Summary

NDR series are designed to meet the demands for full D1 real-time pure hybrid IP cameras and/or analog cameras recording systems.

NDR series adopt high compression rate H.264 full D1 real-time engine for both analog and IP camera streaming. Each channel can be configured as for IP camera or analog camera at full D1 or CIF resolution and different frame rate. Region of interest (ROI) is supported at 5X and 9X zoom capacity along.

HDMI and VGA engines are built-in 3D intellectual motion adoptive refinement with vivid image enhancement algorithm to provide best video quality. TV wall design allows NDRs to be cascaded via TCP/IP network for easy-cabling configuration. IP cameras and analog cameras can be controlled by 3D joystick keyboard(s). Master and slave NDRs design, pre-programmed IP cameras and NDR access tables can be automatically distributed to slave NDRs for quick addressing purpose. WS-Discovery protocol allows quick IP address setup for IP cameras and NDRs.

NDR series provide various backup features include USB DVD/RW, USB flash disk, HTTP download, and Backup Manager for multiple NDRs' files download. Mobile phone device remote monitoring is also supported. Browser based remote live monitoring and video playback features are provided. NDR self-diagnostic monitoring feature monitors NDR internal temperature, cooling fan failure detection, HDD I/O speed, and network status via health check report.

NDR series provide real-time D1 recording and playback, various backup, quick camera and NDR IP addressing, multiple self-diagnostic monitoring, easy-cabling, easy-to-use, and easy-setup features. NDR series are the only choice for moving towards IP cameras recording systems.

Major Features

- Full D1 real-time H.264 recording and playback.
- Pure hybrid, IP camera or analog camera configurable for each channel.
- Up to 4-channel IP cameras recording and playback.
- HDMI compliant & VGA outputs at 1080P, built-in 3D intellectual motion adoptive refinement and vivid image enhancement engines.
- HTTP web-based interface including NDR configuration, PTZ control, playback, and live monitoring.
- NDRs cascaded are allowed for controlling via TCP/IP network for easy-cabling configuration by PIH-931D keyboard.
- Master and slave NDRs design allows distributed quick accessing tables for pre-programmed IP cameras and NDRs.
- 3G mobile phone solutions provided (iPhone, iPad, Android mobile phone).
- Resolution, frame rate, and video quality configurable for each channel.
- WS-Discovery for quick IP setup of IP cameras and NDRs.
- Changeable the camera name with Chinese.
- Power saving design.

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Caution

- **Do not drop or strike this equipment**
- **Do not install the equipment near any naked flames or heat sources**
- **Do not expose this unit to rain, moisture, smoke or dust environment**
- **Do not cover the opening of the cabinet with cloth and plastic or to install this unit in poor ventilated places. Allow 10cm between this unit and its surroundings**
- **Do not continue to operate the unit under abnormal conditions such as detection of smoke, strange smell or no display on screen while power is turned on**
- **Do not touch the power connection with wet hands**
- **Do not damage the power cord or leave it under pressure**
- **Do not operate this unit near magnet, speaker system, etc., to avoid unnecessary magnetic interference**
- **Connection cables should be grounded properly**

CAUTION

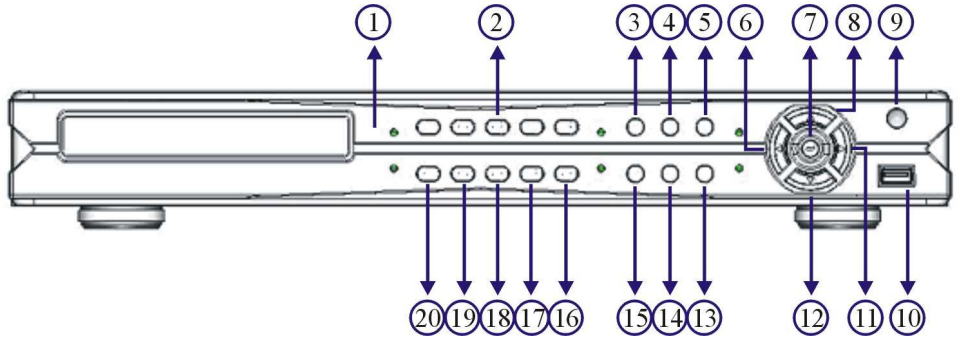
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

TABLE OF CONTENTS

CHAPTER 1. SYSTEM OVERVIEWS

Chapter 1-1. Front Panel



1. LED status panel
Please see system LED status panel.

2. Split-display/camera buttons
a. 4 split-display
b. Camera selection mode

3. SEQ button

4. EJECT button

5. ESC/shutdown button

6. Left button
a. Move cursor left at menu setup.
b. Pan left at PTZ control mode.
c. Decrease a value.

7. Enter button
a. Enter operation in menu setup.
b. Instant PTZ camera selection at live mode.
c. Camera active mode

8. Up button
a. Move cursor up in menu.
b. Tilt up at PTZ control mode.

9. Remote control IR receiver

10. USB 2.0 connector

a. USB flash disk
b. USB DVD/RW

11. Right button
a. Move cursor right in menu.
b. Pan right at PTZ control mode.
c. Increase a value.

12. Down button
a. Move cursor down at menu mode.
b. Tilt down at PTZ control mode.

13. Menu button

14. Backup button

15. Rec button
Start recording operation or stop the recording task.

16. Fast forward button
a. Video fast forward
b. Next event page

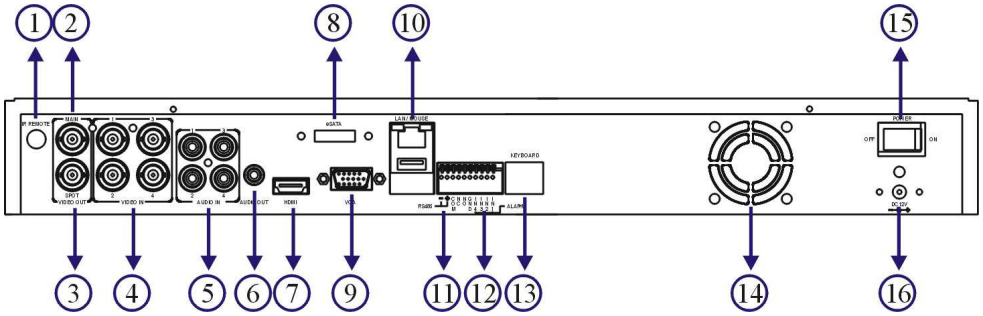
17. Play button
a. Invoke playback selection menu.
b. Replay after FF, FR, Pause, stepping when playing video.

18. Pause button

19. Stop video playback button
Live: freeze video, playback: pause video

20. Fast reverse button
a. Video fast reverse
b. Previous event page

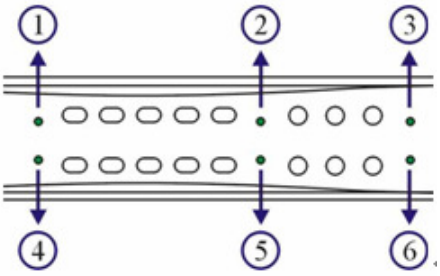
Chapter 1-2. Rear View



1. **External IR receiver (RCA)**
2. **Main monitor**
3. **Spot monitor**
   a. Spot monitor accessible by keyboard.
   b. Each spot output can be programmable for alarmed camera display and sequence display.
4. **Camera inputs**
   Analog camera BNC inputs
5. **Audio inputs**
   Four RCA audio connectors
6. **Audio output**
7. **HDMI output**
8. **eSATA connector**
9. **VGA output**
10. **Network RJ-45 connector**
11. **RS-485**
    For PTZ connection
12. **Alarm I/Os**
    Alarm input switches, 1 N/O alarm output, and 1 N/C alarm output
13. **Keyboard connector**
14. **Fan**
15. **Power switch**
16. **DC 12V input**

Chapter 1-3. System LED Status Panel

System LEDs are meaningful while operating the NDR. The status of each LED is described as in the following table:



Item	LED	Description	Color
1	BACKUP	Backup LED indicator	Green (blinking)
2	POWER	NDR power on/off indicator	Yellow
3	HDD 1	Master HDD recording indicator	Green (blinking)
4	ALARM	External alarm switches indicators when motioned or alarmed	Red
5	REC	Recording indicator	Yellow
6	HDD 2	Slave HDD recording indicator	Green (blinking)

Chapter 1-4. Remote controller

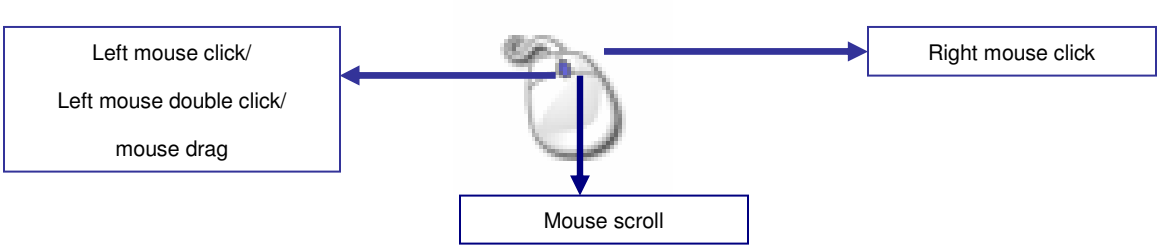
The button arrangement of the remote controller is designed for easy-to-use purposes. Buttons are separated in regions based on their features including NDR operational keys, pan, tilt, and zoom camera device (PTZ) keys, numerical keys, and PTZ buttons.

NDR operational keys	
MENU	Setup menu
ESC	Escape/exit/stop buzzer
ZOOM	Digital video 5X or 9X zooming
REC	Record/stop recording
FREEZE	Live video freeze
	Pause
	Playback
	Stop
	Fast forward
	Fast rewind
	Next single channel
	Previous single channel
	4 split display
	8 split display
	9 split display
	13 split display
	16 split display
SEQ	Sequential display
AUDIO	Audio/mute
BACKUP	Video backup
DVR/NDR	Addressable NDR control
NTSC/PAL	Video system
LANGUAGE	Language selection
Page +/-	Change page of a list.

Auto Pan	Perform auto pan feature		Move up/tilt up
Zoom in	Zoom in of a fast dome camera		Move down/tilt down
Zoom out	Zoom out of a fast dome camera		Move left/pan left
Preset	Call preset of a fast dome camera		Move right/pan right
		ENTER	Enter/set
0 to 9	Numerical keys		

Chapter 1-5. Mouse System

The NDR has both USB mouse interface. General mouse operations are described as below:



Left mouse click—In mouse menu system, mouse click can select a menu item. In window-division mode, click on a camera that is to select the camera in activation mode (active camera).
Left mouse double click-- In window division mode, click on a camera that can call the camera in full screen mode.
Mouse drag—In motion area setup mode, mouse drag can setup a motion area.
Mouse scroll—In setup menu, mouse scroll can increase or decrease a value.
Right mouse click—Popup a submenu system or return to live in main menu.

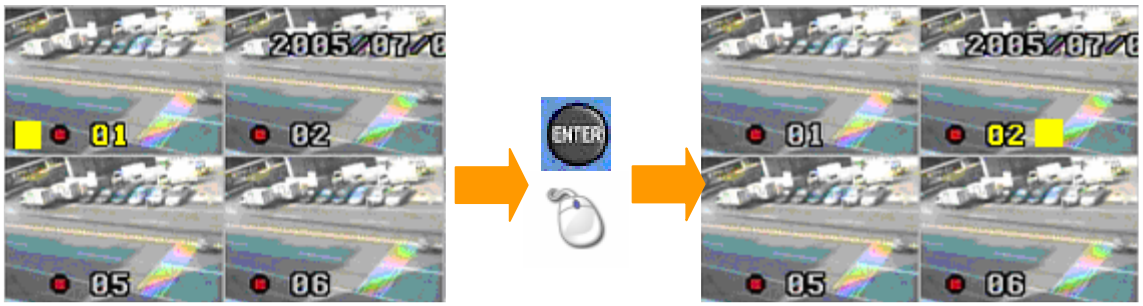
Chapter 1-5-1. Mouse Menu

For using mouse menu, please use the mouse click on Menu item. The mouse menu shows on the screen for more system features.

SETUP
PLAYBACK
ZOOM
PTZ
AUDIO ON/OFF
SHUTDOWN

Chapter 1-6. Active Camera

Active camera is shown as checked at camera name/number. Once a camera is activated, the camera can be controlled for PTZ operation or for camera audio. Moving the active camera sequentially, one can simply press the Enter button on the remote controller, the keypad, or keyboard(s).



Chapter 1-7. Symbols & Icons

The NDR adopts symbols and icons for graphical user interface (GUI) design. These symbols and icons contain useful information in operating the NDR. All the symbols and icons are discussed in the rest of the chapter.

Task bar

The task bar shows up on bottom of the main monitor for indicating the operation status of the NDR while operating the remote controller, the mouse, the keypad, or a keyboard.

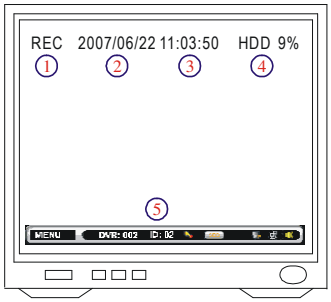
The icons of the NDR are described in the follow table:

Mouse menu	MENU
Controlled NDR ID/RS-485 ID	DVR: 002
The NDR's ID/RS-485 ID address	ID: 02
Manual recording mode	
Schedule recording mode	
Zoom mode	
Sequence mode	SEQ

CHAPTER 2. NDR OPERATIONS

Most of the time, NDR is operated at the surveillance/live mode. In live monitoring mode, the information of screen layout and symbols are described in this section.

