
# 360° 4CH PANORAMA CAMERA

## CMD2422S/SC

INSTRUCTION MANUAL

# IMPORTANT SAFEGUARDS

## CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION :
TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED
SERVICE PERSONNEL.

# GRAPHIC SYMBOL EXPLANATION

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the unit.

## CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS

# PREFACE

With 2 Megapixels (CMOS) camera and a 360° fisheye lens viewfinder, the 360° captured panoramic image is split into four standard video signals (CVBS Port). Each image can be controlled by keyboard controller through RS-485 communication interface or through Lilin single-chip digital video recorder (DVR) Local Host RS-485 communication interface, and control functions are similar to controlling 4 fast dome cameras. The new panoramic camera can be from single 4-channel panoramic camera or serial linking to 64 panoramic cameras allowing expansion to 256-channel video screen. Each channel can be set up to 128 preset points and perform automatic patrol (Auto-Pan).

The digital Pan/Tilt/Zoom (ePTZ) control is different from the traditional fast dome camera, there is no vibration, noise and heat problem inherent in motor rotation. There are also no motor component reliability and life span issues.

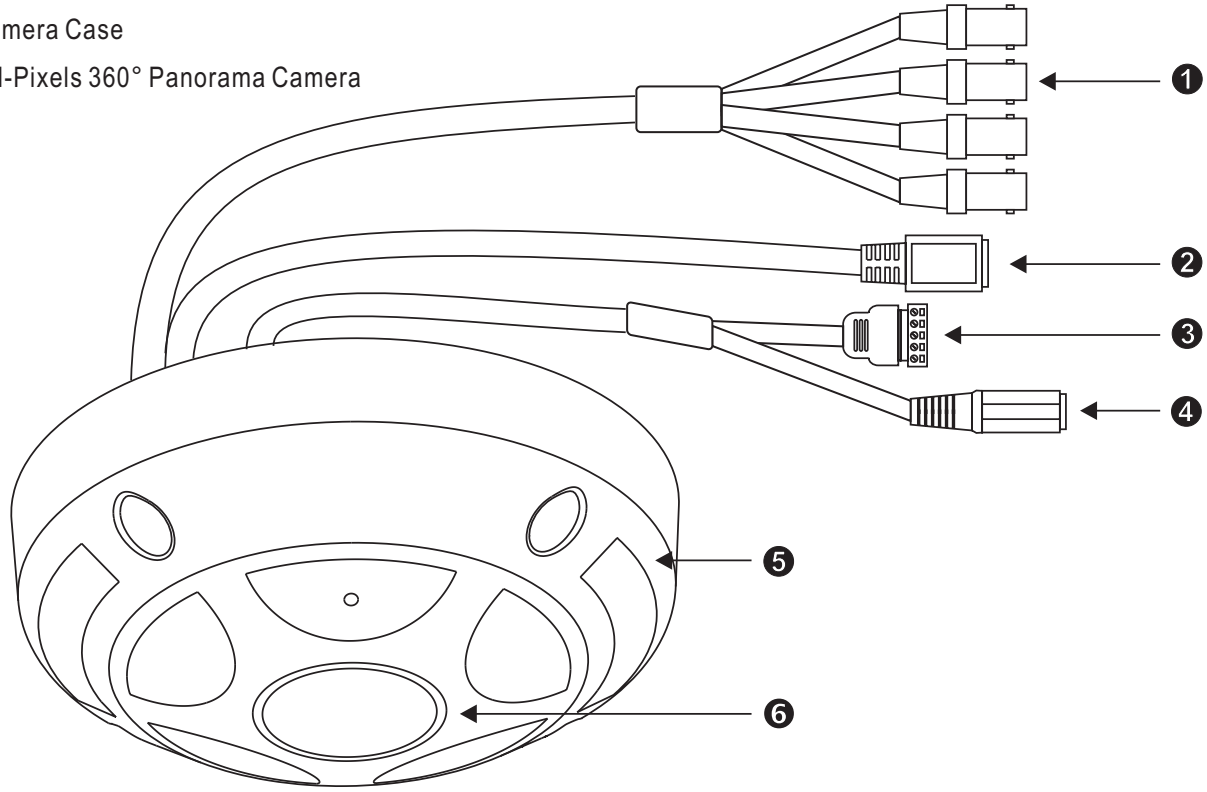
The new 2 Megapixels 360° panorama camera, not only has bright smooth appearance, it timely switch to night mode at low illumination showing clearly visible image with extra infrared illuminator. The best choice among monitoring equipment.

# FEATURES

- Build-in 360° optical fisheye lens with focal length 1.25mm
  Lens angle field of view: 185° ; Vertical = 185° ; Diagonal = 185°
- Effective Pixels
  Input: 1600(H) x 1200(V) ; Output：4 x D1(N/P) 2:1 Interlace
- Minimum Illumination
  Color: 1 Lux (F2.0) ; Monochrome: 0.5 Lux (F2.0) ; 0 Lux at IR LED turn ON
- White Balance: ATW / Manual / 3200°K / 5600°K / 6500°K
- Auto Gain Control
- Shutter Speed: 1/60 ~ 1/10,000s
- Electronic Pan, Tilt & Zoom:
  1. Panning Range: 360° Endless
  2. Tilting Range: 90°
  3. Panning & Tilting Speed: Manual 0.15°/sec ~ 120°/sec, Preset Position 1°/sec ~ 255°/sec
  4. Panning & Tilting Mode: Manual, Auto, Manual Position, Sequential Position.
- Control Interface: RS-485
- Protocol: MLP2 / D-Protocol
- Control Setting:
  1. Build in DSP color camera.
  2. Color / Mono Switch (IR Cut Filter): Day(Color) / Night(Mono) / Schedule
  3. White Balance Control: Auto Tracing(ATW) & Manual(MTW)
  4. 11 levels Brightness Adjustment & 12 levels Pedestal Adjustment
- Up to 64 Panorama Camera configuration
- Preset Position: 128 (Each channel)
- Auto Mode: OFF / AUTO / SEQ. / TOUR
- Self Run Mode: OFF / HOME / AUTO / SEQ. / TOUR
- Schedule Mode: OFF / AUTO / SEQ. / TOUR / STOP

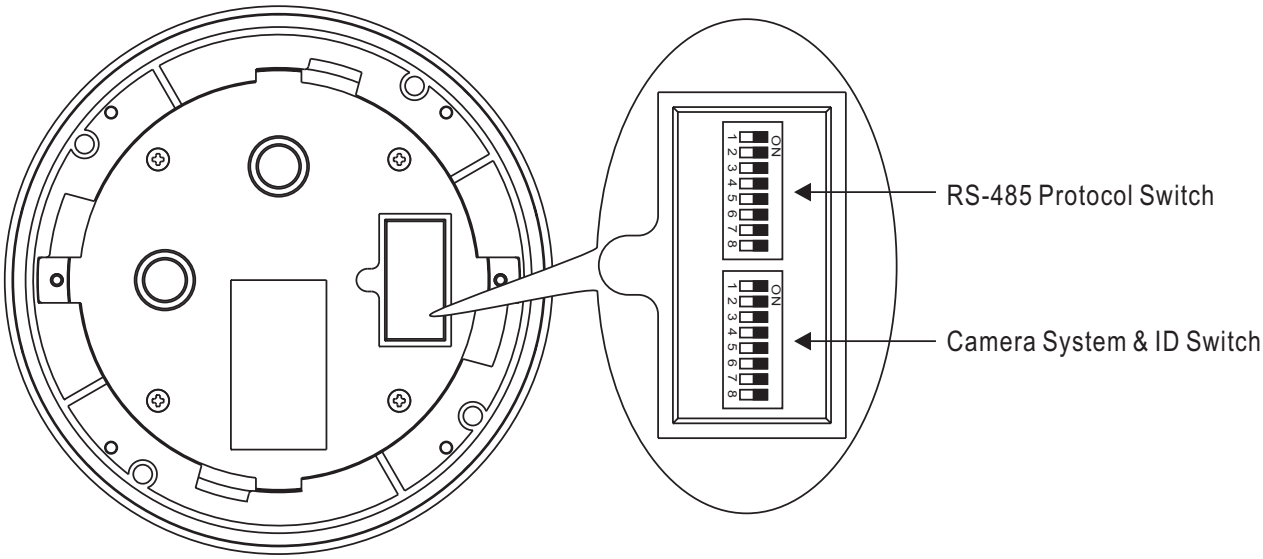
## STRUCTURAL ELEMENT

1. 4 port Video Out BNC Jacks - [4CH BNC Model]
2. RJ-45 Jack - [CAT5 Model]
3. RS-485 In/Out Terminal
4. Power In DC Jack (DC12V)
5. Camera Case
6. 2M-Pixels 360° Panorama Camera




## PANORAMA DOME CAMERA SETUP

- DIP Switch Setting



## RS-485 Protocol Switch Setting

- DIP Switch Setting:

  1. BAUD SEL 1 : Transmission speed selection 1
  2. BAUD SEL 2 : Transmission Speed selection 2
  3. PROTOCOL SEL 1 : Protocol selection 1
  4. PROTOCOL SEL 2 : Protocol selection 2
  5. PROTOCOL SEL 3 : Protocol selection 3
  6. RS-485 IN-TML RES. : RS-485 IN Terminal Resistor ON/OFF
  7. RS-485 OUT-TML RES. : RS-485 OUT Terminal Resistor ON/OFF
  8. NA

  Note: Using Pelco D, please contact your nearest agent.

- Transmission Speed Setting

| BAUD RATE SELECTION | | |
|---|---|---|
| DIP SWITCH | 1 | 2 |
| 2400 bps | ON | ON |
| 4800 bps | OFF | ON |
| 9600 bps | ON | OFF |

Remark: Lilin Protocol control mode is N, 8, 1 Baud Rate : 9600 bps

- Protocol Setting

| PROTOCOL SELECTION | | | |
|---|---|---|---|
| DIP SWITCH | 3 | 4 | 5 |
| MLP2 (MERIT LILIN PROTOCOL 2) VERSION | ON | ON | ON |
| PELCO D PROTOCOL | OFF | ON | ON |

- RS-485 In/Out Terminal Resistor Setting
  - ☛ Daisy Connection: Set RS-485 In and Out terminal resistor as ON. (Factory Initialize)
  - ☛ Parallel Connection: Set the front and last equipments terminal resistor as ON. The parallel connection equipment in the middle set as OFF to keep the best transmitted status.

