NVR

R3 Series

FWR303-00N / FWR303-04P / FWR303-08P

User Manual ver.1.1 / 2014.1

FCC Compliance Statement

Model Name: FWR303-00N / FWR303-04P / FWR303-08P

This device complies with Part 15 of the FCC Rules. Operation is Subject to the following two conductions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operations.

■ WARNING

Unauthorized reproduction of all or part of this manual is strictly prohibited.

The figures in this manual are for illustration purposes only (may differ from the actual product).

The specifications and design of the product are subject to change without prior notice for purposes of quality improvement.

■ CAUTIONS

To get the best use out of the product, be sure to read the cautions before using the product.

For safety, please take note of the following.

- **Instructions before using the product**

1 To prevent electric shock when installing, moving, or opening the NVR and peripheral devices, connect and disconnect the cables as instructed. All cables must be connected to grounded power outlets.

2 If the product is installed near a power outlet, make sure it can be unplugged easily.

3 Do not use the NVR in water or in wet places.

4 Keep the plastic packing materials used for the NVR or other peripheral devices out of reach of children (may cause suffocation).

- **Installation Environment of the NVR**

1 Maintain the following conditions: operating temperature of 5˚C ~ 40˚C; operating humidity of 10% ~ 80%.

2 Install the NVR in a safe place that is free from external vibration.

3 Install the NVR in a well-ventilated place.

4 To protect the hard disk from data loss and breakdown, install the NVR away from magnetic materials.

5 When using a rack other than the standard one, use a separate table with sufficient spacing, i.e., 60cm from the floor, 50cm from the ceiling, and 20cm from the side and back walls and other objects.

- **Safety Notes on the NVR**

1 When installing additional boards and HDD, separate the power cable and turn OFF power supplied to the NVR completely..

2 Keep the product away from heat-generating devices such as heaters.

3 Do not use a damaged power cord.

4 To prevent problems due to magnetic interference and electric surge, use only grounded cables and power outlets.

5 If the power cord is connected, do not touch the power unit. If the power cord is connected, electric current is still flowing internally even after the switch is turned OFF.

6 Do not place a heavy object on top of the product.

7 Do not drop a conductive object in the ventilation holes.

8 Allot sufficient space for system cabling.

9 Use only the parts indicated in the manual. Do not disassemble, repair, or modify the product without permission.

10 Incorrect system setup may cause malfunction.

11 Shut down the system normally as instructed in the manual.

- **Safety Notes on the Lithium Battery**

1 Replace lithium batteries as instructed to avoid danger.

2 Dispose used lithium batteries properly.

【Warning and Caution are indicated as follows.】

	Possible injury or product damage.
	Risk of minor injury or product damage.
	Cautions for the usage of the product.
	Information for the usage of the product.

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Chapter 1 . Introduction

1-1 NVR Model Major Features

Line Up		NVR
Model Name		FWR303-00N / FWR303-04P/ FWR303-08P
System	OS	Embedded Linux - Built in flash memory
	Access	Mouse, Remote Controller, Network, Key controller
	Hexaplex	Live monitoring, Recording, Playback, Backup, Network, Setup
	Upgrade	USB2.0 Memory stick, Network
Camera	IP Camera	ONVIF
Video	System	NTSC / PAL - Config switch
	Input	Up to 16 Channel
	Display Rate	Max. 120 / 100 fps
	Output	1 HDMI, 1 VGA, 1 BNC
Audio	Input / Output Interface	16 IPC / HDMI
Video Recording	Compression	H.264
	Speed	Max. 1080p 120
	Resolution	1080p, 720p
	Event	Motion, Sensor
	Bit Rate	Max. 8Mbps / Channel
Playback	Search	Go to first rec. time, Go to last rec. time, Go to last search time, Calendar, Log viewer, Smart search, Multi-time & Multi day search, Event search
	Mode	Event only playback, Backward, Pause, Frame by frame, Speed up (x1 ~ x32, x300)
Network	Interface	Ethernet 10 / 100 / 1G
	Compression	H.264 / JPEG
	Speed	Max. D1 10fps / Channel
	Resolution	Max. 1080p
Backup	Interface	USB2.0, Network
	Format	Video clip (Backup viewer), JPEG Still Image, Log list, Setup data
Alarm	Pre/Post-Alarm	5sec / 5sec~5min
	Motion Grid	14 x 15 (NTSC / PAL)
	Alarm Action	E-mail, Channel Popup, Buzzer, Relay, PTZ Preset, Remote CMS, Front LED
	Input / Output	4 / 1 – NC / NO / EOL
Display	HDMI / VGA	Full HD
	TV	SDTV(720 x 480 / 576)
	Mode	16 / 9 / 4 / 1 / SEQ - LIVE, 16 / 9 / 4 / 1 - P.B
External Interface	PTZ / Keyboard	★ 2 RS485 - Terminal Block
	ATM / POS	★ RS232C - Terminal Block

Storage	Primary	2 HDD
	External	1 e-SATA
	ODD	N/A
Features	EOL Register(10K)	★ 4Ch
	Digital Zoom	x1 ~ x16
	Watermarking	Yes
	Detection / Search	Motion, Sensor
	Fan Fail	Yes
	E-mail	5 User with still image
	Capture	1080p
	iSCS Recording	Yes
	DDNS, DHCP, UPNP	Yes
	CMS, VMS, RMS	Windows
	Smart Phone (3G)	Android, iPhone, iPad
	Mac Viewer	★ Apple Mac OS
General	Power Supply	12V/5A - Level 5
	Consumption	60Watts
	PoE Consumption	FWR303-08P : 48V 2A FWR303-04P : 48V 1A
	Operation Temp / Humidity	5 ~ 40 ℃ / 10 ~ 80%
	Dimension	340 x 59 x 300 mm
	Certification	CE, FCC, RoHS Compliance

1-2 Components

After unpacking the product, check whether following accessories are included.

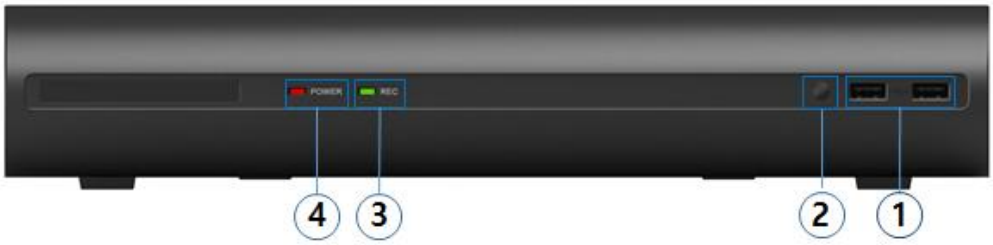
- Remote Controller
- CD (CMS, CMS Manual, User Manual)
- AAA 1.5V Batteries 2ea
- Adapter (DC 12V / 5A)
- PoE Power Adaptor (PoE model) – FWR303-04P (DC 48V 1A) FWR303-08P(DC 48V 2A)

  FWR303-04P: Up to 30w for each channel, total Max. 40w (IEEE 802.3at);

  FWR303-08P: Up to 30w for each channel, total Max. 80w (IEEE 802.3at);

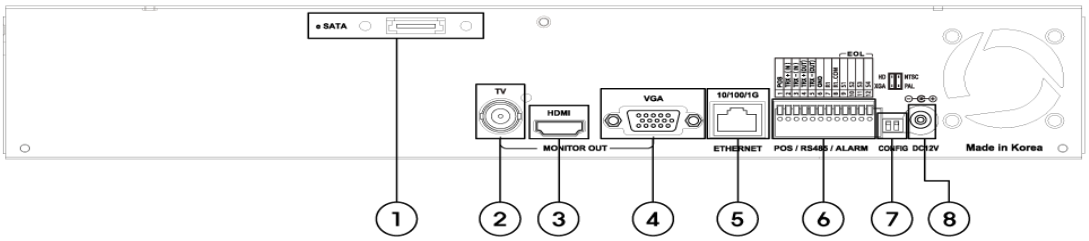
Chapter 2. Installation & Device Connection

2-1 NVR series Front Panel

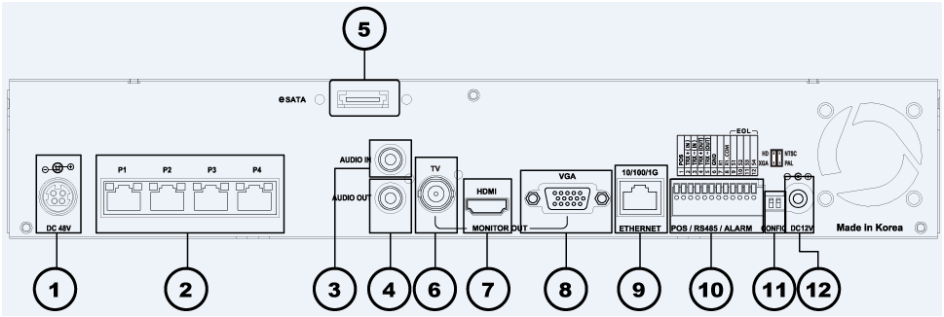


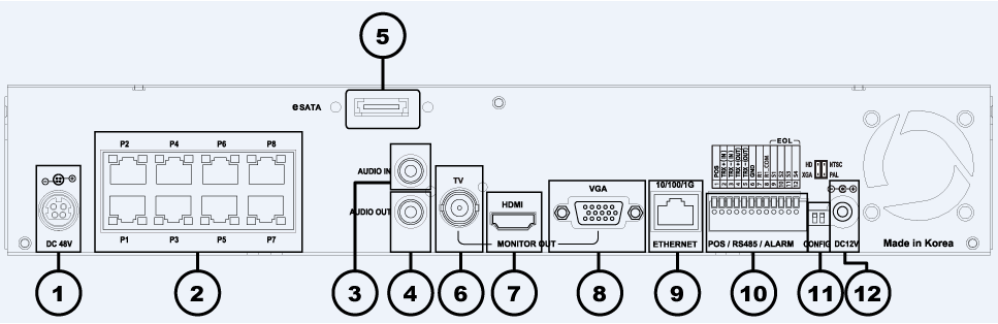
No.	Name	Feature
1	**USB Port**	USB Mouse, USB Memory Stick Connection Port
2	**LABEL**	Brand Name and Model Name
3	**POWER LED RECORD LED**	LED indicating Power On/Off
4	**RECORD LED**	Blue LED turned on upon HDD operation.

2-2 NVR series Rear



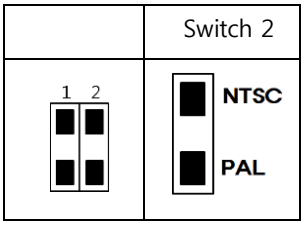
No.	Name	Feature	Type
1	e-SATA	External SATA	USB Type A, e-SATA
2	TV	CCTV monitor displays the output images.	BNC
3	HDMI	HDMI Output	HDMI type-C
4	VGA-OUT	VGA Monitor or LCD Monitor Connection	D-SUB 15P
5	Ethernet	Cable Modem, Ethernet 10/100 Base-T, Network Connection	RJ-45
6	Terminal Block	RS-485 / SENSOR IN / RELAY OUT / POS	Terminal Block
7	CONFIG	NTSC/PAL , HD / XGA	DIP S/W, 2-pin
8	Power	DC 12V 5A 60 Watts	DC Jack



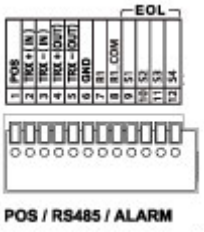


No.	Name	Feature	Type
1	PoE Power	FWR303-04P: DC 48V 1A FWR303-08P: DC 48V 2A	DIN Jack
2	PoE Port	IP Camera Connection	RJ-45
3	Audio In	Audio input	RCA
4	Audio Out	Audio Output	RCA
5	e-SATA	External SATA	USB Type A, e-SATA
6	TV	CCTV monitor displays the output images.	BNC
7	HDMI	HDMI Output	HDMI type-C
8	VGA-OUT	VGA Monitor or LCD Monitor Connection	D-SUB 15P
9	Ethernet	Cable Modem, Ethernet 10/100 Base-T, Network Connection	RJ-45
10	Terminal Block	RS-485 / SENSOR IN / RELAY OUT / POS	Terminal Block
11	CONFIG	NTSC/PAL , HD / XGA	DIP S/W, 2-pin
12	Power	DC 12V 5A 60Watts	DC Jack

2 - 3 Configuration Switch Setup



2 - 4 Terminal Block



The terminal blocks in the rear of the product are for the connection of PTZ / Sensor / Relay / POS Connection. The number of the terminal block may be different depending on the model.

