

16 CHANNEL NETWORK READY DVR



DVR-16/IP

User's Manual

Precautions

- All the safety and operation instructions should be read before the DVR-16/IP is operated.
- All the safety and operation instructions should be retained for future reference.
- Comply with operating instruction and notice warning information.
- Do not use strong or abrasive detergents when cleaning the DVR-16/IP.
- There are no user-serviceable parts inside. Contact qualified service personnel for maintenance.
- Do not expose the DVR-16/IP to water or moisture and do not try to operate it in wet areas. Well-chosen cover is needed when you put the DVR-16/IP in outdoor areas.
- Make sure that two ends of the power port are plugged.
- Do not drop metallic parts through slots or slop the DVR-16/IP with any liquid.
- Do not attempt to disassemble the DVR-16/IP.
- Contact qualified service personnel if the following situation happens:
 - The power-supply cord or plug is damaged.
 - The DVR-16/IP has been exposed to rain or water.
 - The DVR-16/IP does not operate normally by following the operating instructions.
 - The DVR-16/IP falls to the ground or its cover is damaged.
- When replacement parts are required, make sure that the service technician has used replacement parts specified by original seller or that these parts have the same characteristics as the original ones. Unauthorized substitutions may result in fire, electric shock, or other hazards.
- Use only with a mounting accessory recommended by original seller.
- Never push objects of any kind into this DVR-16/IP through openings as they may touch dangerous voltage points or short cut parts that could result in a fire or electric shock.
- Certify operating safety by qualified installer.
- If an outside cable system is connected to the DVR-16/IP, be sure the cable system is grounded so as to provide some protection against voltage surges and built-in static charges.
- All normal precautions to avoid component damage due to electrostatic discharge should be taken during installation and operation.
- To prevent electric shock, do not remove screws or covers.

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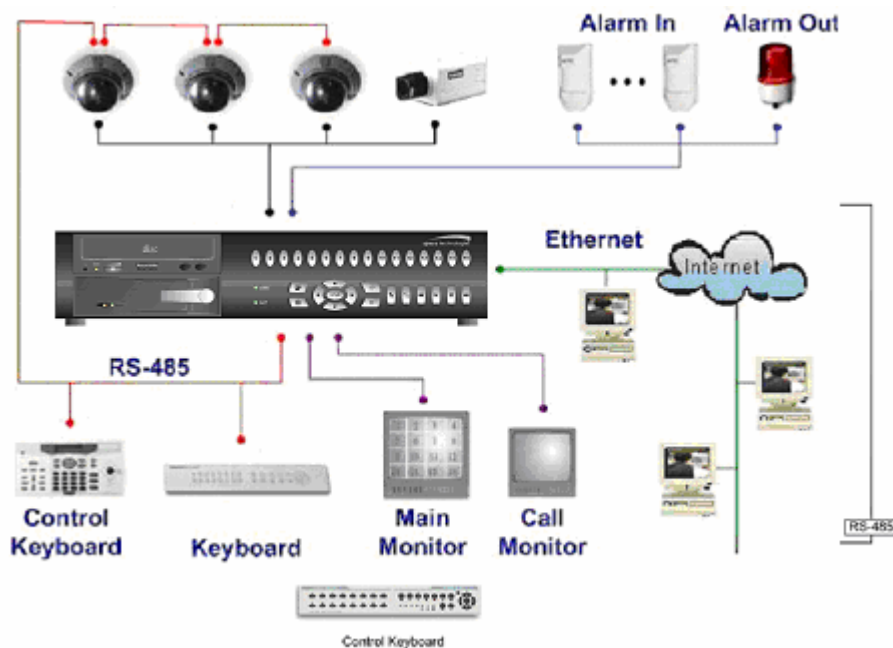
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1. Features

- Powerful Wavelet compression
- Proprietary real time O.S.
- Duplex operation: View live and playback video simultaneously
- Support NTSC and PAL system
- Programmable recording picture rate (up to 60 PPS)
- Recording priority of each camera dynamically adjusted by motion detection
- Hot swappable HDD
- Built in CD-RW for video clip export
- Data format compatible with Windows
- Powerful Alarm Processor allows flexible alarm trigger and response configuration
- Programmable motion detection area and sensitivity for each camera individually
- Different motion sensitivities available for day and night time
- Intelligent algorithm refreshing main monitor display dynamically
- User friendly video search
- Versatile multiple-windows display format
- Password to secure installation authorization
- System auto reboot after power interruption
- System software stored in nonvolatile memory, free from hard disk crash
- P/ T/ Z control available
- Remote monitoring and control through Internet or Ethernet (Optional)

2. DVR-16/IP Application

DVR-16/IP is a cost-effective and easy-to-use multiplexed digital video recorder, equipped with proprietary real time operating system, powerful Wavelet compression engine, duplex multiplexer front-end, CD-RW and the hot swappable Hard Disc Drive.



3. Quick Installation Guide

The DVR-16/IP is equipped with a mobile rack, the HDD is hot-swappable. You can exchange the HDD when the HDD is full. The following figures illustrate how to install HDD into the removable cartridge.

Step1: Pull the active-handle outwards and unlock with the miniature key provided (Figure 1).



<Figure 1>

Step2: Pull the handle outwards till the carrier body is out of the cartridge (Figure 1).



<Figure 2>

Step4: Insert the DC power cable and IDE cable on the HDD. Make sure the HDD is set to "Master" (Figure 2).

Step5: Position the HDD into carrier body and slide the top cover back to secure. Secure the HDD using the screws provided (Figure 3).



<Figure 3>

Step6: Slide the carrier body back in the cartridge frame and lock it with the key provided. Then push the active-handle inwards (Figure 4).



<Figure 4>

4. Front Panel Introduction

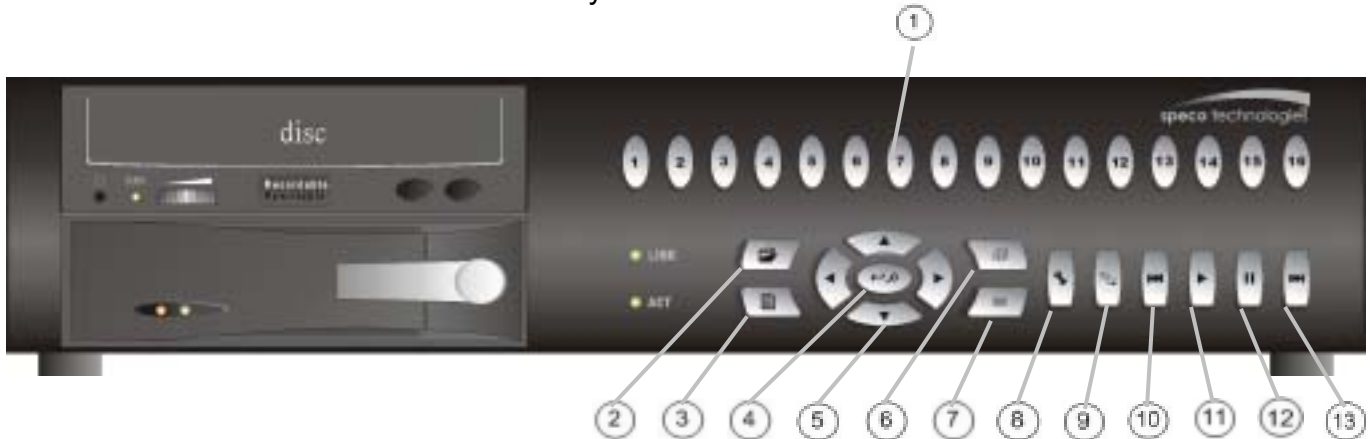
The DVR-16/IP front panel controls enable you to perform preset and programmable functions. The figures below show the available buttons on the front panels.



**DVR-16/IP starts detecting the camera and recording automatically after power is on.

4.1 The Buttons on the Front Panel

The following are the introductions of DVR-16/IP front panel buttons. The front panel is illustrated and each button is described by name and function.



① CHANNEL 1~16

1. The number of channel buttons corresponds to the number of channels supported by the unit. Press one of these buttons to view the channel full screen.
2. Press the number button corresponding to the wanted camera, and then press the SET button to go to the “External Devices” Menu; you should go to the “Configuration Table 1” first to set the correspondent dome’s “PTZ” item to enable.

② GOTO

In playback mode, you can press GOTO to enter GOTO menu. This menu allows you to search for certain recorded video by date and time, or you may either go to the beginning or the end of the recorded video.

GOTO	
1 Minute	30
2 Hour	20
3 Day	21
4 Month	11
5 Year	02
5 Goto Begin	
6 Goto End	
7 Exit	

③ MENU

Press this button to enter OSD setup menu (the LED will be lit).

④ ENTER / ZOOM

1. In OSD menu mode, this button is used to make the selection or save settings.
2. In full-screened mode, this button functions as a “2x2 Zoom In” button (the LED will be lit).

⑤ DIRECTION

1. These buttons function as directional control in OSD menu.
2. In Zoom mode, press these buttons to view the wanted viewing area.
3. In multi-window mode, the DVR-16/IP allows you to select one window to playback the recorded video while the DVR-16/IP is in Live mode. Press one of these buttons and a window cursor will be displayed. Using Direction buttons to move the cursor to desired window, and then press Play button to playback the recorded video. The password is needed before you playback the recorded video.

⑥ SEQ

1. In Live mode, press this button to enter automatic sequential sequencing mode, and press it again to exit. The button LED will be lit (and also those channel LEDs currently in display).
2. The DVR-16/IP allows you to setup the sequence. In Sequence mode, press SET to enter and press MODE to exit this Sequence Setup menu. The number on the top is to remind you which sequence is being set. Other items will be described by following paragraphs.

1	Pages	16	11	Page 8
2	Mode	0	12	Page 9
3	Timer	5	13	Page 10
4	Page 1		14	Page 11
5	Page 2		15	Page 12
6	Page 3		16	Page 13
7	Page 4		17	Page 14
8	Page 5		18	Page 15
9	Page 6		19	Page 16
10	Page 7		20	Exit

Pages

This first item allows you to decide the total number of pages for this sequence. The maximum value is 16, which means that each sequence can have up to 16 pages.

Mode

This item allows you to decide which display mode will be used in this sequence. “0” represents “full screen” mode, ...and “7” represents 16-windows mode.

Timer

This item allows you to set each page’s dwell time.

Page Setup

These items allow you to setup each page. Press Enter for page setup. Use directional buttons to change each page’s channel setting.

⑦ ESC

1. In OSD mode, press this button to return to previous menu. At the end of playback, the DVR-16/IP goes to Pause mode; press ESC to return to Record mode.
2. If you press this button and “Down Arrow” simultaneously, the DVR-16/IP will be shutdown.

⑧ SET

In multi-windows display mode, press this button to enter SET mode.

The menu will appear with the cursor over the first window. Use DIRECTION buttons to move the cursor, then press the CHANNEL button to assign the camera directly. The cursor will move to next window automatically. Press ESC button to exit SET mode.

⑨ MODE

Press this button to select display formats (4, 5, 7, 9,10,13 and 16 windows). The camera LEDs of selected cameras should be lit.

⑩ FAST REWIND

In playback mode, press this button to play recorded video in reverse direction. Press it repeatedly can change the rewind speed: x1, x2, x4 and x8. If the button has been pressed and held for 3 seconds, the DVR-16/IP will go to the beginning of the recorded video.

⑪ PLAY

1. In Live mode, press this button to start playing back recorded video.
2. In Playback mode, press this button to stop playing (and the DVR-16/IP will start recording automatically). When the DVR-16/IP has played back to the end of the video, it will pause on the very last image ,and you can press ESC to leave the image and start recording again.

