Player One Mars-C USB3.0 Color Planetary Camera Instruction Manual

Contents

Player One

Player One Mars-C USB3.0 Color Planetary Camera

Specifications

- **Sensor Diagonal**: 6.46 mm
- **Total Pixels**: 2.1MP
- **Max Resolution**: 1944*1096
- **Pixel Size:** 2.9um
- **Frame Rate:** (not specified)
- **Bayer Matrix:** (not specified)
- **Shutter Exposure Range:** (not specified)
- **Readout Noise:** (not specified)
- **QE Peak:** (not specified)
- **Full Well:** 12ke
- ADC Data Port Adapter Back Focal Length Protective Window Diameter: (not specified)
- **Weight:** (not specified)

Product Description

The Mars-C is a planetary camera developed by Player One Astronomy, featuring a Sony IMX462 1/2.8 format sensor. With a pixel size of 2.9um and a total of 2.1MP resolution, this camera provides high-quality imaging for astronomical purposes.

Features

- **Cutting-edge Design:** The camera’s design combines a scientific and technological regular hexagon with round chamfers for rigidity and flexibility. The luxurious look is enhanced by the red and black color scheme.
- **High-density Sponge Shading Pad:** Blocks light from side slits to prevent side leakage during imaging.
- **256M DDR3 Cache:** Stabilizes data transmission, reduces read noise, and ensures excellent performance even with USB 2.0 connections.
- **DPS Technology:** Dead Pixel Suppression technology eliminates fixed abnormal pixels for improved image quality.
- **Overvoltage and Overcurrent Protection:**
  Ensures safety for the camera and connected equipment.

Performance

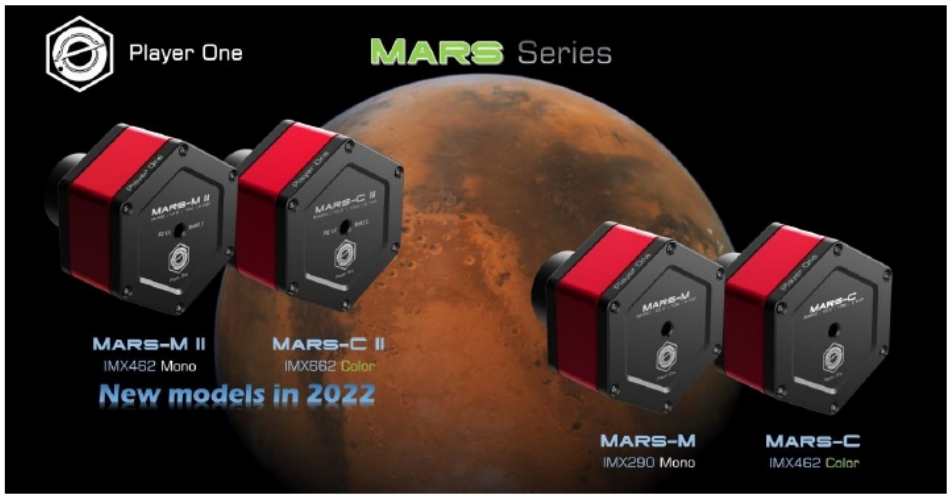
- **HCG Mode:** Automatically reduces readout noise while maintaining high dynamic range.

- **QE Curve:** Unique sensitivity curve with strong infrared sensitivity at 800-850nm.

Product Usage Instructions

- **Connection**
  Connect the Mars-C camera to your computer using the provided data port adapter. Use the ST4 guide cable to connect the camera to the AUTO GUIDE port of the equatorial mount for guiding purposes.
- **Camera Settings**
  Adjust the camera settings based on your imaging requirements. Utilize the HCG mode for reduced readout noise when using a gain setting of 80. Experiment with different exposure settings to achieve optimal results.
- **Imaging Tips**
  To capture high-quality images, ensure proper focus by adjusting the focal plate when taking solar photographs. Take advantage of the DPS technology to suppress dead pixels and improve overall image quality.
- **Data Transfer**
  When transferring data from the camera to your computer, ensure a stable connection to avoid frame dropping. The DDR3 cache helps in stabilizing data transmission even with USB 2.0 ports.
- **Maintenance**
  Regularly clean the protective window of the camera to maintain image clarity. Keep the camera protected from overvoltage and overcurrent situations to prolong its lifespan.