- RS-485 Protocol DIP Switch of Lilin CMD2422S/CMD2422SC Series Setting

| RS-485 Protocol DIP Switch Setting | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DIP SWITCH | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| MLP2 Version | ON | OFF | ON | ON | ON | ON | ON | X |

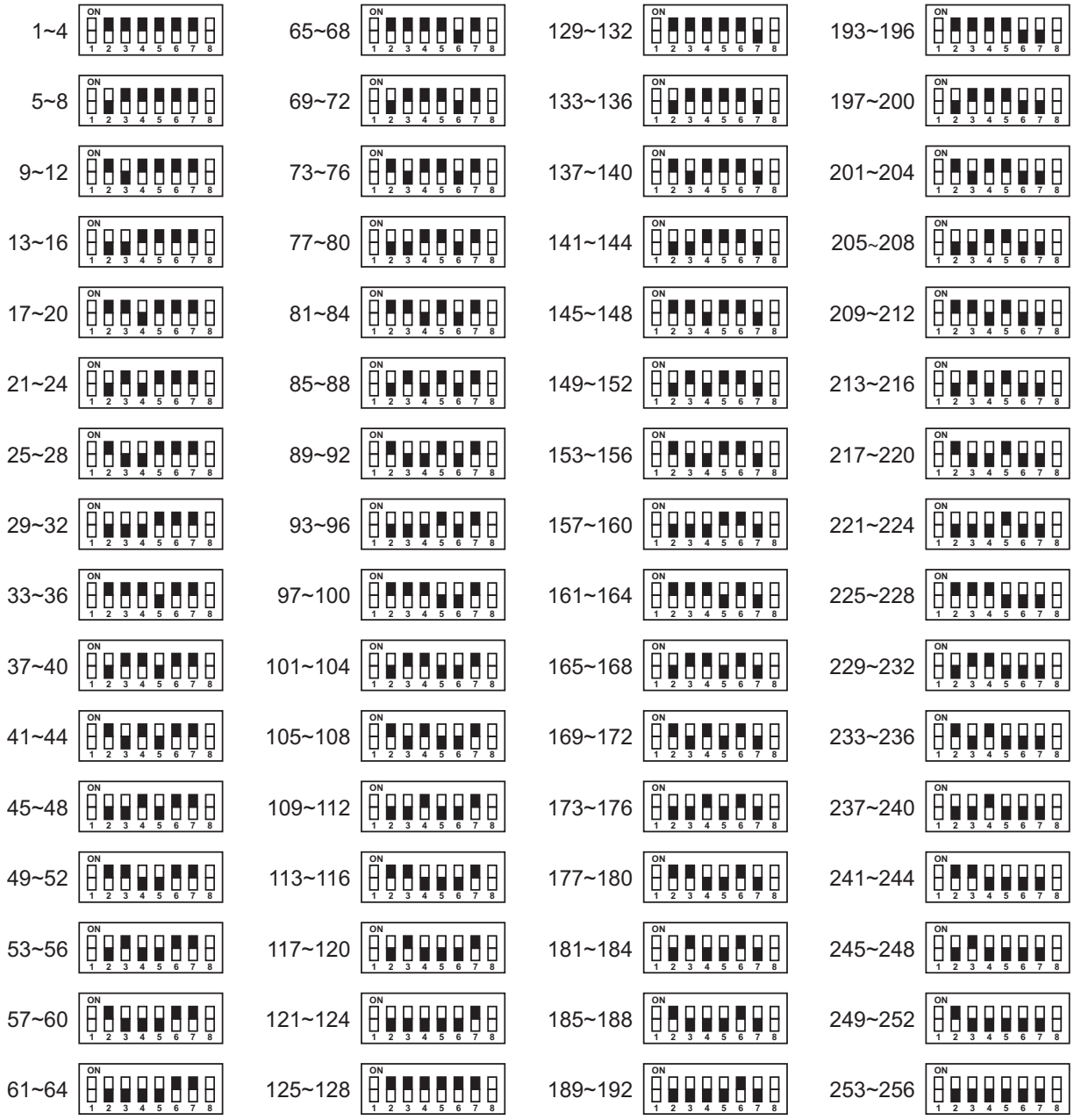
## Panorama Camera System Switch

| Camera System & ID Switch | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DIP SWITCH | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| PAL | ON | Camera ID : 1 - 256 | | | | | | X |
| NTSC | OFF | Camera ID : 1 - 256 | | | | | | X |

## Panorama Camera ID Address Setting Refer Chart

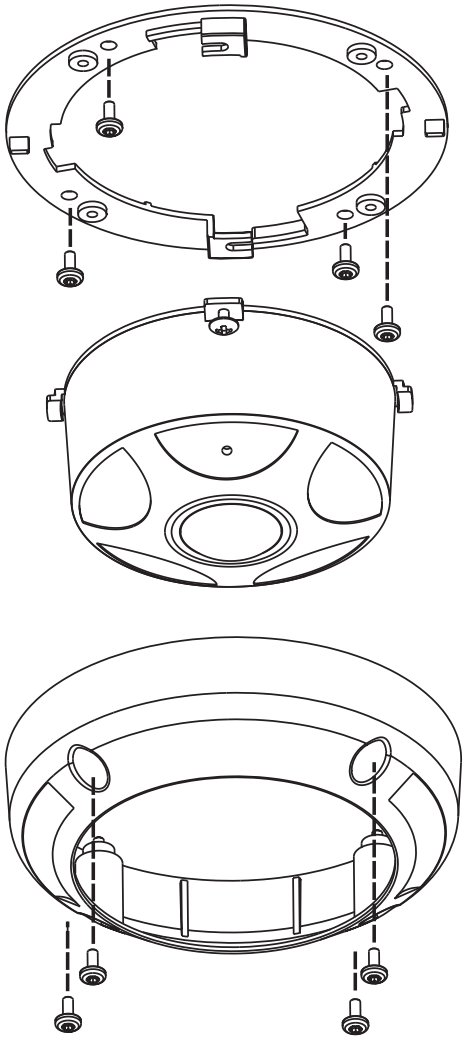
Up to 64 4CH panoramic camera can be serial linking in one system. Therefore each channel is addressed by ID switch for identification.

The 4CH Panorama Camera ID setting are as follows:

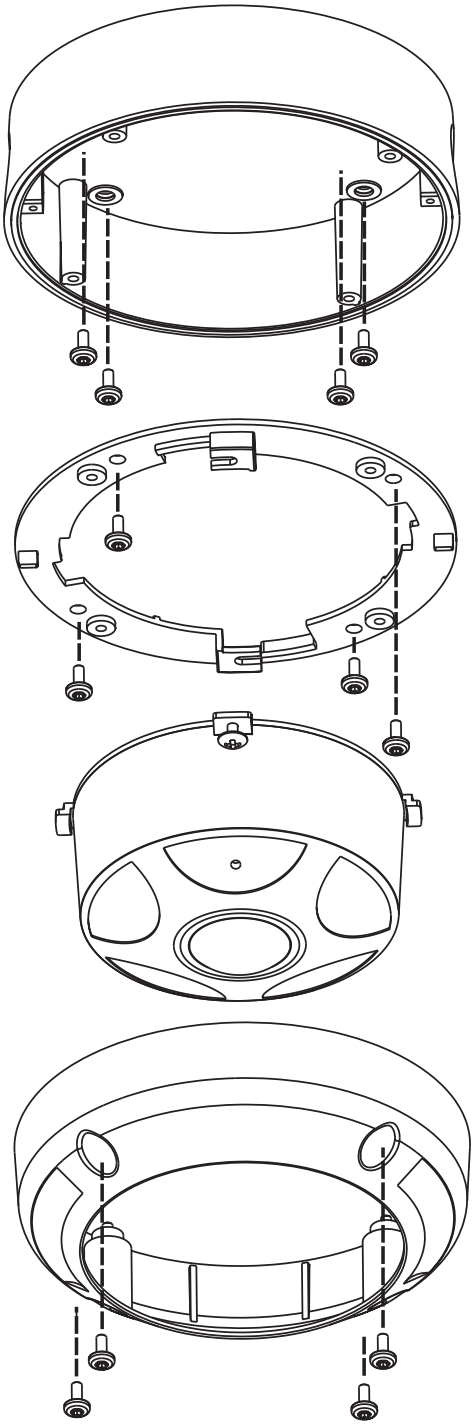


# INSTALLATION

Embedded Mounting

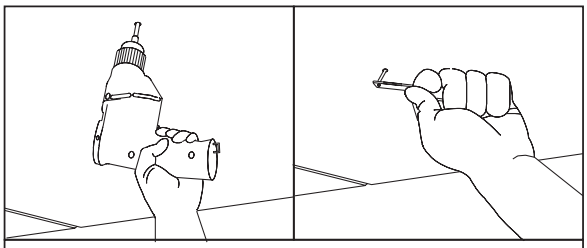


Attached Mounting
(Only applicable in CAT5 model option)

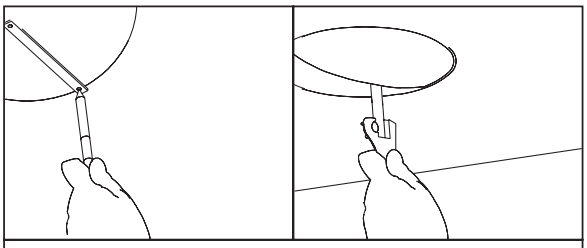


## Embedded Mounting (False Ceiling)

- Step 1. Ceiling Preparation



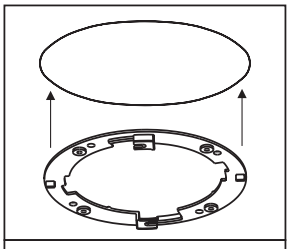
Drill a 3/32" (2.4mm) hole at the center of the chosen area.



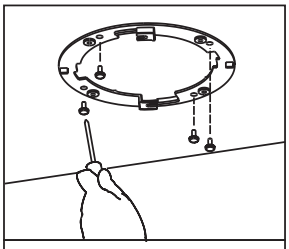
Use a pencil and a compass to mark a circle 3.6"~4.1" (90~105mm) in diameter and cut the circle.

Note: Due to camera body cable tap hole position, drill hole bigger than 3.6"(90mm) but smaller than fix ring inner diameter.

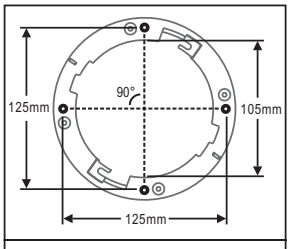
- Step 2. The Ceiling Ring



Place fixed ring on the ceiling.

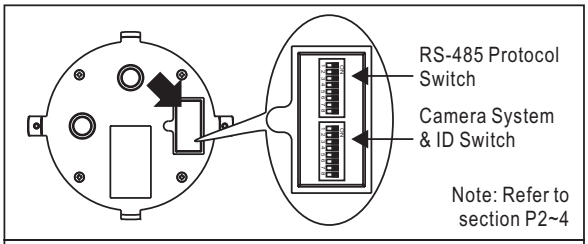


Tighten the four tapping screws into the ceiling or four machine screws with four screw nuts.



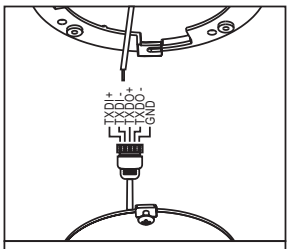

Fixed ring size and screw location.

- Step 3. Camera Setting

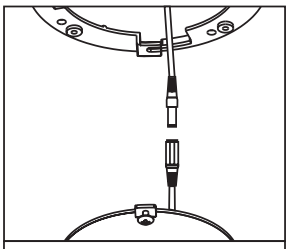



Separate rubber sheet from the camera main body. Set Panorama Camera ID, RS-485 Protocol and Camera system.

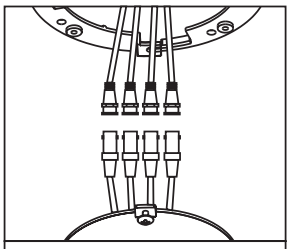
- Step 4. Control Cable Connection



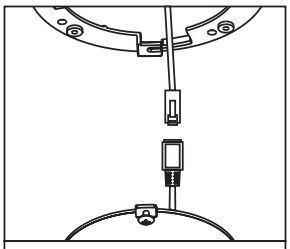

Connect RS-485 cable.



Connect DC12V Power cable. (Suggest to use the ADAPTOR from the factory.)

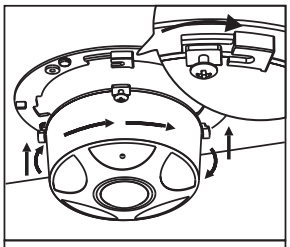


Connect four video signal cable. [4CH BNC Model]

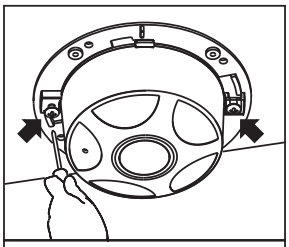


Connect RJ-45 cable. [CAT5 Model]

● Step 5. Install Camera Body and Ring

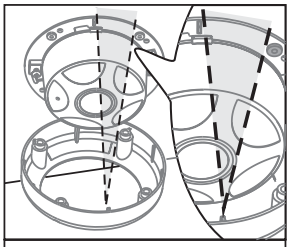


Attach the camera body to the fixed ring.
**Notice:** Camera body screw hole should be align to fixed ring's latch position.