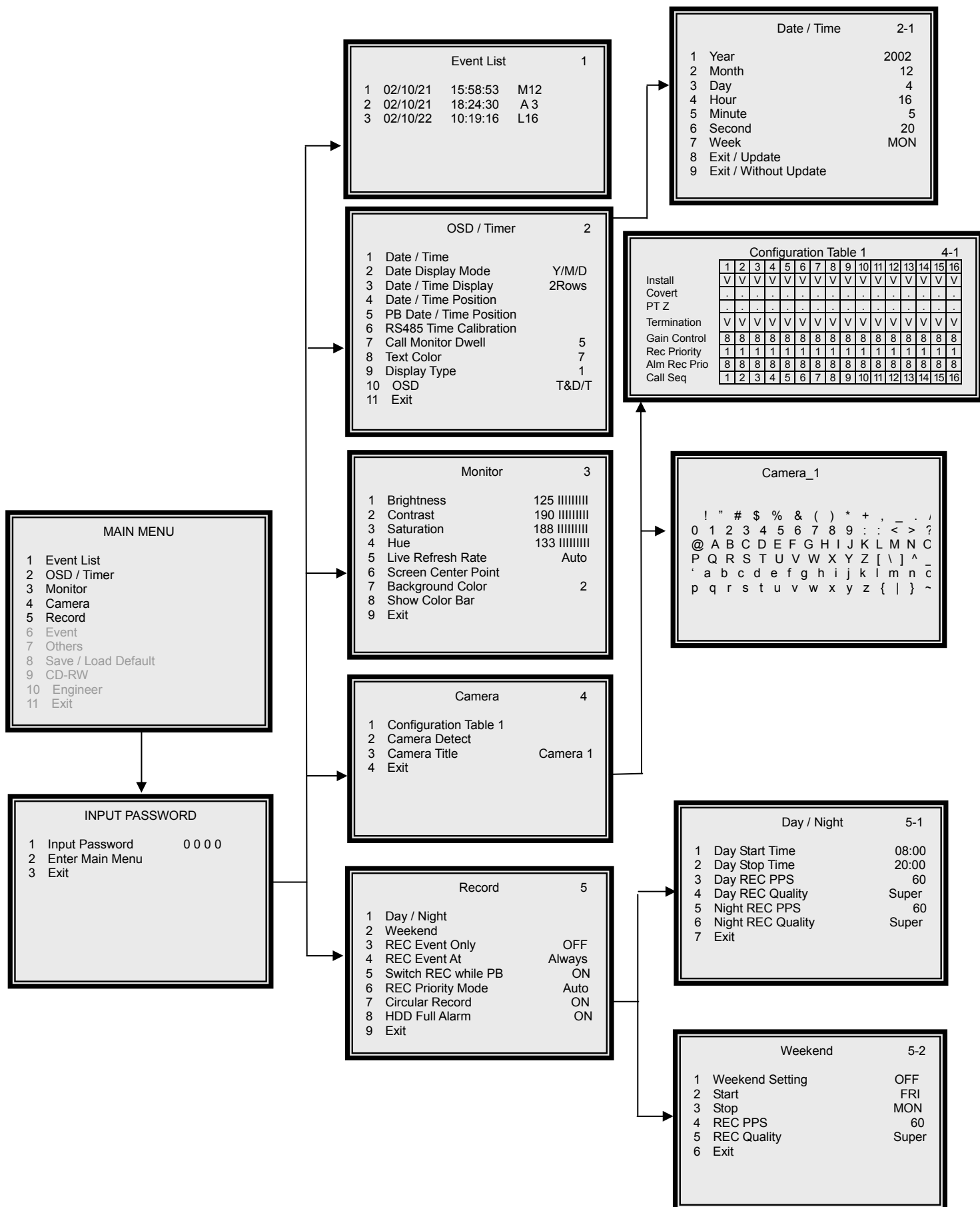
⑫ PAUSE

Press this button to pause playback video or to freeze live video. During this time of pause, the pause LED would be lit.

⑬ FAST FORWARD

In playback mode, press this button to play recorded video in forward direction. Press it repeatedly to increase the speed by x1 x2, x4 and x8. If the button has been pressed and held for 3 seconds, the DVR-16/IP will go to the end of video.

5. DVR-16/IP Menu Tree



MAIN MENU

- 1 Event List
- 2 OSD / Timer
- 3 Monitor
- 4 Camera
- 5 Record
- 6 Event**
- 7 Others
- 8 Save / Load Default
- 9 CD-RW
- 10 Engineer
- 11 Exit

Event 6

- 1 Day / Night Switch
- 2 Event Response
- 3 Motion Detect
- 4 Alarm In
- 5 Video Loss Detect Dis
- 6 Alarm Set / Reset SW En
- 7 Release Time
- 8 Clear Event List
- 9 Exit

Day / Night Switch 6-1

- 1 Day / Night SW Enable No
- 2 Switch<OFF> Day
- 3 Delay For Active 60
- 4 Exit

Event Response 6-2

- 1 Internal Buzzer ON
- 2 Event Relay Output ON
- 3 Event List ON
- 4 Event Full Screen OFF
- 5 Call Event Display ON
- 6 Response Duration 10
- 7 Any Key To Stop ON
- 8 Exit

Motion Detect 6-3

- 1 Motion Detect OFF
- 2 Configuration Table 2
- 3 Condition Set Up
- 4 Exit

Camera_1 6-3-3

- 1 Select Camera 1
- 2 Detect Area
- 3 Sensitivity
- 4 Exit

Alarm In 6-4

- 1 Alarm In Detect OFF
- 2 Configuration Table 2
- 3 Exit

Release Time 6-7

- 1 Motion RES Time 2
- 2 Video Loss RES Time 2
- 3 Alarm In RES Time 10
- 4 Exit

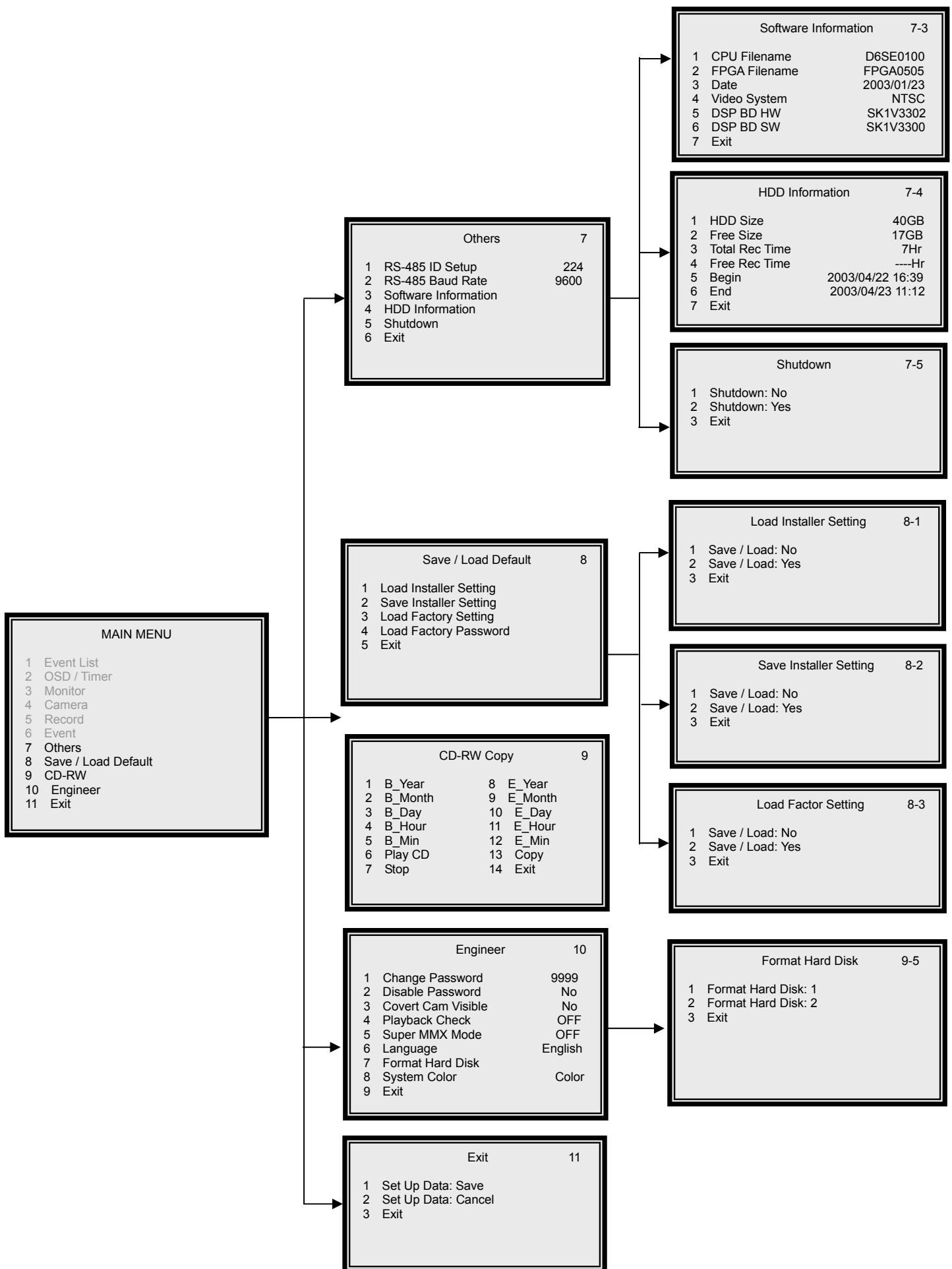
Clear Event List 6-8

- 1 Clear Event List: No
- 2 Clear Event List: Yes
- 3 Exit

Configuration Table 2 6-4-2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Alm In Type	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Day: Alm In	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Day: Motion	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Night: Alm In	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Night: Motion	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

ESC For Return



6. OSD Menu Setup

The OSD menu is composed in hierarchy architecture, it allows you to configure the DVR-16/IP according to the application environment. Many options can be selected via the operation of the OSD menu.

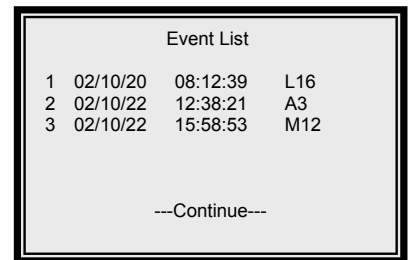
To enter this OSD menu, press the MENU button of the front panel, then the OSD menu will appear with a highlight cursor over the first item. The cursor can be moved by the up and down buttons.

If you want to exit the OSD menu, you may either 1)select the last item “EXIT” and then press ENTER button; or 2)press ESC button of the front panel directly.



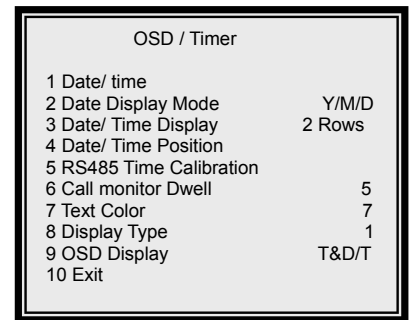
6.1 Event List

The item allows you to enter the Event List. Up to 255 events will be logged using non-volatile memory. The memory architecture is “First In First Out”, so always the latest events remain on the list.



6.2 OSD/ Timer

This menu allows you to set the current date/ time, and other On-Screen-Display (OSD) parameters. You can press the ENTER button to enter the sub-menu.



6.2.1 Date/ Time

Item 1~7 allow you to set the date and time, use the right/ left buttons to adjust the DVR-16/IP to local time.

If you want to save the modification(s), move the cursor to **8 Exit/ Update** and press Enter button, the adjusted setting(s) will be memorized. If you don't want to save the modifications, move the cursor to **9 Exit / Without Update** and press Enter button, the adjusted setting(s) will be discarded.



6.2.2 Date Display Mode

This item allows you to select a format of date OSD display. You can use right/ left buttons to choose the select from: Y/M/D, M/D/Y and D/M/Y.

6.2.3 Date/ Time Display

This item allows you to select one or two rows for Date /time OSD display.

6.2.4 Date/ Time Position

This item allows you to move current Date/ Time Display to any position. Use the DIRECTION buttons to move Date/ Time display.

6.2.5 PB Date/ Time Position

This item allows you to move the recorded Date/ Time Display to any position.

6.2.6 RS-485 Time Calibration

RS-485 is used for multi-point communications: many devices can be connected to the same bus. Move to this item and press the ETNER button, all DVR-16/IP timers will be synchronized.

6.2.7 Call Monitor Dwell

The call monitor is always switching full screen video of all installed cameras, this item allows you to set the Dwell Time between switching. The timer value ranges from 1 to 255 (the unit is second).

6.2.8 Text Color

This item allows you to select one from 16 different colors for all display on the screen.

6.2.9 Display Type

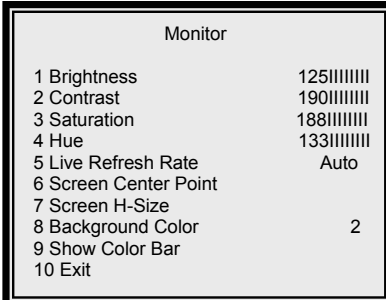
This item allows you to select one from 6 different text types (reverse, bold...) for on Date/ Time display.

