

"POWER OVER ETHERNET" SECURITY CAMERAS

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TuCS COMPUTER
son
SOCIETY



An International
Association of Technology
& Computer User Groups

**Web location for this
presentation:**

<http://aztcs.apcug.org>

Click on “**Meeting
Notes**”

SUMMARY

"Power Over Ethernet" (PoE) cameras are immune to the Wi-Fi jammers that some criminals are now using.

TOPICS

- "Power over Ethernet" ("PoE")
- "Powerline Networking" Kits
- "Power over Ethernet" Injector Adapters
- "Power over Ethernet" Network Switches

TOPICS (continued)

- Power-Over-Ethernet cameras are not blocked by the Wi-Fi jammers that are now being used by burglars
- Combining "PoE" injectors and/or "PoE" network switches WITH "Powerline Networking" kits

"Power over Ethernet" STANDARDS

- https://en.wikipedia.org/wiki/Power_over_Ethernet

"Power over Ethernet" STANDARDS (continued)

- "Power Sourcing Equipment"
feeds voltage to
"Powered Device"

"Power over Ethernet" STANDARDS (continued)

- According to https://en.wikipedia.org/wiki/Power_over_Ethernet :

Property	802.3af (802.3at Type 1) "PoE"	802.3at Type 2 "PoE+"
Power available at PD ^[note 1]	12.95 W	25.50 W
Maximum power delivered by PSE	15.40 W	30.0 W
Voltage range (at PSE)	44.0–57.0 V ^[24]	50.0–57.0 V ^[24]
Voltage range (at PD)	37.0–57.0 V ^[25]	42.5–57.0 V ^[25]
Maximum current I_{\max}	350 mA ^[27]	600 mA ^[27]

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"Power over Ethernet" STANDARDS (continued)

- To avoid frying the "Powered Device" at the far end, the "Power Sourcing Equipment" goes through a series of handshakes before sending the proper voltage and amperage to the "Powered Device":

Stages of powering up a PoE link

Stage	Action	Volts specified [V]	
		802.3af	802.3at
Detection	PSE detects if the PD has the correct signature resistance of 19–26.5 kΩ	2.7–10.1	
Classification	PSE detects resistor indicating power range (see below)	14.5–20.5	
Mark 1	Signals PSE is 802.3at capable. PD presents a 0.25–4 mA load.	—	7–10
Class 2	PSE outputs classification voltage again to indicate 802.3at capability	—	14.5–20.5
Mark 2	Signals PSE is 802.3at capable. PD presents a 0.25–4 mA load.	—	7–10
Startup	Startup voltage ^{[32][33]}	> 42	> 42
Normal operation	Supply power to device ^{[32][33]}	37–57	42.5–57

"Power over Ethernet" STANDARDS (continued)

- Cat 6 is much better than Cat 5 cabling according to <https://www.belden.com/blog/digital-building/3-reasons-why-power-over-ethernet-demands-cat-6a-cable>

TWO KINDS OF "POWER SOURCE EQUIPMENT" TO POWER THE PoE CAMERAS

PoE Injector Adapter

or

PoE Network Switch (that has an requirement for a 110 volt outlet and that does not have a "Passthrough" capability)

TWO KINDS OF "POWER SOURCE EQUIPMENT"

(continued)

To make a PoE camera work, you need to either install the usually-bundled PoE injector adapter OR a separately-purchased PoE network local-area switch between the camera and an existing router

PoE INJECTOR ADAPTER

Adds DC power to an existing Cat 5/5e/6/6a cable running between an existing LAN switch and a PoE-cable device. Most PoE cameras are bundled with a PoE injector.

PoE NETWORK SWITCH

Provides both a Local Area
Networking wired networking
"Cat x" and "PoE" power injection
for "downstream" camera devices

PoE NETWORK SWITCH (continued)

<https://www.amazon.com/dp/B08LR18SC4/>



NETGEAR 5 Port PoE Gigabit Ethernet Plus Switch (GS305EP) - with 4 x PoE+ @ 63W, Desktop or Wall Mount

[Visit the NETGEAR Store](#)

4.7  1,259 ratings

[Search this page](#)

Amazon's **Choice**

in Computer Networking Switches by NETG...

Delivery

Buy new:

\$69⁹⁹

 **prime** Overnight

FREE Returns 

FREE delivery **On**
4 AM - 8 AM. Or
mins

 [Deliver to France](#)

..

