DEWMASTER V2

PRODUCT MANUAL

Version *1.0*

01-Dec-2024

VERSION HISTORY

Version #	Implemented By	Revision Date	Reason
1.0	*Evans Souglakos*	*01/12/2024*	*Initial Document*

TABLE OF CONTENTS

Introduction

Thank you for purchasing the Pegasus Astro DewMaster 2.

Purpose

DewMaster 2 is the next evolution of our popular DewMaster offering enhanced functionality for dew heater management. Connect and control up to five dew heaters independently through precise PWM duty cycle adjustments. Featuring USB-C connectivity and both WiFi Hotspot and Client modes, it ensures easy access to its web-based dashboard for remote monitoring and adjustments.

The device's fully digital operation and a large 2.1-inch, high-contrast red OLED display make setup and control intuitive and fast. Instantly view real-time power consumption (in Amperes) and input voltage at a glance.
An included external temperature and humidity sensor provides continuous monitoring of relative humidity, ambient temperature, and dew point—essential for maintaining optimal conditions.

DewMaster2's automated dew heater control activates in response to high humidity, keeping your optics free from moisture so you can focus on your work. Additionally, two auxiliary inputs support extra temperature probes, allowing precise tracking of the temperature of your optical components for comprehensive environmental control.

In the box

The box contains the following items:

- DewMaster 2 Controller
- Environmental Sensor (Temperature and Humidity)
- 2.1 mm to 2.1 mm cable (1 meter length)

Device care

The device electronics are housed inside an aluminium blue and black anodized enclosure. The enclosure is made from aircraft aluminum alloy type 6061 which provides very good corrosion resistance.

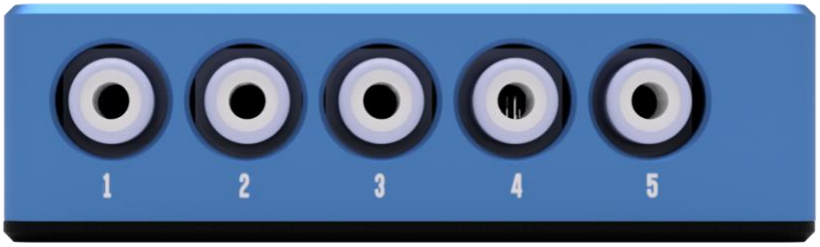
- While the controller is safeguarded against moisture, it is essential to emphasize that it is not waterproof and should always be maintained in a clean and dry environment.
- Prolonged exposure to excessive moisture can pose a significant risk to the electronics and connectors, potentially causing damage. It is imperative to exercise caution in this regard.
- Avoid any contact between solvents or chemicals and the device, as these substances can have adverse effects on its functionality.
- When the controller is not in use for extended periods, it is advisable to store it indoors within a dry room to prevent any potential moisture-related issues.
- Take precautionary measures and refrain from touching the internal components during operation, as they may become hot. Ensuring safety and optimal performance is paramount.

Device Overview

- OLED 2.3-inch display
- Three push-buttons to control device
- 2 x 12V Outputs for your additional equipment.

From left to right

- EXT Port – RJ12- Stock temperature and humidity sensor Input.
- USB-C – PC port – USB2 Connectivity.
- Temperature Probe 1 (T1) - 3.5mm stereo jack.
- Temperature Probe 2 (T2) - 3.5mm stereo jack.
- Red LED operation indicator.
- DC 2.1mm Input Socket.



5 x RCA Dew Outputs (Plug Dew Heater Strips)

Power Requirements

DewMaster2 accepts a voltage range from DC 11.0V – 14.5V.

- We strongly recommend using our certified “Pegasus Astro 12V/10A power supply”.
- A 13.8V lead (or calcium/lead) or a 12.8V LiFePO4 battery is also recommended.
- Please use a power supply that can provide adequate current. The current indicator (in Amperes) on the OLED display shows the consumption of connected dew strips.

Under no circumstances exceed DC 15.0V input as you might cause severe damage to the electronic board.

