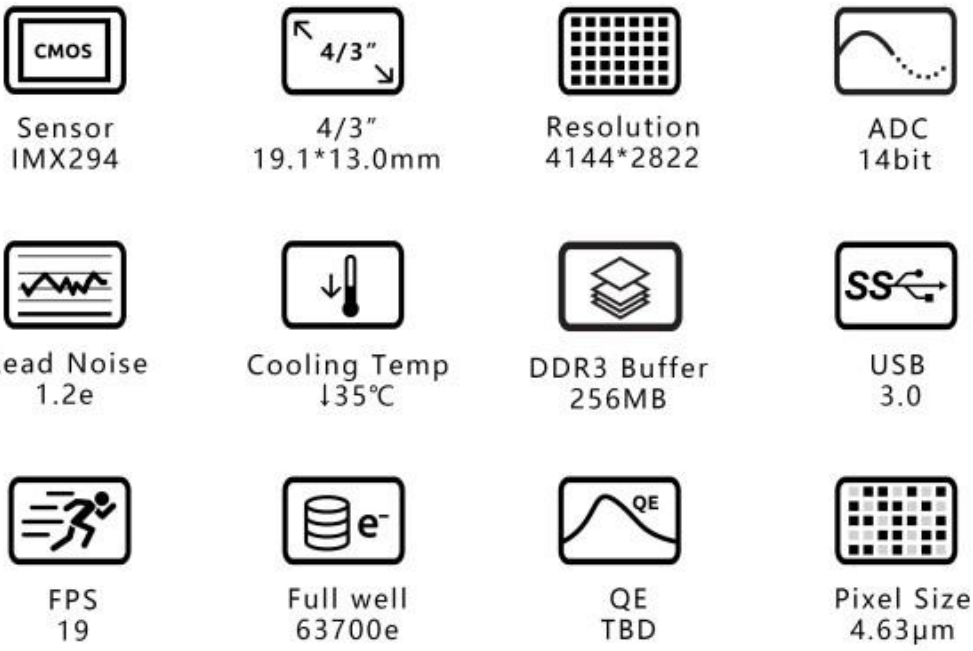
Product Description

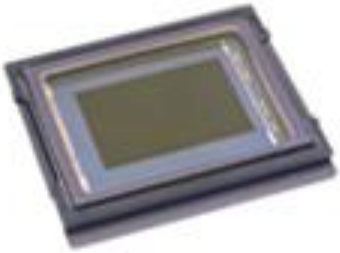
ASI294MC Pro



The ASI294 is the first camera in the world equipped with the latest Sony sensor IMX294CJK.

▶IMX294CJK

Sony 10.71M-Effective Pixel Color CMOS Image Sensor (official description from Sony site), with a diagonal of 21.63mm (4/3 format). ZWO has refined the sensor and remolded it to increase the diagonal to 23.2mm with approximately 11.71M-Effective pixels (4/3 format).



▶High-Sensitivity Type 4/3 CMOS Image Sensor that Supports 4K for Astronomic Cameras and Industrial Applications