Style: 5 Port | 4xPoE+ 63W

- Energy efficient design compliant with IEEE802.3az
- Silent operation ideal for noise sensitive environment

"Ring Stick Up Cam Elite"

<https://www.amazon.com/Ring-Stick-Up-Cam-Elite-Power-over-Ethernet-HD-Security-Camera-with-Two-Way-Talk-Night-Vision-White-Works-with-Alexa-/dp/B07TC7D9CS/>



"Ring Stick Up Cam Elite" (continued)

When you buy a "Ring Stick Up Cam Elite", it is bundled with a "PoE injector Adapter":

BASIC HOOK-UP

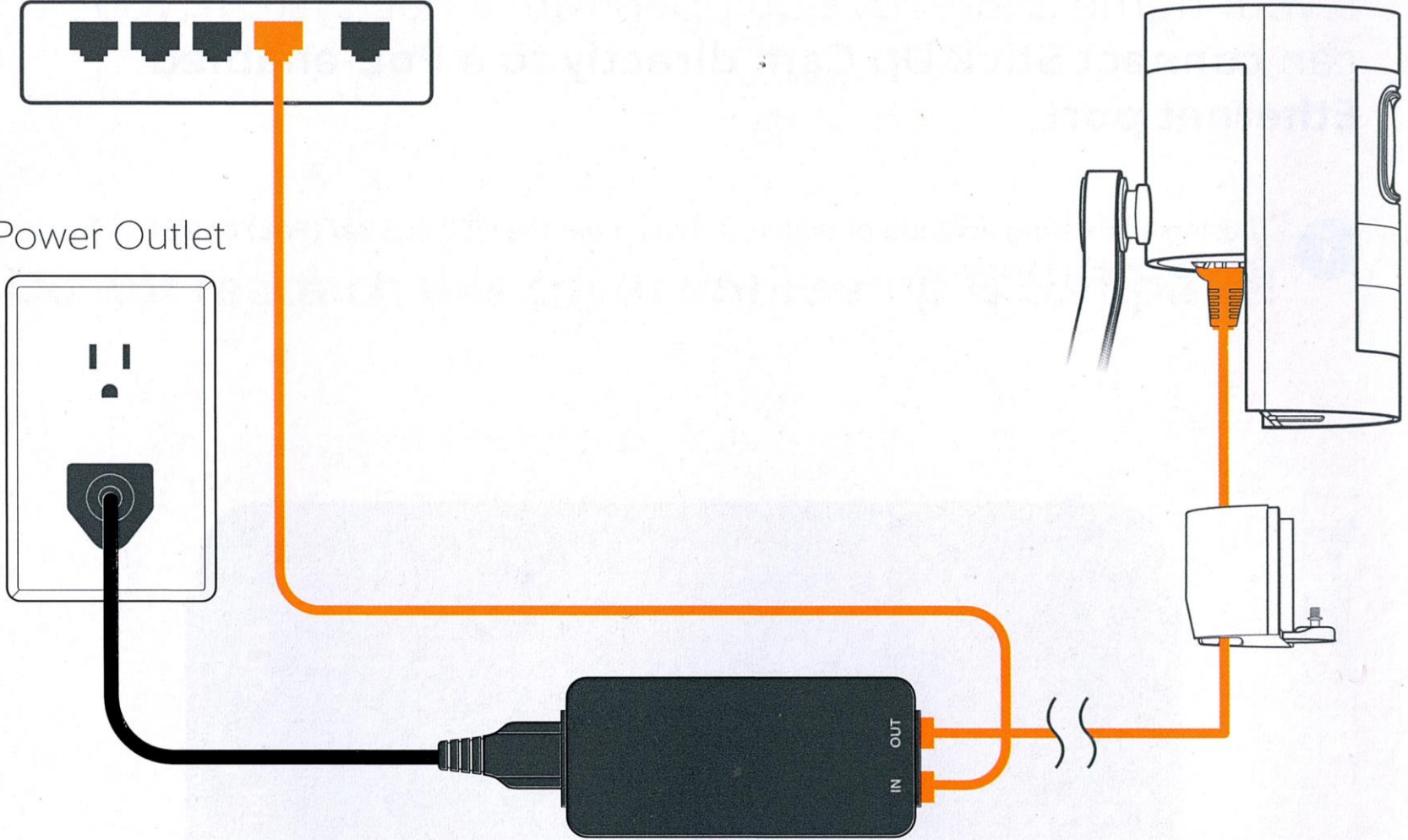
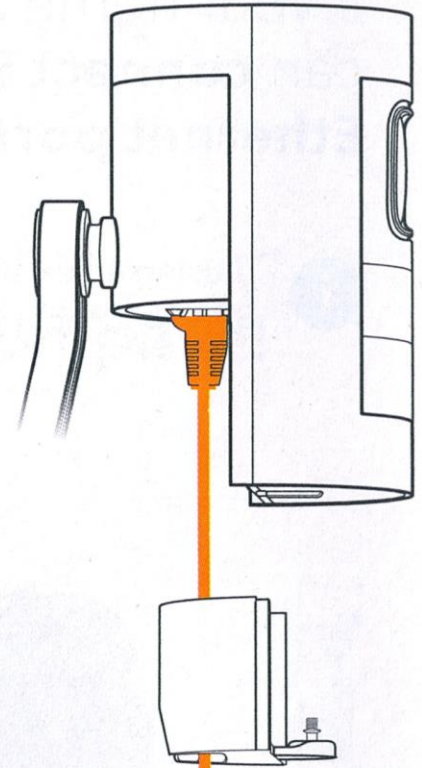
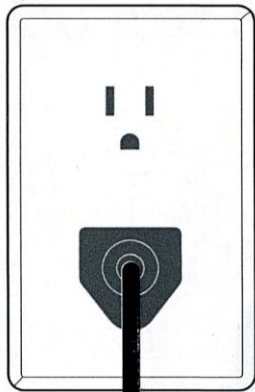
To install a "Power over Ethernet" "PoE" camera, you need to "interject" either a "PoE injector adapter" OR a "PoE network switch between your existing Internet-connected router and your new "PoE" camera.