SCREEN LAYOUT



① Recording indicator

② Date

③ Time

④ HDD recording percentage

⑤ Task bar

Chapter 2-1. Sequential Display

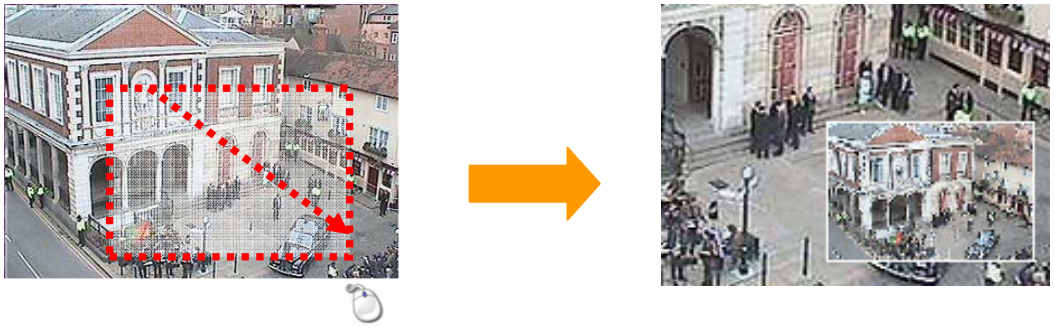
The NDR provides multiplexer feature displaying each camera in full screen sequentially in specific time period. To perform sequential display, simply press SEQ button on the remote controller or a keyboard. The sequence icon shows on the task bar for indicating the NDR is in sequence status. To perform sequence using mouse, please click on Mouse Menu->Sequence.

Chapter 2-2. Freeze

In live monitoring and playback modes, the NDR provides screen-freezing feature in which suspicious individuals can be determined. To freeze the screen, press Freeze button on the remote controller. Press the button again to cancel this operation.

Chapter 2-3. ROI Mode

The NDR provides 5X and 9X digital zooming (ROI) capability live monitoring and video playback modes. To perform this feature, press Zoom button on the remote controller. Once the NDR is in zooming status, press Up, Down, Left, or Right buttons to move the zooming window around to view other portion of the channel. Press the Zoom button. It can perform 5X digital zoom, 9X digital zoom, and normal view screen in sequence.



To perform ROI feature using a mouse, please first perform mouse drag for zoom mode. Once the video is in zoom mode, scroll mouse can perform 5X digital zoom, 9X digital zoom, and normal view screen.

5X digital zoom

9X digital zoom

Chapter 2-4. CH+ & CH-

In case of scanning through cameras in full screen, channel buttons, CH+ & CH- can be used to monitor all cameras.

Chapter 2-5. Audio & Mute

Once the audio channel is properly setup, the NDR can output the live audio. To enable live audio, press Audio button. To disable live audio, one can press Audio button.

Chapter 2-6. Addressable NDR Control Button

To control one of the NDRs using only one remote controller, please press on the addressable NDR control button followed by the NDR ID. The rest of the NDRs are in sleeping mode until one of the NDRs gets called.

Chapter 2-7. NTSC/PAL

To change video system, press on NTSC/PAL button. Password is required if a user presses on this button.

Chapter 2-8. Language

The NDR provides multi-language on screen display (OSD) support. To change from one language to another, simply press on Language button.

Chapter 2-9. ESC/Shutdown Procedure

To properly shutdown the NDR, please press ESC/Shutdown button for a second. A password dialog box shows up. Please provide administrator password to perform the task. Power off the NDR without proper shutdown procedure that it may corrupt a video file. File recovery procedure may start to recovery the video file when booting up the system.

Chapter 2-10. OK/Cancel Button

The NDR has OK/Cancel operation in menu/submenu system. To perform this operation, the user can press Menu for OK or ESC for cancel on the keypad or the remote controller. For keyboard, please press SET button for OK or CANCEL button for cancel.

Chapter 2-11. Page +/-

A user can use page+/- or fast reverse (FR) or fast forward (FF) for changing the page of Log view, playback event list, WS-Discovery, and table setup

CHAPTER 3. PTZ CONTROL

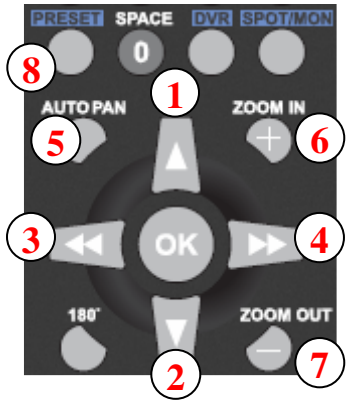
PTZ device can be controlled in live monitoring mode and PTZ setup mode via the keypad and/or the remote controller. The rest of the chapter describes the ways of controlling PTZ devices using the keypad and a remove controller.

Chapter 3-1. Instant PTZ Controllable Mode

Instantly controllable PTZ camera (active camera) is shown in yellow color in live monitoring mode indicating that the camera can be instantly controlled for PTZ operations. Moving the active camera sequentially, one can simply press the Enter button on the remote controller. Once a camera is in active mode (text in yellow), major PTZ features can be easily performed.

Chapter 3-2. Remote Controller & PTZ

PTZ buttons are framed in yellow that contain auto panning, zooming, and zooming out. Other PTZ and NDR buttons are shown in blue on remote controller. The details are described as below:



① Tilting the PTZ device up

② Tilting the PTZ device down

③ Panning the PTZ device left

④ Panning the PTZ device right

⑤ Perform auto panning of the PTZ device

⑥ Perform zooming in of the PTZ device

⑦ Perform zooming out of the PTZ device

⑧ Calling presets

Chapter 3-3. Recall Presets

To call a preset, please follow the following instructions:

- Press Preset button to enable the calling preset mode.
- In Preset mode, preset 01 to 64 directly to recall preset points of the PTZ device.

CHAPTER 4. RECORDING

Chapter 4-1. Start Recording

The NDR automatically performs recording task after power on. Press REC button on the keypad or the remote controller that it can change the recording mode from schedule recording to manual recording. Press REC button again. NDR returns back to schedule recording again.

Chapter 4-2. Manual Recording

Manual recording is equivalent to emergency recording. In manual recording mode, the NDR records all the cameras based on recording frame rate. In many cases, there might be a situation. A user might want to record all the cameras for suspicious events. Manual recording can now be used for an emergency. If there are motion triggerings or alarm switches set for the NDR, the events can be recorded in the NDR's event log.

Chapter 4-3. Schedule Recording

For storage consideration, there are many applications that may be required to record video after motion triggering or alarm activations. Schedule recording can be used that the NDR records video based on motion or alarm triggering for certain hours. The schedule table can be preprogrammed to meet the recording requirement.

Chapter 4-4. Alarm Switch Activation Recording

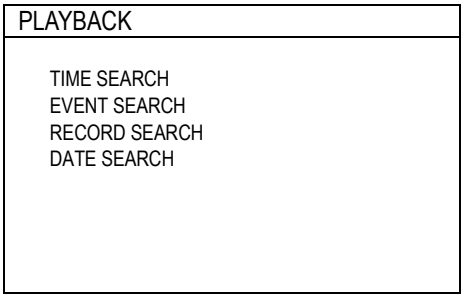
Recording operation can be triggered by an external alarm switch. An external alarm switch can activate the NDR for recording. Proper settings such as Alarm Rec Duration and activation type (N/O or N/C) should be configured before operation. Once one of the alarm switches gets triggered, the alarm icon (bell) shows at the bottom of each camera channel.

Chapter 4-5. Motion Detection Recording

Motion detection is very useful feature of the NDR that the intrusion detection of a camera can be detected. Motion detection recording sensors motion variation, and it triggers the NDR to perform recording task. Once motion detection is activated, the motioned channel shows an alarm icon (little man) on the screen to inform users.

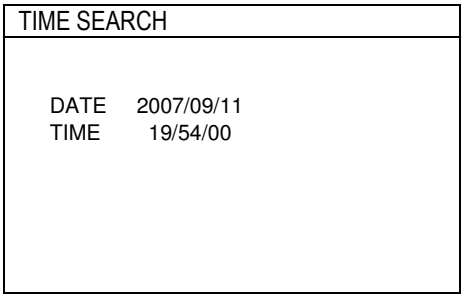
CHAPTER 5. PLAYBACK

To playback, please press Play button on the remote controller, a keyboard, or the keypad. A playback message box shows up for searching video clips. The details are described in the following sections:



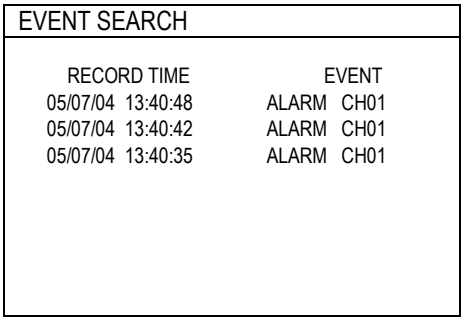
Chapter 5-1. Time Search

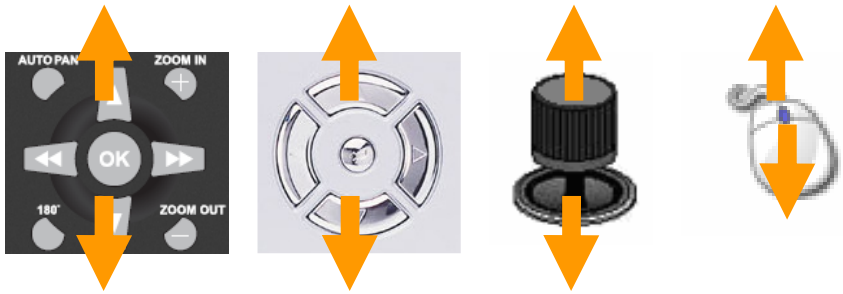
Time search feature can perform date and time search based on recorded video data. This feature is very easy-to-use, and it allows a user to perform video searching task throughout hard disk drives. To perform time search operation, simply press Left or Right button on the highlighted date or time field. To change the date and time, please press Up or Down button.



Chapter 5-2. Event Search

Event list contains information including date, time, event type, and camera channel for the event. There are external alarm event and motion alarm event that can be found in event list. To filter out events, please set starting and ending time in the event search dialog box. To view operation log, please see System->Log View for detail.

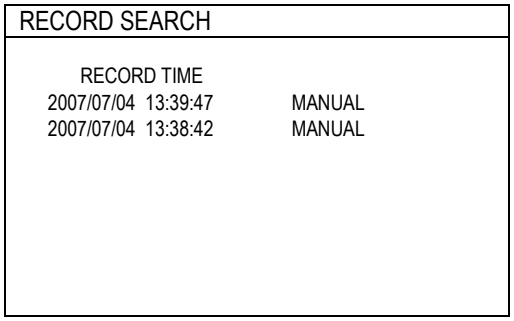




- To select an event list item, press Up or Down button.
- Press Enter button to play the video clips
- To select next page, please press FF or FR button

Chapter 5-3. REC Search

REC SEARCH contains the list when a user presses REC button to activate manual recording operation. To play the REC Search list, please select Record Search item. A list of start recording shows up accordingly. Press Up or Down button to select list item for playback.



Chapter 5-4. Time Search

User can also use calendar and time for performing video search feature.

Chapter 5-5. Other Playback Features

Once one of above playback features is performed, features such as fast forward (FF), fast rewind (FR), pause, stop, step, and re-play can then be used.

FF: Press Right button, shuttle ring right on the front panel, or FF key on the remote controller to fast forward the playing video. The speed of fast forwarding is range from 2X ~ 6X of the original playback speed.

FR: Press Left button, shuttle right left on the front panel, or FR key on the remote controller to fast rewind the playing video. The speed of fast rewinding is range from 2X ~ 6X of the original playback speed.

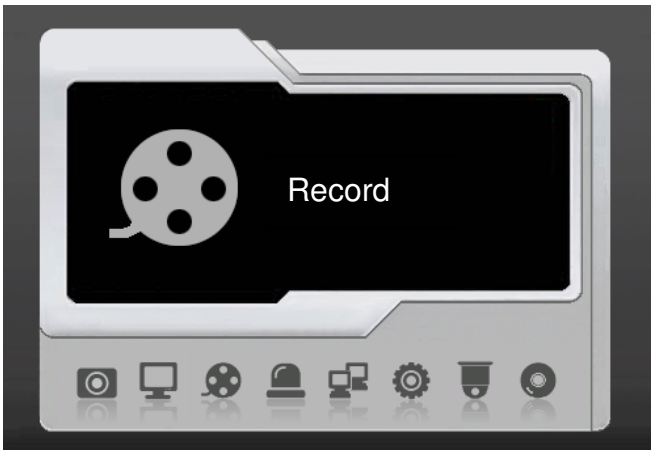
PAUSE & STEPPING: press Pause button while playing video that can pause the video. Once the video is in pausing mode, one can press Left or Right button on the NDR's keypad or the remote controller to play the video step-by-step.

STOP: To stop video playback, press Stop button on the keypad or the remote controller. The NDR's screen switches back to playback main menu for other playback operations. Press ESC button again that it returns to live monitoring mode.

CHAPTER 6. MENU SYSTEM

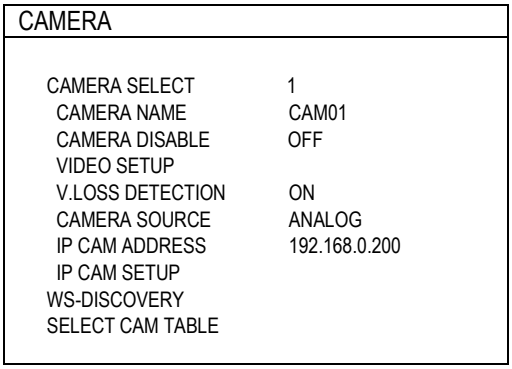
Chapter 6-1. Setup Menu

Setup menu contains menu settings for camera, monitor, record, alarm, system, network, PTZ, and backup. The details of all the setup menu items are described in the rest of the chapters.



