H.264

MH1600H / MH1600M / MH3200M

Digital Video Recoder

WEBGATE

We sincerely appreciate purchasing Digital Video Recorder.

For product connection and initial configuration, please, refer to the

installation guide and for the product details, refer to user guide

English

Introduction

Thank you for purchasing a Webgate digital video recorder.

This manual is for MH1600H, MH1600M, MH3200M.

Before product installation and operation, please become thoroughly familiar with this user manual and other manuals referenced by this manual.

This user manual and the software and hardware described here are protected by copyright law. With the exception of copying for general use within fair use, copying and reprinting the user manual, either partially or in entirety, or translating it into another language without the consent of Webgate Inc. is strictly prohibited.

This specification may change without prior notice for improvement of product performance.

Product Warranty and Limits of Responsibility

The manufacturer does not assume any responsibility concerning the sale of this product and does not delegate any right to any third party to take any responsibility on its behalf. The product warranty does not cover cases of accidents, negligence, alteration, misuse or abuse. No warranty is offered for any attachments or parts not supplied by the manufacturer.

- ❖ Malfunctions due to negligence by the user

- ❖ Deliberate disassembly and replacement by the user

- ❖ Connection of a power source other than a properly rated power source

- ❖ Malfunctions caused by natural disasters (fire, flood, tidal wave, etc.)

- ❖ Replacement of expendable parts (HDD, FAN, etc.)

※ The warranty period for the HDD and Fan is one year after purchase.

This product is not for exclusive use of crime prevention but for assistance in cases as

fire or theft. We take no responsibility for damage from any incident.

4. Do not charge the batteries provided with Remote Controller

Important Notice

1. Do not place heavy objects on the top of the product.

2. This equipment is indoor use and all the communication wiring are limited to inside of the building

3. Product is for indoor use. It is not weatherproof. Use product with referring to its environmental specifications (Temperature & Humidity). To clean the product, gently wipe the outside with a clean dry cloth.

4. Product uses AC power of 110V ~ 240V. Be cautious not to cause electric damages to product.

5. Be careful not to drop the product. Physical shocks may harm the product including internal HDD. In addition, be sure the product is secured after installation.

6. Product is made of metal. Therefore you can hurt human beings if you throw it to them or hit on them. When installing product, be cautious to locate on safe places where children are unreachable.

7. If Product does not operate properly, please contact the closest WEBGATE distributor for after sales service. Tampering or disassembling the product will void the warranty.

8. Security surveillance laws may differ for each country. Therefore, please contact the local region first to avoid any surveillance law violations.

9. "Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient.

Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."

Experience and technical skills are needed for the installation of this product as an improper installation may cause fire, electric shocks, or defects. Any installation job should be performed by the vendor you purchased this product from.

The content of this manual can differ according to firmware or Software upgrading, and the standard and appearance of products may be changed for the improvement of quality without an advance notice.

Contents

KEY FEATURES

Monitoring Screen

Supports real live video with high resolution per each channel and variable display mode.

- Real H.264 Video

- Various monitoring

    Single, 4ch, 9ch, 10ch, 16ch

- Auto Switching(AUTO)

    Composite 4 ea, DVI 2ea

Audio Recording

Supports real-time audio input and recording

- Simultaneous 16ch audio input & recording available

- Input : 4ch RCA, 12ch D-SUB, Output : 1ch(Rear)

- Simultaneous audio recording and playback available

Recording

It supports 480/960ips recording at H.264 High-Resolution and available to record max. 5 seconds before triggering an event.

- H.264 Video recording with High-Quality

    MH1600H   :   D1 - 480ips

    MH1600M   :   HALF – 480ips

    MH3200M   :   HALF – 960ips

■ Supports manual & schedule recording

■ Video loss detection

■ Supports archiving event list (Sensor, Video loss, Motion detection, Text)

Available record Max 5 seconds before triggering an event per each channel

Search / Playback

It supports variable and convenient functions for search & playback.

■ Play back by time,date,channel

■ Easy and convenient search using mouse

■ Pre/Post search from a freeze frame

■ Play back by Event (Sensor, Video Loss, Motion Detection, Text)

■ Easy search by Remote controller

Back up device

It is available to back up to DVD-R,CD-R,USB memory by user's choice

■ Supports various back up device : DVD-R, CD-R, USB

■ HDD external unit (recordin unit for external capacity expension)

Network

It supports variable network like LAN, XDSL and easily control from remote site using PC client viewer.

■ E-mail notification thru, TCP/IP, DHCP in case of triggering an event

■ Live monitoring form remote site (Whole screen or available to select quad screen)

■ Available to playback, recording, search and DVR management thru. network viewer in PC

■ Available to record, search & playback by time from remote site.

- Supprots 10/100Mbps Ethernet/xDSL

- Multiple DVR connection

ETC

- Supports User friendly GUI and mouse function

- Supports User friendly GUI and mouse function

- Easy and simple firmware upgrade thru. USB memory

- PTZ Control (SPEED DOME), PRESET fucntion

- Available to control up to 16 DVRs with one remote controller

- Event information (Image) transmission feature using Twitter

Install Manual

1. Feature

1.1   Supplied Accessories

Unpack and check all the items as below

AC Cord, Remote control, Setup CD, HDD Fixing Screw, Rack Mount
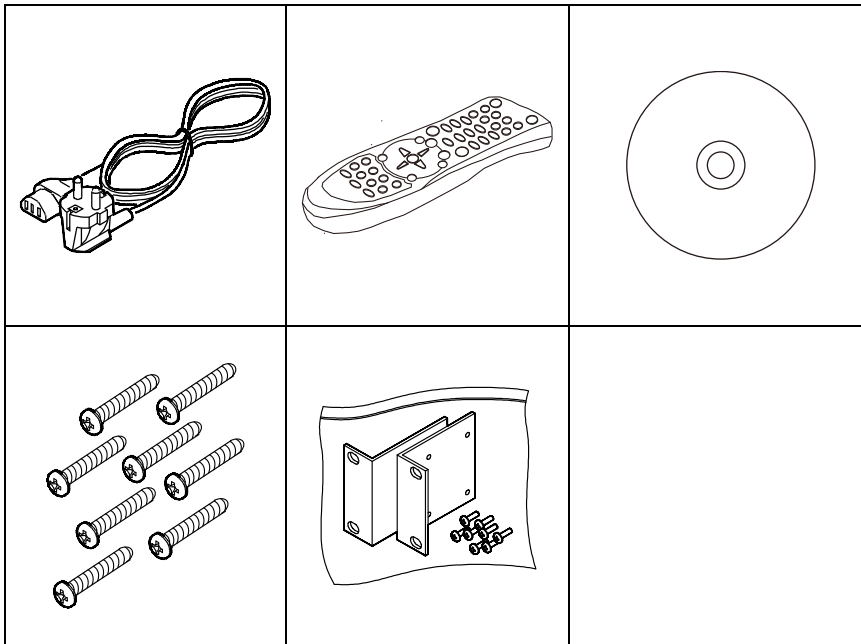
1.2 Description & Function
1.2.1 Front
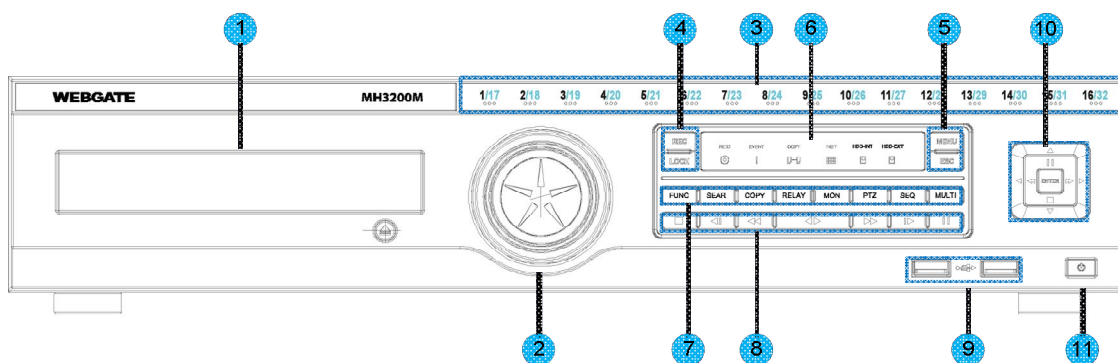
Division		Description
1	DVD-Multi for Back up	Back up use for recorded data by DVD/CD media
2	Jog / shuttle	Playback direction change and speed control
3	Touch Panel switch / channel LED	To select single channel with illuminating of relevant channel LED
4	REC	To start and stop recording
	LOCK	To lock the buttons on the front panel/remote controller in monitoring status
5	ESC	To exit menu or close pop-up window.
	MENU	To enter Menu
6	Recording LED	Display recording status.
	Event LED	Display event status
	Copy LED	Display copy status
	Network LED	Display network status
	Internal HDD LED	Display recording status to internal HDDs
	External HDD LED	Display recording status to external HDDs by eSATA
7	FUNC	To start Function menu
	SEAR	To start Search mode
	Copy	To run copy mode.

	Relay	To run and pause Relay action by manual.
	Mon	Switching monitor
	PTZ	To use Focus / Menu / Preset / Aux during PTZ
	Sequence	To run or stop user sequence.
	Multi	To change DVISION in live or playback mode.
8	■(STOP)	To stop replay in playback mode.
	◀I(SREW)	To move to reverse direction by one frame
	◀◀(REW)	To move or select in menu and change replay speed to reverse direction in playback mode
	◀▶(PLAY)	To select playback mode and change playback direction
	▶▶(FWD)	To move or select in menu and change replay speed to forward direction in playback mode.
	I▶(SFWD)	To move to forward direction by one frame
	II(PAUSE)	To move or select in menu and pause live/ replay video.
9	USB port	Use connecting USB memory or Mouse
10	◀	To move to left in menu
	▶	To move to right in menu
	▲	To move to upper in menu
	▼	To move to lower in menu
	Enter	To select menu or enter the selected menu
11	Power	To turn On/Off power

1.2.2 Rear

1.2.2.1 MH1600H

No	Input/ Output name	Description
1	Power connector	Socket for AC100V~AC240V power cord.
2	CH1~16	BNC input for camera connection
3	Loop out	BNC output(Loop) for camera connection.
4	Monitor 1~4	BNC connection for monitor output.
5	Audio input(RCA)	RCA connection for Audio input
6	Audio output	Speaker output terminal.
7	Ground	Ground between DVR & external device.
8	SMPS Fan	Control the temperature of SMPS
9	D-Sub Audio port	D-Sub port for Audio
10	Sensor IN	Input for external sensor.
11	Relay	Relay Connection terminal.
12	Com2,3	For RS-485
13	Com1	RS-232C D-SUB.
14	DVI OUTPUT 1,2	Video output port to connect PC monitor.
15	eSATA port	For eSATA external HDD connection
16	Storage	For external HDD connection
17	Ethernet	For network connection (RJ-45)

1.1.1.1. MH1600M

No	Input/ Output name	Description
1	Power connector	Socket for AC100V~AC240V power cord.
2	CH1~16	BNC input for camera connection
3	Loop out	BNC output(Loop) for camera connection.
4	Monitor 1~4	BNC connection for monitor output.
5	Audio input(RCA)	RCA connection for Audio input
6	Audio output	Speaker output terminal.
7	Ground	Ground between DVR & external device.
8	SMPS Fan	Control the temperature of SMPS
9	D-Sub Audio port	D-Sub port for Audio
10	Sensor IN	Input for external sensor.
11	Relay	Relay Connection terminal.
12	Com2,3	For RS-485
13	Com1	RS-232C D-SUB.
14	DVI OUTPUT 1,2	Video output port to connect PC monitor.
15	eSATA port	For eSATA external HDD connection
16	Storage	For external HDD connection
17	Ethernet	For network connection (RJ-45)

1.2.2.3 MH3200M
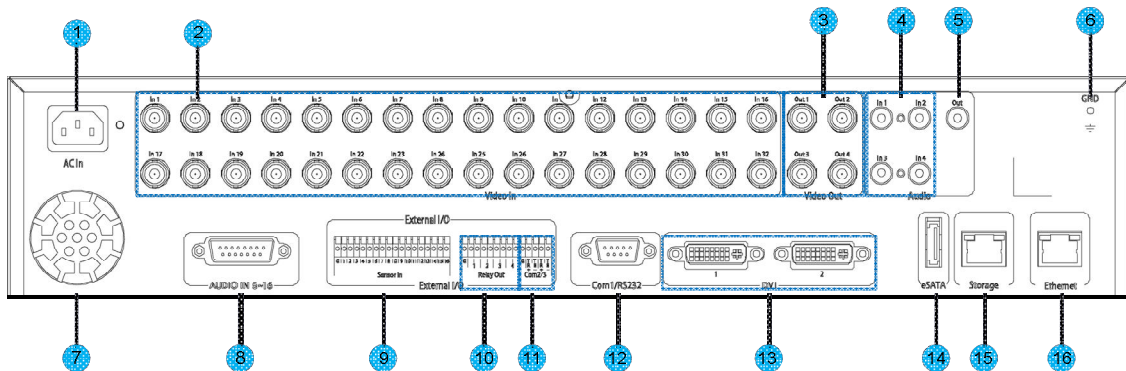
No	Input/ Output name	Description
1	Power connector	Socket for AC100V~AC240V power cord.
2	CH1~32	BNC input for camera connection
3	Monitor 1~4	BNC connection for monitor output.
4	Audio input(RCA)	RCA connection for Audio input
5	Audio output	Speaker output terminal.
6	Ground	Ground between DVR & external device.
7	SMPS Fan	Control the temperature of SMPS
8	D-Sub Audio port	D-Sub port for Audio
9	Sensor IN	Input for external sensor.
10	Relay	Relay Connection terminal.
11	Com2,3	For RS-485
12	Com1	RS-232C D-SUB.
13	DVI OUTPUT 1,2	Video output port to connect PC monitor.
14	eSATA port	For eSATA external HDD connection
15	Storage	For external HDD connection
16	Ethernet	For network connection (RJ-45)

1.2.3 REMOTE CONTROLLER

It is available to use all functions of DVR. If several DVR are set with unique ID numbers, they can be controlled with one remote controller. To use remote controller, it is necessary to set ID first which want use. Keep pressing ID button repeatedly (Up to Max. 16 times) and use it matching DVR & ID.
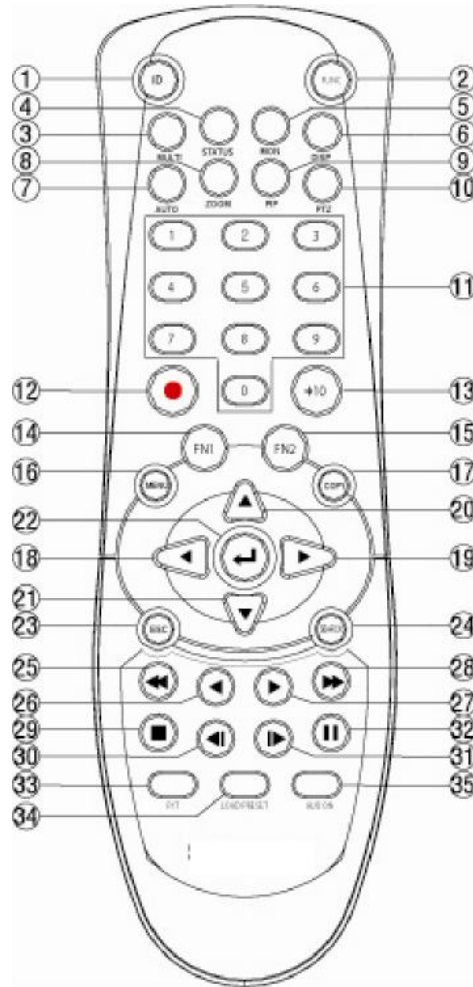
No.	Item	Description
1	ID	To select Remote Controller ID
2	LOCK	LOCK
3	COPY	To indicate copy menu, copy recorded data to USB
4	BACKUP	Not use
5	RELAY ON	To manually ON
6	RELAY OFF	To manually OFF
7	SEQ	Auto sequencing
8	MULTI	To change division
9	ZOOM	To run digital zoom

10	SEARCH	To indicate search menu
11	CHANNEL BUTTON	To select channel
12	SELECT	Not use
13	+10	In case of selecting over 10 (+10 + 1)
14	MON	Move the focus of monitoring
15	REC	To start/stop recording
16	MENU	Covert to menu screen
17	HELP	To start Function menu
18	◀/REW	Move setting menu to left direction/REW
19	▶/FWD	Move setting menu to right direction/FWD
20	▲/PAUSE	Move setting menu to top direction/PAUSE
21	▼/STOP	Move setting menu to bottom direction/STOP
22	ENTER/PLAY	Menu selection/Playback
23	ENTER	To select menu
24	EXIT	To cancel setting, escape from menu
25	FAST REWIND(◀◀)	Speedy replay to reverse direction
26	REWIND PLAY(◀)	Replay to reverse direction
27	FORWARD PLAY(▶)	Replay to forward direction
28	FAST FORWARD (▶▶)	Speedy replay to forward direction
29	STOP(■)	To stop replay
30	STEP REVERSE(◀I)	Replay to reverse direction by each frame
31	STEP FORWARD (I▶)	Replay to forward direction by each frame
32	PAUSE(II)	To freeze playback
33	PTZ	To start PTZ menu
34	LOAD PRESET	To read preset
35	SAVE PRESET	To save preset

2. Installation

2.1 Installation and Connection

2.1.1 Connecting & Running

2.1.1.1 Connecting camera

Connect CCTV camera to DVR with BNC cable as below.
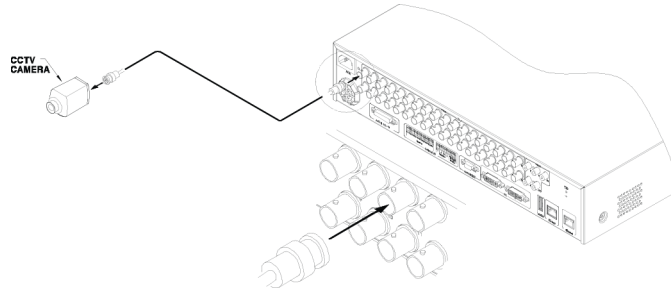
- The video type for all channels should be either NTSC or PAL, not be combined both

- DVR sets video signal's impedance (75Ω) automatically. Impedance is set as 75 Ω basically. If connecting a device to video output, impedance will be "Hi-z" status.

- Video Type (NTSC/PAL) should be changed after booting DVR. The order of camera recognition follows ch1 through Ch16 camera and 1st recognized camera type leads other camera type.

2.1.1.2 Connecting monitor

Connect CCTV monitor to DVR with BNC cable as below.
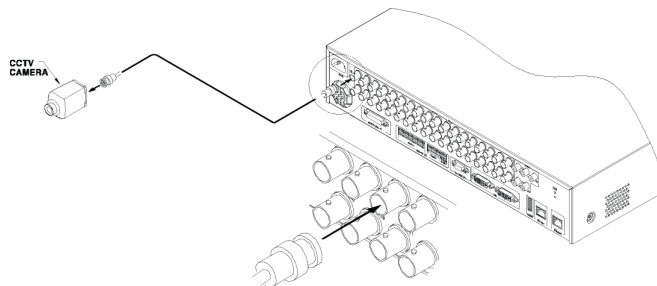
2.1.1.3 Connecting Audio

Connect audio signal to DVR with using RCA cable or D-SUB as below.

MIC

Speaker with Amplifier
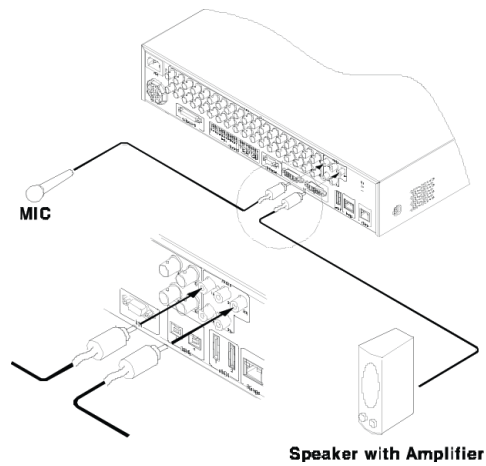
2.1.1.4 Supplying Power

Connect power cable as below.

AC Power
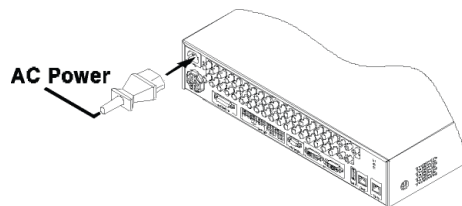
- When supplying power, DVR starts booting automatically.
- In order to cut off power, press power switch on DVR front during 5 seconds, then select "YES" after appearing a pop-up window.
- For supplying power again, push the Power button.

Press PWR Button
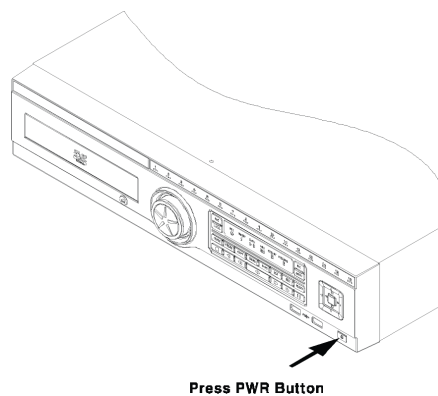
2.2   Running OSD menu

2.2.1 OSD menu configuration

Press [MENU] in keypad of front or Click in [Main Menu] in Function menu to open configuration menu as below
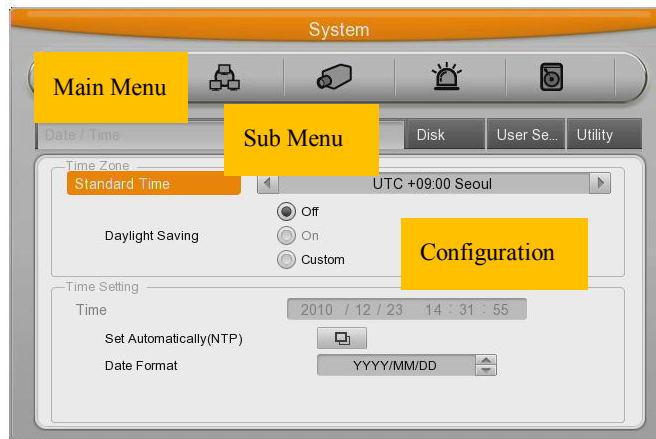
(1) Main Menu : The selected tab is show in bright color and the related sub-menu will be shown left- below the tab. To move to the previous/next tab, use the [◀/▶] arrow buttons. To move to a sub-menu press the [Enter] key or click the mouse button when you use mouse.

(2) Sub-menu : The selected sub-menu is shown as tab title and the related setting will be shown. To move to the previous/next tab, use the [◀/▶ ▲/▼] arrow buttons. To move to the related setting press [Enter] or click the mouse. To move to upper main menu, press [ESC] button.

(3) Setting page : The selected tab is shown as orange, to move to the previous/next tab, use the [◀/▶] or [▲/▼] arrow button or click the mouse. To configuration setting, press [Enter] key for value setting or click the mouse. When setting value is a word, a dialogue box to edit the word will be open. When setting value is number, it should be set with using [◀/▶] or [▲/▼] or click the related numbers by mouse . Press [ESC] button or click [Enter] by mouse when the value is set. Also [ESC] button or click the mouse is available to upper sub-menu.

2.2.1.1 Dialogue box to edit a word

Dialogue box to edit a word is image shown as below; It is available to input both word and number.

