



IP/ PoE Extender

# User Manual

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Model : IP09P

PoE over CAT5e Extender



## Introduction

IP09P is a point-to-point PoE (Power over Ethernet) extender that can use single CAT5e (or greater) cable to extend TCP/IP signal and huge amount of power for a remote PoE device, such as speed dome camera, Dante PoE speaker, smart LED...etc., with no external power required. It's a perfect solution for CCTV system, large-scale audio environment, smart building and factory.

## Features

- Signal extension up to 800M over CAT5e cable.
- Provides up to 90W power for remote PoE device.
- Power source from either a PoE switch or an external power adapter.
- Bandwidth up to 100Mbps.
- Supports Full duplex and half duplex mode and Auto MDI/MDI-X switching.
- Built-in 30kV ESD, 40A EFT, and 30A surge at RJ45 side.

## Installation view

### 1 Power from a PoE switch



\*Transmission distance may vary by where your power is provided

### 2 Power from a power adapter



\*Transmission distance may vary by where your power is provided

### 3 Extra Power supply at the transmitter side for additional 100M extension



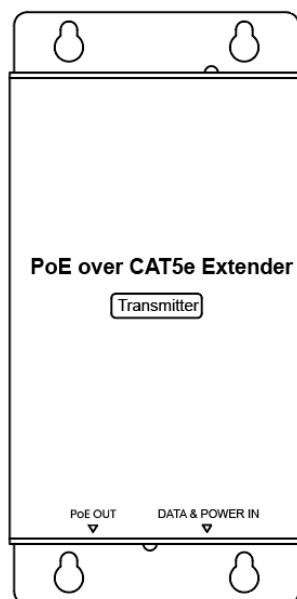
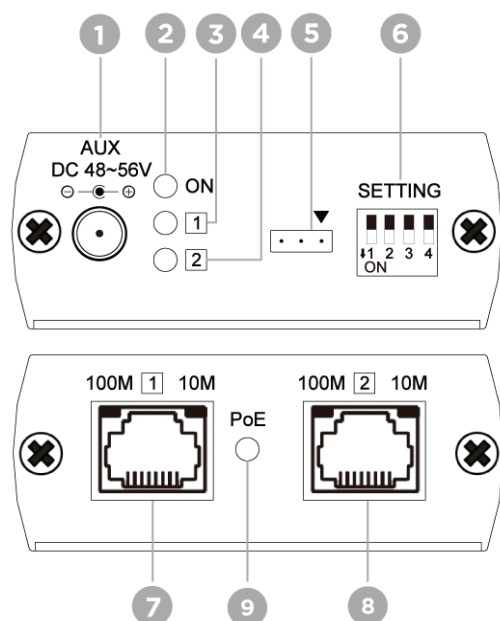
\*Transmission distance may vary by where your power is provided

### 4 Extra-long distance PoE Extension



\*Transmission distance may vary by where your power is provided

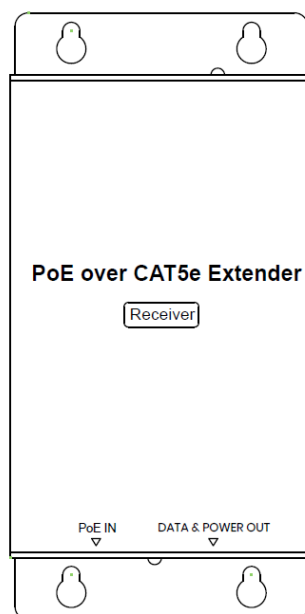
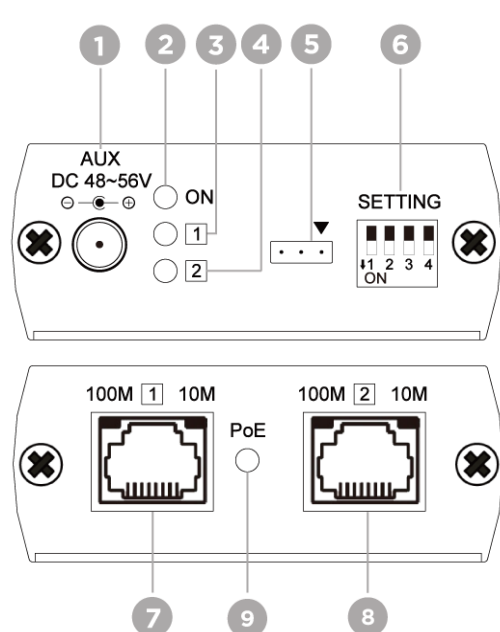
## IP09PT Panel Review