① PTZ Camera/Keyboard Controller

Connect PTZ control cable; TRX+, TRX- and GND to Terminal Block (TB1); No.4 TRXD+, No.5 TRXD- and No.10 GND in the rear of NVR. You may refer to APPENDIX for supported PTZ cameras in this manual. Keyboard

controller has the same connection as PTZ camera.

② Sensor / Relay / POS

Connect Sensor / Relay / POS to the terminal block directly depending on the model.

	Sensor and Relay Type NC(Normal Close) : Normally closed; opens when a signal is received NO(Normal Open) : Normally open; closes when a signal is received

The external alarm device may require the power supply depending on its type. Be cautious.

Chapter 3. Operation, Setup Tools

NVR Model can be controlled easily by using the front panel, remote controller and mouse.

3-1 Remote Controller

	POWER	Turn the system power ON or OFF.
	MODE	
	FULL	1CH Mode
	QUAD	4CH Mode
	9 SPLIT	9CH Mode
	16 SPLIT	16CH Mode
	SEQ.	Sequence Mode ON/OFF

B) System Operation and Setup Button

	MENU	Data, Schedule, System Set up
	ESC	Exit the current menu Move to the upper menu.
	PREV	Move back (Reverse)
	PAUSE	Pause
	FORWARD	Move forward
	BACKWARD	Playback

	PLAY	Play

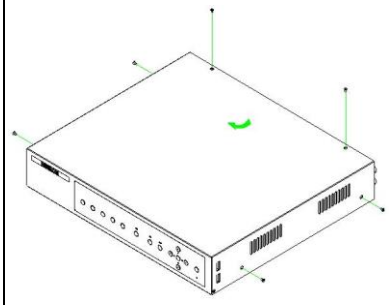
3-2 Mouse

The mouse pointer as shown below appears if a mouse is connected to the USB terminal at the front panel.

	Mouse Control functions are shown below.	
	Click on the right button	Monitoring Mode / Move from Play Mode to Monitoring Menu / Pop up or remove Play Menu. Show sub-folder of the certain Menu window.
	Click on the left button	Select Menu.
	Double click on the left button	Select Menu.
	Click the left button and drag	Move a certain window.

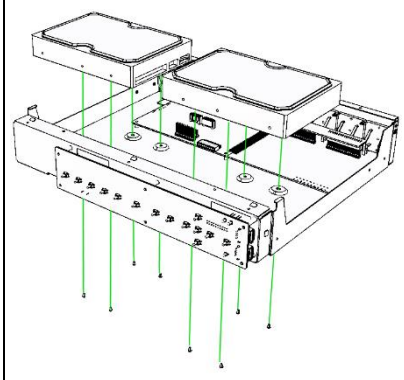
Chapter 4. NVR Operation Setup

4-1 Storage Installation



1) Open the top case by using screw driver.

Caution	1) Normal termination of the system and fully unplugged power code are required before conducting HDD installation. 2) Touch a grounded metal substance or ground yourself before installing HDD in order to reduce static electricity. Static electricity may cause a malfunction of the product. 3) After installing HDD, Do not connect to power supply with the top case opened. The top case must be covered before usage.



2) Unscrew and separate the HDD bay from body.

3) Screw the additional HDD bay to current HDD bay

4) Connect HDD to HDD connector on the main board directly without cable.

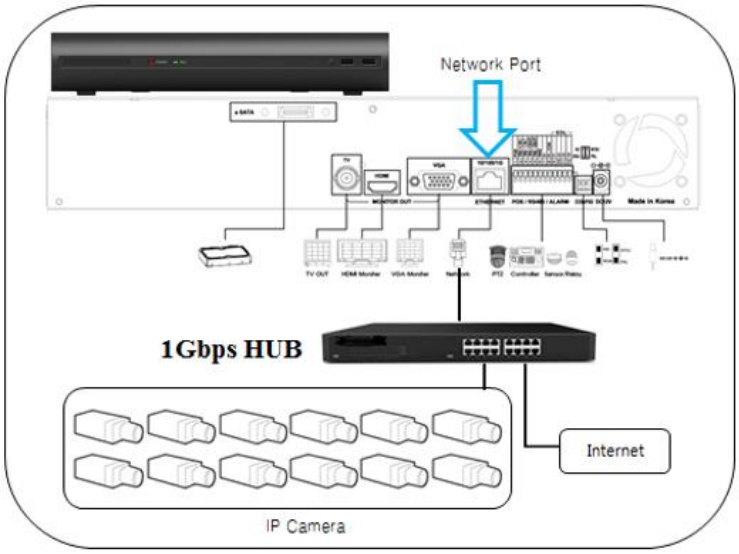
Reassemble the top case by reversing 1) to finalizing HDD installation.

4 - 2 Network Setup

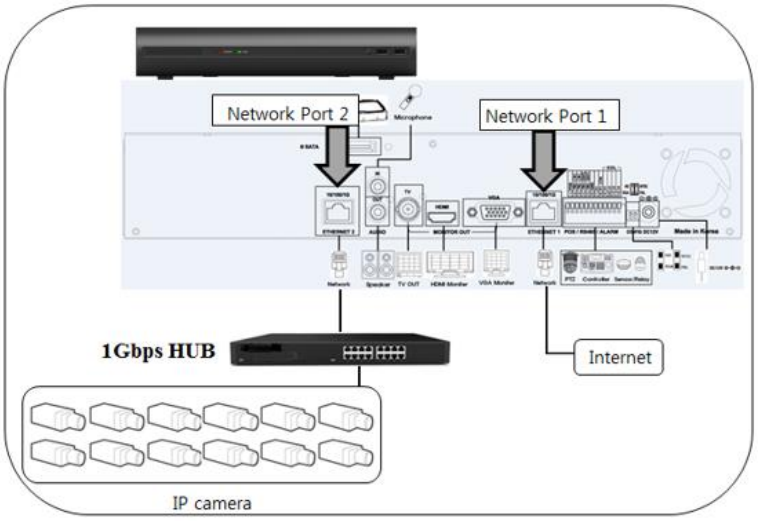
Connect the NVR Network Port (found in rear) to Ethernet hub.
Connect IP cameras to Ethernet hub.

Gigabit HUB are recommended for NVR

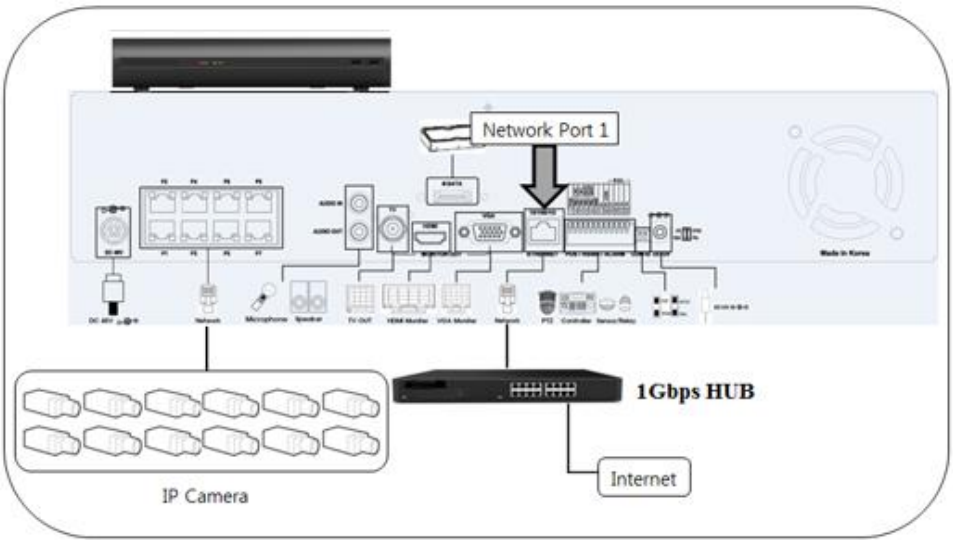
(1) NVR with one Network Port



(2) NVR with one Network Port



(3) NVR with PoE port



4 - 3 IP Camera Registration & PoE port connection

4-3-1 Non PoE model

① Check the adapter, and connect the power.

② Once Power cable is connected (found in Rear Side), booting will be enabled.

③ After booting is finished, the NVR can search for IP Cameras within the same 'network'.

④ IP Camera Registration Menu window pops up as shown below.

•After an IP Camera is found, the IP Cameras "Port, ID, password, protocol" can be inputted. Please take careful note that if there is any mistake or 'typo' in any of the 4 Settings (Port, ID, PW, Protocol), then connection will not be possible.

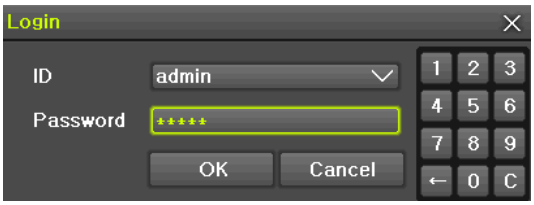
•Have to press the Save button after registration.

⑤ After IP camera registration, the live screen and channel indication,/ clock are shown.

⑥ Menu window pops up by clicking the right button of the mouse as shown below

ID and Password are required for initial installation.
Default ID and Password are [admin : 00000]

⑦ For security purpose, user must log in first to use {Monitoring Menu}.
After logging out, the user cannot use {Menu}.

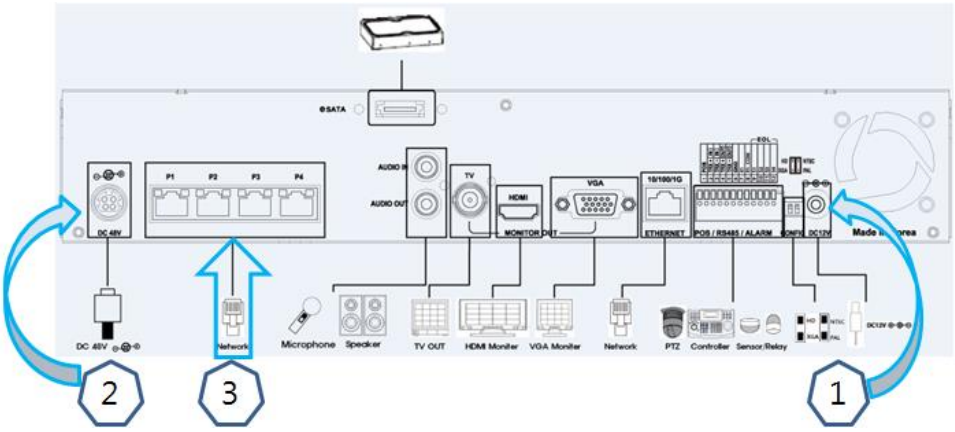


4-3-2 NVR with PoE port

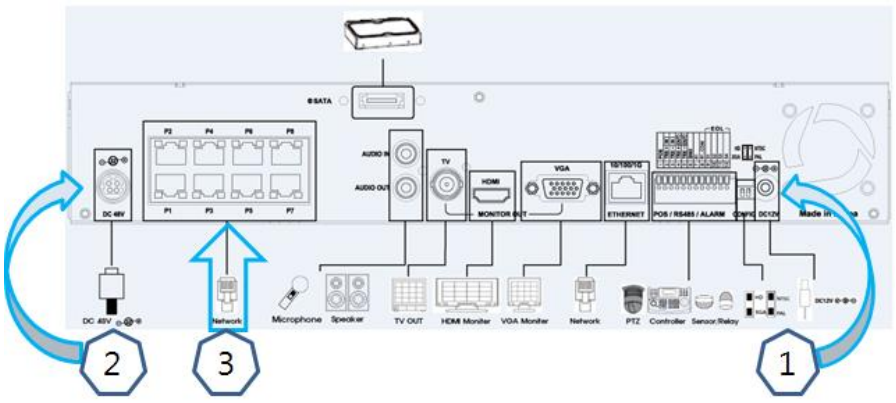
NVR with PoE models support the up to FWR303-08P port. NVR with PoE support the PnP function. NVR will automatically detect the IP camera (PoE model) and register the camera.