Chapter 6-2. Camera Setup

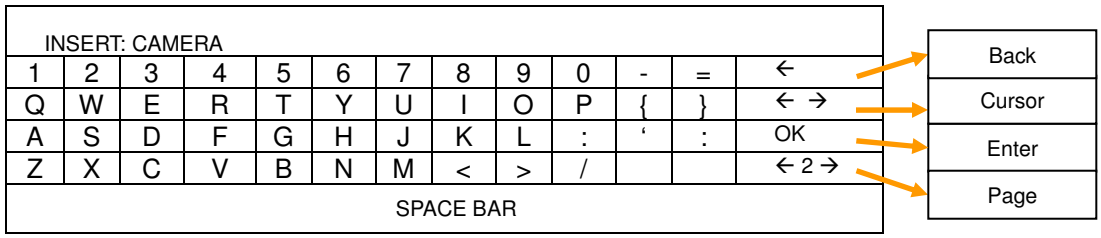
A user can setup camera settings at camera setup option. Camera name, video setup, IP camera or analog camera setting, WS-Discovery, and camera table can be found at this option.



Chapter 6-2-1. Camera Name

A user can edit up to 12 characters for a camera name. To setup the camera name, please type the character using visual keyboard and press **Enter** button.

Visual Keyboard

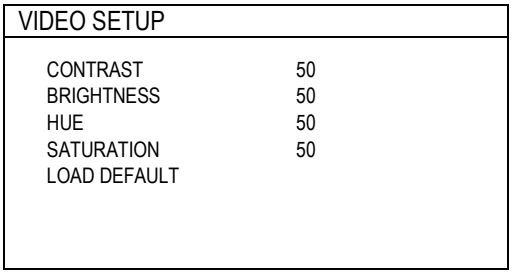


Chapter 6-2-2. Camera Disable (Secured Recording Channel)

Channel enable feature can disable the live video of a camera. The channel can still perform video recording. For privacy or security considerations, irrelevant people may be prohibited to see the live video.

Chapter 6-2-3. Video Setup

Video setup can adjust video's contrast, brightness, hue, and saturation for each camera. To restore the default setting, please press Load Default menu item.



Chapter 6-2-4. Video Loss Detection

To enable or disable video loss detection, please set this option to be On or OFF. If the video signal is unstable and causes video loss, a user can disable this option. Unstable video signal may generate thousand of video loss events in one second. Temporarily turn this option Off that can improve NDR system performance.

For IP camera, this option refers to network connection loss of an IP camera.

Chapter 6-2-5. Camera Source

To setup a camera channel, please select analog camera or IP camera from this setting. NDR can be set to a camera source of an analog camera or an IP camera.

Chapter 6-2-6. IP Camera Address

Once a camera source is set to an IP camera, please setup the IP address of the IP camera for the channel. To manual setup IP address, please press Enter for editing from the virtual keyboard. You can also use WS-Discover for automatic IP address setup.

Chapter 6-2-7. IP Camera Setup

To setup IP camera, please follow the following instructions.

Camera IP Address: the IP address of the IP camera
Camera HTTP Port: the HTTP port number of the IP address (default 80)
Camera RTSP Port: the RTSP port number of the IP address (default 80)
Username: Username of the IP camera (default: admin).
Password: Password of the IP camera (default pass).
ONVIF Setup: ONVIF setup.
IP CAM Table ID: Assign the IP address to the table ID.
Set IP Cam Table: Assign the IP address with the table ID to IP camera table.
Init IP Cam Table: reset IP camera table.

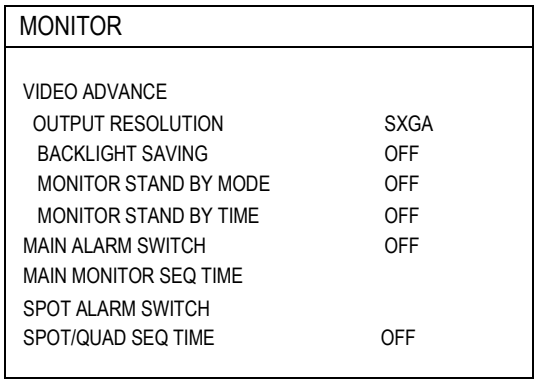
Chapter 6-2-8. WS-Discovery

Web Services Dynamic Discovery (WS-Discovery) is part of ONVIF protocol for searching IP cameras via LAN. This utility simplifies setup up IP address of an IP camera. Please use this utility scans all the IP cameras in LAN. Pick a scanned IP camera for NDR's channel fo r recording and live monitoring.

Chapter 6-2-9. Select Camera Table

After setting up IP addresses of a NDR, the IP address of the IP camera can be set into cam era table for quick addressing. The IP camera table can also be used by other NDRs.

Chapter 6-3. Monitor Setup



Chapter 6-3-1. Video Advance

To setup advanced HDMI/LCD/VGA video setting, please following this section.

VIDEO ADVANCE	
ADAPTIVE DEINTERLANCE	ON
EDGE PRESERVING	ON
MOVING OBJECT CORRECTION	ON
FILE MODE	ON
SHARPNESS ENHANCER	OFF

Each of the VGA settings is described in the following table:

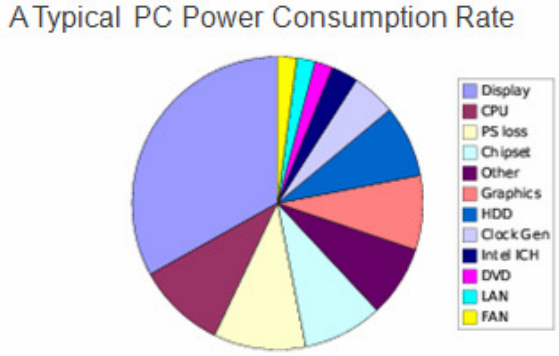
	OFF	ON
Adaptive de-interlacing		
Edge preserving		
Moving object correction		
Film mode		
Sharpness enhancer		

Chapter 6-3-2. Output Resolution

HDMI and VGA output resolutions can be set at this option.

Chapter 6-3-3. Backlight Saving

DVR/NVR is 24 hours non-stop running. HDMI/LCD panel consumes the most energy to a typical PC. The following figure shows HDMI/LCD panel consumption rate.



Backlight saving mode is to turn the LCD backlight darker. Turn backlight of the LCD can also save LCD power consumption.

Chapter 6-3-4. Monitor Standby Mode

After stand by time of the main monitor, HDMI/LCD monitor is in sleep mode to save power consumption. To reactivate the HDMI/LCD monitor, please enable alarm/motion detection, move NDR's mouse, press any key on the front panel, or press any key on the remote control.

Chapter 6-3-5. Monitor Standby Time

To setup standby time, please change the time at this feature.

Chapter 6-3-6. Main Alarm Switching

The main monitor output can be configured in displaying camera's full screen. To enable this feature, please select the camera in camera selection box.

Chapter 6-3-7. Main Monitor SEQ Time

Sequence feature can multiplex each camera screen in full size in specific time period. Once the sequence time is set, press SEQ button on the remote controller or the keypad to activate the sequence feature.

Chapter 6-3-8. Spot Monitor Switching

The NDR has a spot output. To setup the sequence, please first assign spot or quad output. Specify SEQ TIME in seconds. Once above has been setup, spot monitor starts to perform sequence display.

Chapter 6-3-9. Spot Sequence Time

To specify Spot sequence time, please set this option.

Chapter 6-4. Record Setup

Record setup menu can setup features related to recording features such as recording quality, frame rate, recording mode, audio selection, alarm recording, recording resolution, group of pictures (GOP), schedule table, HDD overwritten, and limited recording.

RECORD	
CAMERA SELECT	1
QUALITY	HIGH
FRAME RATE	30
RECORD MODE	SCHDEDULE
AUDIO	1
PREALARM REC	OFF
POSTALARM	5 SEC
RESOLUTION	CIF
GOP	4
SCHEDULE TABLE	
HDD OVERWRITTEN	YES
LIMITED RECORDING	

Chapter 6-4-1. Record Quality

The recording quality can be configured for each channel. To change the quality setting, press Left or Right button.

Chapter 6-4-2. Frame Rate

Each camera channel can be setup for its frame rate individually. To setup the frame rate, please press Left or Right button.

Chapter 6-4-3. Recording Mode

Each camera can be setup for schedule recording or no recording. Once the recording mode has been turned off, each recording mode including alarm, motion, or manual recording does not record.

Chapter 6-4-4. Audio

There are up to four audio inputs that can be recorded into the NDR. To setup audio recording, please assign the audio channel to a particular camera.

Chapter 6-4-5. Post-alarm Recording

Post-alarm recording can record the video of a camera after a particular alarm/motion is triggered. To enable post-alarm recording, please set the post-alarm recording seconds for this option.

Chapter 6-4-6. Resolution

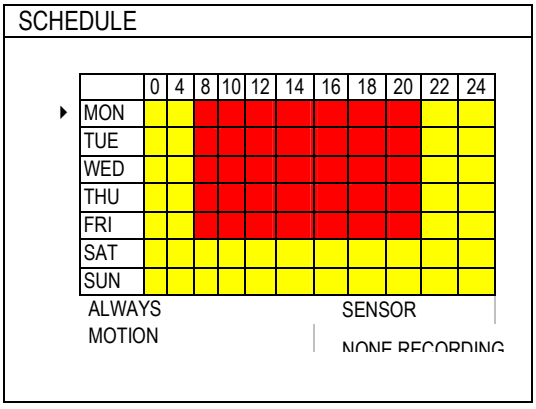
The NDR can provide full D1 or CIF recording solutions. The default setting is at full D1 recording. To change recording resolution, please press Left or Right button.

Chapter 6-4-7. GOP

Group of Pictures (GOP) technology is wildly used by dynamical streaming compression algorithm such as MPEG-4 and H.264. GOP technology contains one still image followed by dynamical streaming (P frame) . For example, GOP 4 means that there are 1 still image followed by 3 P frames. The P frame is just a small portion (dynamic part of the video) of the still image for reducing video size. Higher GOP means smaller video in size if the video source is static. If the video source changes dramatically such as PTZ camera in auto pan mode, it may results in bad video quality.

Chapter 6-4-8. Schedule

Once the schedule has been setup, the NDR can record camera video based on the schedule table. The NDR's timer detects every second to check if it should start to record. To edit the schedule table, a user can press Enter button for editing mode. Press Enter button that can change recording mode, always, sensor, motion, or no record. For the Apply All setting, the user can use Up or Down button to select Apply All menu item. Press Enter button on" Apply All" menu item that can setup a recording mode for a week.



Chapter 6-4-9. HDD Overwritten

The NDR can be setup for HDD circular recording. If the user does not want the HDD to be overwritten, please turn the option to be off.

Chapter 6-4-10. Limited Recording

In many countries, the HDD recording may be limited and can be only accessed for a certain period. Once the recorded data passes the period, the data can no longer be accessed.

Chapter 6-5. Alarm Setup

Alarm setup menu allows changing the settings of extern alarm switches, motion alarm, buzzer, and alarm recording duration. To change these settings, please enter Alarm setup menu and follow the instructions:

ALARM

CAMERA SELECT	CH01
ALARM INPUT TYPE	OFF
ALARM ENABLE	OFF
MOTION SENSITIVITY	OFF
MOTION AREA SET	NORMAL
MOTION BUZZER TIME	05 SEC
ALARM TIME	05 SEC
BUZZER	ON
BUTTON SOUND	ON

Chapter 6-5-1. Alarm Input Type

The NDRs' alarm inputs can be configured as normal open (N/O) or normal close (N/C). The alarm input is one-to-one mapped to a camera respectively.

Chapter 6-5-2. Motion Enable

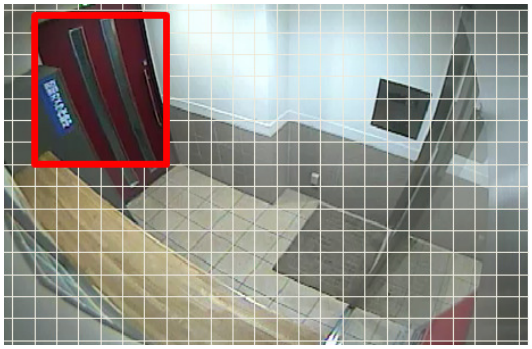
Motion Enable enables motion alarm activation, if the motion area has been set with proper motion sensitivity. Press Left or Right button at Motion Enable menu item to change the setting.

Chapter 6-5-3. Sensitivity

There are eight levels of sensitivity adjustable for motion alarm triggering, range from Very High to Very Low. Press Left or Right button to change the sensitivity setting.

Chapter 6-5-4. Motion Area Set

There are few ways to setup motion area. The detail setup sequence is described as follows:



	Keypad	Keyboard	Remote controller	Mouse
Step 1	Enter Motion Area Set menu item.			
Step 2	Press Up, Down, Left, or Right to move cursor			Move mouse for starting position.
Step 3	Press Enter to define starting area.			
Step 4	Press Enter again to finish a motion detection zone.			Mouse-drag for an area.
Step 5	To clear motion zones press Menu button			Double-click for clear motion zones.
Step 6	Press ESC for exit the setting menu.			Right-mouse click for exit motion zone setting.

Chapter 6-5-5. Alarm Time

Motion alarms and external alarm inputs can trigger the buzzer alarm. Buzzer time is adjustable from 0 to 100 sec. Press Left or Right button on Buzzer Time to adjust the time setting.

Chapter 6-5-6. Alarm Output Time

Alarm output time setting allows changing buzzer and alarm output dwell.

Chapter 6-5-7. Buzzer Enable

In case, the warning buzzer requires to be turned off. A user can disable the buzzer under System->Buzzer Enable menu item.

Chapter 6-5-8. Button Sound

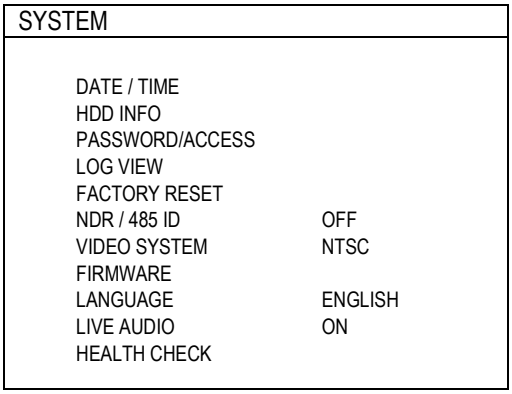
To enable or disable button sound, please set button sound option.