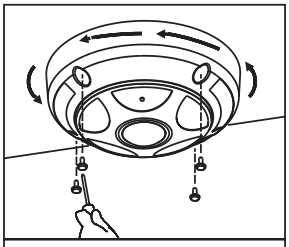


Tighten the two screws to fix the camera body.

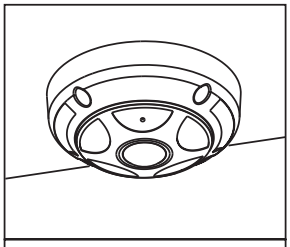
● Step 6. Install Decorative Ring



Put the decorative ring on the camera body.
**Notice:** Ring's positioning column should be between camera body positioning column and screw nut.



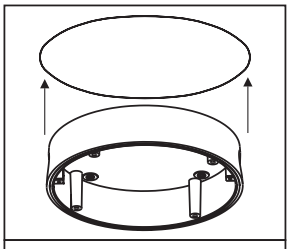
Rotate the decorative ring counter clockwise until its position column touch the camera body positioning column. Tighten the 4 screws.



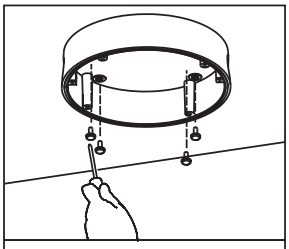
Installation is complete.

Attached Mounting (Fixed Ceiling) - [Option for CAT5 Model only]

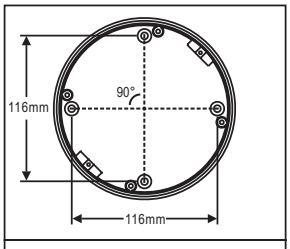
● Step 1. Fixed the Camera Base



Attach the camera base to ceiling.

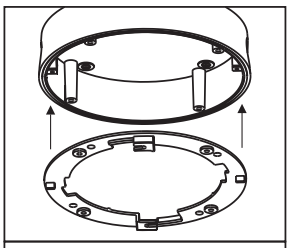


Tighten the four tapping screws into the ceiling.

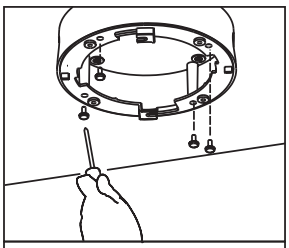



Camera base size and screw location.

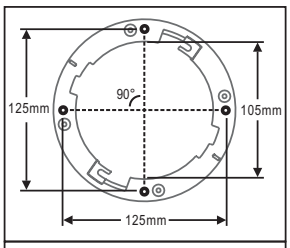
● Step 2. Fixed the Ring



The fixed ring placed on the base.

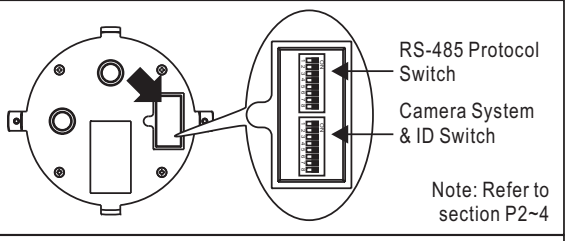


Tighten the four screws into the base.



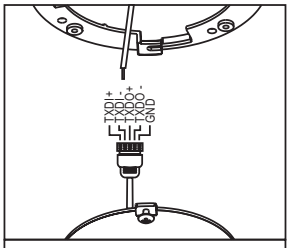

Fixed ring size and screw location.

● Step 3. Camera Setting

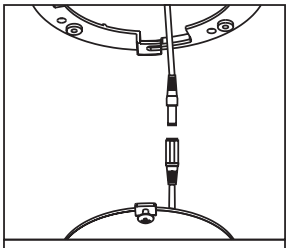



Separate rubber sheet from camera main body.
Set Panorama Camera ID, RS-485 Protocol and Camera system.

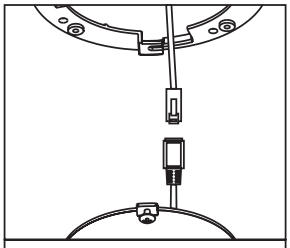
● Step 4. Control Cable Connection




Connect RS-485 cable.

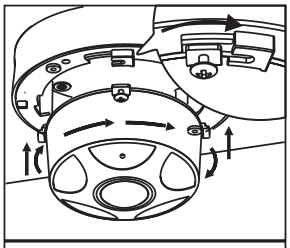


Connect DC12V Power cable. (Suggest to use the ADAPTOR from the factory.)

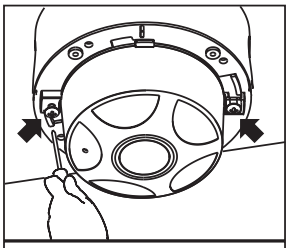


Connect RJ-45 cable. [CAT5 Model]

● Step 5. Install Camera Body and Ring

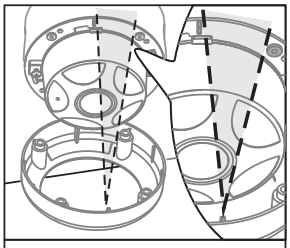


Attach the camera body to the fixed ring.
**Notice:** Camera body screw hole should be align to fixed ring's latch position..

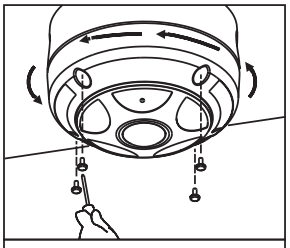


Tighten the two screws to fix the camera body.

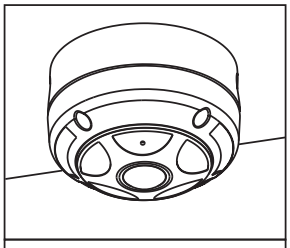
● Step 6. Install Decorative Ring



Put the decorative ring on the camera body.
**Notice:** Ring's positioning column should be between camera body positioning column and screw nut.



Rotate the decorative ring counter clockwise until its position column touch the camera body positioning column. Tighten the 4 screws.



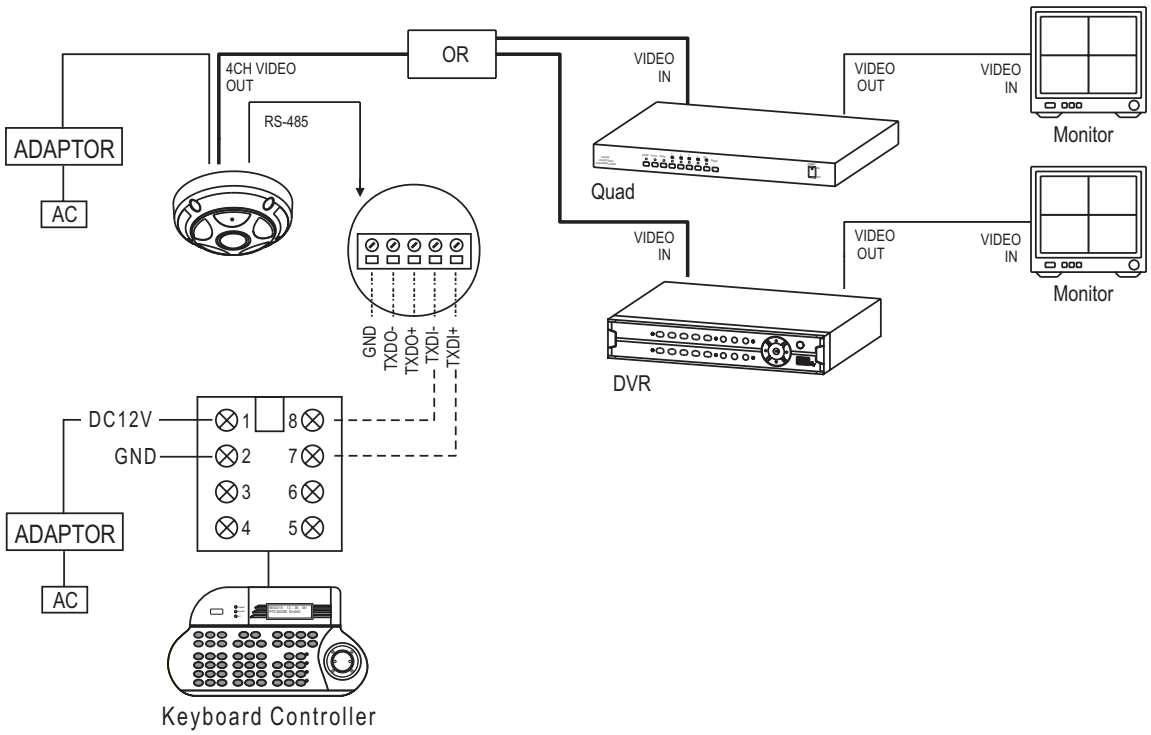
Installation is complete.

# SYSTEM CONFIGURATION

Lilin's Panorama camera Surveillance System is suitable for wide range of surveillance applications. With DVR digital storage in the system, it can control the panoramic camera. Such flexibility means future expansion is easily facilitated.

## Panoramic Camera, Keyboard and 4CH DVR Configuration

Single Panoramic camera configuration: One Panorama Camera connects to one PIH-931D/932T. Telemetry control is sent via twisted pair between Panoramic camera and Keyboard. 4 channel Video signal from the panoramic camera is sent to multiplexer or quad and into monitor.




**RS-485 Connection**

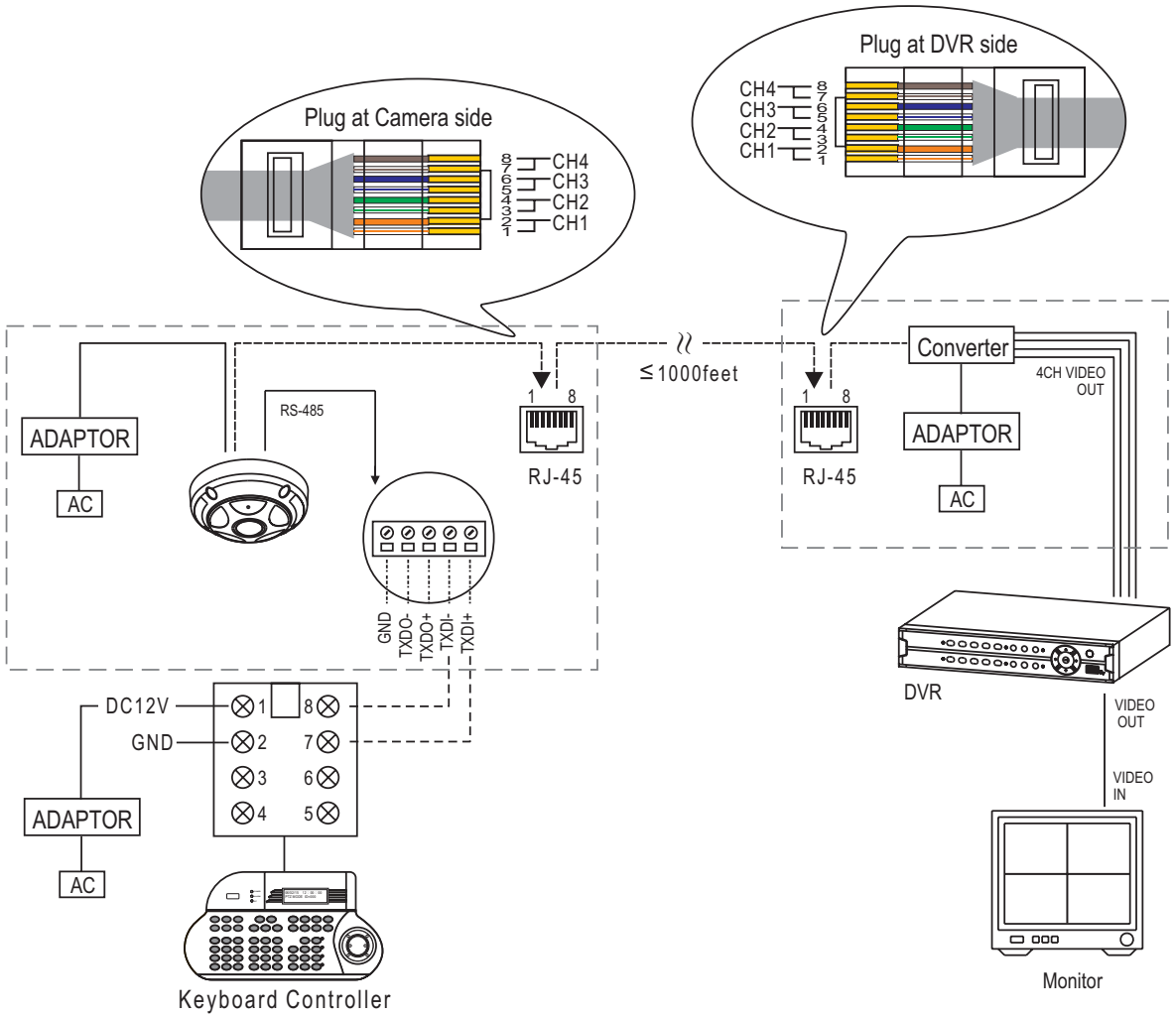
7th pin TXDI+ of Connector Box connects to TXDI+ of RS-485 jack on panoramic camera.

