Pocket Powerbox Micro

(PPBMicro)

PRODUCT MANUAL

Version 1.2

30-Oct-2024

VERSION HISTORY

Version #	Implemented By	Revision Date	Reason
1.1	Evans Souglakos	03/01/2020	Initial document
1.2	George Karantzalos	30/10/2024	Manual update

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing Pegasus Astro Pocket Powerbox Micro

1.1 PURPOSE

Pocket Powerbox Micro is the successor of the Pocket Powerbox

This small-sized device (in short PPB Micro) is suitable for the "grab and go" astrophotographer. It can provide up to 10 Amps of power and has a sufficient number (4) of 12V Outputs, two dew heater channels, an adjustable voltage power output, and an environmental sensor to monitor humidity/temperature (dew point).

1.2 IN THE BOX

The box contains the following items

- 1 x Pocket Powerbox Micro Controller
- 1 x Temperature / Humidity Sensor
- 4 x Power Cords 2.1mm to 2.1mm (2x1m, 2×0.5m)
- 1 x USB Cable

1.3 DEVICE CARE

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

- While the device is safeguarded against moisture, it must be emphasized 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 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 device is not in use for extended periods, storing it indoors in a dry room is advisable 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 DESCRIPTION

2.1 DESIGN OVERVIEW

PPB Micro front-right view

PPB Micro back-right view

2.2 FEATURE LIST

- 4 x 12V DC Power outlets for your equipment (Quad ON/OFF via software)
- 10 Amps of total power
- A Voltage Adjustable Output (Can be switched ON/OFF – 3V, 5V, 8V, 9V, 12V)
- 2 Channels PWM Dew Heaters – RCA Outputs (Adjust levels via software)
- Humidity and Temperature Sensor (included)
- Auto-Tune Dew Heaters (Auto-Dew)
- Reverse Polarity Protection / Overvoltage Protection
- USB / PC Controlled or Standalone Operation out of the box
- Lightweight and extremely compact CNC aluminum enclosure

SETUP AND OPERATION

3.1INITIAL CONNECTION

- Plug the external environmental sensor into the EXT port (RJ12 port)
- Plug the USB2 cable to the controller's USB port and to your computer
- Plug the power supply (battery or power pack) into the "12V DC IN" socket. We strongly advise using our certified power supply that provides DC 12V / 10 Amps. **SKU: PEG-PSU-21**

3.2 DEVICE BOOT-UP

- The device will boot after three seconds and the LED will turn solid red. This means the firmware was loaded successfully, and the controller is now fully operational.

3.3 DEVICE DEFAULT CONFIGURATION

- Default factory settings are set to **standalone** mode which means:
  a. DC passes through voltage to all four outputs (All outputs are ON and deliver power)
  b. Dew Heater outputs are configured to Auto-dew
  c. Adjustable Output is enabled and configured to 3 Volts

3.4 SOFTWARE INSTALLATION

- To establish seamless communication with the device, please visit our official website at https://pegasusastro.com. Download the Unity software package, which includes all requisite ASCOM drivers, to facilitate connectivity with the PPB Micro.
  Click here to download Unity Platform: https://pegasusastro.com/download/

IN-DEPTH DEVICE OVERVIEW

4.1 POWER INPUT

PPB Micro accepts a voltage range from DC 11.0V – 14.5V *

- ❖ *Above 14.5V the Pocket Powerbox Micro will shut down all outputs to save your precious equipment from over-voltage.*

• 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 at least 6 Amps of current. For your observatory needs you might need up to 8 Amps of current.

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

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) which powers the unit.

Insert the 2.1mm plug on the DC power cable. The controller will initialize and the status LED will turn solid red after 3 seconds. (The 3-second wait time duration is on purpose for a new firmware upload process).