Chapter 6-5-9. SMTP Setup

NDR is capable of sending alarm JPEG snapshots to email account if motion or alarm gets triggered. To enable this feature, please type in the email account information.

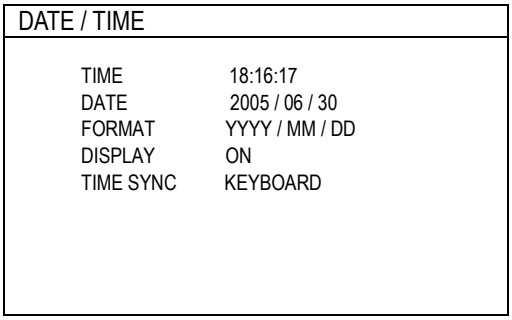
Chapter 6-6. System Setup

The NDR system related settings such as date/time, HDD, password, log, restoring manufacturing default, NDR/RS-485 ID, video system, firmware update, language, and health check can be configured at this system menu. To setup above features, please follow the following instructions:



Chapter 6-6-1. Date/Time

The NDR has built-in timer to record time information. One can choose different time format or disable the timer.



Time Sync

Time Sync feature allows the NDR to synchronize its timer system to PIH-931D keyboard. To synchronize NDR's timers to a PIH-931D keyboard, please set this option to Keyboard. PIH-931D keyboard starts to synchronize every 15 minutes.

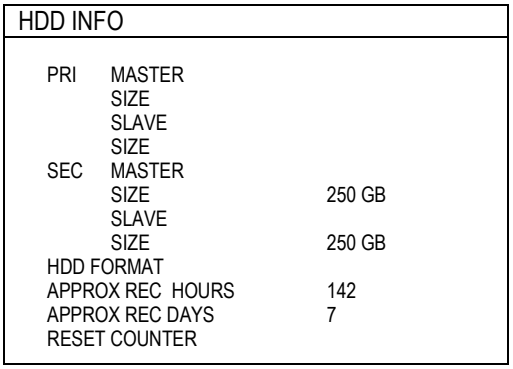
Warning: Highly recommend to perform Time Sync feature before the NDR starts to record video.

Warning: Highly recommend to re-format HDD, if the timer has been set and the HDD has recorded video data.

Chapter 6-6-2. HDD Information

HDD INFO shows the following information:

1. Size—The capacity of the hard disk drive
2. Approximate recording hour—recording hours based on the HDD(s)
3. Approximate recording days—recording days based on the HDD(s)
4. Average frame size—Average picture size

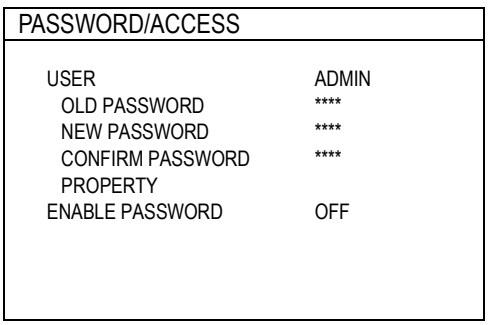


HDD Format

To format HDDs, please select HDD Format menu item. Password is required for preventing unauthorized access. A warning message also gets prompted for formatting verification. Please be alerted to this operation. It may erase not only event list data but also recorded video data. Press Enter button at HDD Format menu to format the hard disk drives. Formatting hard disk drives may take several seconds based on the number of lists recorded.

Chapter 6-6-3. Password/Access

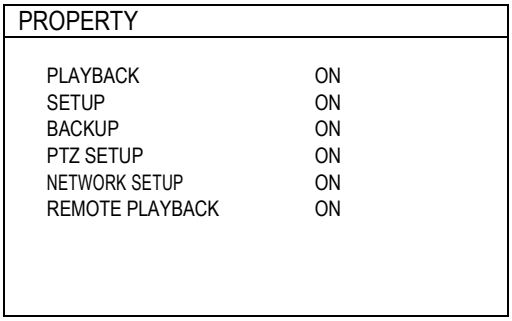
The NDR has three sets of password protection (accounts) preventing unauthorized access. To activate password function, please turn Enable Password on or off at System->Password. The password consists of four to eight digits for entering the NDR. The default passwords are admin, “1111”, operator, “2222”, and guest, “3333”. The acceptable characters are 1 to 10 (0) and A to Z. To change the password setting, please press Enter at System->Password->Change Password.



Note: In case, forgetting your password, please contact your sales agent for master password.

Access Property

Each account can be assigned for access rights including video playback, menu setup, video backup, PTZ setup, network setup, and remote network playback. For an administrator, she or he can manage various access rights for other users.



Chapter 6-6-4. LOG View

Operational log, video lose event, abnormal power off, and other NDR events can be reviewed by LOG View menu item.

Chapter 6-6-5. Factory Reset

A user may want to restore manufacturing default settings. A confirm message shows up for final verification. To perform this task, please select Factory Reset at System->Factory Reset and press Enter button.

Note: Factory reset does not affect IP address, video system, and language settings.

Chapter 6-6-6. NDR ID for Remote Control

Each NDR can be assigned by a unique NDR ID accessed by the remote controller. With a unique NDR ID set, the remote controller issues commands to a particular NDR. The rest of NDRs are in sleep mode.

Chapter 6-6-7. Video System

The NDR supports both NTSC and PAL video systems. The NDR allows switching from one video system to another without rebooting. To change video system, press Left or Right button at System->Video System.

Chapter 6-6-8. Firmware Update

Firmware update allows one to upgrade the NDR's firmware for improving system performance. To perform firmware update, press Enter on Setup->System->Firmware Update. There are two ways to perform firmware update via (1) USB flash disk at NDR site and (2) HTML interface via network.

To perform firmware update using USB flash disk, please follow the instructions:

(1) Plug in a portable USB disk at the NDR's USB port.
(2) Press Enter button at Start Update Firmware.
(3) After finishing transferring, remove the USB device and reboot the NDR.

Prepare Firmware

To prepare firmware update, please create a directory, firmware, in the USB flash disk. The USB flash disk should contain file system FAT-16 or FAT-32. Please visit the web site at www.meritlilin.com to download the latest firmware and save the file in the directory mentioned above. The firmware name of the NDR is "ndr104.bin".

Start Update Firmware

To perform firmware update, please plug in the USB flash disk into the NDR. Select Start Update Firmware menu item and press Enter button. It will automatically transfer the firmware into the NDR. After transferring firmware, wait until "Please Reboot System" message gets prompted and reboot the NDR.

Export Setup

Export setup feature allows a user to export internal configuration into a system file, at USB flash disk's firmware directory. The file can later be imported to other machines. The imported machine's internal configuration gets updated based on the original NDR's configuration. To perform Export Setup, please select Export Setup menu item and press Enter button.

Import Setup

To perform Import Setup feature, please select Import Setup menu item and press Enter key. The configuration of the NDR gets updated based on the system file.

Version

Version menu item indicates the current version number of the NDR.

Chapter 6-6-9. Language

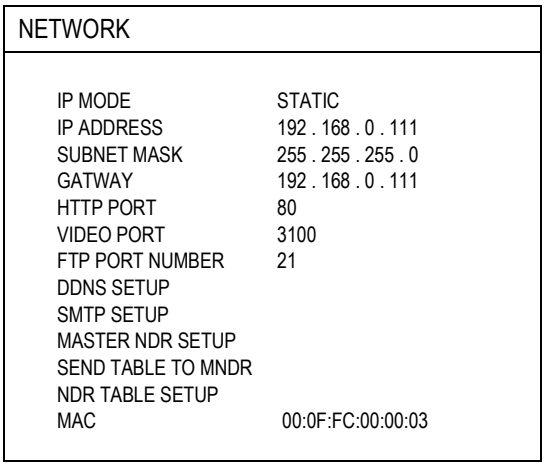
The NDR provides multi-language OSD support. A user can change his/her preferred language to operate the NDR. Press on Left or Right button to change the Language setting.

Chapter 6-6-10. Live Audio

To turn on or off live audio monitoring, please set Live Audio option.

Chapter 6-7. Network

The NDR allows a user to access the video via Internet or LAN. In order to connect to LAN or Internet, subnet mask, gateway, and IP address should be configured. Please consult your Internet provider or system administrator for above information.



Chapter 6-7-1. IP Mode

The NDR provide static, DHCP, and PPPoE IP modes. It is highly recommend to access NDR in high bandwidth network such as gigabit LAN.

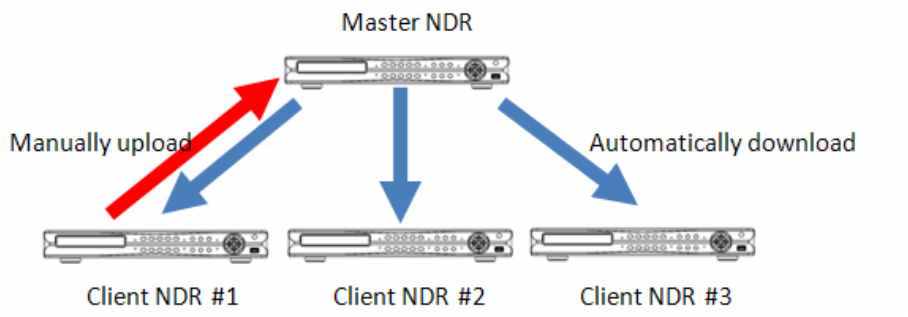
Chapter 6-7-2. HTTP & Video Port Numbers

For Internet connection, port number IP mapping technologies can be used for single IP address shared by multiple devices via a network router. Please consult your network administrator for this advanced network technique. HTTP Port number is the web service port number of the NDR.

Note: Default Internet port numbers for the NDR are port 80 (HTML web pages) and port 3100 (video port)

Chapter 6-7-3. FTP Port Number

NDR is built-in with an FTP server and client processes. IP camera access table and NDR access table can be distributed to master NDR. The database distributed flow is described in the following diagram. IP camera and NDR tables can be edited by any one of the NDR. The table can be uploaded to a master NDR. The tables can be automatically distributed to client NDR every 2 minutes.



The FTP service is also used by BackupManager.exe. BackManager can manage all NDR's video clips via network.

Chapter 6-7-4. DDNS

To use domain name provided by DDNS server (www.dyndng.org), please first visit www.dyndns.org to register an account. After registration, please enter "host name", "username", and "password" in DDNS menu item at NDR side.

Note: Please use lower case for "host name", "username", and "password" for both DynDNS registration and NDR settings.

Chapter 6-7-5. Master NDR Setup

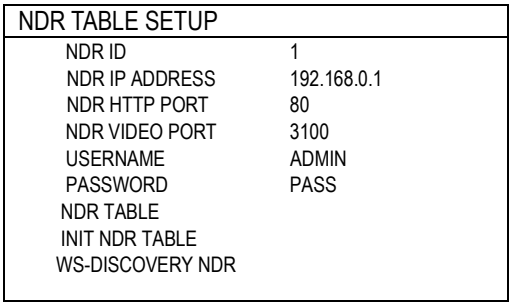
Each NDR can be configured as a Master NDR. Master NDR is for client NDRs to retrieve IP camera and NDR access tables. Client NDRs connects to a Master NDR every two minutes for downloading the access tables.

Chapter 6-7-6. Send Table to Master NDR

A user can choose any one of the NDRs for editing IP camera and NDR access tables. Once the access tables are setup, the tables can be manually upload to the master NDR. To perform this task, please press "Enter" button at this option.

Chapter 6-7-7. Keyboard ID and NDR Table Setup

A user can edit NDR table at each NDR, the table can be uploaded to the master NDR. This NDR table can later be automatically downloaded to the rest of the client NDR for central management purpose.



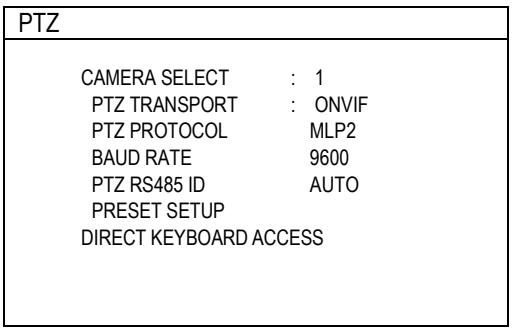
NDR ID: the ID is for quick addressing purpose.
NDR IP address: IP address of a NDR.
NDR HTTP Port: HTTP port of the NDR (default 80).
NDR Video Port: video streaming port for remote PC (default (3100).
Username: the username of the NDR (default admin).
Password: the password of the NDR (default 1111).
NDR table: Display or select from a NDR table for editing purpose.
Init NDR table: initialize the NDR table.
WS-Discovery NDR: set a NDR scanned by WS-Discovery protocol to the table.

Chapter 6-7-8. MAC

Display the MAC address of the NDR.