BASIC HOOK-UP WITH THE BUNDLED "PoE INJECTOR ADAPTER":

Internet Modem,
Ethernet Switch, or Hub



Power Outlet



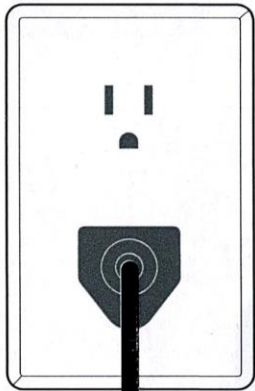
PoE Adapter

LAN SIDE OF YOUR
EXISTING ROUTER

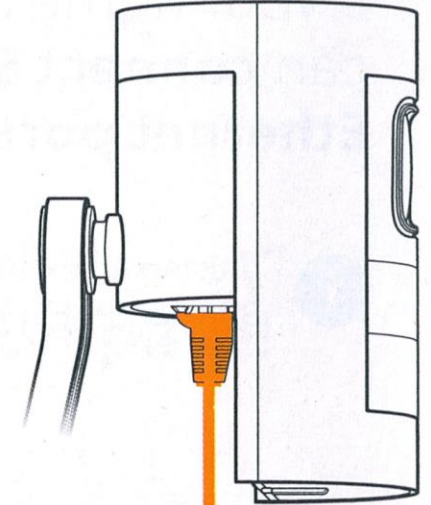
Internet Modem,
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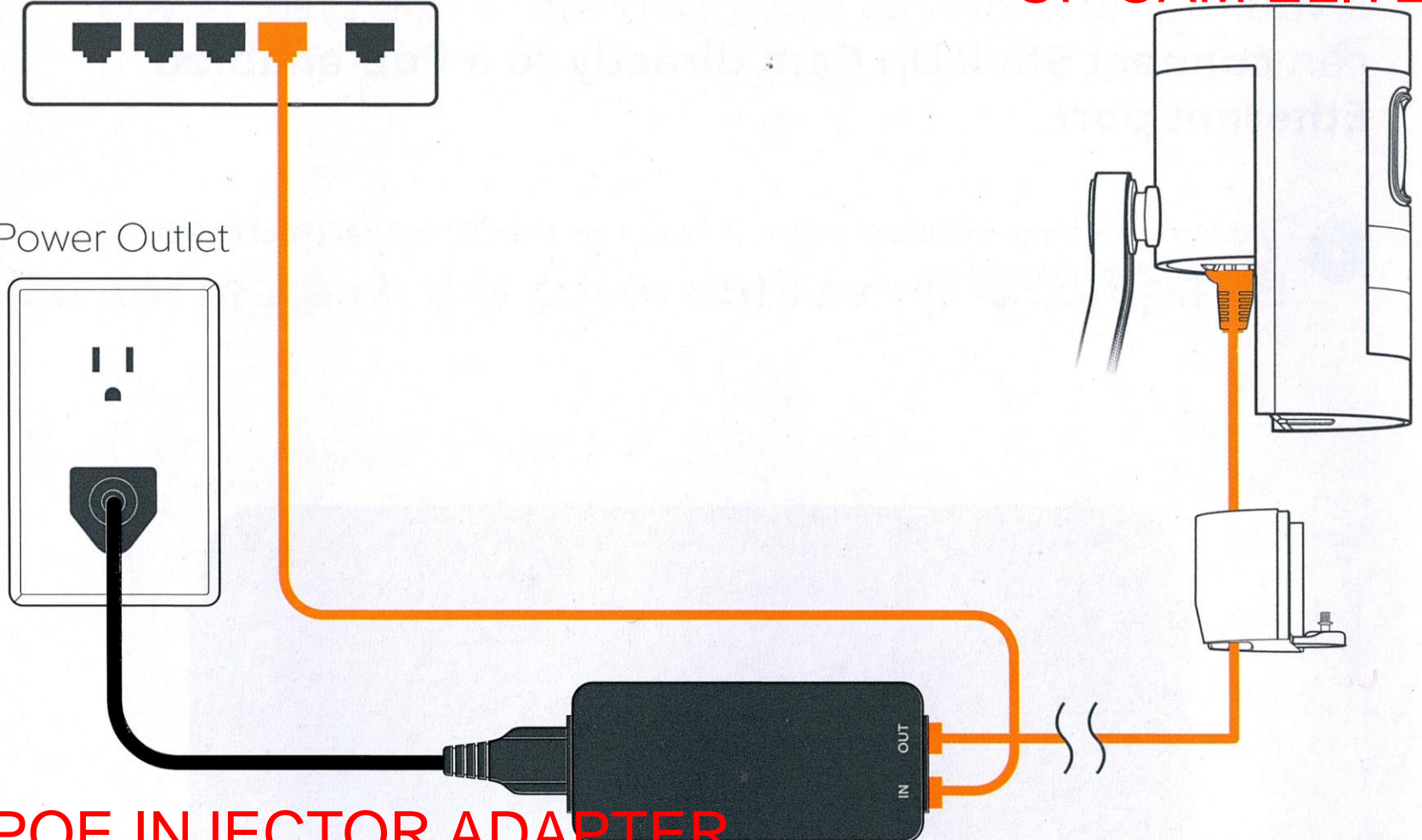