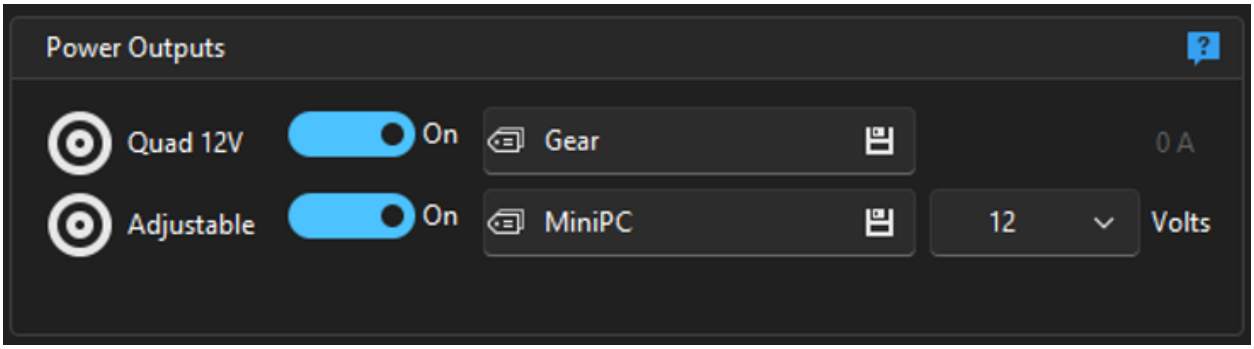
4.2 DATA CONNECTIVITY

A USB2 Type B port at the side of the unit accepts the USB cable for PC connection. A 1.8m USB2 type B cable is provided in the package.

4.3 12V POWER OUTPUTS

Pocket Powerbox Micro device has:

Four (4) 12V DC unregulated outputs. All outputs are driven by a single Smart MOSFET, capable of delivering up to 10 Amps of current (in total). This MOSFET incorporates a broad range of smart features like diagnose and protection. The 12V Channel can be switched ON/OFF via software.



Each 12V power output has the following specification:

Voltage type Output Port	**Output Port**
12V-13.8V DC unregulated	2.1mm DC Power Jack / Center Positive

4.4 DEW HEATER OUTPUTS

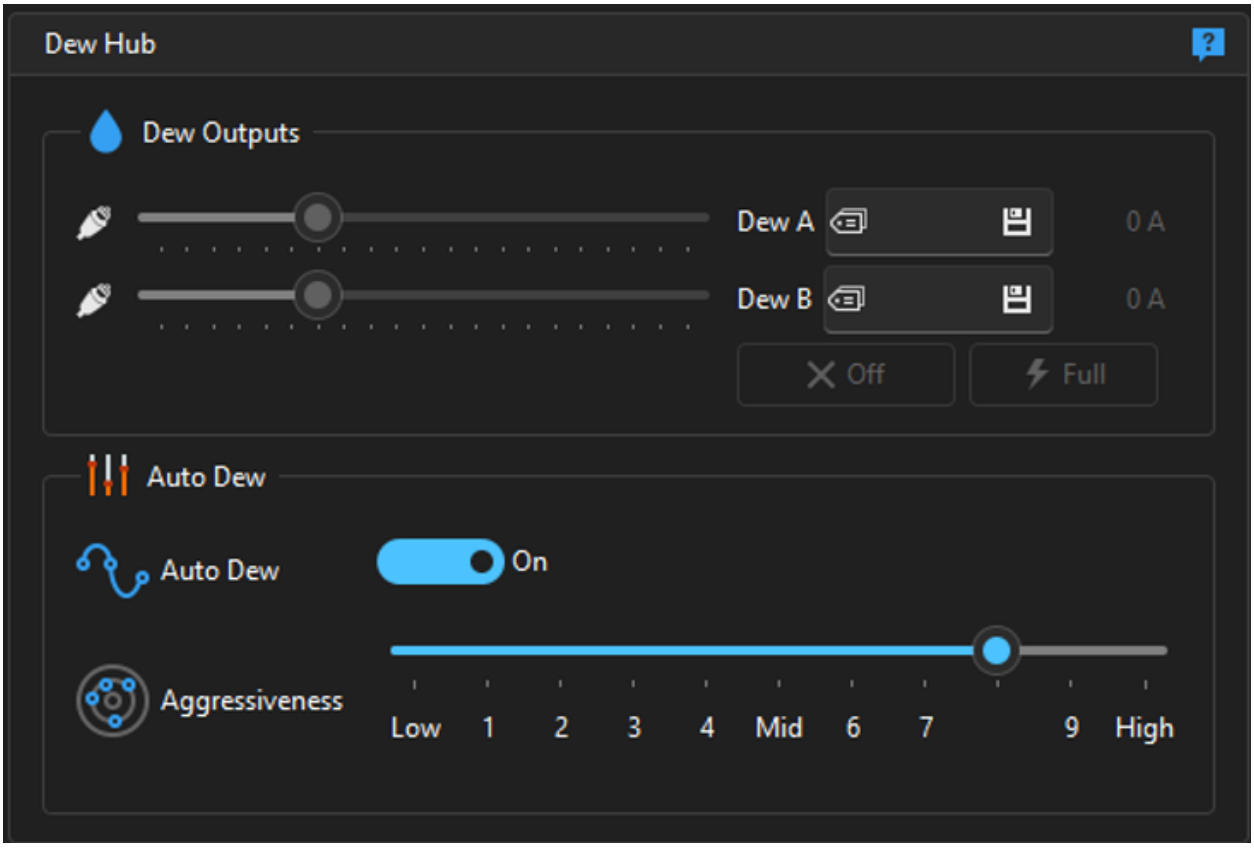
Device has two (2) channel dew heater outputs. Like power outputs, each dew heater output includes a Smart MOSFET type, capable of delivering up to 5 Amps of power per channel.