The top of the equipment would print Transmitter

| No. | Interface                | Function   |
|-----|--------------------------|--|
| 1   | Power Jack               | To connect with DC48 or 56V power adapter when connecting to non-PoE device. Power input maximum up to 110W. |
| 2   | Power LED Indication     | To indicate the power status (Refer to Description 1)  |
| 3   | Port 1 Status Indication | Port 1 mode indication (Refer to Description 3)  |
| 4   | Port 2 Status Indication | Port 2 mode indication (Refer to Description 3)  |
| 5   | Console Port             | To update firmware.  |
| 6   | DIP Switch               | To select the desired mode (Refer to Description 5)  |
| 7   | RJ45 Connector           | Port 1 ; To connect with an networking device or IP09P (Refer to Description 4)                              |
| 8   | RJ45 Connector           | Port 2 ; To connect with IP09PT/ IP09PR  |
| 9   | PoE LED Indication       | To indicate the PoE connection status (Refer to Description 2)   |

## IP09PR Panel Review



The top of the equipment would print Receiver

| No. | Interface                | Function   |
|-----|--------------------------|--|
| 1   | Power Jack               | To connect with DC48 or 56V power adapter when connecting to non-PoE device. Power input maximum up to 110W. |
| 2   | Power LED Indication     | To indicate the power status (Refer to Description 1)  |
| 3   | Port 1 Status Indication | Port 1 mode indication (Refer to Description 3)  |
| 4   | Port 2 Status Indication | Port 2 mode indication (Refer to Description 3)  |
| 5   | Console Port             | To update firmware.  |
| 6   | DIP Switch               | To select the desired mode (Refer to Description 5)  |
| 7   | RJ45 Connector           | Port 1 ; To connect with an networking device or IP09P (Refer to Description 4)                              |
| 8   | RJ45 Connector           | Port 2 ; To connect with IP09PT/ IP09PR  |
| 9   | PoE LED Indication       | To indicate the PoE connection status (Refer to Description 2)   |

## Description

### 1 Power LED Indication

| Green ON | Green OFF | LED Breathing |
|----------|-----------|---------------|
| Power ON | Power OFF | Power Saving  |

### 2 PoE LED Indicator

| Blue ON | Blue OFF |
|---------|----------|
| PoE OFF | PoE OFF  |

### 3 Status Indication

#### Port 1 Status

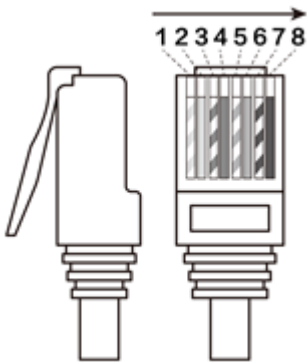
| Blue ON       | Blue OFF             | LED Blinking |
|---------------|----------------------|--------------|
| Long Distance | Unlinked or Ethernet | 100Base-T1   |

#### Port 2 Status

| Blue ON       | Blue OFF             | LED Blinking |
|---------------|----------------------|--------------|
| Long Distance | Unlinked or Ethernet | 100Base-T1   |

- 3.1 Once the port 1 and 2 remain unlinked, the IP09C will automatically turn to Power Saving mode.

#### 4 RJ45 Pinout



| 568B Pinout<br>Order | RJ45 Port 1 (Black) |                   | RJ45 Port 2 (Yellow) |         |
|----------------------|---------------------|-------------------|----------------------|---------|
|                      | Data                | PoE               | Data                 | PoE     |
| 1. Orange-white      | TX+ (DATA1+)        | PoE+ (Data Pair)  | DATA1+               | Power + |
| 2. Orange            | TX- (DATA1-)        | PoE+ (Data Pair)  | DATA1-               | Power + |
| 3. Green-white       | RX+ (DATA2+)        | PoE- (Data Pair)  | DATA2+               | Power - |
| 4. Blue              |                     | PoE+ (Spare Pair) |                      | Power + |
| 5. Blue-white        |                     | PoE+ (Spare Pair) |                      | Power + |
| 6. Green             | RX- (DATA2-)        | PoE- (Data Pair)  | DATA2-               | Power - |
| 7. Brown-white       |                     | PoE- (Spare Pair) |                      | Power - |
| 8. Brown             |                     | PoE- (Spare Pair) |                      | Power - |

- 4.1 10BASE-T, 100BASE-TX and long distance 100Mbps mode use two pairs of wires to transfer data.
- 4.2 100BASE-TI, long-distance 10Mbps mode use one pair of wires to transfer data.
- 4.3 Power is transferred through four pairs of wire.