8th pin TXDI- of Connector Box connects to TXDI- of RS-485 jack on panoramic camera.

## Long distance Panoramic Camera with a Keyboard and 4CH DVR

( Applicable Model: CMD2422SC ; Video transmission distance: 300m)

When installing the panorama camera in long distance is required, may switch to panorama CAT5 camera. This model has built-in video encoder converting 4-ch analogue video signal to CAT5 network signal. With RJ-45 network connector, and transmitted through the network cable up to 300 meters transmission distance. Just connect video decoder at the other end or at the DVR 4CH video input front-end to restore the analog video and have complete panorama camera 4-ch video signal.




**RS-485 Connection**

7th pin TXDI+ of Connector Box connects to TXDI+ of RS-485 jack on panoramic camera.

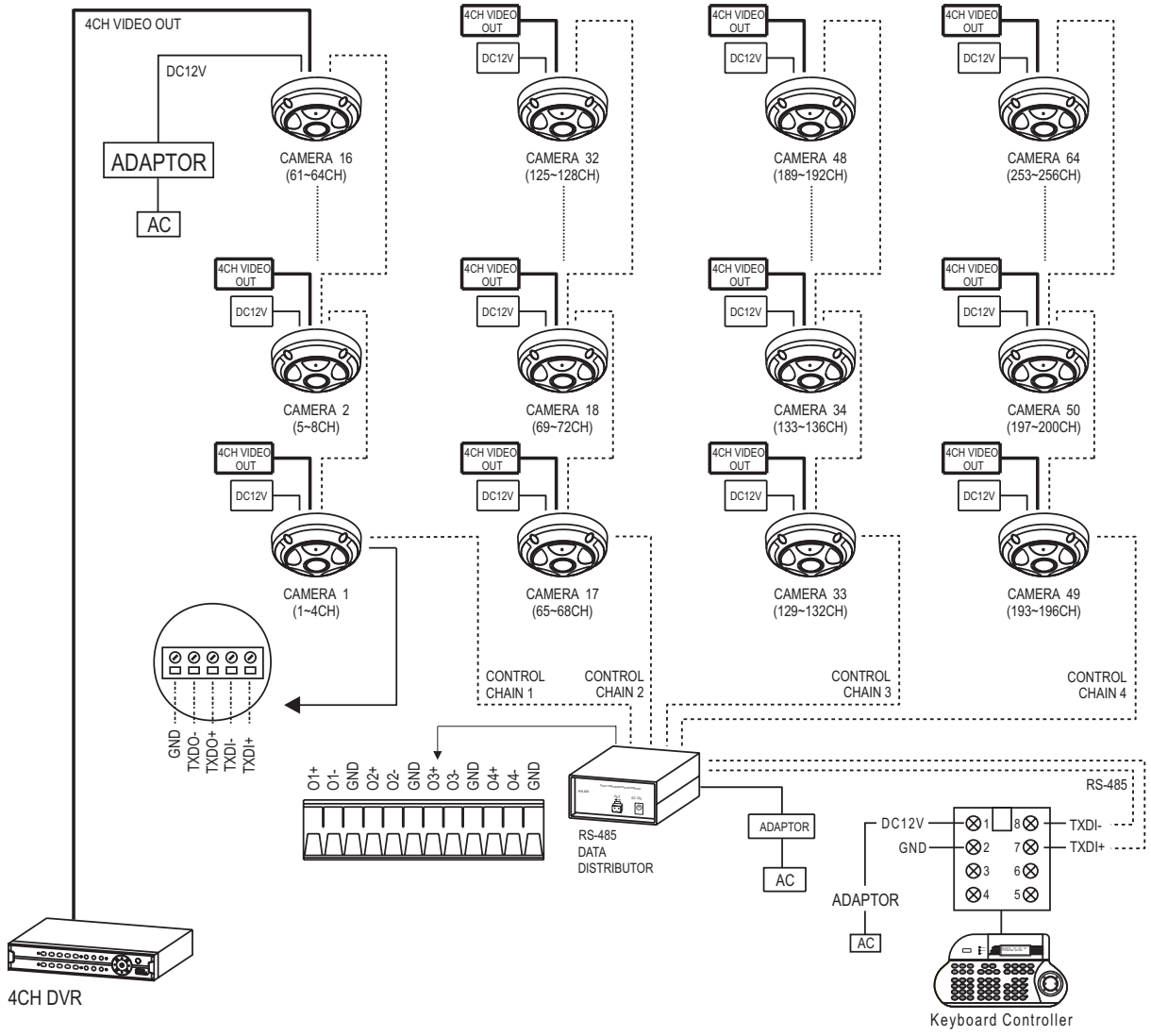
8th pin TXDI- of Connector Box connects to TXDI- of RS-485 jack on panoramic camera.

**RJ-45 Connection**

✻ Should pay attention to the RJ-45 connectors at both ends, must be the same color order.

| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Signal | CH1 | | CH2 | | CH3 | | CH4 | |
| Color | White/Orange stripe | Orange solid | White/Green stripe | Green Solid | White/Blue stripe | Blue solid | White/Brown stripe | Brown Solid |

Multiple Domes means that more than one panoramic camera is linked in the system. Each panoramic camera connects to next panoramic camera forming a serial linking. Each panoramic camera has an individual ID dip switch, which allows the keyboard to identify each panoramic camera and make command. Sometimes it is more convenient to wire a telemetry system in star configuration rather than daisy chain. To do this a PIH-804Ⅲ data distributor is necessary. It takes an output from a keyboard or a matrix and splits the single data line into 4 separate data lines. One Keyboard can control up to 64 cameras total of 256 channels.




**RS-485 Connection Between PIH-804Ⅲ Data Distributor and Panoramic Camera**

1st output TXDI1+ of PIH-804Ⅲ connects to TXDI+ of 1st panoramic camera and TXDI1- of PIH-804Ⅲ to TXDI- of 1st panoramic camera.

Linking 2nd Panoramic Camera

TXDO+ of 1st panoramic camera connects to TXDI+ of 2nd panoramic camera and TXDO- of 1st panoramic camera to TXDI- of 2nd panoramic camera.

**RS-485 Connection Between PIH-804Ⅲ Data Distributor and Keyboard**

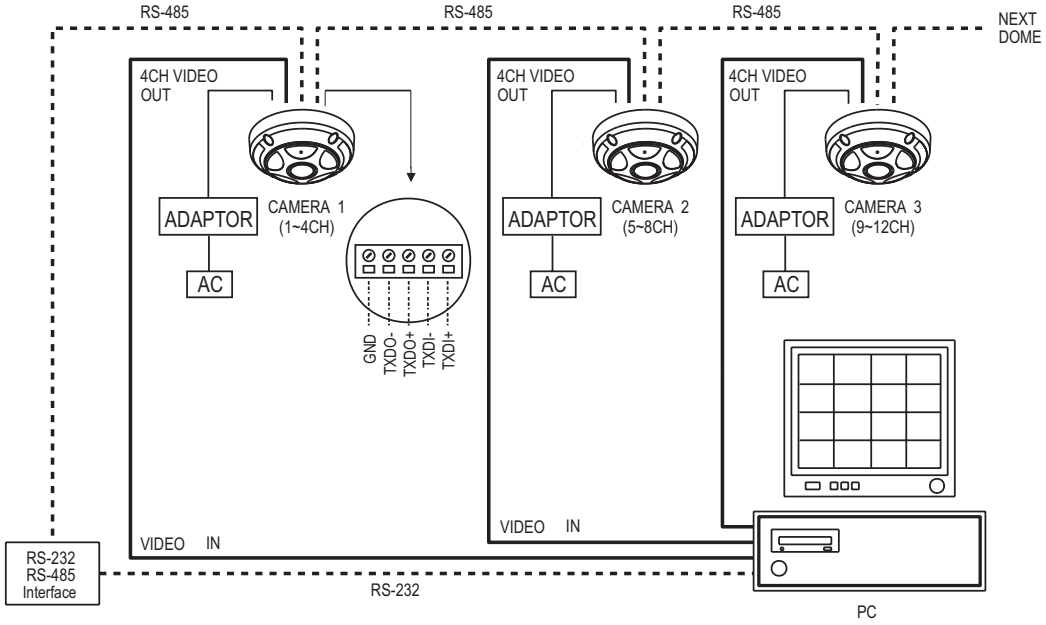
7th pin TXDI+ of Connector Box connects to TXDO+ on RS-485 OUT jack of PIH-804Ⅲ

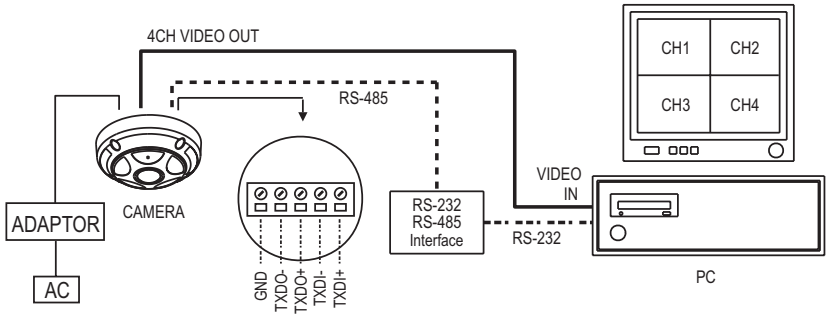
8th pin TXDI- of Connector Box connects to TXDO- on RS-485 OUT jack of PIH-804Ⅲ

## Panoramic Camera with PC Control

PC telemetry remote controls panoramic camera with standard RS-485 data format (format: N, 8, 1 Baud Rate: 9600bps). The PC control port RS-232 is converted to RS-485 format by interface. User may use their own software (protocol) or software provided by Lilin to control the panoramic camera.

In this system, you can connect up to 64 panoramic cameras, a total of 256 channels.




**RS-485 Connection Between Panoramic Camera and Conversion Interface**

TXD+ of conversion interface RS-485 jack connects to TXDI+ of 1st panoramic camera and connect TXD- to TXDI-.