"RING STICK
UP CAM ELITE"



"POE INJECTOR ADAPTER
BUNDLED WITH "RING
STICK UP CAM ELITE"

PoE Adapter

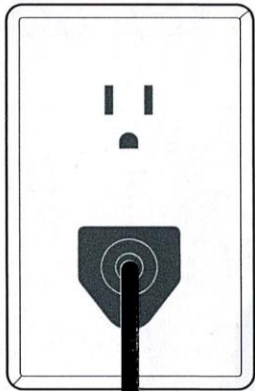


LAN SIDE OF YOUR EXISTING ROUTER

Internet Modem,
Ethernet Switch, or Hub

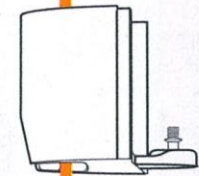
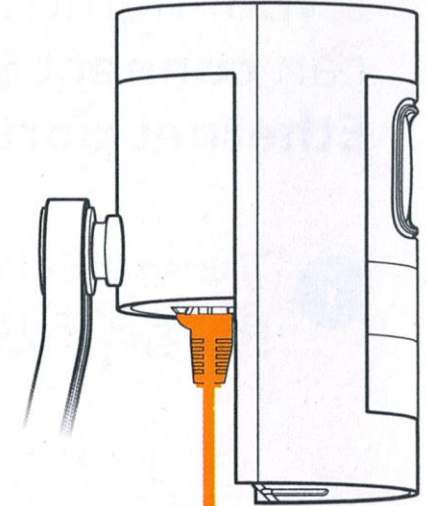


