

# YALE-852-Ultra PIR Motion Sensor Camera

## Introduction

YALE-852-ULTRA is a ZigBee passive infrared (PIR) motion sensor camera. It is capable of sending wireless signals and captured images (picture quality of up to 640 x 480 pixels) to the coordinator in the ZigBee network upon movement detection.

The PIR Camera is designed to give a typical detection range of 12 meters when mounted at 2 meters above ground. It consists of a two-part design made up by a cover and a base. The cover contains all the electronics, optics and camera, and the base provides a means of fixing. The base has knockouts to allow mounting on either a flat surface or in a corner. The PIR Camera also has tamper protections switch which will be activated upon any attempt of unauthorized cover opening.

The PIR Camera utilizes ZigBee technology for wireless signal transmission. ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission

The PIR Camera serves as an end device in the ZigBee network. It can be included in the ZigBee network to transmit signal upon activation, but cannot permit any other ZigBee device to join the network through the PIR.

## Parts Identification

### 1. Blue LED/Function Button

#### LED Indication:

The Blue LED lights up in the following conditions:

- The Blue LED flash once every 20 minutes  
The PIR Camera has lost connection to its current ZigBee network.
- The Blue LED lights up for 30 seconds:  
The PIR Camera is warming up when fault(s) exists in the PIR Camera.
- The Blue LED flashes twice quickly:  
The PIR Camera has successfully joined a ZigBee network after factory reset.
- The Blue LED lights up for 2 seconds under normal operation:  
The PIR Camera has detected a movement when fault(s) exists in the PIR Camera.
- The Blue LED flashes rapidly  
PIR Camera is transmitting pictures to the coordinator of the ZigBee network when fault(s) exists in the PIR Camera.
- The Blue LED and Flash LED flash once  
PIR Camera has been reset.

#### Function Button Usage:

- Press the button once to send a supervision signal.
- To reset the PIR Camera:  
Press and hold the button for 10 seconds. Release the button when both the Flash LED and the Blue LED flash once

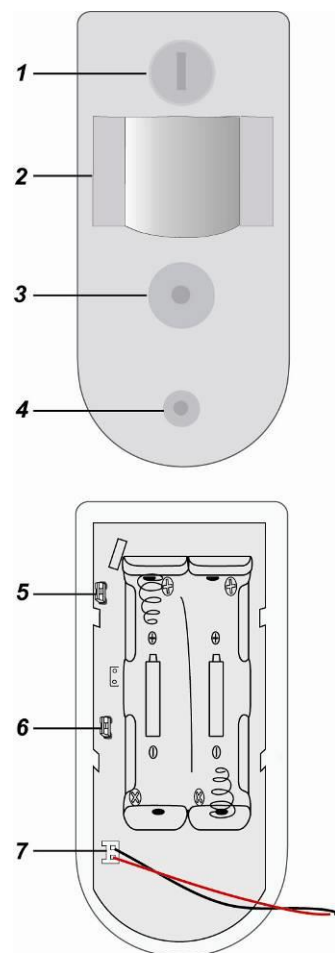
### 2. IR Sensor

The sensor is intended to detect moving objects.

### 3. Flash LED

The Flash LED delivers sufficient light for image capture under low lighting condition.

Both the Flash LED and the Blue LED will flash once when the Function Button is pressed for 10 seconds to indicate the PIR Camera has been reset.



#### 4. PIR Camera Lens

#### 5. Jumper Switch (JP1)



##### Jumper On

The jumper link is inserted connecting the two pins.

- Jumper On: the Blue LED is enabled (**default**).
- Jumper Off: the Blue LED is disabled.



##### Jumper Off

if the jumper link is removed or "parked" on one pin.

#### 6. Jumper Switch (JP2)



##### Jumper On

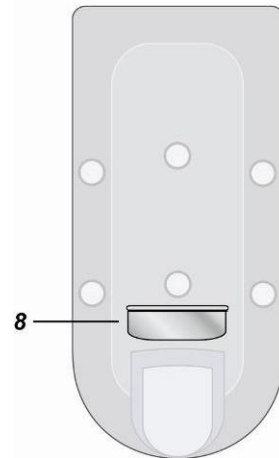
The jumper link is inserted connecting the two pins.

- Jumper On: After transmitting for a detected movement, any further movement detection will transmit the event code again (and the captured images) (**default**).
- Jumper Off: PIR Camera has a "sleep time" of approximately 1 minute to conserve power.



##### Jumper Off

if the jumper link is removed or "parked" on one pin.



#### 7. Tamper Switch

The Tamper switch will be activated when the cover-fixing screw is loosened. The Tamper switch is restored when the cover-fixing screw is tightened.