6.2.10 OSD

This item allows you to select which information you want to display; you can choose from 1)T&D/T(camera title and date/time); 2)Title; 3)D/T(date/time); 4)OFF.

6.3.Monitor

This menu allows you to adjust the quality of the displayed image.



Monitor	
1 Brightness	125|||||||
2 Contrast	190|||||||
3 Saturation	188|||||||
4 Hue	133|||||||
5 Live Refresh Rate	Auto
6 Screen Center Point	
7 Screen H-Size	
8 Background Color	2
9 Show Color Bar	
10 Exit	

6.3.1 Video Setup

Item 1~4 involve adjusting the brightness, contrast, saturation and hue of attached cameras. You may use the right/ left DIRECTION buttons to adjust the value.

6.3.2 Live Refresh Rate

This item allows you to setup the camera refresh rate on the Main monitor; use right/ left buttons to select “Fix” or “Auto”. “Fix” means each camera has the same refresh rate. “Auto” means the camera with more motion will get higher refresh rate automatically.

6.3.3 Screen Center Point

This item allows you to move the center point of the main monitor. Use the DIRECTION buttons to pan/ tilt the monitor center point. Press ESC button to exit when finished.

6.3.4 Background Color

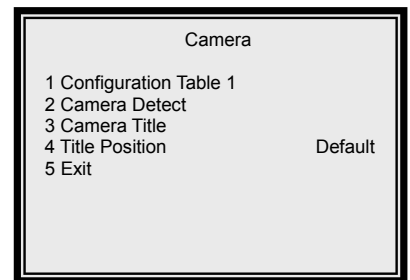
This item allows you to select 1 from 16 different colors for the background color of 1) video-loss, 2) camera un-installed and 3) covert situations.

6.3.5 Show Color Bar

This function allows you to fine tune the monitor’s performance using color bar pattern generated by the DVR-16/IP.

6.4 Camera

This menu allows you to adjust camera-related items, ex. Camera title, Power On Detect, etc.



6.4.1 Configuration Table 1

Configuration Table 1 allows you to configure 5 parameters for each camera individually.

Configuration Table 1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Install		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Covert		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PTZ		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Termination		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Gain Control		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
REC Priority		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Alm REC Prio		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Call Seq		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

ESC For Return

6.4.1.1 Install

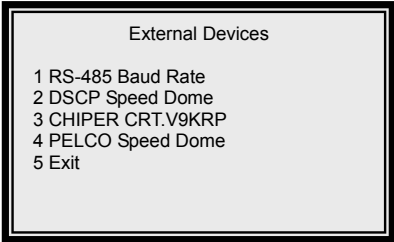
This item allows you to install each channel on **1 Configuration Table1**. Every channel is “installed” by default; you may uninstall any one of them manually. Once a channel is un-installed, all related functions are disabled (√ = camera installed; • = camera not installed).

6.4.1.2 Covert

This item allows you to make each camera’s input invisible (covert) on both main and call monitor, while DVR-16/IP keeps recording the camera’s video. The default setting is every camera visible (√ = covert; • = not covert).

6.4.1.3 PTZ

Set this item to enable, users can set the following external device OSD settings through the DVR-16/IP front panel. Press the number button corresponding to the wanted camera to make it full screen, and then press the SET button to go to the “External Devices” Menu.

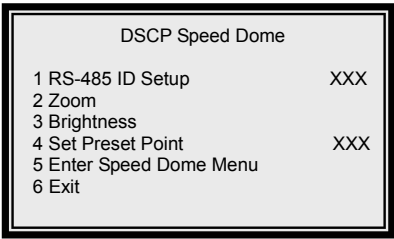


RS-485 Baud Rate

Baud rate is a number related to the speed of data transmission in your security system. The higher the baud rate, the more bits per second that are transferred. Before the data are transferred between two devices, you must ensure that both devices are configured to the same transmission rate.

DSCP Speed Dome

This sub-menu is offered to adjust the dome settings. After you are in the sub-menu, you can pan/ tilt the speed dome freely by pressing SET and the direction buttons simultaneously.



RS-485 ID Setup

If you want to control the DSCP Speed Dome through the front panel, you should firstly check and modify the RS-485 ID here.

Zoom

Press the Enter button to enter the Zoom mode. You can simply push the right direction button to zoom in (tele) and the left direction button to zoom out (wide). Press the ESC button to exit the Zoom mode.

Brightness

Use the right and left direction buttons to adjust the brightness of the selected dome camera. Press the ESC button to exit.

Set Preset Point

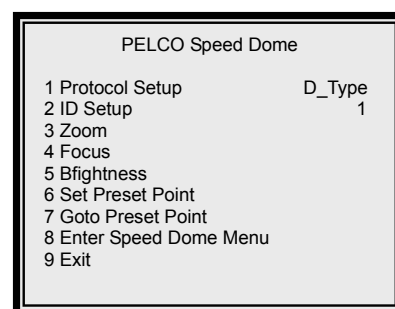
This item allows you to set the preset points. Pan/ Tilt the dome camera to the wanted position and give the preset point a number, and then press the Enter button.

Enter Speed Dome Menu

Press Enter on this item to go to the OSD menu of installed Speed Dome.

PELCO Speed Dome

DVR-16/IP is capable of connecting to PELCO Speed Dome; the related settings can be adjusted here in this sub-menu. You can pan/ tilt PELCO Speed Dome by pressing SET and the direction buttons simultaneously after you are entering this sub-menu.



Protocol Setup

There are two Protocol types to choose from: D_type and P_type.

ID Setup

Each PELCO dome camera should have a ID individually.

Zoom

Press the right direction to zoom in (tele) and the left direction button to zoom out (wide). Press ESC to exit the zoom mode.

Focus

Press the right/ left direction to change focus back and forth between a near object and a far object. Press ESC to exit the mode.

Brightness

Use the right and left direction buttons to adjust to appropriate brightness. Press ESC to exit when you finish the setting.

Set Preset Point

This item allows you to set preset points through the front panel. Pan/ tilt the connected receiver to a proper position, and then press the number buttons to assign a number to the preset point. Press Enter to finish the setting.

Goto Preset Point

Press right/ left direction button to select the number of the wanted preset point; then press Enter to go to the selected preset point.

Enter Speed Dome Menu

Press Enter on this item to enter connected PELCO dome camera's OSD menu. The function only supports a dome camera with DSCP protocol.

CHIPER CRT.V9KRP

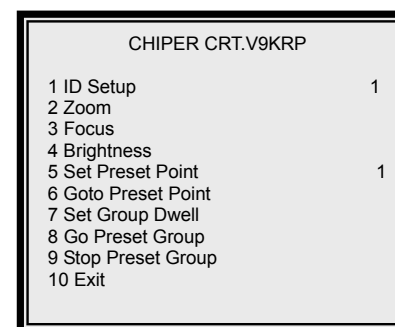
This sub-menu allows you to set the receiver. In the sub-menu, you can pan/ tile the receiver by pressing SET and direction buttons simultaneously.

Item 1~4 (ID Setup, Zoom, Focus, Brightness)

Please refer to the receiver user's manual for detailed information.

Set Preset Point

This item allows you to set preset points through the front panel. Pan/ tilt the connected receiver to a proper position, and then press the number buttons to assign a number to the preset point. Press Enter to finish the setting.



Goto Preset Point

Press right/ left direction button to select the number of the wanted preset point; then press Enter to go to the selected preset point.

Set Group Dwell

Press the right/ left direction button to choose a proper dwell time.

Go Preset Group

Press Enter to start sequencing.

Stop Preset Group

Press Enter to stop sequencing.

6.4.1.4 Termination

This item allows you to enable/ disable the terminal resistor of each camera. If the camera loop-back connector is not used, the terminal resistor should be enabled to get correct signal termination; this is the default condition. Otherwise, the terminal resistor should be disabled (√ = Terminal resistor is enabled; • = Terminal resistor is disabled).

6.4.1.5 Gain Control

This item allows you to adjust the camera's video level. You may adjust the value between 1 and 16 for each camera.

6.4.1.6 REC Priority

This item allows the user to set the recording priority for each camera under normal state (No alarm occurred). The DVR-16/IP will record the camera that is assigned with a higher priority more frequently.

The user can move the cursor and use ENTER key to adjust the value. The value ranges from 1 to 16; "1" stands for the lowest priority; "16" stands for the highest priority. If the camera is not installed, the priority will be set to 0 automatically.

6.4.1.7 Alarm REC Priority

This item allows you to set the recording priority when an alarm is triggered for the current channel, either by Alarm In or by Motion.

6.4.1.8 Call Seq

For Call monitor, there are 16 steps programmable. This item allows you to assign camera for each step (1~16); "0" means to skip this step. Those cameras which are not installed or converted won't be displayed on call monitor.

Example:

If you set the PPS to "30", the record priority of channel to level "4", and the record priority of all rest channels to level "1", then each channel's PPS can be count by below formula.

Situation 1: No alarm event happens.

$$\text{Channel 1 PPS} = 30 * \frac{4}{4+1+1+1+1+1+1+1+1+1+1+1+1+1+1+1} = 6.31$$

$$\text{Channel 2 PPS} = 30 * \frac{1}{4+1+1+1+1+1+1+1+1+1+1+1+1+1+1+1} = 1.58$$

$$\text{Channel 3 PPS} = 30 * \frac{1}{4+1+1+1+1+1+1+1+1+1+1+1+1+1+1+1} = 1.58$$

Situation 2: An alarm event happens on channel 2.

$$\text{Channel 1 PPS} = 30 * \frac{4}{4+8+1+1+1+1+1+1+1+1+1+1+1+1+1+1} = 4.61$$

$$\text{Channel 2 PPS} = 30 * \frac{8}{4+8+1+1+1+1+1+1+1+1+1+1+1+1+1+1} = 9.23$$

$$\text{Channel 3 PPS} = 30 * \frac{1}{4+8+1+1+1+1+1+1+1+1+1+1+1+1+1+1} = 1.15$$

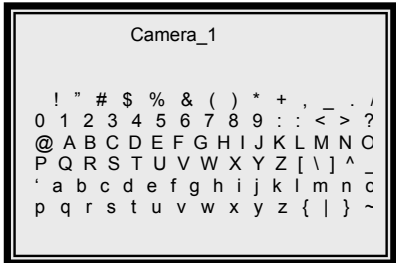
6.4.2 Camera Detect

The DVR-16/IP can check the camera BNC connectors for video signal and judge the channel is connected or not. If the camera doesn't exist, it's recommended to set that channel as "not installed". Otherwise that channel will be considered as "video loss". Besides, the DVR-16/IP storage space is wasted.

6.4.3 Camera Title

Each camera can be assigned a "Title" (up to 12 characters). The default title for each camera is the channel number.

Use the right and left direction buttons to select the wanted camera, and then press Enter to enter a virtual table (shown as right figure).

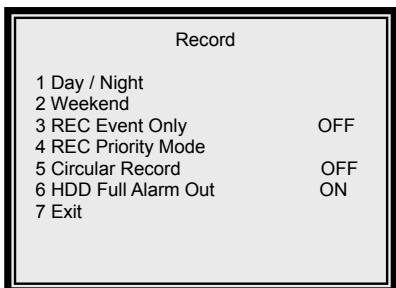


You can use DIRECTION buttons to select wanted character, and press ENTER to add the character to the title. You can also press MODE button to correct the wrong character you enter by mistake. Press MODE button, and a cursor will appear over the title. Press MODE button repeatedly till the cursor over the character need to be changed; now you can pick another character to replace it by using the DIRECTION buttons. The first character (blank) is used as Space button.

6.5 Record

This menu allows you to set up all the parameters related to recording, ex. REC Quality, PPS (Picture Per Second)...

Once you change these parameters, the total record time will be changed as well. The table below is offered for your reference (the PPS is set to 60).



HDD size	Total Record Time (Hour)				
	Quality: Ultra	Quality: Super	Quality: High	Quality: Normal	Quality: Low
40 GB	5	7	9	12	15
80 GB	10	14	18	24	30
120 GB	15	21	27	36	45
160 GB	20	28	36	48	60

6.5.1 Day/ Night

This menu allows you to setup the Day start/ stop time, the PPS (Picture Per Second) and recording quality for Day and Night time.

Day / Night	
1 Day Start Time	08:00
2 Day Stop Time	18:00
3 Day REC PPS	60
4 Day REC Quality	Super
5 Night REC PPS	60
6 Night REC Quality	Super
7 Exit	

6.5.1.1 Day Start Time/ Day Stop Time

These two items allow you to set the start/ stop time of the daytime. Use the DIRECTION buttons to enter the start/ stop time.