## 5 Power and Transmission Distance

The reports below show the extension distance and the amount of power transferred by distance. All statistics get from the result of using the COMMScope 57535-2 (CAT5e 24AWG) cables to test.

### 5.1 Mode & Data Rate by transmission distance

| Mode                | Data Rate | Distance |
|---------------------|-----------|----------|
| 100BASE-TX with EEE | 100Mbps   | 100M     |
| 100BASE-TX          | 100Mbps   | 130M     |
| 100BASE-T1          | 100Mbps   | 300M     |
| Long Distance       | 100Mbps   | 500M     |
| 10BASE-T with EEE   | 10Mbps    | 100M     |
| 10BASE-T            | 10Mbps    | 250M     |
| Long Distance       | 10Mbps    | 800M     |

### 5.2 Power from 56V Power Adapter

| Input Power     | Distance | Output Power |
|-----------------|----------|--------------|
| 95W (56V/1.7A)  | 200M     | 50W          |
| 72W (56V/1.3A)  | 300M     | 38W          |
| 56W (56V/1.0A)  | 400M     | 29W          |
| 45W (56V/0.8A)  | 500M     | 23W          |
| 40W (56V/0.7A)  | 600M     | 20W          |
| 32W (56V/0.57A) | 700M     | 16W          |
| 28W (56V/0.5A)  | 800M     | 14W          |

### 5.3 Power from 48V Power Adapter

| Input Power     | Distance | Output Power |
|-----------------|----------|--------------|
| 64W (48V/1.4A)  | 200M     | 36W          |
| 44W (48V/0.9A)  | 300M     | 24W          |
| 34W (48V/0.7A)  | 400M     | 19W          |
| 29W (48V/0.6A)  | 500M     | 15W          |
| 22W (48V/0.45A) | 600M     | 12W          |
| 21W (48V/0.44A) | 700M     | 10W          |
| 17W (48V/0.35)  | 800M     | 8W           |

### 5.4 Power from IEEE 802.3at PoE Switch

| Input Power                | Distance | Output Power |
|----------------------------|----------|--------------|
| IEEE 802.3at<br>PoE Switch | 200M     | 21W          |
|                            | 300M     | 19W          |
|                            | 400M     | 17.5W        |
|                            | 500M     | 16.5W        |
|                            | 600M     | 15W          |
|                            | 700M     | 13W          |
|                            | 800M     | 10W          |



## 6 DIP Switch Setting

6.1 Port 1 can be set manually and automatically but Port2 can only set automatically.

| SWITCH | SETTINGS/ FUNCTION     |       |                       |       |         |      |        |       |
|--------|------------------------|-------|-----------------------|-------|---------|------|--------|-------|
| SW 1   | Auto Mode<br>(Default) | OFF ↑ | Auto Mode<br>with EEE | ON ↓  | 100Mbps | ON ↓ | 10Mbps | OFF ↑ |
| SW 2   |                        | OFF ↑ |                       | OFF ↑ |         | ON ↓ |        | ON ↓  |
| SW 3   |                        | OFF ↑ |                       | OFF ↑ |         | ON ↓ |        | ON ↓  |
| SW 4   |                        | OFF ↑ |                       | OFF ↑ |         | ON ↓ |        | ON ↓  |

6.2 Auto Mode/ Default: Automatically set up the link speed and transmission protocol.

6.3 Auto+EEE Mode: Energy-Efficient Ethernet based on Auto Mode.

6.4 When all DIP switches are ON, the data rate will support 100Mbps at all modes.

6.5 When Switch 1 is OFF and Switch 2, 3, 4 are ON, the data rate will support 10Mbps at all modes.

6.6 When data rate is 10Mbps at 100BASE-T1 mode, the mode will automatically switch to Long-Distance mode and data rate remains 10Mbps.