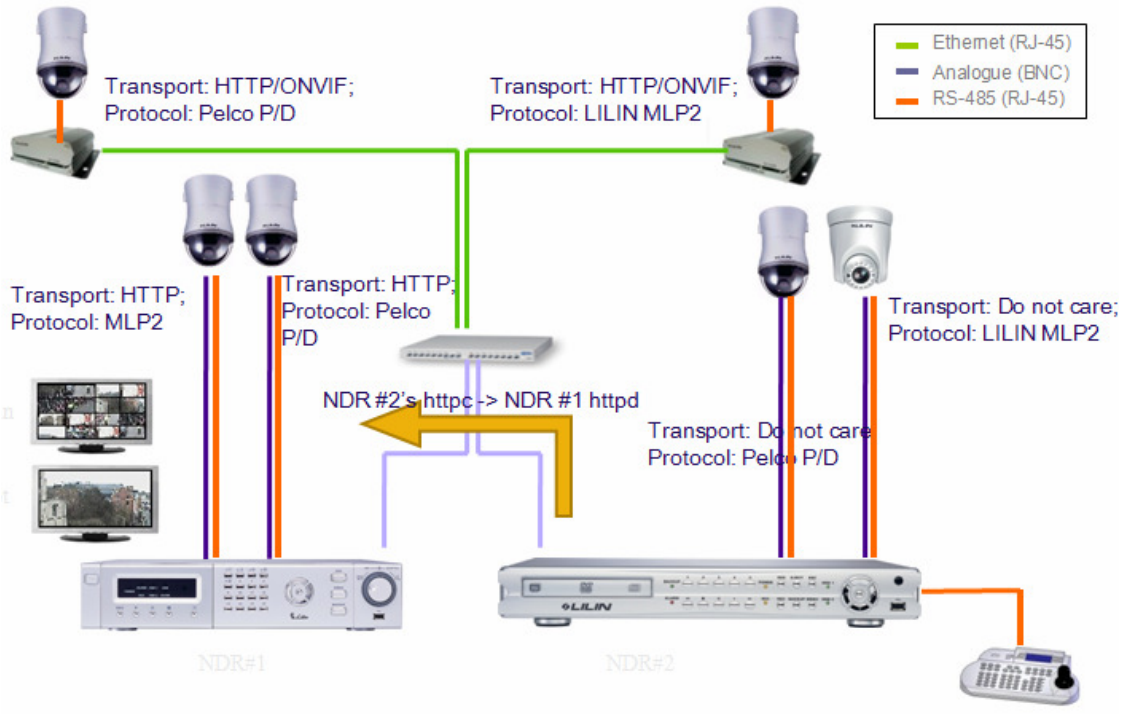
Chapter 6-8. PTZ Setup

The NDR can control RS-485 PTZ or IP PTZ. Using NDR's keypad or the remote controller can access all these cameras. To setup PTZ connection, please follow the following instructions:



Chapter 6-8-1. PTZ Transport and PTZ Protocol

PTZ's RS485 protocol such as MLP2 or Pelco D/P can be transmitted to a PTZ device by ONV IF and LILIN HTTP protocol. PTZ Protocols include MLP1, MLP2, Pelco D, and Pelco P. Prot ocol transmissions are shown as below:



Chapter 6-8-2. PTZ Model & Baud Rate

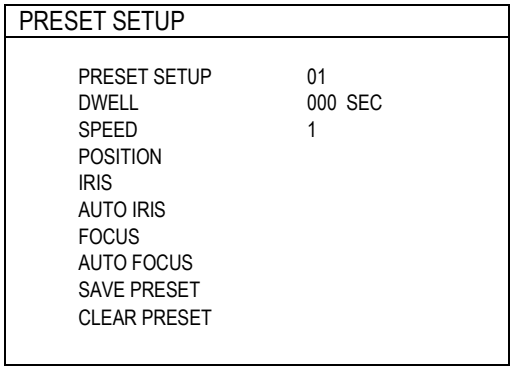
If PTZ protocol is transmitted via traditional RS485 wires attached to the NDR. Please setup baud rate and RS485ID respectively.

One can choose the model of PTZ devices by pressing Left or Right button. The NDR adopts this PTZ model's protocol and communicates with the PTZ device. Each PTZ device can be assigned by its PTZ protocol with different baud rate.

Model	Baud Rate	Number of Bytes
PIH-7000 (MLP1)	9600	3
PIH-7600 (MLP1)	9600	3
PIH-7625-3 (MLP1)	9600	3
PIH-7625-7 (MLP2)	9600	7
PIH-7622-7 (MLP2)	9600	7
Pelco D	2400~9600	None
Pelco P	2400~9600	None

Chapter 6-8-3. Preset Setup

A preset of a PTZ camera can be configured for manipulation during live monitoring. Panning, tilting, zooming, calling presets, auto panning, and other PTZ features provided by a PTZ camera can also be accessed during live monitoring mode. All the features should be configured before accessing PTZ functions. Please follow the rest of this chapter to setup a preset:



Chapter 6-8-4. Preset

To define a preset, press Left or Right button on the keypad or the remote controller to change the preset number.

Chapter 6-8-5. Dwell

Define dwell of a preset. Dwell number ranges from 0 to 255 (the shortest to the longest).

Chapter 6-8-6. Speed

Define speed of previous preset to the next preset. The speed number ranges from 1 to 8 (the slowest to the fastest). The speed might vary based on different PTZ device's settings.

Chapter 6-8-7. Position

To adjust PTZ lens position, press Enter at Adjust Pos menu item. A PTZ screen keypad shows up as a reminder. Please press Left, Right, Up, or Down button on remote controller to move the PTZ lens. To zoom in and/or zoom out of the PTZ device, press Zoom In.

Chapter 6-8-8. IRIS & Auto IRIS

To adjust IRIS, please press Left or Right button on IRIS option. For auto IRIS, press Enter on Auto IRIS option.

Chapter 6-8-9. Focus & Auto Focus

To adjust focus, please press Left or Right button on Focus option. For auto focus, press Enter on Auto Focus option.

Chapter 6-8-10. Save Presets

Once the above parameters are entered, the lens of the PTZ device should be in place with proper IRIS and focus set. To store the parameters permanently, please press Up or Down button to choose Save menu item. The position gets stored by each PTZ device programmatically. You can test the stored preset by switching back and forth on Preset menu item. To define other preset point, please repeat chapter 6-8-4.

In live monitoring mode, this preset can be recalled at any time. To recall a preset, please read Call Preset section for detail.

Chapter 6-8-11. Clear All Preset

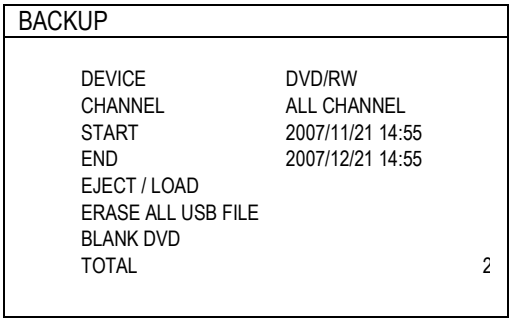
To clear all the preset points of a PTZ device, please select Clear All Preset menu item. Press Enter key on the front panel or remote controller. The operation clears all the preset points.

Chapter 6-8-12. Direct Keyboard Access

Direct Keyboard Access mode allows RS-485 protocol directly transmitted to RS-485 PTZ device. NDR is no longer handle the conversion of the RS-485 protocol.

Chapter 6-9. Backup

The NDR provides various backup methods for performing backup task including USB flash disk, DVD/RW (advanced model), and FTP file download.



To perform backup, please press Left or Right to select backup device type. Press Enter button on Channel option to select backup channel(s). Once the channel(s) has been selected, enter start backup and end backup time. The video size will be calculated in Total field.

For DVD/RW backup, please purchase DVD+RW disk (recommended). Perform Blank DVD feature before starting DVD backup.

Note: Windows Media Player can play AVI file. However, only one channel can be

Chapter 6-9-1. FTP Download

If backup device is set to File, important backup video can be stored in NDR's temporary buffer. The NDR has 2 GB internal storage space allocated for file backup. The backup files get deleted automatically for the next time the backup task performed again.

To download the backup files, please use FTP program (Backup Manager) to download the video file to your PC. Please provide the account and password as “Admin”, “Oper”, and “Guest” in the FTP program to download the file(s). The user can also use integrated HTML interface for FTP file download.

Chapter 6-9-2. HTTP File Download

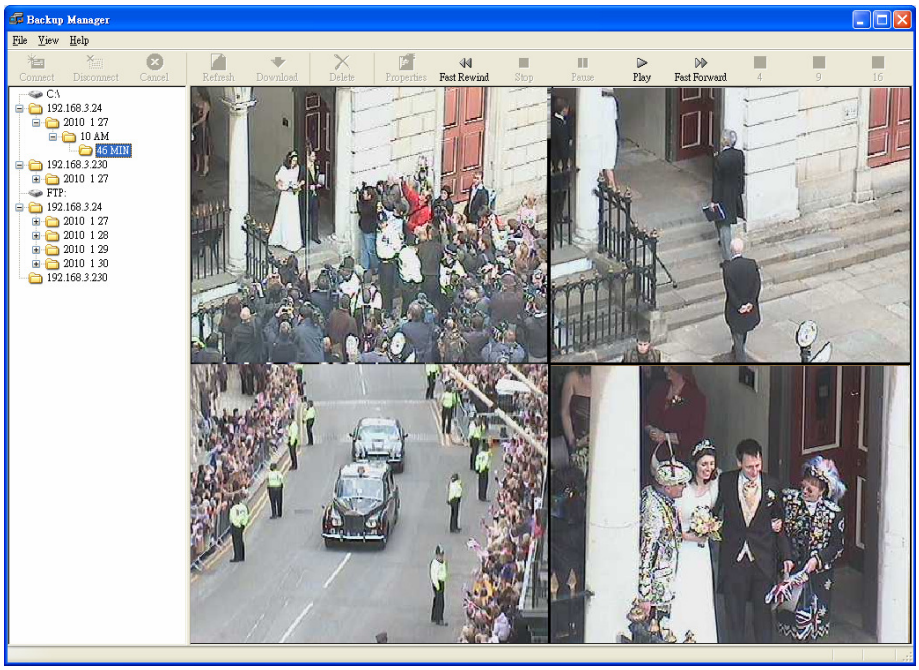
NDR also allow downloading the file from HTTP web page. To use HTTP download, please see network chapter for detail.

CHAPTER 7. FILE PLAYBACK

To play a backup file from a PC, a user can export NDR's video to H.264 file. To review multiple channels playback, Backup Manager (Backupman.exe) built-in in the NDR can be used.

Chapter 7-1. Play H.264 Files

The NDR can export H.264 file to (1) USB flash disk, (2) DVD/RW, (3) File for FTP download (4) HTTP download. To play the exported H.264 video files on a PC, please use Backupman.exe . Backupman.exe can be copied over the backup device whenever the backup task has been performed. The user can also download the application from the NDR's HTML interface.

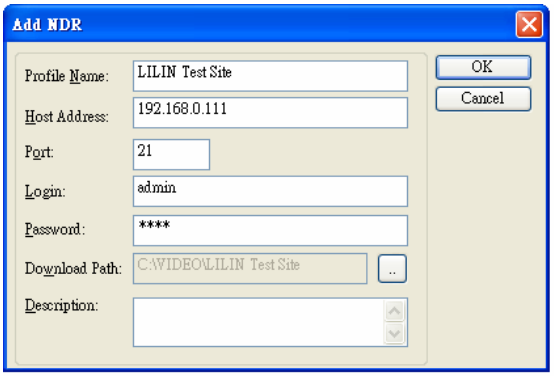


Chapter 7-2. Play H.264 Audio

Double click on a channel in full screen for playing audio.

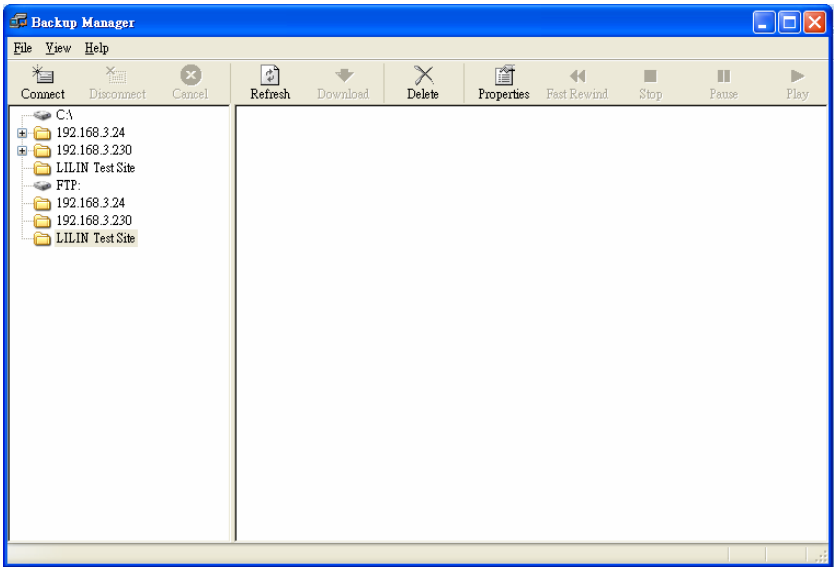
Chapter 7-3. Manage NDRs Download

To manage multiple NDRs file download, please use Backup Manager to download files from NDRs. To perform NDRs file download, please first click on File->Add NDR. It prompts Add NDR dialog box.



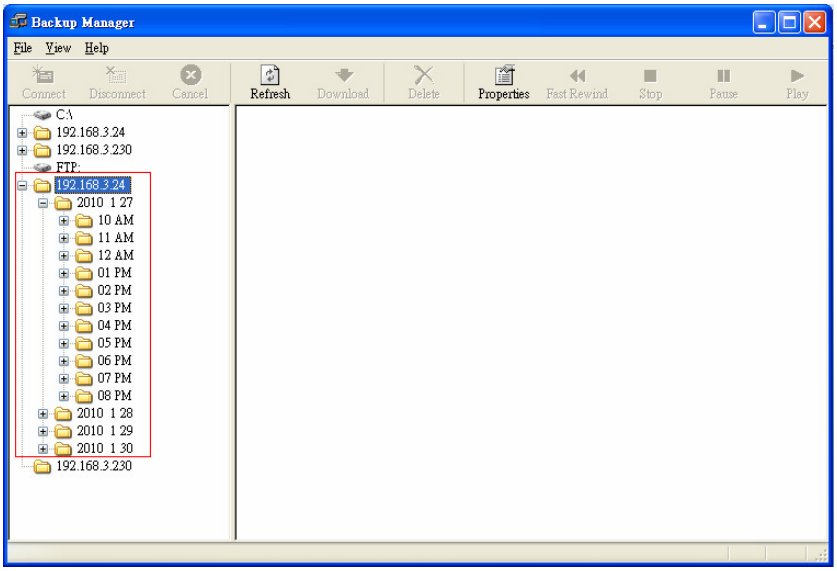
Chapter 7-4. Connect to NDR's FTP Service.