Product Features

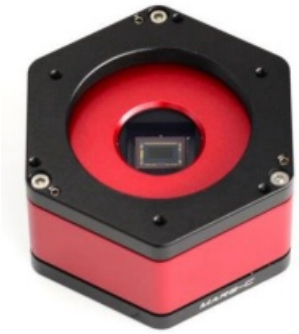


Technical parameters

Sensor	SONY IMX462 1/2.8″ CMOS (color)
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
Bayer Matrix	RGGB
Shutter	Rolling shutter
Exposure Range	32μs-2000s
Readout Noise	2.6e~0.7e
QE Peak	≈9%
Full Well	12k e
ADC	12 bit
Data Port	USB3.0/USB2.0
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 set up in capture software!

Product Description

Mars-C is a planetary camera developed by Player One Astronomy, which adopts the Sony IMX462 1/2.8” format sensor. The 2.9um pixel size accommodates a good depth of 12ke with a total of 2.1MP (the resolution is 1944*1096), 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 will name Saturn with a 1-inch sensor camera, and for Mars, we will name it with a ½.8-inch sensor camera. All names will be engraved on the housing of the cameras.

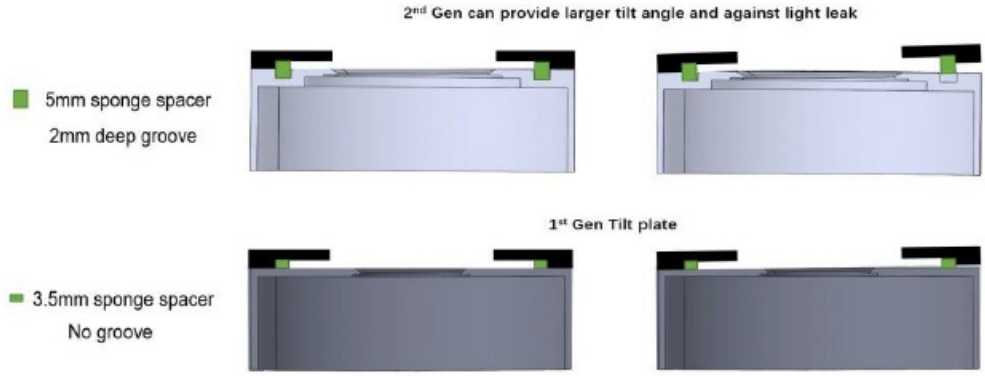
Features

Cutting-edge Design

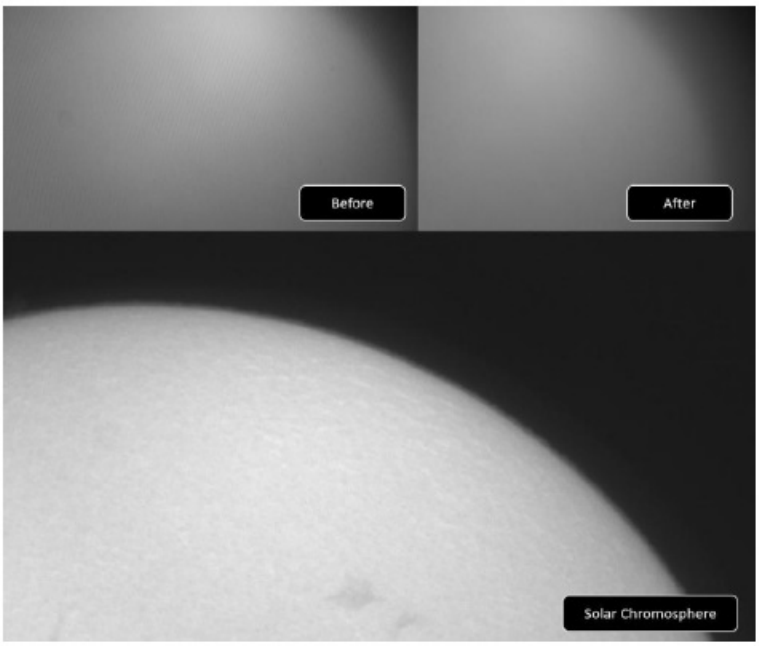
The planetary cameras developed by Player One Astronomy use a scientific and technological regular hexagon to construct the main body line, supplemented by round chamfers to achieve both rigidity and flexibility. The positive red, which is like a summer fire, is matched with the low-key and steady black, 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 it.