(1)PoE Port& PoE power

"PoE Port" and "PoE Power" for each model are as follows.



< FWR303-04P NVR – FWR303-04P>



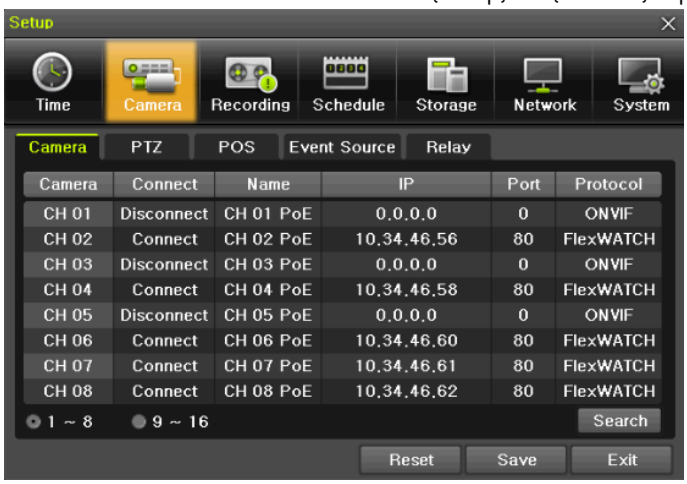
<FWR303-08P NVR- FWR303-08P>

No.	Name	Feature	Type
1	NVR Power	DC 12V 5A, 60 Watts	DC Jack
2	PoE Port	FWR303-04P: Up to 30w for each channel, total Max. 40w (IEEE 802.3at) FWR303-08P: Up to 30w for each channel, total Max. 80w (IEEE 802.3at)	RJ-45
3	PoE Power	DC 48V 1A(FWR303-04P), DC 48V 2A(FWR303-08P)	DIN Jack

(2) Connect the PoE camera to the PoE port and Registration Menu window pops up as below.

(3) After IP camera registration, the live screen and channel indication / clock are shown.
It takes about 2 minutes to make the first connection (up to 3 minutes for FWR303-08P NVR)

(4) The detailed connection information can be found at the {Setup} -> {Camera} tap.



4 - 4 Monitoring

NVR Model Series features powerful monitoring functions as shown below.

4 - 4 - 1 Real Time Monitoring Mode and Icon

After booting is finished, Audio/Recording Status/Channel Title/Connection Status/Time/HDD Status are displayed as shown below.

※ Recording Event / Recording Mode Icon ※		
Recording Event	M	Motion Detection Recording
	S	Sensor Recording
	T	Text Recording
Recording Mode	V	Video Recording
	A	Audio Recording
	T	Text Recording

※ Recording Event Icons are still displayed despite of the recording stop. Recording Mode Icon distinguish recording status.

※ Live Screen Icon ※	
	Video is not connected or Video is covert.
	Audio is activated.
	Audio is mute
Video Loss	Camera has been disconnected.

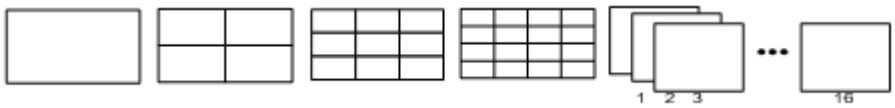
※ Control Bar ※	
①	Full Screen
②	4 Channel Screen
③	8 Channel Screen

④	16 Channel Screen
⑤	ZOOM function
⑥	Auto Sequence Mode
⑦	Date / Time
⑧	HDD Status
⑨	Playback

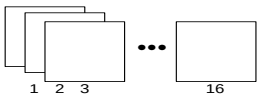
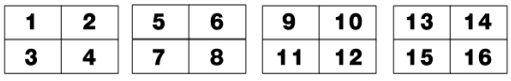
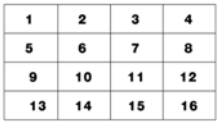
4 - 4 - 2 Screen Division and Auto Sequence

After the system is booted, images will be displayed on a screen divided into 16 division. Except for the basic setting, the system follows user's setting on the screen division from next booting.

NVR Model provides the 5 screen division mode including 1 / 4 / 9 / 16 / Auto Sequence and 1 / 4 / 9 / 16 are Basic Mode.



※ In Basic Mode: 1 / 4 / 9 / 16, pressing the same mode button leads to screens as shown below.

1 Channel Division Mode (16 Group)	
4 Channel Division Mode (4 Group)	
9 Channel Division Mode (2 Group)	
16 Channel Division Mode (1 Group)	

※ The user can view an image on full screen by double-clicking a desired channel in the 4/9/16 Sub-Screen mode. Double-click any part of the screen to return to the previous mode.

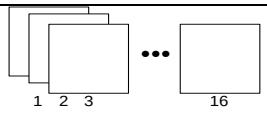
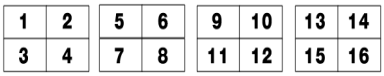
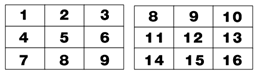
※ Auto Sequence

Auto Sequence is to rotate images at an interval of the certain time in 1 / 4 / 9 Basic Division. Auto Sequence is not available in the Basic 16 Division mode.

① Move to {Menu} → {Miscellaneous} → {Display Setup}.

② Pressing Remote Controller {SELECT} Button / Mouse Arrow Button initiate the Auto Sequence mode.

③ Auto Sequence in Basic 1 / 4 / 9 Division Mode

		
1 Channel Mode Sequence	4 Channel Mode Sequence	9 Channel Mode Sequence

4 - 4 - 3 Channel Grouping

Channel Grouping is to switch the image location in the screen between channels in the monitoring mode.

① In the 'Live' Display, the user can click on the respective channel and by using 'Drop & Drag' can s witch to the channel grouping that they want with the mouse.

4 - 4 - 4 Zoom

Zoom is to zoom in or out the 1 channel division image in the real time monitoring mode.

① Move to {Menu} → {Zoom} or press the zoom icon from the control bar in the real time monitoring mode.

② After selecting a channel, it becomes the 1 channel mode and the zoom control screen sho ws at bottom-right.

[Figure 5-1. Zoom Control Screen]

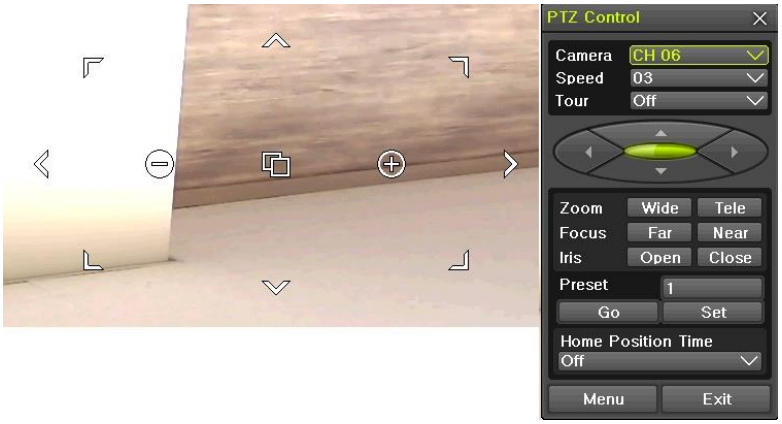
③ In case of the mouse, move the pointer to an area to be zoomed in the zoom control scree n and double-click on it.

④ Then, it zooms in 3 levels; Normal, x4, x16. Those 3 levels can be controlled by the wheel of the mouse. The user also can left-click and drag the yellow box to move the focused ima ge in higher than the x4 mode.

⑤ Using remote controller, it is available to move to 3 levels by using {SELECT} button in the remote controller. The yellow box can be moved by the arrow keys.

4 - 4 - 5 Screen Control by using PTZ

To control PTZ camera, select {PTZ Control} in Menu or press {PTZ} in the remote controller



In the PTZ mode, there are two function; Full and Mini. Tour has [Tour1] and [Tour2]. Home Position Time is 1 / 5 / 10 / User setting (1-60) minutes.

	Preset / Using horizontal / vertical / Zoom / Focus / Iris movement of PTZ Camera, zoom or focus or Iris a certain spot of the image by designating the coordinates and move to the designated coordinates quickly.

	Home Position Time - If there are no controlling signals to PTZ camera after a certain time, it goes automatically to the Preset No.1 position as Preset No. 1 is designated as Home Position

4 - 5 Playback

4 - 5 - 1 Playback and Playback Speed Control

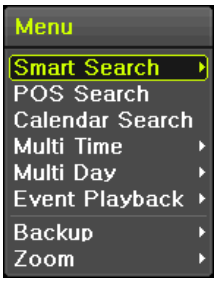
① In the Playback mode, the user can play back video contents by using buttons as shown below.

② After the data is played to the end, the data of the next time zone will be automatically searched and played (this function is possible only in the Multi-channel Playback mode; both backward playback and forward playback are possible).

③ Pressing buttons, the user can adjust the playback speed by(x 1) / (x 2) / (x 4) / (x 8) / (x 16) / (x 32) / (x 300).

Description of the Search Buttons		
Button	Name	Features
	Channel Mode Change	Switch the channel mode.
	Zoom Mode	Switch to the Zoom mode.
	Forward Play / Fast Forward	Pressing one more time in x300 leads to x1 back.
	Forward Frame by Frame	Playback frame-by-frame Pause
	Pause	Pause
	Reverse Frame by Frame	Reverse playback frame by frame Pause
	Reverse Play / Fast Reverse	Pressing one more time in x300 leads to x1 back.
	ESC	Exit out of Playback Mode.
		Status bar indicating information of the hourly recorded image data and the speed.

Selecting the right-mouse button or menu button in the Playback Mode pops up the {Playback Menu} as shown below.



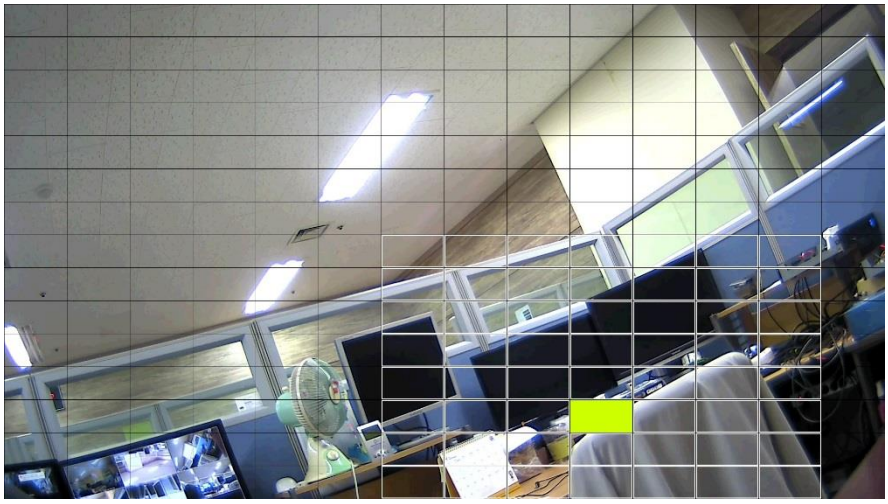
4 - 5 - 2 Smart Search

This function is used to search an image with the object movement at a specific zone quickly. Searching by each channel and a detail control are available.

Type	Content
Sensitivity	5 levels; Lowest / Low / Middle / High / Highest
Minimum	Mosaic pixel control available between 1- 10
Quick Search	In the NTSC mode, search 30 frames once. In the PAL mode, search 25 frames once.
Detail Search	Search all frames.

① Move to the Smart Search and select the desired channel.

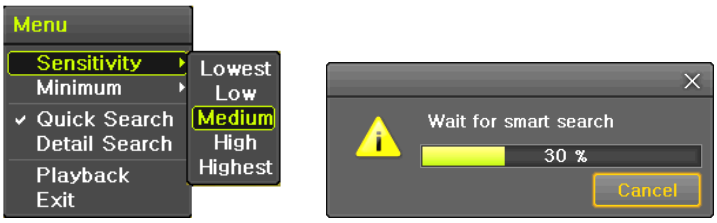
② After shifting to the 1 channel mode, select areas to be smart searched.



③ The 14 * 15 pixel mosaic mode appears. In the beginning, all pixels are selected. Designate an area by left-click and drag the pixel mosaic pointer(deep yellow). Designate another area by repeating the same way.