Auto-Dew: Controller can auto adjust the heater power levels by consulting the Dew Point readings of the environmental sensor.

- Auto-Dew must be set to ON (default ON by factory setting) in Unity platform.
- Auto Dew aggressiveness can be set from low (0) to high (10). (default 8)

As the dew point comes close to environmental temperature, both dew heater channels power is increased. The algorithm consults the dew point and the current draw of the heaters and tunes the power levels every 10 seconds.

- Dew heater outputs are also suitable to light a flat panel or spin your telescope's fans.



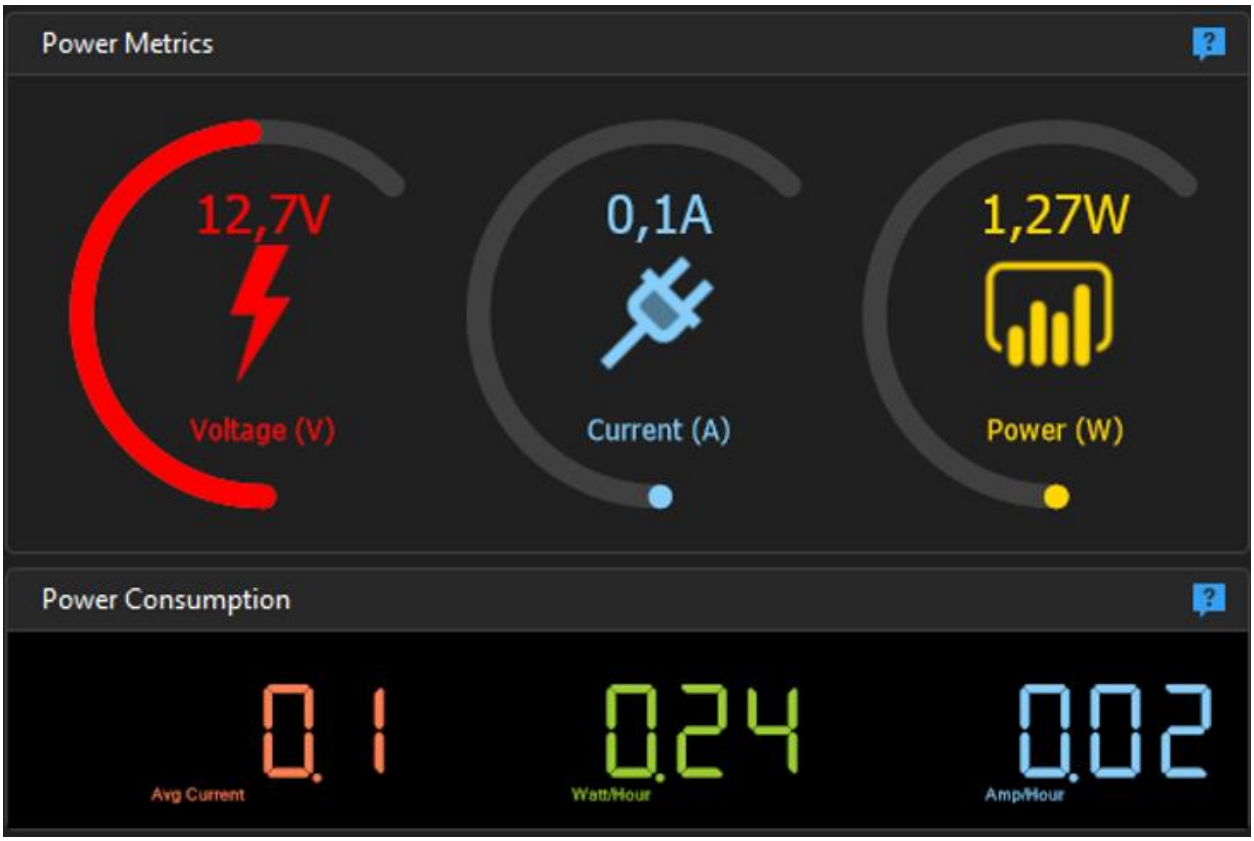
Each dew heater output has the following specifications:

Voltage type	**Output Port**
12-13.8V DC, PWM - Duty Cycle %	RCA Female Jack / 5 Amps Each

4.5 BUILT-IN POWER SENSORS

- A DC voltmeter exists after the controller's DC input. (Measures 5 – 15 Volts).
- A current meter exists after the controller's DC input. (Measures 0 – 20 Amps).
- The main output channel (4 x 12V) incorporates a current/amp meter. A Smart MOSFET diagnoses the power consumption of these 4 ports and provides protection against overload, overtemperature, and short circuit.
- Each Dew Channel incorporates a current meter and protects against overload, over temperature and short circuit.
- The variable output does not have a dedicated current meter. However, its current consumption is measured with the global / input current meter.

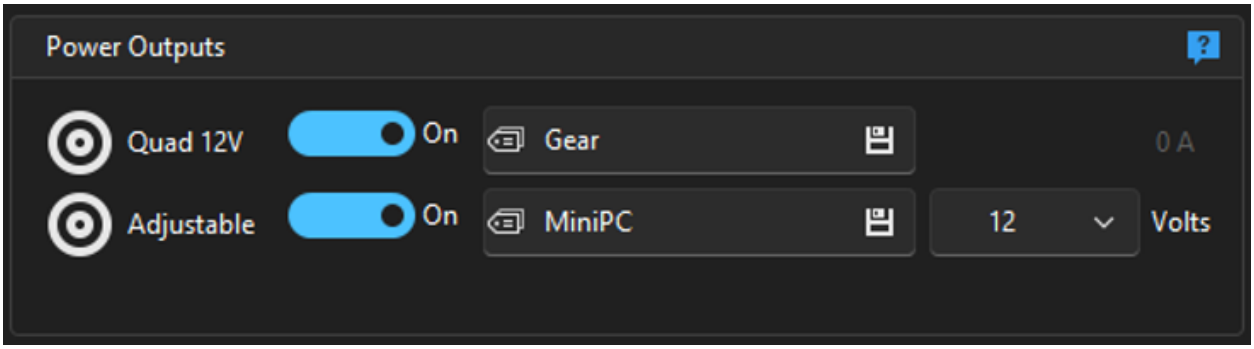
You can monitor in real time the Voltage (V), Current (A), Power(W) and the device power consumption in Unity platform dashboard.



4.6 ADJUSTABLE OUTPUT

A 2.1mm output provides 3-12V and 3A of current (max).

- This regulated output is configured to 3 volts by default.
- The adjustable output can be switched ON and OFF via the **Unity Platform**
- You can adjust the voltage of this output via **Unity Platform** to 3, 5, 8, 9, 12 Volt levels.
- The setting is stored in the controller's memory and is automatically retrieved during boot.



You can use a wide range of our Battery Couplers (Nikon / Canon / Fuji / Sony) to provide constant power to your DSLR / Mirrorless camera. If you use this output for battery couplers you must set it to 8 Volts. https://pegasusastro.com/products/battery-couplers/

The adjustable output has the following specifications

Voltage type	**Port**
3-12V DC regulated	2.1mm DC Power Jack (Center Positive)

IMPORTANT NOTE: Adjustable Output cannot accept the DC Input cable. Device will power on but this action might cause a severe damage to device if accidentally operated under this configuration and the current draw is more than 3Amps.

