

User Guide

IEXT101-PH

Long Reach Ethernet & PoE Extender



Version 1.0

June, 2022

CTC Union Technologies Co., Ltd.

Far Eastern Vienna Technology Center

(Neihu Technology Park)

8F, No. 60, Zhouzi St.,

Neihu, Taipei 114, Taiwan

T +886-2-26591021

F +886-2-26590237

E sales@ctcu.com

H www.ctcu.com



2022 CTC Union Technologies Co., LTD.

All trademarks are the property of their respective owners.

Technical information in this document is subject to change without notice.

Table of Contents

Introduction	4
Package List	4
Features	4
Specifications.....	5
STANDARDS.....	5
NETWORK INTERFACE	5
DATA RATE.....	5
POWER SUPPLY (FOR IEXT101-PH-L ONLY)	5
MECHANICAL	5
ENVIRONMENTAL	5
CERTIFICATIONS	6
Panels	7
Extension Distance vs. Link Speed / PoE Power Budget.....	8
Connectors	9
RJ-45 ETHERNET PORT PINOUTS.....	9
RJ-45 ETHERNET & POE PIN ASSIGNMENTS	9
DIP Switch (IEXT101-PH-L)	10
DIP Switch (IEXT101-PH-R).....	11
Recommended Power & Ground Wiring Scheme	12
DC POWER CONNECTION	12
EARTH GROUND CONNECTION	13
LED Indicators.....	14
Wall-Mounting Installation.....	15
Application.....	16

Introduction

IEXT101-PH-L (Local Unit) & IEXT101-PH-R (Remote Unit) are a pair of Industrial Grade LAN extenders which are designed to extend power (IEEE 802.3at) and data over 100 meters. Traditionally, standard Ethernet supports Ethernet transmission distance up to 100 meters. However, by using paired LAN extenders, they can extend transmission distance up to 800 meters over 2 or 4-pair UTP cable in point-to-point topology.

The local unit of IEXT101-PH-L supports 55-57VDC power inputs and feeds both power and data to the remote unit. The remote unit then provides 10/100Base-TX Ethernet and power over Ethernet (IEEE 802.3at standard or non-standard 'passive PoE') to the connected standard or non-standard powered devices (PD).

IEXT101-PH-L (Local Unit) & IEXT101-PH-R (Remote Unit) are the best choice when there is no power available at the remote side or when providing power at the remote is difficult or expensive. Moreover, these extenders are particularly designed for harsh environments, such as industrial networking, traffic surveillance, security automation applications, IP surveillance, city security, intelligent transportation systems (ITS) and are also suitable for many military or utility market applications where environmental conditions exceed commercial product specifications.

Package List

- **IEXT101-PH-L (Local Unit)**
 - One IEXT101-PH-L (Local Unit) device
 - Two-pin terminal block for power inputs
 - Wall-mounting kit (Two brackets and screws)

- **IEXT101-PH-R (Remote Unit)**
 - One IEXT101-PH-R (Remote Unit) device
 - Wall-mounting kit (Two brackets and screws)

Features

- Long distance power feeding and data transmission up to 800 meters on 2 or 4 pair UTP cable
- Supports standard IEEE 802.3af/at or passive PoE devices
- Eliminates the need for any power supply at the remote side
- Quick deployment and easy maintenance
- IP30 protection and fanless design

Specifications

Standards

- IEEE Standards: IEEE 802.3 (10Base-T), IEEE 802.3u (100Base-TX)
- PoE Standards: IEEE 802.3af, IEEE 802.3at

Network Interface

- 1 x 10/100Mbps RJ-45 LAN Port
- 1 x RJ-45 for distance extension (PoE and data delivery to the remote side)

Data Rate

- The LINE speed between IEXT101-PH-L & IEXT101-PH-R pair will be 10M or 100M depending on extension length and DIP Switch settings
- The LAN speed of IEXT101-PH-R is same as LINE speed (extension port)