6.5.1.2 Day REC PPS/ Night REC PPS

These two items allow you to set the Day/ Night record PPS (Picture Per Second). The higher the number of pictures per second, the smoother the video playback appears to you, but it'll take more storage space.

6.5.1.3 Day REC Quality/ Night REC Quality

These two items allow you to set up the Day/ Night record quality. A superior picture quality affects a better playback, but will fill the hard disk faster; total record time will be shorter.

6.5.2 Weekend

This menu allows you to set up weekend start/ stop time, record PPS and record quality.

Weekend	
1 Weekend Setting	OFF
2 Start	FRI
3 Stop	MON
4 REC PPS	60
5 REC Quality	Super
6 Exit	

6.5.2.1 Weekend Setting

This item allows you to enable/ disable the following weekend-related functions. If the item is set "OFF", all related functions will be disabled.

6.5.2.2 Weekend Start Time/ Weekend Stop Time

These two items allow you to set up weekend start/ stop time.

6.5.2.3 Weekend REC PPS

This item allows you to set weekend record PPS (Picture Per Second).

6.5.2.4 Weekend REC Quality

This item allows you to set up the weekend record quality

6.5.3 REC Event Only

You are allowed to decide the situation DVR-16/IP starts recording. If you select “OFF”, then DVR-16/IP will remain in recording mode all the time. If you choose a time, then DVR-16/IP starts recording only when an event (both Alarm and Motion events) is triggered, and the time you choose indicates how long DVR-16/IP keeps recording. For example, if you select “15 sec”, DVR-16/IP starts recording when an event is triggered, and it keeps recording for 15 seconds.

6.5.4 REC Event At

The DVR-16/IP allows you to record event recording only. In this case, you can decide the recording duration: Always, Night, Day and Weekend. If “Weekend” is selected (the “Weekend setting” must be “ON”), then the DVR-16/IP records event recording only on weekends; and if “always” is selected, the DVR-16/IP won’t record image until an event is triggered all the time.

Record Event Only	Record Event At	Recording Status
Option 1: OFF		
Option 2: 15 Sec Option 3: 30 Sec Option 4: 45 Sec Option 5: 1 Min Option 6: 3 Min Option 7: 5 Min Option 8: 10 Min Option 9: 20 Min Option 10: 30 Min	Option 1: Always	
	Option 2: Day	
	Option 3: Night	
	Option 4: Weekend	

Recording Mode Normal Status (Non-recording Mode)

6.5.5 Switch REC While PB

If an event is triggered while you are playing back the video, the DVR-16/IP can switch back to recording image automatically to alert you to the event. If you choose “ON”, the DVR-16/IP will switch back to the recording image while the event is triggered.

6.5.6 Rec Priority Mode

This item allows you to set up the record priority, use RIGHT/LEFT keys to select Setup or Auto. Setup means priority mode will follow the setup value in configuration table, Auto means the camera with most motion will get higher priority automatically.

6.5.7 Circular Record

The DVR-16/IP can store the recorded video information in circular or not. If the setting is “ON” (default), the earliest recorded video will be over-written automatically (none-stop recording). If Circular Record setting is “OFF”, the recording will be stopped when the HDD is full; under this situation, a flash highlighted message (HDD Full) will be shown on the screen when the rest recording time is about 45 minutes; and the beeper will start beeping when the rest recording time is about 15 minutes.

6.5.8 HDD Full Alarm

If you select “ON” for this item, the beeper will start beeping when the rest recording time is about 15 minutes; and the beeper will stop beeping after you insert a new HDD. The other way to stop the beeper is to select “OFF” for this item.

6.6 Event

This menu allows you to configure how the EVENT condition is handled and how the DVR-16/IP responses.

When an alarm is triggered, you can press the ESC button and the alarm channel button to switch the call monitor to the alarm channel; after then, you can press these two buttons to start switching again.

Event	
1 Day / Night Switch	
2 Event Response	
3 Motion Detect	
4 Alarm In	
5 Video Loss Detect	Dis
6 Alarm Set / Reset SW	En
7 Release Time	
8 Clear Event List	
9 Exit	

6.6.1 Day/ Night Switch

This sub-menu allows you to enable or disable the “Day/ Night Switch” signal from the external I/O connector. Move to **1 Day/ Night Switch** and press ENTER button, the sub-menu will appear.

Day/ Night Switch	
1 Day / Night SW Enable	No
2 Switch <OFF>	Day
3 Delay For Active	60
4 Exit	

6.6.1.1 Day/ Night SW Enable

Use right/ left buttons to select YES (enable) or NO (disable). If you select “NO”, the Day/ Night Switch signal will be ignored; the event processor will follow the time schedule that defined in Record Section. If you select “YES”, the event processor will follow the On/ Off position of the external Day/ Night switch.

6.6.1.2 Switch <OFF>

This item allows you to configure which setting (Day/ Night) will be activated when the switch is OFF. You may select Day or Night by using the right/ left buttons.

6.6.1.3 Delay For Active

After the Day/ Night switch setting has changed, there is a delay time before the event process takes effect; this function is to avoid the operator triggering a false event by mistake.

6.6.2 Event Response

This sub-menu allows you to set how the DVR-16/IP responds to the triggered event.

Event Response	
1 Internal Buzzer	ON
2 Event Relay Output	ON
3 Event List	ON
4 Event Full Screen	OFF
5 Call Event Display	ON
6 Response Duration	10
7 Any Key To Stop	ON
8 Exit	

6.6.2.1 Internal Buzzer

This item allows you to set the internal buzzer activated or not when an event is triggered.

6.6.2.2 Event Relay Output

There are two alarm output signals in the external I/O connector: Alarm N.O. (normal open) and Alarm N.C. (normal close), these signals are driven by an on-board relay. These signals can be used to drive a light or siren to warn the operator of alarm events.

This item allows you to enable/ disable the alarm output pins. If the alarm output is OFF (disabled), the relay won't be energized when alarm is triggered.

6.6.2.3 Event List

The events will be logged in the non-volatile memory.

The first column is the item number, followed by the date and time of the event and the "type of event": "A" represents Alarm Input, "L" represents Video Loss, and "M" represents Motion Detection. The last column is the channel number of the event.

6.6.2.4 Event Full Screen

When event is occurred on any camera input, the video of this camera would be displayed on the main monitor in full screen, and keep until event duration time is expired. This item allows you to enable/ disable the function.

6.6.2.5 Call Event Display

If you select "YES" for this item, The Call Monitor will switch to the corresponded camera immediately when an event is triggered. Otherwise, the Call Monitor just switches between each installed camera sequentially.

6.6.2.6 Response Duration

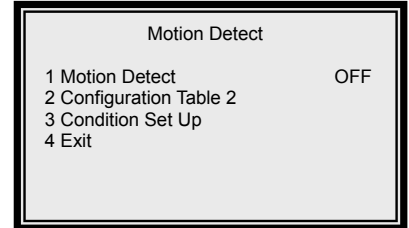
This item allows you to decide how long time the buzzer and Alarm Out relay keeps after an event is triggered. You can choose the alarm output from 1 second to 9999 seconds.

6.6.2.7 Any Key To Stop

When the event is triggered, the buzzer will beep, the Alarm Out relay will be activated. If you want to stop these actions by pressing any one key, then you must select “YES” for this item.

6.6.3 Motion Detect

This menu allows you to configure how Motion Detection works. Each camera can have its “Detect Area” and “Sensitivity” defined individually.



6.6.3.1 Motion Detect

This item allows you to enable/ disable the motion detect function of the DVR-16/IP.

6.6.3.2 Configuration Table 2

Move the cursor to 2 Configuration Table 2 and press ENTER button, the table will appear.

This table allows you to enable/ disable the day and night motion detect functions.

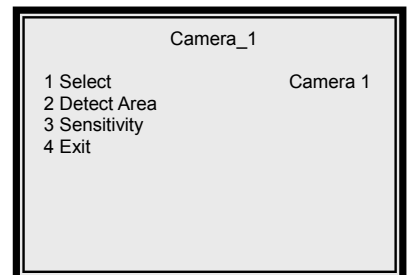
Configuration Table 2		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Alm In Type		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Day: Alm In		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Day: Motion		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Night: Alm In		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Night: Motion		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

ESC For Return

6.6.3.3 Condition Set Up

This menu allows you to setup each camera’s motion detected area and sensitivity.

First select the wanted camera by using the right and left direction buttons, and then move the cursor to the second and third items to setup the chosen camera’s detect area and sensitivity.

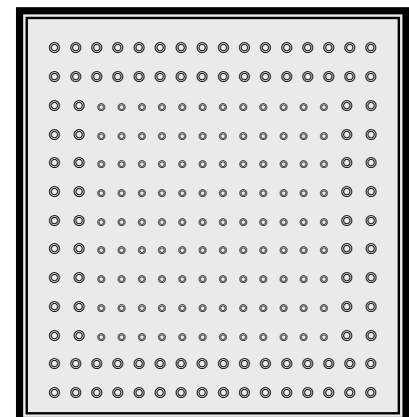


6.6.3.4 Detect Area

This item allows you to setup the motion detect area of each camera.

The screen is covered by 192 (16x12) “detection grids”.

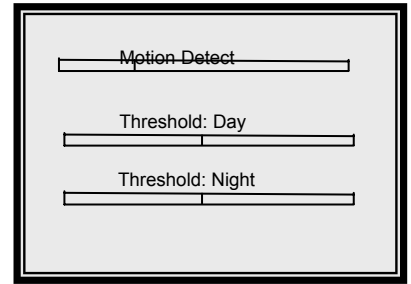
You may use the DIRECTION buttons to move the cursor then press the ENTER button to enable/ disable the grids. Pressing MODE button can change the size of the cursor. You may also toggle all the grids on/off by pressing SET button (: disabled; : enabled).



6.6.3.5 Sensitivity

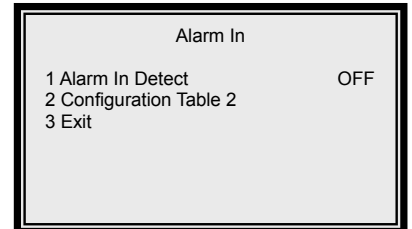
This item allows you to setup the threshold of motion detection.

The first bar shows the current detected amount of motion of this camera. The second and third bar allows you to setup the “day/ night threshold” (or “trigger level”), once the detected motion amount become larger than this level; the alarm will be triggered.



6.6.4 Alarm In

This menu allows you to enable/ disable the Alarm pins of external I/O connector and to select N.O. (normal open) or N.C. (normal close) type for each pin.



6.6.4.1 Alarm In Detect

This item allows you to enable (YES) or disable (NO) the Alarm In pins.

6.6.4.2 Configuration Table 2

This item allows you to select N.O. (normal open) or N.C. (normal close) type for each Alarm In pins.

6.6.5 Video Loss Detect

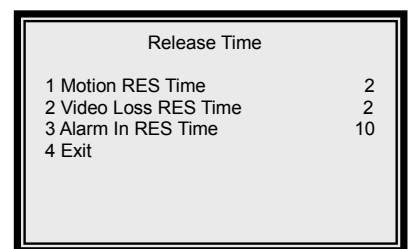
This item allows you to enable/ disable the DVR-16/IP to detect Video Loss as an alarm event.

6.6.6 Alarm Set/ Reset SW

This item allows you to enable/ disable the Alarm Set/ Reset signal of the external connector. If you select EN (enable), then you can force the alarm output to on/ off by using Alarm Set signal.

6.6.7 Release Time

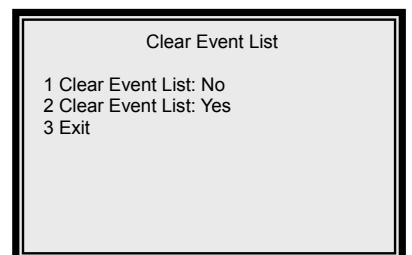
This menu allows you to set the “release time” of alarm source: motion detection, video loss and alarm in. The release time defines how long time after the alarm trigger condition disappears; the same condition should be ignored to avoid false alarm being re-triggered.



6.6.8 Clear Event List

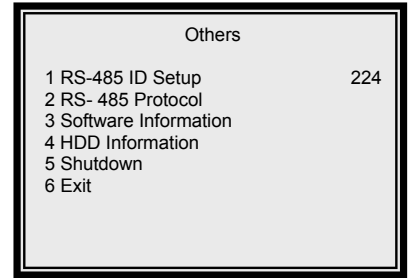
This menu allows you to clear event list. If you want to delete the event list, move your cursor to 2 Clear Event List: YES. If you want to keep the event list, move your cursor to 1 Clear Event List: NO.