Please make sure that you will not accidentally plug DC input to the ADJ Output

4.7 ENVIRONMENTAL SENSOR

The stock probe is an external temperature/humidity sensor that is attached to the controller. It comes with a 50cm cable.

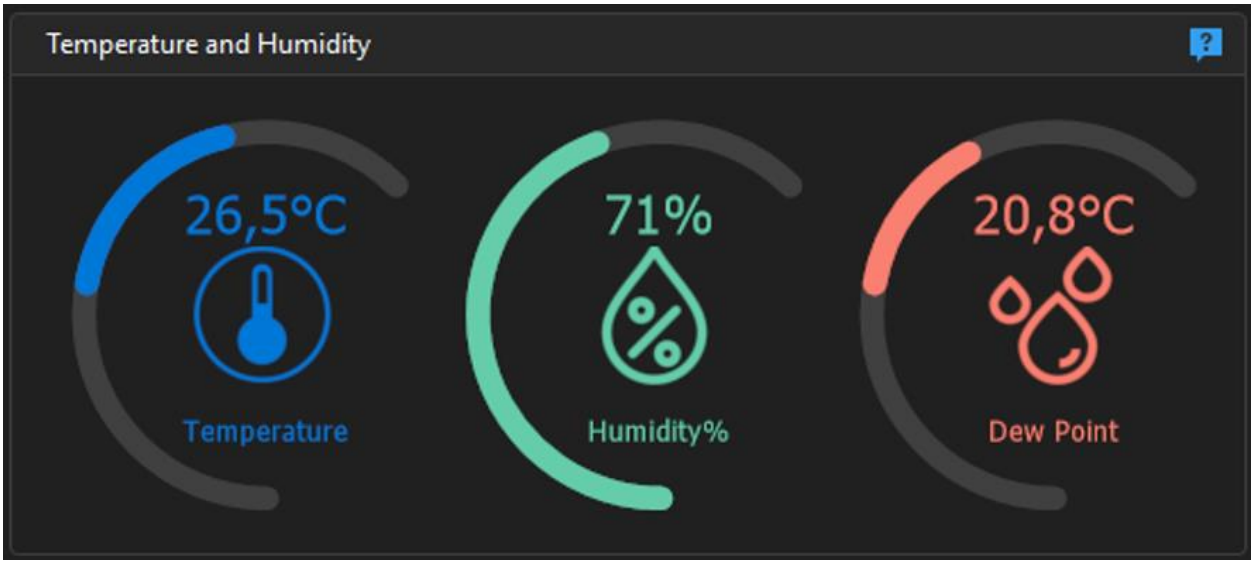
Probe measures:

- 0 to 100% humidity readings with 2-5% accuracy
- -40 to 80°C temperature readings ±0.5°C accuracy

The unit automatically detects the presence of the probe and polls for temperature readings every 15 seconds.

An RJ12 socket connects the temperature/humidity sensor with the “Pocket Powerbox Micro“ controller.

You can monitor in real-time the temperature, humidity and dew point in the Unity platform dashboard.



4.8 RESET WATCHDOG

A watchdog resets the device if for any reason there is no response from the controller after two (2) seconds. A neat feature in the unlikely event of a microcontroller freeze – when have a remote observatory and you need to be sure that everything works as expected.

4.9 EXT PORT

EXT (expansion) port is available for device expansion. This RJ12 socket allows the connectivity of current and future Pegasus Astro products. Plugged devices can be controlled from Pocket Powerbox Unity Platform or a dedicated ASCOM driver.

The device supports the eXternal Motor Controller

4.10 STATUS LED

A red colored LED is fitted on the right front side of the unit. The light pattern displayed by the LED indicated the status of the device. The LED can be turned on / off from the software at your demand.

Permanently Light	Device is up and running
Flashing Light (4 times every 4 sec)	Device entered to firmware upload
Flashing Light (once per 0.5 seconds)	A power issue (overvoltage) exists and controller had already shut down the ports. Check diagnostic message in software
Permanently Off	Controller not operational, firmware not loaded or LED switched off from software

4.11 UPGRADABLE FIRMWARE

The device is firmware upgradable to support future features and bug fixes.

