

Mars-M Camera Manual

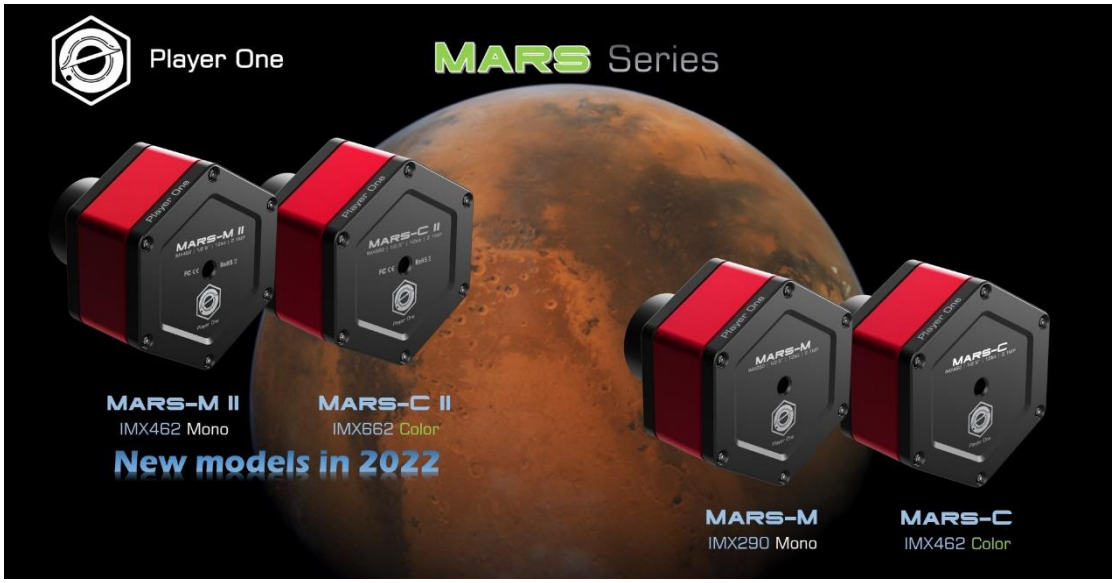
V1.0

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Product Features

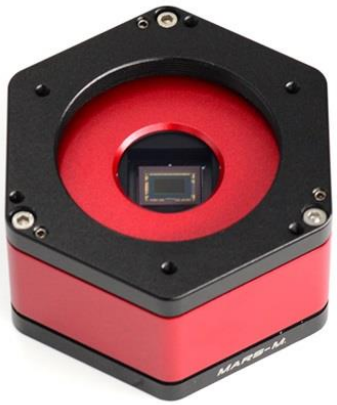


Technical parameters

Sensor	SONY IMX290 1/2.8" CMOS
Diagonal	6.5mm
Total Pixels	2.1 Mega Pixels
Max Resolution	1944×1096
Pixel Size	2.9μm
Chip Size	5.6mm×3.2mm
Frame Rate	136FPS（10bit）
Shutter	Rolling shutter
Exposure Range	32μs-2000s
Readout Noise	3.2e~0.98e
QE Peak	≈80%
Full Well	14.6k e
ADC	12 bit
Data Port	USB3.0/USB2.0 ST4
Adapter	1.25″ / M42X0.75
Back Focal Length	12.5mm
Protective Window	D21*1.1MM High Quality AR Plus (Anti Reflection) Multi-Layer Coating
Diameter	66mm
Weight	180g
Resolution and FPS	Under USB3.0 mode Resolution 12bit ADC 10bit ADC 1944×1096 62.5 FPS 136 FPS 1920×1080 63.5 FPS 138 FPS 1280×720 94.1 FPS 205 FPS 800×600 112.4 FPS 245 FPS 640×480 139.3 FPS 304 FPS More resolution options could be setup in capture software!

Product Description

Mars-M is a monochrome planetary camera developed by Player One Astronomy, which adopts the Sony IMX290 1/2.8″ CMOS, with a 1944 x 1096 array of 2.9um pixels and the diagonal is 6.46 mm.



The naming of Player One Astronomy cameras is unique. For example, we name the planetary cameras after planets (They are Mercury, Venus, Mars, Jupiter, Saturn, Uranus and Neptune, Earth is not included). The size of each planet to a certain extent, represents the size of camera sensors. We name Saturn with a 1-inch sensor camera, and for Mars, we name it with a ⅛-inch senor camera. All camera names will be engraved on the housing of the cameras.