After adding a NDR profile into the Tree View, please click on the Profile and click on Connect button.



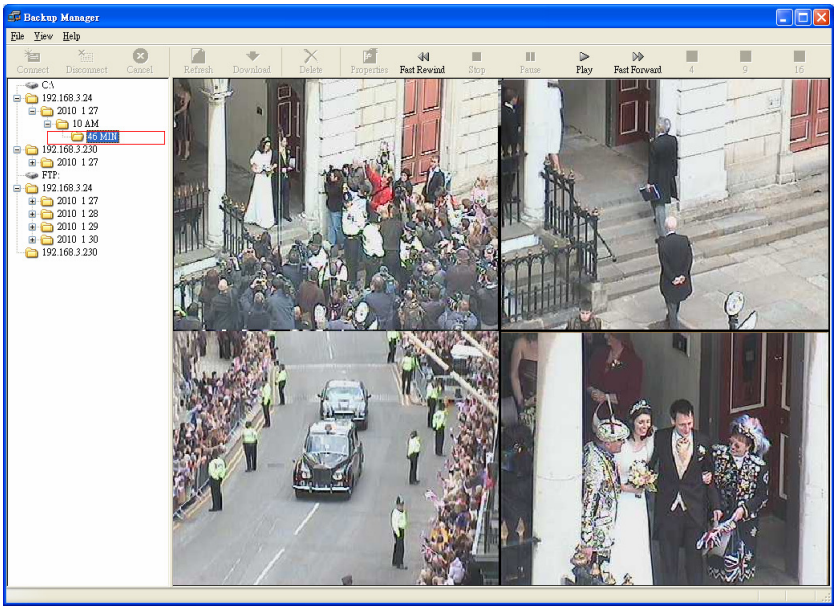
Chapter 7-5. Start to Download NDR's Files.

Once a NDR is connected, a list of time stamps of the NDR gets listed in the treeview. Select one of the stamp and click on Download button to download the files.



Chapter 7-6. Play local NDR's files.

Click on the time stamp of the local driver, the file clips can by playback by clicking on the Play button.



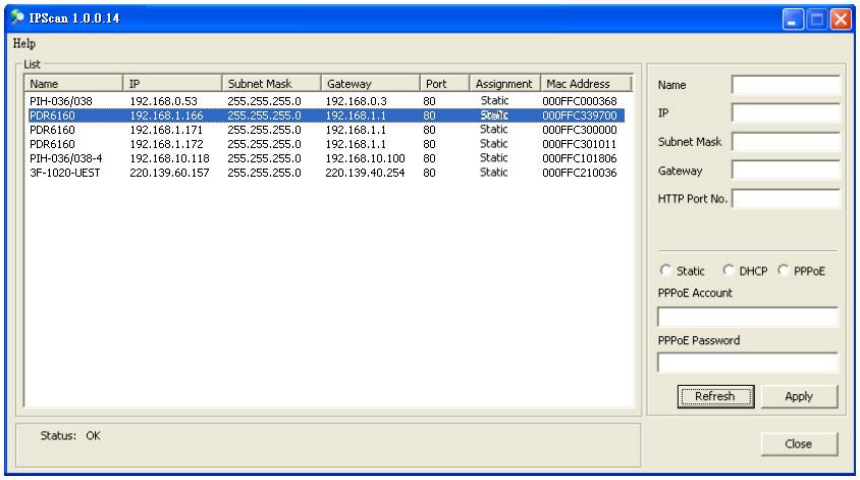
NETWORK

CHAPTER 8. NETWORK

There are two ways to access the NDR via network--Internet browser (web interface) or CMX application. All the features including live monitoring, menu setup, video playback, and file backup can be done by using web interface.

Chapter 8-1-1. Configuration

Make sure that network IP address, subnet mask, and gateway of the NDR are setup correctly. Always, consult your network administrator before installing NDR.



To setup IP address, a user can use IPScan utility to scan all the NDRs within a LAN. This powerful tool can help the user to monitor, to find, and to set IP configuration for all Merit LILIN's IP-based products.

Note: The default IP address of the NDR is 192.168.0.111

Chapter 8-1-2. Internet Ports

To access the NDR via Internet using a router, please make sure that IP Ports of the router (IP sharing device) are set. The NDR uses the following IP Ports by default:

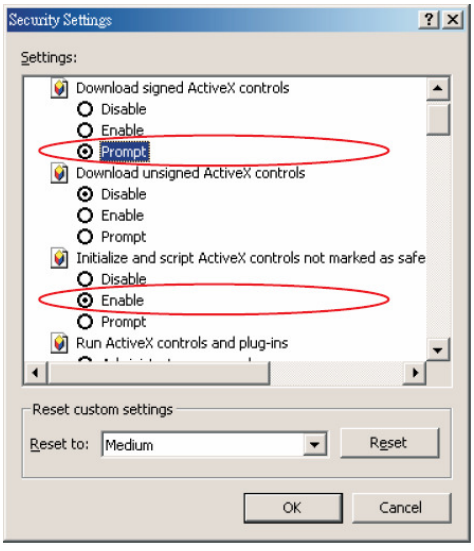
Port 80—HTML web pages
Port 3100—Command port

Chapter 8-2. Access the NDR via Internet Browser

To access the NDR, a user can use Internet browser to get live and stored video via Internet. The NDR's web interface also provides features of PTZ access, split window display, and system configurations. General NDR web interface is described in the following figure:

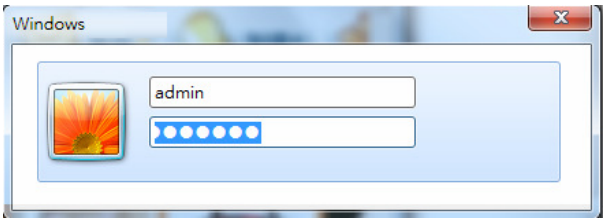
Chapter 8-2-1. Before Using Internet

Make sure that your Internet Browser allows signed ActiveX plug-in running on your PC. Set "Download Signed ActiveX plug-in controls" to "Prompt" and "Run ActiveX control and plug-in" to "Enable" at Internet Explore->Tools->Options->Security Settings.



Chapter 8-2-2. Logon

To logon the NDR, please type in the IP address in the HTTP address box via Internet browser. By default, type “192.168.1.171” in the HTTP address box to access the logon page. Use default password “1111” for Administrator, password “2222” for Operator, and password “3333” for Guest.



Note: Each user can be assigned for different access level at System->Password/Access.

Chapter 8-2-3. Hyper Link Panel

Hyper Link Panel contains major features including video source, configuration, and Backup Manager download page.

Configure the NDR via Web page

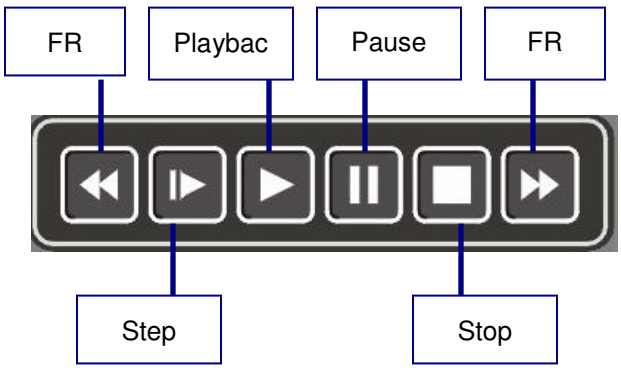
To configure the NDR via web page, please Click on “Configure” hyper link. There are internal server setting, general network setting, PTZ device setting, and video system setting allowed. The detail settings are described in the rest of the chapter.

Download H.264 NDR File Player

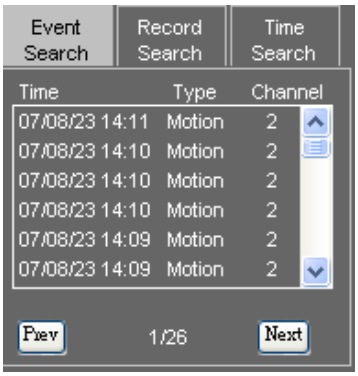
H.264 NDR File Player (Backup Manager) hyper link allows a user to download the application via Internet.

Chapter 8-2-4. Playback Over Network

The NDR allows a user to perform Play, FF, Pause/Step, and Stop operations on a remote NDR. The buttons are described in the following figure:



To perform playback operation, please click on Playback hyperlink. A playback dialog box shows up. Event search list, record search list, and time search are all integrated in the dialog box on the hyper link panel.

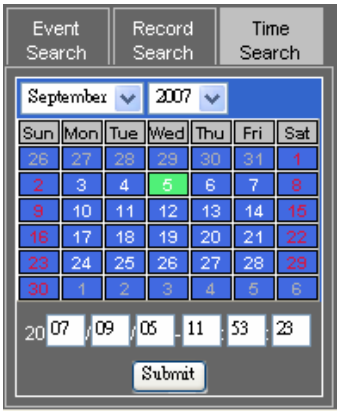


Normal Record and Event Lists

Double click on the record list item or event list item for playback. A user can also click on Search button to retrieve the video.

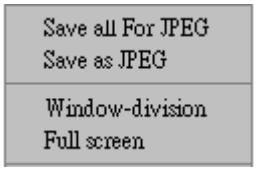
Time Search

Time search feature allows a user to search both master and slave HDDs by date and time. To perform time search function, please specify date and time information in date and time edit boxes. Press Search button to finish this task.



Chapter 8-2-5. Save JPEG file

To save live or playback video to JPEG files, please perform right mouse click on Video Display Control area. In system menu, select Save All as JPEG or Save JPEG for the live or playback video.



Chapter 8-2-6. Network Audio

The NDR can provide network audio monitoring for both live and playback video. To activate network audio, please open a camera's video in full screen on Video Display Control. It can deliver network audio to a PC for both live and playback video.

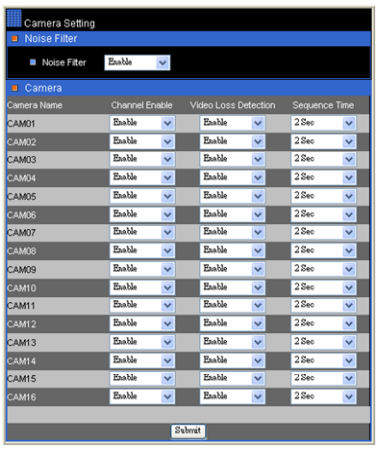
Chapter 8-3. Configure the NDR via Web page

Features of the NDR's main menu system can be configured via web interface. Features such as camera, alarm, recording, network, and backup can all get setup remotely.

Chapter 8-3-1. Camera Setting

Channel Enable—Enable or disable live video on main monitor

Sequence Time—Camera sequence time for main monitor



Chapter 8-3-2. Recording Setting

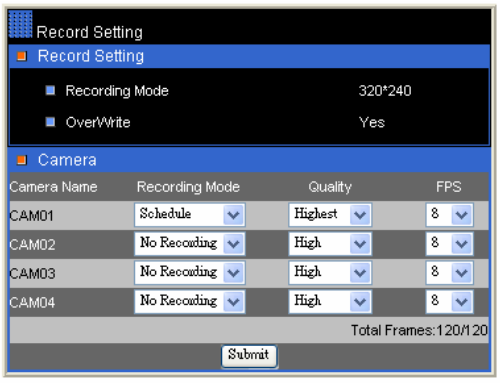
Current Rec Mode—Current NDR recording mode

HDD Overwritten—Option for circular recording

Camera Recording Mode--Assign schedule recording or no recording for a camera.

Camera Quality—Setup the recording quality for a camera

Camera FPS—recording frame rate for a camera



Chapter 8-3-3. Recording Schedule Table

A user can setup record schedule table via Internet, to setup scheduling table, please specify day and time with the recording mode. The user can also use Apply

Chapter 8-3-4. Alarm Setting

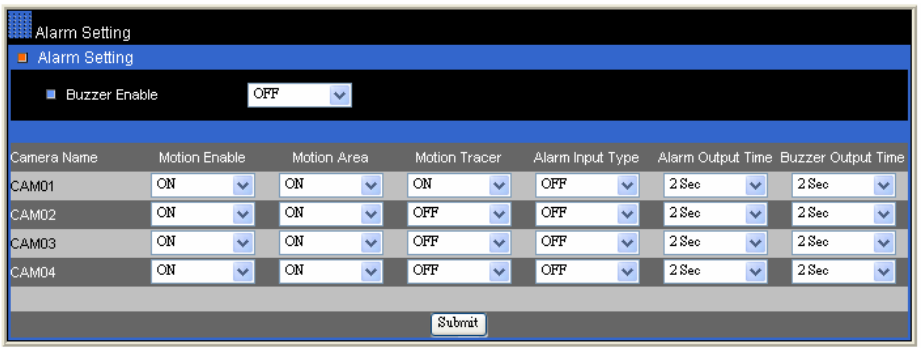
Buzzer Enable—Enable/disable NDR buzzer

Motion Enable—Enable/disable motion detection

Motion Tracer—Enable/disable motion trace

Alarm Input Type—Set alarm input as NO/NC or disable

Buzzer Output Time—Assign buzzer time for each camera



Chapter 8-3-5. Alarm E-mail

Enable Alarm E-Mail—Option for enable alarm/motion email

From—From E-Mail address

To—To E-Mail address

Host/IP Address—SMTP mail server's IP or DNS address

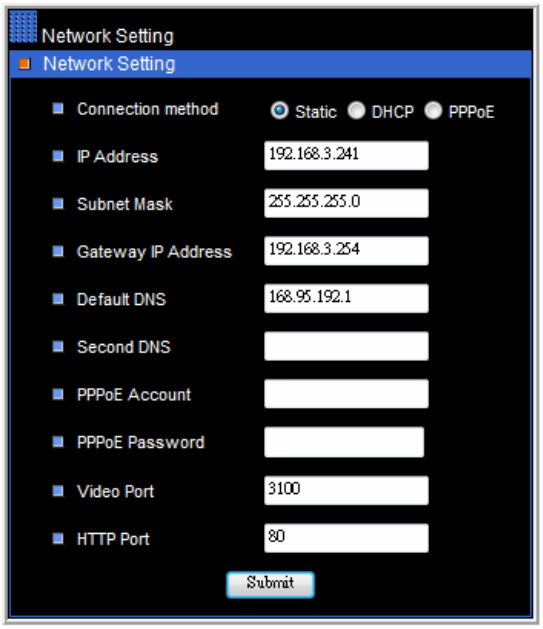
Authentication—Option for user and password authentication

E-Mail Account—receiver's E-Mail account

E-Mail Password—receiver's E-Mail account's password

Chapter 8-3-6. Network Setting

IP Address—NDR's IP address
Subnet Mask—Subnet mask
Gateway IP Address—Router/Gateway IP address
PPPoE account—PPPoE protocol account name
PPPoE password—PPPoE password
Video Port—The NDR's video port
HTTP Port—HTML port number



Chapter 8-3-7. System Setting

MAC Address: MAC address of the NDR

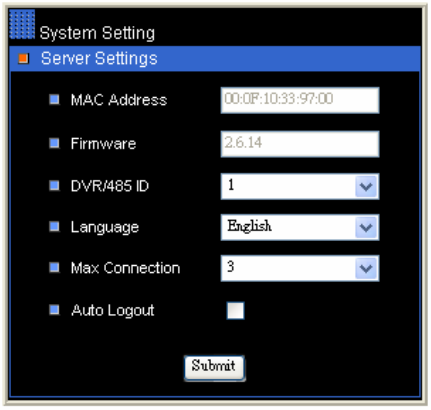
Firmware: firmware version of the NDR

NDR/485 ID: Addressable NDR ID for multiple NDRs remote control using remote controller and RS-485 keyboard.