When a new firmware update is available, the user is notified upon connecting PPB Micro to a PC running the Unity platform.

STANDALONE OPERATION

Pocket Powerbox Micro can work "out of the box" as a standalone device. Just plug the cables, setup the "Autodew" functionality and every time you boot the device, it will retrieve your settings. So, if you don't like to connect to a PC every time, you don't have to. Simple as that!

Default factory standalone settings are:

- DC pass-through voltage to all four outputs (All outputs are ON and deliver power)
- Dew Heater outputs are configured to Auto-dew
- Adjustable Output is enabled and configured to 8 Volts

SOFTWARE

ASCOM

PPB Micro is supported by ASCOM 6 and 7

https://ascom-standards.org/

INDI

PPB Micro is fully supported by INDI and INDIGO

Indigo: http://www.indigo-astronomy.org

Indilib: https://indilib.org/filter/pegasus-indigo.html

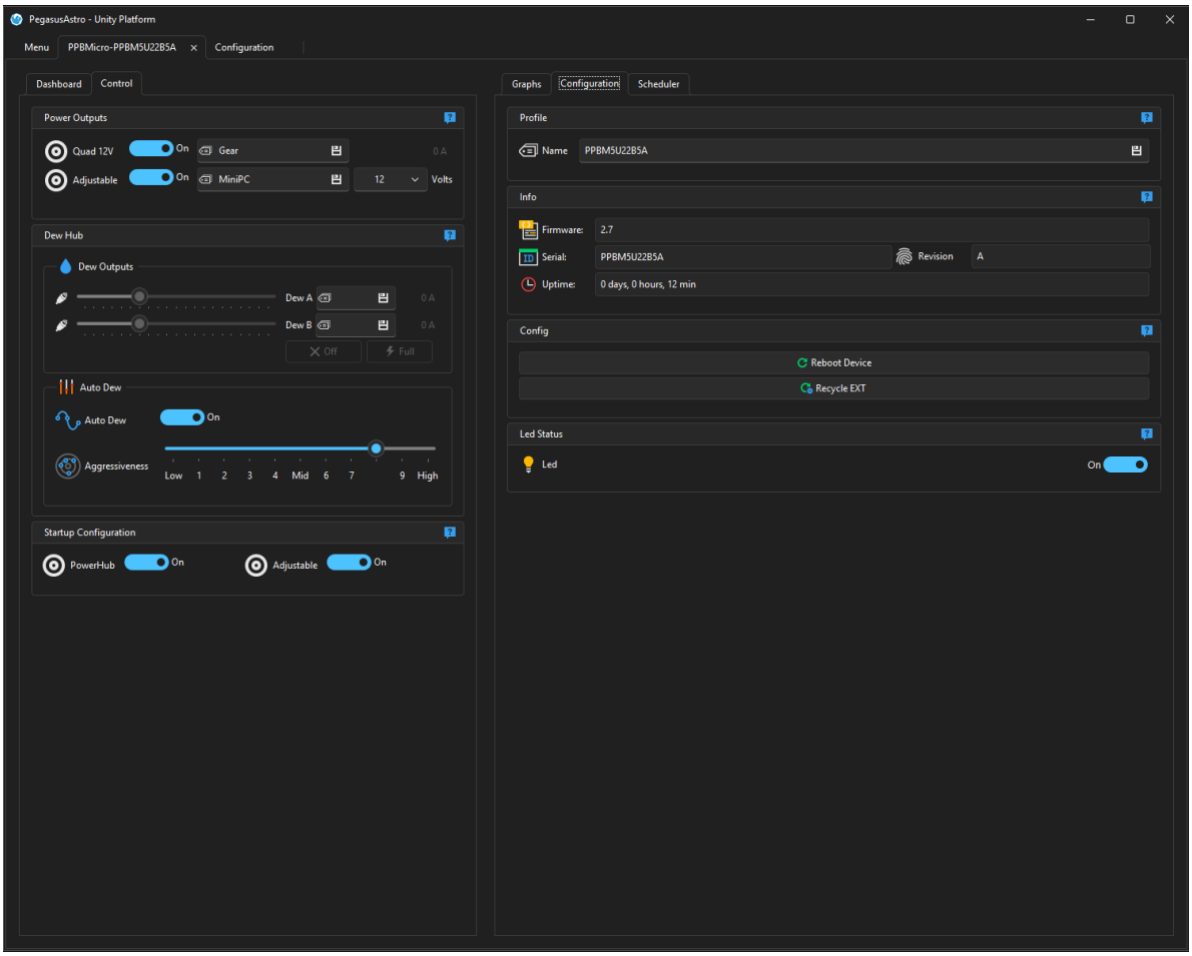
UNITY PLATFORM