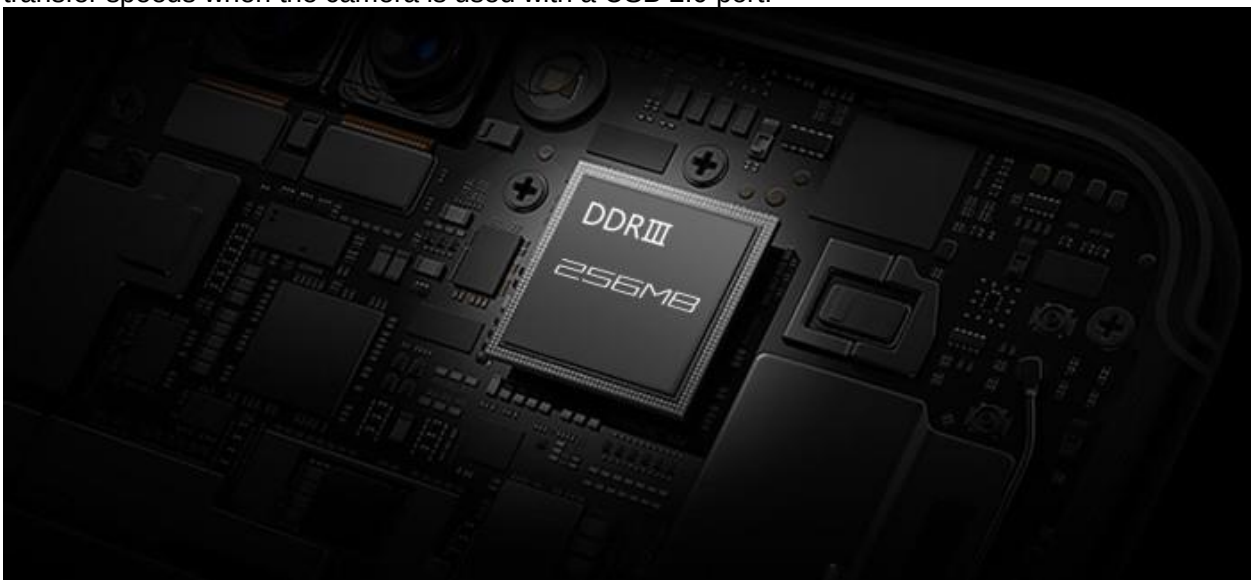
The IMX294CJK sensor is the first in-house image sensor for astronomic cameras to adopt the 4/3 format and provides the necessary number of pixels for true 4k output at 120 frames per second (w/ ADC 10-bit output mode, the ASI294MC can run up to 25fps at 4k format when used with USB 3.0). In addition, the use of larger-sized pixels achieves SNR1s of 0.14 lx* which is very close to the value of the ASI224 (0.13 lx*).

▶Exceptional low-illumination performance

Exceptional low-illumination performance of SNR1s: 0.14 lx is realized by use of a large-size optical system and by expanding the area per pixel to 4.63 µm. This makes the IMX294CJK ideal for astronomic camera market applications that require low-illumination performance.

DDR Memory Buffer

The ASI294MC Pro camera includes a 256MB DDR3 memory buffer to help improve data transfer reliability. Additionally, the use of a memory buffer minimizes amp-glow, which is caused by the slow transfer speeds when the camera is used with a USB 2.0 port.



DDR memory buffer is the main difference between ASI “Cool” and “Pro” cameras.