Power Outlet



You can install up to 100 meters of regular, outdoor, or direct burial Cat 6 or 7 or 8 cable for this connection

"RING STICK UP CAM ELITE"



"POE INJECTOR ADAPTER BUNDLED WITH "RING STICK UP CAM ELITE"

PoE Adapter

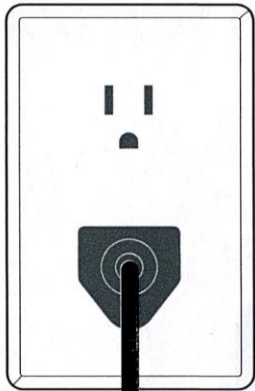


LAN SIDE OF YOUR EXISTING ROUTER

Internet Modem,
Ethernet Switch, or Hub

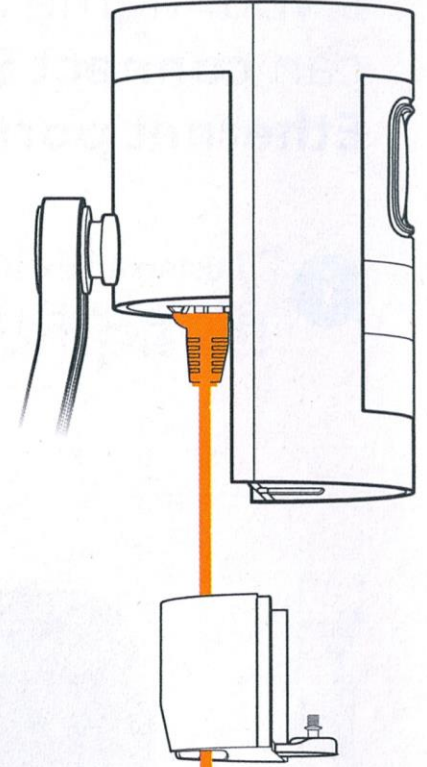


Power Outlet



You can install a Powerline Networking kit between the existing router and the PoE + "injector adapter"

"RING STICK UP CAM ELITE"



"POE INJECTOR ADAPTER BUNDLED WITH "RING STICK UP CAM ELITE"

PoE Adapter



"Ring Stick Up Cam Elite" (continued)

The "Ring Stick Up Cam Elite" is bundled with a black-colored "PoE injector Adapter" but you can buy a white one if you prefer one:



"Ring Stick Up Cam Elite" (continued)

The "Ring Stick Up Cam Elite" is bundled with a black-colored "PoE injector Adapter" but you can buy a white one if you prefer (<https://www.amazon.com/Ring-PoE-Adapter-2nd-Gen/dp/B08GF9K2PK/>) :



"Ring Stick Up Cam Elite" (continued)

If you are using the bundled "PoE injector Adapter", then you do not need to install a "PoE Network Switch" between your existing network router and your "PoE" camera.

"Ring Stick Up Cam Elite" (continued)

If you are not using the bundled "PoE injector Adapter", then you need to install a "PoE Network Switch" between your existing network router and your "PoE" camera as follows:

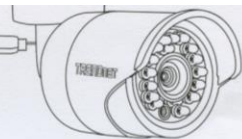
BASIC HOOK-UP WITH A SEPARATELY-PROCURED "PoE NETWORK SWITCH

If are only using a single "PoE Network Switch", do not get one that is "passthrough":

Get one that has requires a 110 VAC outlet instead.