Pegasus Astro Unity Platform is our new all-around application. Our goal is to provide a robust and modern application that will support current and future products under one roof.

Download and install Unity platform
https://pegasusastro.com/release/unity/setup/PegasusAstroUnityPlatform.exe

Please note that **all required ASCOM drivers are included in Unity Platform installation.**

Control tab



Power Outputs

Control the Quad 12V outputs and the Adjustable output.

Dew Hub

Set the Auto-Dew function and the dew heater aggressiveness control.

Startup Configuration

Set the Startup state of Quad 12V outputs and Adjustable output

Configuration tab

Profile

Setup device custom name

Info

- Firmware version
- Device serial number and revision
- Uptime: time during the PPB Micro is in operation

Config

- Reboot device
- Recycle EXT port

LED status

Turn on and off the device status LED

Dashboard

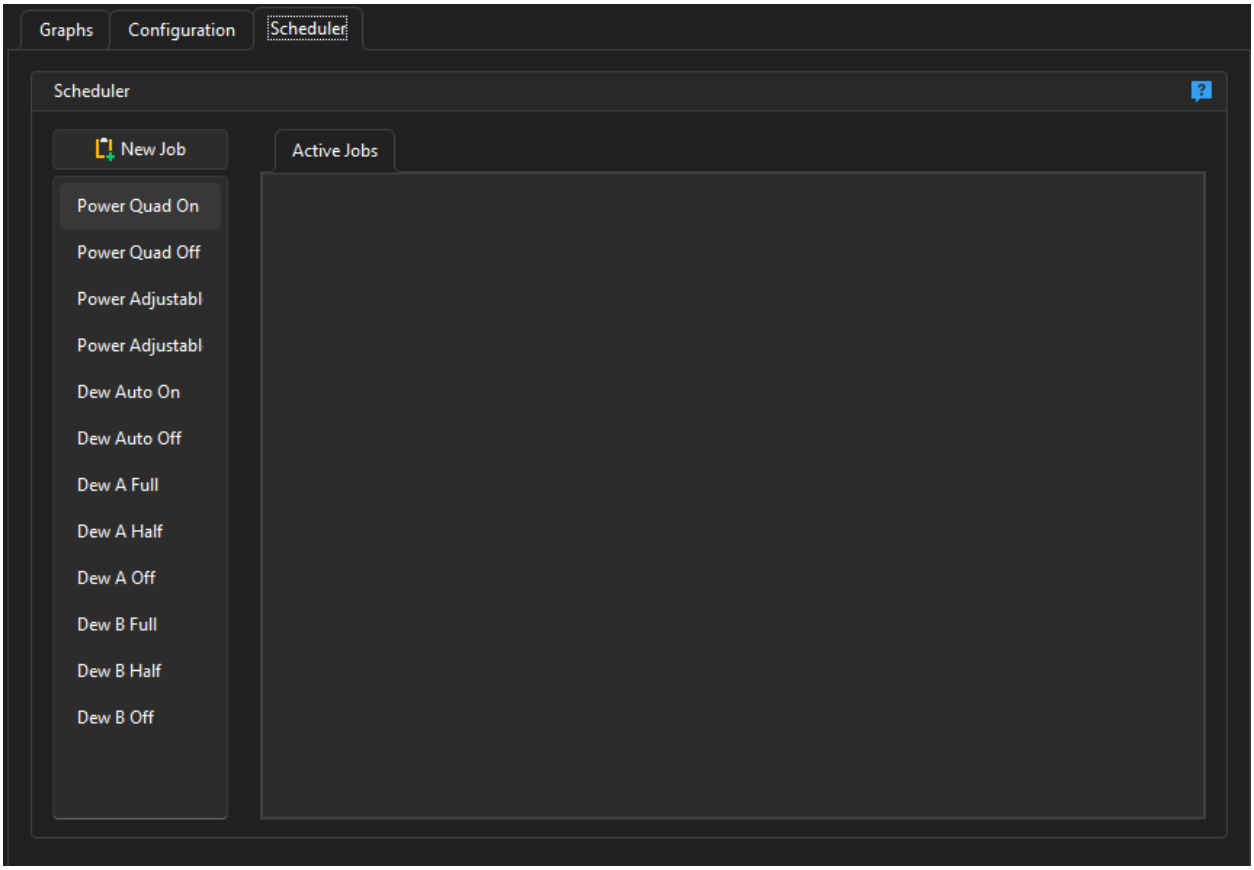
Monitor real-time Environmental conditions and Power metrics.