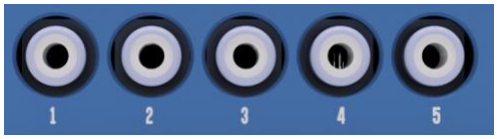
The controller has been designed with reverse polarity protection. If you accidentally reverse the power source polarity, the unit will instantly cut the power. The controller is fitted with a 2.1mm DC power connection (center positive pin) that powers the unit.

OLED Display

A 2.1 inch 128 x 64-pixel Organic LED (red film) screen is used for the device. This display works lag-free, at very low temperatures. (-40 deg Celsius) The red film on top of the display ensures that your night vision is going to be unaffected.

RCA Outputs

The device features five high-capacity MOSFET transistors, each capable of handling up to 6 Amps. This design ensures stable performance with minimal voltage drop across the outputs, providing efficient power delivery exactly where it’s needed. Dew strips connect to RCA sockets labeled 1 through 5, with each channel individually controlled for precise operation.



Environmental Sensor

A high-resolution, calibrated temperature and relative humidity external sensor provides precise environmental readings for your setup. This sensor seamlessly integrates with the dew heater outputs, allowing DewMaster2 to automatically adjust power levels based on current conditions (dewpoint).

Temperature Probes

Optional temperature probes are available for purchase and can be connected to the T1 and T2 sockets of DewMaster 2. These probes can be mounted on the telescope hood to monitor the optic cell's temperature. Using these readings alongside the ambient temperature, the device intelligently adjusts the heater power to prevent dew formation, ensuring optimal seeing conditions remain uninterrupted.

s

Setup and Operation

1. Clip the provided environmental sensor to the EXT port.
2. Plug any temperature probe you purchased into T1 and T2 sockets (optional).
3. Insert the 2.1mm plug into the DC power cable. The controller will initialize and the status LED will turn solid red after a second. The OLED screen will instantly show the splash logo of the DewMaster2 device. After a few seconds, the device boots fully and shows the Dew Power Control screen.
4. If the environmental sensor is connected and detected by DewMaster2, the OLED display will recycle each screen every 10 seconds showing "Dew Power Control" or "Env Conditions".

Push Buttons

The device has a simple three-button interface that allows you to easily configure key settings, adjust the power for the five dew outputs, and quickly modify device parameters.

Press and release  button to cycle between Dew Power outputs. From 1 to 5.

Press  or  buttons to decrease or increase the power percentage of each selected heater. Keep the button pressed for a larger change.

Dew Control Modes

Each of the five outputs can be configured to use one of the four (4) different modes: Manual, AutoDew, Probe T1, Probe T2. To set the mode for each output, refer to the “menus” section.

Manual

Manual mode lets you manually control the output. Adjust the power level for each dew output from 0% to 100% by selecting the corresponding slider and the plus or minus buttons. The percentage value for each output is displayed to the left of its slide for easy reference.

AutoDew

AutoDew mode utilizes data from the environmental sensor, including ambient temperature and relative humidity, to calculate the dew point. It automatically adjusts the power output based on these factors: as the dew point approaches the ambient temperature, the system increases the power to the dew heaters

accordingly. Additionally, the current draw of each dew heater is factored into the calculation, ensuring optimal power delivery to meet the required conditions.

Probe (T1 or T2)

You can assign a temperature probe (T1 or T2) to a dew port and position it to touch the telescope's hood near the optics. Ensure the probe does not come into contact with the dew heater strip, as the strip's temperature is higher than the actual shield or primary cell temperature of the telescope assembly.

The goal is to gently heat the lens to 2–4°C above the ambient temperature. This prevents dew formation on the lens while avoiding excessive heat that could disrupt the telescope's viewing quality.

Each temperature probe can be linked to multiple heaters for efficient control. However, the device supports a maximum of two physical probes at any given time.

Power Monitor

The device features a precise input voltage meter and current meter, allowing you to monitor your battery voltage and accurately measure the power consumption of your dew heaters. You can monitor these readings on the OLED main screen, as well as through ASCOM, Alpaca, or the Web Dashboard.

12V pass-through DC outputs

The DewMaster2 offers two 12V DC outputs, allowing you to power additional equipment while minimizing cable clutter.
Each DC output accepts 2.1mm jacks and can provide up to 6 Amps of current.
These two DC outputs are also measured from the device current meter displayed on the screen.

