

POCKET POWERBOX ADVANCE Gen2



PRODUCT MANUAL

Version 1.5

30-Oct-2024

VERSION HISTORY

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

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INTRODUCTION

Thank you for purchasing Pegasus Astro Pocket Powerbox Advance Gen2

1.1 PURPOSE

The Pocket Powerbox Advance, or PPBADV for short, represents a noteworthy addition to our esteemed Powerbox product series. Positioned strategically between the Pocket Powerbox Micro and the Ultimate Powerbox v2/3, it is engineered to offer enhanced capabilities, including a USB3 Hub that can accommodate up to four USB ports.

1.2 IN THE BOX

The box contains the following items

- 1 x Pocket Powerbox Advance Gen2
- 1 x Temperature / Humidity Sensor
- 4 x Power Cords 2.1mm to 2.1mm (2x1m, 2x0.5m)
- 1 x USB3 Cable Type B (1.8m)

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 which provides very good corrosion resistance.

- While the device 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 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, 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 DESCRIPTION

2.1 DESIGN OVERVIEW



Power output view



USB HUB and Adjustable output view



EXT port view

2.2 FEATURE LIST

- 4 x 12V DC Power outlets for your equipment (A single channel to switch all four outputs ON/OFF via software)
- 12 Amps of total distributed current
- Adjustable Output (3, 5, 7, 8, 9, 12Volt) / 3Amps (Can be switched ON/OFF) Power your DSLR / Mirrorless camera
- Embedded Powered USB3 Hub – 2 x USB2 Ports & 2 x USB3 Ports Available (USB3 ports are backwards compatible with USB2 devices)
- 1 x Power USB Port (up to 3Amps) – Suitable for Raspberry PI 3/4 power
- EXT Port (RJ12) for external accessories (E.g. External Focus Controller)
- 2 Channels PWM Dew Heaters – RCA Outputs (Adjust power levels via software)
- Humidity and Temperature Sensor (included)
- Auto Tune Dew Heater Channels
- Reverse Polarity Protection
- USB / PC Controlled or Standalone Operation out of the box
- Lightweight and extremely compact aluminum enclosure

SETUP AND OPERATION

3.1 INITIAL CONNECTION

- Plug the external environmental sensor into EXT port (RJ12 port)
- Plug the USB3 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 that 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 pass 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 Adv Gen2. 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 Advance Gen2 will shut down all outputs to save your precious equipment from over-voltage.*
- ❖ *Below 10V the Pocket Powerbox will shut down all outputs to prevent any voltage under-run issue (firmware v2.3 and above)*
- 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 10 Amps of current.

Under no circumstances exceed DC 15.0V input as you might cause a 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 on the unit.

Insert the 2.1mm plug on the DC power cable. 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 USB3 Type B port at the side of the unit accepts the USB cable for PC connection. A 1.8m USB3 type B cable is provided in the package.

4.3 USB HUB

A powered USB3 Hub at the back of the device provides:

- **2 x USB3 SuperSpeed Ports**
- **2 x USB2 High-Speed Ports.**

The new SuperSpeed hubs operate in parallel with the USB 2.0 controller, so 5 Gbps SuperSpeed data transfers are not affected by slower USB 2.0 traffic.

USB Port Configuration under PPBADV Gen2

- USB Port1 supports USB2 devices
- USB Port2 supports USB2 devices
- USB Port3 supports USB2 & USB3 devices
- USB Port4 supports USB2 & USB3 devices
- USB 1 and USB 2 ports are switchable via software



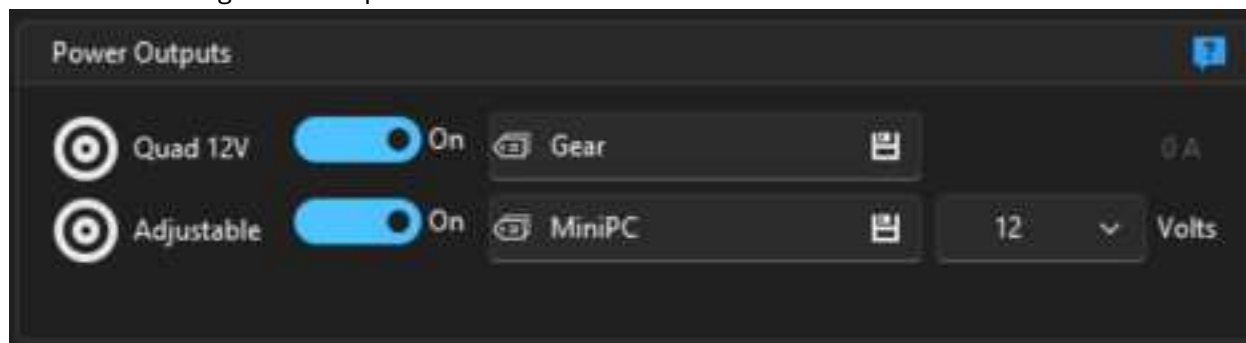
USB High Power Output

- USB Port 1 or USB Port2 can deliver up to 5Volts / 3Amps of current. RPI3/4 can directly receive power from these two USB ports.