#### 8. Battery Insulator

## Features

### ● **Image Capture**

When the alarm system is armed, the PIR Camera will capture 3 alarm images upon movement detection. You can also manually request the PIR Camera to take a picture through CIE. The captured images will be transferred to ZigBee coordinator or CIE for user to view.

### ● **Warm Up Period**

When the ZigBee network coordinator or system control panel enters arm mode, or when PIR Camera is put into Test Mode, the PIR Camera will warm up for 30 seconds. Do not trigger the PIR Camera during the 30-second warm up period. If the PIR Camera is under low battery or tamper opened condition, the Blue LED will light up during the warm up period.

### ● **Sleep Timer**

When **Jumper Switch 2** is set to Off, the PIR Camera has a "sleep time" of approximately 1 minute to conserve power. After transmitting for a detected movement, the PIR Camera will not retransmit for 1 minute. Any detected movement during this period will reset the sleep time to 1 minute. Continuous movement in front of the PIR Camera will therefore not exhaust the battery.

### ● **Battery and Low Battery Detection**

The PIR Camera uses two **1.5V "AA" Lithium batteries** in series connection as its power source. The batteries are pre-installed in the PIR Camera. To activate the batteries, pull out the battery insulator.

The PIR Camera features Low Battery Detection function. When the battery voltage is low, the PIR Camera will transmit Low Battery signal to the coordinator in ZigBee network. If movement is detected under Low Battery condition, the Blue LED will light up for 2 seconds.

When changing battery, after removing the old battery, press the Tamper Switch or the Function Button twice to fully discharge before inserting new batteries

### ● **Tamper Protection**

The PIR Camera is protected by a tamper switch which is compressed when the cover-fixing screw is tightened. When the cover-fixing screw is loosened, the tamper switch will be activated and the PIR Camera will send a tamper open signal to the ZigBee network coordinator or system control panel to remind the user of the condition. If movement is detected when the tamper switch is open, the Blue LED will light up for 2 seconds.

- PIR Camera will not detect the status of the tamper switch within 5 minutes of inserting battery.
- If the Tamper Switch is triggered during this 5-minute non-detection period, the PIR Camera will transmit a tamper status signal to the ZigBee network coordinator or system control panel immediately after the 5-minute non-detection period.

- **When the tamper switch is compressed, Factory Reset of the PIR Camera is disabled.**

- **Supervision**

The PIR Camera will transmit a supervision signal to report its condition regularly according to user setting. The factory default interval is 30 minutes. The user can also press the Function Button once to transmit a supervision signal manually.

- **Test Mode**

- Test mode is for you to check the PIR camera's detection range (not shooting coverage).
- To enter Test mode, press and hold the Function button over 3 seconds and release the button to enter the Test mode for 3 minutes.
- The PIR camera will warm up for 30 seconds. Please do not trigger the Camera during this warming-up period.
- After the warm-up period, you can trigger PIR camera to check IR detection range. If PIR camera is triggered, the Blue LED will light up for 2 seconds.

## ZigBee Network Setup

- **ZigBee Device Guideline**

ZigBee is a wireless communication protocol that is reliable, has low power consumption and has high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission. Due to the fundamental structure of ZigBee network, ZigBee device will actively seek and join network after powering on. Since performing a task in connecting network may consume some power, it is required to follow the instructions to avoid draining battery of a ZigBee device

- Ensure your ZigBee network router or coordinator is powered on before inserting battery into the ZigBee device.
- Ensure the ZigBee network router or coordinator is powered on and within range while a ZigBee device is in use.
- Do not remove a ZigBee device from the ZigBee network router or coordinator without removing the battery from a ZigBee device.

- **Joining the ZigBee Network**

As a ZigBee device, the PIR Camera needs to join a ZigBee network to transmit signal when a movement is detected. Please follow the steps below to join the device into the ZigBee network.

1. Pull out the battery insulator on back of PIR Camera to activate battery.
2. **Make sure the tamper switch is open (released) by loosening the bottom screw.**
3. Press and hold the function button for 10 seconds, release the button when both the Blue LED and flash LED flash once.. Please make sure to enable the permit-join feature on the router or coordinator of your ZigBee network.
4. After joining the ZigBee network, the PIR Camera will be registered in the security system in the network automatically. Please check the ZigBee network coordinator, system control panel, or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
5. After joining the ZigBee network, if the PIR Camera loses connection with the ZigBee network, the LED will flash 20 minutes to indicate. Please check your ZigBee network condition and PIR Camera signal range to correct the situation.