Power Supply (For IEXT101-PH-L Only)

- 55~57VDC power inputs
- 2-Pin removable terminal block

Power Consumption

Items Models	Without PoE	With PoE @ 30W
IEXT101-PH-L	<3W	34.5W
IEXT101-PH-R	<1.5W	32.5W

Mechanical

- Water & Dust Proof: IP30 Protection
- Dimensions: 102.5 mm (D) x 52 mm (W) x 25 mm (H)
- Installation Method: Wall Mounting
- Weight: 175g

Environmental

- Operating Temperature: -40°C~75°C
- Storage Temperature: -40°C~85°C
- Humidity: 10%~95% (Non-condensing)

Certifications

- EMC: CE (EN55032, EN55035)
- EMI (Electromagnetic Interference): FCC Part 15 Subpart B Class A, CE
- Railway Traffic: EN50121-4
- Immunity for Heavy Industrial Environment: EN61000-6-2
- Emission for Heavy Industrial Environment: EN61000-6-4
- EMS (Electromagnetic Susceptibility) Protection Level:
 - EN61000-4-2 (ESD) Level 3, Criteria B
 - EN61000-4-3 (RS) Level 3, Criteria A
 - EN61000-4-4 (Burst) Level 3, Criteria A
 - EN61000-4-5 (Surge) Level 3, Criteria B
 - EN61000-4-6 (CS) Level 3, Criteria A
 - EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
- Safety: EN62368-1
- 4KV Surge Protection: For PoE & UTP port
- Shock: IEC 60068-2-27
- Freefall: IEC 60068-2-31
- Vibration: IEC 60068-2-6

MTBF (MIL-HDBK-217)