Language: Language selection of the NDR

Max Connections: Maximum network connections allowed for the NDR

Auto Logout: force to logout remote accesses.



Chapter 8-3-7-1. Timer

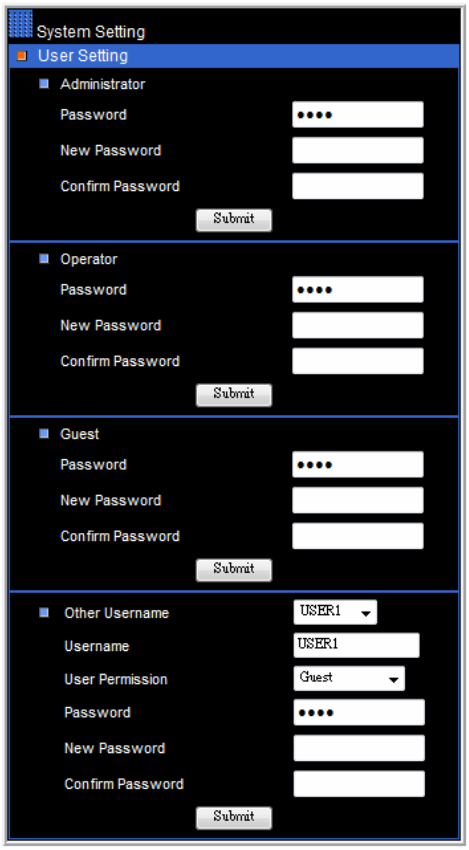
Date: Current date of the NDR

Time: Current time of the NDR

DST: Daylight saving time for a region

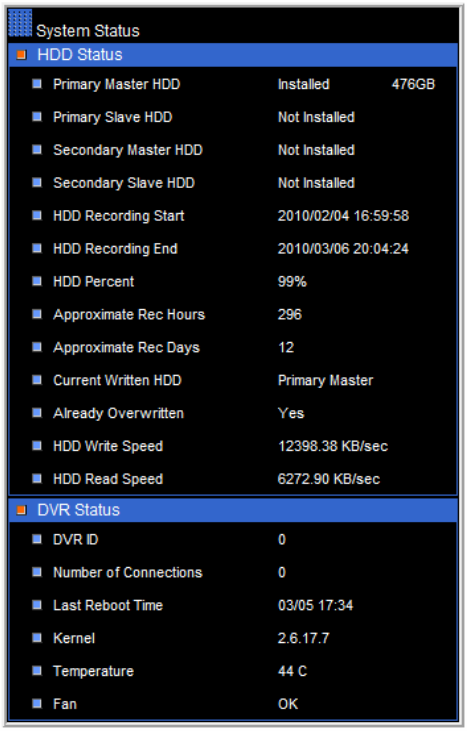
Chapter 8-3-7-2. User Setting

There are three levels (admin, operator and guest) of user authentication allowed in the NDR. To change password, please specify the old password, new password, and confirm password.



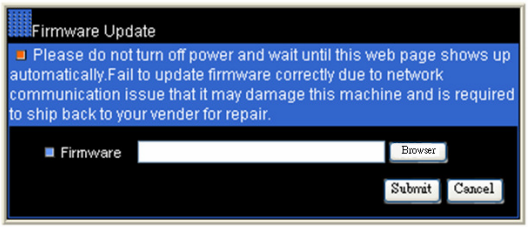
Chapter 8-3-7-3. System Status

Primary Master HDD—HDD detecting status of primary master IDE channel for the NDR
Primary Slave HDD—HDD detecting status of primary slave IDE channel for the NDR
Secondary Master HDD—HDD detecting status of secondary maser IDE channel for the NDR
Secondary Slave HDD—HDD detecting status of secondary slave IDE channel for the NDR
HDD Recording Start—Start recording time of the NDR
HDD Recording End-End recording time of the NDR
Approximate Rec Hours—Total recording hours available for the HDD(s)
Approximate Rec Days—Total recording days available for the HDD(s)
Current Written HDD—The HDD of the NDR in writing
Already Overwritten—The HDD(s) has been overwritten.
HDD Writing Speed—HDD writting speed detector
HDD Reading Speed—HDD reading speed detector
NDR ID—NDR ID/RS-485 ID
Number of Connections—Number of users accessing the NDR via network
Last Reboot Time—Last time for rebooting the NDR
Kernel—The OS version of the NDR
Temperature—NDR internal temperature indicator
Fan—Fan failure indicator



Chapter 8-3-7-4. Firmware update

This NDR is allowed to perform firmware upgrade via network. After NDR receives the firmware, it starts to perform firmware upgrade automatically. After finishing the firmware update, HTML page gets reload. The user can then start to operator the NDR.

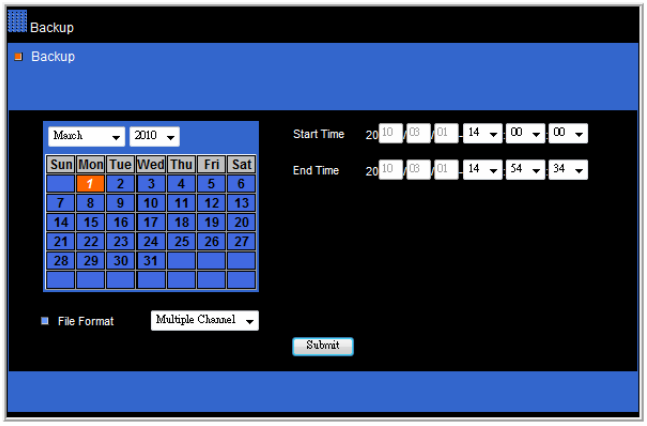


To perform network firmware update, please click on Browse button and locate the firmware. For 4-channel, the firmware file is flash104.bin.

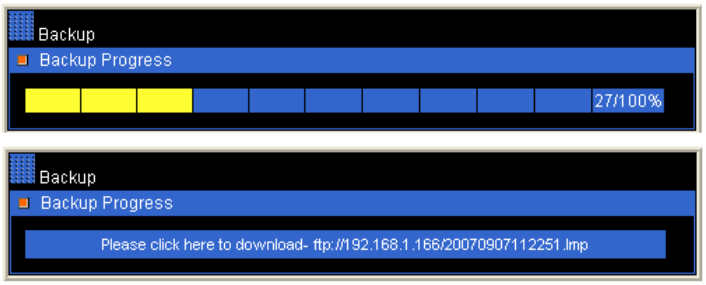
Note: If hardware is not installed, remote firmware update can not be performed.

Chapter 8-3-8. Backup

To perform remote video file backup, click Backup hyperlink. Please specify starting time and ending time. Click on Submit button to perform file backup task.



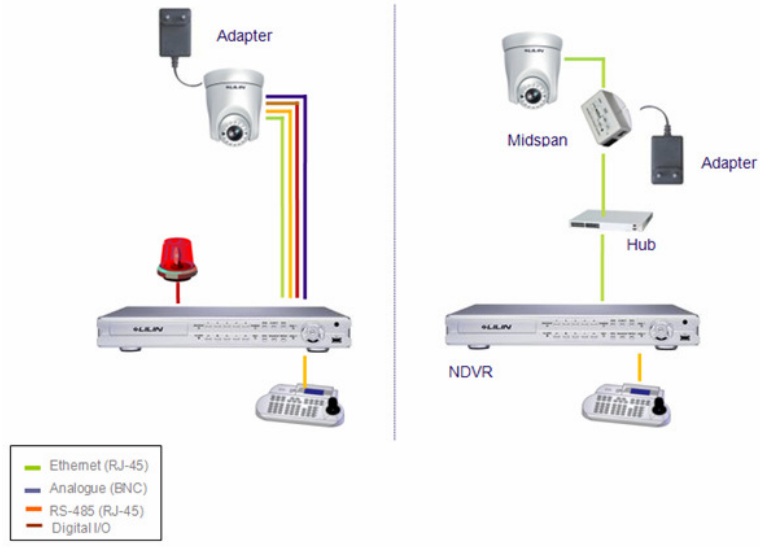
A backup progress bar shows up on the web page. After backup task ends, please click on the file hyperlink with LMP file extension. It can download the file from the NDR's internal HTTP server to your local PC.



To download the backup file(s) again, please click on "Backup File Download" hyperlink to download.

CHAPTER 9. KEYBOARD CONNECTION

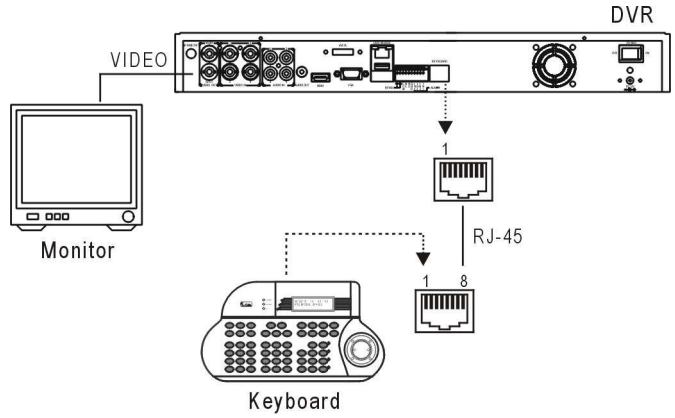
The advantage of using NDR series is that any combination of NDRs, RS-485 keyboards, analog PTZs, and IP PTZs can be controlled within one system via RJ-45 network wire.



Chapter 9-1. Connection between a NDR and a RS-485 Keyboard

To operator a NDR with a keyboard, please directly connect PIH-931D keyboard to the NDR's keyboard input using a RJ-45 cable. The NDR provides DC 12V for PIH-931D keyboard. There is no need for connecting power adapter.

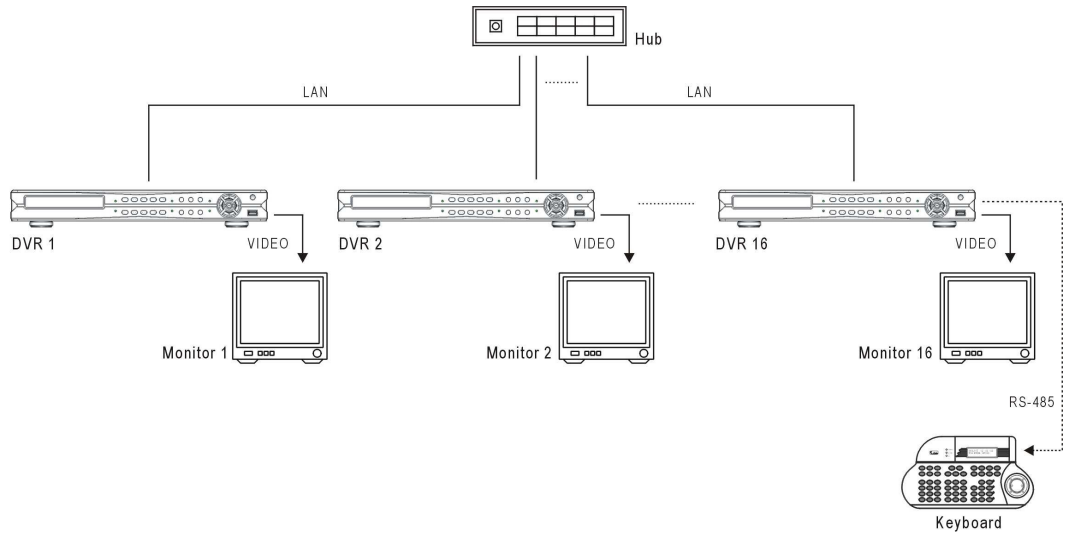
A NDR & A Keyboard Connection Diagram



Chapter 9-2. Connections of multiple LAN NDRs and a RS-485 Keyboard

To connect PIH-931D a keyboard with multiple NDRs via LAN, connect the RJ-45 cable from PIH-931D keyboard to the NDR's RJ-45 keyboard input. The NDRs are connected within a LAN. There are up to 255 NDRs can be connected and addressed.