Screen Pages

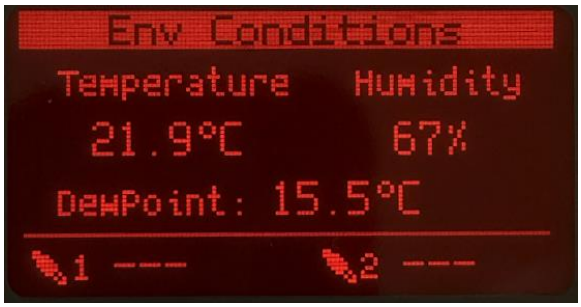
Dew Power Control

The main screen shows the power levels for all five outputs. If the AutoDew function or any sensor probe is configured on any Dew Output it will be displayed inside the slider of each output. On the right of each slider, you can see the percentage of power set to the output.

At the bottom, you'll find the input voltage (V) and the measured current (A). Additionally, the screen displays the Wi-Fi signal strength of your connected network and whether the environmental sensor is detected. (if it is not detected the sensor icon will not be visible)

Environmental Conditions

The screen displays the environment's **ambient temperature**, **relative humidity**, and **dew point**. It also shows the measured temperatures from the **two probes connected to the T1 and T2 sockets**. You can switch between metric and imperial units through the device's settings menu. If any sensor is not detected, a "---" symbol will appear in place of the actual data.



Settings

To move to the settings screen press button for 2 seconds.

Move to each setting by pressing the or button. Change the setting by pressing the button.

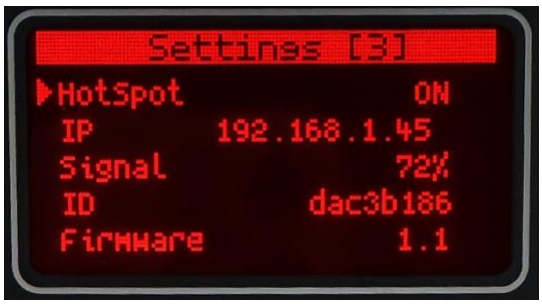
In the settings menu you have the following options:

Set the mode of each Dew Port. You can select Manual, AutoDw, Probe1, or Probe2.

Move to each Dew Port and press the  button to change its mode.
To save your selected configuration “Exit” from the settings menu.

Units: Set Metric or Imperial units
AutoDew Aggressiveness: From 1-10. The higher the number, the more aggressive the power on each port when the calculated dewpoint is close to ambient temperature.
Store Dew Levels: Store current dew levels in memory so the device can retrieve them on boot.
Beeper: ON/OFF. Enable or Disable the beep sound when you press the buttons.
Exit: Exit and apply settings.

HotSpot: Enable or Disable Wi-Fi Hotspot.
IP: IP of the device registered to a local Wi-Fi network.
Signal: Wi-Fi signal percentage.
ID: Unique ID of the device.
Firmware: Firmware number of the device.



Wi-Fi Client

DewMaster v2 seamlessly operates as a client, connecting to a 2.4GHz WiFi network. Notably, it stands out by functioning concurrently **as both Wi-Fi hotspot and Wi-Fi client.**

To link up with a WiFi network, navigate to the Unity platform, access the Wi-Fi tab, and initiate a scan to discover networks in your area. Simply select the desired network, input the Wi-Fi password and your preferences are stored.

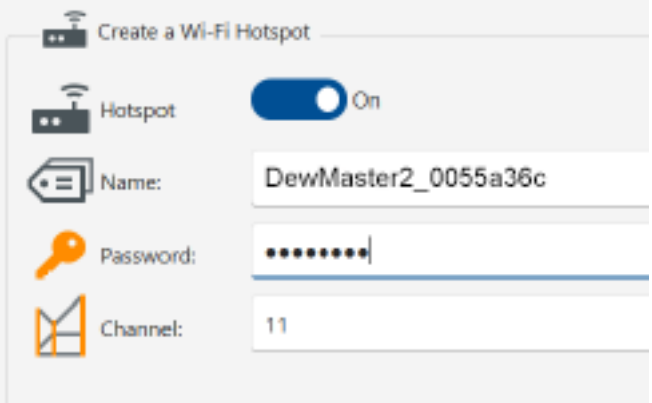
With each reboot, the device effortlessly connects to the configured wireless network. The device retrieves your selection on every boot and automatically connects to the configured wireless network.
-

Wi-Fi HotSpot

DewMaster v2 has a Wi-Fi Access point (hotspot) at 2.4 GHz. The hotspot is enabled by default. The SSID name is compiled from the prefix `Dewmaster2_` and the unique device ID e.g. `0043c88c`.