Graphs

Exportable Environmental conditions and Power metrics graphs

Scheduler

A built-in scheduler lets you add tasks at specific dates and times. Click “New Job” button to choose a date and time and then drag power controls from left to right.



N.I.N.A

Follow the generic N.I.N.A. device connect guide to connect your Pegasus Astro device.

PPB Micro can be connected as a Switch and as a Weather device.

https://pegasusastro.com/troubleshooting/unityplatform-troubleshooting-guide/#a5ff6a48d96516df8

MOUNTING

Pocket Powerbox Micro has a pair of M3-threaded holes on the bottom cover spaced 27.5mm apart.

Check out Pegasus Astro mounting accessories https://pegasusastro.com/products/mounting-accessories/

PPB Micro is compatible with Pegasus Astro A-Plate (SKU: PEG-APLATE), Universal Clamp (SKU: PEG-USCLAMP) and Pegasus Shoe (SKU: PEG-SHOE)


Pegasus Astro, Pocket Power Box Micro
Made in Greece

TECHNICAL SPECIFICATION

Supply Voltage (recommended)	12V – 13.8V DC
Power Input connector	DC 2.1mm (up to 10Amps) (Center Positive)
Connectivity	USB2 – Type B USB Connector
4 x 12 Outputs	Maximum Current 10 Amps in total. DC 2.1mm (Center Positive) Software: ON/OFF all quad ports (1 channel)
2 Channel x 12 PWM Outputs	Maximum Current 5A Each, Black Colored RCA Connector, Pulse Width Modulated (Suitable for Dew Heaters or Flat panel) Software: Duty Cycle % / OFF
1x Sensor Input	RJ12 Socket, Connectivity with Environmental Sensor 0-100% humidity readings with 2-5% accuracy -40 to 80°C temperature readings ±0.5°C accuracy
Camera / DSLR Output	Max 3Amps, 3,5,7,8,9,12 Volt (Adjustable from software), 2.1mm Center Positive
Voltmeter	Measures 5 – 15V
Dimensions	66mm x 66mm x 24mm
Weight	115 grams

RECOMMENDATIONS

- It is advised to select and use good quality and short-length USB cables.
- Do the same for power cables. Long and thin power cables will have an effect of voltage drops. This can cause issues to your camera (CCD or CMOS) image quality or mount tracking.
- Make sure you use a good-quality DC input socket with a thick power cable (1.5mm for each pole). Verify there are no gaps that can cause power disconnects.
- Do not loop USB or power cables. This might cause issues in communication.
- Pay extra attention if you are using a “step-up voltage converter” in the DC input. You need at least 6 Amps to power all your devices. (We don’t recommend step-up converters – buy a good battery or check our certified 12V/10A power supply.

Check out our cable management recommendations guide for more detailed information

Cable Management recommendations

ENVIRONMENTAL SPECIFICATIONS

The device's electronic components and materials have undergone a selection process to ensure its robust performance across a wide range of environmental conditions. With an operational capability spanning from -40°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.

</> DEVELOPMENT

Pocket Powerbox Micro Serial Command Language

Firmware >=v.2.5 (review Jan 2021)

Pocket Powerbox Micro Serial Command Table

RETURNS AND SERVICE POLICY

The device is covered by two (2) years warranty.
For detailed information on returns and service policy follow the link below

https://pegasusastro.com/returns/

Designed and assembled in Greece
For any questions, feedback and support please contact: support@pegasusastro.com