It detects motions in non-designated blocks.

④ Right-click brings up the menu as shown below. Configure each category and press the Play back button to start searching.



⑤ It may take time during the searching. Start the playback after searching.

4 - 5 - 3 POS Search

The Text Data recorded needs to be searched in order to Playback

4 - 5 - 4 Calendar Search

Move to {Menu} → {Search} → {Calendar Search} and then a searching window pops up.

4 - 5 - 5 Multi-Time

The user can playback the video recorded image of the certain channel recorded in different time zones simultaneously. The arrangement of the searching result is the past to recent format.

4 - 5 - 6 Multi-Day

The user can playback the video recorded image of the certain channel recorded in different dates simultaneously.

The arrangement of the searching result is the past to recent format.

4 - 5 - 7 Multi-Channel

Multi-Channel Search is to play recorded images of the different channel over a certain designated time.

4 - 5 - 8 Event

Event is to search and play events [All / Motion / Sensor].

4 - 5 - 9 Backup

The user can save the backup image data and capture the image into [CD / External Device].

Backup	Save the recorded data into [CD / External Device].
Snapshot	Capture and save the current displaying screen.

4 - 6 Setup

4 - 6 - 1 Time

※ Function Description

1. Time Synchronization

1) Synchronization with the NTP server

The time is synchronized once every hour with the NTP Server.

A. Automatic Setup

The nearest server from the user's zone will be selected for connection. If the connection fails, the next nearest server will be chosen.

B. User Setting

The user sets the URL or IP for the NTP server. If connection is not established, a message will be sent to the user, and the related log, saved.

If synchronization with the NTP server fails, synchronization with RTC will be established.

2) Synchronization with the NVR Time Server

The DTS server is executed in the NVR system and the time is synchronized every hour. DTS clients of NVR series referring to the DTS synchronize the time of the NVR system with DTS.

When the DTS time or a zone is changed, the change is reflected on NVR series belonging to the network (the synchronization signals are broadcasted without passing through the router or gateway). The NVR time server does not support automatic connection.

2. Daylight Saving Time (DST) Setup

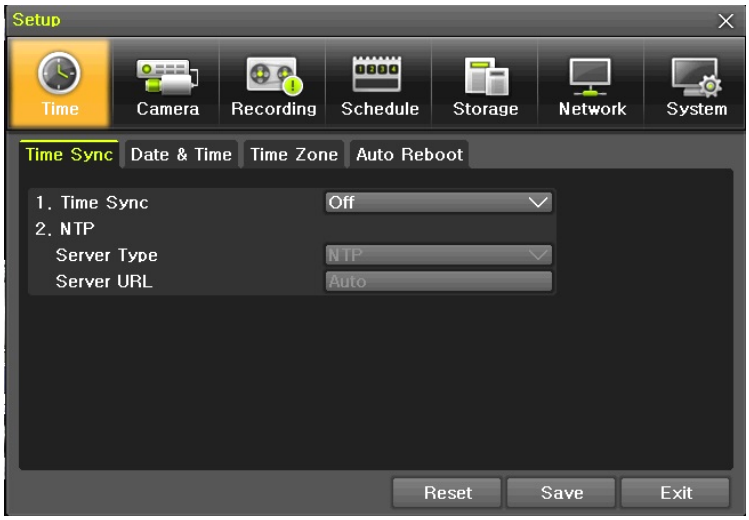
Regardless of whether NTP server or DST server is referred to, DST is automatically processed according to the time.

3. Time Setup by User

The user can set the time directly.

For the NTP client setup, the user can read the time but not change it.

※ Move to {Menu} → {Setup} → {Time} to set up time functions.



(1) Time Sync

① Select Time Sever / Sever Type / Sever URL.

Off	The time server is not used.
NTP	NTP is used to set the time for the time NVR.

{NTP} setup is available when {Time Sync} is set as NTP.

The user can enter the IP only when the server type is NVR. For the NTP server, Automatic, IP, or URL should be selected.

(2) Date and Time

① Date and Time

Only available when Time Server is off.

The system date and time format is Year/Month/Day Hour/Minute/Second.

By using the arrow keys and the Select button, move the focus onto the desired field; Year/Month/Day Hour/Minute/Second and press the Select button.

Select a field you want to change by using the arrow buttons and press the Select button.

② **Date** Display **Type**

Select Time Display Format among [Day/Month/Year] / [Month/Day/Year] / [Year/Month/Day].

(3) Time Zone

A) Time Zone

① Select {Standard Time Zone}.

② On the selection window, select the standard time zone you want to set.

B) Daylight Saving Time

① By using the arrow keys and the Select button, select {Summer Time}.

② On the selection window, select On/Off by using the arrow keys and the Select button.

	※ For a weekly setting in the {Start Time} and {End Time} fields, set Day to 0. ※ After the Daylight Saving Time is selected, the existing data will be displayed as “OLD_” in the search and log list.

(4) Auto Reboot

Auto Reboot is for system stability, rebooting itself regularly.

4 - 6 - 2 Camera

(1) Camera

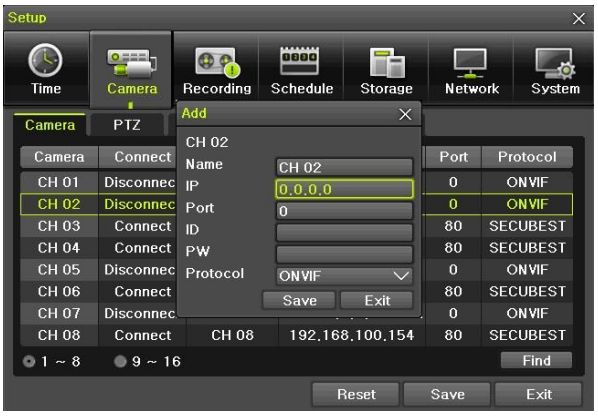
① Camera ADD & Delete

Camera Up to 16 ONVIF supported IP Cameras can be connected.

IP Cameras can be ‘added’ to channels with the ‘Disconnect’.

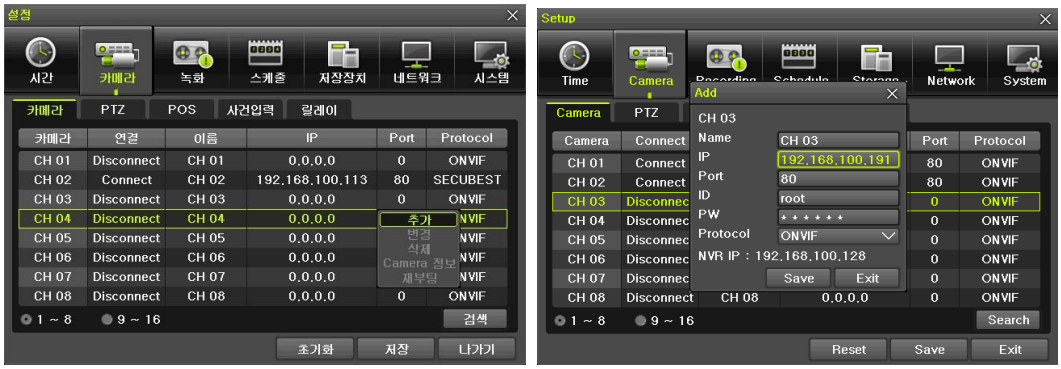
“Connected” IP Cameras – after selection can be ‘Delete’ or ‘Reboot’, (Reboot – the NVR can reboot the IP Camera).

When an IP Camera is ‘Added’, the user can input the IP camera’s IP, Port, ID, password, protocol in order to connect. Please take careful note that if there is any mistake or ‘typo’ in any of the 4 Settings (Port, ID, PW, Protocol), then connection will not be possible.



② IP Camera Find

By using the 'Find' Button, the NVR can search for IP Cameras within the same 'network'.



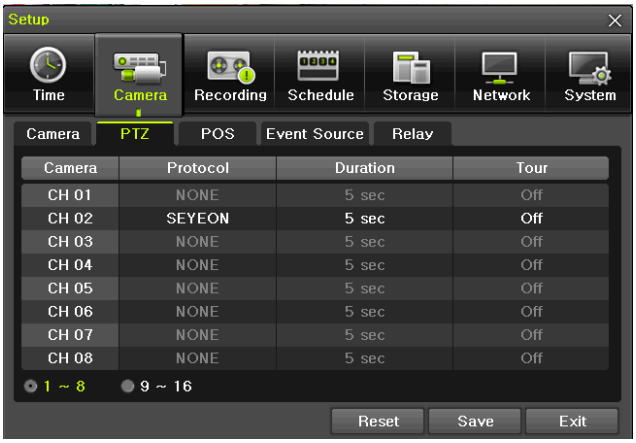
After an IP Camera is found, the IP Cameras "Port, ID, password, protocol" can be inputted. Please take careful note that if there is any mistake or 'typo' in any of the 4 Settings (Port, ID, PW, Protocol), then connection will not be possible

(2) PTZ

This enables the user the real-time monitoring by using PTZ camera.

The PTZ camera must be connected to the system. For external connection, refer to [2-3 Connection of Other Devices] → [2) Terminal block]. Select {Menu} → {Setup} → {Camera} → {PTZ}.

① Configure Protocol / Duration / Tour.



※ The Protocol depends on the IP Camera Manufacturer's protocol.

※ Duration can be selected at 5 / 10 / 15 / 20 / 5-60 (User setting) seconds.

※ Tour consists of Tour 1 / Tour 2 and each tour can be set with 8 Preset.

(3) POS

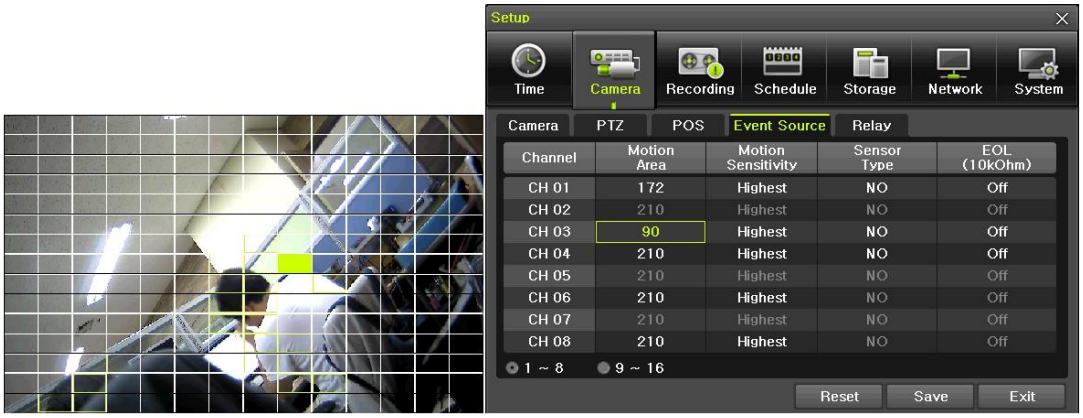
Setup the protocol and baud rate of the POS device.

(4) Event Source

Select {Menu} → {Setup} → {Camera} → {Event Source}.

① Motion Area

The user can setup the motion detection area. Area setup related to motion can be decided.



② Motion Sensitivity : Lowest/Low/Middle/High/Highest.

③ Sound Sensitive : Lowest/Low/Middle/High/Highest.

④ Sensor Type : Select the sensor type.

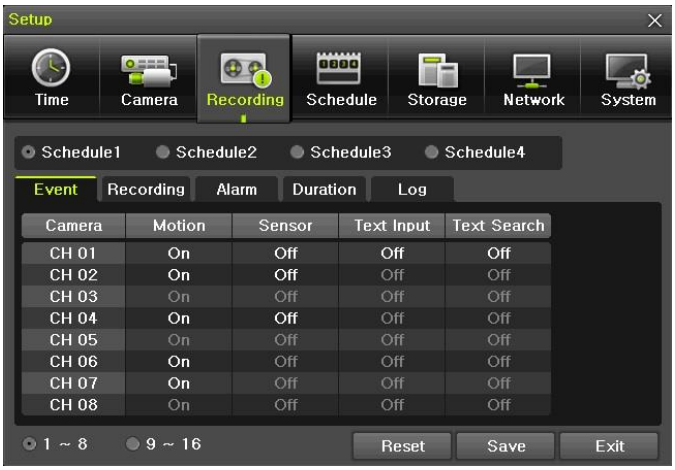
⑤ EOL : EOL Function Select (On / Off).