Drivers and software download:
http://player-one-astronomy.com/service/software/
Manuals download:
http://player-one-astronomy.com/service/manuals/

Features



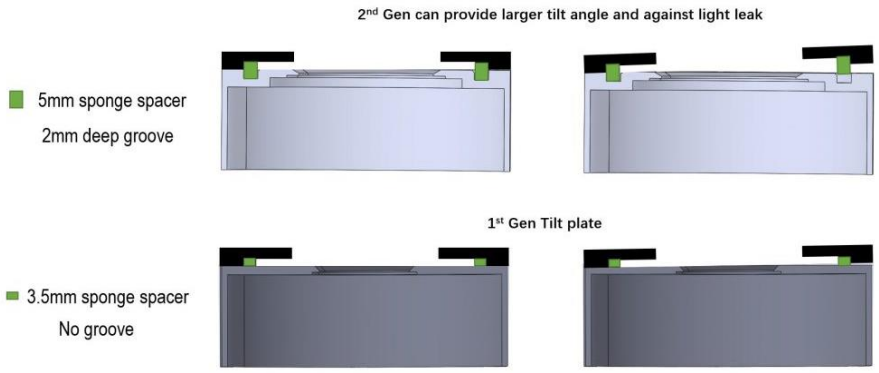
Cutting-edge Design

The planetary cameras developed by Player One Astronomy uses a scientific and technological regular hexagon to construct the main body line, supplemented by round chamfers to achieve both rigidity and flexibility. The positive red, which is like a summer fire, is matched with the low-key and steady black, and the super-fine frosting process on the entire surface makes the camera look luxurious and cool, highlighting the style of high-end players, can't take my eyes off.

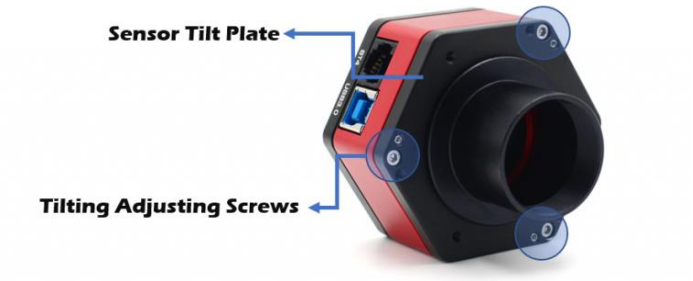


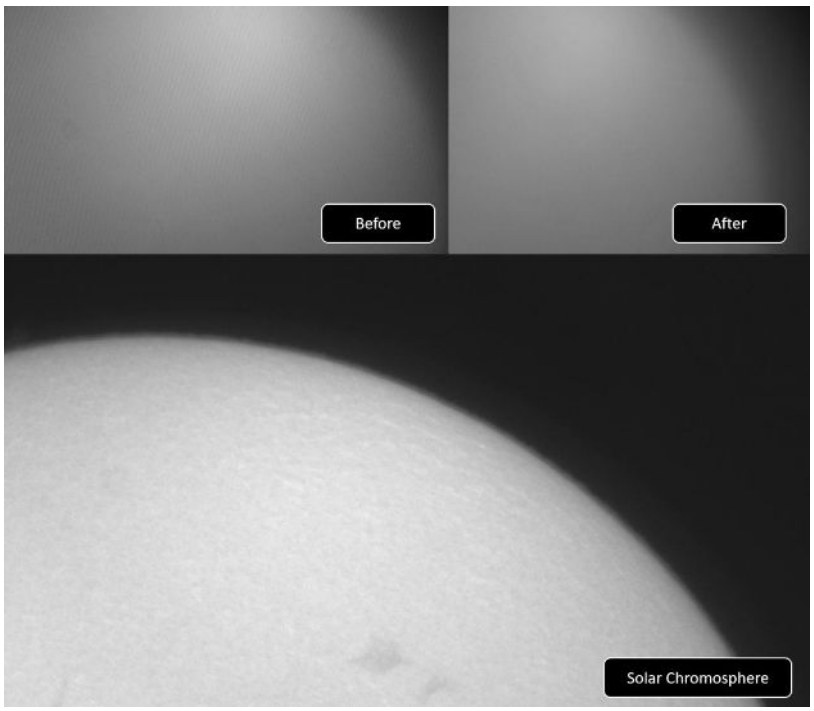
2nd Gen – Sensor Tilt Plate

The built-in high-density sponge shading pad can block the light from the side slits without any side leakage.



When taking solar photograph with prominence telescope, the Newton ring is annoying. Smoother solar image without Newton ring could be taken by adjusting the focal plate. Get a much smaller field curvature of the telescope.