This arrangement is to avoid user clear the list by mistake.



6.7 Others

This menu allows you to check the RS485 communication protocol and software version.



6.7.1 RS-485 ID Set Up

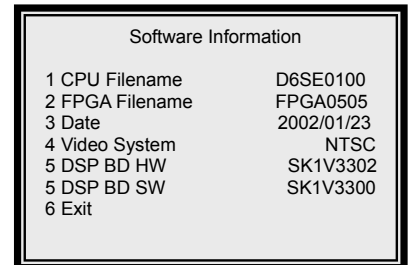
This item can only be accessed by the installer, the RS-485 ID address of this DVR-16/IP can be modified here.

6.7.2 RS-485 Baud Rate

You can choose the baud rate form 38400, 19200, 9600, 4800 and 2400.

6.7.3 Software Information

This menu presents the software information.



6.7.4 HDD Information

This item shows you the HDD information.

HDD Size

The item shows how large size the current HDD has for saving video files.

Free Size

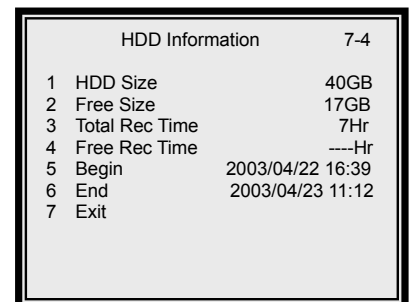
It shows how much available space the current HDD leaves.

Total Rec Time

It shows how much time the current HDD originally can provide for saving the video files.

Free Rec Time

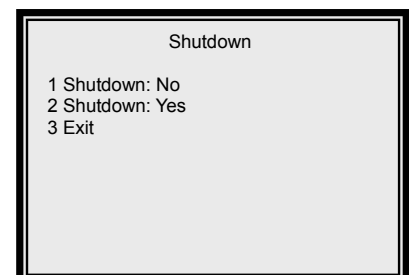
It shows how much time the current HDD can save video files. If the DVR is set to record in linear mode (the system will not overwrite files when the HDD is full), the available recording time will be calculated and shown on the screen automatically; or, if the DVR is set to circular mode, the OSD display on the screen will be "- - - - Hr".



6.7.5 Shutdown

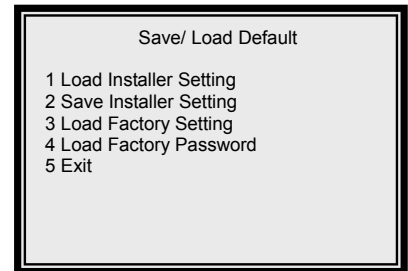
This item allows you to shutdown the DVR-16/IP.

There is the other way to shutdown the DVR-16/IP: press ESC and Down Arrow buttons simultaneously.



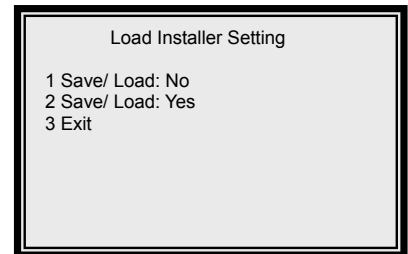
6.8 Save/ Load Default

This menu allows you to restore the DVR-16/IP to the default configuration, which was done by the installer (engineer), or the factory setting.



6.8.1 Load Installer Setting

This item allows you to recall the “Installer’s Configuration” from the on-board non-volatile memory.



6.8.2 Save Installer Setting

This item allows you to save the current setting as “Installer’s setting”. This operation can only be executed with engineer password; otherwise, “Illegal Operation” message will be displayed.

6.8.3 Load Factory Setting

This item allows you to recall the “Factory’s Default” from the read only memory.

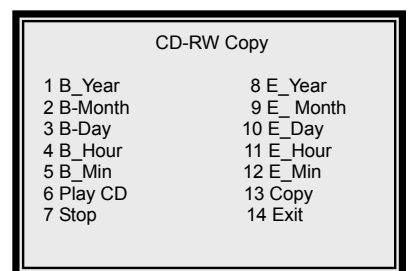
6.8.4 Load Factory Password

This item allows you to reload the factory password in case you forget your own password. The initial factory password is 9999.

6.9 CD-RW Copy

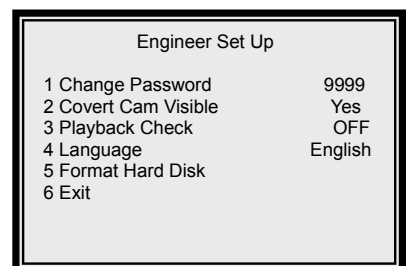
This sub-menu allows you to export video to CD-RW. Select the start time and end time of desired video and then press ENTER on **13 Copy** to start copying.

Press the 6th item to play the CD.



6.10 Engineer Set Up

If you enter the main menu with engineer’s password, you can enter this menu.



6.10.1 Change Password

This password can be changed to any four-digit number use right/ left buttons to change to a new number, press ESC button when finished, the password will be saved into non-volatile memory. If the user forgets this new password, he can recall the factory password by using Load Factory Password in Save Load Option sub-menu.

6.10.2 Disable Password

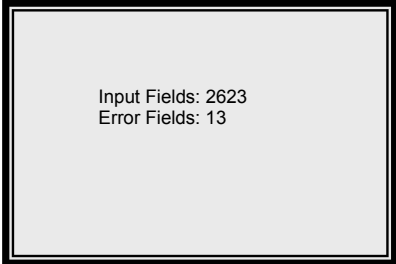
This item allows you to enter the OSD menu without entering the password. Therefore, you can save a lot of time while setting the DVR. This item will be restored to the default setting “No” automatically after you power off and on the DVR.

6.10.3 Covert Cam Visible

You can make some of the camera’s video invisible (covert) on both main and call monitor, (but the recording is continued); if you want to view the covert video while the DVR-16/IP is playing back the recorded video, you should change this item to “YES”.

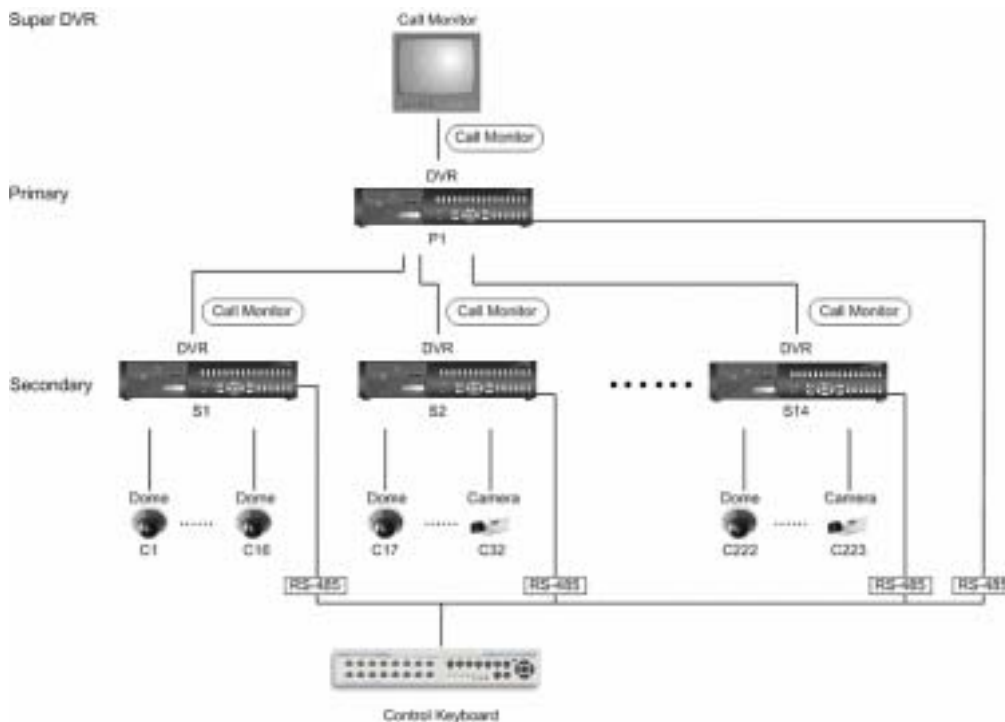
6.10.4 Playback Check

This item allows you to check the internal cabling of DVR-16/IP is functioning correctly or not, usually the “Error Fields” would be a very small number if the system functions correctly. If you choose “ON”, the information will be displayed after you exit OSD menu mode.



6.10.5 Super MMX Mode

This function is used for Matrix-Multiplexer system. The system skeleton and setup guide is shown in Appendix 4 Super MMX and Super MPX System Setup. If you select “Yes”, the call monitor display will depend on RS-485 command. The call monitor output of DVR 1~16 must be connected to the video input of DVR 17; you can monitor any camera of 256 cameras. Please also refer to control keyboard user manual. If you want to control DVR-16/IP by computer or other devices, please refer to Appendix 3. If you select ‘OFF’, the call monitor will work as defined in Configuration Table1 and EVENT setup.



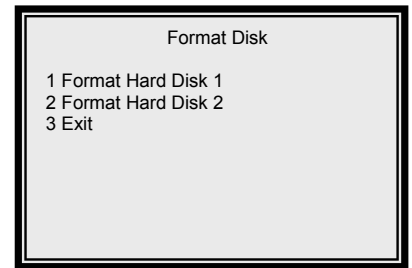
6.10.6 Language

This item allows you to select your native language.

6.10.7 Format Hard Disk

This item allows you to format the HDDs. Choose the HDD you want and then press ENTER to format the selected HDD.

Before you use a new HDD, you should insert it to DVR-16/IP to format to FAT32. And if the HDD was used in another machine with another kind of file system, therefore, the HDD must be formatted to FAT32 in DVR-16/IP before recording process.



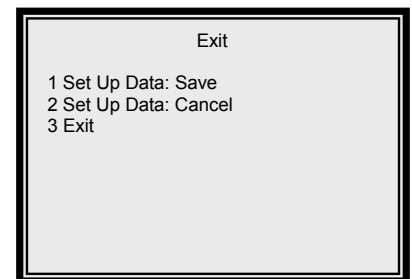
6.10.8 System Color

This item allows you to choose "Color" or "Mono"

6.11 Exit

If you move the cursor to first item and press ENTER, the modifications you have made will be saved into the non-volatile memory (EEPROM).

If you move the flashing highlight to the second item and press ENTER; or press ESC button on the front panel, the modification you have made will keep affective, but not saved into EEPROM. Therefore, if you power OFF and ON the DVR-16/IP, the modifications will be canceled.



7. Windows Application Software

The file format of DVR-16/IP is compatible with Windows O.S; you can process recorded video data under Windows 98, 2000 and XP systems. The application software allows you to playback, printout, export JPEG file or clip a segment of video.

7.1 Connect the USB Mobile Rack to PC

Move out the HDD Cartridge from DVR-16/IP and insert it to a "USB Mobile Rack", then connect the "USB Mobile Rack" and PC with a USB Cable.



7.2 Download the Software

To process recorded video on your computer, you need to download DVR Windows application software first. After Window AP has been installed, you can now connect the swappable HDD to your computer and process the recorded video.



7.3 Function Buttons

1. Open File

Press this button to search and open recorded video file.

2. Display Mode

Press these buttons to choose display mode (4, 9 and 16 windows).

3. Save Image

Press this button for saving current image (JPEG) on your P.C.

4. Print Out

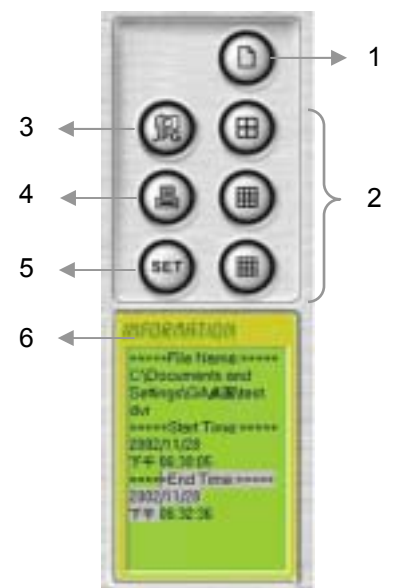
Press this button to print out single picture.