⑥ Relay : Select the relay type.

4 - 6 - 3 Recording

The Main setup is to configure the environment of record and system and major functions.

In the real-time monitoring, move to {Menu} → {Setup} → {Recording}



(1) Schedule Selection (Schedule1 ~ Schedule4)

Each channel can be scheduled in 4 different schedules. This schedule can be set as the recording schedule and each time can be 4 different schedules.

(2) Event

This is to set the events On/Off of Motion / Sensor / Text Input / Text Search.

Recording Type	Description
Continuous	Continuous recording based on the Normal Speed frame rate.
Motion	When motion is detected, recording will be initiated based on the event frame rate.
Sensor	When input signal from an external sensor is generated, recording will be initiated based on the event frame value.
Text Input	When a text is received from POS device, recording will be initiated based on the event frame value.
Text Search	When searching Text, can select to receive email regarding the 'Word' that is set.

(3) Recording

① Recording Resolution

Used to set the resolution of the recorded channel.

	Resolution by Video Type	
Type / Resolution	NTSC	PAL
D1	704 x 480	704 x 576
720p	1280 x 720	
1080p	1920 x 1080	

② Frame Rate

The Recording 'Frame Rate' setup can be set between "0~30", with the total frame rate at 120fps.

③ Bitrate

The Recording Resolution ‘Bitrate’ can be changed in this setting.

④ Audio

Used to set the recording of the external audio input linked to the system.

⑤ Text

Used to set the recording of the external text input linked to the system.

(4) Alarm

※ Function is used to generate alarms through the Buzzer / PTZ Preset / e-mail / Relay / Popup in case of an event. PTZ preset can be configured between 1 and 16.

※ Popup function is to inform event occurrence to the user through a warning window in the real-time monitoring mode.

(5) Duration

Setup Pre-Recording (On / OFF), Post-Recording (5 / 10 / 15 / 20 / 60 / 150 / 300 seconds).

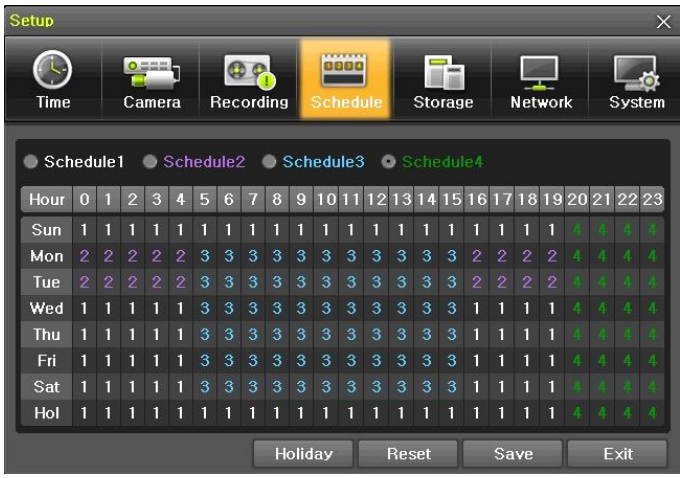
※in Pre-Recording, images of the last 7 seconds before the event occurrence are recorded.

(6) Log

Setup On / Off for Motion / Sensor / Text Input.

4 - 6 - 4 Schedule

NVR model provide 4 different recording mode configurations. Each schedule mode can be set one week/24 hours and the recording follows the setting automatically.



(1) Schedule Setup

Select one schedule among Schedule1, Schedule2, Schedule3 and Schedule4.

Selection Tip

① Select the day and time to be set by using the arrow keys.

② Select after moving the cursor onto Time(0-23) or Day(Sun. – Holiday) then the user can co nfigure the whole line at once.

③ Using the mouse can be easier.

(2) Holiday Registration

This feature is used to enable the user to set the holidays and schedule independently.

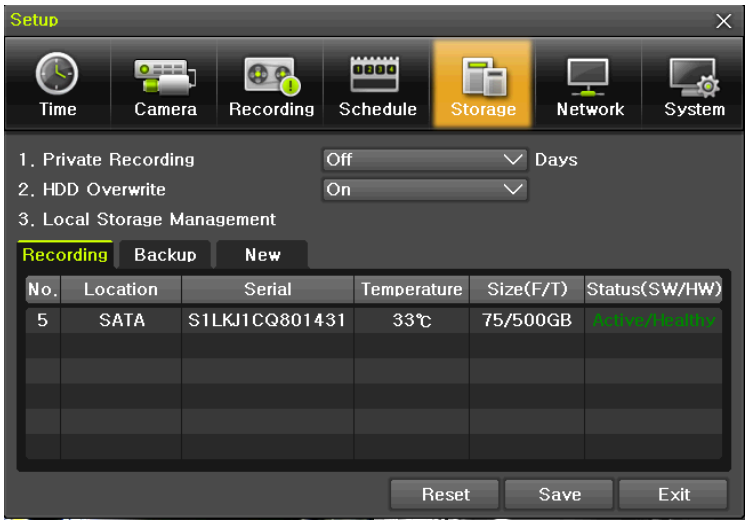
① Move to {Schedule} → {Holiday}.

	※ If the date for the holiday and day of the week are the same in the {Schedule} menu, the holiday setup will have priority over the date setup. ※ Designated holidays are marked with a red tag.

② On the Holiday Registration Window, select the date by using the arrow keys and the Select button and press the Select button.

③ After setting the holiday, move to {Save} at the bottom of the menu. Afterward, press the Se lect button.

4 - 6 - 5 Storage



	In the Storage menu, To apply the new setting, save the new setting after changing the setting. Reset: Initialize the menu to the basic setting.

(1) Max. Recording Days

This is to limit the recording days. You can set off /1day/7days/30days/User setting (1-31).

(2) HDD Overwrite

① Select On/Off for HDD Overwrite.

On	If there is no more hard disk space left, the existing files will be overwritten by starting with the oldest.
Off	If there is no more hard disk space left, the further recording will not be executed.

(3) Local Storage Management

① Local Storage Management Function

Local Storage refers to the internal hard disk and storages connected to the system via USB. Local Storage is classified and managed as {Recording}, {Backup}, {New}, {iSCSI} and functions are described below.

② Recording

The Recording storage is managed in Direct. The Recording storage stores data on the hard disk in the real time. Five commands can be executed. Depending on the S/W status, however, some commands cannot be executed.

New	Returns the status of the selected storage device to New; if this command is executed, the selected storage device will be moved to the {New} storage device manager.

	※ Physical states supporting the execution of the commands above includes Healthy and Warning. In fault state, however, no command can be executed.

③ Backup

The backup storage is managed in Backup. Backup storages are not used to store data; rather, they are only used to back up the data. The user can execute only the {New} command.

Depending on the storage type, the storage is used only for (Recording) or (Backup) purposes.

④ New

All storages, initially detected are managed in {New}. All initially detected storages are displayed as New and can be changed into Recording storage or Backup Storage.

Recording-Format	Changes the selected storage into a dedicated recording storage.
Backup-Format	Changes the selected storage into a backup storage.

Caution

In {New}, At least, one storage shall be selected as a dedicated storage. Otherwise, the data cannot be stored in the real time.

(4) Composition of the local storage device

	※ There are three software status types.
Active	Connected to storage or backup device; currently saving the data.
Online	Only connected to storage or backup device.
Offline	Not connected to storage or backup device.

	※ There are three hardware status types.
Healthy	Connected to storage or backup device; functions normally.
Warning	Connected to storage or backup device, but error was detected; in this case, data storing or backup cannot be made (for more information, see the description below).
Fault	Not connected to storage or backup device; cannot perform data saving or backup.

1. Fault State: The storage device is completely damaged, and none of the S/W operations can be performed. The fault state is not related to a NVR problem. The NVR has detected the fault and stopped the recording.
2. Warning State: The storage device has a physical error that can be corrected by the storage device or by the NVR. If the error is not taken care of, however, the storage device is likely to be damaged (and shift to fault state). Backing up data in the corresponding storage device and replacing the device with a normal one are strongly recommended.
3. If there is an active storage device with a warning or a fault, a message is displayed on the upper left part of the screen.

(5) Instruction when adding the local storage device

① Open the system body and install a new disk (connect the data cable and the power cable)

② Connect power to the system and boot the system.

③ Select {Menu} → {Setup} → {Storage} by using the arrow keys and the Select button.

④ A newly displayed disk will then be displayed as {New}.

⑤ Select a newly installed disk by using the arrow keys and the Select button and initialize the disk as a {Recording} or a {Backup} disk. The following describes the method of setting the recording storage.

⑥ {Recording} shows the status of the newly installed disk online.

Caution

※ Selecting {Recording-Format} or {Backup-Format} causes all data in the device to be erased. Therefore, caution is required.

※ While {Recording-Format} or {Backup-Format} is being set up, do not remove the device (may cause an error when detecting the device).

※ To use the external or portable storage device for system upgrade, set to {Backup-Init} in the {New} item for {Main Setup} {Storage Device} {Local Storage Device Management}.

※When used in NVR equipment for the first time, a backup USB device will always be detected in the {New} category. Therefore, a USB device in the {New} category must be set up as {Backup-Format} prior to use for backup. A USB device that has gone through this procedure will be detected in the {Backup} category when used again in the NVR equipment.

(6) How to changed FAULT HDD

① Check Faulty HDD number

② Turn OFF unit by power button.

③ Detach cover of NVR

④ Find the faulty HDD by number printed on mainboard

⑤ Detach the faulty HDD

⑥ Attach new HDD.

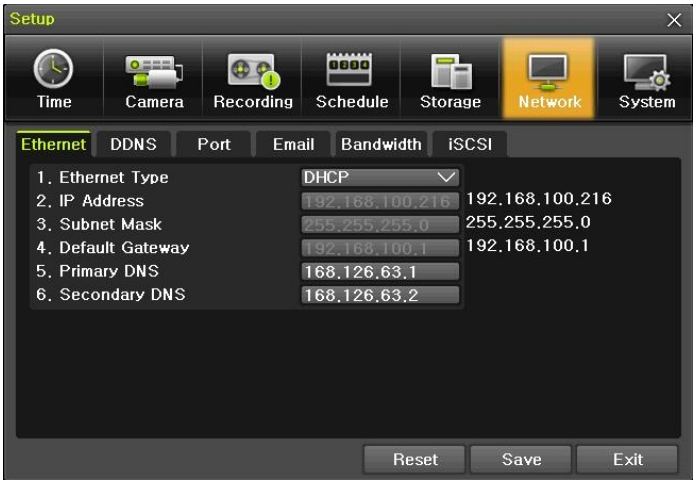
⑦ Attach cover of NVR

(7) HDD Format for Recording

Select the model first.

As shown below, proceed with the following order {New} → {Recording-Format}.

4 - 6 - 6 Network



(1) Ethernet

This is to use a fixed IP in the Local Area Network environment.

① IP Address, Subnet Mask, Default Gateway, Primary DNS, and Secondary DNS will be set automatically when the {Ethernet Type} was selected to 'DHCP'.

② Users can input the IP Address, Subnet Mask, Default Gateway, Primary DNS, and Secondary DNS manually when the {Ethernet Type} was selected to 'static'.

(2) DDNS

As part of the DNS system, the Dynamic Domain Name System (DDNS) service updates IP addresses of the host name in the real time and allocates fixed domain names to systems linked to dynamic IP addresses to allow users to use the same DNS name regardless of the change of in the IP address.

It provides dynamic DNS to ensure URL access in the dynamic IP environment.

User can monitor the remote place thru internet with web server functions which is equipped in NVR.

① Select On/Off of DDNS or a domain name to use by using arrow keys and the selection button.

② In case of DDNS On, enter the host name and save it then, the registration procedure of the host name proceeds automatically. You can enter the host name with 4-20 letters.

③ The host name to enter must not be pre-registered in DDNS sever. Otherwise it won't work.

④ The basic host name is the MAC address of appertaining NVR.

⑤ In case the host name have entered starts with "000c28", none of MAC address will work excepting for appertaining NVR's.

⑥ In case of DynDNS On, enter the host name, user name registered in DynDNS and password then, save them.