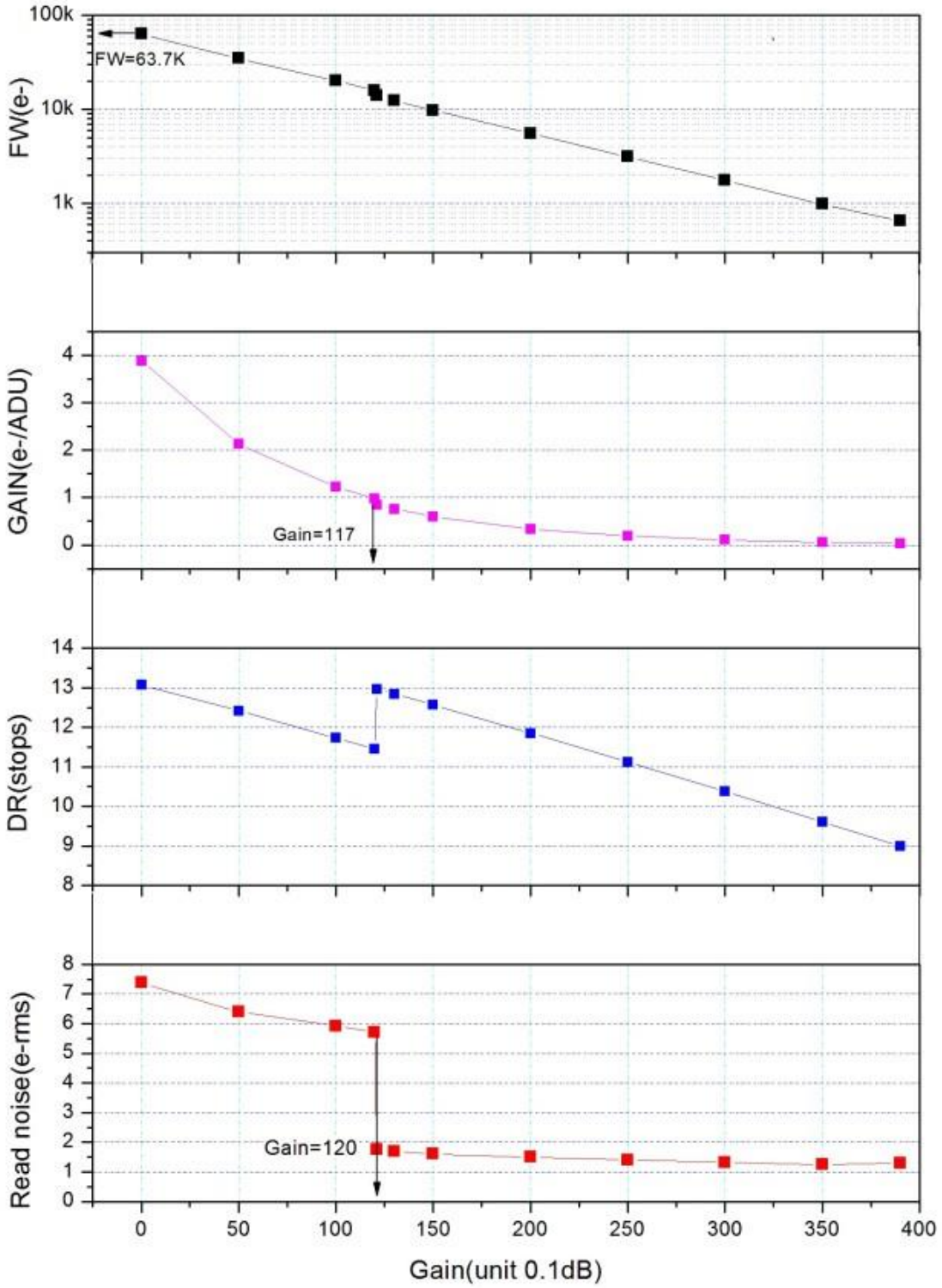
14bit ADC w/ 13 stops DR

The ASI294 has a 14bit ADC unit, allowing it to achieve 13 stops of dynamic range. This is an excellent characteristic for deep sky imaging, which is inherently high dynamic range. At 13 stops, the ASI294 has even more dynamic range than the ASI1600.

HCG Mode

HCG (high conversion gain) mode, which reduces read noise to even lower levels at higher gain without loss to dynamic range, is automatically enabled when the gain setting is 120 or higher. Read noise will drop under 2e-, while dynamic range will remain at 13 stops.