Keep pressing [▲/▼], [◀/▶] arrow button until the word is looking for and press [Enter] or click the mouse. In case of deleting input word press [←], spacing words press [→] button. To exit from dialogue box, press [Enter] or click [Enter] button by mouse after finishing word input.

2.2.2 Setting remote controller
2.2.2.1 Setting ID of DVR

When controlling several DVRs with one remote controller, set Remote Control ID as follows.

(1) Press the [MENU] button
(2) [▶] Select "system" with using [▶] arrow button and press [Enter] or [▼] button
(3) [▼] Select "Utility" with using [▶] arrow button and press [Enter] button.
(4) Select "Remote Control ID" and press [Enter]
(5) [◀/▶] Select a value using [◀/▶] arrow buttons and press [ESC]
(6) Press the [ESC] button to return to the monitor mode.

<Reference>
Up to 16DVRs can be controlled with a single remote controller.
When not using remote controller, set the Remote Control ID as "Off"

2.2.2.2 Setting ID

If several DVRs are with unique ID numbers, they can be controlled with one remote controller. To select a specific DVR, keep pressing the ID button of remote controller until a buzzer sounds during 2 seconds.

2.2.2.3 Operable range of remote controller

Horizontal Angle : ± 30°
Vertical Angle   : ± 30°
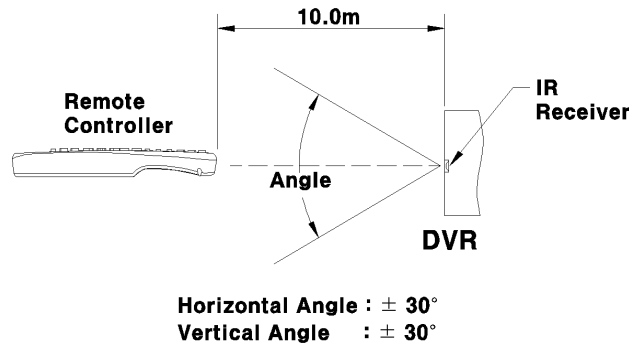
2.2.2.4 Loading the batteries into the remote controller

Remote controller required two AAA-type batteries. Please, refer the following installation step.
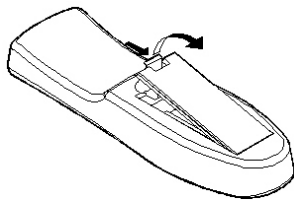
1. Remove the batter cover.
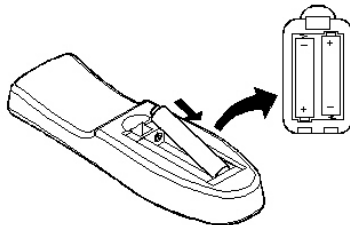
2. Taking care the poles (+/-) are correctly positioned
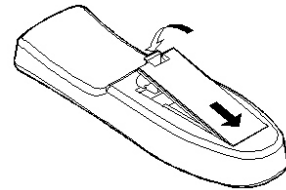
3. Replace the batter cover.

2.2.3 Installation examples

2.2.3.1 Basic configuration

Connect camera and monitor and Audio.
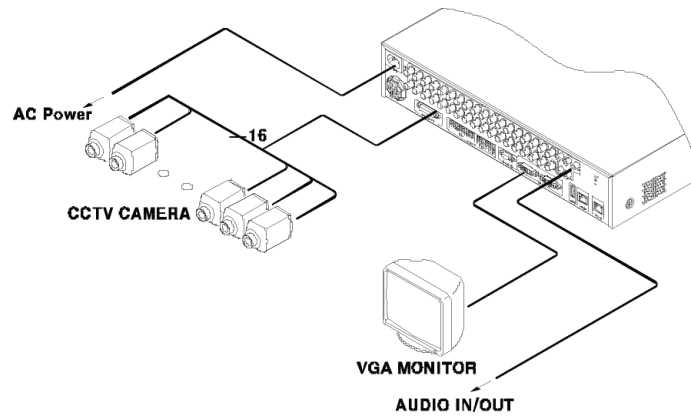
2.2.3.2 Advanced configuration

Connect camera, monitor, audio, sensor, realy etc..
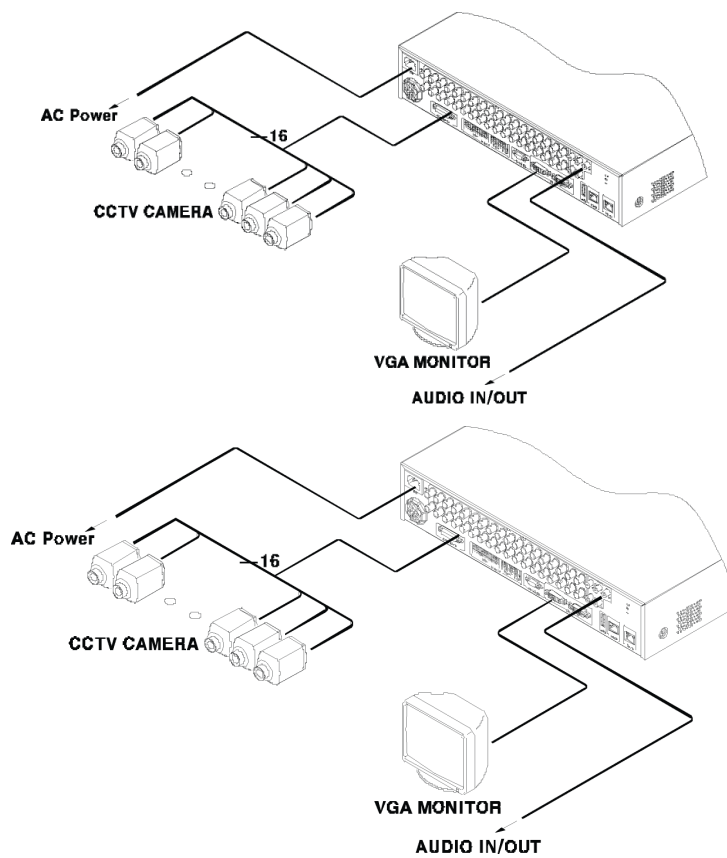
2.2.3.3 External storage & back up configuration

Use USB for back up.
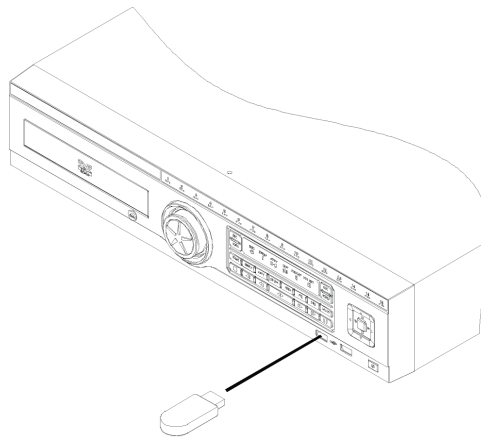
USB Storage for Copy

2.2.3.4 Internet / Intranet configuration
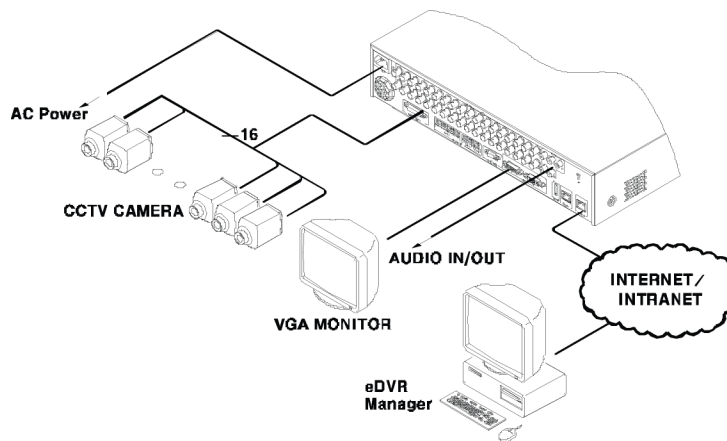
2.2.4 Basic Setting

2.2.4.1 Viewing Image

When power is on, eDVR starts automatically and displayed in basic 16ch-split screen after booting.

<Reference>

If user password is set, a prompt for entering the password will be appeared. Factory default is reserved as not responding keypad on DVR front (It is not from factory default)

2.2.4.2 Setting Date & Time

- Press [MENU] button and select "System" when OSD menu is appeared.
- Select "Date/Time "and press [Enter] button.

Time Zone

Use the left or right arrow key on the front or the mouse wheel to select your time zone. Each press of the arrow keys changes the time zone. (To go to the previous menu, press the [ESC] button on the front or right-click. This is the same for all OSD menus.)

Daylight saving

This menu is linked with "time zone" setting. For example, if the countries applied for daylight saving in time zone setting menu then daylight saving will be turn to ON and other counties are not applied for daylight saving then this option will be turn to OFF, and additionally the user can configure the daylight saving option manually for the counties that were not applied, and in this case, you can use "Custom" option to set.

The second is for selecting a month, week, and day to define the start and end times of DST.

NTP

    (1) Select yes or no of using NTP.

    (2) Select NTP mode among Client, server, both using directional key. [◄/►] or [▲/▼]

    (3) Select Public or Both.

    (4) Enter server IP address when configuring server type by Local.

    (5) Configure communication interval with server.

DATE FORMAT

(1) Select "Date Format" using [◀/▶] or [▲/▼] arrow button and press [Enter] button. Select a value using [◀/▶] arrow button from YYYY/MM/DD, MM/DD/YYYY, DD/MM/YYYY.

(2) Press [ESC] after finishing value setting.

TIME

(1) Select "Time" using [◀/▶] or [▲/▼] arrow button and press [Enter] button.

(2) Select Date, Time using [◀/▶] arrow button and set value using [▲/▼] arrow button.

(3) Press [ESC] after finishing value setting..

APPLY

Most setting values are applied automatically, when exiting form the related menu page. But "Date" & "Time" setting are not applied automatically because they may critically affect the file system of the recorded HDD. To apply Date/ Time settings confirm with [Apply Date/Time] buttons.

(1) Select "Apply Date/ Time" using [◀/▶] or [▲/▼] arrow button and press [Enter]. Then, a warning message will be appeared as below image;

(2) Select using [◀/▶] or [▲/▼] arrow button and select "YES", then, press [ENTER] button. To cancel, press [ESC] button.

2.2.4.3 Record Setting

Select "Record" pressing menu button in front.

Manual Setting

Manual record can be configurator in "Program" of record menu and Manual / Event record is available to Start/Stop with pressing [REC] button on front panel.
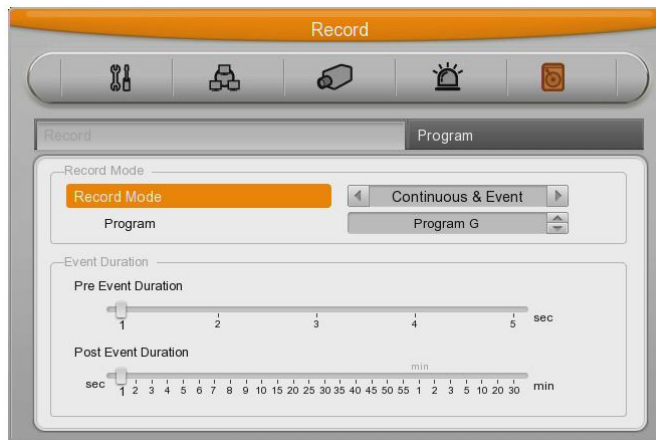
Schedule Setting

Set the recording schedule by each channel that user want record in "Program" of record menu.

Set recording mode as "Schedule & Event" and set by date/ time.

Program Setting

Set resolution, frame rate, quality by each channel that user want record in "Program" of record menu (See details in Record menu)

<Reference>

If recording setting is finished correctly, "REC LED" in front is flickering. In addition, it is marked [SCHEDULE] indicating that all channels are recording.

2.3　Connecting and configuring DIO ports

2.3.1　Wire Handlin

When connecting a wire to a terminal block, follow the instruction below. Not the different types of wire that can be used.

- Standard wire: Pie off the wiring cover 8~10mm and solder it. Wire gage should AWG 22~26.
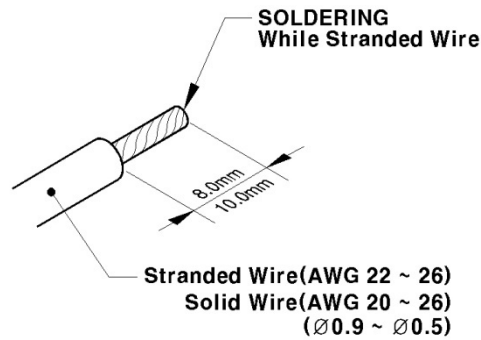
- Sold wire : Peel off the wiring cover 8~10mm and solder it. Wire gage should be AWG 20~26.

2.3.2　Inserting & removing wire

To insert & remove wire in Terminal Block, use a screw driver in the diagram like below.
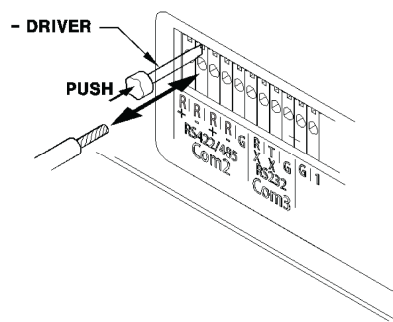
2.3.3 Connecting and configuring sensor

2.3.3.1 Specification

In order to run sensor input DVR normally, the following conditions are required.

Spec	Input Ch.	16EA Transistor input
	Input type	N.C, N.O supprt
	Supported sensor	Dry contact sensor
	Way of connecting	Connecting the trimmed wire to terminal block
Performance	Available input pulse range	Minimum 500ms
	Output current	Typical DC 12mA

Connecting sensor input

Connect S1 ~ S16 with referring the following image. It shows to connect a dry contact (Please refer "Wire Handling".
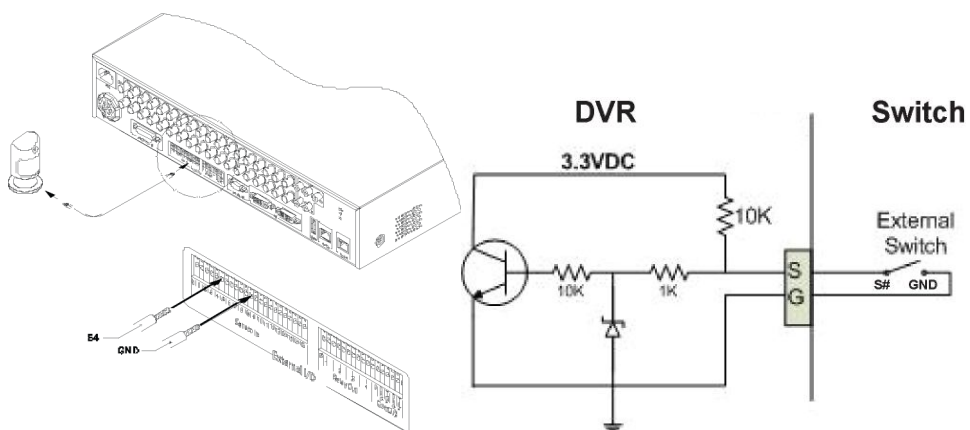
Setting Sensor

(1) Press [Menu] button and select "Event" when OSD menu is appeared.

(2) Move to sub menu pressing [Enter] or using [▼] button and select [Enter].

All Sensor

It is used when setting for all sensors and set off, or Normal Open (N.O.) / Normal Close (N.C.) type.

（1）Select All and set type.

Each sensor

It is used when setting for each sensor and set selecting each sensor.

（1）Select sensor and press [Enter] button.

（2）Select sensor that user want set and set type.

（3）Press [ESC] after finishing value setting.

2.3.3.2 Connecting relay and setting

Specification

In order to run relay output of DVR normally, the following conditions are required.

SPEC	Output Ch.	2EA relay outputs
	Output type	Dry contact
	Connecting type	Connect the trimmed wire to terminal block
Performance	DC	30V 1A
	AC	125V 0.5A

Connecting relay out

Connect R1 ~ R4 with referring to the following images, it shows to connect a warning light. Please refer the "Wire Handling"
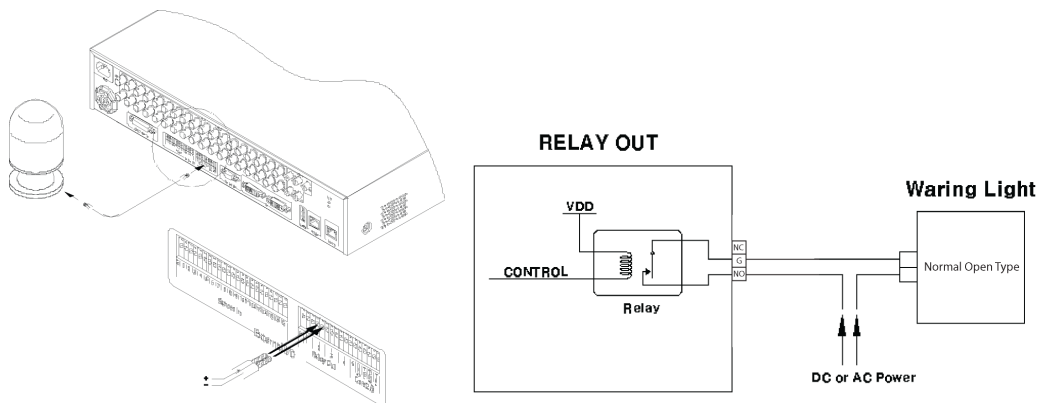
Relay setting

   It is available to run relay selecting from sensor, motion detection, Text, Video Loss which is normal event source and Disk error, Disk full, Fan error, authentication fail, WRS registration fail, Mirroring fail, abnormal Recording stop which is system event source. Also, user can set working condition by schedule. In case of using control center thru. network, relay could be run from remotely.
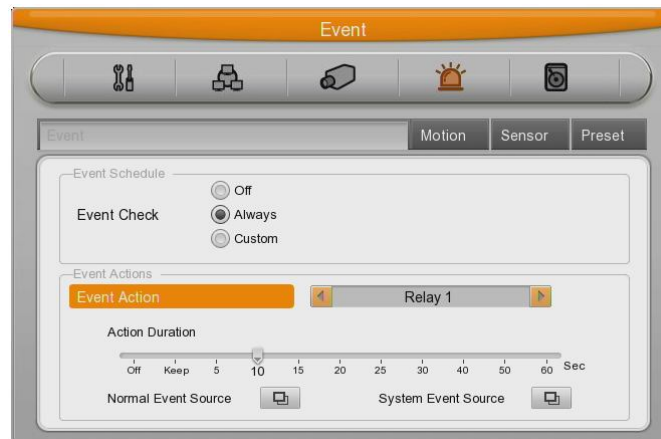
2.3.3.3 Connecting serial port

Configuring serial ports for Pan/Tilt/Zoom
If DVR supports thru. COM port, it is available to connect PTZ camera and control it. For a list of supported protocols, please refer to the list on the OSD configuration menu. The following figure shows how to connect PTZ camera to RS485 (COM2). When using another serial port, connect it with referring to each connection diagram below.
Please refer the "Wire Handling".
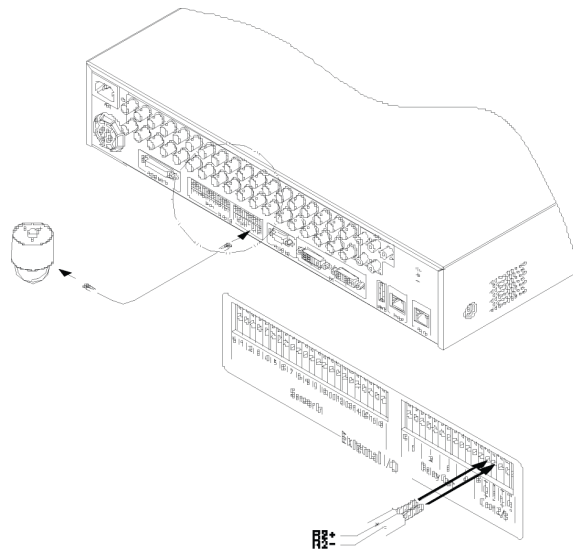
Serial communication port diagram

COM1 connection diagram (RS-232 – D-Sub)

Text
Keyboard
Transparent

Com1

RXD
TXD
GND

Tx
Rx
GND

COM2/COM3 diagram (RS-485)

Com2, 3

Dome Camera Receiver

TR+
TR-
GND

TR+
TR-
GND
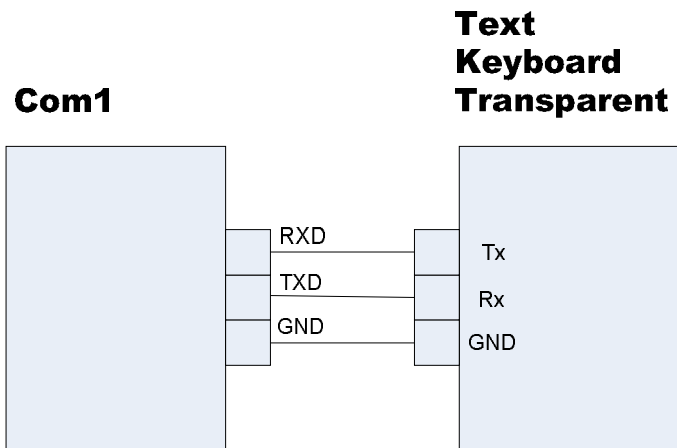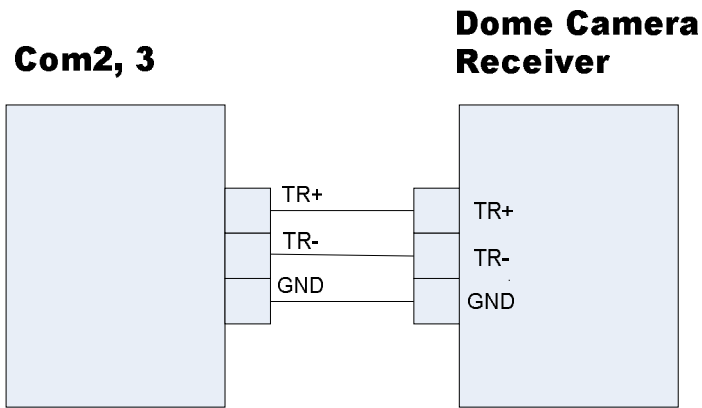
Available PTZ is as below

Model	Manufacturer
Keyboard KBD300A, WGI SPD1800/2600	Webgate
WKC-100 keyboard	Webgate
PELCO(P), PELCO(D)	Pelco
BOSCH Auto Dome, TC8560X-4	Bosch
Sony EVI-D3x	Sony
VT VPT-4x	VT
AD Speed Dome	AD
SungJin SJ372R1	Sungjin
Samsung SCC641	Samsung Electric
Panasonic WV-CS850	Panasonic
SDZ160/330, Samsung SPD, Keyboard SCC3000A, Samsung SRX-100B	Samsung Techwin
LG GAC-PT2	LG
Merit-Lilin Fast Dome	Merit
Elmo PTC200C	Elmo
Canon VC-C4	Canon
HTC-230S	Dongyang Unitech
RVision	RVT
Elbex	Elbex
Honeywell 755/655, HRX-2000, HTX-3000, ScanDome2	Honeywell
VIDO	VIDO
VICON	Vicon

Hunt	Hunt
ORX-1000	Sysmenia
Fine CRR-1600	LiveEye
Tokina	Tokina
Kodicom KRE	Kodicom
Nuvico	Nuvico

Serial Setting

You can set up at 'serial' menu under Device menu.