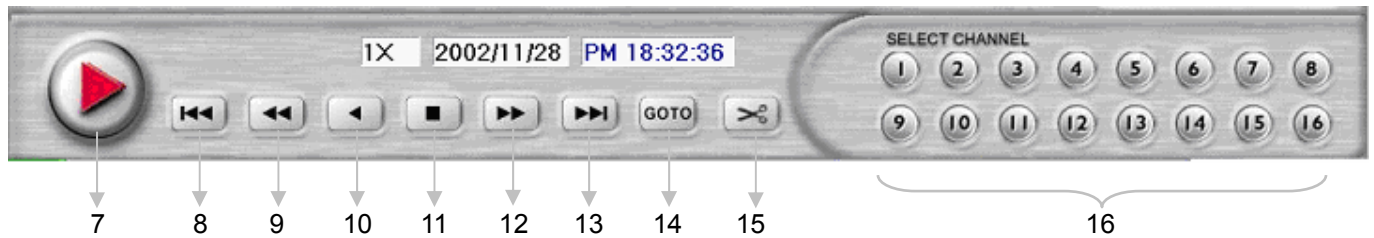
5. Set

Press this button to start setting windows. Use the Mouse to move the cursor to certain window, and then press a Channel button for assigning the camera to this window. The cursor will move to next window automatically.

6. File Information

The Information of the opened file will be shown here: File Name, Start Time and End Time.





7. Playback

Press this button to play the recorded video, and press it again to pause.

8. Go to Begin

Press this button to go to the first image of the recorded video.

9. Fast Rewind

Press this button to play the recorded video in reverse direction. Press this button repeatedly to change the playback speed: x1, x4, x8, x16, x32 and x64.

10. Rewind Playing

Press this button to rewind playing the recorded video at normal speed.

11. Stop

Press this button to stop playing the recorded video.

12. Fast Forward

Press this button to play the recorded video in forward direction. Press this button repeatedly to change the playback speed: x1, x4, x8, x16, x32, and x64.

13. Go to End

In playback mode, press this button to go to the end image of the opened file.

14. GOTO

In playback mode, press this button for searching the recorded video of certain date and time.

15. Video Clipping

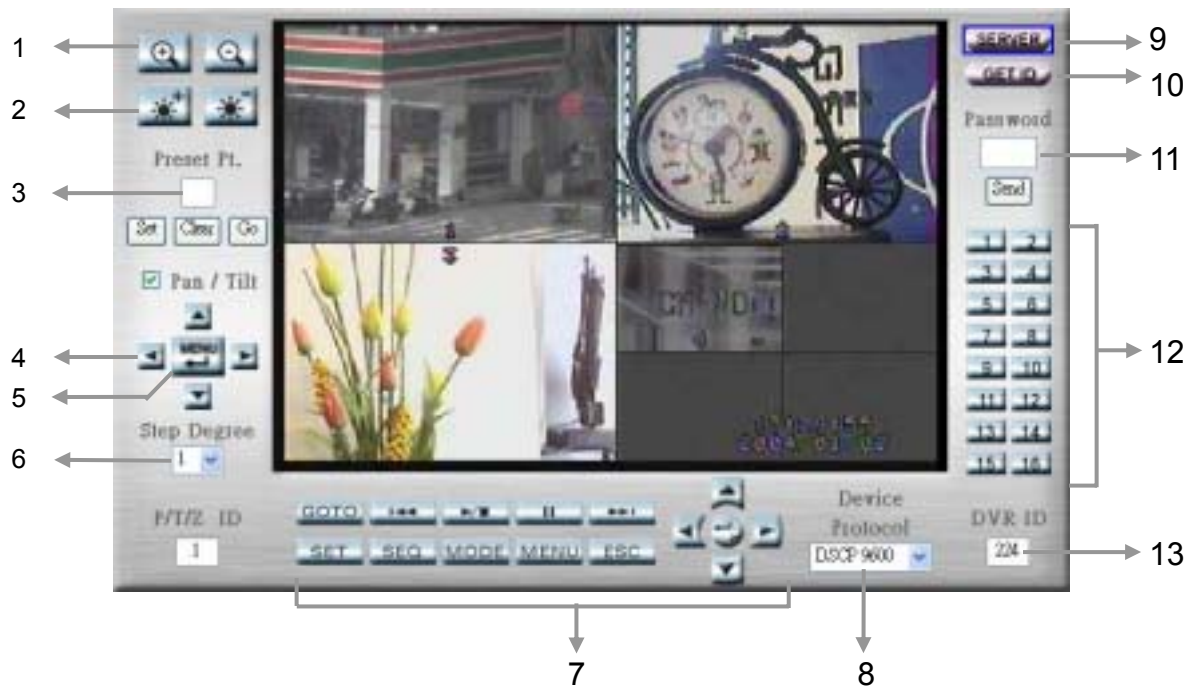
Press this button to clip a small period of video for transferring more easily. Press "Video Clipping" to start clipping and Press again for stop.

16. Channel 1~16

Press one of these buttons to view the channel full screen.

8. DVR-16IP Remote Access of Video over the Web

This section discusses the remote control ability of DVR-16/IP; it is an optional function. Users are able to access live and recoded video from remote site through Internet with Ethernet port connected. Key in the correct IP address, and then below control panel will appear on your computer screen. Through the control panel, users are allowed to control and setup the OSD settings of DVR-16/IP and connected speed dome remotely.



8.1 Button Introduction

1. Zoom In/ Zoom Out

If the DVR-16/IP has connected with any dome cameras, you can zoom in or zoom out the camera using the two buttons.

2. Iris Near/ Iris Far

These two buttons are used for controlling the iris lens. Proper adjustment will ensure the correct exposure depending on the camera's situation and the lighting levels.

3. Preset Pt.

If you want to set a preset point for viewing, you have to enter a number for the preset point first, then pan/ tilt the camera to select the preset point a wanted position. After the number and position are both determined, click on the "Set" button to complete the procedure.

You are able to clear a preset point at the same time; enter the number of that preset point, and then click on the "Clear" button to clear off the preset point.

After the preset points are set, you can go to one of them immediately by one click. Enter the number of the desired preset point, then click on the "Go" button to go to it.

4. Direction buttons

- 4.1 If the “Pan/ Tilt” (check box) is enabled (default), these buttons are used to pan/ tilt the connected dome cameras. Choose a wanted camera through “P/ T/ Z ID” before you tried to pan/ tilt it.
- 4.2 If the “Pan/ Tilt” (check box) is disabled, these buttons can be used to select OSD menu items of speed dome camera.

5. Menu/ Enter

In normal status, press this button to enter the OSD menu of connected speed dome camera. This button is used as “Enter” button while in speed dome OSD menu mode.

6. Step Degree

Users can set the step degree of dome camera. You can choose form 1~15 degree.

7. DVR-16/IP-related buttons

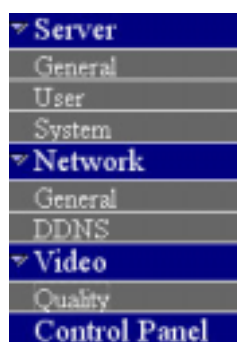
Please refer to page 6 for the descriptions of these button functions. The password is required before entering the DVR-16/IP menu through Internet.

8. Device Protocol

Here allow you to set the device protocol. For a communication to be successful, each device must recognize and follow the same standard.

9. Sever

Press this button to go to the sever-related menu (Figure 1). Users can modify the sever settings in this menu.



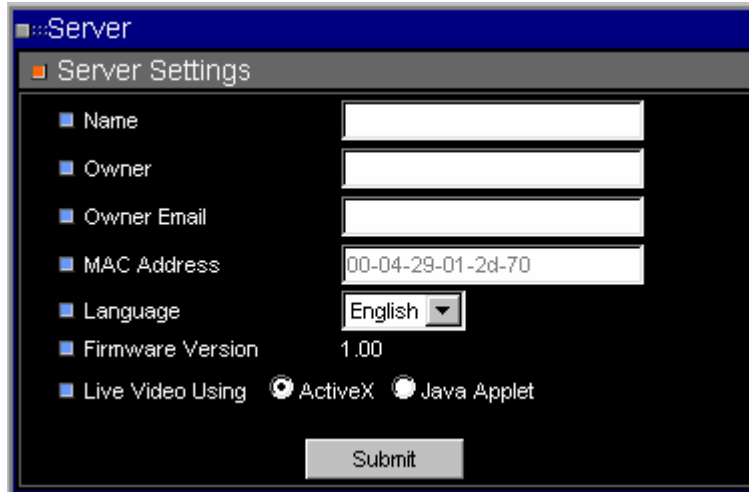
<Figure 1>

9.1 Server

You can set the server settings in this menu.

9.1.1 General

Users can set the general server settings here in this sub-menu (Figure 2). The MAC address will be detected and shown on the test box automatically.



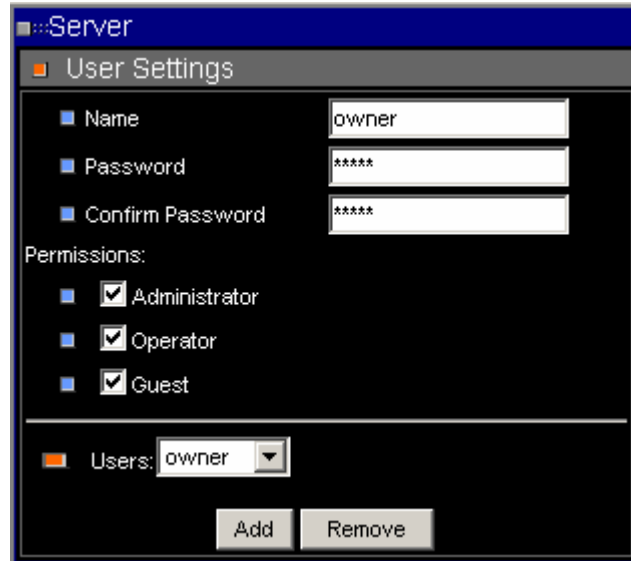
The screenshot shows a window titled "Server" with a sub-menu "Server Settings". It contains several input fields and controls:

- Name: [Text Input]
- Owner: [Text Input]
- Owner Email: [Text Input]
- MAC Address: [Text Input] (value: 00-04-29-01-2d-70)
- Language: [Dropdown Menu] (value: English)
- Firmware Version: 1.00
- Live Video Using: ActiveX Java Applet
- Submit: [Button]

<Figure 2>

9.1.2 User

This sub-menu allows you to set the authorized user's name, individual password and the permission level (Figure 3).



The screenshot shows a window titled "Server" with a sub-menu "User Settings". It contains several input fields and controls:

- Name: [Text Input] (value: owner)
- Password: [Text Input] (value: *****)
- Confirm Password: [Text Input] (value: *****)
- Permissions: Administrator, Operator, Guest
- Users: [Dropdown Menu] (value: owner)
- Add: [Button]
- Remove: [Button]

<Figure 3>

Different user has different default password with respective permission, as below:

User Permission	ID	Password
Administrator	owner	owner
Operator	operator	operator
Guest	guest	guest

9.1.3 System

Choose “Save Changes” to save the modifications you’ve made (Figure 4).



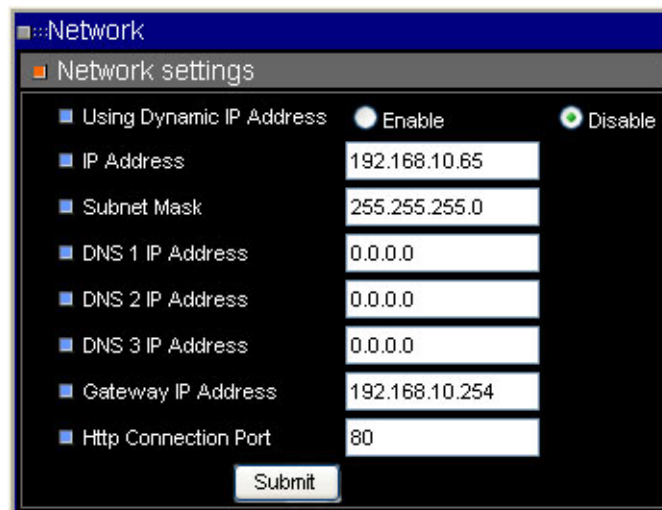
<Figure 4>

9.2 Network

This sub-menu is offered to set network settings.