Installation Guide

gabit PoE+ Switch
g

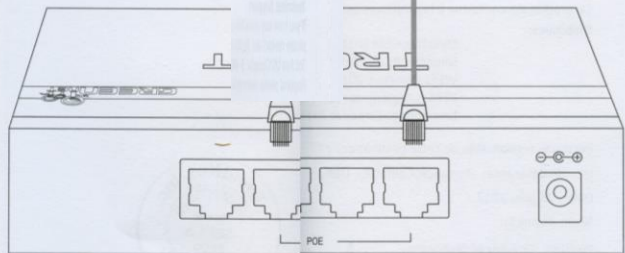


PoE Camera



Internet

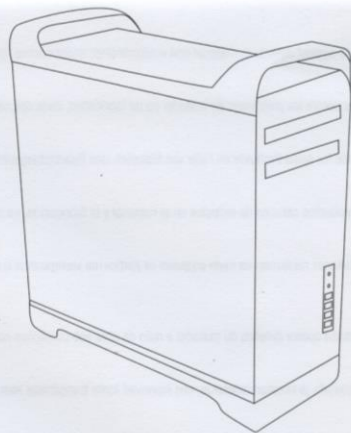
TPE-TG50g



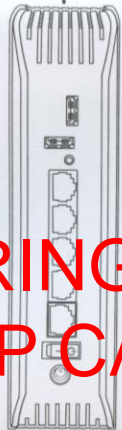
POE



Power

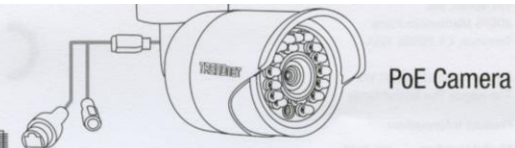


**"RING STICK
UP CAM ELITE"**



Installation Guide

Gigabit PoE+ Switch
10g



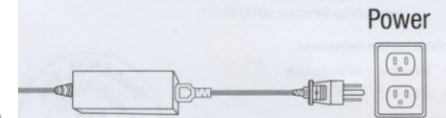
PoE Camera

"RING STICK
UP CAM ELITE"

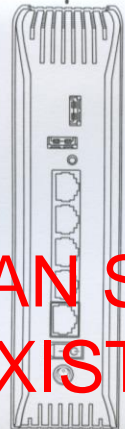
NEWLY-ADDED
"POWER OVER
ETHERNET" LAN
SWITCH DEVICE



Internet



Power

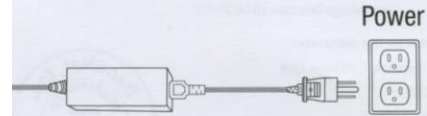
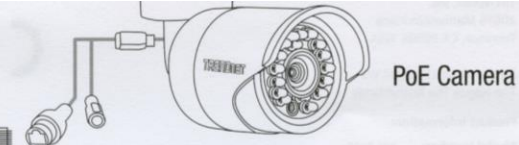


LAN SIDE OF YOUR
EXISTING ROUTER

You can install up to 100 meters of regular, outdoor, or direct burial Cat 6 or 7 or 8 cable for these two connections

NEWLY-ADDED "POWER OVER ETHERNET" LAN SWITCH DEVICE

"RING STICK UP CAM ELITE"



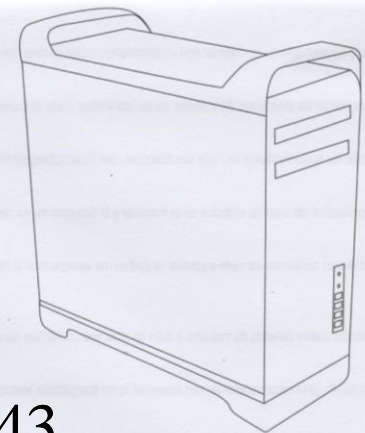
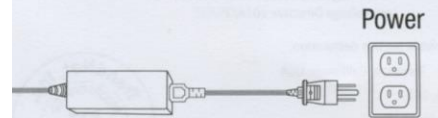
LAN SIDE OF YOUR EXISTING ROUTER

Installation Guide
Gigabit PoE+ Switch
Log

**You can
Install a
Powerline
Networking
kit between
the existing
router and
the PoE +
network
switch**

**NEWLY-ADDED
"POWER OVER
ETHERNET" LAN
SWITCH DEVICE**

**"RING STICK
UP CAM ELITE"**



**LAN SIDE OF YOUR
EXISTING ROUTER**

A MORE ADVANCED CONFIGURATION:

Internet supplier's interface equipment

--> your or their router

--> Powerline Networking kit running over
110 VAC house electrical wiring

-->(upstream) PoE network switch (that does
NOT have a passthrough Ethernet jack)
provides wired Ethernet network
AND DC power to

-->(downstream) passthrough PoE network
switch provides wired Ethernet network
AND DC power to

-->multiple PoE cameras

A MORE ADVANCED CONFIG. (continued)

In the previous configuration, only the following equipment require a 110 VAC power outlet:

Internet supplier's interface equipment

Your or their router

Powerline Networking kit running over
110 VAC house electrical wiring

Higher-level PoE network switch

because the higher-level PoE network switch
sends DC power to both the

lower-level PoE switch and the PoE cameras