From serial setting, you can set protocol, port, baud rate, parity bit, stop bit and data bit.

After completed serial setting, select desired channel from camera menu, and setting up PTZ Home, PTZ Idle Time, PTZ Port, and PTZ address.

2.3.3.4 Connection to external device via Serial port

Text input device connection (ATM / POS / Access Control)

Using COM1/RS232, TEXT DATA can be recorded with synchronizing POS/ATM..
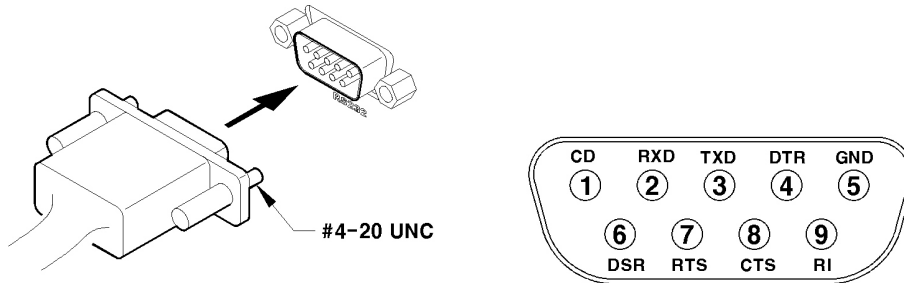
Like above picture, connect COM1/RS232 (9pin D-Sub) in Device menu and configure Serial and Text

Serial (COM1) Setup

(1) OSD Select "Device" in OSD menu and move to sub menu.

(2) Selecting COM1 and configure "Text"in Device

(3) Setup the value of Baud Rate/Parity/Stop bit/Data bit with the device.

Text Setup

(1) Select "Deice" on OSD, and move to sub menu.

(2) Select "Text"and configure relevant text information.

<Reference>

Since external device cannot be recognized, before installing, please, ask to the shop.

2.3.3.5 USB Device Connection

USB port is for the video copy of small data or for USB mouse. Its recommended specification is same as below.

USB Spec.	Ver 2.0
Device	USB Memory Stick,
Voltage/electric current	Max. 200mA per DC 5V / Port
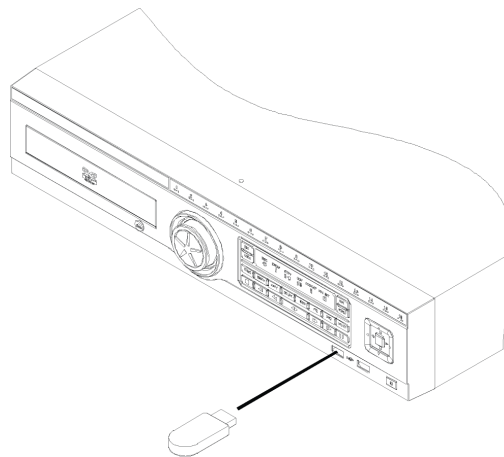
USB Storage for Copy

<Reference>

It should be formatted by FAT32.

In case of normal connection, if executing Copy menu, disk will be recognized same as below and Set copy range → Select Drive → Execute Copy
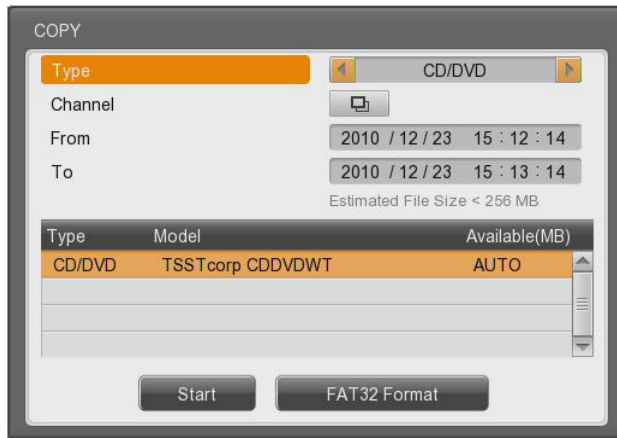
[CD/DVD Copy]
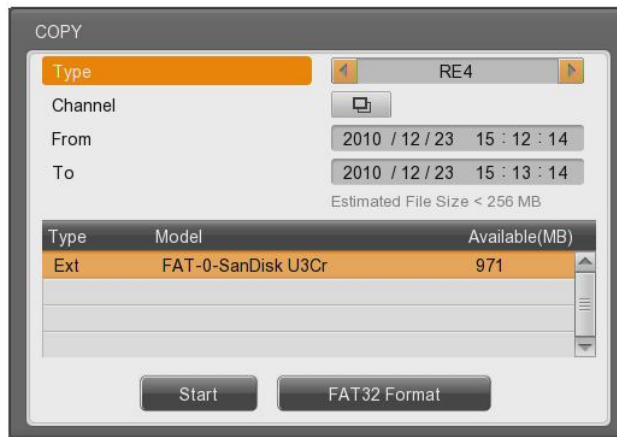
[RE4 Copy]

Select the channel to copy.

Standard setting is selecting all channels.
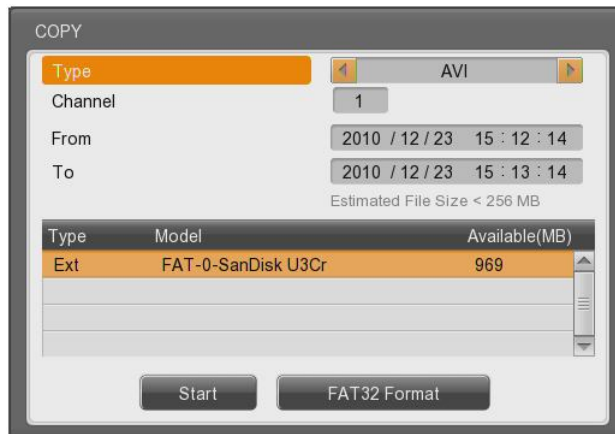
[AVI Copy]

<Reference>

A USB Flash memory which should install additional program on Windows OS, cannot be recognized.

2.3.3.6 Video In/Out connection

Video Input/Output is Loop through and check the connectivity automatically and set end resistance.

For instance, if connected by Video input, end resistance is configured by75Ω and if

Video in/output is same, it will be Hi-z mode. Therefore, in case that Input/Output is connected at the same time, end resistance of device receiving output should be configured by 75Ω.
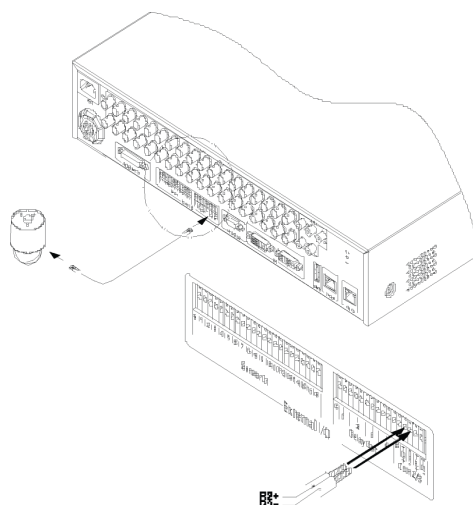
2.3.3.7 Audio In/Out connection

There are 4 RCA Audio Input and and 12 D-sub Audio input and 1 RCA output.
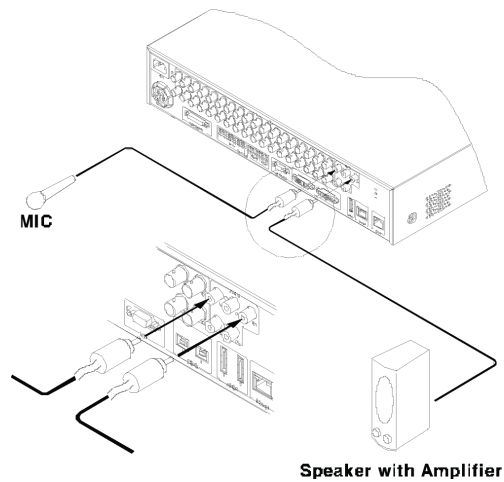
2.3.4 HDD

※ Please, ask to distributor or manufacturer for available HDD list.

2.3.4.1 HDD registration and format

After mounting HDD and booting system, "Disk Manager" will execute automatically.

If not, please, check the connectivity of HDD

(1) Press [Enter] button in "Disk Manager"

(2) Using [▲/▼] Key select new HDD(Displayed [No] on Enabled item) and press [Enter].

(3) If you see the message for format, select [Yes].

(4) Press [ESC] and escape from "Disk Manager.

2.3.4.2 HDD Replacement

(1) Turn off the DVR and take off the HDD that has a problem and replace it with new HDD.

(2) Turn On the DVR and go to "Disk Manager" menu and select the removed HDD which has a problem, and press "Enter" Key.

(3) "Removed disk will be Confirmed" message will be pop-up and select "Yes" to delete it from the list.

(4) Select the new HDD from the list and press "Enter" key.

(5) Select "Yes" when the system asking "do you want to format"

(6) After complete above procedure then Press "ESC" key to exit the "Disk Manager" menu.

> **<Note>**
>
> **1. HDD Re-using (Add Used)**
>
> You can use HDD that has been used before from DVR, in this case you do not need to do format and delete the data.
>
> How to use it? Please install previous HDD in the DVR, and go to "Disk Manager" menu and select the HDD that you wish to re-use which is you just installed HDD, and press "Enter" key then you will see the pop-up message "This disk can be added without format/Nevertheless, do you want format this disk?" and select "NO" for re-use without format, and select "YES" for format.

2.3.5 Remote monitor and control

Via Internet/Intranet, in remote site, user can access with PC.

2.3.5.1 Ethernet connection

ETHERNET CABLE
(Not supplied)
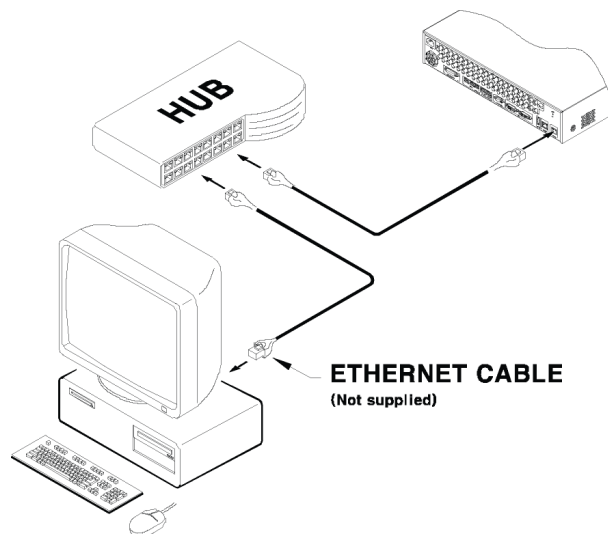
(1) Cut power

(2) Connect Ethernet cable to DVR and Hub.

(3) Input Power..

<Reference>

To protect DVR damage, after connecting Ethernet cable, input Power.

Please, check Ethernet cable connection firmly.

Input power on DVR and check their connectivity.

2.3.5.2 Network configuration

Ethernet

Set type as Ethernet and input IP, Netmask, Gateway, DNS.

The way to input is using directional key or mouse wheel.

PPPoE

Set type xDSL, and move to xDSL menu.

First, change Ethernet Port

Please, input ID and Password for PPPoE.
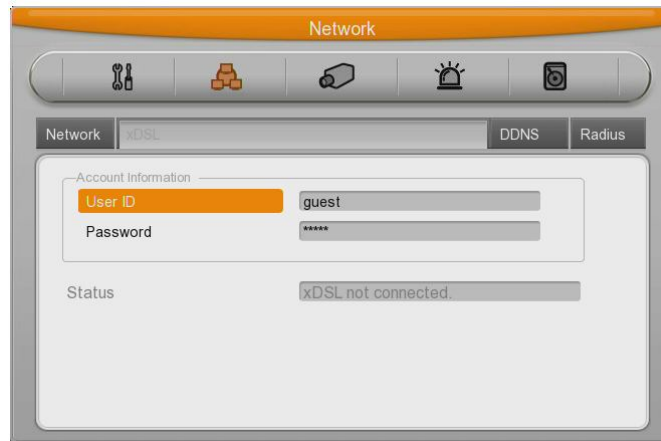
WRS

After changing interval over 1 min, register WRS address and product and input Group ID.
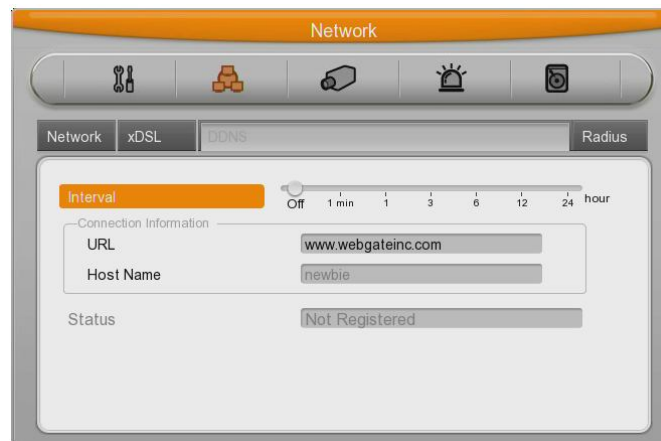
2.3.6 External device connection

DVR has external Storage Device Interface and 1ea of eSATA port. Using eSATA port, user can expand Storage capacity up to 8TB.

> **<Note>**
> Since some of eSATA device can not be compatible with DVR, before the usage, please, contact the seller and check its compatibility in advance.

2.3.6.1 eSATA Device Connection

In case of external eSATA supporting FireWire, using eSATA port on the rear part. And since DVR does not support power to eSATA, eSATA device should be one external power is supported.
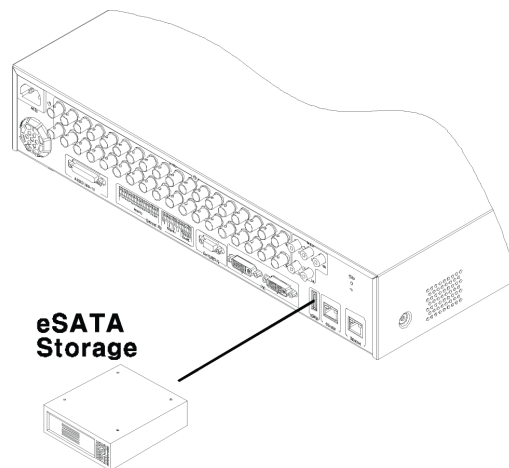
> **<Note>**
> Basically eSATA is connected to DVR while DVR is running, works properly. However it depends on eSATA manufacturer. Therefore, we recommend below order for making connection.
>
> 1. Power off DVR
> 2. Connect external eSATA storage with power-off
> 3. Power on DVR
> 4. Power on external device after completion of DVR booting,

2.3.7 NVS04 connection

2.3.7.1 Connecting with DVR

(1) Connect to DVR as shown in the picture below using Gigabit Ethernet Cable.

(2) Connect DVR Port of NVS04R and Storage Port of DVR directly..

<Note>
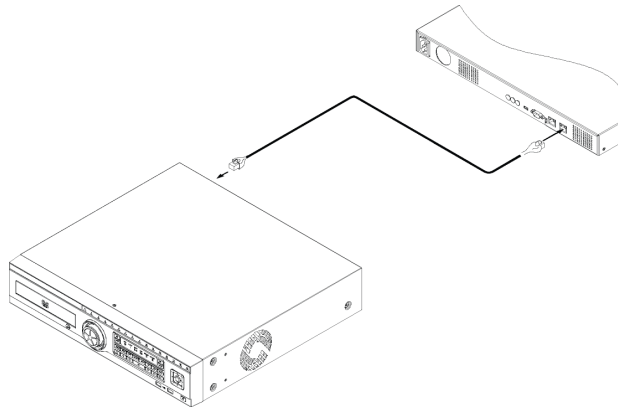
1) The network cable connected to DVR should be Gigabit Ethernet Cable (Category-6). If not, it is not connected to DVR.

2.3.7.2 Set ID Configuration

Set ID using Rotary Switch located on the back. This ID is used as IP Address of NVS04R and the form of IP address is 10.10.20.XXX. when the user connect more than 2 units of NVS04R, each ID should be set differently.
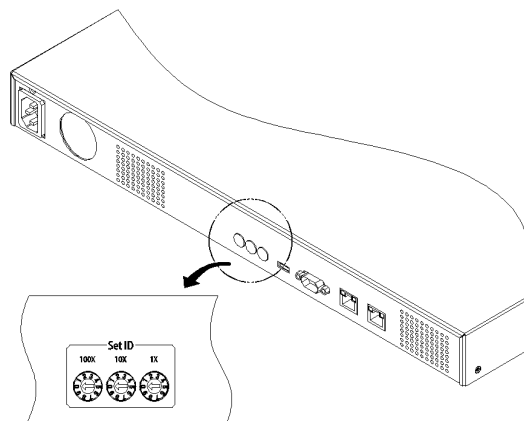
Set the ID using driver. The value for the first digit of switch should match with values of 100x on the rare panel while the second digit of switch should match with value of 10x and the third digit of switch should match with 1x on the rare panel

2.3.7.3 Power connection and operation

(1) Connect power as below.

(2) As soon as power is connected, the device starts booting.

<Note>
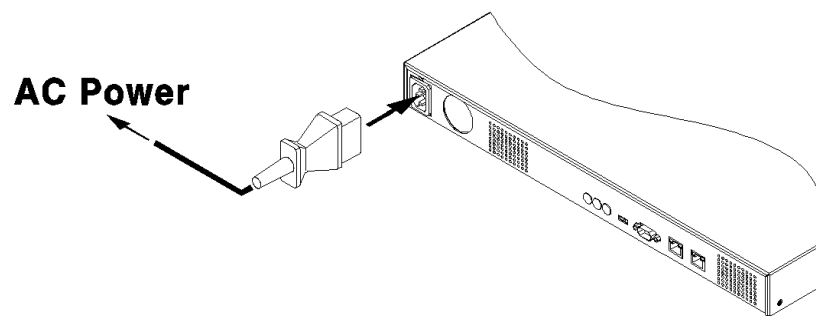
1) It takes around 1 minute to connect NVS04R and DVR after connecting power.

Four LEDs at the front starts blinking and they are fully on when connection is completed. The HDD list is available to check at Disk Manager

2) Refer the manual of "**NVS04R installation and user guide**" for detailed explanation..

User Manual

3. Menu Use

3.1 Menu Structure

The menu structure will be shown like below image, and each menu setting method descriped from chapter 4 to chapter 6.
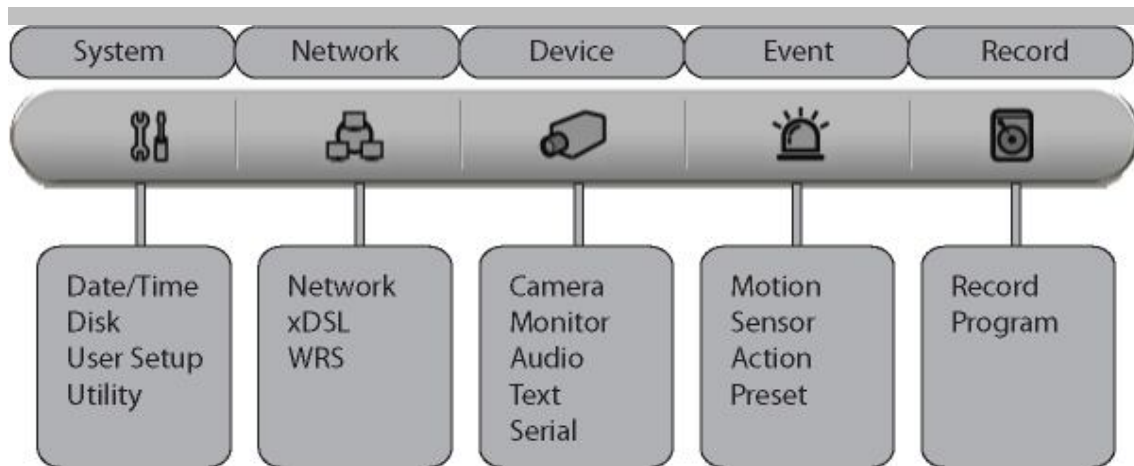
3.2 Function Menu

To run Function menu, please, click the right button of mouse in live monitoring or playback status or push "Func" button on the front panel.

The Function menu can be controlled by mouse.

Each function can be executed by clicking right button of mouse and click desired icon.

The Function menu also can be controlled by front part of DVR's buttons.

Please refer to below picture for the Function menu structure.

Function of Live
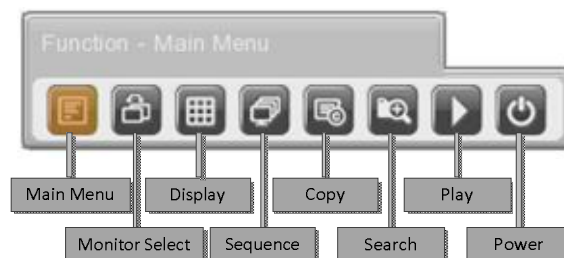
Function of Playback
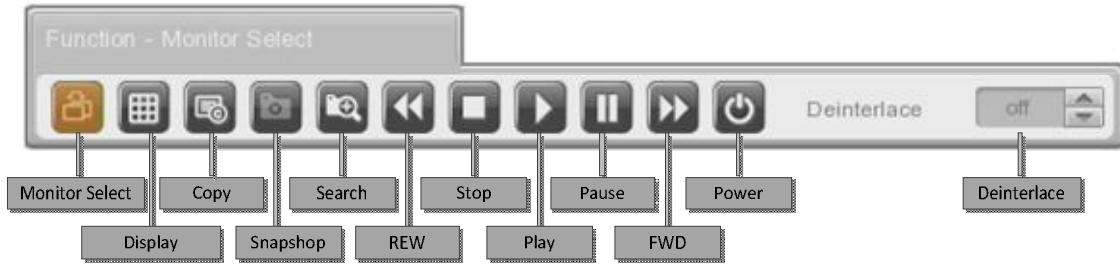
3.3   Factory Reset

In order to reset value to factory value, go to System Setting->System->Setting, and once press Factory Reset then the warning message will be appear, click "Yes" to reset the DVR value to factory.