Linking 2nd Panoramic Camera

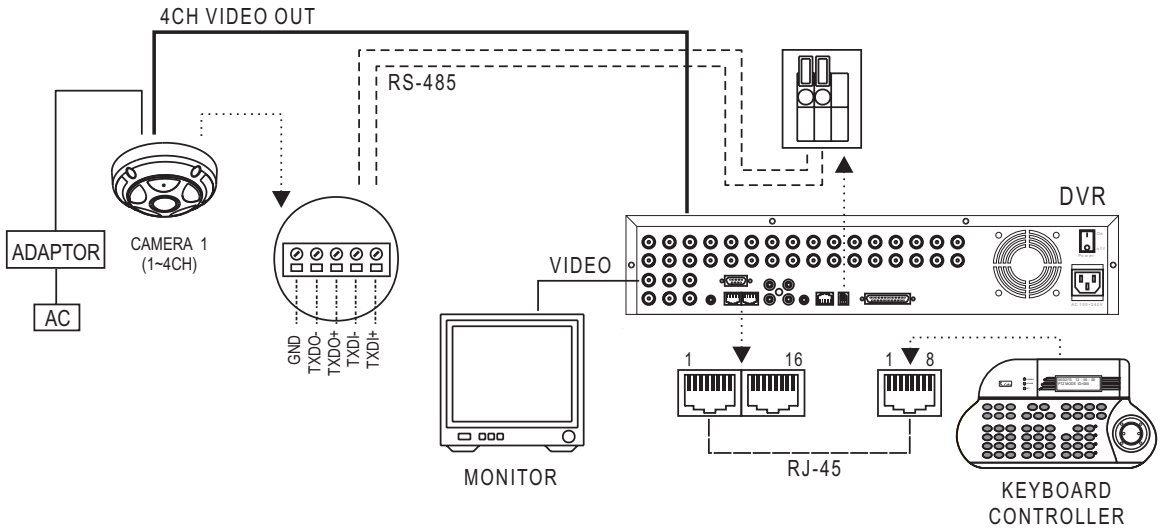
TXDO+ of 1st panoramic camera RS-485 jack connects to TXDI+ of 2nd panoramic camera and TXDO- of 1st panoramic camera to TXDI- of 2nd panoramic camera. 64 panoramic cameras can be linked through the connection as shown.

## Panoramic Camera, DVR and Keyboard

The DVR System is an advanced digital recorder, with long recording time and easy searching features. Telemetry remote control is through twisted pair for data transmission to the panoramic camera.

Panoramic camera can be controlled directly from the control panel of the DVR, or from keyboard.

Each DVR (Digital Video Recorder) can manage 16 channels signal and daisy link four (16 channels) panorama cameras via RS-485 interface.




**RS-485 Connection Between Fast Dome and DVR**

TXD+ of DVR RS-485 jack connects to TXDI+ of 1st panoramic camera and TXD- of DVR to TXDI- of 1st panoramic camera.

Linking 2nd Panoramic Camera

TXDO+ of 1st panoramic camera RS-485 jack connects to TXDI+ of 2nd panoramic camera and TXDO- of 1st panoramic camera to TXDI- of 2nd panoramic camera.

**RJ-45 Connection Between DVRs**

"Keyboard Out" of 1st DVR connects to RJ-45 jack connects to "Keyboard In" of 2nd DVR's RJ-45 jack.

**RJ-45 Connection Between DVR and Keyboard**

"Keyboard In" of 1st DVR's RJ-45 jack connects to RJ-45 jack of keyboard.

# OPERATION

## Initial Power Up Inspection

After you completed the installation and initially power up, the panorama camera will perform self-test procedure, the camera calibrates and checks the basic function, controlling the camera is possible after self-test is completed.

If preset positions and tours have been programmed into a panorama camera and the power is turned off, the panorama camera will enter the Auto Scan mode once the power is turned on again (after self-test period). The panorama camera will remain in Auto Scan until an operator cancels it.

## Manual Operation (Pan/Tilt Control)

To control the pan and tilt movement of the panorama camera screen, simply use the joystick on the keyboard; to pan the panorama camera screen. left push the joystick to the left, to tilt down pull the joystick down (towards you). To move the panorama camera screen faster, push the joystick further in that direction, the joystick is proportional to the speed of the panorama camera; a small movement will move the panorama camera screen slower.

❶ UP
Push the joystick forward, the camera tilt up.

❷ DOWN
Push the joystick down (towards you), the camera tilt down.

❸ LEFT
Push the joystick left, the camera pan left.

❹ RIGHT
Push the joystick right, the camera pan right.

❺ DIAGONAL
Push the joystick diagonally, the camera moves to that direction (direction ⑤ on figure 1)

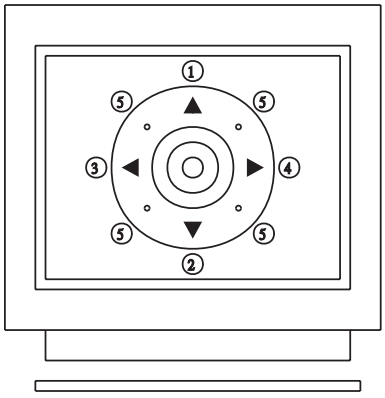



Figure 1
Relationship Between Joystick and Direction

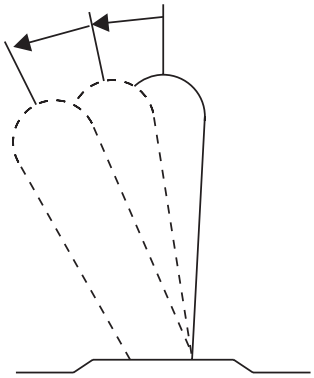
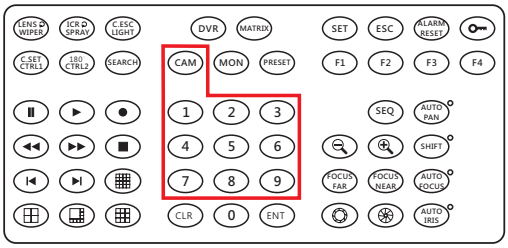


Figure 2
Relationship Between Joystick and Rotation Speed

## Panorama Camera Selection

Each panoramic camera has four surveillance panoramic image channels, the user can switch between image channel and operation.

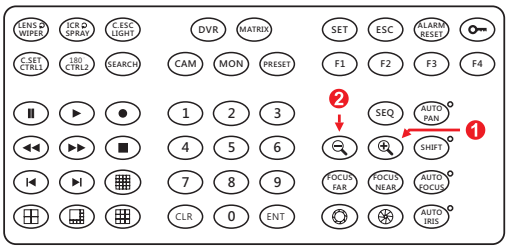


- To select 1st Panorama Camera (Channel 1 of the first Camera)
  Push key (1) followed by (CAM) key.
- To select 64th Panorama Camera (Channel 4 of 16th Camera)
  Push key (6) (4) followed by (CAM) key.

＊When matrix system is used, select monitor before camera selection. Please refer to matrix system user manual.

## Zoom Lens Control (Digital Zoom)

Each panoramic camera has four surveillance panoramic image channels, the user can control screen zoom in (or out) image in each channel separately.

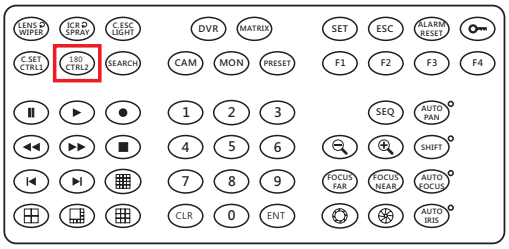


① **To Zoom In**
Push (⊕) key. The viewing angle becomes narrower and target will become enlarge on the screen. Zooming will stop when the key is released.

② **To Zoom Out**
Push (⊖) key. The viewing angle becomes wider and target will become smaller on the screen. Zooming will stop when the key is released.

## Horizontal 180° Instant Flip

Sometimes it is hard to use the joystick to control the camera tracking the target directly under the camera. The instant flip key can rotate the camera 180° instantly. This allows the camera continue to track the target passing directly under the camera. To operate 180° instant flip:



- Push (180 CTRL 2) key on keyboard to flip the camera 180° horizontally.

## Preset Positions Setting

Each panoramic camera can have 128 individual preset positions. Each preset stores the exact position of the camera and automatic pan, tilt, zoom, focus and iris setting. Once the data is set, the preset can be recalled for viewing, or the presets can be set for auto pan.

＊Only the first 16 preset positions of panorama camera can be set to auto pan mode.

### ❶ Select Panorama Camera

Push key (1) followed by (CAM) key, confirming that first channel is selected.

Ex. To select 1st channel (Channel 1 of the first Camera) : (1) (CAM) keys

To select 64th channel (Channel 4 of the 16th Camera) : (6) (4) (CAM) keys

### ❷ Selecting Preset Position

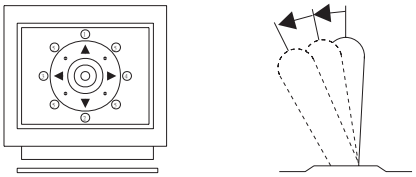
Push key (1) followed by (PRESET) key, confirming that first preset position selected.

Ex. To select 1st preset position : (1) (PRESET) keys

To select 128th preset position : (1) (2) (8) (PRESET) keys

### ❸ Joystick Control

Move the joystick to bring the camera to the desired view position.



### ❹ Adjusting Lens

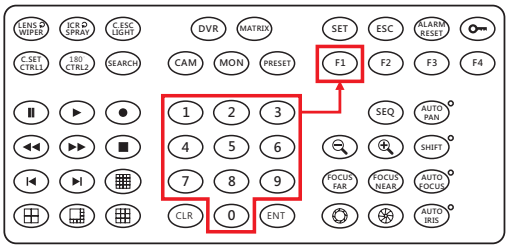
When set up preset point, adjust ZOOM IN and ZOOM OUT keys.

### ❺ Setting Preset Speed

The speed the panorama camera travels to that preset position can be adjusted between 1° to 255° per second (the factory default is 40°/sec).

To set speed as 10°/sec:

Push key (1) (0) followed by (F1) key, two beeps will be heard confirming that speed is set.



Note: Push key again to confirm speed entered.

### ❻ Setting Preset Dwell Time

The dwell time means the time user wants to view on certain preset position under Auto Pan. The Preset Dwell Time can be set between 0~255 seconds. (The factory default is 0 second.)

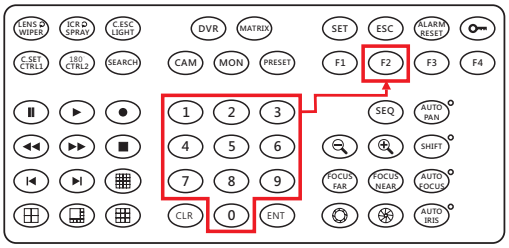
* If the dwell is set to 0 second then that position will be omitted from the Auto Scan Tour.

To set dwell to 5 second:

Push key (5) followed by (F2) key.

Ex. To set dwell to 5 second: (5) (F2) keys

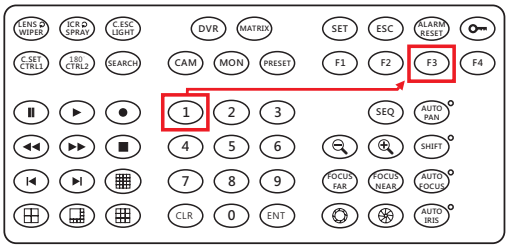
To set dwell to 10 second: (1) (0) (F2) keys



### ❼ Storing Preset Data

Once the above steps have been completed, the information must be stored or it will not be memorized by the system.

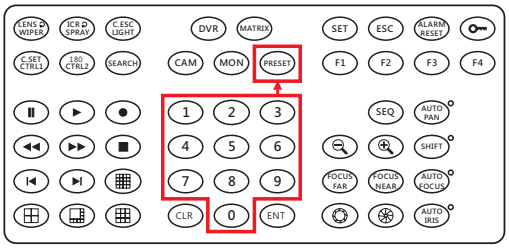
Push key (1) followed by (F3) key, two beeps will be heard confirming that data is stored.



Note: For the first 16 presets on each panorama camera, the above steps must be repeated. For presets 17~128 there is a default speed and dwell setting so steps ❺ and ❻ are not required.

## Recalling Preset Position

Once the required preset positions have been stored in a camera, they may be quickly recalled, returning the camera to exact position.



- To recall 1st Preset Position:
  Push key (1) followed by (PRESET) key. The panorama camera will move to that position in speed of 360°/sec.
  Ex. To recall 1st preset position : (1)(PRESET) keys
  To recall 128th preset position : (1)(2)(8)(PRESET) keys

## Changing Preset Data

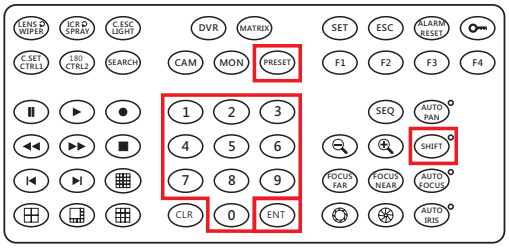
In order to change any preset position from the one stored, the panorama camera must first be sent to that preset position.

Ex. To change the 4th preset position of channel 3 of the 2nd Panorama Camera, perform the following steps:

❶ Push (7)(CAM) to select Panorama Camera 7 (Channel 3 of the 2nd camera).
❷ Push (4)(PRESET) to go to 4th preset position.
❸ Move joystick to bring camera to the desired view position.
❹ Adjusting lens (Digital Zoom).
❺ Setting preset speed
❻ Setting dwell time
❼ Store Data
(Please refer to preset position setting for step❸~❼)

## Single Preset Position Saving

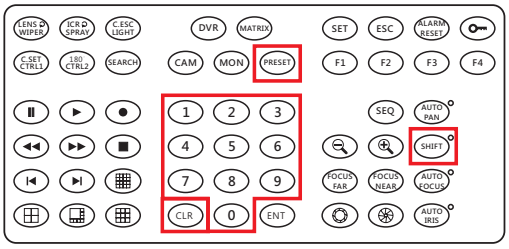
The main purpose of this function is the preset position can be quickly stored or modified, and retain the original preset speed and dwell time setting.



- Move the joystick to bring the camera to the desired view position, push (SHIFT) + want to save the preset number keys + (PRESET) + (ENT) keys, two beeps will be heard confirming that new preset position is saved.

## Single Preset Position Delete

The main purpose of this feature is to quickly delete the preset point, but still retain the preset point speed and dwell time originally set.



- Push (SHIFT) + want to delete the preset number keys + (PRESET) + (CLR) keys, two beeps will be heard confirming that preset position is deleted.

## Activating Auto Pan

When the Auto Pan function is activated, the panorama camera will auto touring the preset groups set.

- To activate Auto Pan:
  Push (AUTO PAN) key, confirming the activaed of Auto Pan. (Auto Pan Led will be lit.)

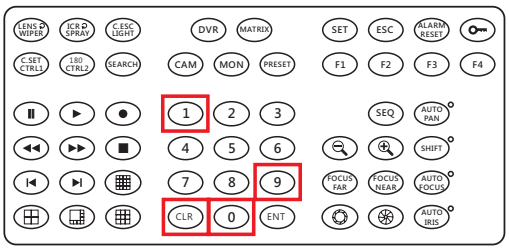
- To stop Auto Pan:
  Push (AUTO PAN) key again, confirming the stop of Auto Pan. (Auto Pan Led will be Off.)

Note: When an image is in auto pan mode, it cannot be controlled unless auto pan is turned off. But other image or other panorama camera can still be controlled.

## Deleting Preset Data

Sometimes it is necessary to delete the stored data. All the data can be cleared from a panorama camera by pressing key, (9) (0) (1) (1) following by the (CLR) key.

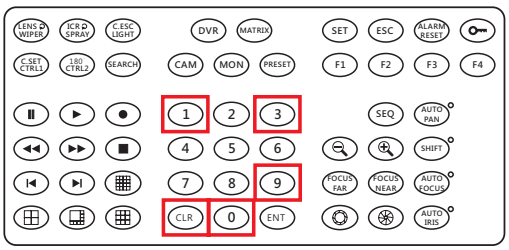
* Channel 1~4 of the panorama camera from all 128 preset data will be erased.



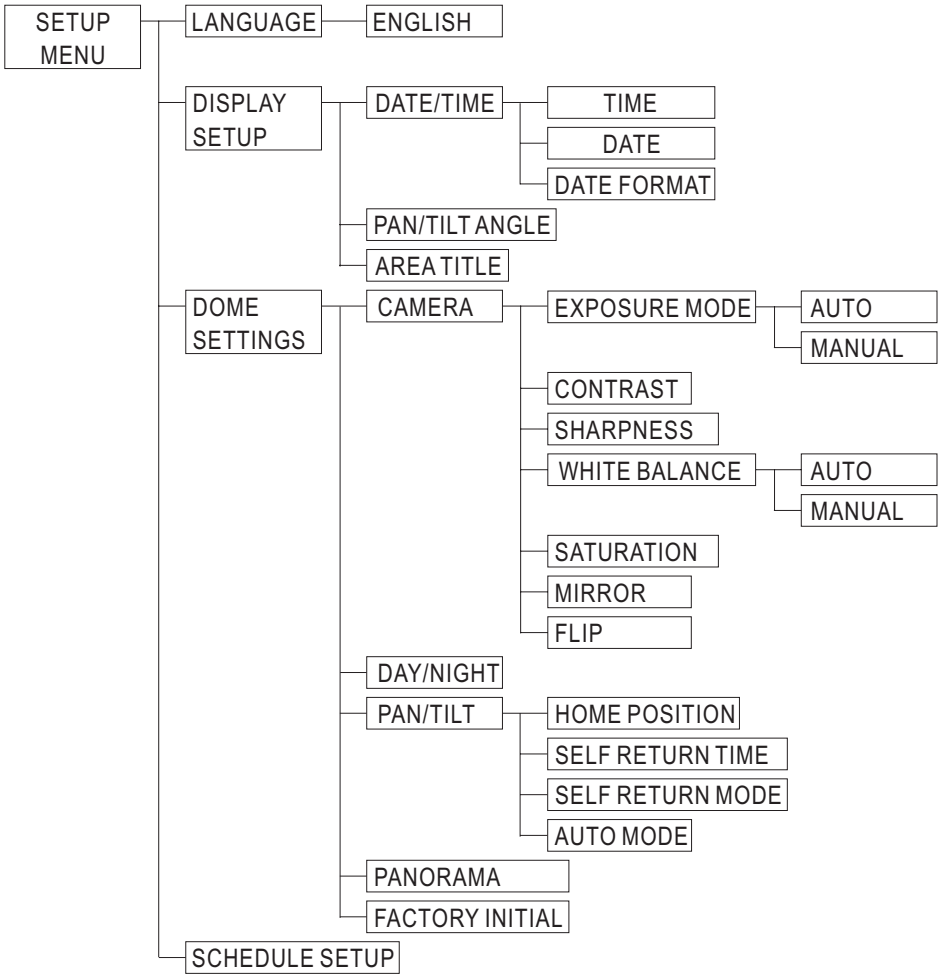

## Reboot System

Sometimes it is necessary to reboot the system.

- Push key (9) (0) (1) (3) , followed by the (CLR) key. Two beeps will be heard confirming reboot the system.



# SETUP MENU TREE



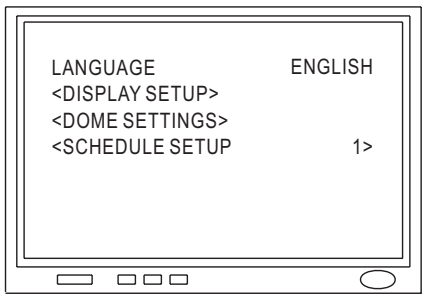

# PANORAMA CAMERA FUNCTION SETUP

Panorama Dome Camera (build-in fisheye lens) are equipped with superior day & night 2 Megapixels CMOS video quality.

It provides on-screen display setup menu and all the functions can be selected and set through the OSD Setup Menu.

## Setup Menu Display

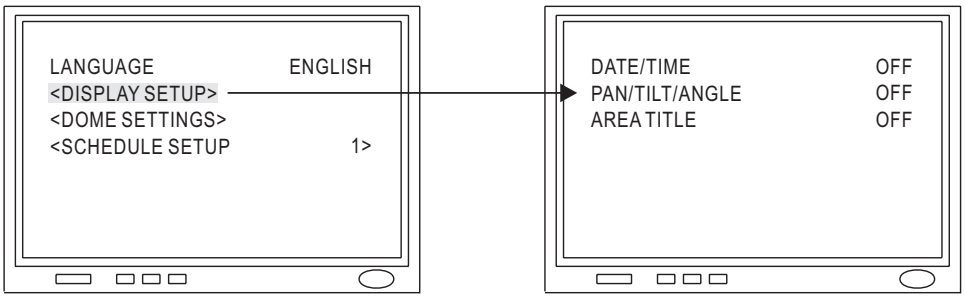
- Press (SET) key on the keyboard to recall Setup Menu.
- Press (ESC) key to exit setup menu.



## Display Character Setup Menu

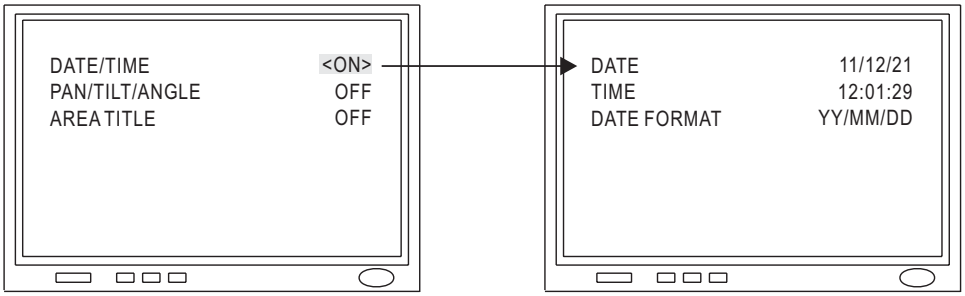
1. Display character Setup Menu

- Press (SET) key into Setup Menu.
- Push joystick down to select <DISPLAY SETUP>, and then press (SET) key to display character setup menu.
- Press (ESC) key to go back setup menu.




2. Date and Time Setting

- Push joystick down to select <DATE/TIME>, and then push joystick left or right to make selection:
  OFF : No Date/Time on the monitor screen.
  ON : Display Date/Time on the monitor screen. When selection is open, and then press (SET) key, date/time will be set.




(1) Date Adjustment

- Push joystick down to select <DATE>, and then press (SET) key to setup date.
- Push joystick left or right to adjust date, and then push joystick down to next item of date. Press (ESC) key to go back.

(SET) → 11 / 12 / 21 → <DOWN> → 11 / 12 / 21 → <DOWN> → 11 / 12 / 21 → (ESC) → 11 / 12 / 21

(2) Time Adjustment

- Push joystick down to select <TIME>, and then press (SET) key to setup time.
- Push joystick left or right to adjust time, and then push joystick down to next item of time. Press (ESC) key to go back.

(SET) → 11 : 12 : 21 → <DOWN> → 11 : 12 : 21 → <DOWN> → 11 : 12 : 21 → (ESC) → 11 : 12 : 21

(3) Date Format setting

- Push joystick down to select <DATE FORMAT>, and then push joystick left or right to adjust format of date.

→ YY / MM / DD → MM / DD / YY → DD / MM / YY →

3. PAN/TILT Angle Setting

- Push joystick down to select <PAN/TILT/ANGLE>, and then push joystick left or right to select pan/tilt setup:
  OFF : No Pan/Tilt Angle on the monitor screen.
  ON : Pan/Tilt Angle on the monitor screen.