- IEXT101-PH-L: 1,561,636 Hours
- IEXT101-PH-R: 1,591,281 Hours

Panels

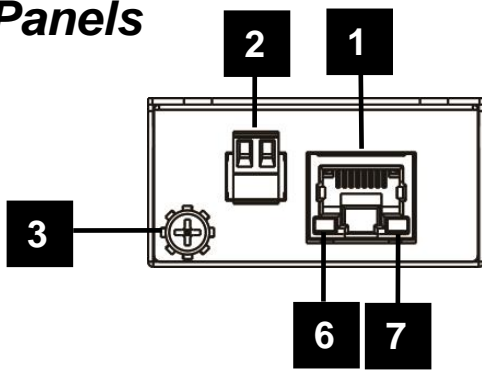


Figure 1. Top Panel of IEXT101-PH-L

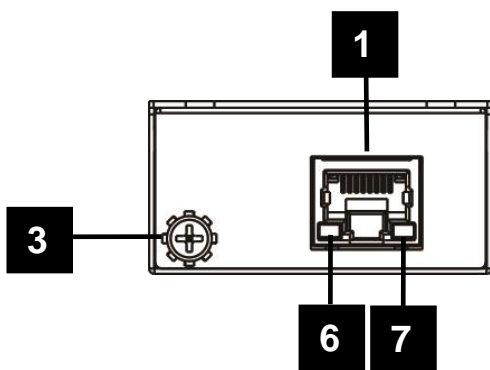


Figure 2. Top Panel of IEXT101-PH-R

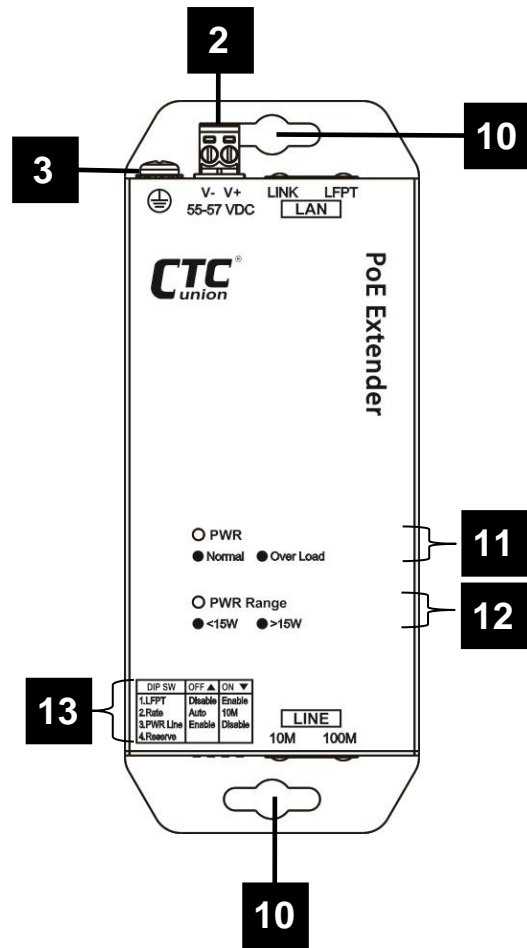


Figure 4. Front Panel

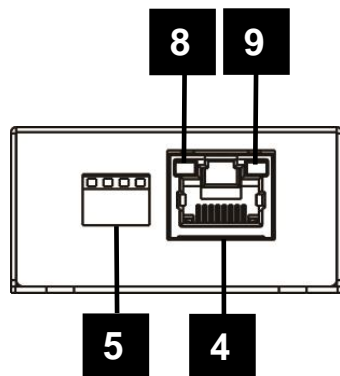


Figure 3. Bottom Panel

No.	Description	No.	Description
1	LAN RJ-45 connector	8	Line speed is in 10Mbps.
2	Power input connectors (For IEXT101-PH-L)	9	Line speed is in 100Mbps.
3	Grounding connector	10	Wall-mounting holes
4	LINE RJ-45 connector	11	Power LED indicator
5	DIP Switch	12	Power range LED indicator
6	LAN link LED indicator	13	Function table of DIP Switch
7	LFPT LED indicator		

Extension Distance vs. Link Speed / PoE Power Budget

- **Cat. 5e UTP Cable**

Extension Distance (Meters)	Link Speed (Mbps)	PoE Power Budget (Maximum Watt)	
		4-Pair UTP	2-Pair UTP
100	100	31.4	28
200	100	29.6	22.4
300	100	27.6	15.2
400	100	24.7	12.2
500	100	20.3	9.8
600	100	17.2	7.9
700	10	15	7.1
800	10	13.2	6.1

- **Cat. 6 UTP Cable**

Extension Distance (Meters)	Link Speed (Mbps)	PoE Power Budget (Maximum Watt)	
		4-Pair UTP	2-Pair UTP
100	100	32.2	28.8
200	100	30.5	25.5
300	100	28.7	16.7
400	100	27	14.7
500	100	24.1	11.8
600	100	20.5	9.9
700	10	17.7	8.7
800	10	16	7.5

Note: Please note that the tables above are for your reference. The actual result will vary depending on your actual cable quality and networking conditions.

Connectors

IEXT101-PH-L has two standard shielded RJ-45 connectors for Ethernet cable connections. The connector labeled LAN will connect to Ethernet switch, while the connector labeled LINE will connect to IEXT101-PH-R LINE side for distance extension. The connector of IEXT101-PH-R labeled LAN will connect to PD devices such as IP Camera, Access Point, IP Phone, Digital Signage or any other PoE powered devices.