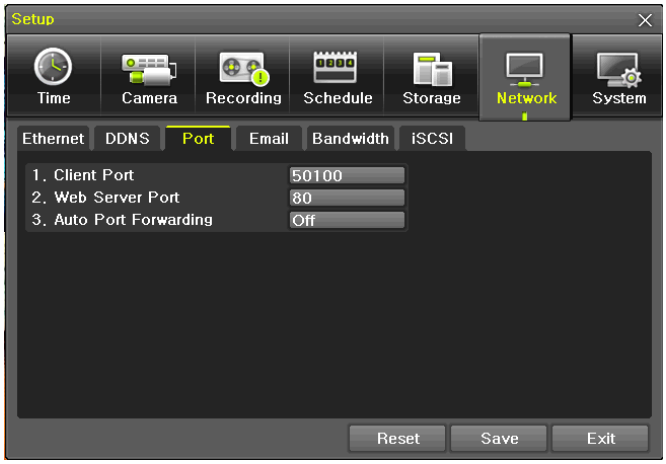
	※ Access to DynDDNS sever (http://www.dyndns.org) and apply for the user account then, register the domain name to use and enter URL. ※ For more information, please access to the site.

(3) Port

Move to {Menu} → {Setup} → {Network} → {Port}.

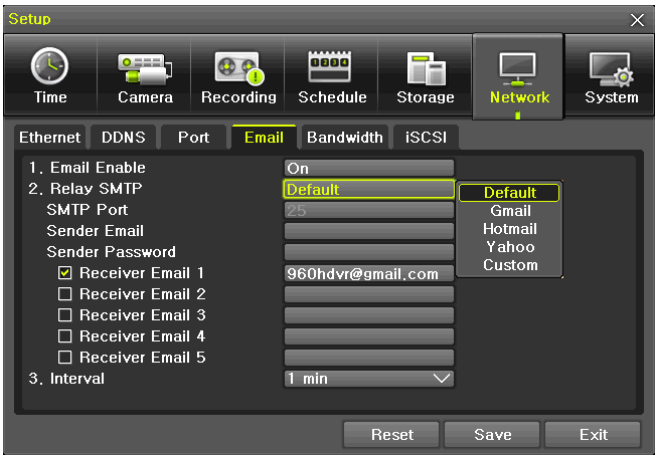
This feature is used to set the network port.

The default value is 50100; a randomly chosen value can be used depending on the network environment. The Web Server Port is used to connect the NVR remote monitoring. The Web Port Default is 80, but can be set between 2000 ~ 65527.



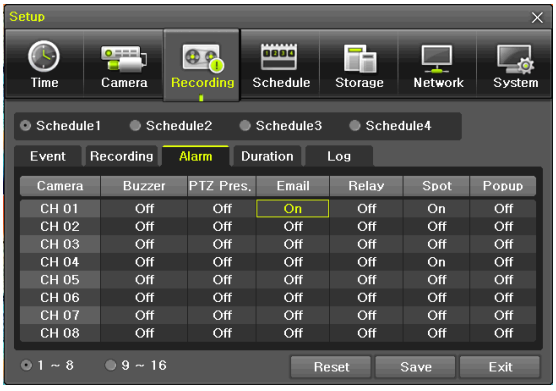
(4) E-mail

① Move to {Menu} → {Setup} → {Network} → {E-mail}. To use the e-mail function, DNS or sub DNS in {Menu} → {Setup} → {Network} → {Ethernet} need to be configured.



This is to set automatic E-mail transmission service when an event occurs.

To use the e-mail function, {E-mail} in {Menu} → {Setup} → {System} → {7. Alarm} or {E-mail} in {Menu} → {Setup} → {Action} → {Alarm} need to be configured.



② Relay SMTP is set on ‘Gmail’ as default, but when ‘Default’ (in menu tab) is selected, this will changed to dvr@cctvuser.com.

③ Receiver Email can be set up to 5 users (emails).

④ Email Interval settings are as follows [5 sec / 1 min / 3 min / 5 min /10 min].

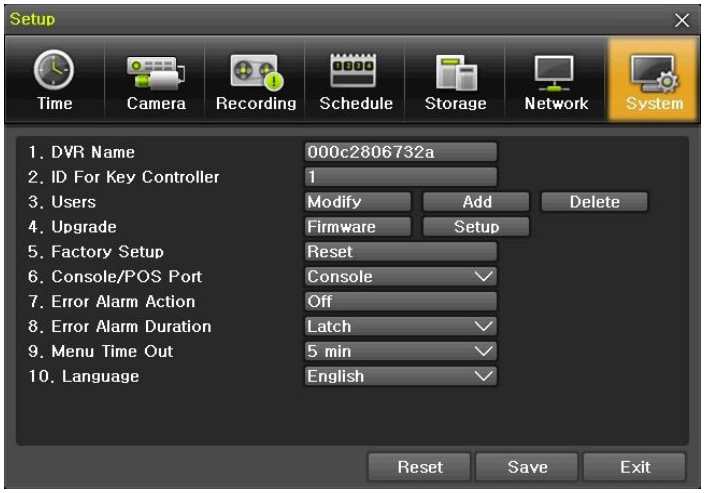
(5) Bandwidth

Move to {Menu} → {Setup} → {Network} → {Bandwidth}.

This sets up adjust resolution / quality and transmitting the data by using the network.

Image Resolution	D1
Image Quality	Adjust quality of the image, as the value increases, the compression rate gets higher and image quality gets low. However the transmission rate gets higher.
Transmission Codec	JPEC / H.264

4 - 6 - 7 **System**



1. NVR Name	Used to name the NVR device.
2. ID For Key Controller	Unique system controller number setting.
3. User Registration	Used to register, add, or delete users.
4. Upgrade	Upgrades the system firmware/system setup
5. Factory Setup	Initialize Setup.(Factory default value, except for the network value)
6. Console / POS Port	POS or Console Port Setting
7. Alarm	Set the alarm On/Off and alarm format.
8. Alarm Duration	Set the alarm time by continuous/5/10/15/User setting
9. Menu Time Out	Used to set the time for exiting the System Setup menu automatically and displaying the real-time monitoring screen.
10. Language	System OSD language setting

(1) NVR Name

. The initial value is the Mac address. (It supports up to 20 letters for the system name.)

(2) ID For Keyboard Controller

① Move to {Menu} → {Setup} → {System} → {2. ID for Key Controller}.

② In the selection window, enter ID by using the arrow keys and the Select button (number 1~255 is available for ID.)

(3) User Registration

※ Add, edit, or delete the users who will operate the system and give authorities to users as shown below.

System Access Authorization	
Network Live	View the real-time images upon network access.
Playback	View the recorded images.
Copy (download)	Copy and download files.
PTZ camera	PTZ camera control
Setup	Recording, schedule, system, storage, Time, PTZ, network, Screen setup
Network Upgrade	Remote network upgrade
Covert channel monitoring	View the covert channel in the network.

Up to 15 users can be registered. Letters for ID and Password can be entered up to 30.

(4) Upgrade

The firmware and menu setting of the product can be easily upgraded through the use of the external storage devices or portable storage devices with USB 2.0 port.

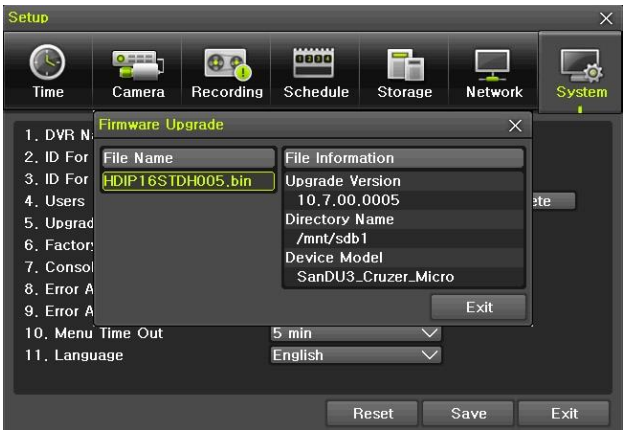
※ Find and copy the upgrade file to the highest folder in the external storage device or portable storage device supporting USB 2.0.

※ Connect the storage device with the upgrade file stored in USB 2.0 port at front panel.

	1) After copying the upgrade file, be advised to get rid of the USB device with safety removal mode from PC. 2) If the USB device is disconnected from the USB port while the upgrade file is being copied, the NVR system may not automatically detect the file.
Caution	Removing USB during the upgrade in progress may cause damage on the system. The system starts over when the upgrade is completed.

① Firmware Upgrade

① Select {Firmware} and the upgrade file list stored in the selected device and simple version info of the selected file are then displayed. Select a file and Firmware Upgrade window appears.



⚠	※ Downgrading to a previous version is not supported. ※ The upgrade information window will then appear within 15 seconds.

② Read the information and select {Yes} to start the upgrade gradually. Select {No} to return to the {System} mode.

③ After the upgrade is completed, the system reboots.

④ Move to {Menu} → {Miscellaneous} → {NVR Information} → {2. Software Version} to check the version.

(5) Setup Upgrade

① Select {Setup} and the upgrade file list stored in the selected device and simple version info of the selected file are then displayed.

② Select a file and then the upgrade starts immediately.

Caution	Select a file and then the upgrade starts immediately. All setting values of the current menu will be changed to the upgrade setting values.

(6) Factory Default

① Move to {Menu} → {Setup} → {System} → {5. Factory Setup}.

② Select {Yes} when Initialization (Yes/No) Window appears.

Caution	Note that all setting data will be initialized. ※ All values go back to Factory Default Value.

(7) Console / POS Port

① Move to {Menu} → {Setup} → {System} → {6. Console / POS Port}.

② On the selection window, select the device by using the arrow keys and the Select button.

(8) Alarm

Alarm is to notify system incidents [Video Signal loss/ HDD full/ FAN fail/ HDD fail/ HDD warning] through

[Buzzer/ E-mail/ Relay01/ System check].

Select each [Off/Buzzer/E-mail/Relay01/Popup Window] by ticking.

		※ Popup Window Setup at {Menu} → {Setup} → {System} → {7. Alarm}. Popup Window is to pop up the system check window in the monitoring screen as shown. it indicates [Video Signal loss/ HDD full/ HDD Not Detect / FAN fail/ Storage Fail/ Storage Warning / Sensor Connection Tamper].

(9) Alarm Duration

① It sets the duration of the alarm triggered by the recording and system event.

② Move to {Menu} → {Setup} → {System} → {8. Alarm Duration}.

③ In the selection window, set Alarm Duration by using the arrow keys and the Select button.

(10) Menu Time Out

If no input is made in the System Setup menu from the remote controller and mouse, the system automatically shifts to the real-time monitoring mode.

① Move to {Menu} → {Setup} → {System} → {9. Menu time Out}.

② In the selection window, select the time zone you want to set by using the arrow keys and the select button.

Off	The Automatic Menu Exit is not used. ※ The user can exit the menu by pressing the [ESC] button in the System menu.
1/2/3 MIN	If there is no input from the remote controller, or mouse, the system will shift to the real-time monitoring mode.
User Setting	The user can enter the time directly. ※ The time can be set to 1 ~ 60 minutes.

③ Selecting the User Setting causes the input window to appear.

④ Enter the time by using the numeric buttons or the arrow keys and the Select button.

(11) Language

This feature is used to select the language for the On Screen Display (OSD) menu of the system. 18 languages are supported.

4 - 7 Search

4 - 7 - 1 Search Mode

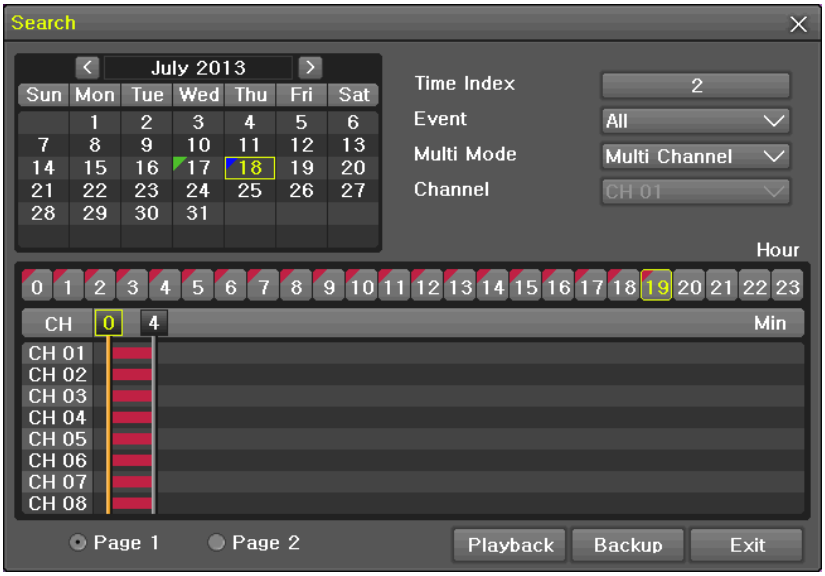
Move to {Menu} → {Search} in the real-time monitoring mode.

