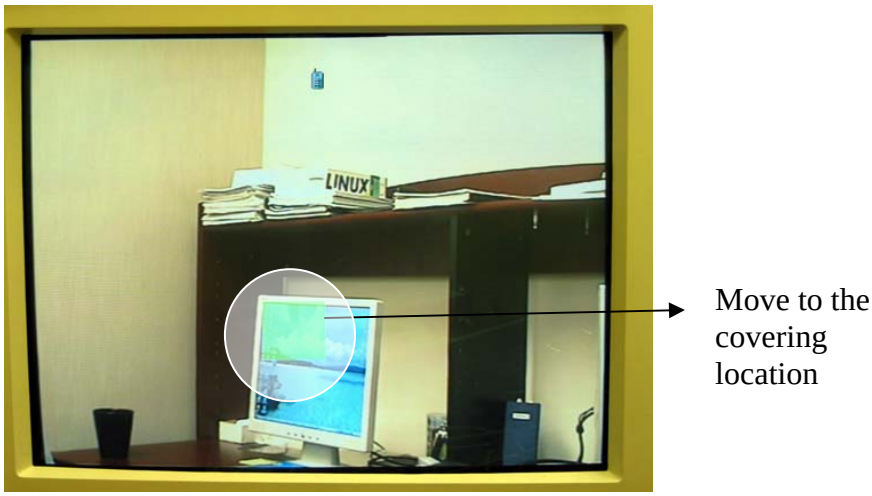


Several steps are involved to setup the mosaic region:

Step 1: Select one channel, change the box to "ON" from "OFF", then move the focus to "Mosaic Region" and press ENTER button;

Step 2: The selected channel will be displayed, with a small green block overlaid, as the starting covering location.

Step 3: Use directional buttons to move the green block around, to the location which is not intended to show the details. ***Please note***: when the block shows in green, it means it is at the state of moving, and its size cannot be changed at this stage.



Step 4: Press any digit key (1 to 9), which brings the block to the state of changing size. The block will not be displayed in the color purple. Use the directional keys to move the left and bottom boundaries of the block to change its covering size.

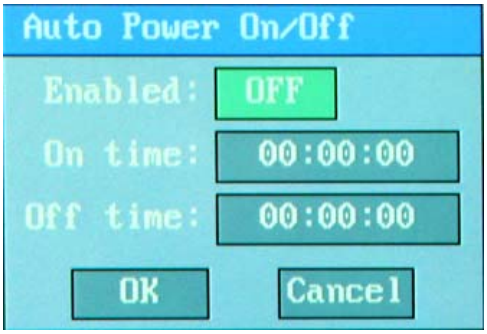
Step 5: Press the ENTER key to finish and save the setting, or ESC to exit without saving.

Step 6: When coming back to “Mosaic Setting” dialog, make sure you set the selected channel to “ON” from “OFF”, then press “OK” to finish the setup. The video will be shown as:

- ***Clear hard drive:*** This option allows you to clear all the video data from the hard drive. All recording and playing tasks have to be stopped before clearing the hard drive. This operation will clear all hard drives connected (up to 4 hard drive), and it is irreversible, which means the data cannot be recovered after being cleared.

- ***Factory default:*** Select this option to reset all the parameters in this DVR box to the default factory values, including passwords.

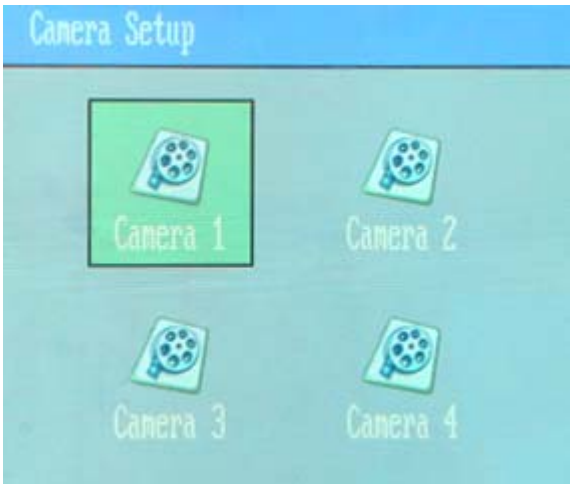
- ***Scheduled power on/off*** : The DVR can be configured to turn on or off the power by itself according the pre-set time:



7.4.7 Camera Setup

In order to connect to the PTZ control platform for each camera via RS485, several communication parameters in this DVR device have to be configured to match the settings on the camera side.

From the main menu, highlight the sub-menu item "***Camera***" and press "ENTER" to select it. Then select which camera (channel) to configure:



For selected camera, three parameters have to be specified:

- Camera Name: 8 character string as the caption for each camera.
- Camera ID: This is a three digits number for camera ID.
- Baud rate: select from 1200/2400/4800/9600/19200, and must match the number on the PTZ control side.
- Protocol: PELCO-D and PELCO-P protocols are supported.

To type in the camera name, you can directly type in 10 digit characters, or press "ENTER" button to bring up a "soft keyboard" on the display screen:

Use directional key to move the cursor and “ENTER” for the selection. By default, all characters are capital characters. To type in low case characters, select button “CAP” and press “ENTER”, all characters will be converted as low cases.

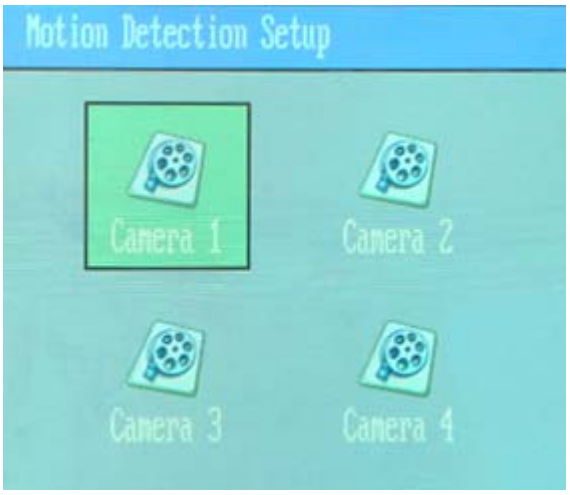
Please note: in order to correctly connect and control the PTZ camera, the three settings, Camera ID, Baud rate and Protocol, have to be exactly the same as the setting on the PTZ camera.

7.4.8 Motion Detection

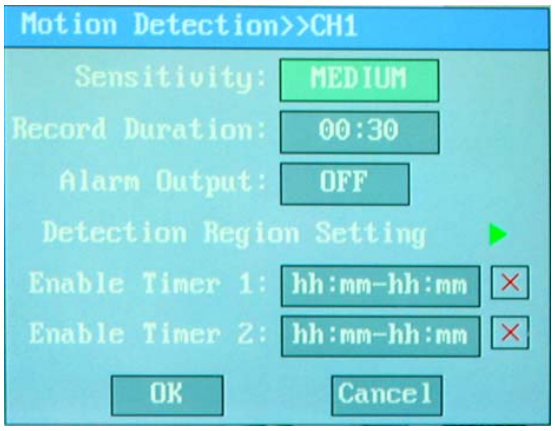
Motion Detection is a function used to monitor the activities in the scene, and automatically trigger the recording if the motion activity is higher than a pre-set threshold. This feature can be very useful and more efficient when monitoring areas with little motion for most of the time, like warehouses, back doors, etc.