- **Factory Reset**

If the PIR Camera did not successfully join a ZigBee network upon power up, or if you want to remove the PIR Camera from the current network and join a new network, you need to use the Factory Reset function to clear the PIR Camera for its stored setting and information first before it can join another network. To perform Factory Reset:

1. **Make sure the tamper switch is open (released) by loosening the bottom screw.**
2. Press and hold the function button for 10 seconds, release the button when both the Blue LED and LED flash once.
3. The PIR Camera has been reset to factory default setting with all its previous network information removed. It will now actively search for available ZigBee network again and join the network automatically.
4. If the PIR Camera successfully joins a ZigBee network, the Blue LED will flash twice to indicate.

# Installation

## ● **Installation Guideline**

- The PIR Camera is designed to be mounted on either a flat surface or in a corner situation with fixing screws and plugs provided.
- The base has knockouts, where the plastic is thinner, for mounting purpose. two knockouts are for surface fixing and four knockouts are for corner fixing as shown in the picture
- **It is recommended to install the PIR Camera in the following locations.**
  - In a position such that an intruder would normally move across the PIR's field of view.
  - Between 1.9 and 2m above ground for best performance.
  - In a corner to give the widest view.
  - Where its field of view will not be obstructed e.g. by curtains, ornaments etc.
- **Limitations**
  - Do not position a PIR Camera to look directly at a door protected by a Door Contact, this could cause the Door Contact and PIR Camera radio signals to be transmitted at the same instant when entering, canceling each other out.
  - Do not install the PIR Camera completely exposed to direct sunlight.
  - Avoid installing the PIR Camera in areas where devices may cause rapid change of temperature in the detection area, i.e. air conditioner, heaters, etc.
  - Avoid large obstacles in the detection area.
  - Not pointing directly at sources of heat e.g. Fires or boilers, and not above radiators.
  - Avoid moving objects in the detection area i.e. curtain, wall hanging etc.

## ● **Using PIR Camera with ZigBee Router**

### **IMPORTANT NOTE**

If PIR Camera installation location is away from your system control panel and requires ZigBee routers to improve signal strength. **DO NOT** use a ZigBee Router without backup battery. A ZigBee router without battery will be powered down during AC power failure and the PIR Camera connected to the router will lose connection with ZigBee network. You should plan your PIR Camera installation location using only ZigBee router with backup battery.

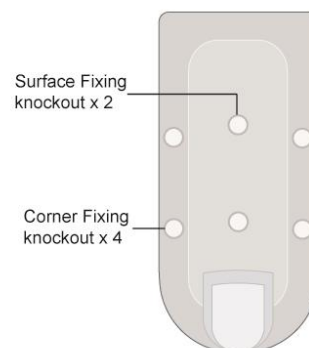
## ● **Mounting the PIR Camera**

### ● **Surface mounting:**

1. Remove the fixing screw and cover assembly.
2. Break through the Surface Fixing knockouts on the base.
3. Using the holes as a template, drill holes in the surface.
4. Insert the wall plugs if fixing it into plaster or brick.
5. Screw the base into the wall plugs.
6. Screw the cover back onto its base.

### ● **Corner mounting:**

1. Remove the fixing screw and cover assembly.
2. Break through the Corner Fixing knockouts on the base.
3. Using the holes as a template, drill holes in the surface.
4. Insert the wall plugs if fixing it into plaster or brick.
5. Screw the base into the wall plugs.
6. Screw the cover back onto its base.



## Appendix (For developers only)

- **PIR Camera Cluster ID**

Device ID: <i>_852_DEVICEID: 0x404</i> (proprietary)	
Endpoint: <i>0x01</i>	
<b>Server Side</b>	<b>Client Side</b>
<b>Mandatory</b>	
Basic (0x0000)	<i>None</i>
IAS Zone(0x0500)	
<b>Optional</b>	
<i>_852_Cluster(0x0503)</i> (proprietary)	<i>None</i>

- **Attribute of Basic Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0x01	M
0x0001	<i>ApplicationVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0x00	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0	O
0x0004	<i>ManufacturerName</i>	Character String	0 – 32 bytes	Read only	YALE Technology	O
0x0005	<i>ModelIdentifier</i>	Character string	0 – 32 bytes	Read only	852_00.00.01.05TC	O
0x0006	<i>DateCode</i>	Character String	0 – 16 bytes	Read only		O
0x0007	<i>PowerSource</i>	8-bit	0x00 –0xff	Read only		M
0x0010	<i>LocationDescription</i>	Character String	0 – 32 bytes	Read / Write		O
0x0011	<i>PhysicalEnvironment</i>	8-bit	0x00 –0xff	Read / Write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 –0x01	Read / Write	0x01	M

- **Attribute of IAS Zone Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0001	<i>ZoneState</i>	8-bit Enumeration	All	Read only	0x00	M
0x0002	<i>ZoneType</i>	8-bit Enumeration	All	Read only		M
0x0003	<i>ZoneStatus</i>	16-bit bitmap	All	Read only	0x00	M