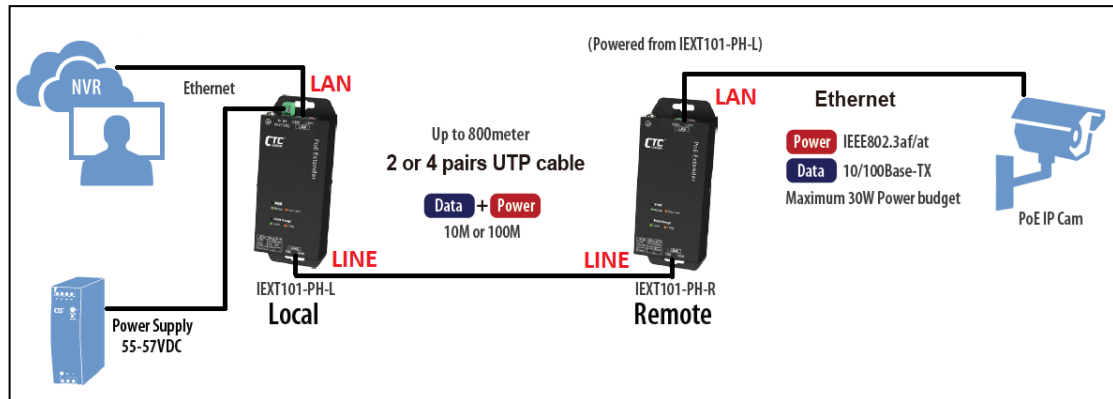


Figure 5. Connector Diagram

RJ-45 Ethernet Port Pinouts

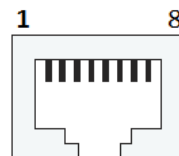


Figure 6. RJ-45 Ethernet Port Pinouts

RJ-45 Ethernet & PoE Pin Assignments

Pin No.	RJ-45 Ethernet 100Base-TX	PoE Output (2 Pair)
1	RX+	V+
2	RX-	V+
3	TX+	V-
4	-	
5	-	
6	TX-	V-
7	-	
8	-	

DIP Switch (IEXT101-PH-L)

DIP NO.	DIP 1	DIP 2	DIP 3	DIP 4
Position	LFPT	Rate	PWR Line	Reserved
OFF	LFPT Off	Auto	Enable	
ON	LFPT On	10M	Disable	

DIP 1

OFF: Disable LFPT function.

ON: LFPT function is enabled. When the remote device is link down, the link of the local device will be forced down.

DIP 2

OFF: The device automatically learns the link speed rate. The link speed can be either 10Mbps or 100Mbps.

ON: This setting forces port speed rate to 10Mbps.

Note 1: The LAN speed is determined by LINE speed which means that if LINE speed is forced to 10Mbps, the LAN speed will be set to 10Mbps as well. When speed rate is set to Auto, the LINE speed will be determined by the extension distance. For detailed "Extension Distance vs. Link Speed/PoE Power Budget" information, please refer to page 8.

Note 2: Please note that the "Extension Distance vs. Link Speed/PoE Power Budget" tables in page 8 are for your reference. The actual result will vary depending on your actual cable quality and networking conditions.

DIP 3

OFF: Provide power to LINE side.

ON: Do not provide power to LINE side.

Note: The remotely connected PD device will perform a power reset when this DIP switch is turned ON (Disable) and then turned OFF (Enable).

DIP 4 :

This DIP switch is reserved for future use. Please place this DIP Switch in the original OFF position.

DIP Switch (IEXT101-PH-R)

DIP NO.	DIP 1	DIP 2	DIP 3	DIP 4
Position	LFPT	PD PWR	PoE Mode	Reserved
OFF	LFPT Off	Enable	Active	
ON	LFPT On	Disable	Passive	

DIP 1

OFF: Disable LFPT function.

ON: LFPT function is enabled. When the remote device is link down, the link of the local device will be forced down.

DIP 2

OFF: Provide power to the PD device.

ON: Do not provide power to the PD device.

Note: *The remotely connected PD device will perform a power reset when this DIP switch is turned ON (Disable) and then turned OFF (Enable).*

DIP 3

OFF: This sets the device to Active mode which negotiates with the remote powered device via IEEE802.3at/af standard.

ON: This forces the device to passive mode. In this mode, the device continuously feeds power to the powered device without negotiation.