From the main menu, highlight the sub-menu item "***Detection***" on the second row, and press "ENTER" to select it.

First, the system will ask to choose which channel to set up:

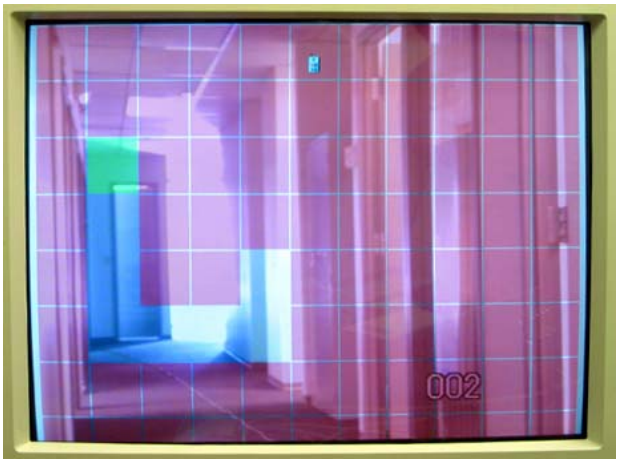


Then, for the selected channel, the following parameters have to be set:



- ***Sensitivity***: There are five levels, Very High, High, Medium, Low, and Very Low. The higher the sensitivity level, the easier it is to trigger the alarm.
- ***Record Duration***: Specify the time duration for the recording when motion is detected.

- ***Alarm output***: Select ON to output the alarm signal to external alarm connectors when motion is triggered, while OFF for no output.
- ***Detection area***: Pressing on "Detection Region Setting" button will bring up a map:



There are 99 (11 x 9) zones for PAL video input signal and 88 (11 x 8) zones for NTSC format. Directional keys can be used for navigation and any digit key (0 – 9) to switch ON and OFF for each zone. Red (ON) zone mean this area will be used for motion detection, while transparent (OFF) zone will be ignored for the detection. At start, all zones are set to ON. After all zones are set, press "ENTER" key to save the changes, or ESC to exit without saving.

If you start to play back previously recorded video, and switch to the motion detection setting without stopping the playing back function, this "***Detection area"*** option will be disabled, to prevent the case that the previously recorded video images are used to set up the detection area.

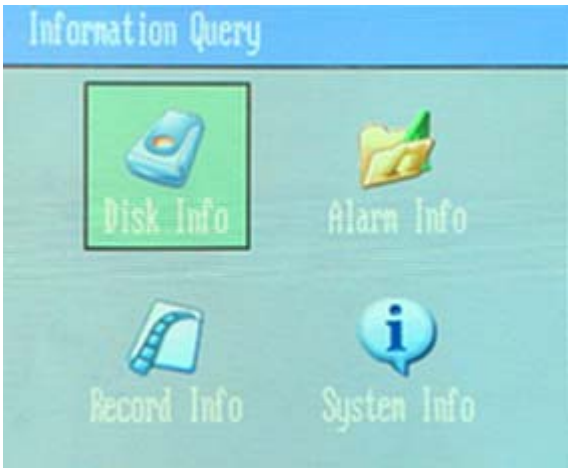
- ***Enable time***: The motion detection can also be enabled or disabled for different times of the day. You can specify up to two time intervals in a day. To enable the detection, enter the time duration (Hour:Minute – Hour:Minute) and marking as ☑ to enable it.

  In case the ending time is earlier than the starting time, the system will interpret that the time interval will pass middle night and extend to the next day. For example, 13:10—09:18 will start from afternoon 13:10 to the next day morning 09:18.

Please note: By default, motion detection is disabled for both time intervals. You have to select at least one time interval to enable the motion detection function. If you like to enable it all the time, set one of the time interval as "00:00 – 00:00", and enable that time interval as ☑.

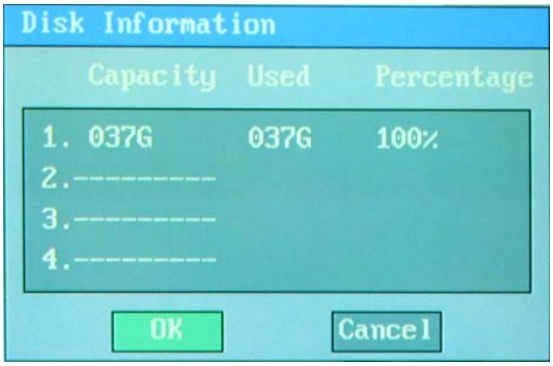
7.4.9 Info Query

From main menu, highlight the sub-menu item "***Info***" and press "ENTER" to select it:

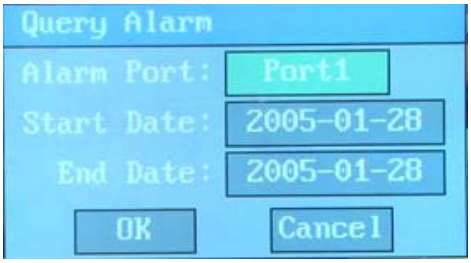


There are four categories of the information: Disk Info, Alarm Info, Record Info and System Info.

- **Disk Info** will display the current status information of the four hard drives, including drive size, used space and usage percentage.

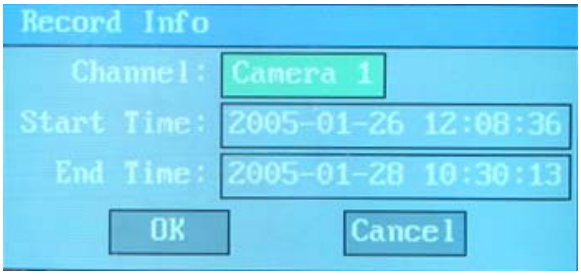


- **Alarm Info** allows you to check the recorded alarm events. You need type in the start and end date, as well as the alarm port number, in order to perform the query. The date format is: Year-Month-Day.

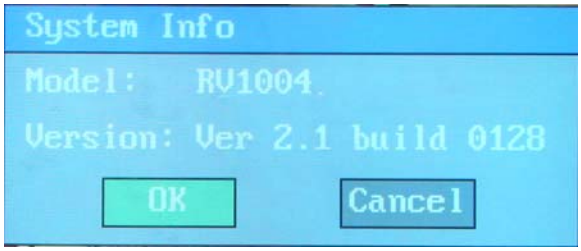


For listed alarm events, you can select one of them and start to play the video recorded at that moment.

- **Record Info** will display the earliest and latest recording time for each channel. These are read only items.