Read noise, full well, gain and dynamic range for ASI294



Full well Capacity

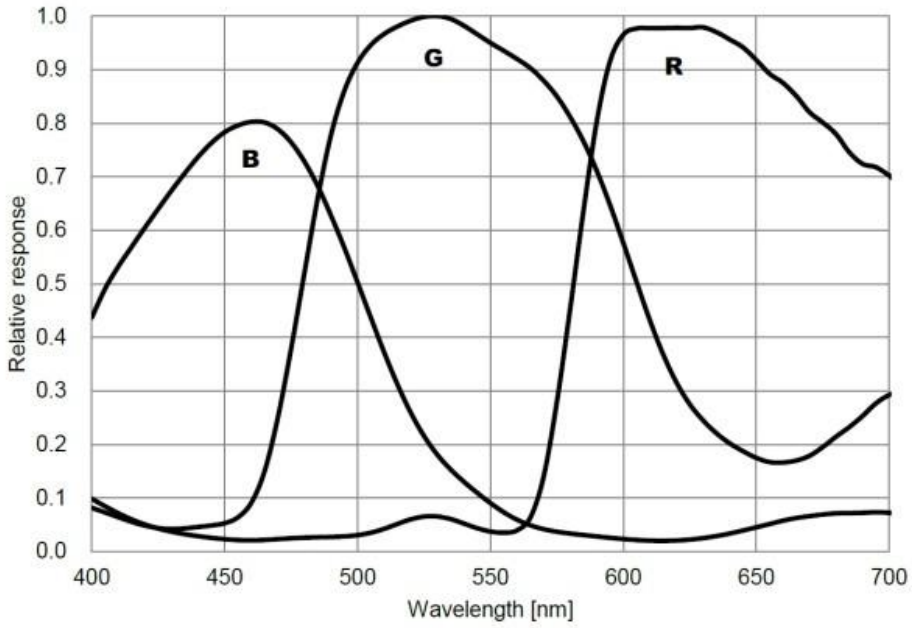
63700e full well, which is 3 times than ASI1600's capacity. Even bright stars won't saturate under long exposure. This camera can achieve higher SNR (signal to noise ratio) with just one single exposure.

Reliable Mechanics

ASI294MC Pro has same mechanics as ASI1600 Pro. There are four screws that seal the sensor chamber. Our camera design has been extensively tested and is very stable. Even when used in higher humidity environments, ASI294MC Pro will still work fine without dew problems.

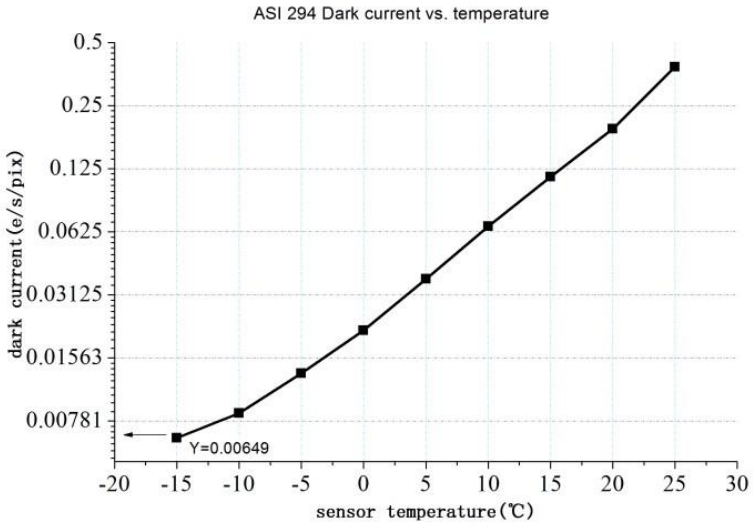
High QE

The IMX294 sensor is a BSI (backside illuminated type) sensor, which has very high QE (quantum efficiency, which we estimate is over 75% peak).



Dark Current

The dark current of the ASI294 is a bit lower than the ASI1600 at same temperature, based on our test results. Dark frame sample @ Highest dynamic range settings, 300s, -10°C, bin1. Please check the dark frame to make sure you fully know the performance. ASI294MC Pro Dark Frame