DIP 4 :

This DIP switch is reserved for future use. Please place this DIP Switch in the original OFF position.

Recommended Power & Ground Wiring Scheme

DC Power Connection

IEXT101-PH-L extenders are powered up by an external power supply (55VDC~57VDC). To connect to the power supply, insert V+ and V- wire into power contacts. Then, tighten the wire-clamp screws to prevent power wires from loosening. If the power supply is connected correctly, then the PWR LED on the front panel will be lit in green.

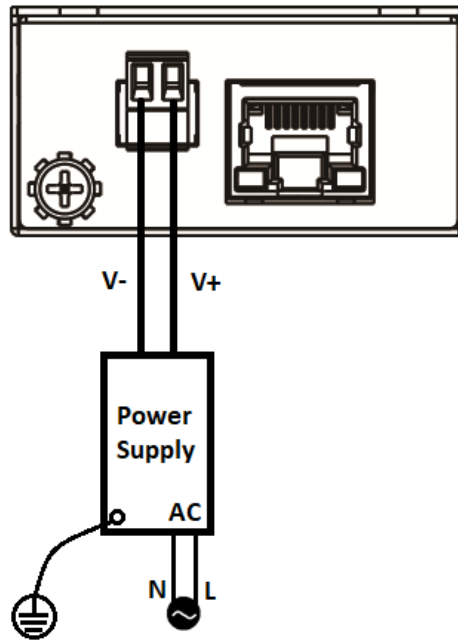


Figure 7. DC Power Connection

Earth Ground Connection

An earth ground connector is provided on the top panel with an earth ground sign next to it. Grounding the device properly can help to release leakage of electricity to the earth safely so as to reduce unexpected influences from electromagnetic interference (EMI) and electromagnetic susceptibility (EMS).

Prior to connecting to the power, it is important to connect the ground wire to the earth. Follow steps below to install ground wire:

1. Loosen or remove the grounding screw.
2. Attach the grounding screw to the ring-type or fork-type terminal of the grounding cable. Make sure that the grounding cable is long enough to reach the earth.
3. Use a screwdriver to fasten the grounding screw.

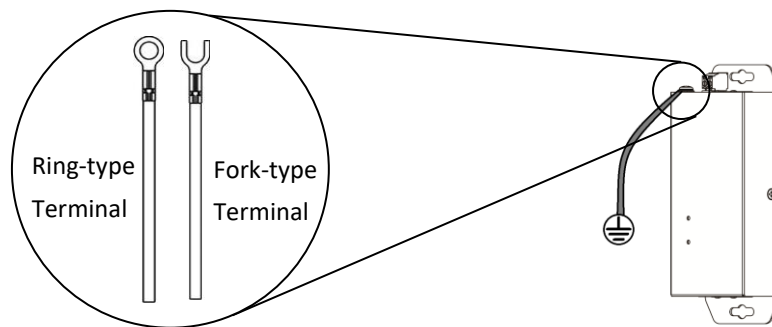


Figure 8. Grounding Cable Type

Figure 9. Grounding Connection

LED Indicators

LED	Color	State	Descriptions
PWR	Green	On	Power is on.
		Off	No Power.
	Amber	On	If the following PoE overloading conditions occur, the PWR LED indicator will be lit in Amber. <ul style="list-style-type: none"> • IEXT101-PH-L: PoE output >30W or PoE output errors • IEXT101-PH-R: PoE output >29W or PoE output errors
		Off	Normal conditions.
PWR Range (IEXT101-PH-L)	Green	On	PoE output <15W
	Amber	On	PoE output \geq 15W
PWR Range (IEXT101-PH-R)	Green	On	PoE output <15W
		Blinking	Passive PoE mode.
	Amber	Off	PoE function is disabled or there is no PoE output under Active PoE mode.
		On	PoE output \geq 15W
LAN LINK	Green	On	LAN side link is up.
		Blinking	LAN side link is up and active.
		Off	LAN side link is down.
LAN LFPT	Amber	On	Link fault pass through function is activated and link loss conditions occur.
		Off	LFPT function is off or link operates normally.
LINE 10M	Amber	On	LINE side link is up and operates at 10Mbps.
		Off	LINE side link is down or operates at 100M.
LINE 100M	Green	On	LINE side link is up and operates at 100Mbps.
		Off	LINE side link is down or operates at 10Mbps.