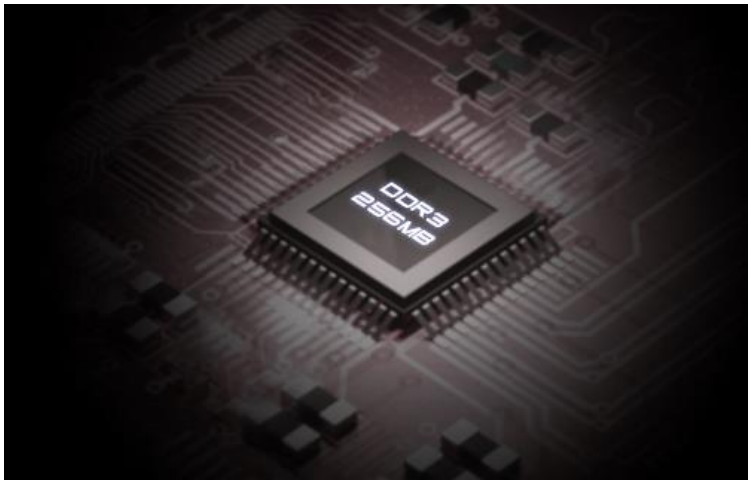


The built-in high-density sponge shading pad can block the light from the side slits without any side leakage.

256M DDR3 Cache

Player One Astronomy cameras are the first one who adopts the DDR3 cache in all planetary cameras in the world! It helps stabilize and secure data transmission, it effectively avoids frame dropping and greatly reduces readnoise.

With the DDR3 cache, the Mars-M camera does not have high demands on computing needs any longer, it will still have excellent performance even if it is connected to a USB 2.0 port.



DPS technology

The planetary cameras from Player One Astronomy have DPS (Dead Pixel Suppression) technology. The DPS is analyses many dark frames to find out those fixed abnormal pixel and record the map in camera memory. In imaging, each exposure frames, those position of dead pixels will be given a median value according to the active pixels around that abnormal pixel.



Overvoltage and overcurrent protection mechanism

Player One cameras produced by the number one player ensures the safety of your camera and other equipment through overvoltage and overcurrent protection mechanisms.

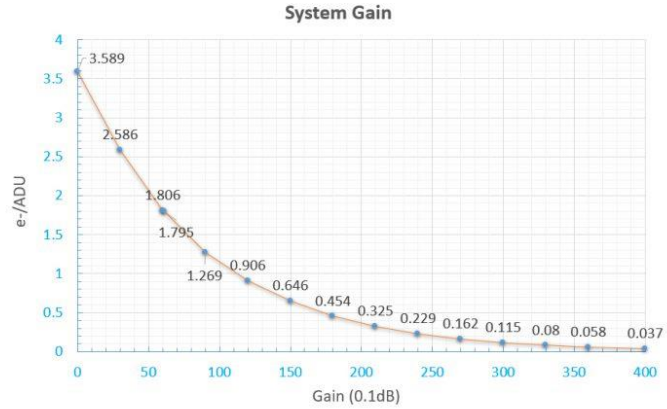
USB3.0 Port and ST4 Port

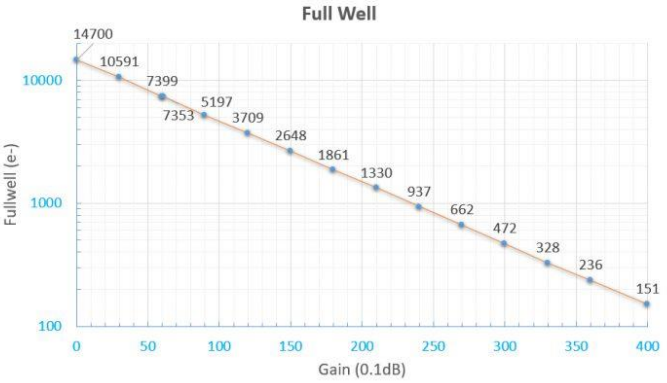
When the camera is connected to the USB3.0 interface and full-resolution preview is used, it can reach 136 FPS in RAW8 mode (10bit ADC), and the frame rate in RAW16 mode (12bit ADC) is 64 frames per second. When recording images, since the actual writing speed will be affected by the writing speed of the hard disk itself, when the hard disk writing speed is slow, the recording may not reach the theoretical speed. It is recommended that you use a high-quality solid state drive to record data to give full play to the performance of the camera.