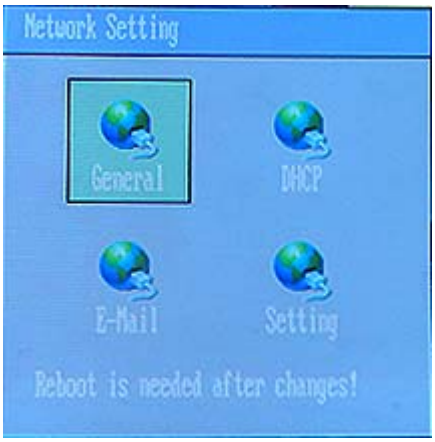


- **System Info** will display the model of the DVR and the software version currently running.



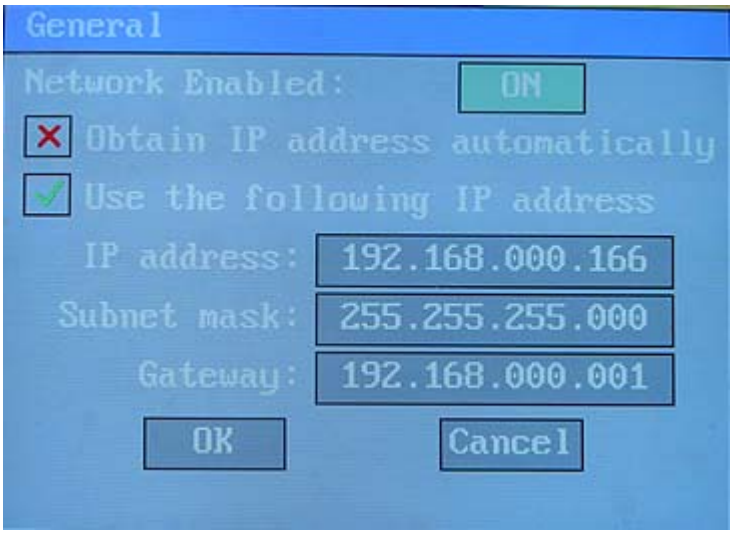
7.4.10 Network Setup

From the main menu, highlight the sub-menu item "***Network***" on the last row and press "ENTER" to select it:



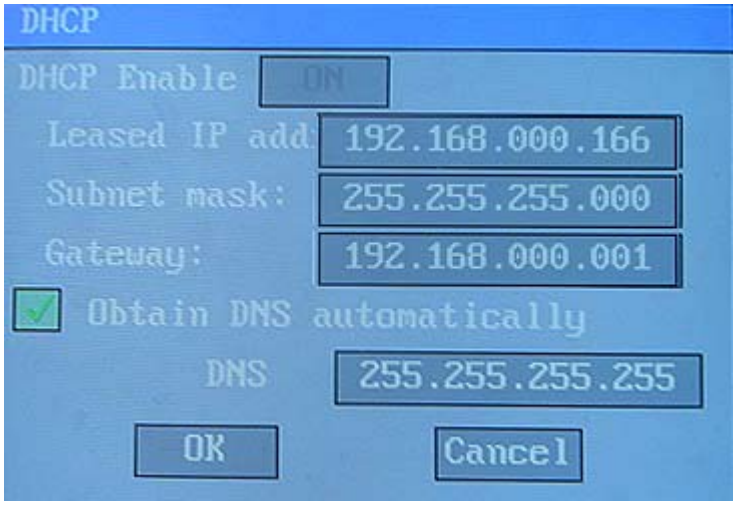
The DVR can be configured as a video server on the network, to allow remote PC software ***NetViewer*** to connect to this DVR. You can remotely watch the video in real time, play back recorded video data, backup recorded video to a PC, or configure the DVR parameters remotely.

First, select the "General" sub-menu, to allow you to either enable or disable the network function, and set up IP addresses.



Same as any network devices, you can set the DVR to obtain IP address automatically from a DHCP server in your network (if exist), or, manually give a static IP address, network mask and a gateway. After you press the "OK" button, the settings are saved into the DVR, and back to network menu.

If you select “Obtain IP address automatically” in “General” sub-menu, you can check the obtained IP address from “DHCP” sub-menu:



In this menu, you can also select to enable to obtain DNS automatically, or manually give the IP address of DNS server.

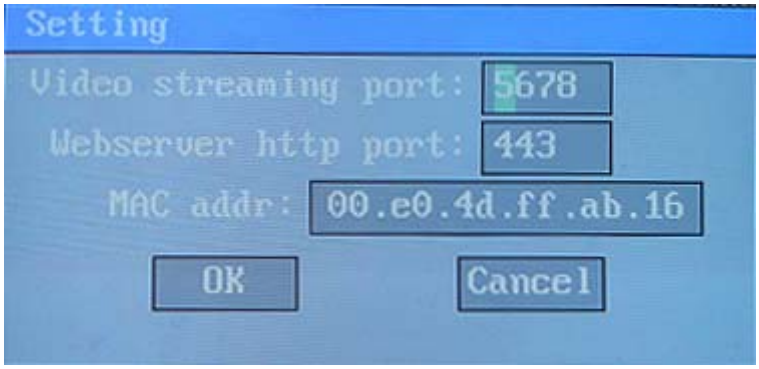
The third sub-menu in “Network” menu is “Email”:

In this page, you can select to enable email notification when there is an alarm triggered. If you select “ON” for “Email Enabled”, you need to specify the SMTP email server. You can either give the IP address of the SMTP server, or the host name, (like “smtp.avsonics.com”). Most likely, you get this email server IP address or host name from you ISP. Please note: If both IP address and host name are given, IP address will be used. If you want to use host name, leave the IP address field as “000.000.000.000”.

Then you need to put in the email address, to which the email is sent to. And you can also specify the sender or same as email receiver. If you need to send the email to more than one receiver, add the second one in “Cc” field.

For the email content, please select “Content” button, press Enter key, so that you can type in some sentence as email body when the email is actually sent out.

The last item in “Network” menu is “Setting” for the port:



Two IP ports need to be set up. The first one is used for video streaming, and default setting is 5678. You can change to other number. However, PC side remote access software needs to know what this port is, in order to stream video. The second port is for built-in web server, same as any other web server, port 443 is used as default http port.

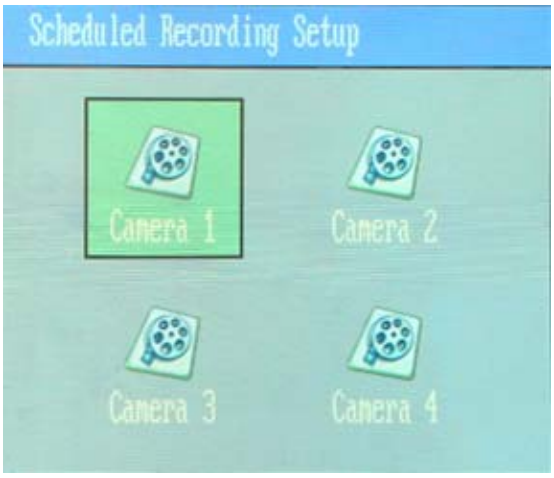
To help users who use ADSL as Internet connection, the DVR allows setting MAC address, which is needed for certain ADSL ISP.

Please note: You need to reboot the DVR in order to make the changes take effect.