(1) Calendar Search

Calendar Search allows the user search and playback by [Year / Month / Day / Hour / Minute], [Multi-Channel / Multi-Time / Multi-Day] and [Motion / Sensor].

① Search Mode

On the real-time monitoring screen, select {Menu} → {Search} → {Calendar Search} and then a searching window pops up as shown below.



② Year / Month / Day Selection

Select the desired [Year / Month / Day]. The color of the icon at the top-left of square in the calendar indicates the recording status.

③ Time Index

Every time when the user changes the time at {Menu} → {Setup} → {Time} → {Date and Time} tab, a new folder(Index) is created and files saved in the folder before the time change can be found at {Menu} → {Calendar Search} → {Time Index}.

Selecting a file at {Menu} → {Calendar Search} → {Time Index} leads to a selection window popup and the user can select a file in different folders (before time change).

④ Event

Event is to search the data by the events. Select [All / Motion / Sensor].

⑤ Multi-Channel Search

The Multi-Channel Search is to play recorded images of the different channel over a certain designated time.

⑥ Multi-Time Search

The user can playback the video contents of the certain channel recorded in the different time zone simultaneously.

Entering into the search mode during the Multi-Time playback leads to the Multi-Time Search.

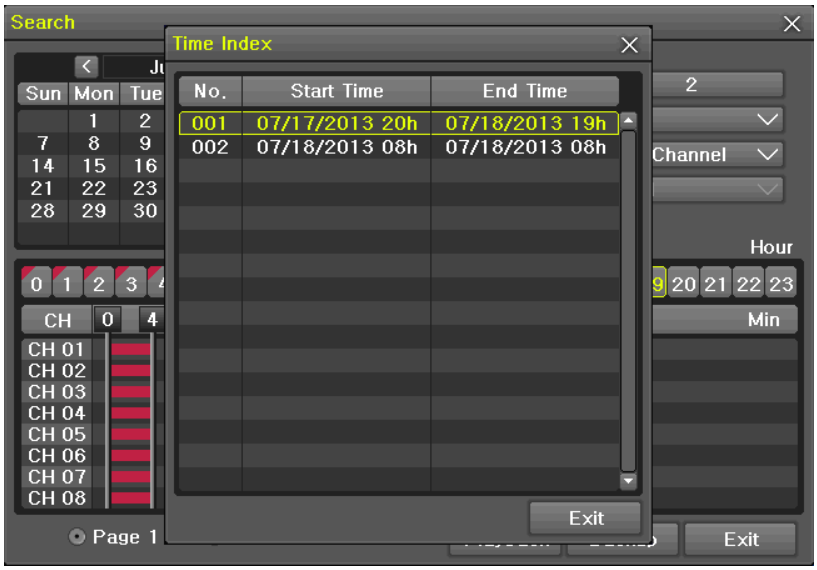
⑦ Multi-Day Search

The user can playback the video contents of the certain channel recorded in different dates simultaneously.

Entering into the search mode during the Multi-Day playback leads to the Multi-Time Search.

⑧ List All

To check Time index in order of time line.



(2) Go To The Last

The user can search and playback the last recorded data by Multi-Channel Mode.

(3) Go To The First

The user can search and playback the first recorded data by Multi-Channel Mode.

※ Go To The First and Go To The Last are only available in {Multi-Channel}.

(4) Go to The Last Played Time

The user can playback from the last played time by Multi-Channel Mode.

(5) POS Search

Text Data can be searched and used for playback [Year / Month / Day / Hour / Minute], [Text 1]

① POS Search Mode

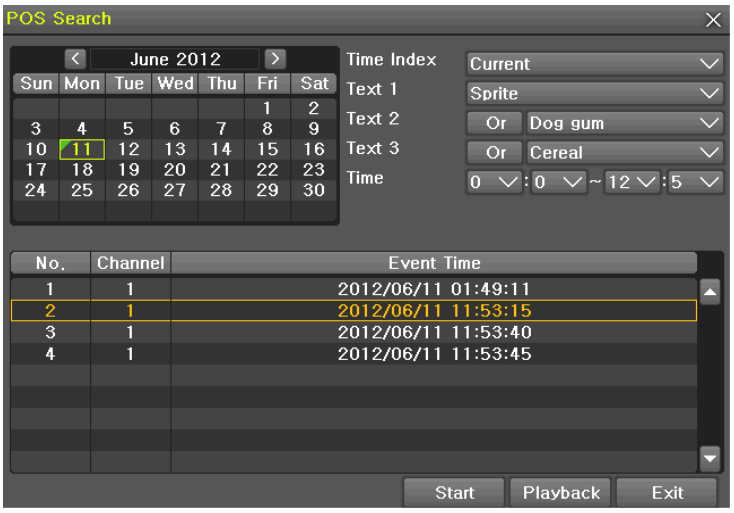
On the real-time monitoring screen, select {Menu} → {Search} → {POS Search} and then a searching window pops up as shown below.

② Year / Month / Day / Text / Time Selection

Please select date/time, Time index, Text 1, 2, 3, and select the start time within the channel.

③ Search / Playback

After selecting the 'Start' Button, '1 searched item' needs to be selected in order for 'playback' to start.



4 - 8 Backup

In order to backup the data, make sure to check that either internal or external storage devices (CD, DVD or HDD) supports USB 2.0 is connected. For supported external devices, refer to Appendix. The user can back up data in the real-time monitoring, search, log, or the playback mode.

(1) Backup in The Real-Time Monitoring Mode

① In the real-time monitoring mode, select {Menu} → {Backup} → {Backup}. The backup menus will then appear.

② The automatic backup time is set to 5 minutes before the Copy (Backup) button is pressed, and the end time, to the time the Copy (Backup) button is pressed.

③ All channels containing data at the time of backup are backed up automatically. Depending on the divided screen mode, however, only those channels that can be viewed may be selected.

④ For the remaining backup procedures, see [5-12-5 Common Backup Procedure].

(2) Backup in Search Mode

① Select {Menu} → {Search} → {Calendar Search}.

② Click the right-mouse button.

③ The automatic backup start time is set to the year/month/date/hour/minute set in the search

mode, and the end time, to the last minute/second of the data existing at the selected time.

④ All channels with existing data at the time of backup are backed up automatically.

⑤ For the remaining backup procedures, see [5-12-5 Common Backup Procedure].

(3) Backup in Log Mode

① Select a date in {Menu} → {Miscellaneous} → {Log Viewer} and select a log related to the data to be backed up.

② Click the right-mouse button.

③ The automatic backup time is set to 5 minutes before the selected log is generated, and the end time, to the time the selected log is generated.

④ All channels with existing data at the time of backup are backed up automatically. If a log has been generated for a specific channel, however, then only that channel is selected.

⑤ For the remaining backup procedures, see [5-12-5 Common Backup Procedure].

(4) Backup in Playback Mode

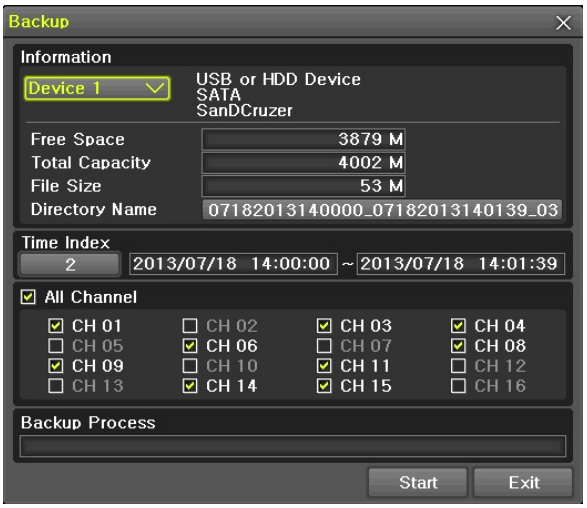
① In the Playback mode, select {Menu} → {Backup}. Any playback in progress at this time will stop.

② The automatic backup time is set to 5 minutes before the Copy (Backup) button is pressed, and the end time, to the time the Copy (Backup) button is pressed.

③ All channels containing data at the time of backup are backed up automatically. Depending on the divided screen mode, however, only those channels that can be viewed may be selected.

④ For the remaining backup procedures, see [5-12-5 Common Backup Procedure].

(5) Common Backup Procedure



① shows the initial backup window menus.

② A list of the devices that can be selected is outputted with simple information of the currently selected devices

③ Selecting a device by pressing the Select button causes the free space and total capacity for the selected device to be displayed.

④ Selecting a device causes the directory name based on the initial values for the time and

channel to be displayed and the size of the file to be backed up to be calculated.

⑤ The directory is named as same with the backup time. The first 12 digits are determined by the year/month/day/hour/minute/second for From, and the 12 digits in the middle, by the year/month/day/hour/minute/second for To. The last 2 digits are determined by the number of folders in the selected device.

⑥ Selecting a device enables selecting the backup time as well. As a rule, the From time cannot be later than the To time, and the To time cannot be earlier than the From time.

⑦ To change the start and end time, press the Select button after choosing the start and end time. Change year/month/day/hour/minute/second by using arrow keys and press the ESC button.

⑧ Changing the backup time causes the name of the directory to be backed up to be changed as well.

⑨ If the file to be backed up exceeds the free space, its size is displayed in a yellow box in case the selected device is capable of rerecording and in a red box if not.

	If the backup storage device is not formatted, in case the box displaying the size of the file to be backed up is displayed in yellow, and if backup is executed by pressing the Copy (Backup) button, a prompt asking(Yes/No) whether to erase the device will appear. Selecting {YES} causes the storage medium for the selected device to be erased.

⑩ Press the Copy (Backup) button. A prompt asking(Yes/No) whether to proceed with the back up.

※ Select [Yes] to back up the data or [No] to stop the backup. Otherwise, press the [Cancel] button to return to the device selection mode on the backup window.

⑪ Select {Yes} to continue the backup.

4 - 8 - 1 Capture

The Capture function lets the user create a JPG file in the real-time monitoring, playback, search, or log mode and back up the image data.

① To back up the currently displayed image, select {Menu} → {Backup} → {Capture} in real-time monitoring, Playback and Log mode.

② When only one USB2.0 backup device (excluding ODD devices) is searched, the JPG file is stored in the same device.

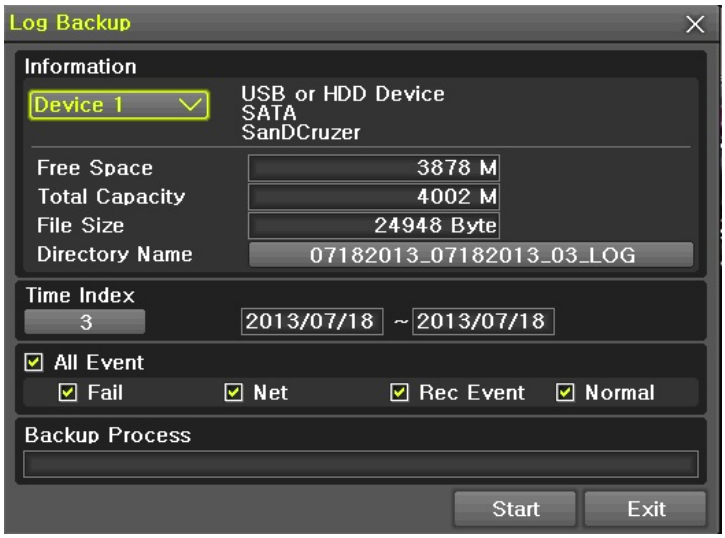
③ If there are no or more than two USB2.0 storage devices (excluding ODD devices), a window for selecting the device will be displayed.

④ If the selected device is an ODD device, a prompt asking whether to back up in the ODD device.

4 - 8 - 2 Log Backup

This is to back logs up including General/ Recording Event / Network / Fail.