4. Area Title Setting

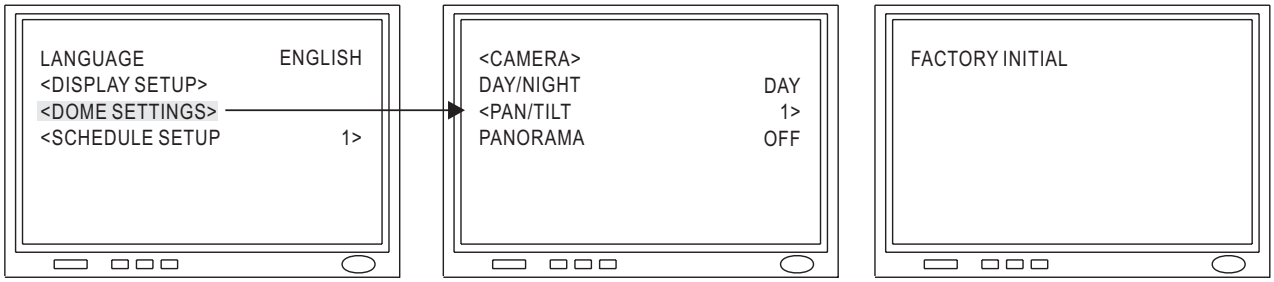
- The area title function can display a direction indicator that appears in the picture to indicate the direction of the location being shown on the screen. Text can also be displayed in the place of the direction indicators, if desired. The direction indicators are N(north), NE(northeast), E(east), SE(south east), S(south), SW(southwest), W (west), and NW(northwest).

- Push joystick down to select <AREA TITLE>, and then push joystick left or right to select pan/tilt setup:
  OFF : No Area Title on the monitor screen.
  ON : Area Title on the monitor screen.

## Display Function Setup Menu

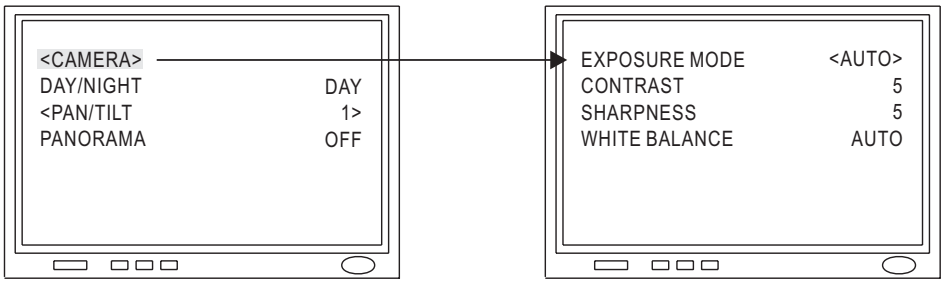
1. Display the Camera Setting Menu

- Press (SET) key to enter Setup Menu.
- Push joystick down to select <DOME SETTINGS>, and then press (SET) key to enter dome setting menu.
- Press (ESC) key to go back setup menu.




2. Camera Setting Menu

- After getting in dome setting menu, push joystick down to select <CAMERA>, and then press (SET) key to enter camera setting menu.




(1) Exposure Mode Setting

- Push joystick down to select <EXPOSURE MODE>, and then push joystick left or right to setup auto mode or manual mode.
  - ▶AUTO Exposure mode: This mode automatically adjusting electronic shutter speed according to the brightness changes for best performance in high brightness area.

▶ MANUAL Exposure mode: Press SET key into MANUAL Exposure setting menu, and then push joystick left or right to make selection.
Manual exposure levels are 1~10 (gray ~ light).

(2) Contrast Setting

- Push joystick down to select <CONTRAST>, and then push joystick left or right to adjust the image contrast level.
  Contrast ranges are 1~11 (weak ~ strong).

(3) Sharpness Setting

- Push joystick down to select <SHARPNESS>, and then push joystick left or right to adjust the image sharpness level.
  Sharpness ranges are 1~10 (normal ~ high).

(4) White Balance Setting

- Push joystick down to select <WHITE BALANCE>, and then push joystick left or right to setup auto mode or manual mode.
  ▶ Auto White Balance mode: Auto tracing white balance, suitable for 2500~9500K color temperature.
  ▶ Manual White Balance mode: Manual white balance, suitable for 2500~9500K color temperature.
  - Select <MANUAL>, and press SET key into Manual White Balance mode adjustment image.
  - Push joystick down to select <R>, and then push joystick left or right to adjust the low color temperature.(1~99)
  - Push joystick down to select <B>, and then push joystick left or right to adjust the high color temperature.(1~99)

(5) Color Saturation Setting

- Push joystick down to select <SATURATION>, and then push joystick left or right to adjust the image saturation level.
  Contrast ranges are 1~10 (low ~ high).

(6) Mirror Setting

- Push joystick down to select <MIRROR>, and then push joystick left or right to setup mirror OFF or mirror ON.
  **Note:** Image will be Left / Right reverse.

(7) Flip Setting

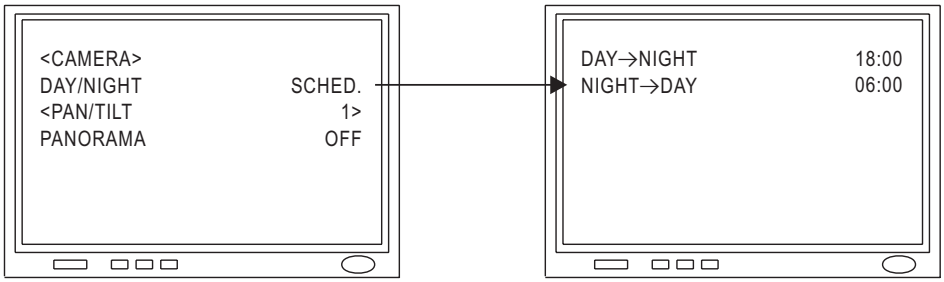
- Push joystick down to select <FLIP>, and then push joystick left or right to setup flip OFF or flip ON.
  **Note:** Image will be Up / Down reverse.

3. Day/Night Control Setting

- After entering dome setting menu, push joystick down to select <DAY/NIGHT>, and then push joystick left or right to select mode.

▶ DAY → NIGHT → SCHED.

DAY : Set to DAY mode and always produce color image.
NIGHT : Set to NIGHT mode and always produce monochrome image.
SCHED. : DAY/NIGHT switch automatically between Day mode and Night mode by schedule of time setting.




- Push joystick left or right to select <SCHED.>, and then press SET key into the day/night schedule setting menu.
- Push joystick down to select <DAY→NIGHT>, and then press SET key into time setting. Push joystick left or right to select time of DAY→NIGHT. Then push joystick down to next item of date. Press ESC key to go back.

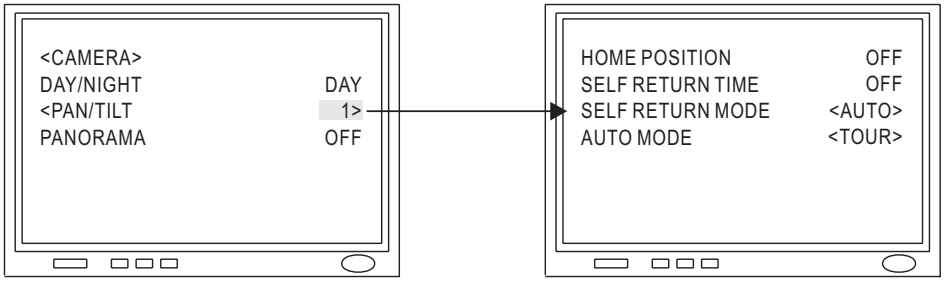
  SET → 18 : 00 → <DOWN> → 18 : 00 → ESC → 18 : 00

- Push joystick down to select <NIGHT→DAY>, and then press SET key into time setting. Push joystick left or right to select time of NIGHT→DAY. Then push joystick down to next item of date. Press ESC key to go back.

  SET → 06 : 00 → <DOWN> → 06 : 00 → ESC → 18 : 00

4. Pan/Tilt Setting Menu

- After getting in dome setting menu, push joystick down to select <PAN/TILT>, and then push joystick left or right to select channel number(1~4), then press SET key into the channel setting menu.




(1) Home Position Setting

- Push joystick down to select <HOME POSITION>, and then push joystick left or right to select home position.

  OFF : NO action.

  1~128 : To set return Home position to 1~128 preset position therein.

  **Note:** When keyboard control isn't used, "Return Mode" is set for "Home" and "Return Time" is over, "Return Mode" function will start.

(2) Self Return Time Setting

- Push joystick down to select <SELF RETURN TIME>, and then push joystick left or right to select return time.

  OFF : NO action.

  1~90 : Delay time of return time setting is 1~90 min.

  **Note:** When keyboard control isn't used, "Return Time" is also over, "Return Mode" function will be started.

(3) Self Return Mode Setting

- Push joystick down to select <SELF RETURN MODE>, and then push joystick left or right to select return mode.

  ↱▶ OFF → HOME → AUTO → SEQ → TOUR ┐

  OFF : NO action.
  HOME : Perform return home position mode.
  AUTO : Perform auto scan mode.
  SEQ. : Perform preset group mode.
  TOUR : Perform tour list mode.
  **Note:** When keyboard control isn't used and "Return Time" is also over, "Return Mode" function will be started.

(4) Auto Mode Setting

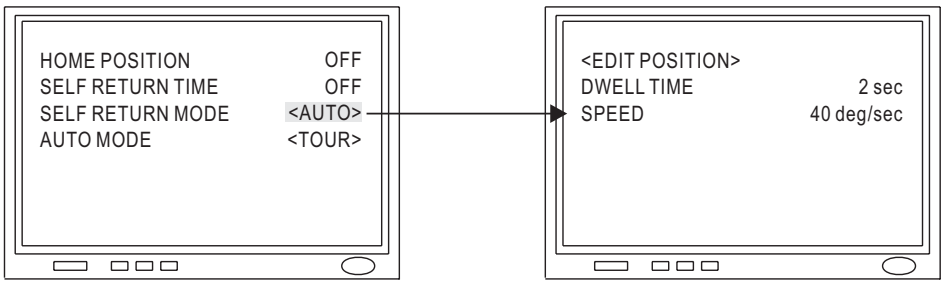
- Push joystick down to select <AUTO MODE>, and then push joystick left or right to select mode.

  ↱▶ OFF → AUTO → SEQ → TOUR ┐

  OFF : NO action.
  AUTO : Perform auto scan mode.
  SEQ. : Perform preset group mode.
  TOUR : Perform tour list mode.
  Note: Press AUTO PAN key on the keyboard to perform Auto mode function.

(5) Auto Scan Mode Setting

- Push joystick down to select <SELF RETURN MODE> or <AUTO MODE>, and then push joystick left or right to select <AUTO>, then press SET key into auto scan mode setting.




Position of Auto Pan Setting

- ○ Push joystick down to select <EDIT POSITION>, and then press SET key into setting.
- ○ Push joystick left, right, up or down to select start position, and then press 🔍+, 🔍- to adjust zoom, then press SET key to confirm.
- ○ Push joystick left or right to select end position, and then press SET key to confirm.

Dwell Time Setting

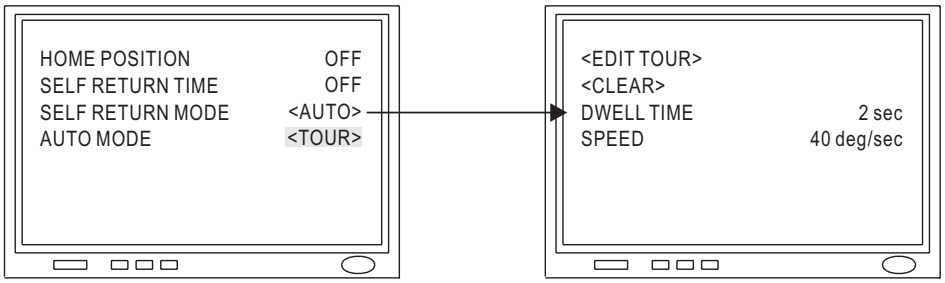
- ○ Push joystick down to select <DWELL TIME>, and then push joystick left or right to select dwell time. (1 ~ 255sec.)

Scan Speed Setting

- ○ Push joystick down to select <SPEED>, and then push joystick left or right to select scan speed. (1 ~ 40 deg/sec.)

(6) Tour Function Setting Menu

● Push joystick down to select <SELF RETURN MODE> or <AUTO MODE>, and then push joystick left or right to select <TOUR>, then press SET key into tour setting menu.