6.7 Port 2 will auto-negotiate to perfect the connection.

6.8 When Port 1 is connected with a networking device over 500M away or the auto-mode cannot work properly, please follow the chart below to manually set up data rates and modes.

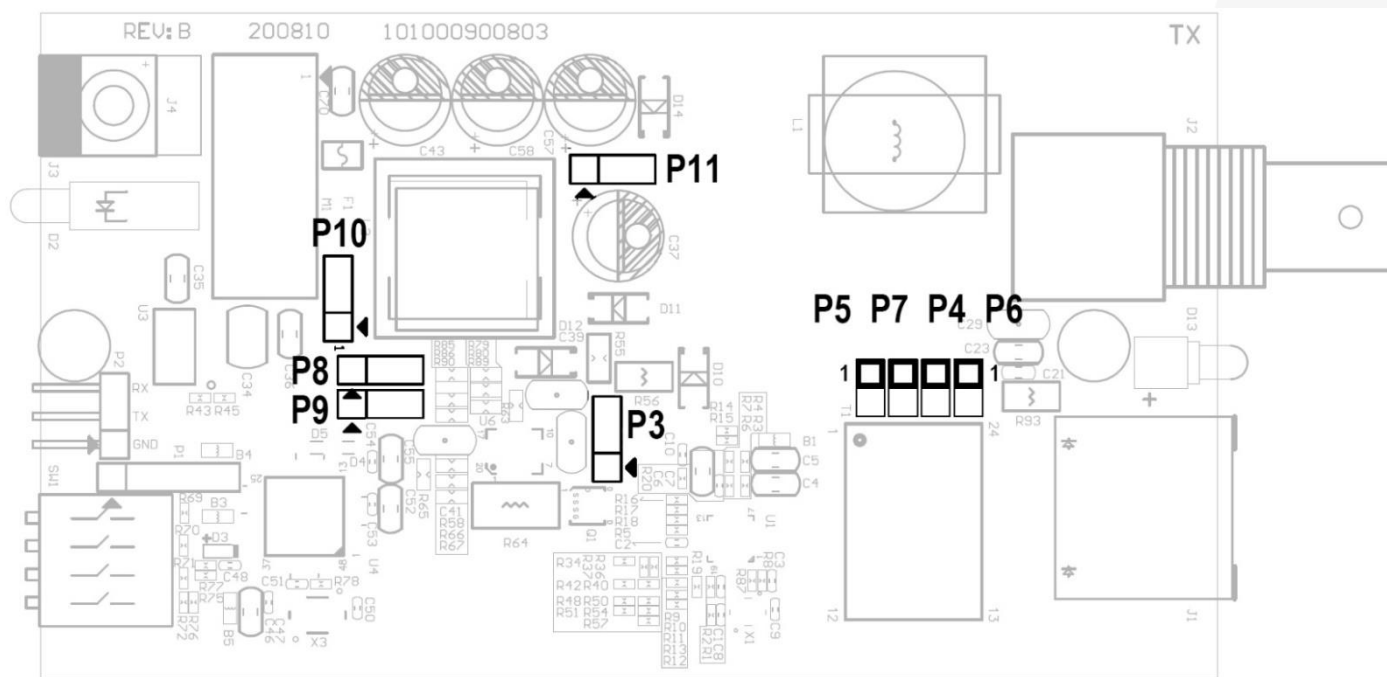
| SWITCH | Function          | ↑ OFF   | ↓ ON    |
|--------|-------------------|---------|---------|
| SW 1   | Link Speed        | 10Mbps  | 100Mbps |
| SW 2   | Standard Ethernet | Disable | Enable  |
| SW 3   | 100BASE-T1        | Disable | Enable  |
| SW 4   | Long Distance     | Disable | Enable  |

### 6.9 Port 1 Auto-Negotiation Priority

| Priority    | Mode                   |
|-------------|------------------------|
| 1 (Highest) | Long Distance 100Mbps  |
| 2           | 100BASE-T1             |
| 3           | Long Distance 10Mbps   |
| 4           | 100BASE-TX Full Duplex |
| 5           | 100BASE-TX Half Duplex |
| 6           | 10BASE-T Full Duplex   |
| 7 (Lowest)  | 10BASE-T Half Duplex   |