Default Value from Factory

System			
Date / Time	Time Zone		UTC 00:00 Dublin
	Daylight Saving		Off
	NTP Function	Sync With NTP	Off
		NTP Mode	Client
		NTP Server Loc.	Public
		NTP Local Server IP	0.0.0.0
		Interval	1(hour)
	Date Format		MM/DD/YYYY
	Time		Current Time
Disk	Over Write		On
	Disk Full Alarm Warning		55
	Block Playback		0
	Delete Data		Off
	Disk Mirroring		Off
	HDD Temp Alarm		Off

User Setup	Right		O
Utility	DVR Alias		DVR0
	Language		English
	DVR Keyboard ID		1
	Remote Controller ID		All
Network			
Network	Type		Ethernet
	DHCP		Off
	IP addr		Current IP
	Net Mask		Current Net Mask
	Gateway		Current Gateway
	DNS Server		4.2.2.1
	Port		80
	Band Width Limit(Mbps)		0.0
xDSL	User ID		Guest
	Password		*****
	Status		xDSL not connected
DDNS	Interval		Off
	URL		www.webgateinc.com
	Group		Newbie
	Status		Not Registered
Radius	Status		Disable
	IP Address		0.0.0.0
	Port		1812
Device			
Camera	Camera Number		Ch1
	Status		On
	Name		Cam 1
	Type		NTSC
	AGC		Enable
	Bright		0
	Contrast		0
	Mosaic		Off

	PTZ	PTZ Home		Off
		PTZ Idle Time		5
		PTZ Port		None
		PTZ Address		0
Monitor		Monitor		Minitor1
		Alarm Pop-up(Sec)		Off
		Scan Mode		Over Scan
		VGA Mode		800x600@56Hz
		Monitor Switching		On
Audio		Audio Channel		1
		Audio Recording		Off
		Sync Video Channel		Ch1
		Audio Gain		0
		Audio Mix		Mix On
Text		Recording		Off
		Sync Test With		Ch1
		Device		Manual
		Seek Header		Off
		Header 1		Header1
		Header 2		Header2
		Delimiter		0D0A
		Timeout(ms)		1000
		Lines		20
Serial		Serial Port		Com1
		Device		None
		Interface		RS232
		Baud Rate		9600
		Parity Bit		None
		Stop Bit		1
		Data Bit		8
Event				
Event		Event Check		Always
		Event Action		Relay1
		Action Duration		10 Sec
Motion	MD			All

	Sensivity		5
	Area		Set All
Sensor	Sensor		All, N.O.
Preset	Channel Number		Ch1
	Preset		Sensor1, Preset1
Record			
Record	Record Mode		Manual & Event
	Program		Program A
	Pre Event Duration		1
	Post Event Duration		1
Program	Normal	Resolution	All D1
		Frame Rate	MH1600H : All 30, MH1600M, 3200M : All 15
		Quality	All Q5
	Event	Resolution	All D1
		Frame Rate	MH1600H : All 30, MH1600M, 3200M : All 15
		Quality	All Q5

Factory Default value (NTSC)

<u>MH1600H</u>

Rec mode		Normal			Event		
List		Res	Fps	Q	Res	Fps	Q
Program	A	D1	30	Q5	D1	30	Q5
	B	D1	15	Q5	D1	15	Q5
	C	D1	7	Q5	D1	7	Q5
	D	Half	30	Q5	Half	30	Q5
	E	Half	15	Q5	Half	15	Q5
	F	Half	7	Q5	Half	7	Q5
	G	CIF	30	Q5	CIF	30	Q5
	H	CIF	15	Q5	CIF	15	Q5
	I	CIF	7	Q5	CIF	7	Q5

MH1600M

Rec mode	Normal	Event

List		Res	Fps	Q	Res	Fps	Q
Program	A	D1	15	Q5	D1	15	Q5
	B	D1	7	Q5	D1	7	Q5
	C	D1	4	Q5	D1	4	Q5
	D	Half	30	Q5	Half	30	Q5
	E	Half	15	Q5	Half	15	Q5
	F	Half	7	Q5	Half	7	Q5
	G	CIF	30	Q5	CIF	30	Q5
	H	CIF	15	Q5	CIF	15	Q5
	I	CIF	7	Q5	CIF	7	Q5

MH3200M

Rec mode		Normal			Event		
List		Res	Fps	Q	Res	Fps	Q
Program	A	D1	15	Q5	D1	15	Q5
	B	D1	7	Q5	D1	7	Q5
	C	D1	4	Q5	D1	4	Q5
	D	Half	30	Q5	Half	30	Q5
	E	Half	15	Q5	Half	15	Q5
	F	Half	7	Q5	Half	7	Q5
	G	CIF	30	Q5	CIF	30	Q5
	H	CIF	15	Q5	CIF	15	Q5
	I	CIF	7	Q5	CIF	7	Q5

4. Monitoring

All analog video image channels connected to DVR is displayed to screen by Power connection.

It is to utilize all monitoring mode of DVR.

4.1   Basic Screen

After Power connection, the DVR operates on automately.

It boots with LED on.

4.2   Single Full Screen Mode

After press the channel number wanted or click mouse button.

Press [MULTI] button to return to divisional screen

4.3   Multi Screen Mode

Press [MULTI] for multi-channel display or click "Display" icon from Function menu.

Press [MULTI] button every time, screen mode is changed to 1~4, 5~8, 9~12, 13~16, 4C, 1~9, 8~16, 1~10, 16 channel division.

4.4   Screen Description

The status bar from monitoring screen, it shows DVR's current status that included Date/Time, Record, Motion/Sensor Detection, Manual Record, Text input and HDD's record capacity.
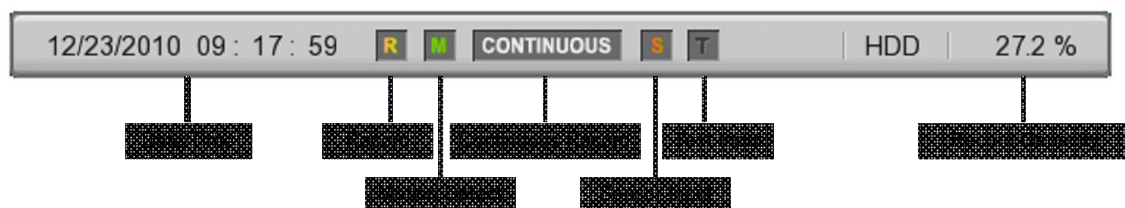
4.5   Auto Switch Mode (Sequence)

Defined channels or multi screens can be displayed in sequence with configurated time interval.

Maximum 16 channels or multi screens can be defined.

.

4.5.1   System Standard Mode

By [SEQ] button, it can monitor auto switching of defined channels.

Press [MENU] for the setting switching term or using mouse click menu icon from function menu.

Move to "Device"➔ "Monitor" from OSD menu.

Select "Monitor" under 'Device" with [Enter] button or mouse click. Set value from 1 sec. to 60 sec. At OFF set, auto switch mode does not operate

Auto Switch mode can be set in every division mode by the press [SEQ] button.

Press [SEQ] button once more to leave from Auto Switch mode.

4.5.2 User Sequence Mode

[Press [AUTO] button or click [Sequence] icon from Function menu with mouse.

Auto Switch model can be set from "Monitor" main menu.

4.6 Event Screen

When the event is occurred, the green color [M] and red color [S] will be display from status bar. In case of [M] displayed, the camera name will be turned to green color, and it will turn to yellow when Motion Detection event finish.

In case of [S] displayed, the camera name will be turned to red color, and it will turn to yellow when Sensor event finish
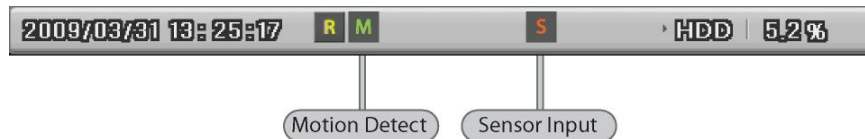
It can be set to Pop-up automatically relevant screen when alarming.

Set pop-up period can be set into "Alarm Pop-up (sec)" inferior to "Monitor" menu.

At the simultaneous alarming in several channels, it displays the division as many channel as alarmed. For example, when 3 channels alarm, 4 divisions is displayed on screen. And press any button to return original channel.

1. If Alarm Pop-up Hold (sec) set to Off, Alarm Pop-up will not operate.
2. If Alarm Pop-up Hold (sec) set to keep, it does not return to previous screen before press any
       button.

4.7   Zoom Screen Mode

- From single full screen mode, press [FUNC] and D-Zoom button then select + button to activate zooming the image.
- Default zoom screen locates to main center when press [ZOOM] button. Zoom image can shift left-right in 18 steps and top-bottom in 12 steps.
- Use directional key(up/down/left/right) button to screen move.
- Press [-] one more with [Enter] or mouse click to return to original screen.

4.8   Pause Live Screen

- Live screen can pause like Playback.
- Press [PAUSE] to pause live screen and press [PAUSE] to return live screen.

4.9 PTZ Control

Connect PTZ controller to DVR and set relevant protocol from "Serial" menu, then PTZ can operate while monitoring live images.

Then PTZ works automatically with following icon.
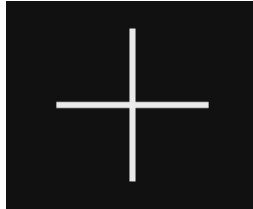
PAN/TILT can be used with directional button on front panel, and PAN/TILT/ZOOM can be used with mouse.

 Press PTZ button from DVR's front panel, or click PTZ icon from Function menu to use OSD Menu, Focus, Preset, Aux.

Below lists are protocols available in DVR

Model	Manufacturer
BOSCH AutoDome, TC8560X-4	Bosch
PELCO(P), PELCO(D)	Pelco
Sony EVI-D3x	Sony
VT VPT-4x	VT
AD Speed Dome	AD
SungJin SJ372R1	SungJin
Samsung SCC641	Samsung Electric
Panasonic WV-CS850	Panasonic
SDZ160/330, Samsung SPD, Keyboard SCC3000A, Samsung SRX-100B	Samsung Techwin
LG GAC-PT2	LG
Keyboard KBD300A, WGI SPD1800/2600	Honeywell
WKC-100	Honeywell
Merit-Lilin Fast Dome	Merit
Elmo PTC200C	Elmo
Canon VC-C4	Canon
HTC-230S	DongYang Unitech
RVision	RVision
Elbex	Elbex
Honeywell 755/655, HRX-2000, HTX-3000, ScanDome2	Honeywell
VIDO	VIDO
VICON	Vicon
Hunt	Hunt
ORX-1000	Sysmenia
Fine CRR-1600	LiveEye
Tokina	Tokina
Kodicom KRE	Kodicom
Nuvico	Nuvico

4.9.1 Pan/Tilt/Zoom

This menu is used to control Pan / Tilt / Zoom function.

Select relevant channel to control PTZ which is connected with PTZ.

4.9.2 Focus

Press [PTZ] button in PTZ screen to activate Focus menu.

Control focus with [Near] or [Far] buttons .

4.9.3 Load Preset

Press [PTZ] button in PTZ screen to activate Load Preset menu.

Select Preset number wanted and press [Load] button

4.9.4 Save Preset

Press [PTZ] button in PTZ screen to activate Save Preset menu.

Select Preset number when you want to save and press [Save] button

4.9.5 Auxiliary On

Press [PTZ] button in PTZ screen to activate Aux On menu..

- Using up / down button or mouse wheel to select the Aux Number.

- Select On and press Enter button or click from mouse.

   (Aux function is available to max 16 functions.)

4.9.6 Auxiliary Off

Press [PTZ] button in PTZ screen to activate Aux Off menu..

- Using up / down button or mouse wheel to select the Aux Number.

- Select Off and press Enter button or click from mouse.

4.9.7 Menu

It is to go into connected PTZ's menu, using up/down/left/right and enter key from front panel for setting the menu, and press ESC button for exit the menu.

5.Playback

5.1   Playback Mode

5.1.1   Playback on Standard monitor (16 / 9 division)

- Please, push play button in monitoring mode or mouse click play button in Function menu.
- If pushing Play button or FWD button, video playbacks in forward direction at 1× speed.
- If pushing REW button, video playbacks in reverse direction at 1× speed.
- If pushing Playback button in multi-division monitor mode,

.

5.1.2   Playback function

◀▶   : Playback 1× speed. If using mouse, click Play button in Function menu.

Multi-channel video will play back if pushing [PLAY] button in monitor mode. And it playbacks from the latest played back. If pressing this button one more during playback, playback direction is reversed.

II   : Pause playback temporary. With mouse, click Pause button in Function menu.

■   : Stop playback. With mouse, click Stop button in Function menu.

▶▶   : Playback speed will be changed. (x1, x2, x4, x8, x16, x32, x64, x1/2, x1, x2, x4 – in order), If pushing [FWD] button in live view, it plays back video 1 minute ago. Playback speed can be changed by pushing [FWD] button or clicking [FWD] button in Function menu.

◀◀   : Reverse playback speed will be changed. (x1, x2, x4, x8, x16, x32, x64, x1/2, x1, x2, x4 in order)

If pushing [REW] button in live view, it plays back video 1 minute ago. Playback speed can be changed by pushing [REW] button or clicking [REW] button in Function menu

I▶   : If pushing [FWD] button on Pause mode, playback by each frame to the forward. Push [PLAY] to return normal playback.

◀I   : If pushing [REW] button on Pause mode, playback by each frame to the reverse. Push [PLAY] to return normal playback.

Jog/Shuttle   : changeable to various playback speeds (x1, x2, x4, x8, x16, x32, x64, x1/2) with either playback direction in playback status.

5.2 SEARCH MODE

This menu is to playback specific time data from the time frame and searching log at Playback mode.

There are Time, Calendar, Event, Thumbnail mode.

Please, push Search button on the front panel or click in Function menu..
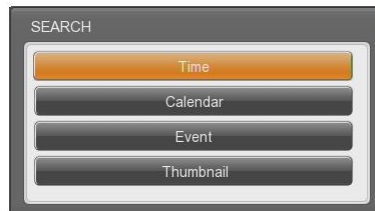
5.2.1   Time Search

Select date and time to search and playback video will be moved to the selected point.
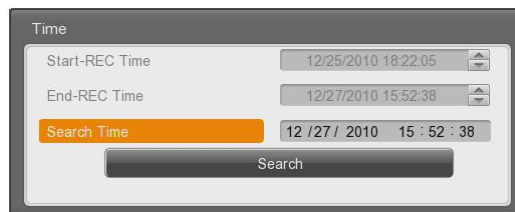
Start-REC Time   : The date and time of start-recording

End-REC Time   : The latest date and time of the recording

Search Time   : Select the range of date and time for Search

Search   : Execution button

5.2.2   Schedule Search

[MH1600H, MH1600M]
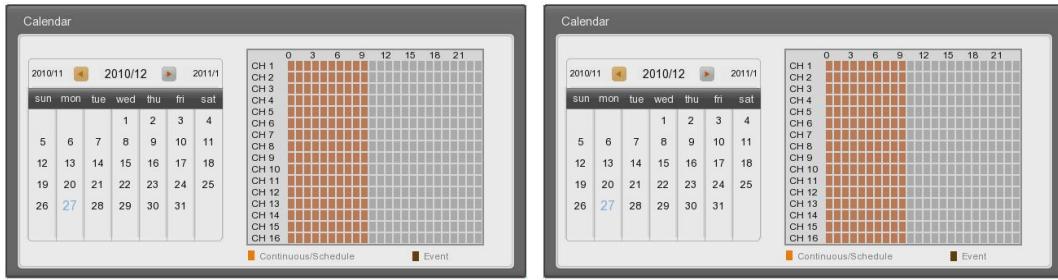
[MH3200M]

Display recording status of channel 1~32

Year	: Select Year to search. With mouse wheel, user can change it.
Month	: Select Month to search. With mouse wheel, user can change it.
Date	: Select Date to search. With mouse, select the date and decide the time by wheel.
Time	: Select the time and push Enter button to play back.

5.2.3 Event Search

User can search by all channels, some of channels, all events, motion detection, sensor in certain range. For change of date and time, with front panel, please use top and down button. In case of using mouse, scroll the mouse wheel after selecting area. Searched result will be displayed on additional event window. Select and push enter or scroll the mouse wheel to move to the wanted date and time area.
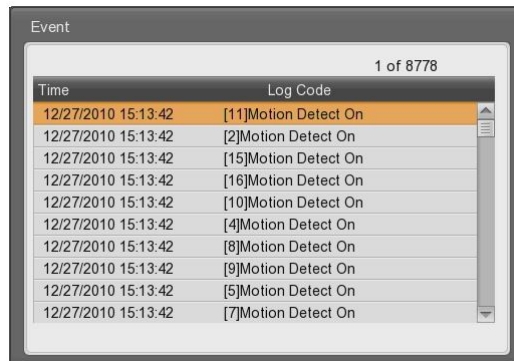
Start-REC Time	: Starting date and time of the recording.
End-REC Time	: The latest date and time of the recording
Search Start Time	: Input start date and time for search with direction button and push Enter and change the value by Up and Down button. With mouse, click and scroll the wheel.
Search end Time	: Input end date and time for search with direction button and push

	Enter and change the value by Up and Down button. With mouse, click and scroll the wheel.
Event Channel	: Select the channel for search
	MH1600H, MH1600M: from Ch1 to Ch16
	MH3200M from Ch1 to Ch32
Event Type	: Select the event type for search
	There are all events, motion detection, sensor, video loss, text type
Smart search	: It's a function that search the object by motion detecting.
	1. Choose channel that you want to search.
	2. Choose event type on MD(Motion Detection)
	3. Set the grid for motion and go to search.

After event search, following result is displayed

Select one of them to playback the relevant recorded data.

Event	
	1 of 8778
Time	Log Code
12/27/2010 15:13:42	[11]Motion Detect On
12/27/2010 15:13:42	[2]Motion Detect On
12/27/2010 15:13:42	[15]Motion Detect On
12/27/2010 15:13:42	[16]Motion Detect On
12/27/2010 15:13:42	[10]Motion Detect On
12/27/2010 15:13:42	[4]Motion Detect On
12/27/2010 15:13:42	[8]Motion Detect On
12/27/2010 15:13:42	[9]Motion Detect On
12/27/2010 15:13:42	[5]Motion Detect On
12/27/2010 15:13:42	[7]Motion Detect On

5.2.4   Thumbnail Search

Search certain channel by thumbnail type. If select the searched thumbnail, selected date and time video will be played back..

Thumbnail	
Channel	1
Start Time	09 / 28 / 2011 13 : 28 : 59
Interval	1 Sec
	Search

Channel	: Select the channel and change the value by direction key or mouse wheel.
Start Time	: Input the date and time for starting search and change the value

                      using up-down direction key or mouse wheel.

Interval   : Set Interval value by Up-down button or mouse wheel.

View video   : If pushing search button, 16 cycles will be shown based on start time.

                      Press [Func] to return to the search or use mouse wheel.

Select video   : Play back from the selected video of thumbnail search result.

                      With pressing Enter or clicking mouse, use can play back.

                      After Thumbnail   search, following result is displayed

                      Select one of them to playback the relevant recorded data

5.3   Copy

This is for copying recorded video. There are CD/DVD and RE4 and AVI type.

Copy function is supported to be used by user who has the authorization. For authority configuration, please, refer to 6.2.3 User setup

To use copy function, press [COPY] or Click Copy button in Function menu.

5.3.1   CD/DVD

This is copy function by using CD or DVD. CD or DVD will be automatically searched..
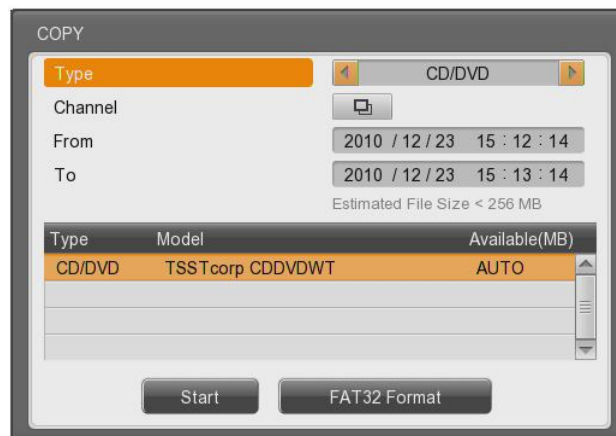
Type	: Select CD/DVD using up-down direction key or mouse wheel. Press Enter and scroll wheel to change the value.
Channel	: User can select some or all channel among 16channels. Select the channel location and press Enter or use mouse wheel.
From	: Select start date and time to copy using up-down key or mouse wheel.
To	: Select end date and time to copy using up-down key or mouse wheel.
Select Disk	: Select the media to copy using Enter button on Select Disk.
Start	: Start Copy. Press Start button with Enter or click the left button of the mouse.
FAT32 format	: Format USB memory or HDD by FAT32 type.
	Do not use when copying into CD/DVD. First execute format and select FAT32 button and press Enter or click left mouse button.

Estimated File Size Display file size of recorded data which is selected.

Please, refer to the recommended media list below.

DVD-R manufacturer	CD-R Manufacturer
Mitsubishi(×16 recommended)	Mitsubishi(×52 recommended)
TDK(×16 recommended)	TDK(×52 recommended)
Imation(×16 recommended)	Imation(×52 recommended)
Sony(×16 recommended)	Sony(×48 recommended)

5.3.2   RE4
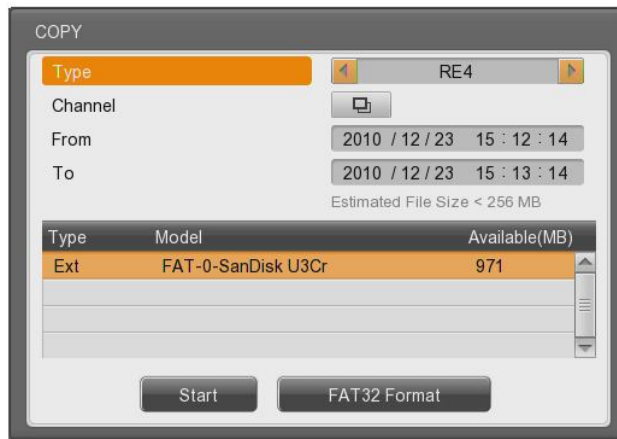
User can back up by HDD, USB memory and play back suing mini-player or Control Center.

Select channel position and press Enter or use mouse wheel to open the channel list like below..

[MH1600H, MH1600M]

[MH3200M]

Type	: Select RE4 using up-down button or mouse wheel.
Channel	: To pop up the channel selection window, press Enter or use mouse wheel.
Select Channel	: use can select some or all channels and after selecting channel, press Enter or click mouse left button.
Start time	: Set start date or time to copy. After selecting part for change and set the value using up-down key or mouse wheel.
End time	: Set End date or time to copy. After selecting part for change and set the value using up-down key or mouse wheel.
Select disk	: Select media to copy. Press Enter on Disk list or click mouse.
Start	: Start copy. Press Enter or click mouse.
FAT32 format	: If USB memory or HDD are not formatted, format by FAT32 first and copy. To execute, press Enter or click mouse.

Caution : not perfectly finished backup file will not be played back in PC.

5.3.3   AVI

Use USB memory or HDD to copy certain part.
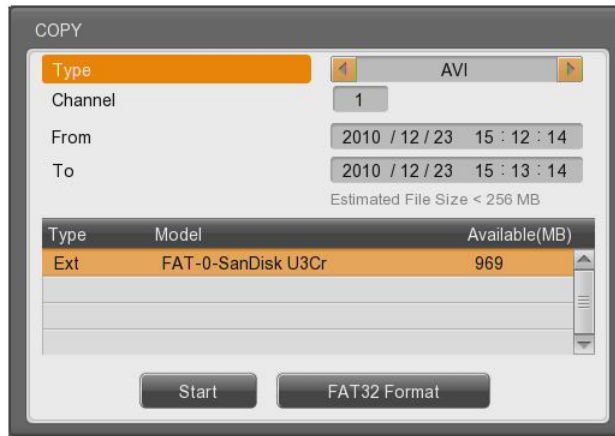
Type	: Select AVI using up-down key or mouse wheel.
Channel	: Select the channel to copy by up-down key or mouse wheel.
From	: Set start date and time to copy. Time and Year by left/right button and date/time by up/down button. With mouse, click left button first and use wheel.
Duration	: Set copy length. Copy as selected time length from the start using up/down key or mouse wheel.
Select disk	: Select media to copy. Press Enter and select media or click mouse.
Start	: Start copy. Press Enter or click mouse.
FAT32 Format	: Format USB Memory or HDD not formatted.

Caution : If copied file is not played back, please, install integrated codec first.

6. Configuration

6.1 Recording Structure

There are 3 modes in DVR recording. Configuration relation structure is like below.