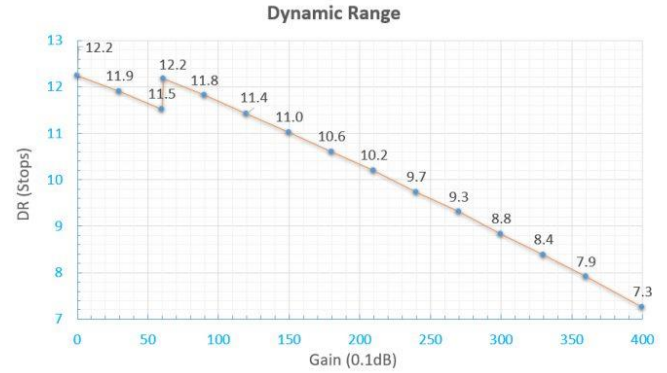
Use the ST4 guide cable to connect the camera and the AUTO GUIDE port of the equatorial mount to do guiding.

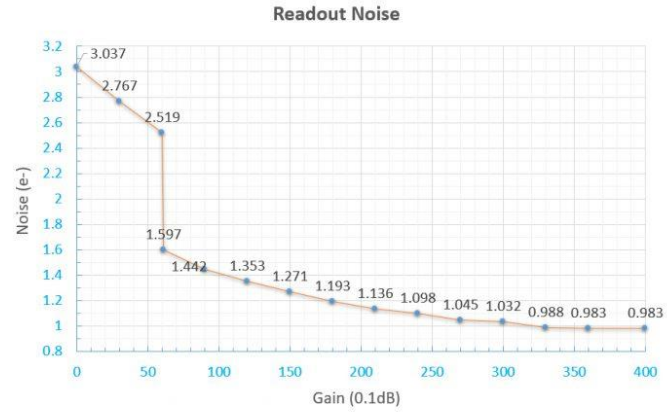


Performance









Readout Noise

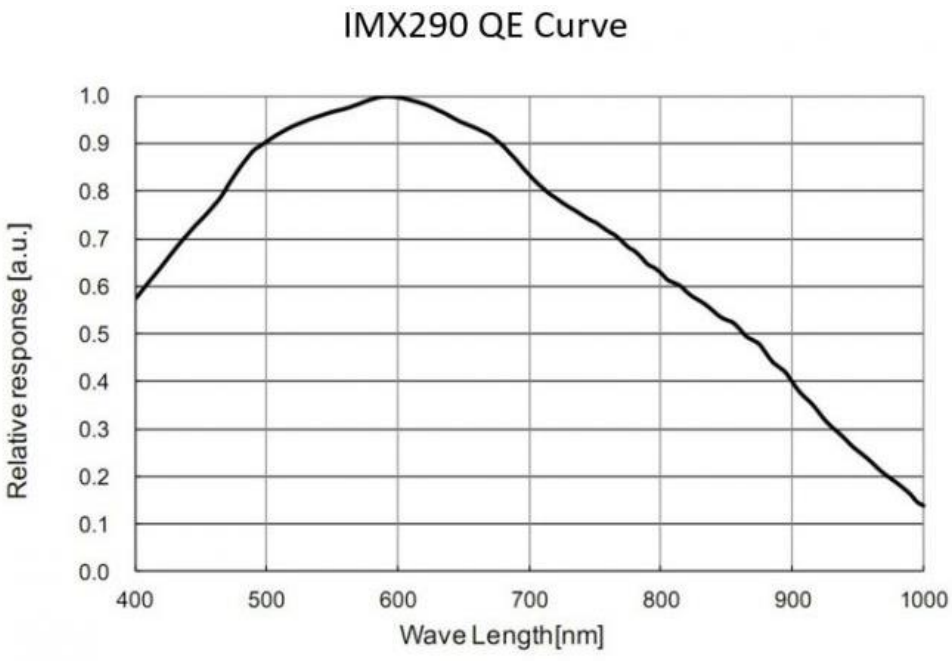
Regarding readout noise, we solemnly promise that all values are obtained from actual tests. And for users, you could use Sharpcap 3.3 for testing. SC3.3 has a function called **Sensor Analysis**, provide a very simple way to test readout noise.
We wrote a tutorial on our website:
http://player-one-astronomy.com/service/manuals/
After many rigorous readout noise tests, the Mars-M camera can reach a low readout noise of 0.73e at a gain of 350 and around 0.7e at a gain of 400.
If you are interested in readout noise testing, you may try it yourself, which is very simple.

HCG Mode

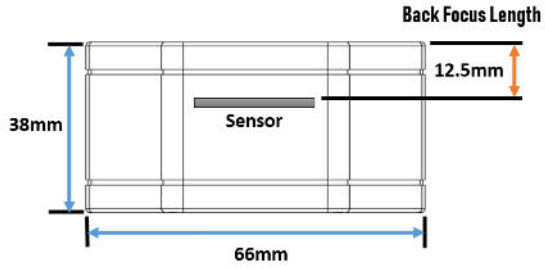
The Mars-M camera has a unique HCG mode, which will automatically turn on when the camera gain setting is ≥60. The HCG mode can greatly reduce the readout noise and retain the same high dynamic range as the low gain.