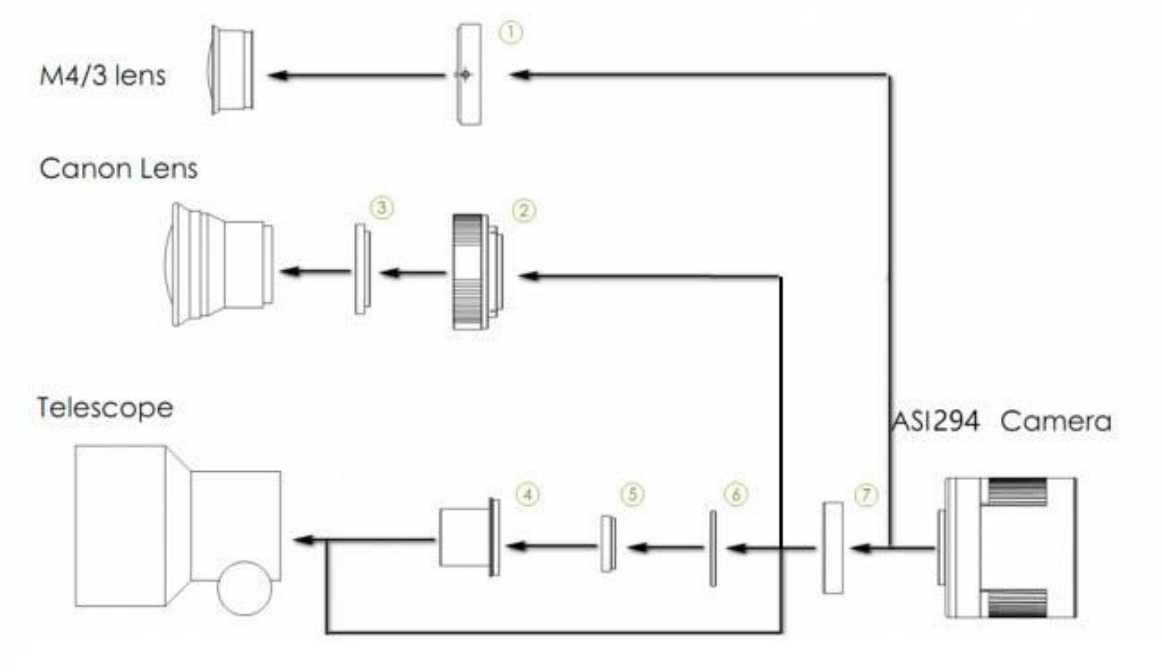
USB 3.0 Port & USB2.0 HUB

USB 3.0 Port: Provide 5Gb bandwidth to make it possible for ASI294 Pro to run at 16 fps (14bit, normal mode) or 19 fps (10bit, high speed mode) at full resolution(11.7Mega).
USB 2.0 HUB: can connect with various accessories, such as filter wheel, guide camera and electronic focuser, so you can better manage your cables. The ASI294 Pro includes two short 0.5m USB 2.0 cables. The integrated USB 2.0 hub is powered by the external power source if you connect one.

Cooling System

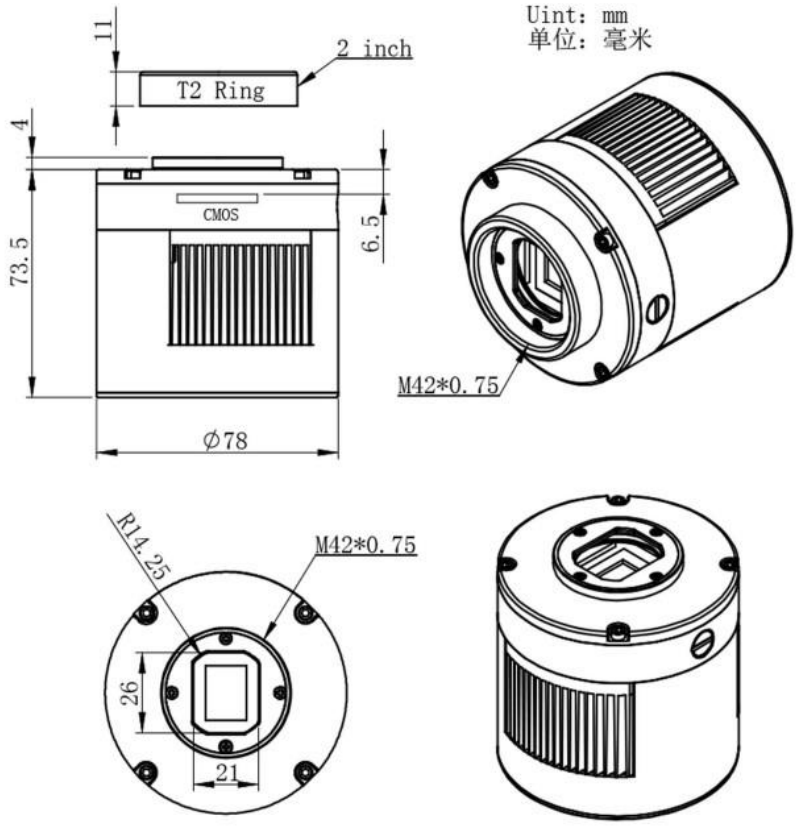
The ASI294 Pro has a 2-stage TEC cooling system that enables deep cooling (35°C-40°C below ambient). The cooler requires an external power supply, which is not included with the camera. You may order a suitable power supply from here.
Recommended cooler power supply: 12V @ 3-5A (or more) DC adapter (2.1×5.5mm, center pole positive). Also, suitable: DC battery with 9-15V.
Using a battery 9-15V is also suitable for the cooler power supply.