Please, refer to the below each item for detailed recording configuration.
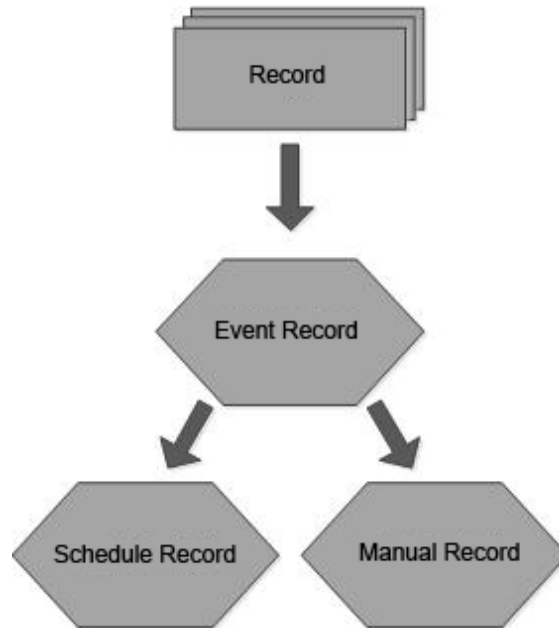
6.2 System Setup

Time and Disk and authority can be configured.

6.2.1 Date/Time

Time set should be configured prior to the recording.

Time configuration is very important to protect the recording data. Time change on recording is not recommended. Time zone configuration value of factory default is "UTC 00:00 Dublin"

6.2.1.1   Time Setup

Caution: under recording, if user changes Time, it will affect time change on previously recorded video data in accordance with. Therefore, we recommend backup before time change.

-   Press Main Menu of Function or [MENU] button on the front panel.
-   Move to "Date/Time" menu.
-   After selecting "Date/Time" in Quick setup and press [Enter] or click.
-   Menu of time configuration 6.2 will be opened
-   To move to the sub menu, use directional key or mouse.

Time zone

Use left/right direction key or mouse wheel. To return to previous menu, press [ESC] or click right mouse button. (It is same as OSD menu)

Daylight saving

This menu is synchronized with time zone configuration menu. It means when daylight saving area is set, this function works. Daylight saving applicable area is all the same with Time zone of Microsoft Windows.

Date format

With using left/right direction key or mouse wheel, configure date among "MM/DD/YYYY", "YYYY/MM/DD", "DD/MM/YYYY".

Time

With left/right direction key, use can move to year, month, day, hour in order and each configuration will be controlled by up/down key or mouse wheel.

Apply

User must push "Apply Date/Time" button. And you will see the below message box.

<Caution>

Except date/time configuration, other configuration records automatically, but

"date/time" configuration influences critical effect to HDD recording file system,

It doesn't record automatically. <u>To apply the changed value, user must press</u>

<u>[apply] button.</u>

6.2.1.2   NTP Setup

NTP(Network Time Protocol) make time of connected devices synchronized. There are NTP server and client which get time signal from the server.

Sync NTP

Set NTP function on/off.

NTP Mode

Configure NTP mode of DVR – Client / Server / All

NTP Server Loc.

When NTP mode is client, it is on Enable. Configure yes or no whether NTP server is in Local Network or Public.

NTP Local server IP

In NTP local server Enable, configure server ip. Input IP address of NTP server or DVR set by NTP server in local network.

Interval

Configure interval of time sync.

Caution: If use NTP client mode, user must set NTP on.

6.2.2   Disk

It explains how to add or remove or format internal or external HDD.

Over Write

If there is no space in HDD, old data will be deleted automatically.

Disk Full Alarm Warning

It gives notice if the recorded data is full up to configured limitation of all HDD disks which is connected to DVR.

Block Playback
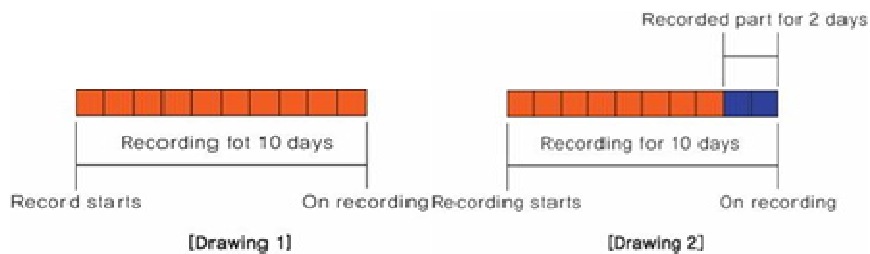
This function makes recording data seen during the limited area.

For instance, if setting block playback by 2 day(Pic 2) among 10 days, just allowed 2 days data can be played back.

Delete Data

This option is to record only the date you selected.

For example, if you select 3 days then DVR will record up to 3 days, and keep overwriting 3 days period of data

Disk Full Alarm Warning

If mounted Disk is full, alarm warning to user.

6.2.2.1 Disk Manager

This is menu for the management of internal or external HDD.

Manage status, bad block, size, Yes or No etc.

Type   : display location or type of disk.

   Int A (Internal A HDD), Int B (Internal B HDD), Ext (External HDD)

Model   : HDD model name.

Bad Blk   : display bad block. In HDD. If no problem, "0" will be displayed. Others
                 are

      Not shown anything at all.

Size   : Display HDD size by MB unit

Enabled   : Make HDD enable mode or disable mode.

     Yes: enable / No: Disable

In case HDD YES

- **Enabled** : Press [Enter] in No mode or scroll mouse wheel. Notice window pops up and show
  user the message like below.

-   Caution : This Disk is not available without format. Will you format Disk?

- If selecting **No, keep previous data and HDD will be Enable to use.**

- If selecting yes, delete previous data and HDD will be Enable to use.

In case HDD No

- **Enabled** : In Yes mode, press [Enter] or scroll mouse wheel and notice window pops up and
  show user the message like below.

-Caution, will you remove Disk?

- **If Yes, user will find the message "Disk is removed" on the bottom and Enable status
will be No.**

- HDD is not used.

- If No, keep previous HDD without change.

6.2.2.2 Disk Status

Temperature and status of HDD will be shown.

6.2.2.3 Disk Mirroring

This DVR has DVR Mirroring function in itself and NVS Mirroring on NVS(Network Video Storage) via Gigabit Network [1

Without additional user control, if connecting DVR and NVS via Gigabit Network Cable, Mirroring function will be activated and user can operate it easily and simply.

But, when using Mirroring function, DVR system performance will be down and recording configuration will be automatically adjusted.

Recorded Video data via Mirroring function can playback in another DVR. But if user wants to use the HDD for recording, it should be formatted again.

□ File system supporting Max. 32TB

□ Support max 8ea of NVS via Cascade Network Port.

□ Support Local(DVR) 2 bay / NVS 4 bay SATA Hot Swap Bay

□ Support Local(DVR) Recording 8TB (4TB with Mirroring)

□ NVS recording 32TB (Mirroring 16TB) will be supported soon.

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[1] Category 6

DVR Mirroring working method
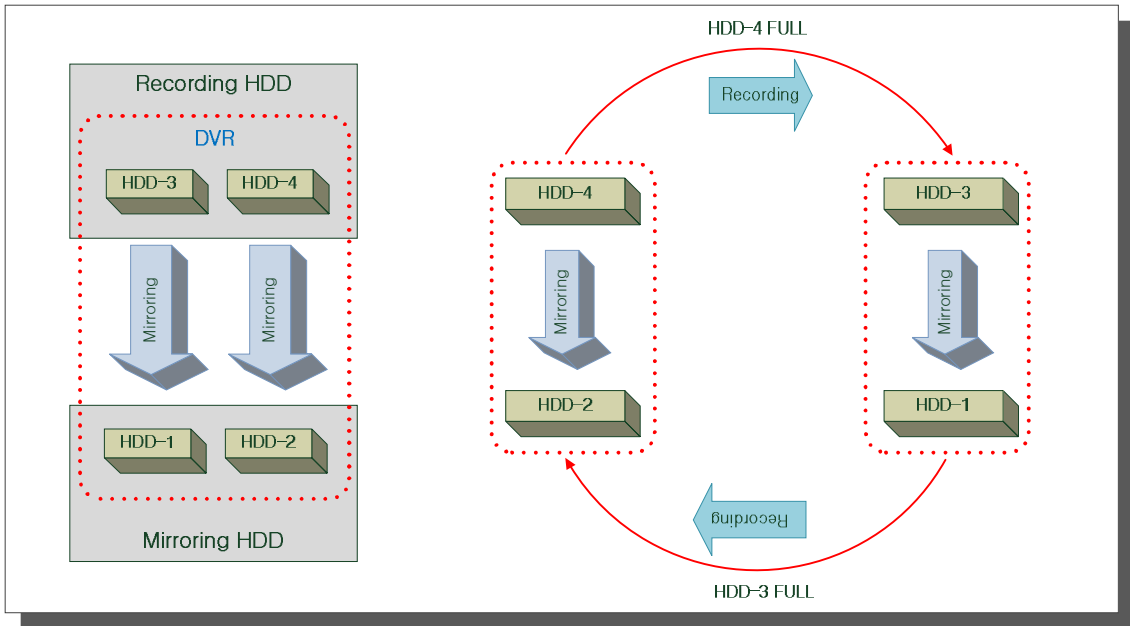
(1) Basically HDDs will be set like the above.

(2) Recording data of HDD-3 is mirroring with HDD-1 and recording data of HDD-4 is mirroring to HDD-2.

(3) If there are 4ea of HDDs are mounted on DVR and starts recording, HDD-4 will start recording.

(4) If HDD-4 is full, automatically HDD-3 will start recording.

(5) In case that Disk Auto Deletion is configured, when HDd-3 is full, automatically system return to HDD-4 and it will overwrite from the oldest data for recording.

(6) To check Mirroring recording data, it will be possible on the additional DVR. Removed Mirroring HDD should be used only for keeping or Playback. And if user wants to reuse Mirroring HDD for recording, it should be formatted.

Mirroring configuration

- Off : All mounted HDD will be recorded in order without Mirroring.

- DVR : Mirroring recording only with internally mounted HDD (not HDD in NVS04R)

- NVS : Mirroring recording only with HDD in NVS04R which is connected to DVR. (Not HDD in DVR)

- All : Mirroring recording with all HDDs in DVR and NVS04R.

(1) Using directional key in Disk Mirroring configuration, please, select DVR for use and press Enter.

But, before Mirroring configuration, all HDDs should be Removed – (Remove(NO).

(2) After configuration with Enter, if Pop-up message window is shown, select YES.

(3) After moving to Disk Manager, all mounted HDDs are supposed to be formatted and IntA,B is configured as [M] (Mirroring) and IntC,D maintains [NO] status.

(4) After selecting Int C,D and then Add(YES), select YES on Pop-up window ad press Enter.

(5) Configured HDD is shifted from [NO] to [YES] and DVR can use the HDD for recording.

(6) After all configurations for Mirroring, if it works properly, HDD for recording and HDD for Mirroring LED of the front panel will be blink. If not recording, front LED will off

Type	Model	Bad Blk	Size(MB)	Enabled
IntC	ATA WDCWD3200AVJ	0	305245	YES
IntD	ATA WDCWD5000AVJ	0	476940	YES
Ext	FAT-0-JetFlash T		15479	NO
CD/DVD	TSSTcorp CDDVDWT		4096	
IntA(M)	ATA WDCWD3200AVJ		303103	
IntB(M)	ATA WDCWD5000AVJ		474879	
NVS208-4	ATA WDCWD5000AVJ	0	476940	YES
NVS208-2(M)	ATA WDCWD5000AVJ		474879	

<Note>
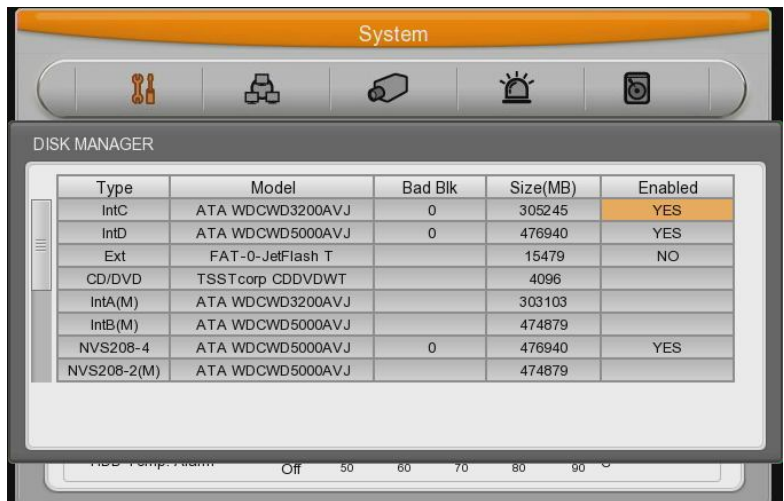
1. For Mirroring function, HDDs capacity and model for Recording and Mirroring should be same. If not, it won't work.

But, in case that HDD capacity is same but just different model, sometimes, it can not work properly.

Ex) Example for normal Mirroring and abnormal Mirroring

1) Normal Mirroring case

Type	Model	Bad Blk	Size(MB)	Enabled
IntA	ATA WDCWD5000AV	0	476940	No
IntB	ATA ST3250820AS	0	238475	No
IntC	TA WDCWD5000AV	0	476940	No
IntD	ATA ST3250820AS	0	238475	No

2) Abnormal Mirroring case or not recommended.(different model and size)

Type	Model	Bad Blk	Size(MB)	Enabled
IntA	ATA WDCWD5000AV	0	476940	No
IntB	ATA ST3250820AS	0	238475	No
IntC	ATA ST3250820AS	0	476940	No
IntD	ATA ST3250820AS	0	479640	No

2. For Mirroring configuration, HDD status of all HDDs in existing DVR and NVS04R should be [NO].

If, one of HDDs is not [NO] status, since Mirroring configuration will be failed, please, remove HDD and make all HDDs at [NO] status.

But, except HDDs formatted by FAT32 from CD/DVD or external storage (eSATA,

IEEE1394, USB).

3. For Mirroring configuration in NVS04R or DVR, other HDDs should not be added except its Mirroring configuration.

   Ex) For NVS04R Mirroring configuration, all HDDs in DVR should be [NO] status.

Recording Configuration.

When using Mirroring function, according to configuration option, DVR system performance will be down and due to this reason, recording configuration

will be adjusted automatically like below table chart.

1) Maximum recording performance per model with NVS Mirroring configuration.

[MH1600H Model]

NVS Mirroring Recording Setting		
Resolution	IPS	Quality
D1	15 ~ 1	Q5 ~ Q1
Half	30 ~ 1	Q5 ~ Q1
CIF	30 ~ 1	Q5 ~ Q1

[MH3200M / MH1600M Model]

NVS Mirroring Recording Setting		
Resolution	IPS	Quality
D1	7 ~ 1	Q5 ~ Q1
Half	15 ~ 1	Q5 ~ Q1
CIF	30 ~ 1	Q5 ~ Q1

2) Maximum recording performance per model with DVR and NVR04R Mirroring function

[MH1600H Model]

DVR/All Mirroring Recording Setting		
Resolution	IPS	Quality
D1	7~1	Q5 ~ Q1
Half	15 ~ 1	Q5 ~ Q1
CIF	30 ~ 1	Q5 ~ Q1

[MH3200M / MH1600M Model]

DVR/All Mirroring Recording Setting		
Resolution	IPS	Quality
D1	4 ~ 1	Q5 ~ Q1
Half	7 ~ 1	Q5 ~ Q1
CIF	15 ~ 1	Q5 ~ Q1

6.2.2.4 Mirroring HDD replacement.

If Mirroring HDD free space becomes 0%, on DVR console screen, alarm pop-up message will be shown for Mirroring HDD replacement. This time, user can check Mirroring HDD free space in Disk Replace menu and user can replace it.

Loc : Mirroring HDD name

Free : HDD free space

From : Date and time of Start recording.

To : Date and time of End recording

State : If free space is enough, it is displayed by Mirroring and if 0%, displayed by Replace. With these information, user can notice the HDD replacement timing..

<Note>

1. For Mirroring HDD replacement, user must do it in HDD Change menu..

2. This time, HDD for replacement should be same model and capacity with the original HDD.

3. If user does not replace Mirroring HDD after replacement popup message – 0%, System will delete the oldest data in sequence and keep Mirroring.

   This time, if user check Mirroring block of each HDD in HDD replace menu, user can see the

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doubled block but it just points out that this Mirroring HDD is not replaced.
Actual recording data is not doubled

6.2.3 User Setup

There are administrators and user and administrator can use all functions. The max. Number of user is 10 people. Each user can use the function allowed.

Authority setting

If set to X for user authority, the function will be unavailable. Set to O for user authority…
(default : O)

In case of set to O all for user authority like first picture, it'll be available for all functions. In case of set to X like second pictures, it's not available to use MENU, PTZ, Relay and Playback on each user.

Authority Use

Administrator provides each authority and password to each user after setting authority use.
Only functions that takes from administrator will be available to use after confirming authority and password

In case of taking MENU function to user 1, you'll see authority confirmation windows like below picture, a user who not taking MENU authority will not be available to use.

To use MENU function on User 1, it should take MENU authority from the administrator.

Password change

Select user ➔ Input password and press change ➔ Press Yes

Password input box is displayed. Password can be input with front figure button or text input window. After inputing 5 digit figure, click "OK" button.

After that, message pop up window will be shown and press "Yes".

<Reference>

Admin Password is "12345" in factory default and from user 1 to 10 in order

"11111","22222",.. and user10 is "00000"

Auto Login/Logout

Set to account for DVR login, it'll be automatically login(Admin, user1~user10)

And it'll be automatically logout when you set auto logout time(1~60mini) in the menu and login window will be shown after that.

(Remarkt)

Only live display is working for auto logout function, live display will not be shown when logout.

6.2.4 Utility

Configure the name of DVR, remote controller ID, Language.

DVR Alias

Set the name of DVR.

DVR Keyboard ID

This menu is to set the address of keyboard when using all functions of DVR by keyboard. Factory default is "1". If user wants to control various DVR by one keyboard, its address should be set with the different value.

Remote Controller ID

Max 16 remote controller ID can be set and one remote controller can manage 16 DVRs. Registration order for Remote controller.

- Make remote controller direction to DVR.
- Press ID button and figure in accordance with configured remote controller ID.
- If IDs are matched correctly, DVR buzzes.
- Use Remote controller.

Language

Select Language to use.

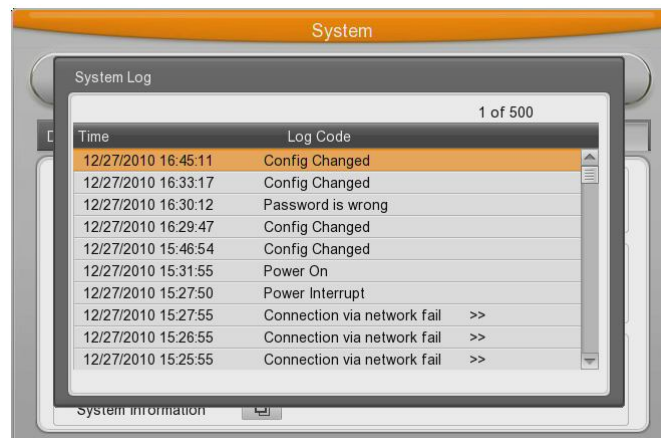**Firmware Update**

Can update firmware by USB Memory.

- Insert USB memory to USB port.
- Press Firmware Update button.
- Select [YES] on the pop up window.

- System will reboot.
- Firmware update is done.

System Log

System Log shows boot status of system and user and configuration etc.

.

Factory Reset

Change all configuration value by factory default.

Config Import/Export

Export – Save Configuration data in DVR to USB

Import – Apply exported Configuration data to relevant DVR or another DVR

System Information

Display recording status and system configuration of DVR

SYSTEM INFORMATION 2	
Firmware Version	3.0.2(2.13.0)
Serial Number	H20101224001
MAC Address	00:30:a1:20:11:01
Camera Type	NTSC
HDD Total Size	1391.2 GB
HDD Total Recordable Size	0.0 GB
Current Recordable Time	FIFO

SYSTEM INFORMATION 1

CH	RES	REC	IPS	QLT	VIDEO	AUDIO
1	D1	Schedule	15	Q5	728 Kbps	0 Kbps
2	D1	Schedule	15	Q5	704 Kbps	0 Kbps
3	D1	Schedule	15	Q5	720 Kbps	0 Kbps
4	D1	Schedule	15	Q5	712 Kbps	0 Kbps
5	D1	Schedule	15	Q5	720 Kbps	0 Kbps
6	D1	Schedule	15	Q5	704 Kbps	0 Kbps
7	D1	Schedule	15	Q5	720 Kbps	0 Kbps
8	D1	Schedule	15	Q5	704 Kbps	0 Kbps
9	D1	Schedule	15	Q5	624 Kbps	0 Kbps
10	D1	Schedule	15	Q5	608 Kbps	0 Kbps
11	D1	Schedule	15	Q5	632 Kbps	0 Kbps
12	D1	Schedule	15	Q5	616 Kbps	0 Kbps
13	D1	Schedule	15	Q5	624 Kbps	0 Kbps
14	D1	Schedule	15	Q5	632 Kbps	0 Kbps
15	D1	Schedule	15	Q5	632 Kbps	0 Kbps
16	D1	Schedule	15	Q5	632 Kbps	0 Kbps

Caution : This function is allowed only for system administrator.

6.3   Network

This is menu for configuring network.

Type

Configure type of Network (Ethernet/xDSL). If connected to cable modem or LAN directly to DVR, configure by "Ethernet".
If DVR connects to xDSL- one of PPPoE type, configure xDSL. But if it is not type of PPPoE, configure 'Ethernet'.

DHCP

With DHCP (Dynamic Host Configuration Protocol), all hosts connected to LAN can get Public IP address temporary.
If LAN has DHCP server and it is active, DHCP server allocate IP address to DVR.

Mostly middle and large network use DHCP server in LAN, but in case of small network, NAT(Network Address Translation) of HUB is general.

IP Adders

IP Address is for the connection between DVR and Control Center and also for web connection from Webviewer. (But, Net Mask, Gateway should be configured.)

Net Mask

Net Mask makes range of IP address available. It should be received from network administrator.

Gateway

Gateway is necessary to communicate IP, it should be received from network administrator.

DNS Server

DNS1 is mandatory item to registry and use WRS and it should be asked to network
  administrator.

UPnP Port Forwarding

It configurates port of DVR automatically when DVR is used with internet hub.

Port

Port is necessary for Control Center and Webviewer connection.

**Reference : Basic port is 80 and if using PPPoE modem and AP, be careful typing port
  number.**

Bandwidth

Menu for configuring network data transmission capacity. Without any additional configuration, it
works but if user wants to set, please let administrator do..

6.3.1   xDSL

DVR is connected to xDSL line and use PPPoE type, please change type by xDSL and
configure user ID and Password. User ID and Password should be same as xDSL.
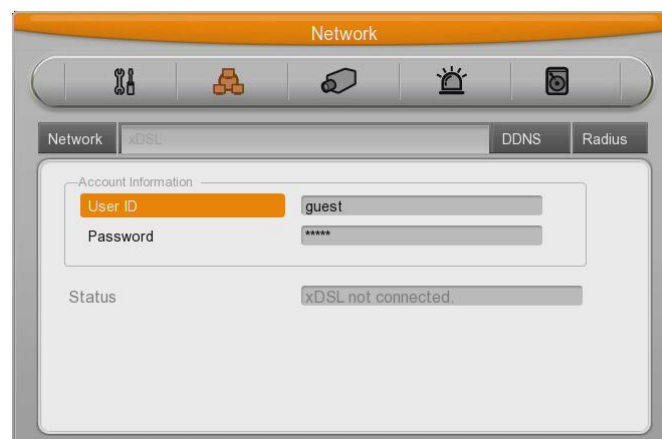
User ID/Password

Configure user ID and Password.

