Camera

PARTS YOU'LL NEED:

POE injector
Make sure your camera has a POE module, otherwise you can't use the POE injector.
https://www.aliexpress.com/item/WAN-LIN-DC48V-0-5A-PoE-Injector-PoE-Switch-Ethernet-CCTV-Power-Adapter-EU-UK-US/32787153455.html

Ethernet cables
You can either buy ethernet cables locally, or get these cool thin ones.
These are very cool flat ethernet cables which can go below doors and possibly windows, so no hole in the wall needs to be made. They look cheap and flimsy, but they are in reality very sturdy. You will need 2, one from the RPi to the POE injector, and another from the POE injector to the camera. Choose the lengths according to your needs.
https://www.aliexpress.com/item/SAMZHE-CAT6-Flat-Ethernet-Cable-250MHz-1000Mbps-CAT-6-RJ45-Networking-Ethernet-Patch-Cord-LAN-Cable/32790826168.html

Lenses
Depending on the FOV you have available, you might want different kinds of lenses. Here are the ones that we have tested and are OK. Choose one which you can use without having any obstruction in the field of view (trees, houses, etc.). We recommend the 4mm/f0.95 as a good all-arounder for fairly dark skies. If you live in a very light polluted city, get the 8mm lens.
IMPORTANT NOTE: Make sure you remove the IR filter from the lens holder (you can use a pen, the small piece of glass will shatter, just clean it up).

4mm/f0.95, FOV 88x45 deg
https://www.aliexpress.com/item/StarLights-F0-95-4mm-focal-LENs-2MP-1-2-7-special-for-image-sensor-IMX327-IMX307/32876034491.html

6mm/f0.95, FOV 55x30 deg
https://www.aliexpress.com/item/StarLights-F0-95-6mm-focal-LENs-2MP-1-2-7-special-for-image-sensor-IMX327-IMX307/32875689463.html

8mm f/0.90, FOV 40x20 deg
https://www.aliexpress.com/item/32985863629.html

16mm f/1.0, FOV 20x10 deg
https://www.aliexpress.com/item/32857028953.html

All-sky lens
https://www.aliexpress.com/item/Focusafe-CS-Mount-Fisheye-Lens-1-25mm-180-degree-IR-CCTV-Lens/32911136144.html

+ CS mount lens holder: https://www.aliexpress.com/item/2-X-CCTV-Board-Camera-M2-Screws-CS-Metal-Mount-Lens-Holder-for-cctv-camera-mainboard/32833667462.html
+ Dome: https://www.aliexpress.com/item/CCTV-camera-Metal-Dome-Housing-Cover-Vandal-proof-Dome-camera-housing-CS-mount/32845751236.html

Heater + fan module
This is connected to the POE module. It dissipates about 0.5A when the heater is on. Get this only for colder climates.
https://www.aliexpress.com/item/Heater-Fan-thermostat-Temperature-Control-System-for-CCTV-AHD-TVL-1080P-Camera-DC-12V/32809593987.html

Ethernet waterproof connector cap
These are big enough to pull the whole ethernet connector through, so no cutting of the cable is needed. These are 10 pieces, you only need 1 per camera.
https://www.aliexpress.com/item/10PCS-Lot-Inner-17-5mm-Finished-RJ45-Modular-Waterproof-Connector-Cap-Terminal-Cover-Shell-for-Outdoor/32834472563.html

Camera cables
You will only need these if you didn't buy the 48V PoE cable from the Yumiki camera store below. In that case, you will also need the PoE module. This is a lot of 10 - they come with the caps that are not big enough for the ethernet cable to go through, so just buy the ones above. These also don't come connected to the connectors, and that might be a pain to put together.
https://www.aliexpress.com/item/10PCS-Waterproof-POE-LAN-cable-for-CCTV-IP-camera-board-module-with-weatherproof-connector-Single/32821364606.html

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Camera sensor boards (choice of one below)