① Move to {Menu} → {Backup} → {Log backup} and start the backup process after selection of the events.



.Log files are created at a folder shown below.

565645348945_20100303.log

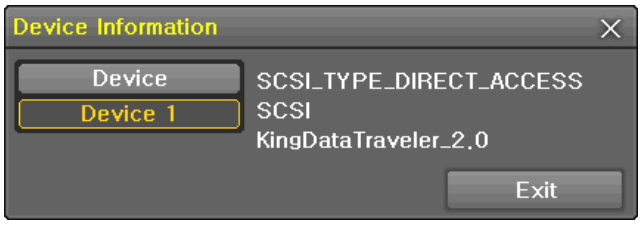
.log file is the text file.

4 - 8 - 3 Setup Backup

The Setup Backup is to back all setup values of the current menu up. This function enables the user to copy the setups and apply them into other devices.

① For the Setup Backup, a device for backup must be connected.

② Move to {Menu} → {Backup} → {Setup Backup} and a window shown below appears. The setup is copied by the name shown below.



Saved as the name below.

HD116T_565645348945_80_01_20100303_113237.bin
① ② ③ ④ ⑤

①Model ② NVR name ③ Version ④ Date ⑤ Time

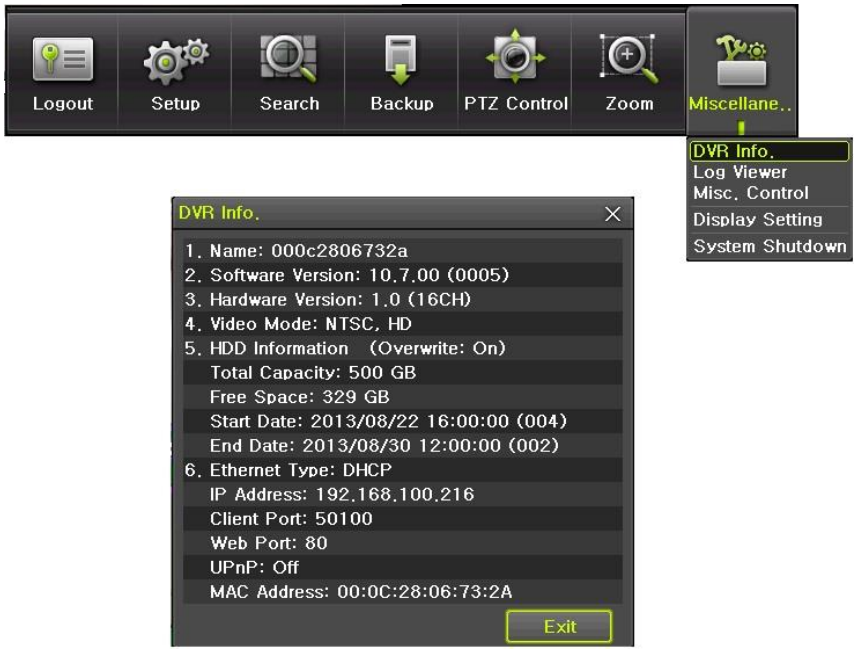
③ Move to {Menu} → {Setup} → {System} → {4. Upgrade} ->{Setup} after insert the backup device.

④ With this way, the user can upgrade a new device with the current setup values in easy way.

Chapter 5. Miscellaneous

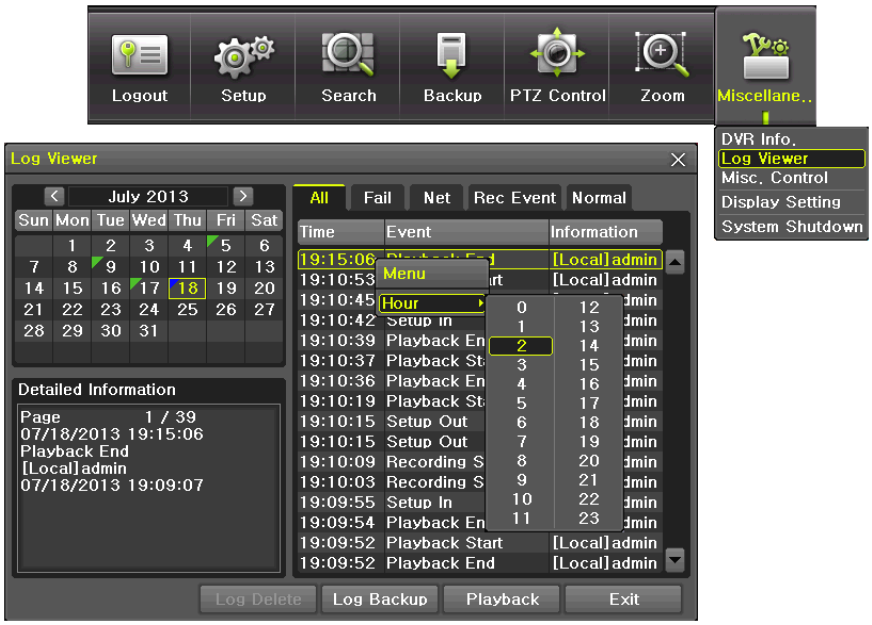
5-1 Miscellaneous

5-1-1 System Information



5-1-2 Log Viewer

NVR records all Log information over the system operation including Power on/off, System Setup and Network Access. Move to {Menu} → {Miscellaneous} → {Log Viewer} to see the logs.



Log Type

General	Logs related to power ON / OFF, file copy/backup failure, setup start/end, playback, and other basic system operations.
Recording Event	Logs related to the recording including motion detection and sensor detection.
Network	Logs related to network operations including network login, network logout, and network live.
Fail	Logs related to system operation failures including signal loss and network connection failure.
All	Logs related to all system operations.

System Log Viewer

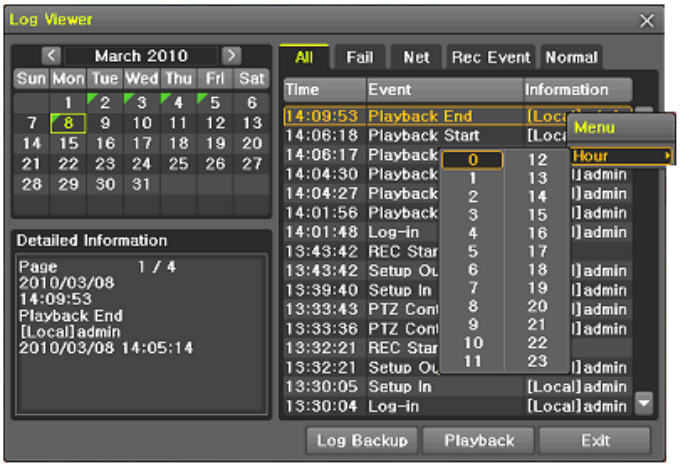
① On the activated calendar window, select the desired date (year / month / day) by using the arr ow keys and the Select button.

② The user can check the time and the log type by using the arrow keys in the log list.

③ Use the Up / Down button to check the logs by time and type on each page.

④ The user can shift the focus to a certain time zone to play the certain time (playback will start fro m the time point when logs are saved).

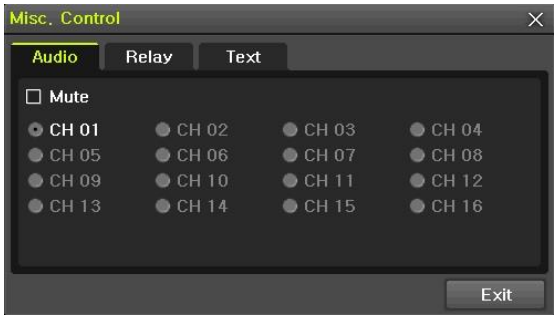
⑤ Click the right-mouse button and select {Hour} to move the desired log time zone.



	Time Changed Log Data View The stored data folder is created each time the user changes the time. A blue triangular icon is displayed at a date in the calendar window that time changes are made. Otherwise, a red triangular icon is displayed at an unchanged date. To view the log details, select the desired date with a red icon. Selecting a date with the blue icon causes the changed date list window to appear.

5 - 1 - 3 Control

In the real-time monitoring, move to {Menu} → {Miscellaneous} → {Misc. Control}.



① Move to the Audio tab and select the channel to be activated or Mute.

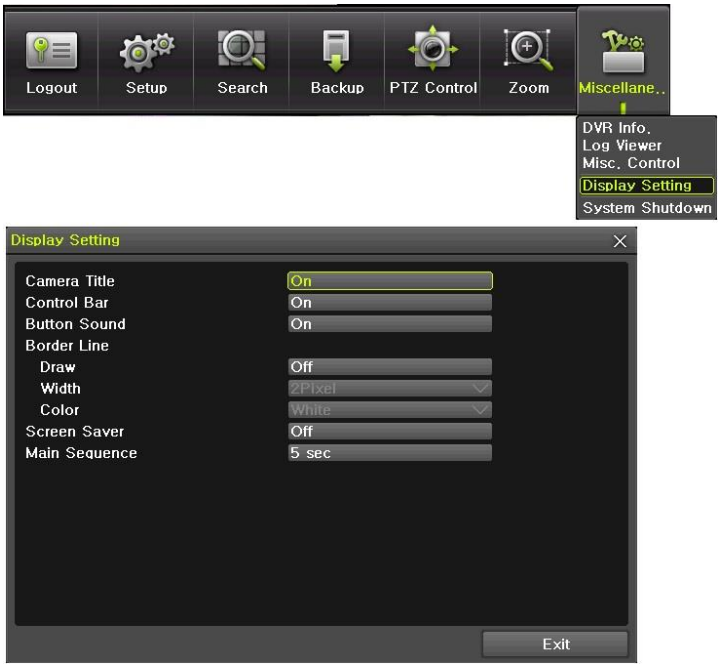
② Move to the Relay tab and select.

③ Move to the Text tab and select.

NVR model support only 1 channel text input.

5 - 1 - 4 Display Setting

Camera Title On/Off, Control Bar On/Off, Button Sound On/Off, Border Line Draw/Width/Color, Screen Saver, Main Sequence. After selecting Display Setting, it becomes the 1 channel mode and a menu pops up as shown below.



① Screen Saver

Monitor connected with NVR can be shut down to protect monitor. {Menu} → {Miscellaneous} → {Display Setting} → {Screen Saver}

Name	Function
Duration	Screen Save duration setting
Starting	Screen Save starting setting, 0 to 24
Waiting Time	Screen Save activating term when there is no input

A/P/P/E/N/D/I/X

Recommended HDD Specification

Maker	Brand	Model Name	Capacity	rpm	Read/Write Power	Start-up Current (12V typical, A)	Operation Temperature
Western Digital	AV-GP	WD10EURS / WD10EURX	1TB	Intellipower	4.9W / 5.3W		~60℃
		WD20EURS / WD20EURX	2TB	Intellipower	4.5W / 4.5W		~60℃
		WD30EURS / WD30EURX	3TB	Intellipower	6.0W / 6.0W		~60℃
	WD Purple	WD40PURX (WD40EURX)	4TB	Intellipower	5.1W	1.75A	~65℃
		WD30PURX	3TB	Intellipower	4.4W	1.725A	~65℃
		WD20PURX	2TB	Intellipower	4.4W	1.725A	~65℃
		WD10PURX	1TB	Intellipower	3.3W	1.2A	~65℃
Seagate	Video 3.5 HDD	ST4000VM000	4TB	5900	7.5W	2A	~75℃ (drive case)
		ST3000VM002	3TB	5900	7.5W	2A	~75℃ (drive case)
	Pipeline HD	ST2000VM003	2TB	5900	5.05W	2A	~75℃ (drive case)
		ST1000VM002	1TB	5900	3.7W	2A	~75℃ (drive case)
	Surveillance HDD 4TB Hard Drive	ST4000VX000	4TB	5900	8.0W	2A	~70℃
		ST3000VX002	3TB	5900	8.0W	2A	~70℃
		ST3000VX000	3TB	7200	8.0W	2A	~70℃
		ST2000VX000	2TB	7200	8.0W	2A	~70℃
		ST1000VX000	1TB	7200	5.9W	2A	~70℃

Recommended USB2.0 Devices

USB2.0 Device	Media	File System
Memory Stick	Flash Type	FAT32
2.5” Portable USB HDD	HDD Type	FAT32