Status

It shows connection status of DVR.

6.3.2 WRS

If DVR is connected to Cable modem or xDSL modem, IP address is changed at every connection to ISP. In this case, changed IP address can not be known. If DVR using static IP register into WRS server, changed IP address can be known easily when it connects to DVR.

To register Static IP to WRS, please refer the following to set.
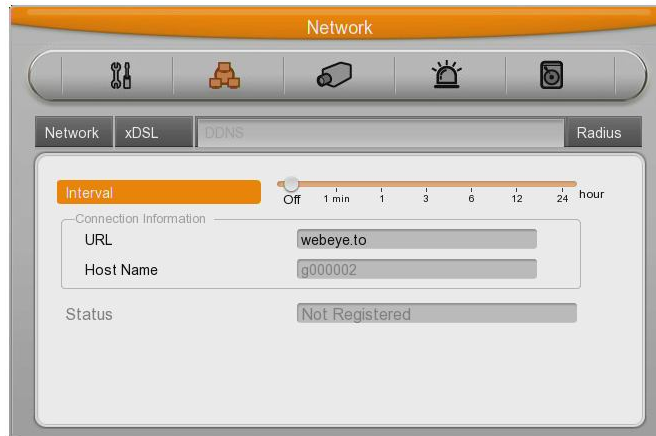
WRS Interval

For continuous registry, register interval should be set to 'WRS Interval'. According to set value of static IP address, it renews the information in WRS server regularly. If user registers the interval '0' or DVR does not transmit any data for 2 days, the data is removed from WRS.

WRS URL

This menu is to set server address to register. WRS addresses that Hunt operates now are www.webgateinc.com or mycam.to.

6.3.3 Radius

It makes to manage account information from several different DVRs to one account using Radius server. Please ask to Administrator before you use it.

To set Radius, Status, IP Address, Port should be set.

Set 'Enable' the status to use Radius and enter 'Radius Server IP' to IP Address.

Standard port to use is 1812 and specific port number which is from Server is also useable.

'User ID', Password' and 'Radius Shared Key 'are needed from administrator of Radius server after forwarding DVR account information to him.

Use 'ID/Password/Shared key' to register unit to Control Center.
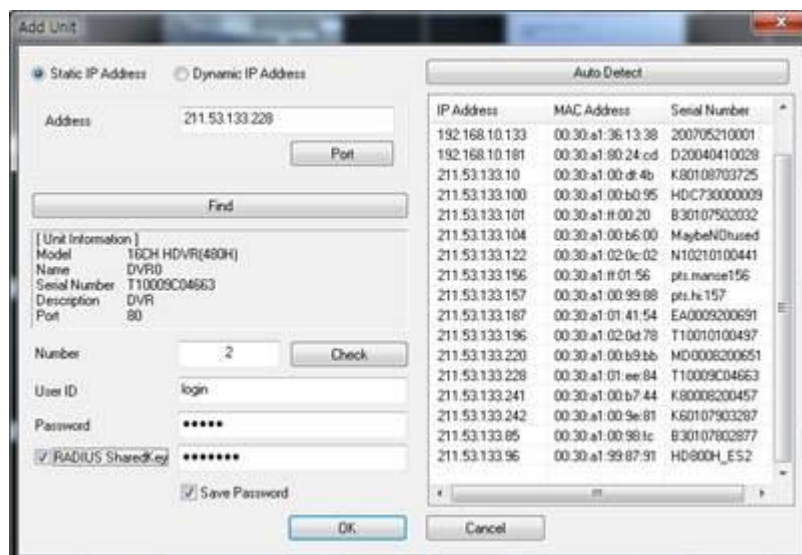
Click the Radius Shared Key and enter ID, Password, Shared Key.

Registration is completed of all information is correct.

6.3.4 Notifier

To use Notifier (Notifier Protocol) function, please, refer to the tech manual or cantact Notifier administrator in advance.

(Notifier™ device is for Fire Alarm. And if user enable Notifier function, DVR uses Notifier™ signal instead of sensor input of DVR.)

<Caution>

In case of using Notifier function, Normal Recording under 'Manual & Event' will not work together. If you want to Manual & Event normal recording, please, make Notifier status disable.

6.4   Device Setup

This menu is for configuring each camera connected to DVR.

There are [name][Status][Color/black or white][Brightness][Contrast][PTZ] etc.

Caution : NTSC and PAL camera can not be used at the same time.

If changing the camera from NTSC to PAL, system should be rebooted.

Configured value will be applied to monitoring and search at the same.

6.4.1 Camera Setup

Select the camera to configure in Channel menu.

6.4.1.1 Title

Configure camera name.

If pressing [Enter] button or click mouse, test menu will be shown.

For text string, text input box will be shown.

- Use directional key for text input.
- With mouse, just click the text.
- Select the text using up/down and left/right button.
- After selecting the text, press [Enter].
- To delete the text, press [←] button.
- To make a space between letters, press [→].

6.4.1.2 Using Channel

Configure whether using camera or not.

After pressing [Enter], select it using left/right key or mouse wheel.

If user wants to enhance the recording or network monitoring speed, please, set the channel disable.

6.4.1.3 AGC (Auto Gain Control)

AGC is the function to control the range of video signal input from camera connected.

Configure Enable/Disable using directional key or mouse wheel.

6.4.1.4 Brightness/Contrast

It can control Brightness and Contrast of video. After press [ENTER], use left/right button or mouse wheel to set the value wanted from each "–9" to "+9".

6.4.1.5 Privacy Mask

It makes the particular area to Mosaic. After Mosaic, the relevant area is displayed to black.

6.4.2 Monitor Setup

Main monitor provides all function which DVR supports and with spot monitor can use single channel conversion.

Standard monitor is available to use all functions from DVR.

Alarm Popup

If specific channel uses MD, Sensor Input, it makes the relevant channel popups as single or multi screen. To use this function, event should be set to 'Always' or 'Custom' and MD / Sensor configuration should be done also.

Covert channel

With Covert menu, user can covert the channel in Live/Playback mode

In Covert menu, all channel lists will be shown and press [Enter] button and click mouse to tick the channel. Checked channel will not show the video in Live/Playback.

User sequence configuration

User sequence can be edited. There are 16 user sequence mode and its interval is from 1 to 60seconds.

Multi-mode

The DVR has 3 predefined screen modes. 4C(4channels), 9C(basic 7 channels and additional 2 channels),10C(10 channels).

The way to composing

The way to compose screen is selecting the target and after selecting right window and press [Enter] button or use mouse. If channel selection is down, press [ESC] button or click mouse light button.

DVI Resolution

There are 9 resolution can be select 800x600@56Hz, 1024 x 768@60Hz, 1280 x 720@50Hz,1280 x 720@60Hz, 1920 x 1080p60, 1920 x 1080i50, 1920 x 1080i60, 1920 x 1080RB.

Display information

Display information is to configure which information will be shown on live view and playback view. In live view, time, channel name, event, recording status, HDD, remote controller ID, text can be set and in playback view, time,command,channel name, event, text can be configured.

Scan Mode

Support Over Scan / Under Scan Monitor.

6.4.3   Audio Setup

With this menu, user can configure Voice Channel, Audio recording, Volume, Synchronization, Mixing..

Voice Channel

Select audio to use

Recording

Configure yes or no of using audio recording. If no, audio will be out only in live view and if yes, Audio will be out in both view modes.

Volume

Configure volume by +, - direction

Synchronize Video Channel

Configure which channel is matched with the input audio. If Audio no.1 is set to video channel no.5, Audio no.1 is output with video channel no.5.
Default set is Audio no.1 to video channel no.1.

Voice mixing

Select audio in live view. If setting by "Mix On", all input audio will be out in every channels and if configured certain channel, input audio will be out on the selected channel only.

6.4.4   Text Setup

Configure Text in Device menu.

Recording

Set On/Off of recording against Text input

Sync Text with

Select channel to synchronize with text.

Device

Select the device to input text. Manual, Star Finger 007, VSI Pro are available to select.

Star Finger 007 and VSI Pro can be used with defined protocol, and other devices with Manual mode.

Header check

It has the various type of data input from the external device (Access Control, POS, ATM etc.) but it's not necessary for a device which is supported its protocol by DVR .Like VSI Pro, VSI Pro Hydra, and Star Finger 007, it is not needed when the protocol of these device have implemented on the device. If not, this is the parameter to analyze how the one of data is constructed from the text data that is input continuously.

Namely, all data has the first and the end. Header indicates the information that already inserts to inform its starting. Therefore, Header information is defined here to acknowledge its starting of a data. The reason of 2 Header is to detect maximum 2 data out because each device can output various data's.

Delimiter

Delimiter value can be different according to the manufacturer, please, refer to the product manual or seller.

Time out

Following lines defined here means maximum number of text line from one data. Even if there is standized data, there can be a short and long data. For example, there are 3 lines to write names on ATM. But some may need only First name & Last name to register. Which it means requires only 1 shorter than other ATM users. It is to decide the last line of the one data register as final complete data to save after an hour's consideration of register later because DVR can not recognize it automatically.

Lines

Define how many lines will be shown.

Caution : external device can not be recognized, please, ask to the seller.

6.4.5　Serial Setup

DVR has 3 serial ports. One is RS-232C(D-Sub) and the other 2 ports are RS-485(Terminal).

Serial Port

Select Serial port.

Device

Select the connected device.

Interface

Configure which interface user uses.

COM1 is for RS-232C, COM2 and COM3 is for RS-485

Baud rate/Parity/Stop Bit/Data Bit

In put suitable value according to external device.

6.4.5.1 PTZ Setup

Additional configuration for PTZ Address, PTZ port.

PTZ Home

Shift to preset assigned if it has no movement in certain time while PTZ control.

PTZ Idle Time

If it has no movement during configured time, shift to PTZ Home.

PTZ Port

Select Port for PTZ

PTZ Address

Configure the address configured in PTZ.
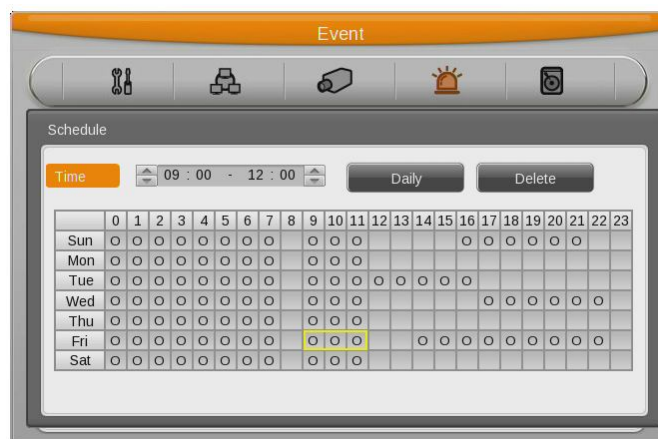
6.5 Event Setup

There are 5 items such as event, Text, Sync Event, Preset, System event.

6.5.1 Event Check

There are 3 items – Always, not apply, Custom.

In case of Custom, with similar configuration window like schedule, user can configure event per weekday/time.

• Time : Set time applicable

• Daily : Adapt selected schedule to whole day of the week.

• Delete : Delete Schedule

Configure

If time set, the content will be shown at schedule table.

Click to schedule start and end by mouse, the schedule will be shown at schedule table.

Delete

click delete button after selecting schedule

Not selecting schedule and click delete button, it'll delete selected schedule first.

How to change

Select Schedule to edit and change weekday, program,time directly.

In case that Schedule 50 are all configured, select the time zone to change by mouse click and click the time again, previouse configuartion will be deleted and new configuration will be shown.

6.5.2 Sync Event

Configuration for Event synchronization.

Event Action

There are 7 actions – relay 1 to 4, buzz, E-Mail, FTP

Action Duration

Action Duration runs if relay and buzz are configured, and goes on during the configured time. E-mail works by configured time interval.

Normal Event Source

User can configure Sensor, motion detection, V-loss, Text.

Sensor	MD	V-Loss	Text
16	16	16	1

System Event source

System Event source can configure Bad block, Disk full, Fan error, authorization failure, WRS registration failure, Mirroring failure, Abnormal recording stop.

6.5.2.1 E-mail address

Input E-mail address to get event alarm by E-Mail.

Sender Address

Not mandatory but necessary for receiver to find out which DVR sends event.

Authentication

There are 3 ways to send E-mail, Non-authentication sending, SMTP server authentication, TLS authentication. Non-authentication is to send e-mail without authentication from authentication server. SMTP server authentication is to send e-mail after an authentication of sender's e-mail address from SMTP server. TLS authentication is to send e-mail after an authentication of sender's e-mail address from TLS server

Including Picture

In general event, when sensor, MD, V-loss events are generated, the event information and Channel video will be sent to e-mail together.

But system event just send system event information.

6.5.2.2 FTP sending

It sends 1 video image of event to FTP server when event is occurring.

FTP Uploading

It makes FTP function on or off.

To use FTP sending function, select 'Normal Event' or 'System Event'.

Server URL

Enter the FTP server address to send image.

User ID

Enter the relevant ID when FTP server authentication is set.

Password

Enter the password

FTP Directory

Select Folder to save image

If folder is not indicated, the image is sent to the folder which server selects.

6.5.2.3 Twitter connection

Twitter can be connected to send single image or text message about event information of the channel when event is triggered on the channel.

Action Duration

This is setup for transmission duration of the Twitter

Please select Normal Event or System Event to be used for Twitter transmission

Twitter ID

Type in Twitter account to be used

Login Status

It shows current log in status

Generate PIN

Click on this to have URL information to log i

Login URL

Put URL from Generate PIN menu above into browser of PC then log in window come out and please log in with personal Twitter account

PIN

Type in PIN number provided after log in successfully

Including Picture

In case Sensor, Motion detection, Image loss triggered in normal event, it will send E-mail including event information, channel and image attached
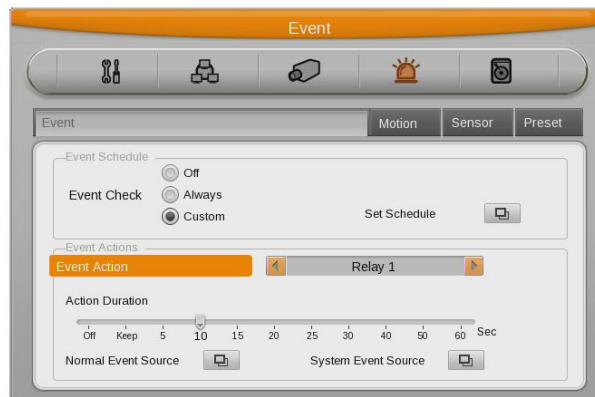
Send Test Message

It send test message about connection status of Twitter

6.5.2.4 Relay

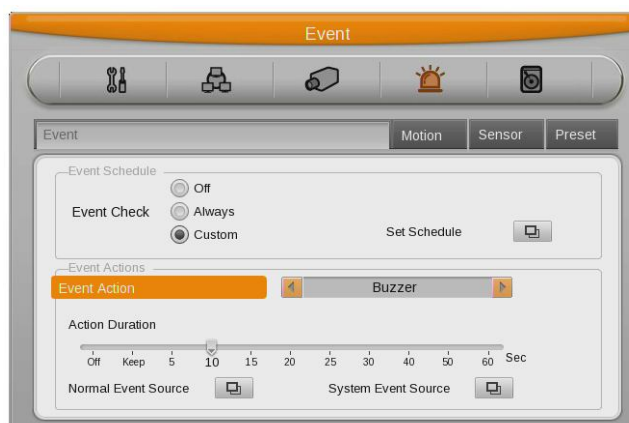When event is working, set to relay as a output.

To work relay, select event between normal and system event.
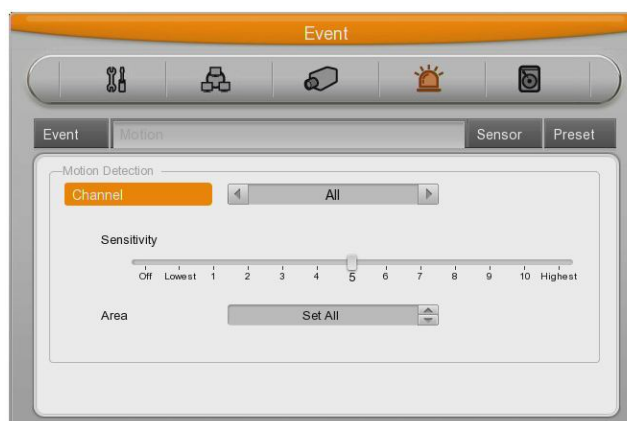

6.5.2.5 Buzzer

When event is working, set to buzzer as a output

To work buzzer, select event between normal and system event.

6.5.3   Motion Detection

Channel

All or certain channel.

Sensitivity

Sensitivity can be configured from min.1 to max 10.

Area

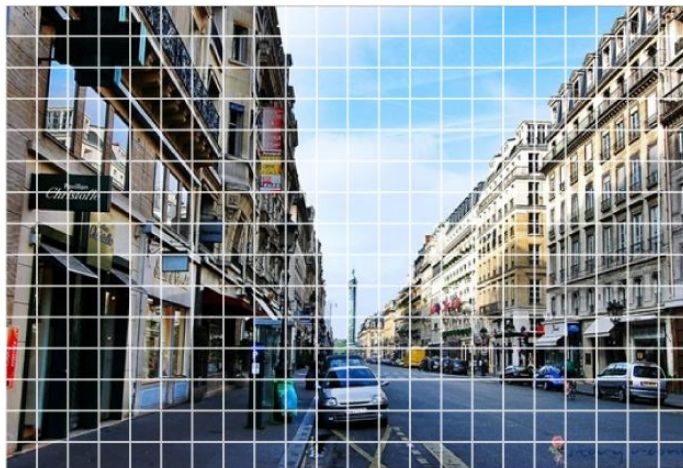Select detection area.

User can select all or certain channel.

User Area

When selecting per channel, it can be configured.

1 grid size is **22x15** and factory default value is all. If pushing user area, configuration window for detection area..

With direction key, select area and press [Enter] or click mouse. And press "ESC" button or click right mouse button, shift to the previous menu.

6.5.4 Sensor

This menu is to setup the existing sensor input and type of sensor.

16 inputs Sensor has 2 types, Normal Open(N.O.) and Normal Close(N.C.).
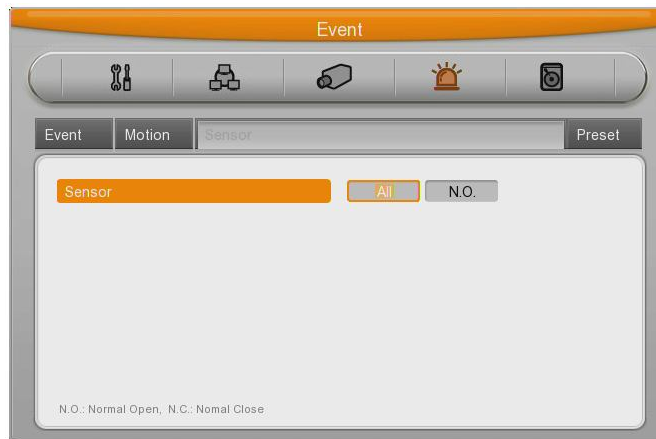
6.5.5 Preset

In PTZ function, make configured preset work according to sensor input.

Please, configure preset per PTZ.

After selecting channel in preset menu, select event to work preset.

Event can select sensor,MD,Text, its preset can be configured up to 16.

6.6 Recording setup

There are 3 mode for recording – schedule recording, manual recording, event recording.
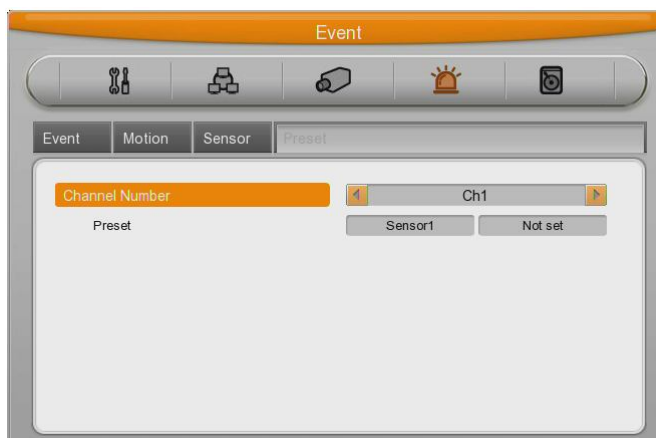
Schedule recording records according to the configured schedule. And manual recording records via pushing "REC" button and event recording records when events are on.

6.6.1 Program setup

Using [Program], adjust frame rate and quality and resolution and configure recording program for Manual&Event&Schedule.

In event recording, one channel can record up to its max frame rate and if setting 2 channels as event recording, their recording frame rate will be adjusted automatically.

Program

There are 9 programs from A to I composing recording quality and resolution per channel.
Please, refer to 3.5 program configuration value.

CH (Channel)

Display the channel figure.

R (Resolution)

There are 3 resolutions - D1(704x480), Half D1(704x240), CIF(352x240)

F (FPS)

It means frame per second and can select 1 to 30fps per second. Max. frame can be changed according to the configuration.

Q (Quality)

There are 5 recording quality - Q5/Q4/Q3/Q2/Q1. Recommended quality for event recording is Q3.

Max R/F

Max R/F shows the number of frame available according to the selected resolution. For instance,
if it is set by 30fps at CIF, it means that the channel can record up to 30frame at CIF
resolution.

Reference : how to calculate recording performance

D1[704x480] = 2 x Half D1[704x240] = 4 x CIF[352x240]

If 480 frames can be recorded at CIF resolution, instead of it, 240 frames at Half
D1 and 120frames at D1 resolution are possible.

• In case that the channel is configured as disable

  Configuration method : Menu > camera configuration > channel : "Disable" – (the channel in gray)

For example, all channels can be configured as 30fps at CIF all the same. If one channel is configured

As disable, system has resource available as much as 30fps at CIF. And if combining it with other 30fps at CIF, other channel can

  be configured as 30fps at Half D1.

• In case that the channel is configured as 0 fps.

  Another channel can not use resource room as much as CIF 30fps. It is because the channel configured as 0 fps needs 2~3fps

at least for network..

Reference : the relation in between general recording and event recording.

When Event is triggered, records event recording according to the configured value. Recording
Performance of DVR depends on the product. For example, if HVRM-T1600E is set as manual
recording at CIF 480fps and event recording at CIF 480fps, it can not be over CIF 480fps.
Therefore, it should be configured within CIF at 480fps resource.

• Event configuration value on CIF 480fps

  If you configure recording all channels at CIF 30fps, available event recording configuration
  is CIF 30fps, Half 15fps, D1 7 fps.
  If you want to configure channel no.1 as D1 30fps, you should adjust the other channel
  recording configuration.

• On event recording of multi-channel

With mulity channel event recording, if configured recording value is over the system max
performance, general recording will keep their recording configuration and event recording will
be balanced down equally.

6.6.2   Manual/Schedule recording setup

With the change of recording mode, manual recording or schedule recording can be at one's choice.