Connecting Diagram



1. M43-T2 adapter (optional)
2. EOS-T2 adapter (optional) 3. 2” Filter (optional) 4. 1.25” T-Mount 5. 1.25” Filter (optional) 6. M42-1.25” adapter 7. T2 extender 11mm

Mechanical Diagram

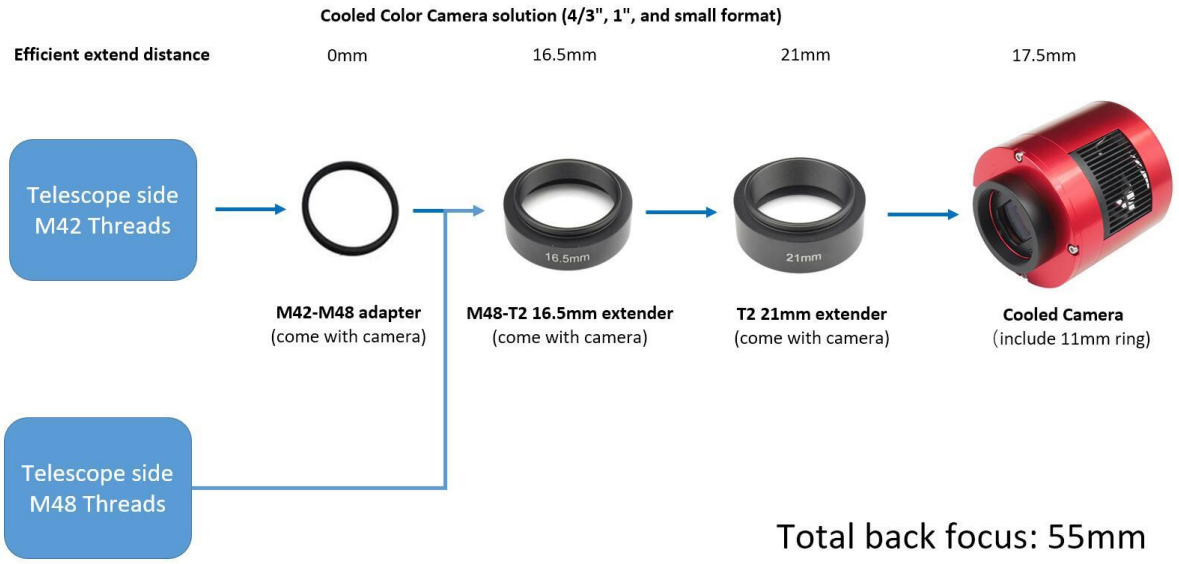


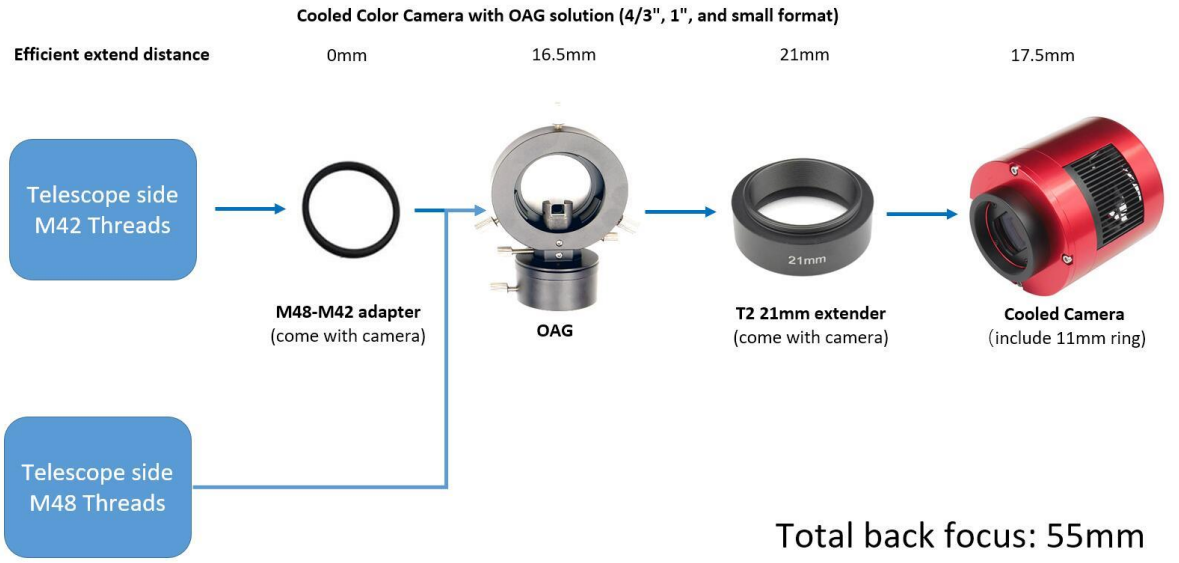
What is in the box?

ASI294 Pro box includes all necessary cables, adapters, and manuals.

Notice: Cooled cameras need a 12v power adapter, If you don't have one, please click this link to buy a 12V power adapter. There are 4 different standards for the different country, please choose it carefully. https://squareup.com/store/imagingstarlight/item/zwo-dc-v-a-us

The best solution of 55mm back focus length





Read more: https://astronomy-imaging-camera.com/tutorials/best-back-focus-length-solutions-55mm.html

Camera technical details

Sensor: 4/3″ SONY IMX294 CMOS
Diagonal: 23.2mm
Resolution: 11.7Mega Pixels 4144X2822
Pixel Size: 4.63μm
Bayer Pattern: RGGB
Shutter:Rolling shutter
Exposure Range: 32μs-2000s
ROI: Supported
Read Noise: 1.2e @39db gain
QE peak: TBD
Full well: 63.7ke
ADC:14bit
DDRIII Buffer: 256MB