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.

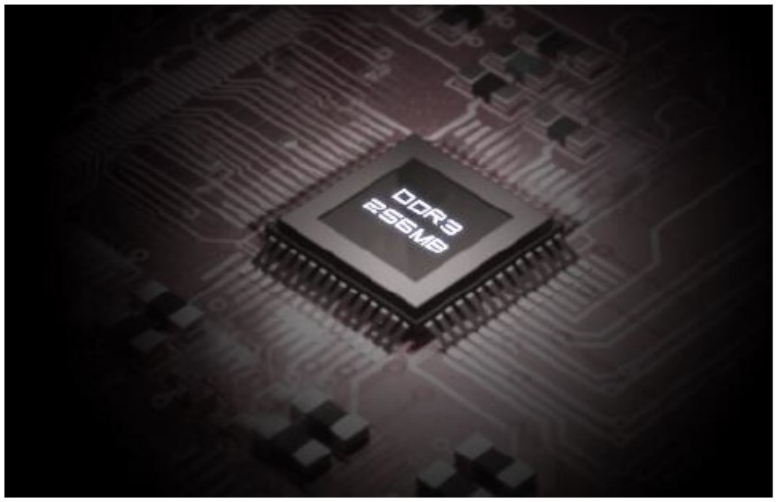


When taking solar photographs with a prominence telescope, the Newton ring is annoying. A smoother solar image without a Newton ring could be taken by adjusting the focal plate. Get a much smaller field curvature of the telescope.



256M DDR3 Cache

Player One Astronomy cameras are the first ones who adopt the DDR3 cache in all planetary cameras in the world! It helps stabilize and secure data transmission, effectively avoids frame dropping, and greatly reduces read noise.



With the DDR3 cache, the Mars-C 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

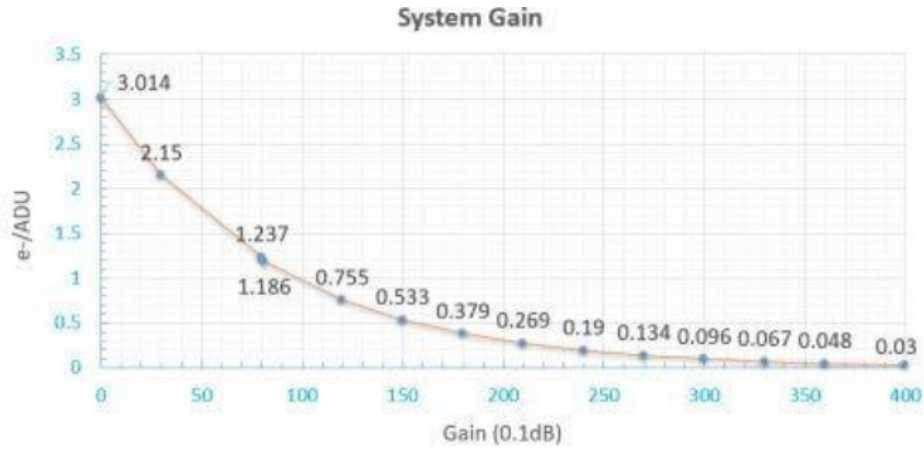
The planetary cameras from Player One Astronomy have DPS (Dead Pixel Suppression) technology. The DPS analyses many dark frames to find out that fixed abnormal pixels and records the map in camera memory. In imaging, for each exposure frame, the positions of dead pixels will be given a median value according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

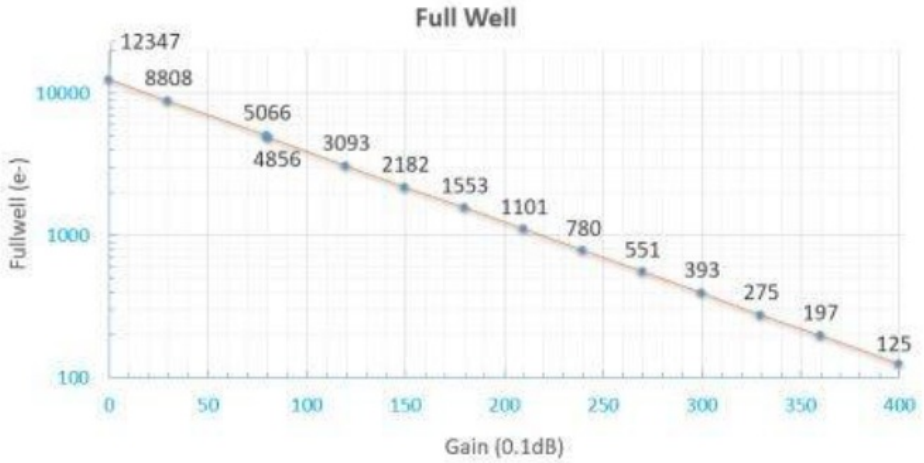
Overvoltage and overcurrent protection mechanism
Player One cameras produced by the number one player ensure the safety of your camera and other equipment through overvoltage and overcurrent protection mechanisms.

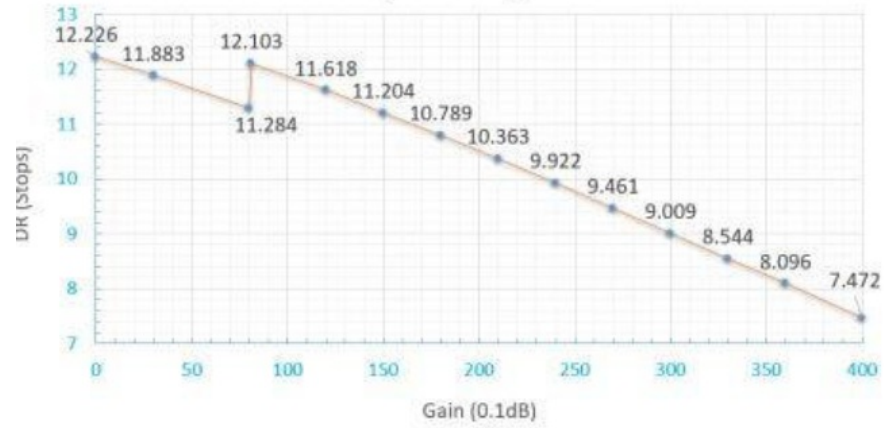
Data Port
When the camera is connected to the USB3.0 interface and a full-resolution preview is used, it can reach 136 FPS in RAW8 mode (10bit ADC), and the frame rate in RAW16 mode (12bit ADC) is 64 frames per second. When recording images, since the actual writing speed will be affected by the writing 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.

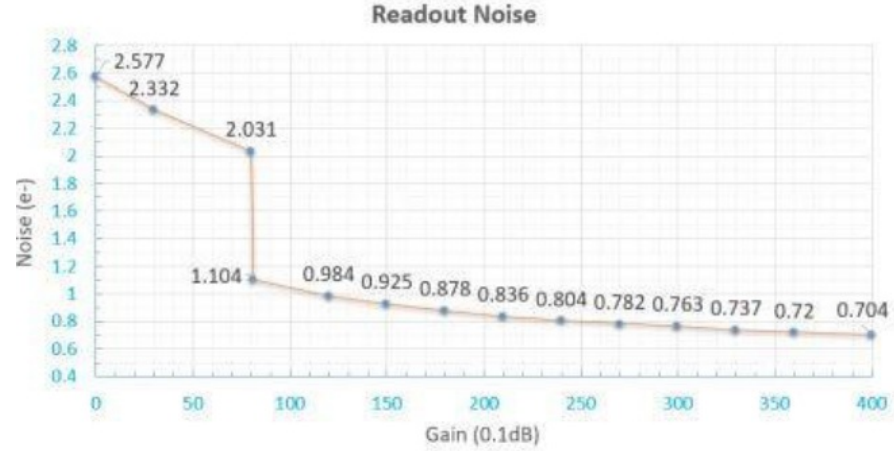
Use the ST4 guide cable to connect the camera and the AUTO GUIDE port of the equatorial mount to do the guiding.

Performance









Readout Noise

- Regarding readout noise, we solemnly promise that all values are obtained from actual tests. And for users, you could use Sharpcap 4 for testing. SC4 has a function called Sensor Analysis, which provides a very simple way to test readout noise.

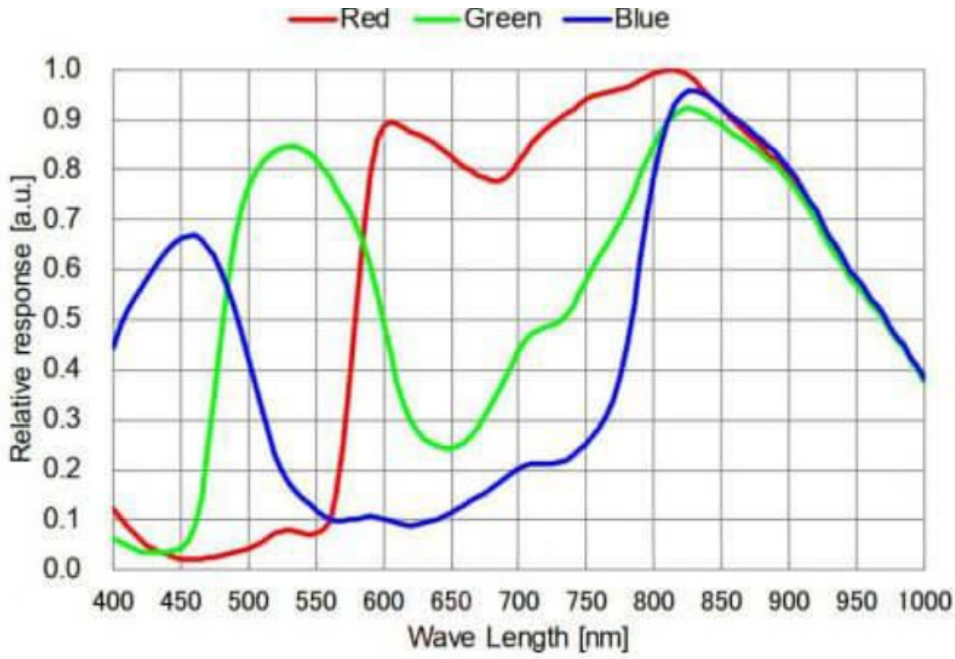
- We wrote a tutorial on our website: **https://player-one-astronomy.com/service/manuals/**
- After many rigorous readout noise tests, the Mars-C camera can reach a low readout noise of 0.73e at a gain of 350 and around 0.7e at a gain of 400.
- If you are interested in readout noise testing, you may try it yourself, which is very simple.

HCG Mode

The Mars-C camera has a unique HCG mode, which will automatically turn on when the camera gain setting is ≥80. The HCG mode can greatly reduce the readout noise and retain the same high dynamic range as the low gain.

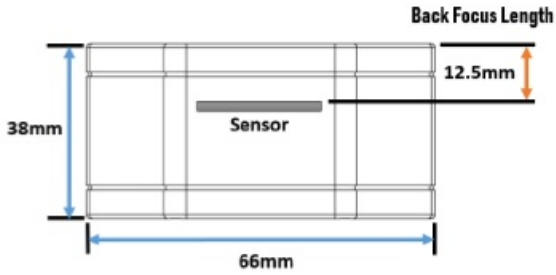
QE Curve

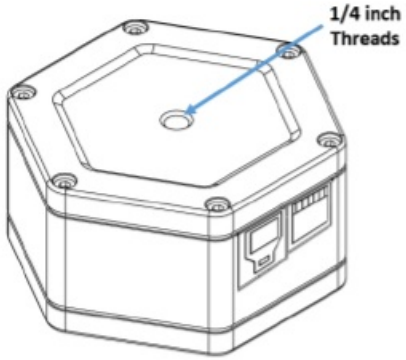
The QE curve of the Mars-C camera is unique. The sensitivity reaches its peak at 800-850nm, and the RGB is gathered together, which has very strong infrared sensitivity.

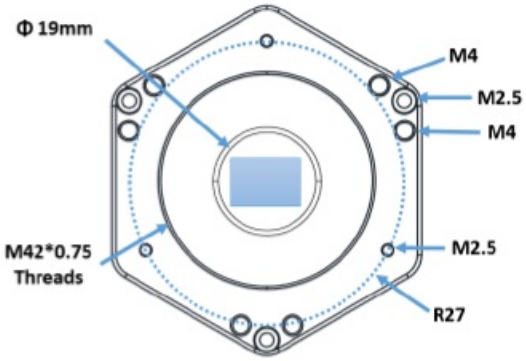


(Excludes lens characteristics and light source characteristics.)

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, and TNT for shipping.
- Make sure your email is correct, we may contact you through emails in case of an emergency.
- If the customer wants to designate a shipping company or has a special requirement, please send an email to **support@player-one-astronomy.com** and tell us your detailed requirements.

Shipping time:

- Usually 7-14 days.
- A tracking number will be updated in 3 days after payment.
- For orders from areas where transportation is not easy, such as islands, or towns 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 is 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 is 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 the best experience, we recommend customers purchase our products from local dealers.

After-sales Service Warranty Policy

- 2-year free warranty (time starting from delivery) for Player One products. If the product has any issues, please send the image or video and description to **support@player-one-astronomy.com** for further check to confirmation.
- Purchase from Player One official online store, we will provide warranty service directly.
- Purchase from the dealer, we will provide warranty service through the dealer.
- Repair in warranty, the customer only pays the shipping fee of shipping back the product to us or the 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 emailing **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, fires, floods, lightning strikes, etc.
- Proof of damage during transit issued by the carrier cannot be provided.
- Other circumstances stated in this policy. In those situations, repairing the product might have an extra cost, we will estimate the cost and email the customer the information before sending the product back.

Frequently Asked Questions

- **Q: What is the purpose of the DDR3 cache in the Mars-C camera?**
  A: The DDR3 cache stabilizes data transmission, reduces read noise, and ensures excellent performance even with USB 2.0 connections.
- **Q: How can I reduce readout noise while maintaining a high dynamic range?**
  A: Utilize the HCG mode in the Mars-C camera, which automatically activates when the gain setting is 80, to achieve reduced readout noise while retaining a high dynamic range.

Documents / Resources

	Player One Mars-C USB3.0 Color Planetary Camera [pdf] Instruction Manual Mars-C, Mars-C USB3.0 Color Planetary Camera, USB3.0 Color Planetary Camera, Color Planetary Camera, Planetary Camera, Camera

References

- Astronomy Magazine: Space News, Observing, Planets, Galaxies
- Software – Player One Astronomy
- User Manual