Wall-Mounting Installation

Each Ethernet extender comes with a pair of wall-mounting hardware brackets. When installing the wall-mounting brackets, be sure to correctly align the screw holes. Use the screws provided in the wall-mounting kit to securely fasten the brackets.

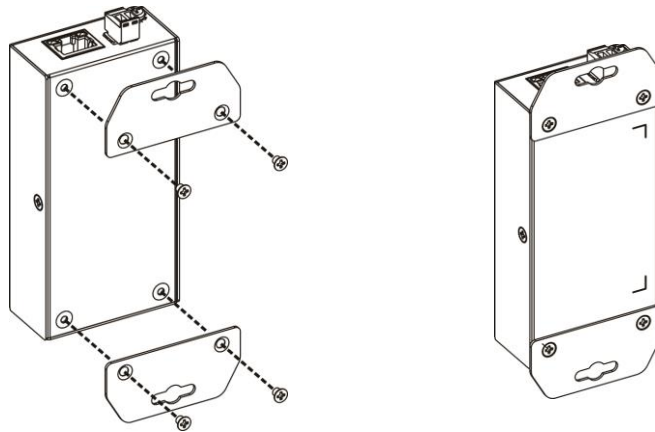


Figure 10. Attaching Wall-Mounting Brackets to the Device

Once two wall-mounting brackets are securely attached to the device, prepare two appropriate screws for wall-mounting installation.

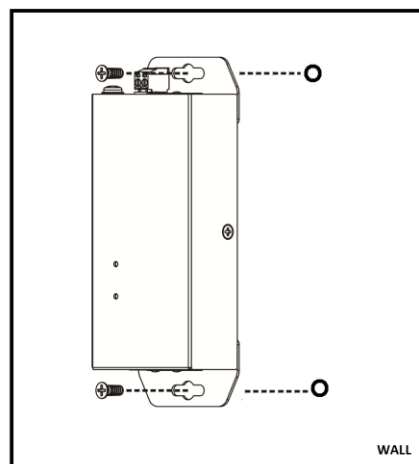


Figure 11. Wall-Mounting Installation

Application

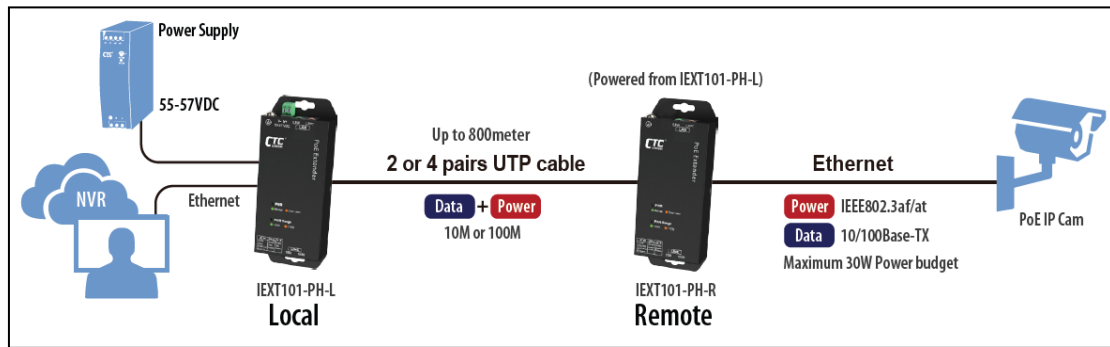


Figure 12. Extender Application Diagram