And their resolution, frame rate, quality will be in accordance with the program.
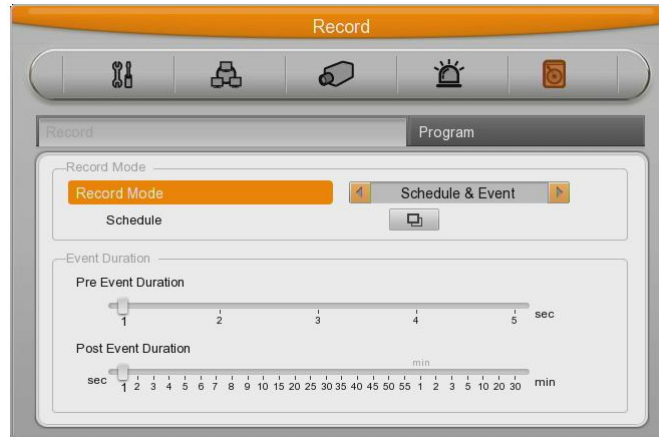
.

6.6.2.1 Manual Recording

Only in manual & event recording, manual recording runs and when pressing [REC] button, recording starts. If you want schedule recording, recording mode should be Schedule & Event.
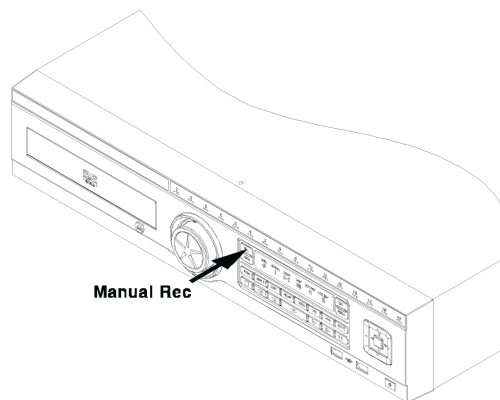
6.6.2.2 Schedule Setup

It records according to the programmed schedule automatically. Make recording mode Schedule & Event and configure day and time.

·Check and select each program default value and select one of 9 programs from A to I or Several programs.

• Program : Set recording program(A~I)

• Time : Set time applicable

• Daily : adapt selected schedule to whole day of the week.

• Delete : Delete Schedule

Configuration

If time set, the content will be shown at schedule table.

Click to schedule start and end by mouse, the schedule will be shown at schedule table.

Deletion

Click delete button after selecting schedule

Not selecting schedule and click delete button, it'll delete selected schedule first.

Edition

Select Schedule to edit and change weekday, program,time directly.

In case that Schedule 50 are all configured, select the time zone to change by mouse click and click the time again, previouse configuartion will be deleted and new configuration will be shown.

Caution : If selecting the same time twice, "!" will be shown on the chart.

When configuring time sector, previously configured time can not be included.

6.6.2.3 Event recording setup

Select resolution and frame rate and quality for event recording.

There are 4 triggers – Sensor, Motion detection, Text, Digital input.

First, select the program and check resolution and frame rate and quality of the channel.

(Refer to 6.6.1, program configuration)

Event recording can sync manual&event, Scheduel&Event.

Select among Manual&Event, Schedule&Event in "Recording mode" of [Record configuration]-[recording].

Reference : Please, check below to configure event recording.

> **1. Select one of Manual&Event, Schedule&Event.**
>
> **2. In program configuration, set frame rate by 0 fps in general mode and only**
>
>   **configure Event frame rate.**
>
> **3. Set Event applying time.**

Event Time configuration

Configure time for event recording and there are 3 modes – Always, no use, Custom.

In "Always", event works all the time and in "Custom", works during configured time.
Configuration of Custom is similar with schedule configuration and can configure weekday, time
for Event.

• Time : Set time applicable
• Daily : Adapt selected schedule to whole day of the week.
• Delete : delete Schedule

Configuration

If time set, the content will be shown at schedule table.

Click to schedule start and end by mouse, the schedule will be shown at schedule table.

Deletion

Click delete button after selecting schedule

Not selecting schedule and click delete button, it'll delete selected schedule first.

Edition

Select Schdeule to edit, and change the values.

In case of being configured by Schedule 50, click and select time to eidt and if clicking the time
table again, previous configuartion will disappear and new configuration will be shown.

6.6.2.4 Continuous Recording

Only continuous & event set can record continuously, select Continuous & Event in the menu, it starts to record.

7. Web Viewer

WebViewer is Web application program loaded to monitor real-time image or to monitor the images recorded through Web browser to PC located remotely.

WebViewer is divided into Login page and Monitor to do monitoring real-time images, Playback to replay recorded images.

7.1   System requirement

	Minimum	Recommendation
CPU	Core2Duo / 2.0Ghz	Quad Core / 2.6GHz
Main Memory	2GB	4GB
Video Memory	128MB	512MB
Display	1024*768 higher	1280*1024 higher
	With 32bit color or higher	
HDD	1GB or higher	
OS	Windows XP Professional(over SP2)	
	Windows Vista Business(over SP1)	
	Windows 7	
Others	DirectX 9.0 or higher	

7.2   Login

After input IP address that set to system, then WebViewer Login page will be connected.

Input the set of User ID & Password, click 'LOGIN' to access.

If didn't change the password in Control Center, ID and Password will be admin/12345.
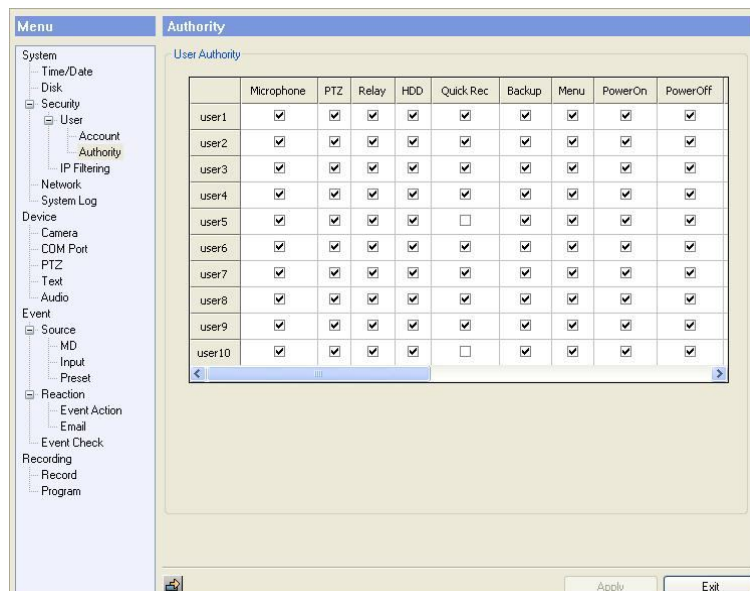ID can not be changed.

7.3   User Setup

To access WebViewer, user authority and password can be changed in DVR or Control Center configuration

In account menu, user password can be changed.
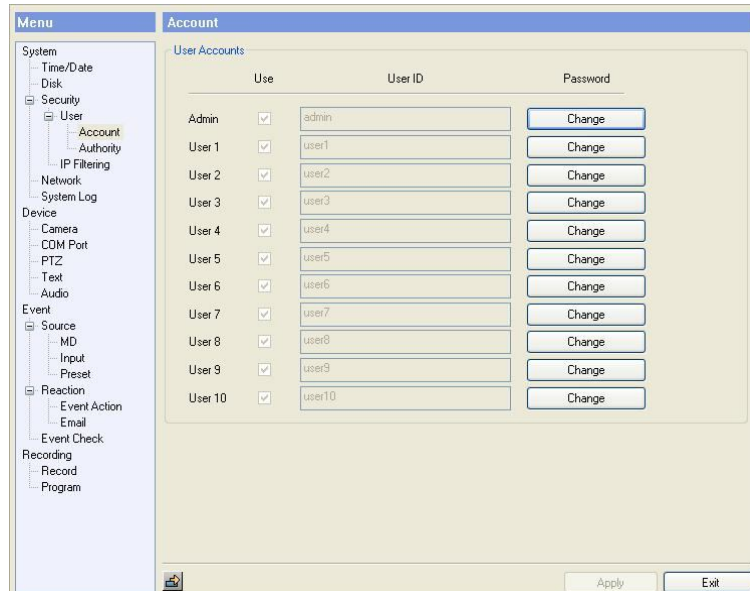
Basic admin password is "12345" and user password is like "11111{", "22222" ~~, user10 is "00000". Valid password is 5 digits.

Authority configuration is almost all the same in DVR and Control Center. But quick recording, backup, audio, yes or no of using channel are only possible in Control Center.

7.4   Browser available

WebViewer is optimized to Windows Internet Explorer 6.0 or higher in PC for smooth use.

Webviewer Installer

Login page provides manual installation program to use WebViewer function.

PC that access to WebViewer first installs ActiveX to use WebViewer's function. At this time when installation is not smooth, installation program needs to download from Login Page and install manually.

Caution

When install WebViewer Installer, it must close all program related to Control Center. It might not be efficient to install.

7.5   Monitor
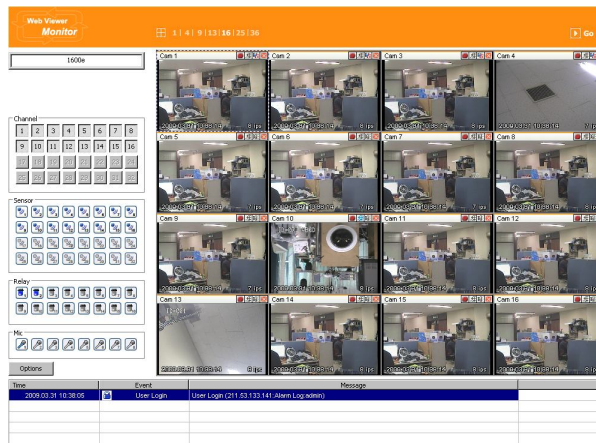
When it is authorized with User ID & Password input at Login page, it moves to monitor page. At Monitor page, monitor real time image of cameras connected to DVR, or it can control PTZ camera, Relay, and use Microphone function according to user's authorization.

Study introduction of each Monitor part and functions of the page.

7.5.1   Screen division and changing video position

When access to first monitor page, it is displayed into 9 divisions, 16divisions or 32 divisions according to number of channel.

It can to change to 1, 4, 9, 13, 16, 25, 36 divisions by click number on top of page.

Also, it can change to 1 channel mode by click any one of channel image.
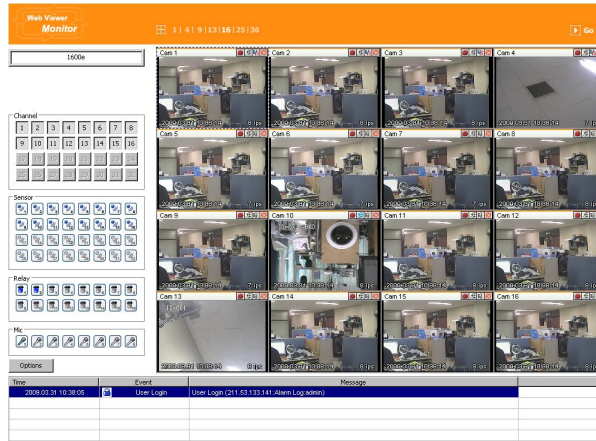
Double click on one of the playback screen to convert in 1 channel mode.
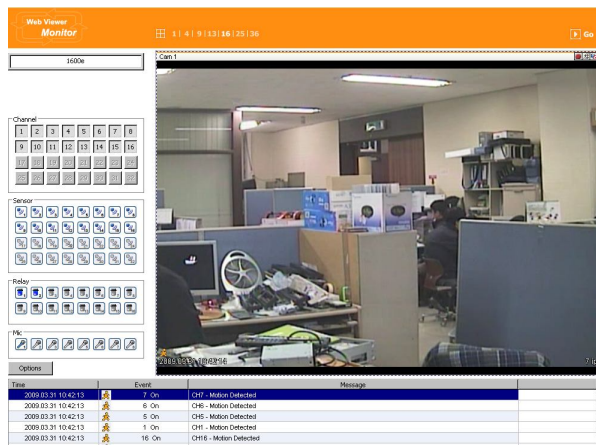
After conversion to 1channel mode, double click on screen to return to previous division channels.

At division screen, it can change screen location.

If 3channel image moves to 6ch, drag 3ch image and drop on 6ch location so as to exchange between 3ch and 6ch image

7.5.2   Move to Playback

Move to playback with clicking the above image.

7.5.3   Channel On/Off

It is On/Off button for the Channel located to left in page. Click the channel wanted to on or off. And Default is on.

7.5.4   Sensor Indication

The icon indicates when sensor occurs in system

When it sensors, relevant sensor icon comes to Red, and indicates sensor number of video.
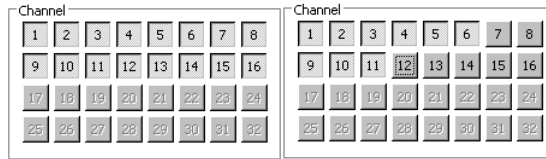
7.5.5   Relay operation

It can on or Off Relay of the unit. Click the number button to activate Relay On, then the icon changes from Blue to Orange color.

Disabled Relay button refers to do not support and relate to this unit.

Relay is need user's authority. Refer to user manual in the unit for the setup of User's authority of Relay.

7.5.6   Using Microphone
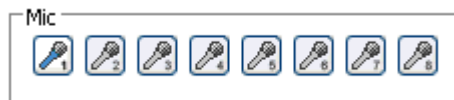
It can on or off the use microphone. Default is off and it is changed from the Blue to Red when click the button for the use Mic.

7.5.7   Event Data

2009.03.31 10:42:13	🏃	7 On	CH7 - Motion Detected
2009.03.31 10:42:13	🏃	6 On	CH6 - Motion Detected
2009.03.31 10:42:13	🏃	5 On	CH5 - Motion Detected
2009.03.31 10:42:13	🏃	1 On	CH1 - Motion Detected
2009.03.31 10:42:13	🏃	16 On	CH16 - Motion Detected

It shows real time event data occurred at the bottom of monitoring page.

Indicated Event data list are as follow..

(Table, Event Icon)

Icon	Function
🏃	Motion Detect On
🔵, 🔴	Sensor Input
🔵, 🟠	Relay Output On
📷, 📷	No Video, Video Detected

7.5.8   Video Recording & Save Saving

7.5.8.1   Video Recording

During monitoring, it can record max. 10 minutes of video by click Quick Recording button "🔴".
During Quick Recording, recording time is indicated on video.

During video recording, if click Quick Recording button "🔴" to stop recording and open the dialogue box to store recorded files. At this time, user can save it to the directory with any file name by user.

Saved recording file is saved into "*.re4" file format. re4 file can playback through Control Center Playback program or Mini Player program.

7.5.8.2   Saving Video

There are 3 types for saving Video - jpg, bmp, eye, saving means the function to record 1 frame of current monitoring channel.

To save video, select the channel and click right button of mouse. And select "Save As" and point out the location and press Save button.

7.5.9   Using PTZ

Among the icon on top of video on monitoring, click 'PTZ' to activate interfacing to control Pan, Tilt, Zoom, and Focus. But, when PTZ camera is connected and ready to set PTZ, the button is activated to use the functions.

Pan, Tilt Control

Mouse is on the image and click right button to pop-up menu for the selection or "PTZ" or 🔵 button. Then it show Cross line on the middle of screen and click image to operate Pan, Tilt. At the middle click Left/Right direction to control Pan, and Click Up/Down direction to control Tilt. Click as far from the middle to activate Pan/Tilt faster.

Zoom, Focus Control

Move mouse to the edge of left & right to see slide bar for Zoom, Focus.

The unit Area Zoom In available has Zoom Zero operating button. It can zoom in/out using slide bar at left of image, left slide bar can control Focus.

Move to Preset

In case of Preset set, Mouse on image press right button for pop-up menu and "Go to Preset" is indicated additionally. When select Preset list, it moves to Preset position selected. Preset should be set up by user in advance.

Activating Auxiliary

In case of Preset set, "Auxiliary" is indicated additionally, and it operates action when select registered menu.

Reference

Supported PTZ camera list can be refereed to '4.8 PTZ manipulation.

7.5.10   Using Audio

In case of Channel setup sync with Audio, press right mouse button on the image to activate pop-up menu to "Listen" or activate Audio listen button. First default is Mute. In case of listening Audio, select pop-up menu or button. After cancelling mute, control audio volume. It can mix several channels of audio

7.5.11   Closing Video Channel
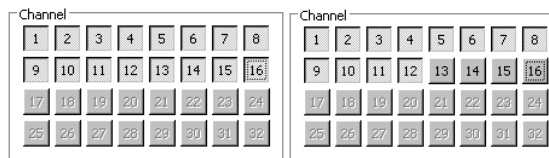
Cancel for disconnection of image monitoring by click 'Close' at top right on screen, then it comes to black screen.

To reconnect the channel disconnected, it can reconnect relevant channel using 'Channel On/Off' menu.

7.6   Playback
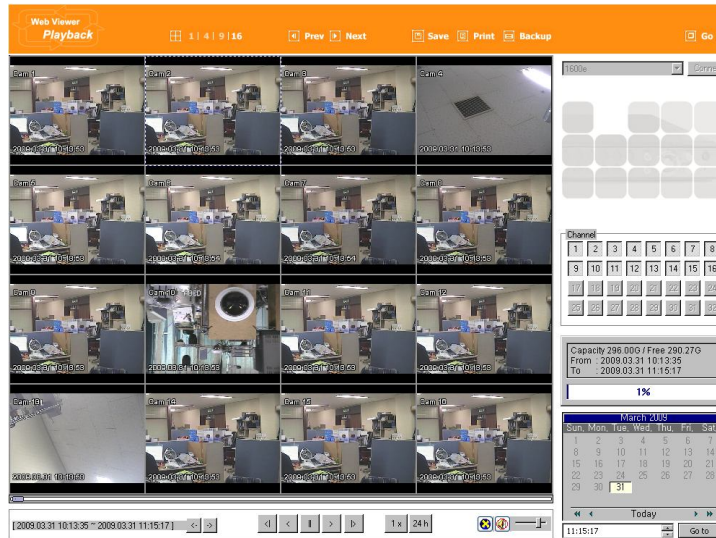
This page is to playback recorded images, and user who has authority of 'HDD' among user ID or administrator can use this function.

Playback that is made up 16 divisions can play the images by searching through colander by recording period and moving the period. It can backup recorded image and also print Pause image or save to Bmp file.

7.6.1   Video Division & Changing Channel

Playback supports 1, 4, 9, and 16 divisional screens. It can select division using menu on tip of page as above picture. 32ch DVR can call the channel using Group moving button as follow.

If screen shows 4 divisions CH1~CH4 and look for next CH5~CH8, it can change the channel with click 'Next' button. Press 'Prev' button to call for previous channel group CH1~CH4.

7.6.2   Image recording

It can save playback image to BMP file.
Click mouse to channel to save. Dotted line will be surrounding to the selected channel, and click 'Save' button.
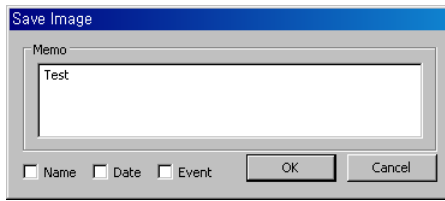
Save Image dialog box appears, then it can input message or select channel name, date, event data.

Press 'OK' to open dialog box for the saving location, then save bmp file.

7.6.3   Print

Select image with mouse for the channel to print image saved, and then click 'Print' button.
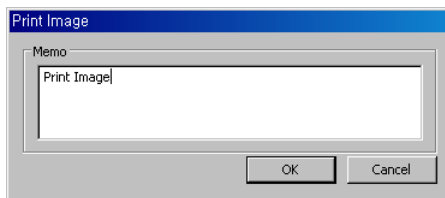
Window comes to input Memo, and click 'OK' button to print the image through the printer connected.

Print material includes 'Printing Date', 'Channel name', 'Recording Date' 'Event', 'Memo'.

7.6.4   Backup

There are re4 (Multi channel) and avi(single channel) Set From, To time and select the channel for backup

Point out the location for backup. Input in Password/Verify.
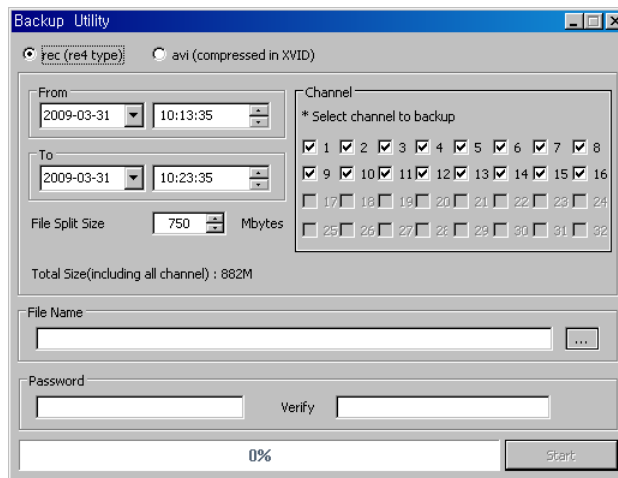
7.6.5   Web Monitor

Click 'Go' button at top of page, and it can move Web monitor page.

7.6.6   Channel On/Off

It is the same function like Channel On/Off function at Web Monitor.

It is Channel On/Off button located on right of Page, and click on or Off page for wanted channel. Default is on.

Disabled Channel button refers to do not support and relate to this unit.

7.6.7   Saving time & Checking Rec, Capacity
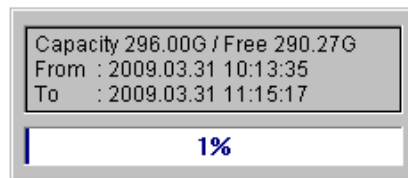
It indicates total capacity of HDD & remains and shows Starting date & Last date of recording. Also it shows percentage (%) for HDD capacity.

7.6.8   Searching Calander
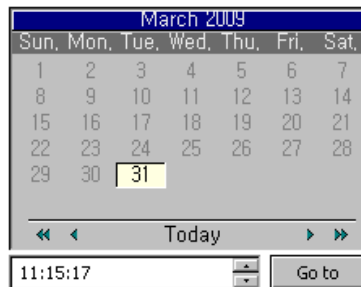
Recorded date is abled in black color, and others unrecorded date disabled in grey. Select button after select date & time so as to playback images on the date & time selected.
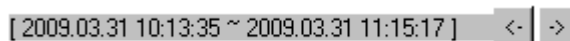
When click 'Go To' button, it indicates for 24hours from the time selected at left bottom. As above picture, it is possible to change the time zone with '24h' button

---

7.6.9 Functional function at the bottom of monitor

① Indicates playback range of recorded image.

② Press ⟨⟨·⟩⟨·⟩ button as the time set at (5) so as to change the time zone to playback in forwarding and backwarding.

③ From left button, it can 'Move a frame back', 'Play backward', 'Stop', 'Play', 'Move a frame forward'.

④ It is the function to set play speed. After click the button, it can set the play speed '0.5x, 1x, 2x, 4x, 16x, 32x, 64x, and All'.

⑤ It is the function to set play area. After click the button, it can select play area '10min, 30min, 1hour, 3hour, 6hour, 12hour, 24hour'.

⑥ It can select DirectX use or not. If check DirectX mode, it can play image into Direct Draw based on graphic card and performance of PC.

⑦ It is the function to set audio play or not, and volume.

8 JAVA Viewer

Java viewer is a web viewer to use in Java.

Java should be installed in login screen to use Java viewer.

After an installation of Java manually, select "Java" in below of Password window and login.

Then single screen of video channel 1 is displayed

Multi-screen display, Event, Relay can be used in Java viewer.

To change Multi screen display, click 1,4,8,16 in right side.

9 User manual for Mobile Viewer

Mobile viewer is viewer service to monitor video via mobile device.

To access mobile viewer, user uses mobile device supporting Wi-Fi or smart phone or 3G.