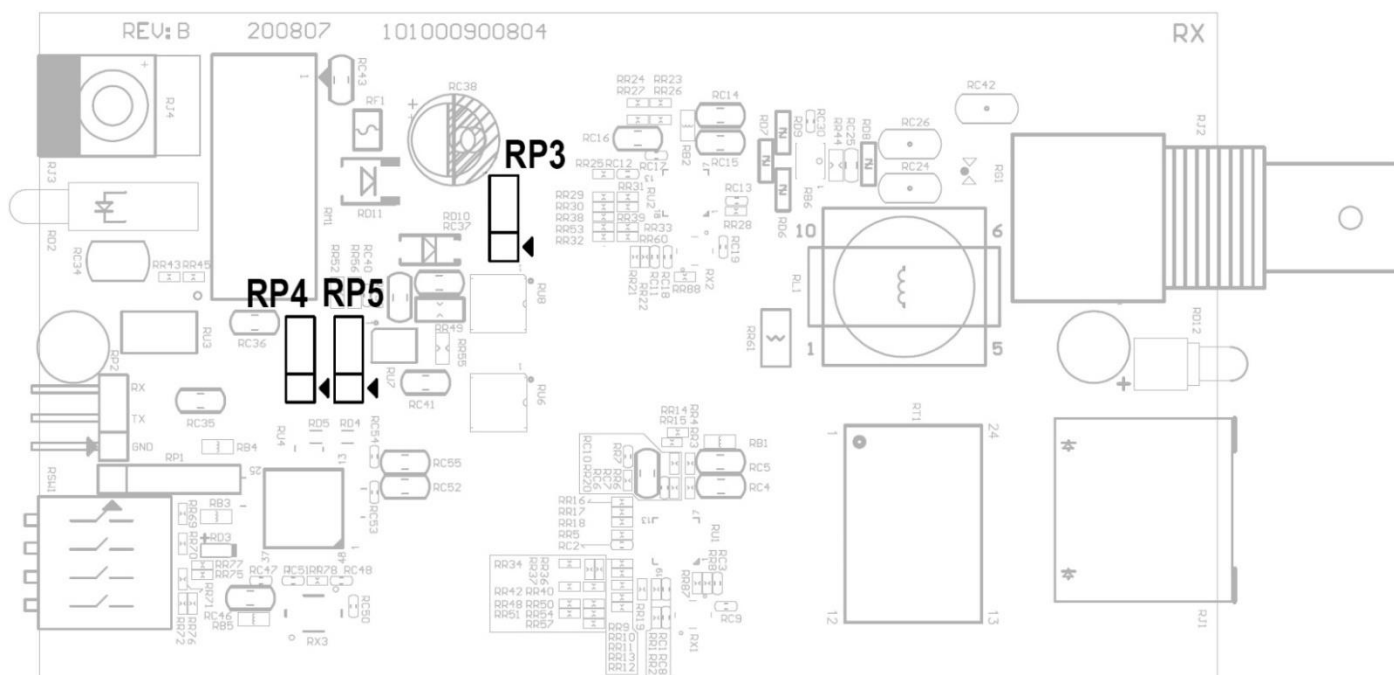
## Jumper Settings

1. We strongly recommend those who have advanced engineering skills to adjust the jumpers.
2. Improper adjustment may make the devices damaged.
3. Any changes should start after turning off the power.
4. IP09PT Jumper Settings:



| Position | Function                       | Setting                 |                      | Description                       |
|----------|--------------------------------|-------------------------|----------------------|-----------------------------------|
| P3       | Operation Mode                 | Jumper cap on pin 1 & 2 |                      | PoE handshake ON (Default)        |
|          |                                | Jumper cap on pin 2 & 3 |                      | PoE handshake OFF                 |
| P4       | Data Pair A<br>Power Settings  | Jumper cap ON           | Mode A<br>(End-spin) | Power over PIN 1,2 (Default)      |
|          |                                | Jumper cap OFF          |                      | Power OFF                         |
| P5       | Data Pair B<br>Power Settings  | Jumper cap ON           |                      | Power over PIN 3,6 (Default)      |
|          |                                | Jumper cap OFF          |                      | Power OFF                         |
| P6       | Spare Pair C<br>Power Settings | Jumper cap ON           | Mode B<br>(Mid-spin) | Power over PIN 4,5 (Default)      |
|          |                                | Jumper cap OFF          |                      | Power OFF                         |
| P7       | Spare Pair D<br>Power Settings | Jumper cap ON           |                      | Power over PIN 7,8 (Default)      |
|          |                                | Jumper cap OFF          |                      | Power OFF                         |
| P8       | PoE Mode                       | Jumper cap on pin 1 & 2 |                      | On Standard PoE Mode (Default)    |
|          |                                | Jumper cap on pin 2 & 3 |                      | On Legacy PoE Mode                |
| P9       | Dual PD Mode                   | Jumper cap on pin 1 & 2 |                      | Power over 8 PINs (Default)       |
|          |                                | Jumper cap on pin 2 & 3 |                      | Dual PD mode OFF                  |
| P10      | Boost Voltage                  | Jumper cap on pin 1 & 2 |                      | Enable boost voltage (Default)    |
|          |                                | Jumper cap on pin 2 & 3 |                      | Disable boost voltage             |
| P11      | Voltage Select                 | Jumper cap on pin 1 & 2 |                      | Boosted voltage for PSE (Default) |
|          |                                | Jumper cap on pin 2 & 3 |                      | No boost voltage for PSE          |

## IP09PR Jumper Settings



| Position | Function          | Setting                 | Description                   |
|----------|-------------------|-------------------------|-------------------------------|
| RP3      | Operation Mode    | Jumper cap on pin 1 & 2 | PoE power ON (Default)        |
|          |                   | Jumper cap on pin 2 & 3 | PoE power OFF                 |
| RP4      | PoE Class Setting | Jumper cap on pin 1 & 2 | Support 802.3bt 90W (Default) |
| RP5      |                   | Jumper cap on pin 2 & 3 | Support 802.3bt 60W           |

## Package Included

- 1 x IP09PT
- 1 x IP09PR
- 4 x Screw
- 4 x Screw Plug

**Specification:**

| ITEM                       | IP09PR  | IP09PT   |
|----------------------------|---|--|
| Support                    |   |  |
| Compliance                 | IEEE 802.3 10BASE-T Ethernet<br>IEEE 802.3u 100BASE-TX Fast Ethernet<br>IEEE 802.3bw 100BASE-T1 Ethernet<br>IEEE 802.3 N-Way Auto-Negotiation<br>IEEE 802.3x Full Duplex Operation and Flow Control<br>IEEE 802.3az Energy Efficient Ethernet<br>IEEE 802.3af Power over Ethernet<br>IEEE 802.3at Power over Ethernet Plus<br>IEEE 802.3bt Power over Ethernet Plus | IEEE 802.3 10BASE-T Ethernet<br>IEEE 802.3u 100BASE-TX Fast Ethernet<br>IEEE 802.3bw 100BASE-T1 Ethernet<br>IEEE 802.3 N-Way Auto-Negotiation<br>IEEE 802.3x Full Duplex Operation and Flow Control<br>IEEE 802.3az Energy Efficient Ethernet<br>IEEE 802.3af Power over Ethernet<br>IEEE 802.3at Power over Ethernet Plus |
| Network Bandwidth          | 10/ 100 Mbps  |  |
| Max. Transmission Distance | 10Mbps at 800M, 100Mbps at 500M   |  |
| Ports & Interfaces         |   |  |
| Input                      | 1 x RJ45  | 1 x RJ45   |
| Output                     | 1 x RJ45  | 1 x RJ45   |
| Power Interface            | 1 x (5.5 x 2.1mm) DC Jack   |  |
| Power                      |   |  |
| Power Supply               | DC 48 ~ 56V Regulated   | DC 12 ~ 56V Regulated  |
| Power Consumption          | 1W  | 1W   |
| Ambient Temperature        |   |  |
| Operation                  | 0 ~ 85℃   |  |
| Storage                    | -20 to 85℃  |  |
| Humidity                   | 95%   |  |
| Physical Characteristics   |   |  |
| Dimensions                 | 67 x 135 x 27mm   | 67 x 135 x 27mm  |
| Weight                     | 205g  | 215g   |