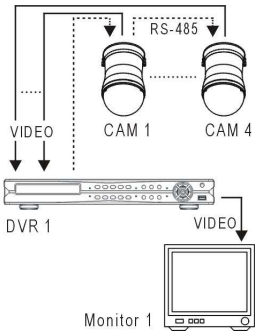
Multiple NDRs & A Keyboard Connection Diagram



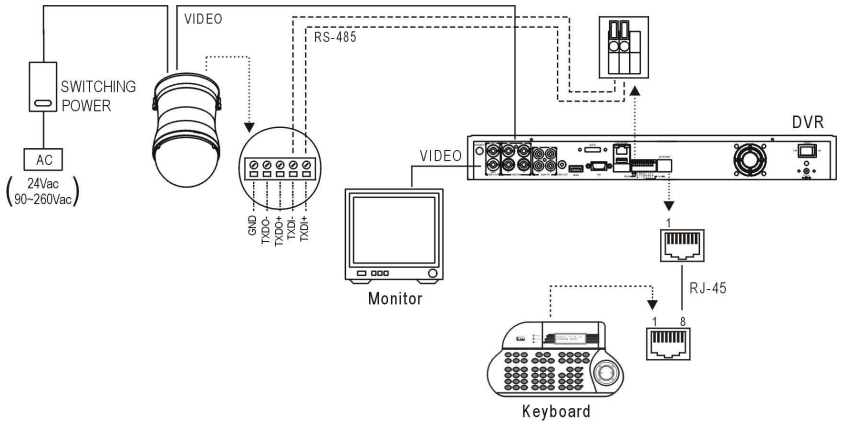
Chapter 9-3. Connections between a NDR and multiple RS-485 PTZs

Please use twisted pair cable to connect a PTZ to a NDR. The connections between PTZs, please refer PTZs' user manual.

NDRs & PTZs System Diagram

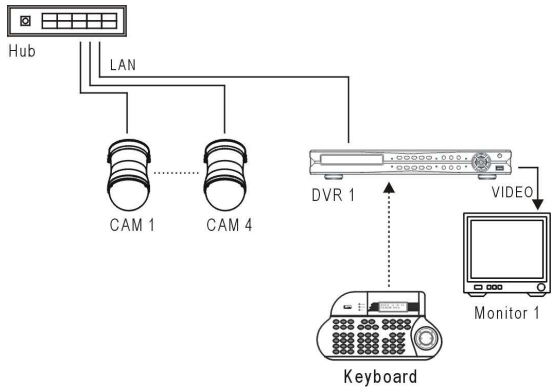


NDRs & PTZs Connection Diagram



Chapter 9-4. Connections between a NDR and an IP PTZs

The advantage of using hybrid solution is to simplify system installation. Video BNC cable, alarm cable, audio cable, and PTZ RS-485 can be replaced by RJ-45 cable. To setup above, please follow the diagram below:



Chapter 9-5. Operating a Keyboard for Controlling NDRs and PTZs

There are four main NDR features including multiplexer, menu setup, PTZ control, and playback controllable by the keyboard controller. To operate NDR by PIH-931D keyboard, please follow the following sections:

Chapter 9-5-1. Switch to NDR Control Mode

Press the SHIFT button and the DVR button to set the keyboard controller to the NDR operation mode.

2006/01/01 12:00:00
DVR MODE ID=000

Chapter 9-6. Control NDR's Multiplexer Features

A NDR's multiplexer features include calling a camera displayed on a monitor, window-division, and camera sequence display. The details are described in the following:

(1) Control a NDR

Enter a number from 1~255 using the number pad and press the DVR button to select the NDR.

2007/01/01 12:00:00
DVR MODE ID=xxx

Example: Control NDR #12.

(2) Call a Camera Displayed on Main Monitor

After a NDR gets controlled by using DVR button, enter a number from 1 to 4 using the number pad and press the CAM button to select the camera.

Example: Call camera #4 of NDR #12.

(3) Window-division on Main Monitor

To perform window division feature of a NDR, press the following window division buttons.

 4 window-division (Quad screen)

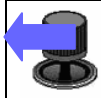
(4) NDR Sequential Display on Main Monitor

Press SEQ button to display cameras' full screen in a sequence with specific time period.

Chapter 9-7. Control NDR's Menu Setup

After an NDR gets controlled. Press the SET button to activate the NDR's setup menu.

Menu Setup Using 3D Joystick

	Enter a submenu		ESC/Exit a submenu
	Move cursor up		Move cursor down
	Decease a digit		Increase a digit
	Enter a submenu		ESC/Exit a submenu

Change page: To switch to another of log view, playback event, WS-Discovery, and other list, please use << or >> for previous page or next page.

Chapter 9-7-1. OK or Cancel button in Submenu System

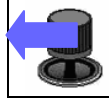
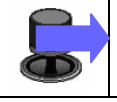
There is OK or Cancel button in submenu system. The shortcut buttons is SET or ESC button on the keyboard.

Chapter 9-8. Control NDR Playback

To perform NDR playback feature, press Play button or Search button.

Play button can invoke playback menu. Use 3D joystick to move menu cursor and perform playback feature.

Search button can invoke time search feature of the NDR. Use 3D joystick to move menu cursor.

	1. Enter a submenu in playback menu 2. Fast forward video in playback mode		1. ESC/Exit a submenu in playback menu 2. Fast reverse video in playback mode
	Move cursor up		Move cursor down
	Decease a digit		Increase a digit

Video Playback Operations

 Pause: Press PAUSE button during playing video can pause the video in pause mode.

 Play: Replay the video after Pause, Fast Forward, or Fast Rewind.

 Fast Forward: Fast Forward the playback video.

 Fast rewind: Fast Rewind the playback video.

 Stop: Stop the playback video and return to playback menu.

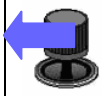
 Record/Stop Record: Perform NDR record or stop NDR recording operation.

Select various split display modes on live and playback monitoring.

Chapter 9-9. Control PTZ

To control PTZ camera in live monitoring mode, press Enter button to gain camera control sequentially in window-division mode or perform call camera in full screen mode.

Once a camera of a NDR gets controlled, the following PTZ operations can be performed.

	Zoom in		Zoom out
	Tilt up		Tilt down
	Pan left		Pan right
	Zoom in		Zoom out
	Focus far		Focus near
	IRIS large		IRIS small
	Auto Pan		

Chapter 9-9-1. Recall a Preset

To recall a preset point of a PTZ device, please press number key and followed by Preset key.

Example #1: Recall preset #16 of camera #21.

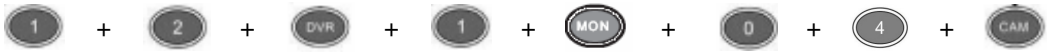
Chapter 9-10. Control a NDR's Spot Monitor

A user can also use a PIH-931D keyboard to control NDRs' spot monitors. The spot monitor is equipped with a Quad processor for quad screen accessed by a keyboard. Sequence feature of spot monitor can also be accessed.

Call a Camera Displayed on a Spot Monitor

After a NDR gets controlled, press #1 + MON for spot monitor output and enter a number from 1 to 4 using the number pad followed by the CAM button to select the camera.

Example: Call camera #4 displayed on NDR #12's spot monitor .

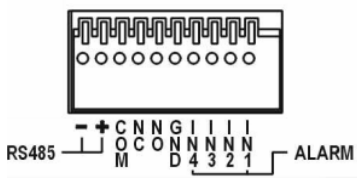


Perform Sequence on a Spot Monitor

After a NDR gets controlled, press #1 + MON for spot monitor output and followed by the SEQ button.

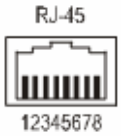
APPENDIX

Appendix A. Alarm I/Os and RS485 for PTZ



Pin 1	Alarm input 1
Pin 2	Alarm input 2
Pin 3	Alarm input 3
Pin 4	Alarm input 4
Pin 5	GND
Pin 6	ALARM NO (normal open)
Pin 7	ALARM NC (normal close)
Pin 8	COM
Pin 9	RS485+
Pin 10	RS485-

Appendix B. RS485 Input and Output Pin Assignment



Terminal	Name
1	--
2	--
3	--
4	--
5	RS-485 – Out Link Keyboard
6	RS-485 + Out Link Keyboard
7	GND
8	DC +12V input

Appendix C. Hard Disk Drive Support List

Model	HDD Size
WD5000AVDS	500GB
WD5000AVVS	500GB
WD10EVDS	1TB
WD3200AVVS	320GB
WD2500AVVS	250GB
WD20EVDS	2TB
ST3500418AS	500GB
WD10EURS-630AB1	1TB
WD15EURS-63S48Y0	1.5TB
WD20EURS-63S48Y0	2TB

Appendix D. Supported USB-DVD/RW

Manufacturer	Model
SONY	DRX-S30U-W
Lite-On	eSAU108
Lite-On	eTAU108
Lite-On	eHAU424-01

Brand	Specification	Capacity	Max Speed	Note
Melody	DVD-RW	4.7GB	4x	Rewritable
RiTEK	DVD-RW	4.7GB	8x	Rewritable
Sony	DVD+R	4.7GB	8x	Burn once
OEM disk	DVD-R	4.7GB	8x	Burn once

Appendix E. Supported USB Flash Disk

Transcend 8G, 16G ; Kingston 4G, 8G, 16G; Sanddisk 8G, 16G

Appendix F. Hard Disk Recording Table

Approximate recording days and hours can also be found at Menu->System->HDD Info.

Recording Quality		Highest		High		Standard		Low	
HDD	Picture size	17	KB/Pic	12	KB/Pic	9	KB/Pic	4	KB/Pic
250	GB	1	Days	2	Days	3	Days	5	Days
500	GB	3	Days	5	Days	7	Days	12	Days
750	GB	4	Days	6	Days	8	Days	19	Days
1000	GB	5	Days	8	Days	11	Days	25	Days
2000	GB	11	Days	16	Days	22	Days	51	Days

Note: #1. Recording frame rate is 30 FPS * 4-Ch Analog camera at D1 resolution.
#2. Above information may be inaccurate due to the installation environment.

HDD	Picture size		KB/Pic
250	GB	5	Days
500	GB	10	Days
750	GB	15	Days
1000	GB	20	Days
2000	GB	40	Days

Note: #1. Recording frame rate is 30 FPS * 4-Ch IP camera at D1 resolution.
#2. Above information may be inaccurate due to the installation environment.

	Specification
Models	NDR104
	Real time Full D1 pure Hybrid NDR
Recording	SATA HDD: internal * 2 (A)
Recording mode	External alarm / motion detection / schedule / manual
Video source	Analog or IP camera * 4 for recording
Speed	PAL: Full D1 100 FPS/Sec at 720 * 576 NTSC: Full D1 120 FPS/Sec at 720 * 480
Resolution	Full D1: 720 * 576 (PAL) 720*480 (NTSC) / CIF: 320 * 288 (PAL) 320 * 240 (NTSC)
Schedule	7 day * 24 hrs time table, recording mode configurable
Backup	USB 2.0 flash disk / HTTP file download / Audio supported
DVD/RW	External USB DVD/RW
Playback	H.264 AVC video
Speed	FR: 2x, 4x, 8x, 16x, 32x, 64x / FF: 2x, 4x, 8x,16x, 32x, 64x
Compression	H.264 AVC and JPEG
Video Input	Analog cameras and/or IP cameras
Camera Name	12 characters
Live video	PAL: 100 FPS/Sec NTSC: 120 FPS/Sec
Video Output	BNC * 2
VGA output	3D intellectual motion adoptive refinement with vivid image enhancement VGA engine
HDMI	Up to 1920 * 1080P
Backlight saving	LCD backlight saving mode
Multiplexer	Sequence / digital zoom / freeze
Digital zoom	ROI for 5X and 9X at live and playback mode
Split screen	4
Spot monitor	Live sequence or alarm switching
Management	
Reports	Full alarm, configuration, and operation reports exporting over HTTP or USB
Authentication	User authentication with feature configurable
Diagnostic	NDR Internal temperature, fan failure detection, and HDD I/O speed
Recording day	Dynamic recording day calculation
Alarm/event	Alarm input * 4 and alarm output * 2 (NO/NC)
Motion	Motion grid 12*12 each channel, 8 sensitivities
Event	External alarm, video loss, stop recording, power recovering, motion detection, schedule, logon, HDD format
Email	Alarm notification with JPEG attachments
Accessories	Remote controller addressable up to 255 NDRs
P/T/Z protocol	LILIN MLP2 and Pelco over HTTP/ONVIF/RS-485
Keyboards	PIH-931D keyboard for controlling NDR/IP cameras over network
IR receiver	Extra IR extension connector
Mouse	USB / PS-2, drag-n-drop, right-mouse-click, mouse wheel.
Audio	G.711 audio, RCA * 1 output (0.7Vp-p, 300 Hz to 3KHz)
Remote control	Yes
Network	Direct Internet browser access / multiple users access
Protocols	ARP / TCP/IP / UDP / HTTP / SMTP / FTP / DDNS / PPPoE / DynDNS / ONVIF compliant / NTP
Web	Live / event log & time search playback / AVI / snapshot
DVR status	HTML DVR status
IPScan	WS-Discovery and IPScan supported, easy-to-setup for IP address
Software	
BackupManager	Multiple NDRs FTP file download and multi-channel playback
Mobile phone solution	iPhone, iPad, and Android mobile phone supported
Others	
WDT	Hardware watchdog timer
DST	Daylight saving time
Multilanguage	English, Chinese, Spanish, Danish, Swiss, Norwegian, Arabic, Japanese, Germany, French, Polish, Portuguese, Vietnam, Italian
CPU/OS	32-bit RISC Processor, ARM926 SoC 336 MHz, Linux 2.6 kernel
Power	DC 12V, 4.2A, 48W
Working Env.	Temp: 0℃ ~ +50℃ / Humidity: 0%~80%
Dimension	434 mm x 364.3 * 52.8 mm (rackmountable)
Weight	5.2 Kg w/o HDD