9.1   Log-In page

Below picture is Mobile viewer log-in page.

To access log-in page via mobile viewer, please, type the address like http://IP/mvmenu.html.

Below image is accessed login page to http://211.53.133.187/mvmenu.html .

To do log-in, please, enter ID/PW and select Resolution and channel number and cycle and push [0] Start View button.
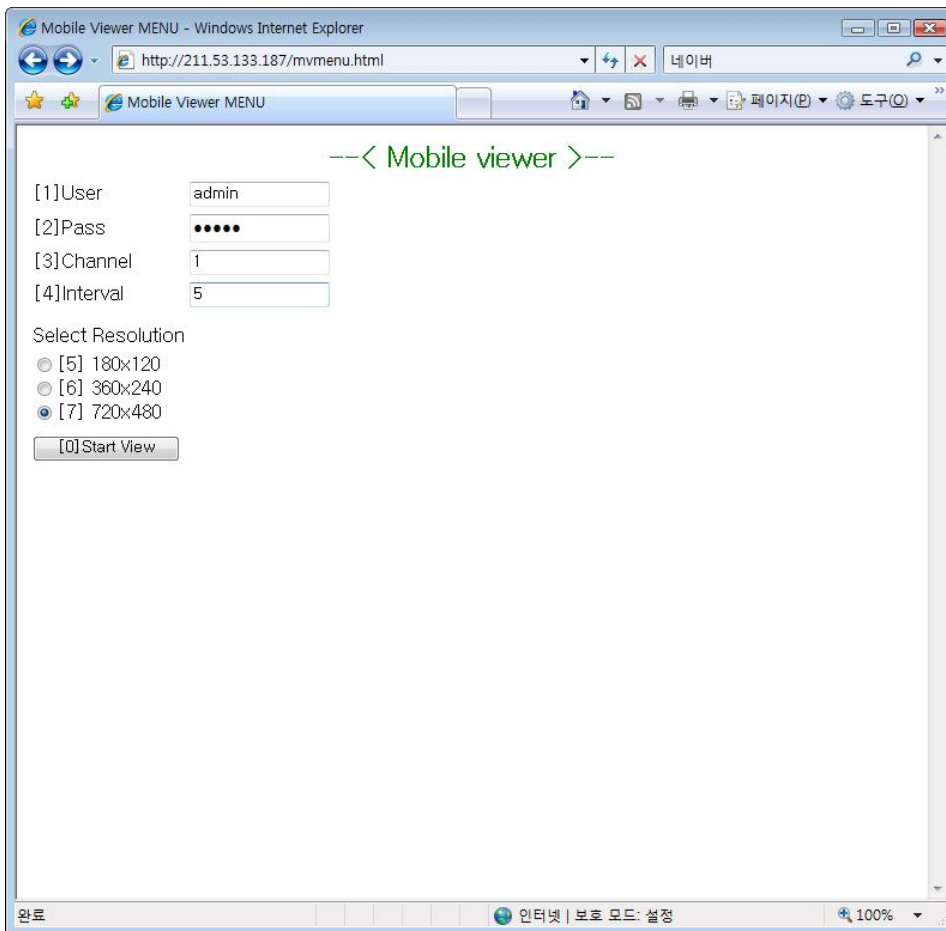
9.2   Monitoring page

This is the page on Log In.

It shows selected channel video and functions right below the screen.

For functions, please, refer to the below.
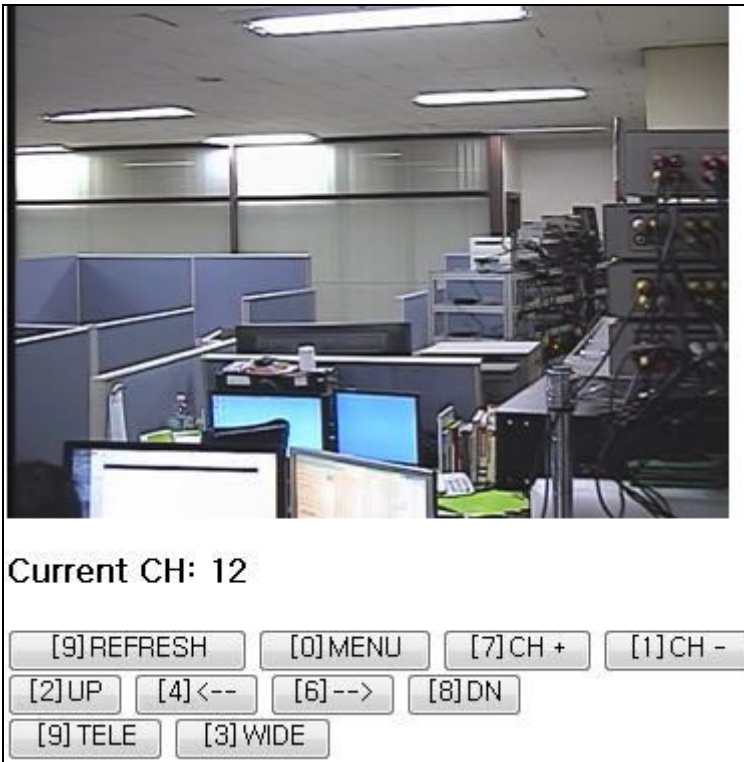
[0] MENU : Move to Log In page

[1] CH- : Move to the previous channel.

[2] UP : Move to upside of Pan Tilt movement

[3] WIDE : Zoom Out action

[4] ← : Move to left side of Pan Tile movement

[6] → : Move to right side of Pan Tile movement

[7] CH+ : Move to the next channel

[8] DN : Move to downside of Pan Tilt movement

[9] TELE : Zoom In action

Trouble shooting

1. DVR booting failure
1. Check the power
2. Check Power cord

2. No video on monitor
3. Check monitor power
4. Check cable between DVR and monitor
5. Check monitor cable port
6. Check DVR power is off
7. If monitor video is gray mode, check the camera type(NTSC/PAL) and reboot.

3. No video in some of channel
8. Check Camera power
9. Check Camera video input
10. Check DVR input port
11. Check On/Off of Activity configuration of Screen
12. Check Covert configuration of Monitor

4. No recording
13. Check Disk Manager if HDD is mounted or not
14. Check recording configuration

5. No playback
15. Check recording configuration
16. Check button

6. If video is too much bright or dark
17. Check Camera configuration
18. Check and dismantling power cable near video cable.
19. Check Brightness, Contrast of screen

7. Remote controller is not working
20. Check Remote controller battery
21. Check Remote controller ID
22. Check Remote Controller manipulation

8. If front button is not working
23. Check DVR Power
24. Check Screen Lock

9. If network is not working

25. Check if Network cable is connected

26. Check DVR IP

27. Check Computer IP

28. Ping Test

29. Check PC specification if Webview video is not shown.

10. The cases necessary to contact the shop

30. In case of extraordinary working(ex: noise, smell or fume)

31. Connector breakage of power cable

32. In case that rain or water is in the product

33. In case that liquid or foreign is in the product

34. If the product is not working in accordance with the manual.

35. In case of breakage from product dropping

36. In case that product performance drop dramatically

The way to check the manufacturing date

It can be checked with its S/N(Serial Number)..

S/N : Serial Number

It means composite 12 digit number with product model name and production year, month, and week. It can be found on the attached label attached on the bottom of product or system info of configuration tool or system information 1 of DVR Func menu.

Serial Number Structure
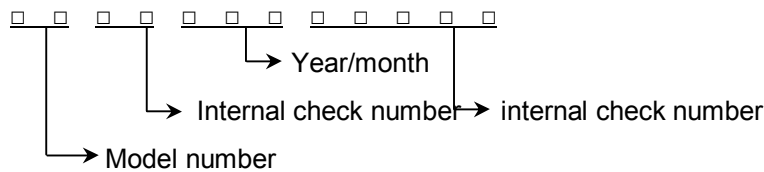
(1) 1~2 digits: Identify Model name of product

(2) 3~8, 8~12 digits : Hunt internal number

(3) 5~6 digits : Manufacturing year

(4) 7 digits: Manufacturing month

     Please see the below table for manufacturing month.

.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	3	4	5	6	7	8	9	A	B	C

The example of verifying manufacturing date using serial number

The below S/N can be verified as following as:

『**EB0009200707** 』

(1) "EB" means "HVRM-T1600E".

(2) "092" means it is produced in "2009 Feb"

(3) "00707" means the serial number.

Available HDD

Please ask to seller about HDD available with DVR.

Compatible CD/DVD list

DVD-R manufacturer	CD-R Manufacturer
Mitsubishi(×16 recommended)	Mitsubishi(×52 recommended)
TDK(×16 recommended)	TDK(×52 recommended)
Imation(×16 recommended)	Imation(×52 recommended)
Sony(×16 recommended)	Sony(×48 recommended)

Specification

Video input	
Video input standard	NTSC or PAL auto detect
Connectors	16ch analog video inputs BNC connector
Loop out	Auto terminated loop out
Main Video output	
Vout 1,2	output via BNC & DVI(VGA) 1,4,9,10,16 mode User defined sequence / alarm pop-up 1920x1080, 1280x720, 1024x768, 800x600 at DVI port
Vout 3,4	output via BNC 1,4,9,10,16 mode User defined sequence / alarm pop-up
Recording	
Compression	H.264 / JPEG
Resolution	CIF/Half(2CIF)/D1(4CIF)
Rate	MH1600H : 480 at D1 MH1600M : 480 at HALF MH3200M : 960 at HALF
Quality	5 levels
Mode	Manual & Event Schedule & Event

	Continuous & Event
Schedule	24hrs / 7day
Playback	Instant playback / Search
Mode	<u>Speed</u>
Search Type	Time, Calendar, Event, Thumbnail
Block Playback	0day ~ 99days
Event & Alarm	
Event source	MD, Sensor, Text
Event check schedule	24hrs / 7day
Event Action	Relay, E-mail, Buzzer, Twitter, FTP
MD Area	22x15(NTSC), 22x18(PAL)
Sensor input	dry contact (N.O. or N.C. selectable)
Text input	POS/ATM support, AVE VSI Pro/Hydra support
System Alarm	
Alarm source	HDD fail, HDD almost full, Fan fail, Pwd fail, DDNS fail
Alarm action	Warning message, buzzer, e-mail, relay
Audio	
Input/output	4 RCA input, 12 D-Sub input, 1R CA output
Compression	16KHz, 16bit sampling ADPCM
Direction	Both
PTZ	
Protocols	32 models including Bosch, Pelco, Sony, Merit-lilin, Honeywell
Network	
Interface	1 10/100 Ethernet
Type	Fixed IP, Floating IP, xDSL
DDNS	supported
Bandwidth Limit	supported
NTP	Server/Client/Both
Users	10 monitoring, 2 playback
Streaming	1 H.264 same as recording 1 additional H.264 smaller than recording 1 JPEG for e-mail sending or mobile
Security	
User Level	1 admin, 10 users

User privilege	Menu, PTZ, Relay, PB, Power on/off, Backup
IP Filtering	supported
Storage/Backup	
Storage Devices	4 internal SATA HDDs, 1 external eSATA I/F NVS04R
File System	Proprietary file system, data-loss protection against power-failure
Capacity	Max 32TB with NVS04R
Backup type	multi-channel or single channel avi file
Backup device	internal CD/DVD or USB drive
S.M.A.R.T.	Temperature and Health
Serial & I/O	
Serial port	1 RS-232C, 2 RS-485
Sensor input	16 dry-contact
Relay output	4 relay
Controller	
Device	Front panel, IR remote, Joystick KBD, Mouse
Software	
WebViewer	Monitoring / Playback
Mobile Viewer	Monitoring with PTZ, iPhone & BB supported
CMS	Control Center Standard, max 1000 clients
SDK	ActiveX(COM) SDK
Environmental & Physical	
Dimension	W : 445.0, L : 417.8, H :88.0
Operating temperature	Operating: 41 ~ 113 degrees F.
Power	AC free volt (100 ~ 240VAC)
Power consumption	Max. 75W Typical 50W

Product Dimension

MH1600H
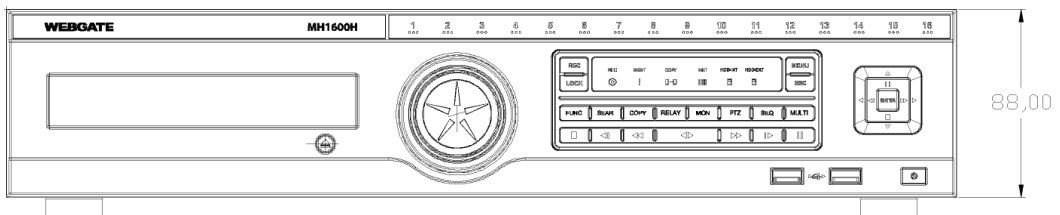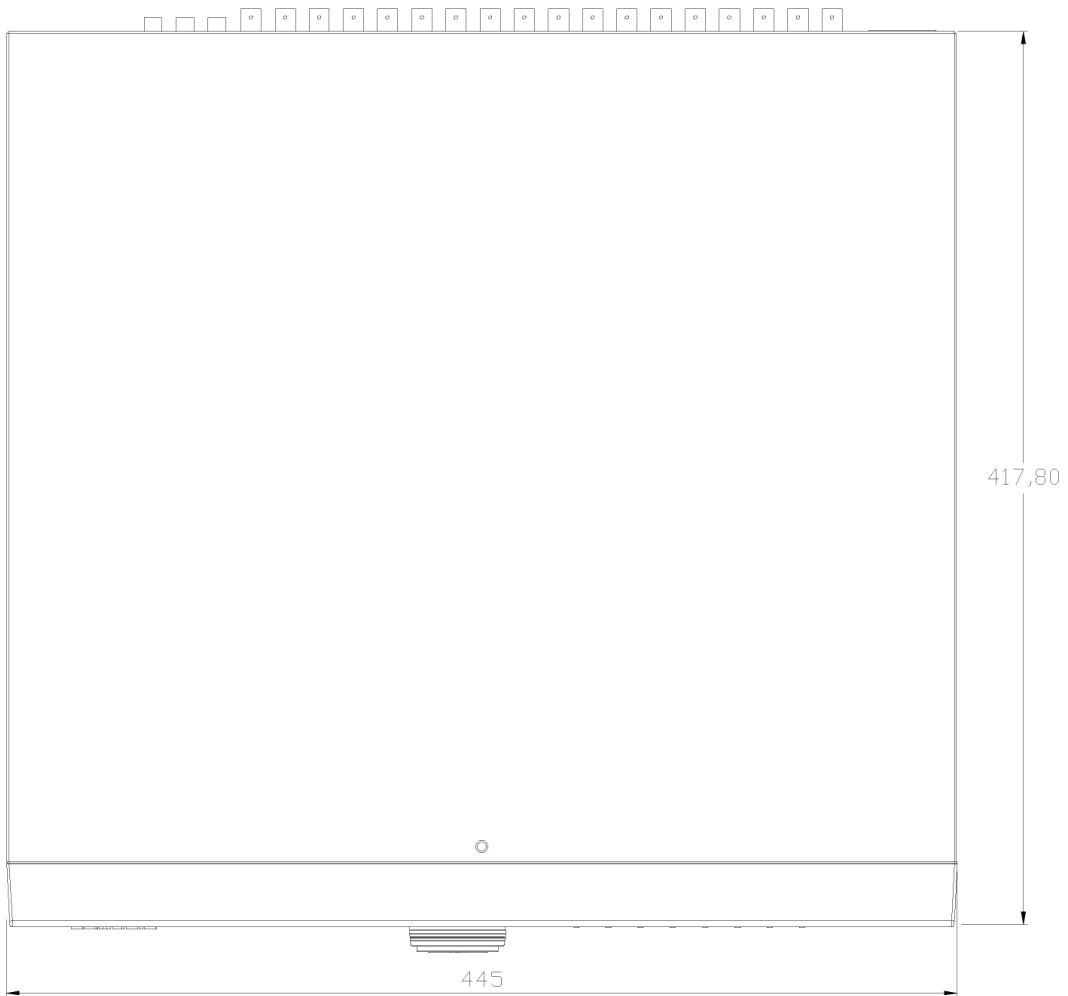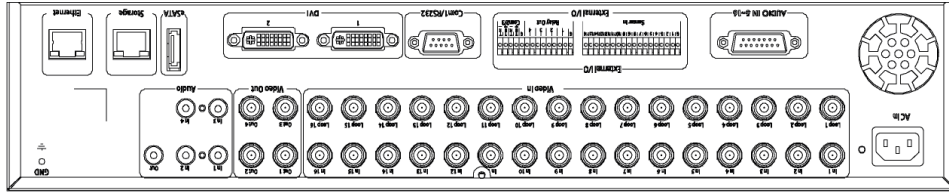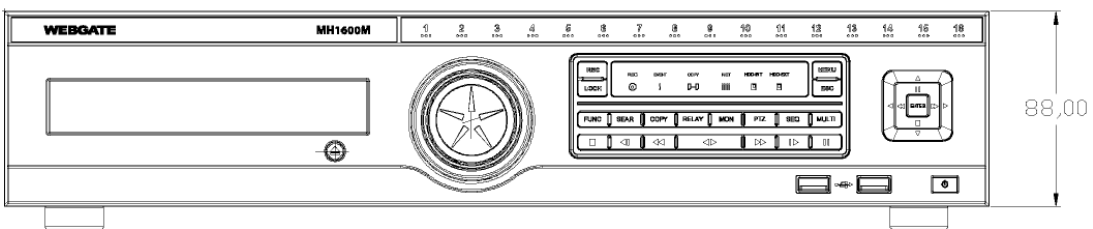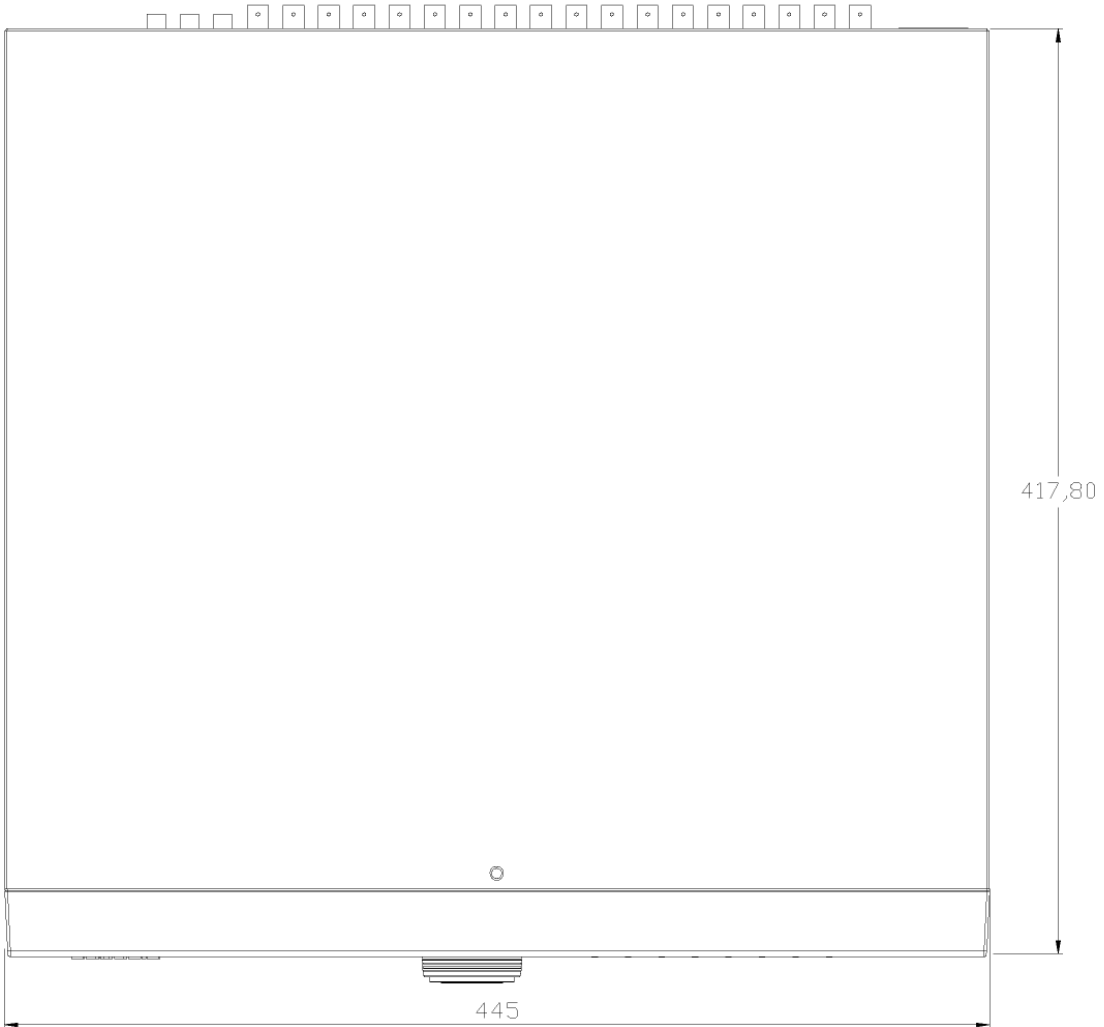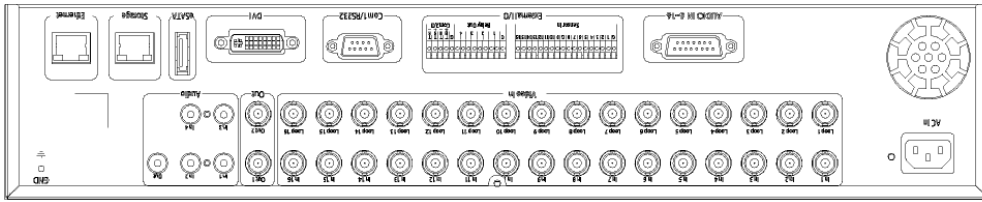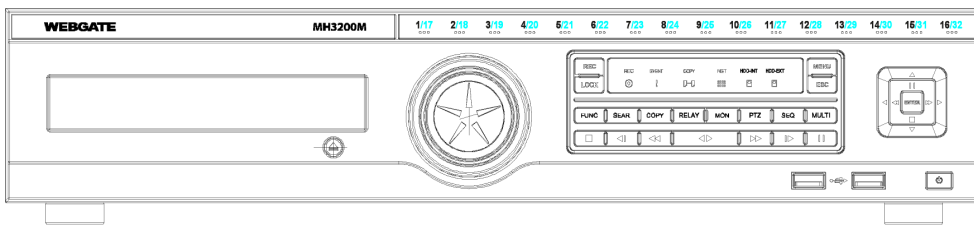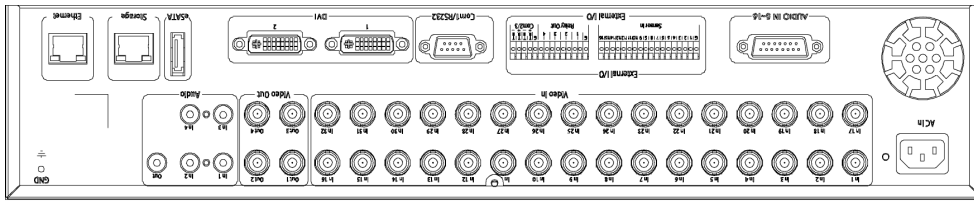
417,80

445

88,00

MH1600M

MH3200M

417,80

445

WEBGATE   MH3200M   1/17 2/18 3/19 4/20 5/21 6/22 7/23 8/24 9/25 10/26 11/27 12/28 13/29 14/30 15/31 16/32

WEBGATE

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