7.4.11 Scheduled Recording

From the main menu, highlight the sub-menu item "***Schedule***" on the last row, and press "ENTER" to select it.

First, the system will ask which channel to set up:



Then, for the selected channel, you need to specify scheduled time intervals for recording:

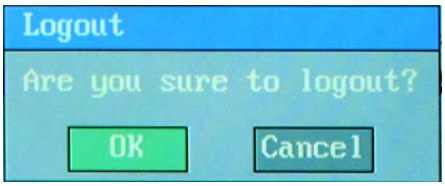
You can specify up to 4 time intervals. Mark with ☑ to enable each interval, or ☒ to disable it. The time format for each interval is: hour: minute – hour: minute.

For each interval, you can specify different record parameters. For example, for Time 1, you can select record 30 frames per second and set it to 12 frames per second for Time 2. The recording parameters for each time interval are only tied to that time interval, and will not affect the recording parameters for manual recording or motion/alarm triggered recoding See section 7.4.2 for details.

All the time intervals can be repeated weekly or daily if all weekdays through Monday to Sunday are enabled with mark ☑ .

7.4.12 Log Out

From the main menu, highlight the last sub-menu item "***Log Out***" and press "ENTER" to select it. The system will ask for confirmation:



When you press the "OK" button, you will log out from the menu system.

Please note: If there is no operation for **20** minutes, the system will automatically log out from the main menu.

7.5 Video Recording

- **Manual Recording**
  When only one channel is displayed on the screen, press "**REC**" to start recording for this channel. If this channel is in the recording mode, press "REC" will stop it. The LED on the front panel will display the recording status of each channel.

  If 4 channels are all displayed in 2x2 mode, press "REC" will bring up menu for channel selection:

  Select ☑ (Record) or ☒ (No Record) in the box after CH1, CH2, CH3 and CH4. Press the ENTER key to switch. After the selection is done, move focus to <OK>, and press the ENTER key to start recording.

- **Scheduled Recording**
  The recording process can also be pre-set for each channel. Please refer to section 7.4.11 for details.

- **Alarm Triggered Recording**
  In order to use this feature, you have to connect all the alarm inputs and output cables, and then set up alarm parameters, like monitor time zone, recording channels, etc (Refer to section 7.4.5). When an alarm signal is passed in, the system will start/stop recording process. The alarm information will also be logged and ready for query in the future.

- **Motion Triggered Recording**
  You need pre-set the motion detection zone(s), time intervals and motion trigger sensitivity (Refer to section 7.4.8). Then the system enters into a state to monitor the motion in the selected area(s). When there is a motion and the motion is above the motion trigger sensitivity, the system will automatically start to record, and stop recording after a certain amount of time (pre-set). ***Please note***: in order to see what happened just before the trigger time, the recording process actually starts 10 seconds earlier.

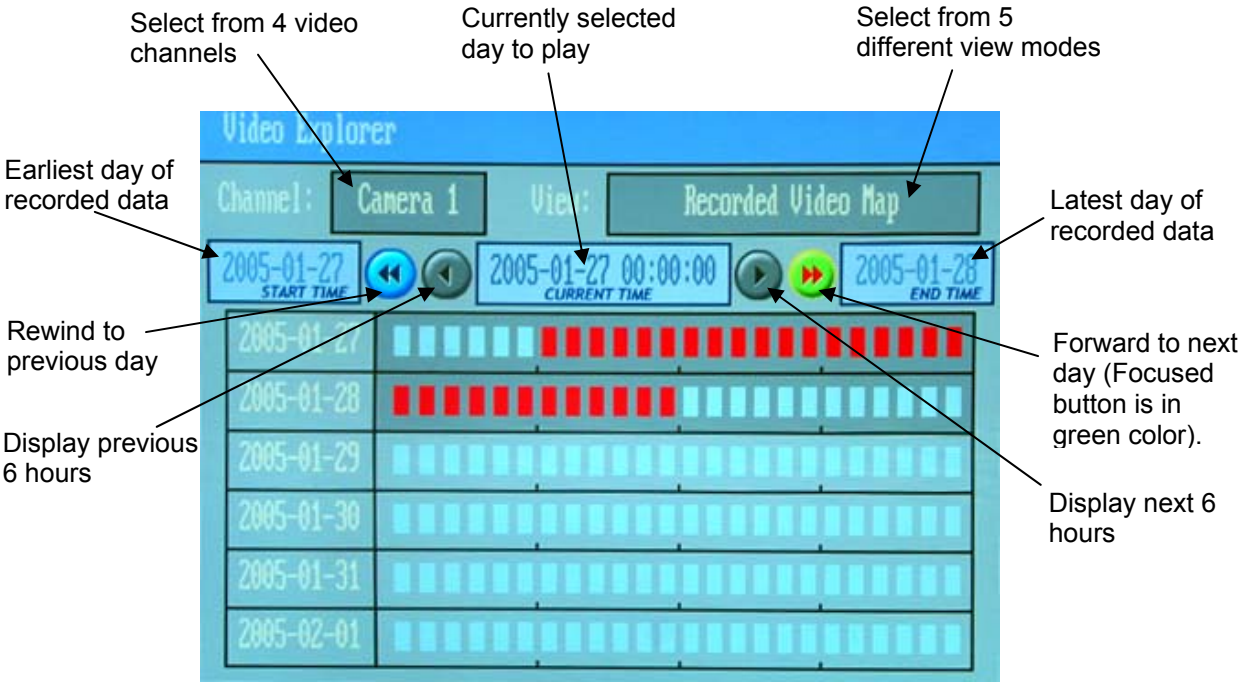
- **Recording status**
  In certain situation, all the four recording methods can be enabled. If multiple recording methods are triggered, **Scheduled Recording** takes the highest priority, and then followed by Alarm **Triggered Recording**, **Motion Triggered Recording** and **Manual Recording.** Refer to section 7.7 for the status display.

7.6 Video Explorer

When DVR is used in video surveillance system, the recorded video data can easily go to 10 to 100 Giga Bytes after several days or months of recording. Searching information through these huge video data is an intimidating task.

RV1004 provides a searching tool called ***Video Explorer*** (VE) to help the user to retrieve the information from the recorded video data. Instead of asking the user to type in the time and channel to play the video, Video Explorer will display all recorded data into a map, and allows the user to search the map by motion activity, by audio volume, by alarm count, or by thumbnail images. And, the data can be indexed by day, by hour, or by minutes.

Press "**Play**" key (On front panel or remote control) to bring up the Video Explorer Menu:



One the first line, you need select which video channel you like to search. Move the focus to the channel selection box and press "ENTER" to switch to different channels.