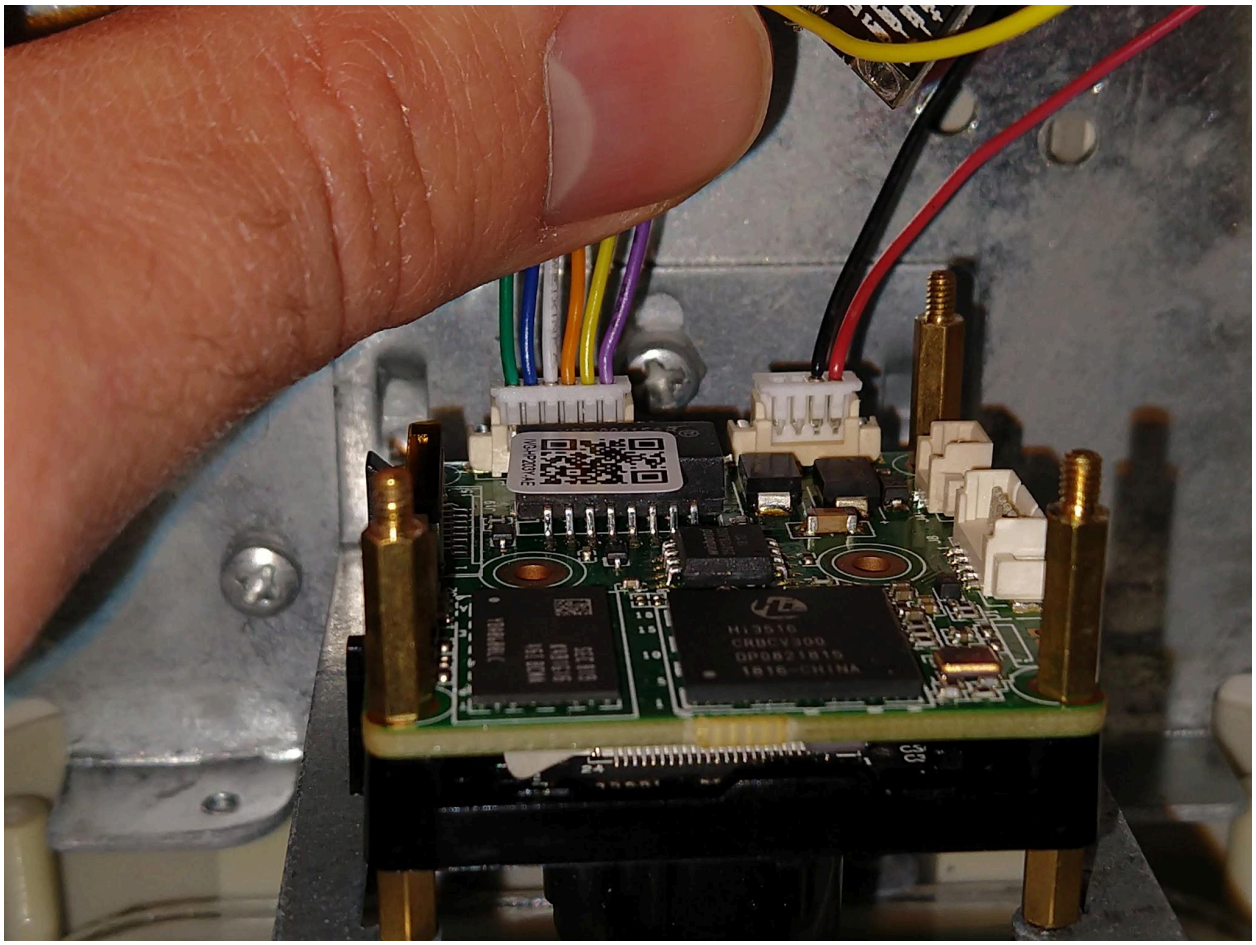
IMX291
Choose"NO LENS" and select the 48V PoE cable, so you don't have to buy the PoE module, nor any additional cables! But you need to choose one of the lenses above.
https://www.aliexpress.com/item/1005002315913099.html

NOT IN STOCK RIGHT NOW: IMX291 with 4mm or 6mm f0.95 lens

This new combo has proven to be very good, and it has a good price. The IR filter has to be manually removed. **Choose the lens you want and select the 48V PoE cable, so you don't have to buy the PoE module, nor any additional cables!**
https://www.aliexpress.com/item/32977094293.html

IMX307
An alternative camera of comparable quality. Choose the 48V PoE cable option. Note that the **lens** it comes with is **no good**, you will **have** to replace it with one of the lenses above.
https://www.aliexpress.com/item/33007423389.html

Connecting wires from the PoE to the camera:

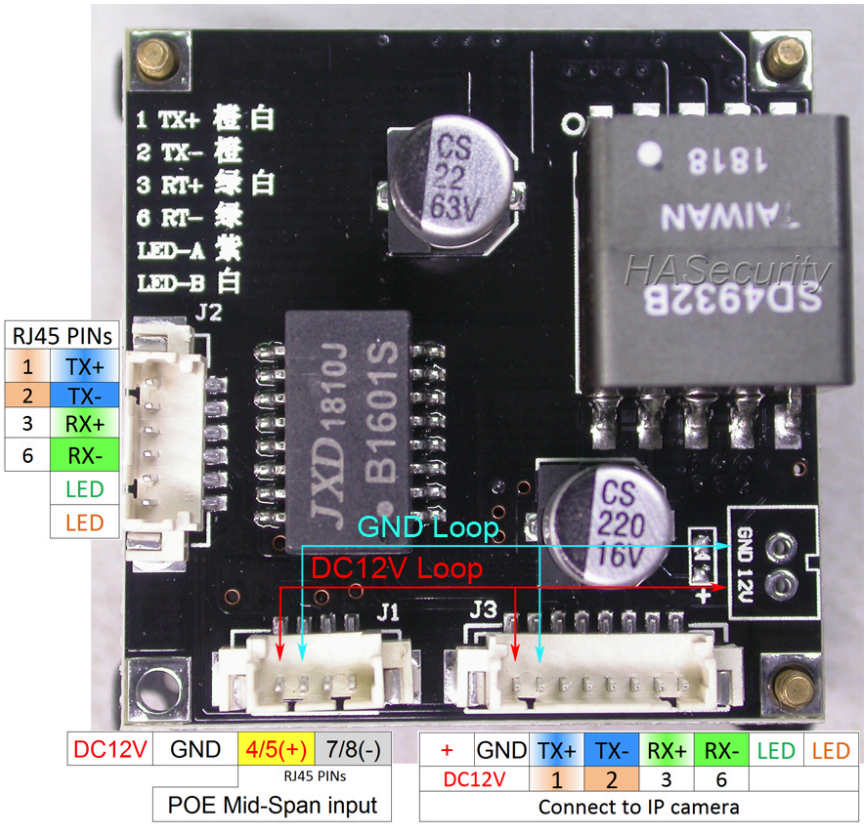


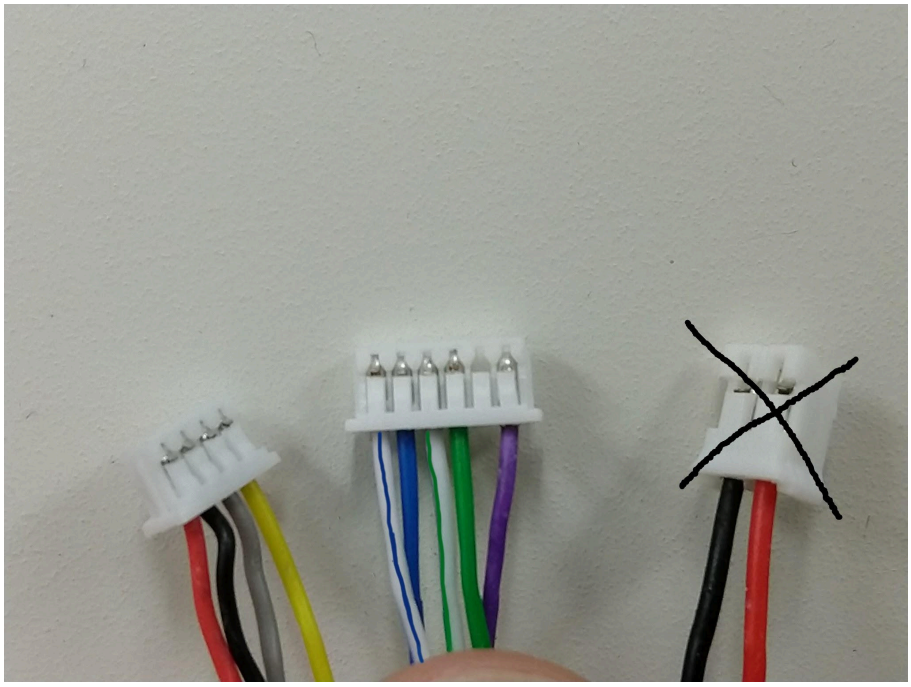
Camera housing and bracket
Choose the "Plate and bracket" version, it comes without the lens shader which makes focusing easier. Make sure to waterproof the front glass by putting silicone sealant around the edges and in the screw holes.
https://www.aliexpress.com/item/32355130687.html

M2 Camera spacing screws
This is a M2 spacer you'll need to put between the camera board and the POE module. Take the 14mm or larger. These are 50 pieces, you only need 4 per camera.
https://www.aliexpress.com/item/32968818335.html
https://www.aliexpress.com/item/32948746653.html

PoE module
The PoE module converts 48V which the PoE injector provides into 12V that the camera and heater+fan need. **You need this ONLY when you are not using the 48V PoE cables from the Yumiki camera store.**
https://www.aliexpress.com/item/32874259693.html

Pinout:





The image above shows how the camera cables should be connected. The crossed out connection won't be used anywhere, so just leave it hanging in the camera housing.