9.2.1 Network settings

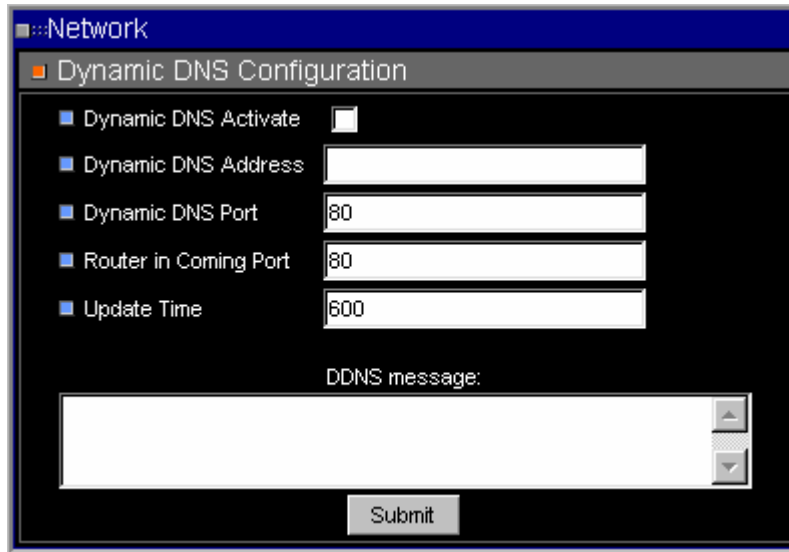
You can set the network-related setting here (Figure 5), including IP address, subnet mask...



<Figure 5>

9.2.2 Dynamic DNS Configuration

This sub-menu allows you to set the DDNS settings (Figure 6).



The screenshot shows a web-based configuration interface for Dynamic DNS. The title bar reads "Network" and the sub-menu is "Dynamic DNS Configuration". The settings are as follows:

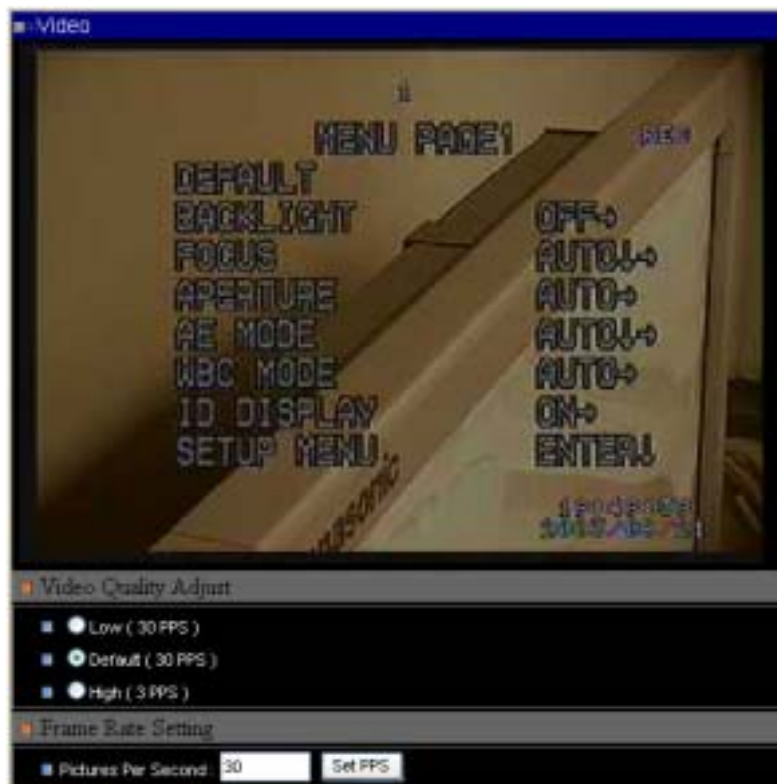
Dynamic DNS Activate	<input type="checkbox"/>
Dynamic DNS Address	<input type="text"/>
Dynamic DNS Port	<input type="text" value="80"/>
Router in Coming Port	<input type="text" value="80"/>
Update Time	<input type="text" value="600"/>

Below the settings is a text area labeled "DDNS message:" with a scrollable input field and a "Submit" button at the bottom.

<Figure 6>

9.3 Video

This sub-menu allows you to set the video quality and PPS (Picture Per Second) (Figure7).



The screenshot shows a camera's video menu. The top part of the screen displays a camera view with a menu overlay. The menu items and their current values are:

DEFAULT	
BACKLIGHT	OFF
FOCUS	AUTO
APERTURE	AUTO
AE MODE	AUTO
WBC MODE	AUTO
ID DISPLAY	ON
SETUP MENU	ENTER

Below the camera view, the "Video Quality Adjust" section has three radio button options: "Low (30 FPS)", "Default (30 FPS)", and "High (3 FPS)". The "Frame Rate Setting" section has a "Pictures Per Second" field set to "30" and a "Set PPS" button.

<Figure 7>

10. GET ID

Press this button to show the DVR-16/IP ID on the screen.

11. Password

Each password contains 4 characters. If you want to enter DVR-16/IP menu or enter playback mode, you have to enter correct password. You need to key the password in the field then press “send” button before you enter DVR-16/IP menu or playback mode. The password shown on screen will not change but you are already able to enter DVR-16/IP main menu to change settings or to enter playback mode.

12. Channel Buttons

The number of channel buttons corresponds to the number of channels supported by the unit. Press one of these buttons to view the channel full screen.

Note:

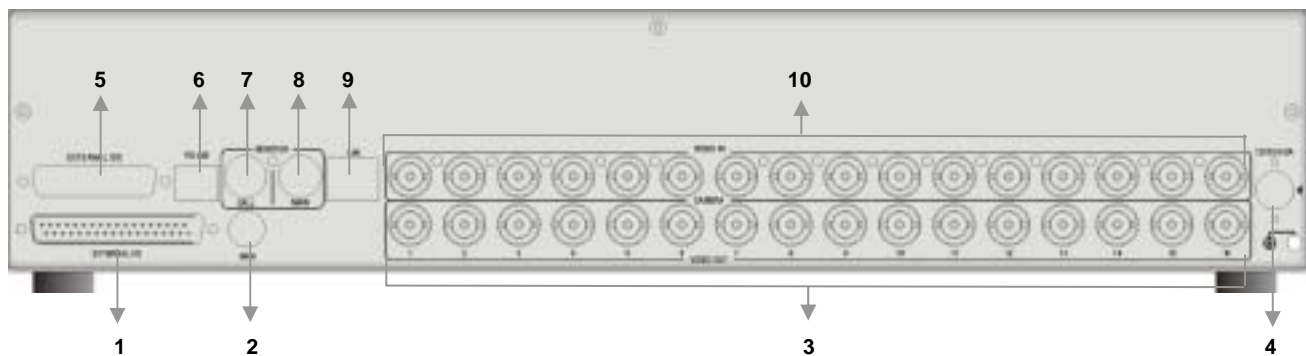
If you want to select DVR-16/IP menu item, you don't have to do it by directional key. You can use Channel Buttons instead. For example, if you want to select DVR-16/IP menu item 3 Monitor, you can just press Channel Button “3” on the right side.

13. DVR-16/IP ID

Users can set the DVR-16/IP ID here.

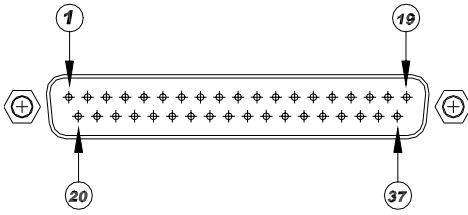
9. Connectors

Rear Board



Item	Description	Item	Description
1	External I/O	6	RS-485 Port
2	Main Monitor output (S-Video)	7	Call Monitor Output (BNC)
3	Video Looping (1~16)	8	Main Monitor Output (BNC)
4	Power Jack	9	LAN Port
5	IDE Port	10	Video Input (1~16)

External I/O Port (37pin DSUB)



Pin No.	Definition	Direction	Pin No.	Definition	Direction
1	GND	Power	20	Reserved	Input
2	GND	Power	21	Reset Alarm	Input
3	GND	Power	22	Day / Night output	Output
4	GND	Power	23	Day / Night switch	Input
5	Reserved	-	24	Set Alarm	Input
6	Reserved	-	25	Reserved	-
7	Alarm NO	Output	26	Alarm In 13	Input
8	Alarm COM	Output	27	Alarm In 12	Input
9	Alarm NC	Output	28	Alarm In 11	Input
10	GND	Power	29	Alarm In 10	Input
11	GND	Power	30	Alarm In 9	Input
12	GND	Power	31	Alarm In 8	Input
13	GND	Power	32	Alarm In 7	Input
14	GND	Power	33	Alarm In 6	Input
15	GND	Power	34	Alarm In 5	Input
16	Alarm In 16	Input	35	Alarm In 4	Input
17	Alarm In 15	Input	36	Alarm In 3	Input
18	Alarm In 14	Input	37	Alarm In 2	Input
19	Alarm In 1	Input			

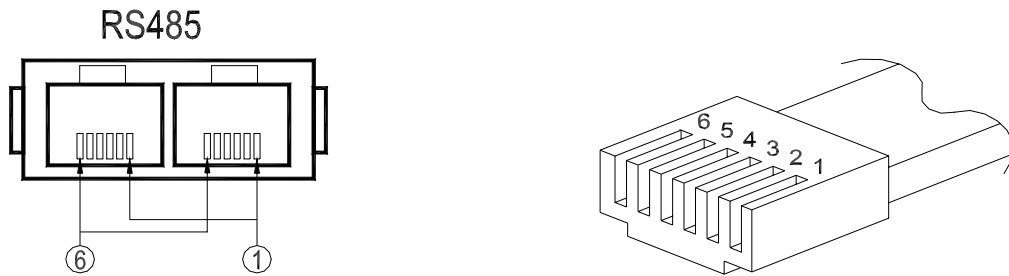
External I/O Board

There is an "External I/O board" included in the DVR-16/IP box. You can connect it to the External I/O port; the pins are identified as the definitions listed on the board. Three pins are listed but of no use: VCR Trigger, RS-232 RX and RS-232 TX.



RS-485 (RJ11)

The default RS-485 port connector is RJ11 6P6C connector.



RJ11 Cable 6P6C pin definition:

Pin No.	Definition	Direction
1	-	-
2	-	Reserved
3	GND	Ground
4	DA (D +)	I/O
5	DB (D -)	I/O
6	-	-

10. Specification

Model Name	DVR-16/IP	
Compression Method	Wavelet	
Video System	NTSC	PAL
Resolution-Live Video	720 x 480 pixels	720 x 576 pixels
Resolution-Recorded	720 x 240 pixels	720 x 288 pixels
Recording Rate	Up to 60 PPS	Up to 50 PPS
Recording Device	Hot swappable HDD	
Video Export	CD-RW	
Recording Quality	Supper / High / Normal / Low	
Video Input	BNC x 16, 1.0 Vp-p, 75 ohm.	
Video Looping Through	BNC x 16, 1.0 Vp-p, 75 ohm.	
Main Monitor Output	BNC x 1, S-VHS x 1, 1.0 Vp-p, 75 ohm.	
Call Monitor Output	BNC x 1, 1.0 Vp-p, 75 ohm.	
Alarm Input	x 16, DSUB 37 pin male (TTL level)	
Alarm Output	x 1, DSUB 37 pin male, 2.0 A / 24 V	
Network Interface	Ethernet (10 Base-T) (Optional function)	
Remote Control	RS-485 DSCP	
Playback Speed	Fast Forward / Rewind (x1~x8), picture by picture	
Zoom	Yes	
Power Supply	DC 12 V / 4 A	
Title	12 characters	
Alarm List	Up to 255 events	
Dimensions	432 x 44 x 400mm (W x H x D)	
Operating Temperature	0~40°C	

Appendix 1: Hard Disk Error Message

Some messages will be shown on the screen when the H.D.D. cannot operate.

◆ **Message:** HDD Detect Time Out

Symptom: The system checks H.D.D. but gets no response over 30 seconds

Possible reason: H.D.D. power on failure

Countermeasure: 1). Wait for the DVR resets the H.D.D. automatically; 2). Power off and on again

◆ **Message:** No Hard Disk

Symptom: No HDD has been found by the system.

Possible reason: 1). No H.D.D; 2). H.D.D. detects failure

Countermeasure: 1). Insert a formatted (FAT 32) H.D.D; 2). Check the power/ IDE bus connectors, ensure they have been connected well; and then insert the HDD again.

◆ **Message:** Check HDD Bus

Symptom: IDE bus error or H.D.D. Master/ Slave jumper error.

Possible reason: 1).The cable of IDE connectors may be damaged; 2). H.D.D. jumper may not be set to "Master".