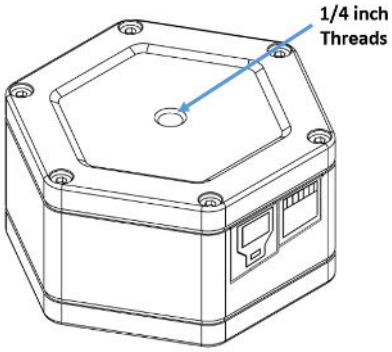
QE Curve

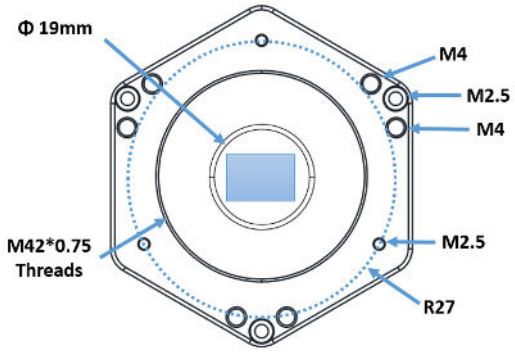
The peak value of QE of Mars-M camera is about 80%, and it has very strong ultraviolet and infrared sensitivity. The actual QE value can be estimated by multiplying the ordinate of the official relative QE graph (below) by 80%.



Mechanical Drawing







Package List



Warranty & Shipping Policy

Payment method

We provide *PayPal* and *PayPal checkout* on our website.

Shipping and Delivery

Shipping Fee:

- Amount >= 299USD: free express shipping
- Amount < 299USD: 29.9USD for express shipping

Shipping Services:

- We usually use DHL, UPS, FedEx, TNT for shipping.
- Make sure your email is correct, we maybe will contact with you through emails in case of emergency.

If customer wants to designate a shipping company or has special requirement, please send an email to *support@player-one-astronomy.com* and tell us your detailed requirement.

Shipping time:

- Usually 7-14 days.
- Tracking number will be updated in 3 days after paid.

For orders from areas where transportation is not easy, such as islands, town in mountainous regions, delivery time will be slightly longer.

Please send an email to *support@player-one-astronomy.com* immediately, if the following occurs:

- Shipping delayed or has some abnormal information.
- The packing is badly damaged on arrival, take pictures and do not sign.

Tax

- The price on our website without tax.
- Please note that buyers are liable to charge tax involved, such as Import tax, VAT, customs handling fee, etc.
- Those fees possibly will be collected at the time of delivery by courier.

For best experiences, we recommend customers to purchase our products form local dealers.

After-sales Service

Warranty Policy

2-year free warranty (time start from delivered) for Player One products. If the product has any issue, please send the image or video and description to support@player-one-astronomy.com for further check to confirm.

- Purchase from Player One official online store, we will provide warranty service directly.
- Purchase form dealer, we will provide warranty service through dealer.

Repair in warranty, customer only pay the shipping fee of shipping back the product to us or dealer, and no other extra fees.

Replacement Policy

You can request our Replacement Service:

√ Within 30 calendar days of receiving the product if the product does not match the original description of the product in one or more significant respects.

√ Within 30 calendar days of receiving the product if the product suffers performance failure.

Please contact our After-Sales team by email to *support@player-one-astronomy.com* within 30 calendar days of receiving the products. Player One shall be responsible for the two-way replacement freight for any products sent in for replacement due to performance faults.

Warranty and Replacement Policy Exceptions:

× Warranty service time or replacement service time expired.

× Legal proof-of-purchase, receipts, or invoices are not provided, or are reasonably believed to have been forged or tampered with.

× A product sent to Player One for replacement does not include all original accessories, attachments and packaging, or contains items damaged by user error.

× A product is found to have no defects after all appropriate tests are conducted by Player One.

× Any fault or damage of the product is caused by unauthorized use or modification of the product, including exposure to moisture, entry of foreign bodies (water, oil, sand, etc.) or improper installation or operation.

× Product labels or serial numbers show signs of tampering or alteration.

× Damage is caused by uncontrollable external factors, including falling down, fires, floods, or lightning strikes, etc.

× Proof of damage during transit issued by the carrier cannot be provided.

× Other circumstances stated in this policy.

In those situations, repair the product might have extra cost, we will estimate cost and email customer to know the information before send product back.