You can easily control the hotspot settings from the Unity Platform.

- Open Unity Platform, click on the discovered DewMaster v2, and locate the Wi-Fi settings tab.
- There you will see the below screen which allows you to control the WiFi hotspot.
- You can easily change the SSID name, enable, or disable the Wi-Fi hotspot, or switch to another channel number.



- You will have to change the hotspot channel if your area is fully crowded with Wi-Fi networks. **Channels 1, 6, and 11 [default] are the best channels for 2.4 GHz Wi-Fi.** These are the only channels in the 2.4 GHz frequency band that don't overlap with each other. You'll only want to consider using a different channel if each of these channels is overcrowded in your coverage area.

Considerations about Wi-Fi channels to improve network connection

- Wi-Fi is a line-of-sight radio technology, which means that it operates not by surrounding your device with a wireless signal, but by connecting directly to it, through whatever walls, subflooring, or other electronic devices are in its way. Each solid object between the antenna of your wireless access point (router/modem) and your computer will diminish the signal. Repositioning things by inches can make a world of difference.

- Sources of interference are not always obvious. Many times, you may be receiving interference from hidden wireless networks or even some electronics. Interference from electronics is more prevalent with the 2.4 GHz radio spectrum. If you are using a low channel width on a free channel and are still seeing wireless disconnects (even while near your wireless access point), then the issue could be something else occupying that spectrum. Try experimenting with other channels.
- In a crowded wireless landscape, wireless performance will often degrade and improve on its own, as other people use their Wi-Fi networks. Experimenting with channel settings can help here as well, since some of your competition may rarely use their Wi-Fi, while others are continually transferring data from many devices. If you live in an apartment complex, for example, and your neighbor has their router against a shared wall, sharing a wireless channel will not become a noticeable problem until they get home, connect with their smartphones, and start streaming to their television. However, at that point, your Wi-Fi may become completely unusable until you change the wireless channel.

WEB DASHBOARD

Upon connecting to the DewMaster2 hotspot or any Wi-Fi network, you can conveniently access it from any web browser by simply typing "**dewmaster2.local**" in the address bar. The device announces itself as *dewmaster2.local* in your local network.