Countermeasure: 1). Check the cable of IDE connectors; it may be damaged; 2). Check the H.D.D. cable; ensure it has been connected with the cartridge well; 3). Check H.D.D. jumper; the jumper has to be set to "Master".

◆ **Message:** Unknown HDD

Symptom: 1). The H.D.D. format is not acceptable.

2). The file system is not acceptable.

Possible reason: 1). The H.D.D. had been formatted with "NTFS" file system; 2). The H.D.D. had been partitioned or the HDD had not been formatted with "FAT32" file system.

Countermeasure: Enter OSD menu and format the H.D.D. again.

◆ **Message:** HDD Detect Fail

Symptom: The HDD is unusable.

Possible reason: Other unknown reasons.

Countermeasure: Exchange the H.D.D. for a new one.

Appendix 2: Supported HDD

The supported HDDs are listed as below:

Brand	Capacity	Rotation Speed	Part Number
Maxtor	40GB	5400 RPM	4D040k2
Maxtor	80GB	5400 RPM	4D080H4
Maxtor	80GB	7200 RPM	D740X-6L
Maxtor	80GB	7200RPM	6Y080P0
Maxtor	120GB	7200RPM	6Y120P0
Maxtor	160GB	7200RPM	6Y160P0
Maxtor	200GB	7200RPM	6Y200P0
Maxtor	250GB	7200RPM	7Y250P0

Notice:

1. We strongly suggest do NOT use Seagate products, because they might have overheated problems while the DVR-16/IP is operating.
2. We had compared other brand HDDs with Maxtor HDDs, we recommend user to use Maxtor HDDs with 8MB cache buffer that would bring DVR the optimum stability.

Appendix 3: RS-485 Command Set

The texts of Data 0, 1 is in **ASCII** code format (**Normal Command**)

Command	OP_code	Data 0,1	Note	
Channel select	A0H	"01" ~ "0G"	Channel 1~16	
Screen mode select		Right	"MR"	Detail setting must reference User's manual
		Left	"ML"	
Sequence		"S1" ~ "S3"	Sequence 1~3	
Up key		"DU"		
Down key		"DD"		
Left key		"DL"		
Right key		"DR"		
Zoom/Enter		"DZ"		
Play key		"KV"		
Freeze/Pause		"KA"		
Set		"KS"		
ESC		"KE"		
List		"KL"		
Date/Time		"SD"		
Title		"ST"		
Menu		"SP"		
Key Lock		"SK"	Lock/ Un_Locked	
Goto		"SR"		
Fast Rewind		"RW"	x1,x2,x4,x8	
Fast Forward	"FF"	x1,x2,x4,x8		
Universal End	"UE"			
Goto Time1	BDH	Data1, Data0	Year & Month	
Goto Time2	BEH	Data1, Data0	Day & Hour	
Goto Time3	BFH	Data1, Data0	Minute & "G"	

PS: Goto Time1: Year=00~99 (it means 2000~2099); Month=01~12

Goto Time2: Day=01~31; Hour=00~23

Goto Time3: Minute=00~59; "G" ASCII=47H

Example:

If the Keyboard ID is 00H, the DVR-16/IP ID is E0H.

If you want to select camera 0 on the main monitor, you can use '01' command.

(The ASCII Code of '01' is 30H & 31H.)

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Receiver ID	Transmitter ID	OP Code	Data0	Data1	Checksum
E0H	00H	A0H	30H	31H	41H

NOTE:

1. The time interval between byte and byte must be shorter than 2ms, and the time interval between 2 commands (6 bytes/command) must be longer than 2ms.
2. Checksum = Byte1 .xor. Byte2 .xor. Byte3 .xor. Byte4 .xor. Byte5

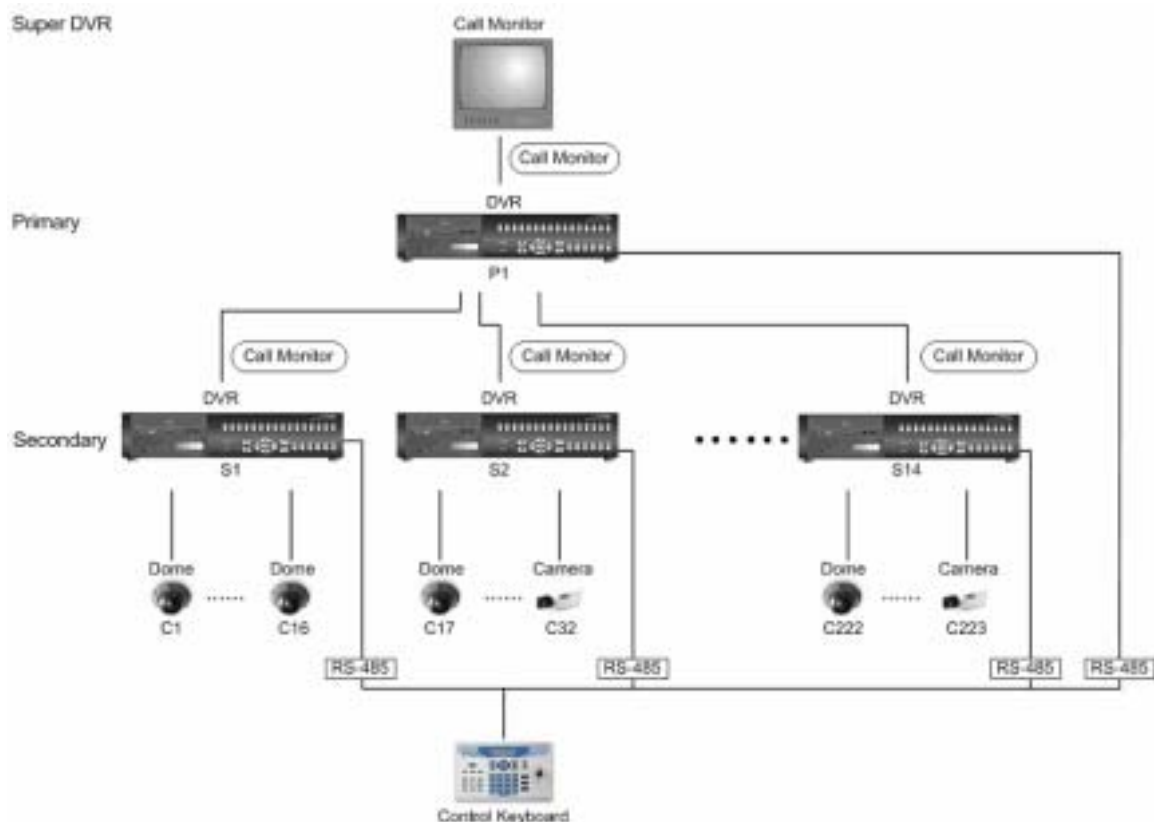
Appendix 4: Super MMX & Super MPX System Setup

1. MMX (Multiplexer-Matrix)

Purpose: by using the call monitor output of the DVR-16/IP/multiplexer array to mimic (or emulate) a small matrix system, each one of the camera can be selected to be displayed on the system monitor.

Ex: when users want to view camera 32, in keyboard's speed dome mode, press camera number 32, then Enter, the system monitor will show the video from camera 32. If camera 32 happens to be a dome camera, he may use the joystick to control it immediately.

System diagram:



Notice:

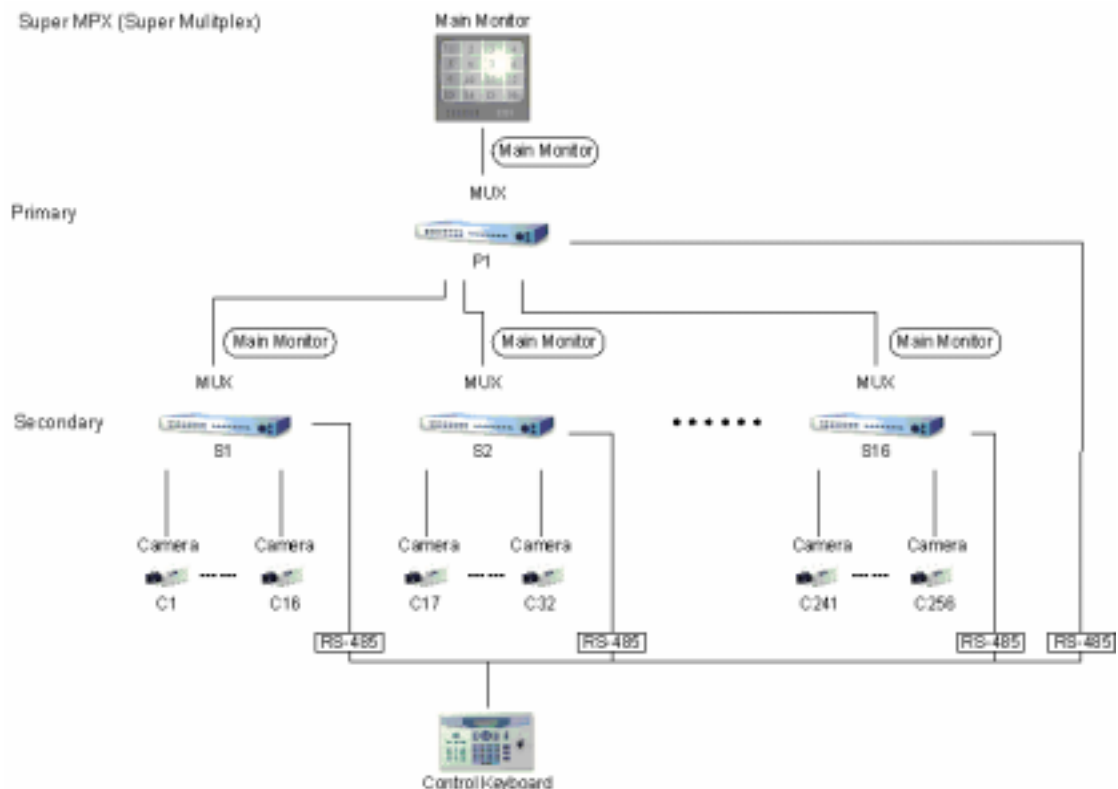
- (1) All DVR-16/IPs shown in the diagram can be Triplex Multiplexer.
- (2) All DVR-16/IPs / multiplexers must enable Super MMX (in OSD menu)
- (3) Choose "Super MMX" from "System Monitor Setting" in keyboard's "System Setting"
- (4) All devices must be connected to the same RS485 bus. In security system, the Dome Cameras are mapping to each channel of the DVR-16/IP / multiplexer. For example, Dome 1 is mapped to channel 1 of S1 (MPX 1). Dome 24 is mapped to channel 8 of S2 (MPX 2)... and so on. When using keyboard as a system controller, please set up each device's ID according to the following table:
- (5) The ID of DVR-16/IP / multiplexer P1 is 255.

MPX NO	MPX ID	Camera ID	Remark
1	E0H, 224	01H – 10H, 1~16	Channel 1~16 of MPX #1
2	E1H, 225	11H – 20H, 17~32	
3	E2H, 226	21H – 30H, 33~48	
4	E3H, 227	31H – 40H, 49~64	
5	E4H, 228	41H – 50H, 65~80	
6	E5H, 229	51H – 60H, 81~96	
7	E6H, 230	61H – 70H, 97~112	
8	E7H, 231	71H – 80H, 113~128	
9	E8H, 232	81H – 90H, 129~144	
10	E9H, 233	91H – A0H, 145~160	
11	EAH, 234	A1H – B0H, 161~176	
12	EBH, 235	B1H – C0H, 177~192	
13	ECH, 236	C1H – D0H, 193~208	
14	EDH, 237	D0H – DFH, 209~223	Only 15 Dome can be connect
15	EEH, 238	None	Can connect to normal camera
16	EFH, 239	None	Can connect to normal camera

2. Super MPX (Super Multiplexer Mode)

Purpose: use Main Monitor instead of Call Monitor, the feature of selecting particular camera to the system monitor is the same as MMX mode. Besides of this, by setting the multiplexers correctly, all of the cameras in this system can be displayed on the system monitor sequentially. Ex: set the P1 multiplexer to Full Screen Sequence mode, dwell time = 3 seconds. Set S1 to S16 multiplexer to 4x4 display mode. Then in 48 seconds, all 256 cameras will be displayed on the system monitor sequentially.

System Diagram:



Notice:

- (1) All Multiplexers shown in the diagram can be DVR-16/IPs.
- (2) Choose “Super MPX” from “System Monitor Setting” in keyboard’s “System Setting”
- (3) All the device must be connected to the same RS485 bus, the RS485 ID for each device must be set up as indicated in the above table.

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