4.4 12V POWER OUTPUTS

Pocket Powerbox Advance Gen2 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

4.5 DEW HEATER OUTPUTS

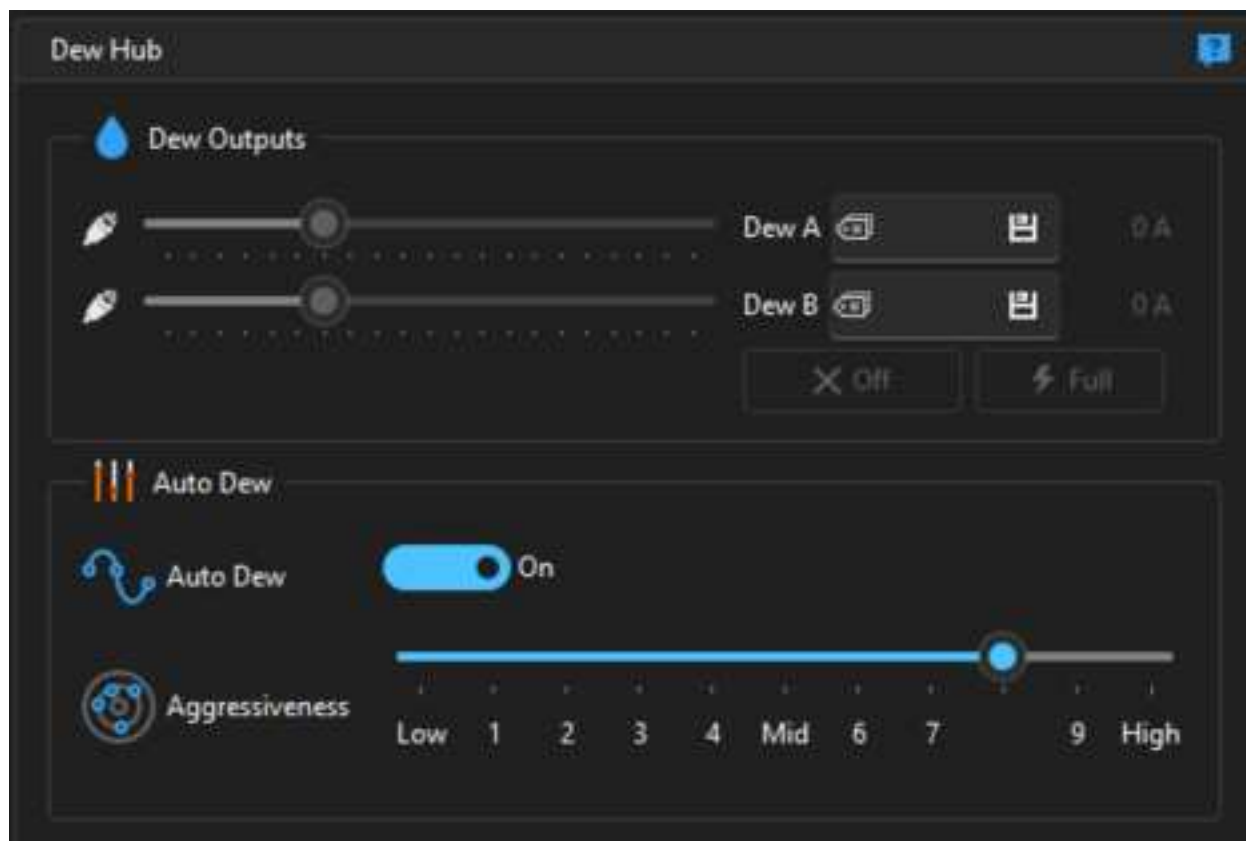
Device has two (2) channel dew heater outputs. Like power outputs, each dew heater output includes a Smart MOSFET type, capable of delivering up to 5 Amps of power per channel.

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 (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

4.6 BUILT-IN POWER SENSORS

- A DC voltmeter exists after controller's DC input. (Measures 5 – 15 Volts).
- A current meter exists after controller's DC input. (Measures 0 – 20 Amps).
- Main output channel (4 x 12V) incorporates a current/amp meter. A Smart MOSFET is capable to diagnose the power consumption of these 4 ports and provide protection against overload, over temperature and short circuit.
- Each Dew Channel incorporates a current meter and provides protection 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.



4.7 ADJUSTABLE OUTPUT

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

- This regulated output is configured to 3Volts by default.
- The adjustable output can be switched ON and OFF via **Unity Platform**
- You can adjust the voltage of this output via **Unity Platform** to 3, 5, 8, 9, 12 Volt levels.
- Setting is stored in 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

4.8 ENVIRONMENTAL SENSOR

The stock probe is an external temperature / humidity sensor which 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 $\pm 0.5^\circ\text{C}$ accuracy

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

A 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 Unity platform dashboard



4.9 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.