Then, you can select different view modes. Move the focus to view selection box, and you can select from 5 view modes by press "ENTER" key:

1. Recorded Video Map
2. Motion Activity Map
3. Audio Volume Map
4. Alarm Count Map
5. Thumbnail Image Map

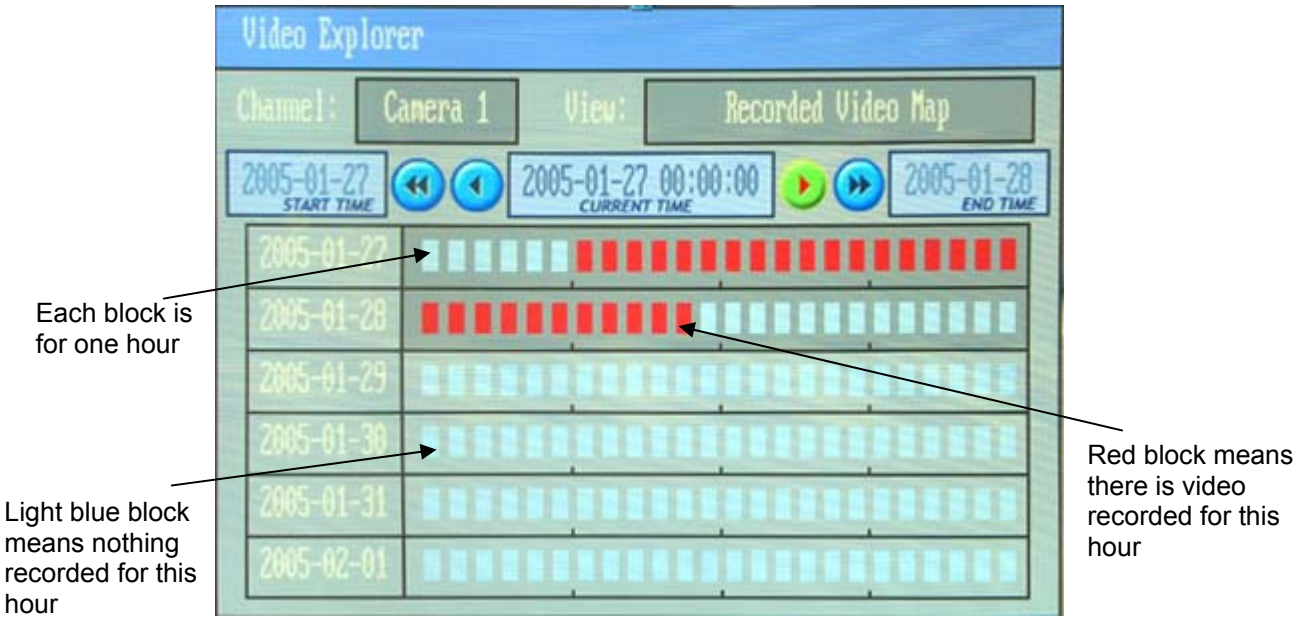
On the second line, the earliest and latest day with available recorded data for selected channel will be displayed, at the beginning and the end of this line. The currently selected day and time will be displayed in the middle of the line. There are 4 buttons on the line, to be used to change the current day and time.

To change the currently selected day, move the focus onto  (previous day) or  (next day) and press “ENTER” to jump one day earlier or later.
You can also do it by pressing ◀◀ or ▶▶ button on the remote control or DVR front panel.

To change the time within the selected day, move focus onto  or  and press “ENTER” to display the data for previous or next 4 hours.

7.6.1 Record Video Map

After select video channel and “Recorded Video Map” in **View** mode on the first line inside the Video Explorer, follow menu will be shown up on screen:

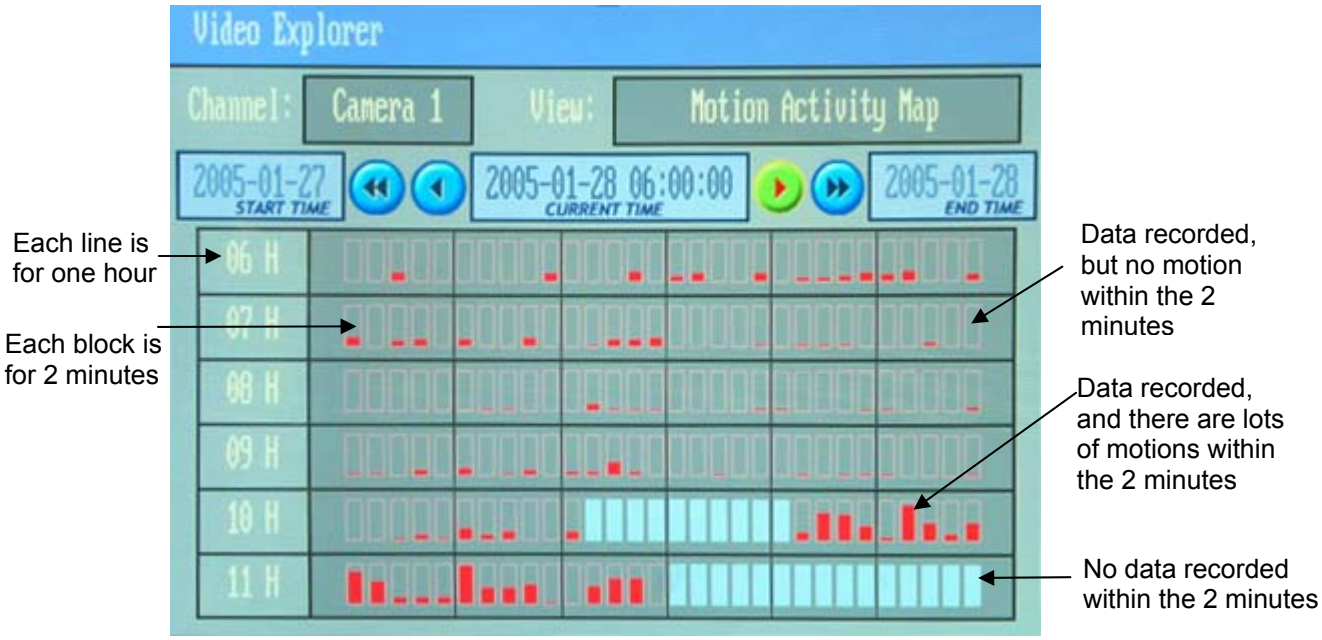


Inside the data map, each line presents one day of video data, with 24 blocks in the line, each block represents video data for one hour. For each block, if there is any video being recorded within the associated hour, the block will be displayed in red color, otherwise the block will be in light blue.

You can use up and down directional key to select the day, and right and left key to move the focus to select a block, and press “ENTER” to start play the video from the start point of that hour.

7.6.2 Motion Activity View

After select video channel and “Motion Activity View” in **View** mode in the first line inside the Video Explorer, follow menu will be shown up on screen:



Inside the view map, each line represents one hour of currently selected day. And each block in the line represents video data for 2 minutes. Totally there are 30 blocks on each line.

For each block, if there is no any video being recorded within the associated 2 minutes, the block will be displayed in solid light blue. Otherwise the block will be displayed in red color, with different heights, depending on how much motion activity within the 2 minute. The higher the red block, the more motion activities.