Raspberry pi

Raspberry Pi 4
We recommend you buy your Raspberry Pi locally. It has to be version 4 with at least 2 GB RAM.

RPi power supply
You will need a 5.1V micro USB power supply for the RPi. It needs to have at least 2.5A. **We recommend buying the official RPi power supply**, others might have issues. Buy this locally.

128 or more GB SD card
You will need an SD card that is at least 128 GB. Less than that is not enough. Buy a version with an SD adapter if this is your first buy, so you can easily insert it into your computer and flash the SD card image. You might find good deals locally, just make sure to card is fast.

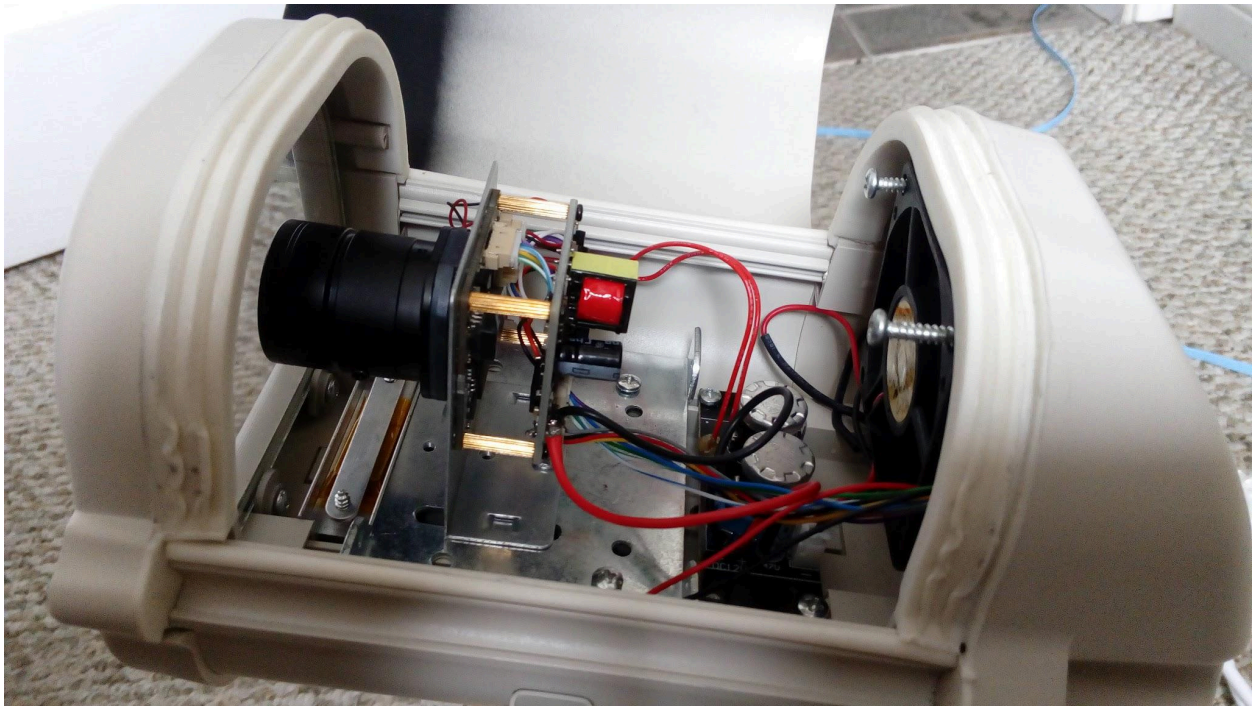
RPi case
This is one of the rare cases which fulfills our needs. It has a fan which is relatively quiet, it's sturdy, and it can fit the RTC (with slight additions). **Please buy this case**, we have tried many

others, but they are not as good. Just make sure to select the correct RPi version when you buy it.
https://www.aliexpress.com/item/32959825297.html

RTC clock
If the internet goes out and the RPi reboots, it might not have a good time, which is essential for meteors. That's why you need an external real-time clock (RTC). This is a pack of 10, you will only need 1 for one system.
https://www.aliexpress.com/item/10PCS-DS3231-Real-Time-Clock-Module-for-arduino-3-3V-5V-with-battery-For-Raspberry-Pi/32770348851.html

Pin headers
The fan on the case makes it difficult to connect the RTC, so you will need one of these to extend the RPi pins a bit higher. This is a pack of 20, but you will need only 2 per system.
https://www.aliexpress.com/item/20PCS-6-Pin-Female-tall-stackable-Header-Connector-socket-Shield/32549850046.html

Completed camera



Completed camera with the 4mm lens

The power should be connected in the following way:

