ZWO ASI678MC

ZWO ASI678MC Color Astronomy Camera

INSTRUCTION MANUAL

1. Product Overview

The ZWO ASI678MC is a high-performance color astronomy camera designed for capturing detailed images of celestial objects, including planets, the Moon, and deep-sky targets. It features an advanced 8.29 megapixel CMOS sensor, optimized for high quantum efficiency and low noise, ensuring excellent image quality even in challenging conditions.

Figure 1.1: Front-side view of the ZWO ASI678MC camera.

Figure 1.2: Top view of the camera, displaying the model number and ZWO logo.

Figure 1.3: Front view of the camera, highlighting the lens assembly.

Key Features:

- **Versatile Imaging:** Suitable for capturing planets, the Moon, and deep-sky objects through a telescope. Can also be used for white light solar imaging with an appropriate solar filter (not included).

- **High-Resolution Sensor:** Incorporates an IMX678 CMOS sensor with 3840x2160 (8.29 megapixel) resolution and 2 micron pixels for fine detail capture.

- **Infrared Sensitivity:** Sensor is highly sensitive in the infrared spectrum, aiding in capturing more planetary detail.

- **Low Noise Performance:** Designed with zero amp glow for clean, low-noise images.

- **Fast Data Transfer:** USB3.0 interface provides high-speed data transfer at up to 47.5 frames per second at maximum resolution.

- **Integrated USB Hub:** Includes a separate USB2.0 hub for powering accessories like autoguiding cameras or electronic focusers (not included).

- **Durable Construction:** Compact, lightweight, and features an attractive red anodized CNC aluminum body built for field use.

- **Flexible Connectivity:** Connects to 1.25" and 2" telescope focusers using the included T-threaded 1.25" nosepiece.

- **Power Supply:** Camera electronics are powered directly from your computer's USB3.0 interface.
- **Software Compatibility:** Compatible with Mac OS X and Windows (32-bit and 64-bit) operating systems. All necessary software and drivers are available from the manufacturer's website.

2. What's in the Box

The ZWO ASI678MC camera package includes the following components:

- ZWO ASI678MC Camera Body
- 1.25" Nosepiece
- 1.25" Cover
- ST4 Cable
- USB 3.0 Cable (2m)
- Quick Guide

Figure 2.1: Included components with the ZWO ASI678MC camera.

3. Setup and Installation

3.1. Driver and Software Installation

Before connecting the camera, it is recommended to download and install the latest drivers and software from the official ZWO website. This ensures optimal performance and compatibility with your operating system (Windows or Mac OS X).

3.2. Connecting to a Telescope

1. Insert the 1.25" nosepiece into the camera's front opening. Ensure it is securely attached.
2. Insert the camera with the attached nosepiece into your telescope's 1.25" focuser. If your telescope uses a 2" focuser, you may need an additional 2" adapter (not included) or connect directly if the camera's T-thread allows.
3. Secure the camera in the focuser using the focuser's thumbscrews.

Figure 3.1: Side view of the camera showing USB3.0 and ST4 ports.

3.3. Connecting to a Computer

1. Connect the supplied USB 3.0 cable from the camera's USB3.0 port (blue port) to an available USB 3.0 port on your computer. The camera draws power directly from this connection.

2. If using accessories such as an autoguiding camera or electronic focuser, connect them to the camera's integrated USB2.0 hub ports.

3. For autoguiding, connect the ST4 cable from the camera's ST4 port to your equatorial mount's autoguiding port.

4. Operating the Camera

The ZWO ASI678MC is primarily used for astrophotography. It requires a compatible software application (e.g., SharpCap, FireCapture, N.I.N.A., etc.) to capture images and videos.

4.1. Planetary and Lunar Imaging

- Connect the camera to your telescope and computer as described in Section 3.
- Launch your preferred capture software.
- Select the ZWO ASI678MC as your camera device within the software.
- Adjust exposure, gain, and other settings to achieve a clear, well-exposed live view of your target.
- Focus your telescope carefully.
- Begin capturing video sequences (often in AVI or SER format) for later stacking and processing. The camera's high frame rate (up to 47.5 fps at full resolution) is beneficial for "lucky imaging" techniques.

Note: This camera is designed for imaging through a telescope and is not intended for taking images through the eyepiece of a telescope. For best results, use with a refractor or reflector telescope mounted on a solid equatorial mount capable of accurate tracking.

4.2. Deep-Sky Imaging (Electronically Assisted Astronomy - EAA)

- While primarily a planetary camera, the ASI678MC can be used for EAA to acquire color images of brighter deep-sky objects.
- Longer exposures will be required compared to planetary imaging.

- Consider using a focal reducer to widen the field of view and increase light gathering for deep-sky targets.
- An autoguider setup is highly recommended for longer exposures to prevent star trailing.

5. Maintenance and Care

- **Cleaning:** Keep the camera body clean using a soft, dry cloth. Avoid using harsh chemicals. For the sensor window, use specialized optical cleaning solutions and cloths only if absolutely necessary and with extreme care.
- **Storage:** When not in use, store the camera in its original packaging or a padded case to protect it from dust, moisture, and physical damage. Store in a cool, dry environment.
- **Handling:** Always handle the camera by its body. Avoid touching the sensor window or the internal components.

6. Troubleshooting

- **Camera Not Detected:**
  - Ensure USB 3.0 cable is securely connected to both the camera and a USB 3.0 port on your computer.
  - Verify that the necessary drivers are installed from the ZWO website.
  - Try a different USB port or cable.

- **No Image/Black Screen:**
  - Check exposure settings in your capture software; they might be too low for the ambient light conditions.
  - Ensure the telescope dust cap is removed.
  - Verify the camera is properly inserted into the focuser and light path.

- **Poor Focus/Blurry Images:**
  - Carefully adjust your telescope's focuser.
  - Ensure proper back focus distance if using additional optical elements.

- **Noise in Images:**
  - Reduce gain settings if possible.
  - Ensure proper cooling if the camera supports it (this model is uncooled, so ambient temperature will affect noise).
  - Post-processing techniques (stacking, dark frames) can reduce noise.

For further assistance, refer to the comprehensive resources and support available on the official ZWO website.

7. Specifications

Feature	Detail
Model	ASI678MC
Sensor	Sony IMX678 CMOS
Resolution	3840 x 2160 (8.29 Megapixels)
Pixel Size	2.0 µm
Sensor Dimensions	7.7mm x 4.3mm
Max FPS (Full Resolution)	47.5 fps

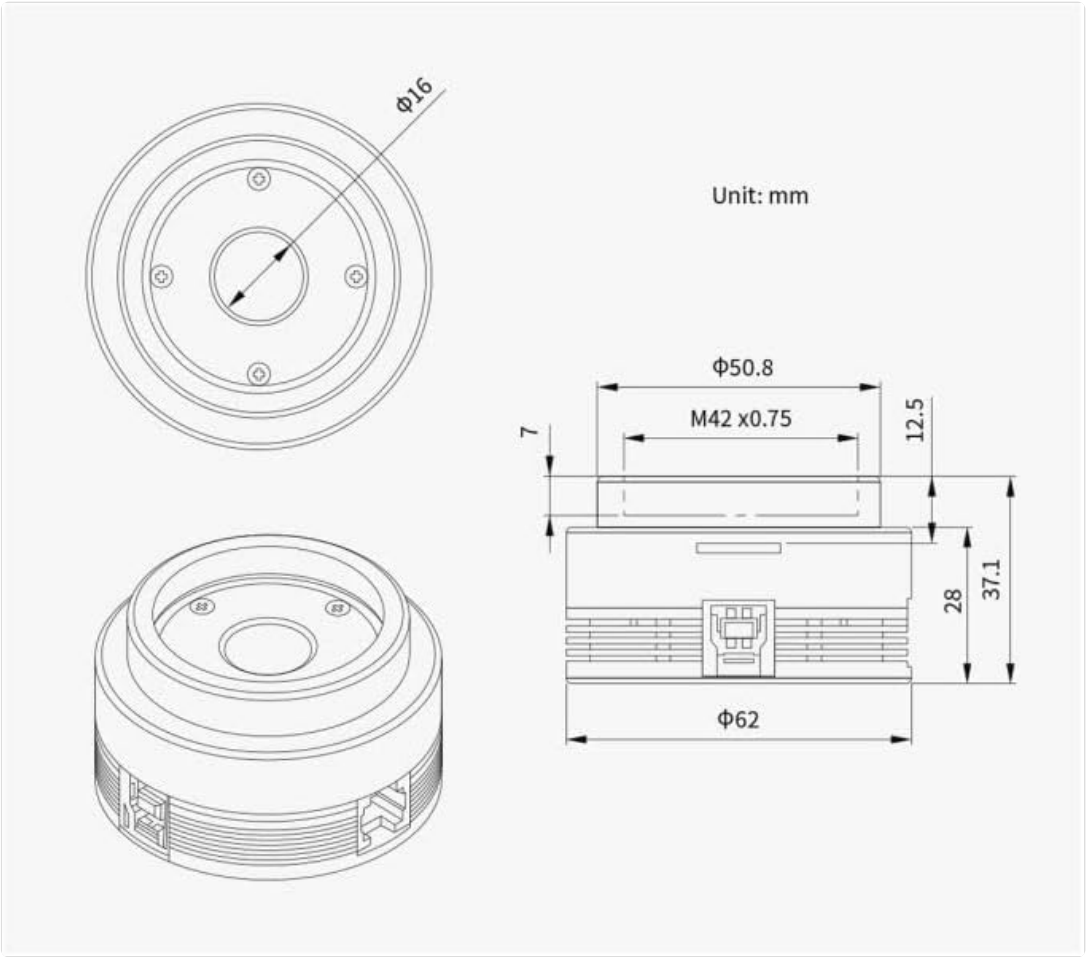|	
Connectivity	USB 3.0, USB 2.0 Hub, ST4 Autoguider Port
Color	Color Camera
Body Material	CNC Aluminum (Red Anodized)
Power Supply	USB 3.0 powered
Operating System Compatibility	Windows (32-bit & 64-bit), Mac OS X

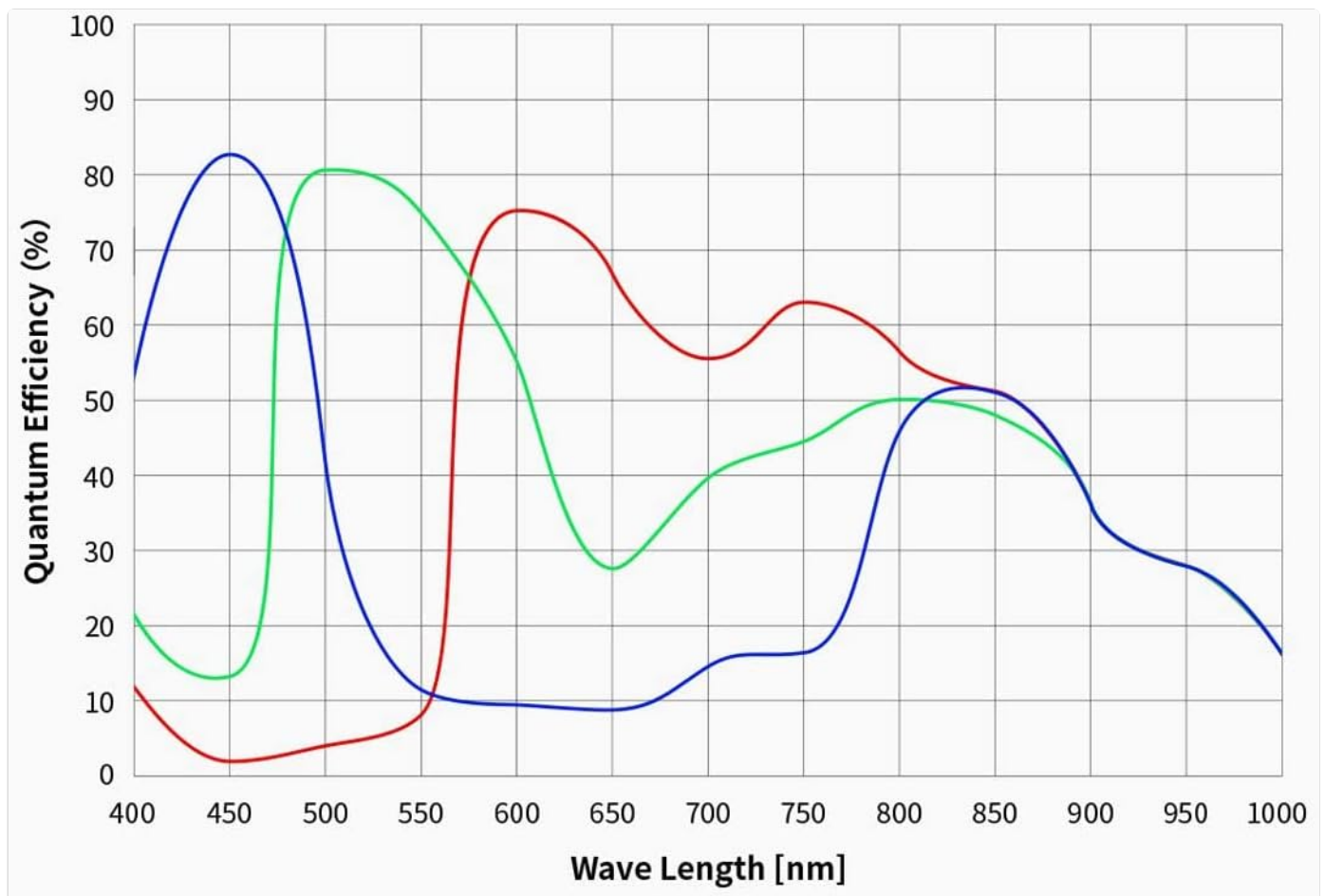Figure 7.1: Technical dimensions of the ZWO ASI678MC camera (Unit: mm).

Figure 7.2: Quantum Efficiency (QE) curve of the ASI678MC sensor, illustrating its sensitivity across various wavelengths.
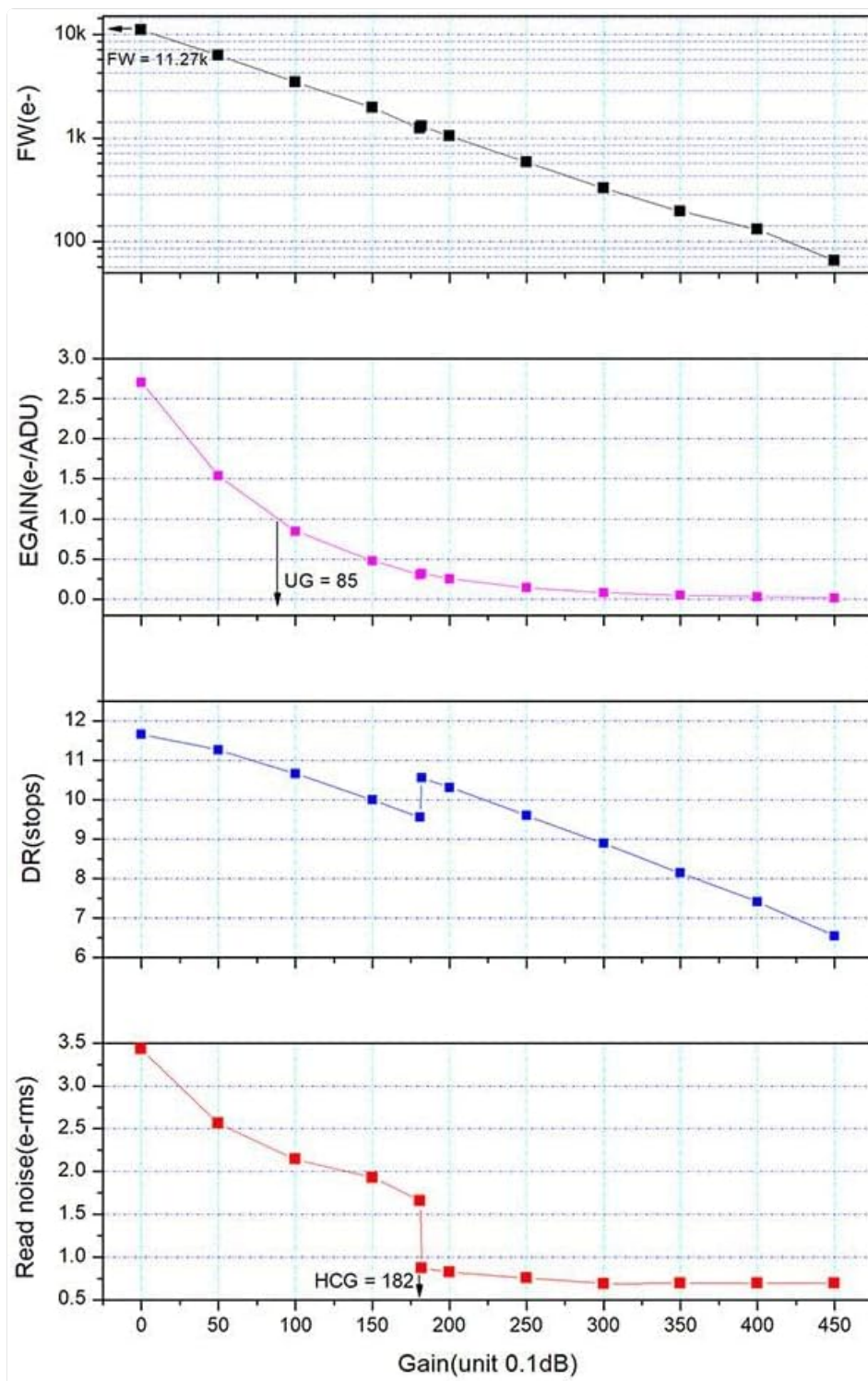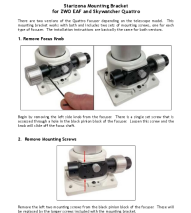
Figure 7.3: Performance characteristics of the ASI678MC, including Full Well Capacity (FW), Electron Gain (EGAIN), Dynamic Range (DR), and Read Noise (e-rms) at different gain settings.

8. Warranty and Support

For detailed warranty information, technical support, and the latest software and driver downloads, please visit the official ZWO website. ZWO provides comprehensive resources to assist users with their products.

Official ZWO Website: www.zwoastro.com

Related Documents - ASI678MC

	[Seestar S50 Quick Start Guide](#) A concise guide for setting up and using the Seestar S50 smart telescope, covering app installation, device connection, solar observation, and important notices.
	[ZWO ASI120MM Mini Monochrome Camera and Autoguider - Sirius Optics](#) Explore the ZWO ASI120MM Mini Monochrome Camera and Autoguider, a compact and high-performance solution for planetary imaging and guiding. Discover its features, specifications, and compatibility.
	[ZWO ASI Guide Cameras Quick Guide](#) A quick guide to installing and using ZWO ASI Guide Cameras, covering connection to computers, software setup, and basic guiding procedures.
	[ASIAIR Plus Quick Start Guide](#) A comprehensive guide to setting up and using the ASIAIR Plus for astrophotography, including app installation, device connection, and activation.
	[Starizona Mounting Bracket for ZWO EAF and Skywatcher Quattro Focuser Installation Guide](#) Detailed installation guide for the Starizona mounting bracket designed for ZWO EAF and Skywatcher Quattro telescope focusers. Learn how to attach the bracket and motor step-by-step.
	[ZWO ASI662MC Camera Manual](#) User manual for the ZWO ASI662MC color planetary camera, detailing its features, specifications, setup, usage, maintenance, warranty, and servicing information.

Documents - ZWO – ASI678MC

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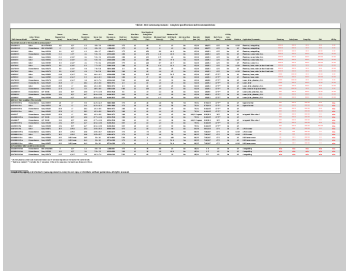

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