Edit Tour

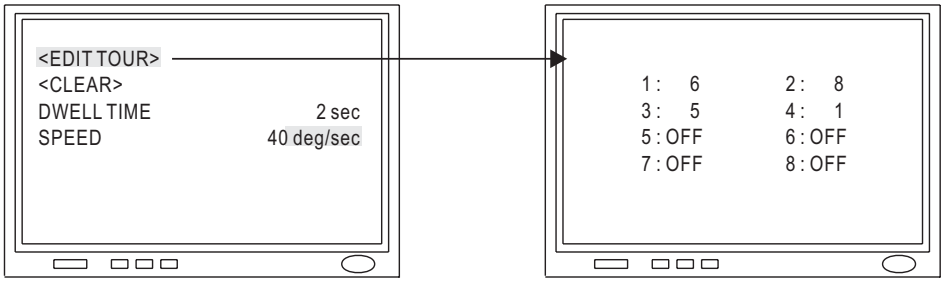
○ Push joystick down to select <EDIT TOUR>, and then press SET key into edit tour setting.

○ Push joystick up to down to select the line, and then press SET key into the line table.

○ Push joystick left or right to select number, and push joystick up or down to select preset. (1~128)

○ This tour table can edit 8 presets.

○ Press ESC key again to back to tours table, and then press ESC key again to back to tour setting menu.




Cancel Tour

○ Push joystick down to select <CLEAR>, and then press SET key to cancel tour.

Dwell Time Setting

○ Push joystick down to select <DWELL TIME>, and then push joystick left or right to select dwell time. (1 ~ 255sec.)

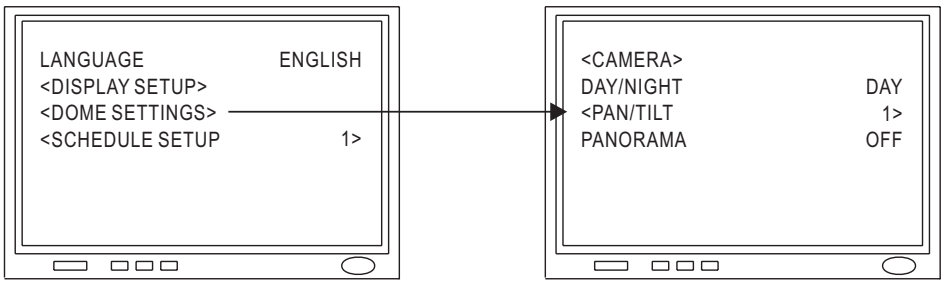
**Note:** When self Return Mode or Auto Mode is Tour, dwell time of Auto Pan will be dwell time.

Scan Speed Setting

○ Push joystick down to select <SPEED>, and then push joystick left or right to select scan speed. (1 ~ 255 deg/sec.)

**Note:** When self Return Mode or Auto Mode is Tour, dwell time of Auto Pan will be dwell time.

5. Panorama Camera Mode Setting



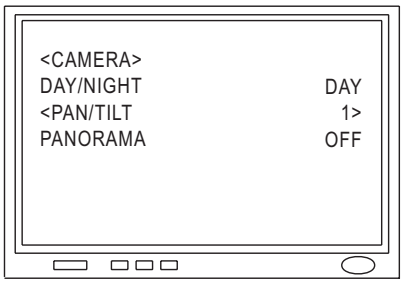
● After getting in dome setting menu, push joystick down to select <PANORAMA>, and then push joystick left or right to select mode.

▶ OFF → PAN01 → PAN02 ┐

OFF : NO action.
PAN01 : The first channel video screen to expand into 360° panorama mode.
PAN02 : The first and second channel video screen are integrated to show single 360° panorama image.

6. Restore Factory Defaults

● After getting in dome setting menu, push joystick down to select <FACTORY INITIAL>, and then press SET key into factory initial setting.

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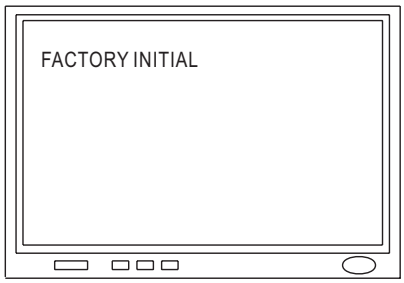


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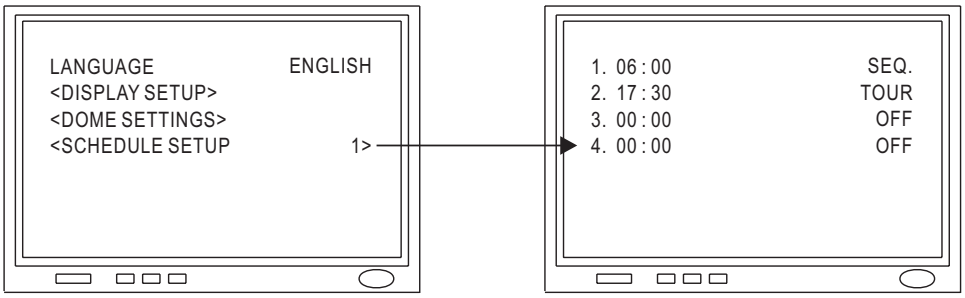
## Startup Auto Options Menu

1. Display the Startup Auto Options Setting Menu

● Press SET key into Setup Menu.

● Push joystick down to select <SCHEDULE SETUP>, and then push joystick left or right to select channel number (1~4), then press SET key into the schedule setting menu.




2. Schedule Time Setting

● Push joystick down to item 1 to 4, and then press SET key to setup time.

● Push joystick left or right to adjust time, and then push joystick down to next item of time. Press ESC key to go back.

SET → 06 : 00 → <DOWN> → 06 : 00 → ESC → 06 : 00

3. Auto Options Setting

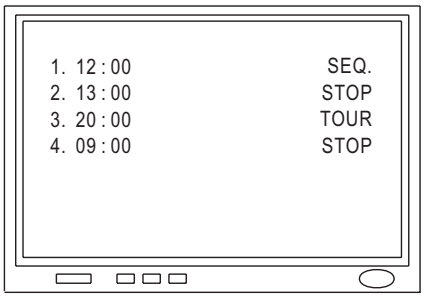
● Push joystick down to item 1 to 4 and complete time setting, and then get into auto setting. Then push joystick left or right to select auto mode and press SET key to confirm. Press SET key to go back.

▶ STOP → OFF → AUTO → SEQ → TOUR ┐

STOP : Stop the auto mode.
OFF : NO action.
AUTO : Perform auto scan mode.
SEQ. : Perform preset group mode.
TOUR : Perform tour list mode.

**Note:** 1. Once scheduled start time arrived, all set auto mode will automatically start.
2. While it is in auto mode under scheduled duration and the power restart, the scheduled auto mode will not continue in auto mode until the scheduled start time.
3. When the schedule start during STOP mode duration, if SELF RETURN is set and SELF RETURN TIME arrives, panorama camera will start SELF RETURN mode first until next scheduled auto mode duration arrive, then it will start auto mode.

Example: 1. 12:00, perform SEQ. Mode.
2. 13:00, STOP (If “self return mode” is home, “home position setting” is 1, and “self return time” is 10 min, camera will be performed “self return mode” function and recall preset position 1 by 13:10.)
3. 20:00, perform TOUR mode.
4. 09:00, STOP (perform “self return mode” at 09:10)



# SPECIFICATIONS

| Model No. | | | CMD2422S | CMD2422SC |
|---|---|---|---|---|
| Lens | Focal Length | | 1.25mm | |
| | Minimum Aperture Ratio (F No.) | | F2.0 | |
| | Angle of View | H | 185° | |
| | | V | 185° | |
| | | D | 185° | |
| Day & Night | | | Schedule / Day(Color) / Night(B/W) | |
| Image Pick-up Device | | | 1/3" Progressive scan CMOS Sensor (4 : 3) | |
| Effective Pixels | | | 1600(H) x 1200(V) = 1,310,720(pixel) | |
| Active Image Size | | | 4.73mm(H) x 3.52mm(V) x 5.60mm(D) | |
| Resolution | | | Input: 1600(H)x1200(V) , Output: 4xD1(N/P) 2:1 Interlace | |
| Minimum Illumination | | | Color: 1Lux(F2.0), B/W: 0.5Lux(F2.0) | |
| S/N Ratio | | | More than 45dB (AGC OFF) | |
| Auto Gain Control | | | Auto | |
| White Balance | | | ATW/ Manual/ 3200°K/ 5600°K/ 6500°K | |
| Back Light Compensation | | | On | |
| Shutter Speed | | | 1/60 ~ 1/10,000s | |
| IP Rating | | | IP66 | |
| Ambient Operation Temperature | | | -10℃ ~ +50℃ (14℉ ~ 122℉) | |
| Dimensions | | | $\phi$ 145 x 50mm | |
| Weight | | | 500g | |
| Power Consumption | | | DC12V, 4W | DC12V, 6W |
| Power Supply | | | DC12V ±10% | |
| **ePan & Tilt** | | | | |
| Panning Range | | | 360° Endless | |
| Tilting Range | | | 90° | |
| Panning/Tilting Speed | | | Manual 0.15°/sec ~ 120°/sec, Preset Position 1°/sec ~ 255°/sec | |
| Panning/Tilting Mode | | | Manual, Auto, Manual Position, Sequential Position | |
| **Main Function** | | | | |
| Control Interface | | | RS-485 | |
| Protocol | | | MLP2 / D-Protocol | |
| System | | | 256 | |
| Control Setting | | | OSD | |
| Character Display | | | ON (Zoom Ratio, Alarm Message, Date/Time, Pan/Tilt Angle) / OFF | |
| Preset Position | | | 128 | |
| Self Run Mode | | | OFF / HOME / AUTO / SEQ / TOUR | |
| Auto Mode | | | OFF / AUTO / SEQ / TOUR | |
| Schedule Mode | | | OFF / AUTO / SEQ / TOUR / STOP | |

Design and specifications are subject to change without notice.

# QUICK REFERENCE TABLE

| Function | | Operation |
|---|---|---|
| Pan / Tilt Control | To Tilt Up | Push Joystick Forward |
| | To Tilt Down | Push Joystick Down |
| | To Pan Left | Push Joystick Left |
| | To Pan Right | Push Joystick Right |
| Dome Selection | | Numeric Key + CAM |
| Zoom In | | ZOOM IN |
| Zoom Out | | ZOOM OUT |
| Manually Bring The Object Farther | | FOCUS FAR (Auto Focus LED off) |
| Manually Bring The Object Closer | | FOCUS NEAR (Auto Focus LED off) |
| Auto Focus | | AUTO FOCUS (Auto Focus LED on) |
| Open Iris | | IRIS O (Auto Iris LED off) |
| Close Iris | | IRIS C (Auto Iris LED off) |
| Auto Iris | | AUTO IRIS (Auto Iris LED on) |
| 180° Horizontal Instant Flip | | 180° REV |
| Set or Recall Preset Position | | Numeric Key + PRESET (128 preset position) |
| Set Preset Speed | | Numeric Key + F1 (1° ~ 255°/sec) |
| Set Preset Dwell | | Numeric Key + F2 (0 ~ 255 sec) |
| Store Preset Data | | 1 + F3 |
| Single Preset Position Saving | | SHIFT + Numeric Keys + PRESET + ENT |
| Single Preset Position Delete | | SHIFT + Numeric Keys + PRESET + CLR |
| Activate Auto Pan | | AUTO PAN (Auto Pan LED on) |
| Stop Auto Pan | | AUTO PAN (Auto Pan LED off) |
| Delete all 128 Preset position Data | | 9 0 1 1 + CLR |
| Reboot System | | 9 0 1 3 + CLR |
| Reset Alarm | | ALARM RESET |
| Select Return Time | | 5 1 + F4 |
| Select Return Mode | | 5 2 + F4 |
| Select Auto Mode | | 5 3 + F4 |

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