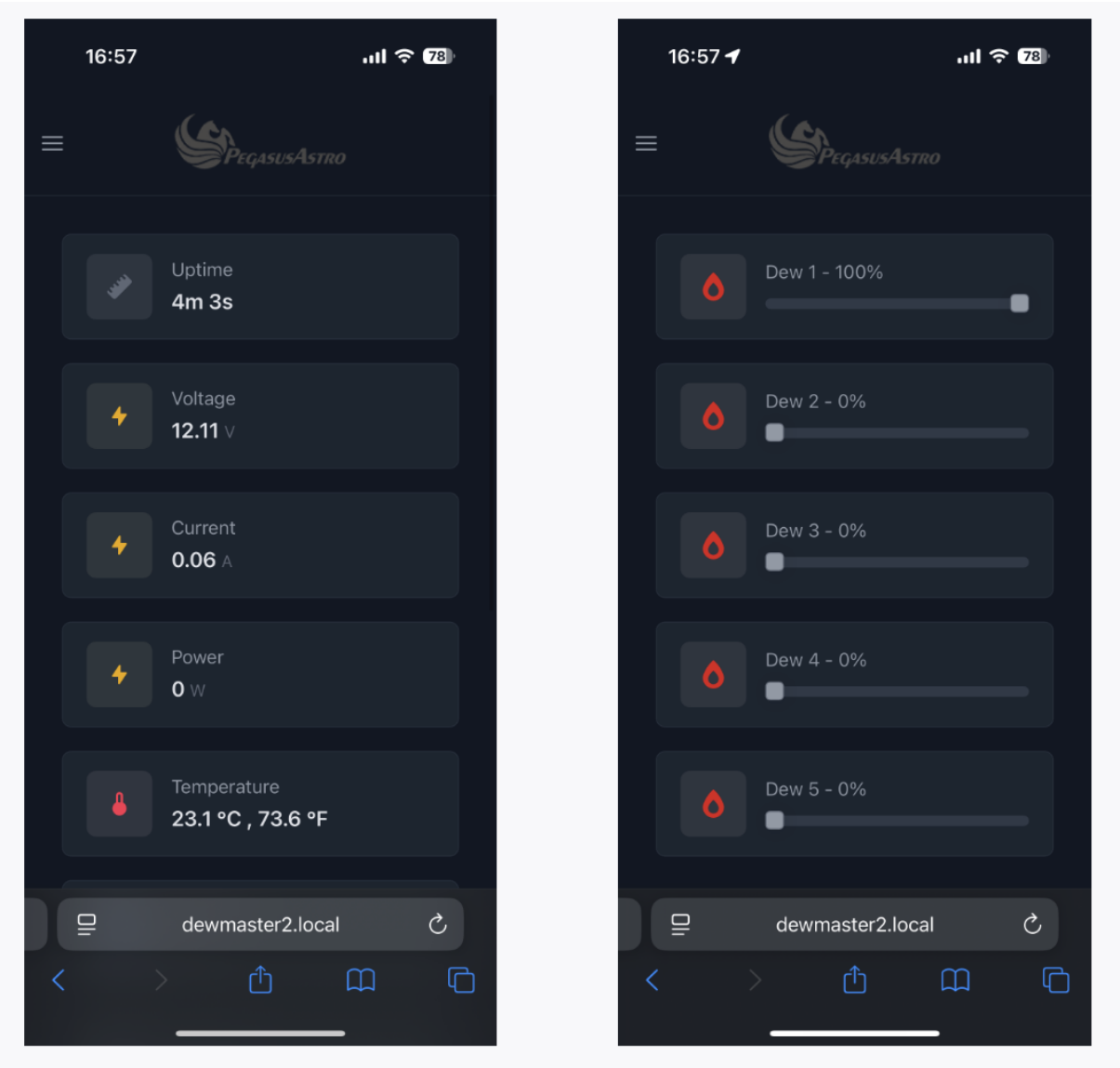
For security reasons, the web dashboard has a simple authentication process and requires a username and a password upon login. The dashboard password is always the Wi-Fi hotspot password.

Default credentials are:

Username	admin
Password (always same as hotspot password)	12345678

This feature is operating system-independent and functions seamlessly alongside USB control.

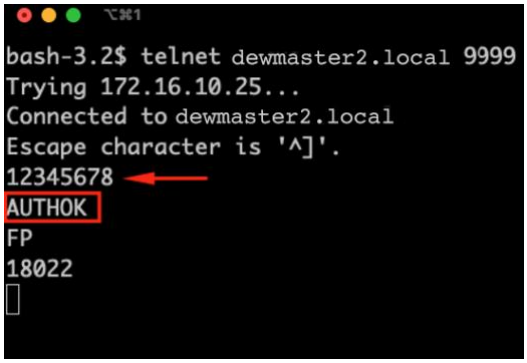
The web dashboard offers full control of the Dew Outputs, set of AutoDew or Temperature Probes, and Wi-Fi configuration along with statistics and information about DewMaster v2.



Command Socket via TCP Port

DewMaster v2 spawns TCP port number 9999 and accepts the same command set as the USB serial port.
The only difference is that you need to provide the access point password before any interaction with the device.

In the below example, we send the default password “12345678” and receive an AUTHOK reply.
After that, we can communicate and control the device. In case the password is wrong the DewMaster2 v3 will close the connection.