Interface: USB3.0/USB2.0
Adaptor: M42X0.75
Protect window:AR window
Dimensions: 78mm Diameter
Weight: 410g
Back Focus Distance: 6.5mm
Cooling: Regulated Two Stage TEC
Delta T: 35°C-40°C below ambient
Camera Power consumption: 650mA at 5V
Cooler Power consumption: 12V at 3A Max
Working Temperature: -5°C—45°C
Storage Temperature: -20°C—60°C
Working Relative Humidity: 20%—80%
Storage Relative Humidity: 20%—95%
Max FPS at full resolution:
10Bit ADC
4144×2822 19fps
14bit ADC
4144×2822 16fps
Resolution USB 3.0 Raw16
4144×2822 16.3fps
4096×2160 21.1fps
3840×2160 21.1fps
1920×1080 40.9fps
1280×720 59.7fps
640×480 85.9fps
320×240 153.4fps
Resolution USB 3.0 Raw8& HighSpeed
4144×2822 19.0fps
4096×2160 24.7fps
3840×2160 24.7fps
1920×1080 47.9fps
1280×720 69.8fps
640×480 100.5fps
320×240 179.3fps
more resolutions are in software, support customize resolution.

Drivers and Softwares:

Our website has newest camera drivers and many DSO and Planetary capture software. Please make sure the newest driver and software has been installed before you start shooting: **https://astronomy-imaging-camera.com/software/**