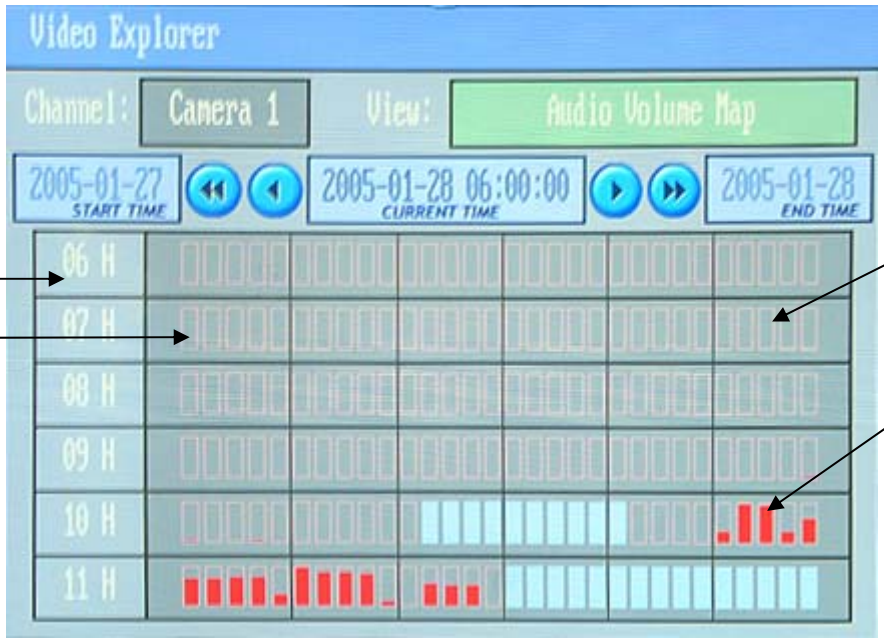
You can use the up and down directional key to select which day, and use right and left key to move the focus to the block for each hour, and press “ENTER” to start play the video from the start point of that hour.

You can use up and down directional key to select the day, and right and left key to move the focus to select a block, and press “ENTER” to start play the video from the start point of that hour.

7.6.3 Audio Volume View

This mode is very similar to “Motion Activity View”, except it displays the information according to the audio data. Each block represents the recorded data for 2 minutes. If not data recorded, the block is displayed as light blue, otherwise in red color.

The height of each block depends on the audio volume within the 2 minutes. If there is no audio or sound level is very low, the block will be displayed as a hollow block.



To change the currently selected day, move the focus onto (previous day) or (next day) and press “ENTER” to jump one day earlier or later.
You can also do it by pressing ◀◀ or ▶▶ button on the remote control or DVR front panel.

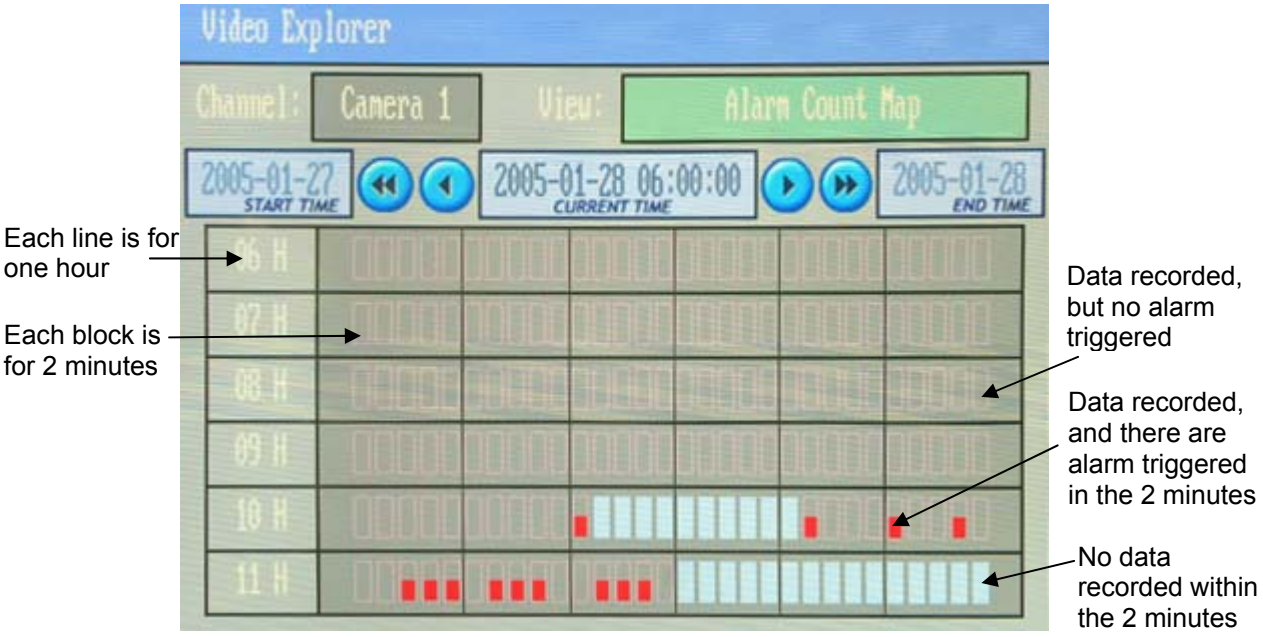
To change the time within the selected day, move focus onto or and press “ENTER” to display the data for previous or next 4 hours.

You can use up and down directional key to select the day, and right and left key to move the focus to select a block, and press “ENTER” to start play the video from the start point of that hour.

7.6.4 Alarm Count View

Similar to “Motion Activity View”, “Alarm Count View” will display the information according to the alarm input data. Each block represents the recorded data for 2 minutes. If not data recorded, the block is displayed as light blue, otherwise in red color.

The height of each block will depends on the alarm counts within the 2 minutes. If there is no alarm triggered, the block will be displayed as a hollow block. The more alarm triggered, the higher the solid red block.



To change the currently selected day, move the focus onto (previous day) or (next day) and press “ENTER” to jump one day earlier or later.
You can also do it by pressing ◀◀ or ▶▶ button on the remote control or DVR front panel.

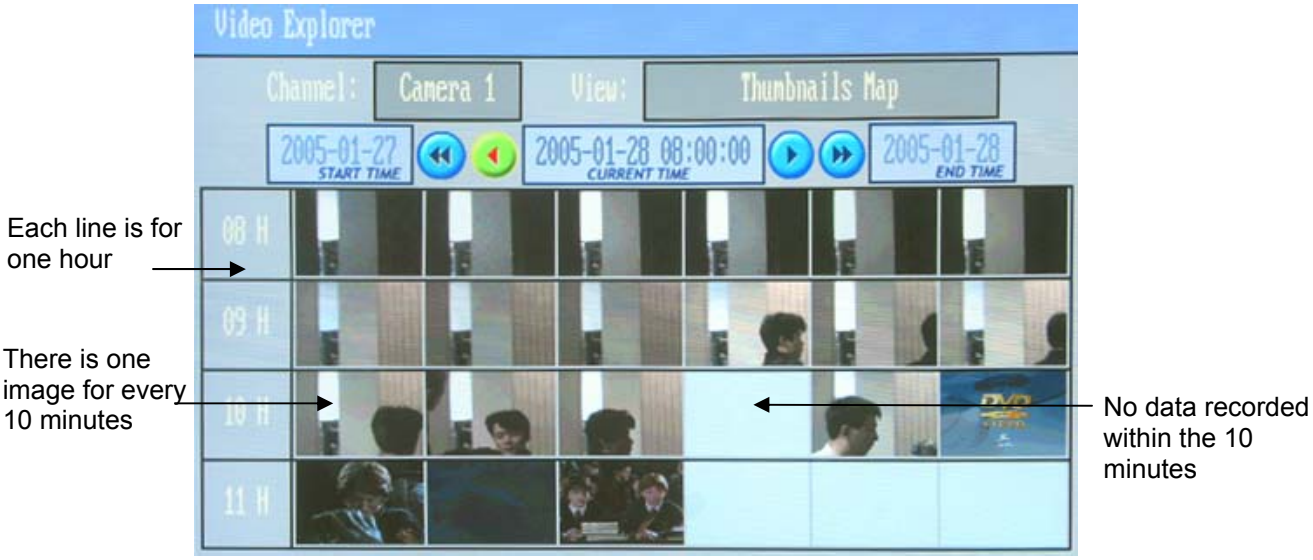
To change the time within the selected day, move focus onto or and press “ENTER” to display the data for previous or next 4 hours.

You can use up and down directional key to select the day, and right and left key to move the focus to select a block, and press “ENTER” to start play the video from the start point of that hour.

7.6.5 Thumbnail Image View

In this view mode, one thumbnail image will be sampled and displayed for each 10 minutes. On each line, there are 6 images, representing for the time of one hour.

You can move the focus to select one thumbnail image, which will be framed in red rectangle, and then press “ENTER” to play the video from that point.



To change the currently selected day, move the focus onto (previous day) or (next day) and press “ENTER” to jump one day earlier or later.
You can also do it by pressing ◀◀ or ▶▶ button on the remote control or DVR front panel.

To change the time within the selected day, move focus onto or and press “ENTER” to display the data for previous or next 4 hours.

You can use up and down directional key to select the day, and right and left key to move the focus to select a block, and press “ENTER” to start play the video from the start point of that hour.

7.7 Play Back Control

RV1004 provides powerful play back controls, including:

- ***Normal Speed Play***: Press button “PLAY” on remote control, or ▶/ ❚❚ button on DVR front panel, Video Explorer will be displayed on the screen. Select the starting point and press “ENTER” to start play back the recorded data at normal speed.
- ***Pause***: During the playing back, press “PLAY” button, or ▶/ ❚❚ button on DVR front panel, to set to the pause mode. Press the button again to continue play back.
- ***Fast Speed Play***: During the play back at normal speed, press “F.PLAY” button on remote control, or ▶▶ button on DVR front panel, to set the play at 2X speed, keep press the button to toggle among normal speed, 2X speed and 4X speed.
- ***Slow Speed Play***: During the play back mode, press “S.PLAY” button on remote control, or ❚▶ button on DVR front panel, to set the play at 1/2X speed, keep press the button to toggle among normal speed, 1/2X speed and 1/4X speed.
- ***Fast Forward***: During the play back mode, press ▶▶ button on remote control, or ▶▶ button on DVR front panel, to jump forward 1 minute.
- ***Fast Rewind***: During the play back mode, press ◀◀ button on remote control, or ◀◀ button on DVR front panel, to jump backward 1 minute.
- **Frame By Frame Play**: During the play back mode, press “FRM” button on remote control, or ❚▶ button on DVR front panel, to set to frame-by-frame play back mode. The video will be paused, and every time the button is pressed, one single frame will be played. Press “PLAY” button will bring the play back to normal speed mode.

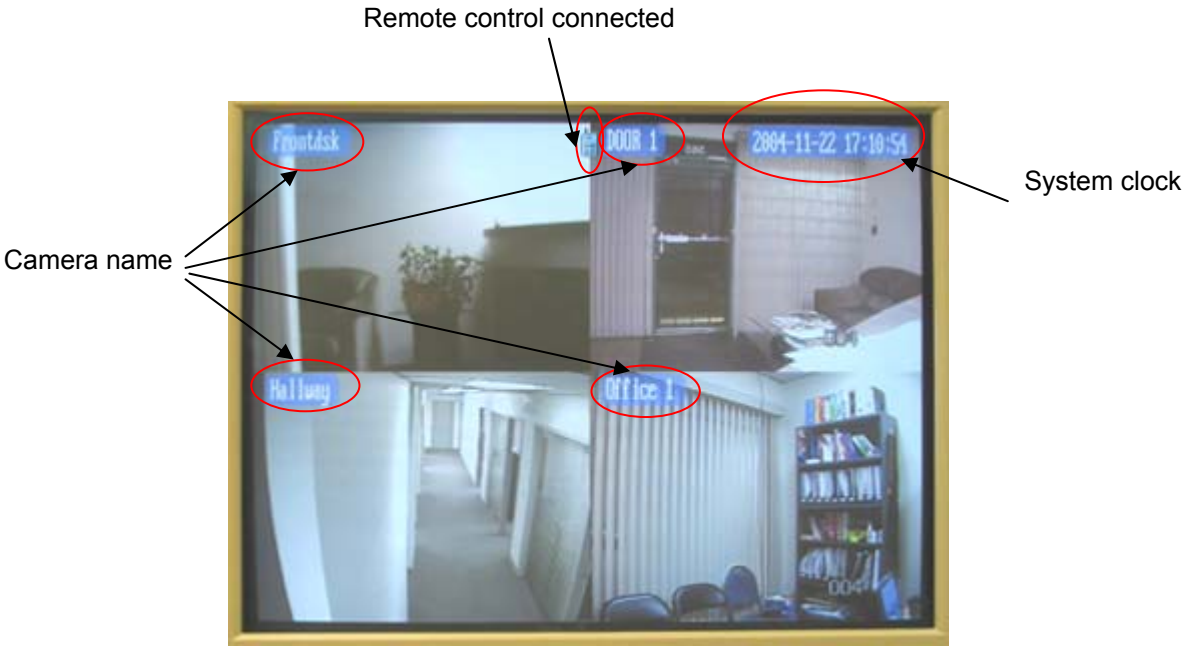
7.8 On Screen Display (OSD)

On Screen Display (OSD) will give you current system information and recording/playing status for each channel. All OSD (except system clock) can be turned on and off by pressing OSD button on DVR front panel, or DISP button on the remote control. There are mainly three types of OSD:

7.8.1 System information

This includes:

a) System clock display: always displayed. It will display the current time during the preview mode, or the recording time for the play back mode.
b) Remote control display: show up only when the remote control is connected.
c) Camera name display: The names of each camera, and can be modified in "camera" sub-menu.



7.8.2 Recording information

There are 4 types of recording methods:

- Manual Recording, displayed as
- Alarm Triggered Recording, displayed as
- Motion Triggered Recording; displayed as
- Scheduled Recording, displayed as

The first three types of recording will use system default recording parameters (resolution, video quality, frame rate etc.), while scheduled recording will use its own separate recording parameters for each channel.

If you choose to display just one channel, more information will be displayed on the screen, including:

- Recording resolution: QCIF, CIF, 2CIF or 4CIF;
- Recording frame rate: from 1 frames per second to 30 frames per second;
- Recording bit rate: from 100K to 4000K (K bits per second);

Recording mode, resolution and frame rate

7.8.3 Playing back information

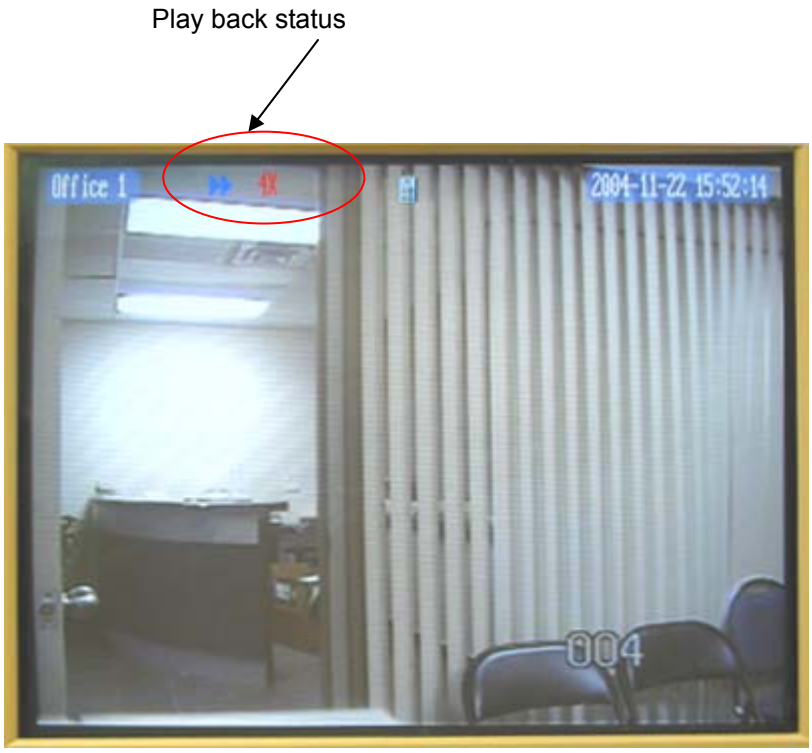
During the video playback, following symbol will be displayed on the up-left corner of the screen:

(a) Normal speed play:

(b) Non-Normal speed play: **X (** is the playing speed, can be “2X”, “4X”, “1/2 X” and “1/4X”)

(c) Pause:

(d) Frame by frame:

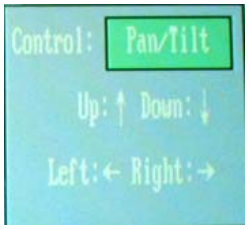


7.9 Camera Pan/Tilt/Zoom (PTZ) Control

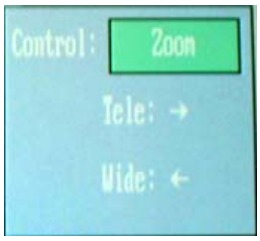
RV1004 DVR can be used to control PTZ cameras via RS485. Before the control operation, please make sure:

(a) The camera is a PTZ enabled camera.
(b) The PTZ camera control cable is connected to DVR RS485 port. See section 6 for connection diagram.
(c) The communication parameters are correctly set up, including RS485 ID (camera ID), Baud rate and protocol. See section 7.4.7.
(d) Switch the preview channel to display the image from that PTZ camera. Make sure the display is not in quad mode.

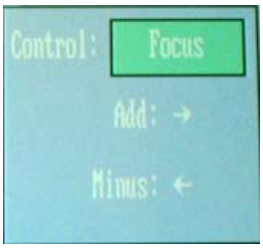
After all above are setup correctly, press “PTZ” button on IR remote control, or any directional key on DVR front panel or remote control, a small menu will pop up on the screen,), to control pan and tilt movements.



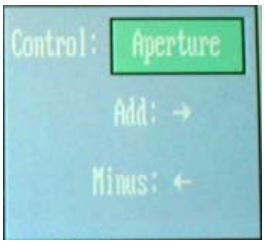
Press the “Enter” button on IR remote control and menu will be changed to zooming control:



And then to Focus control:



To Aperture control:



For each mode, use the directional keys for the control as illustrated in above dialog menu.

8. Specification Data

8.1 System Specifications

Connectors:	
Video Input	**4** BNC connectors (1.0Vp-p,75 Ω)
Video Output	**1** BNC(1.0Vp-p,75 Ω), **1** S-Video and **1** VGA connector
Audio Input	**4** BNC connectors (-8db 22kΩ)
Audio Output	**1** BNC connector (-8db 22kΩ)
Alarm Input	**4** contact connectors
Alarm Output	**2** contact connectors
Network interface	**1** RJ45
PTZ interface	**1** RS485
Serial interface	**1** RJ232
Video/Audio:	
Video Signal Format	**NTSC** and **PAL**
Video Compression	**MPEG4**, support 4 channels, all real time
Audio Compression	**ADPCM**
Video Quality Setting	Very Low, Low, Medium, High, Very High
Frame Rate	1, 5,10,15, 20, 25 for PAL; 1, 6,12,18, 24, 30 for NTSC
Resolution	**QCIF**(176x144 for PAL; 176x112 for NTSC) **CIF** (352x288 for PAL; 352x240 for NTSC) **2CIF** (704x288 for PAL; 704x240 for NTSC) **4CIF** (704x576 for PAL; 704x480 for NTSC)
Storage and Control:	
Hard Drive	IDE, up to 4 disks
Back up control	Network based
Remote control	Full functional IR remote control
Access Control	Three levels of password protection
Physical:	
Power Supply	110V 50Hz AC
Power consumption	60W
Operate Temperature	0 ~ +40 C, Humidity < 85%
Dimension	430mm x 100 mm x 380 mm
Weight	6.1Kg (Hard drive not included)

8.2 Estimation of Recording Time

Bit Rate (For CIF resolution)	**Record time on 80G hard drive for one channel**	
	30 frames / second	**12 frames / second**
Very low (**256K** bits / second, average **1.0** Kbytes / frame)	30 days	86 days
Low (**400K** bits / second, average **1.6** Kbytes / frame)	20 days	56 days
Medium (**600K** bits / second, average **2.5** Kbytes / frame)	12 days	32 days
High (**800K** bits / second, average **3.3** Kbytes / frame)	10 days	28 days
Very High (**1M** bits / second, average **4.1** Kbytes / frame)	8 days	22 days

Note:

1. Above calculation is for the worst case, based on continuous recording, day and night, with or without motion/alarm, and there are motions in the scene all the time.
2. For the scene without much motion, the bit rate can drop up to 1/5, while maintaining the same video quality. This means the actual recording time can be up to 5 times longer, for continuous recording.
3. If Alarm Triggered Recording or Motion Triggered Recording is enabled, frames without motion will be skipped and the recoding time will be even longer.