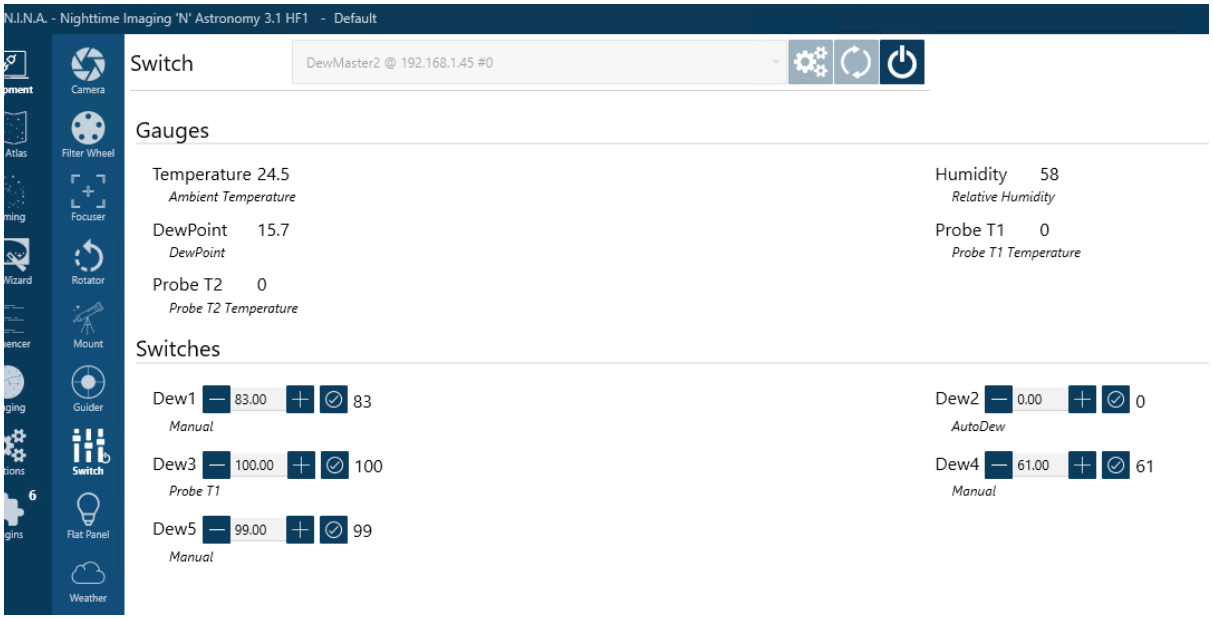


For the complete command set please check the DewMaster v2 product page at the PegasusAstro website.

ASCOM 7 and ASCOM Alpaca

DewMaster v2 works with both ASCOM 6 and 7, supporting observing conditions and ASCOM switches. It also connects to your network and supports ASCOM Alpaca for easy integration.

NINA Switch example discovering DewMaster2 via ASCOM Alpaca.



Mounting

DewMaster2 features a 3 x M3 mounting hole pattern on the bottom, compatible with our PEG-SHOE attachment, enabling secure mounting to a shoe holder for convenient and stable positioning.

Upgradable Firmware

The device offers firmware upgradeability, a valuable feature that not only ensures the flexibility to accommodate future enhancements but also allows for the seamless rectification of any potential bugs or issues.

Technical Specification

Supply Voltage	12V-13.8V DC Operation
Output	Same input voltage in Pulse Width Modulation Duty Cycle
Channels	Five (5)
Power Outlets	5 x RCA Connectors
Power Input Connector	2.1mm Centre Positive Socket (requires optional **PEG-PSU-2.1** or **CIGLIGHT-ADAPTER21**)
Dimensions	109mm x 74mm x 25mm

Weight	250 grams
Meters	Ampmeter and Input voltage meter.
Temperature Probes	2 x 3.5mm sockets (probes not included in package)

Environment

The device's electronic components and materials have undergone a careful selection process to ensure its robust performance across a wide range of environmental conditions. With an operational capability spanning from -30°C to +80°C, coupled with the ability to withstand humidity levels of up to 99%, this device has been engineered to excel even in the most challenging of climates.

Warranty

The device is covered by a comprehensive 2-year warranty. Within the warranty period, we offer free repair services to address any issues that may arise. Following the expiration of the warranty period, we continue to provide repair support and service, which will be subject to a fee. It is important to note that this warranty does not extend to damage resulting from abuse, misuse, accidental falls, or other incidents occurring after the purchase of the product. The customer is responsible for shipping the product to our designated return address for either repair or replacement. For more information please read: https://pegasusastro.com/returns

Support

For any issues, questions or feedback and recommendations please contact us via email: support@pegasusastro.com