4.10 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](#)



4.11 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 second)	A power issue exists: • In case of overvoltage ($> 14.5V$) controller cuts off the output ports. • In case of undervoltage ($< 11.0V$) the LED light blinks only. Below 10.0V the device cuts off the output ports. Check diagnose message in software for more information during this event.
Permanently Off	Controller not operational or LED switched off from software

4.12 UPGRADABLE FIRMWARE

Device is firmware upgradable to support future features and bug fixes.

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

STANDALONE OPERATION

Pocket Powerbox Advance Gen2 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 3 Volts

SOFTWARE

ASCOM

PPB Micro is supported by ASCOM6 and ASCOM7

<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

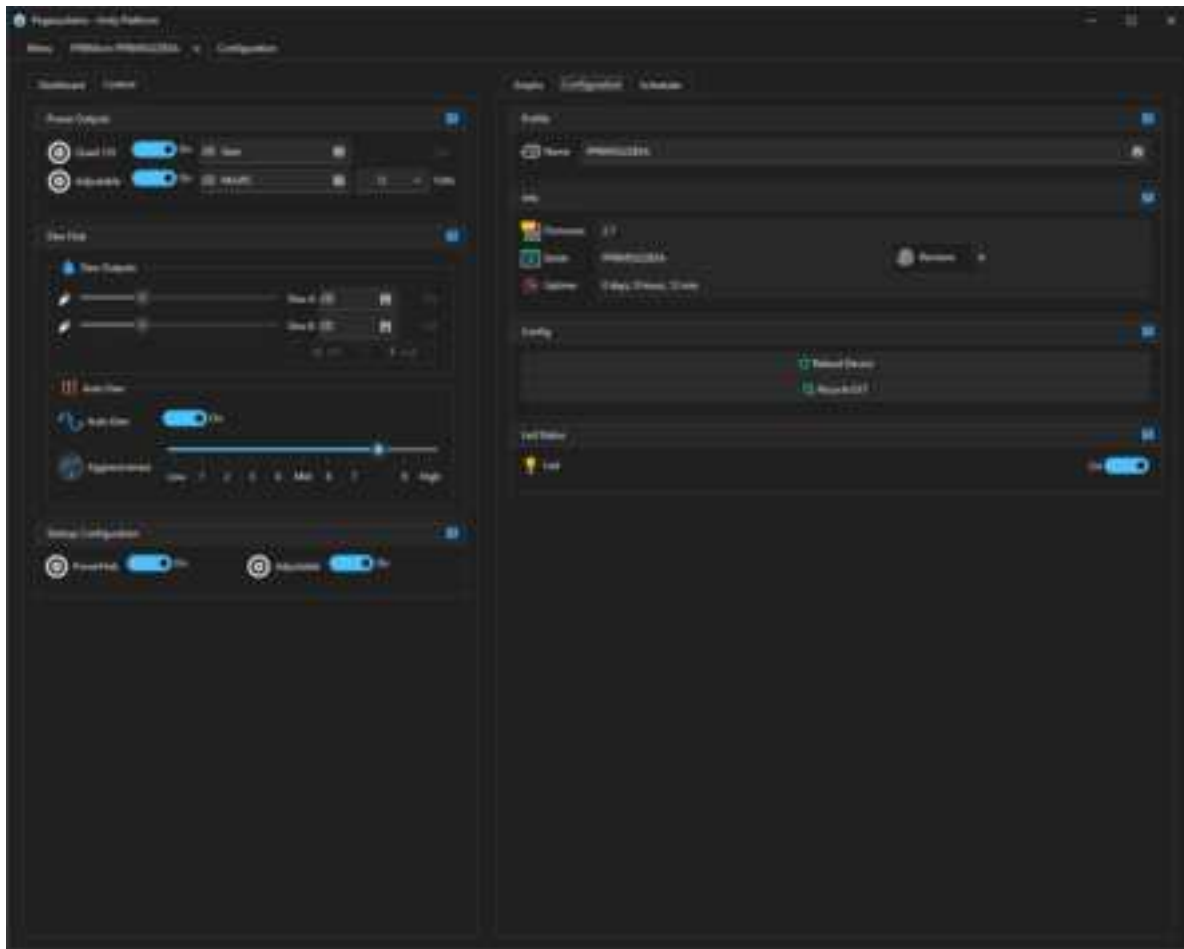
Pegasus Astro Unity Platform is our new all-around application. Our goal is to provide a robust and modern application that will support current and future products under one roof.

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 Adv Gen2 is in operation

Config

- Reboot device
- Recycle EXT port

LED status

Turn on and off the device status LED

Dashboard

Monitor in real time Environmental conditions and Power metrics.

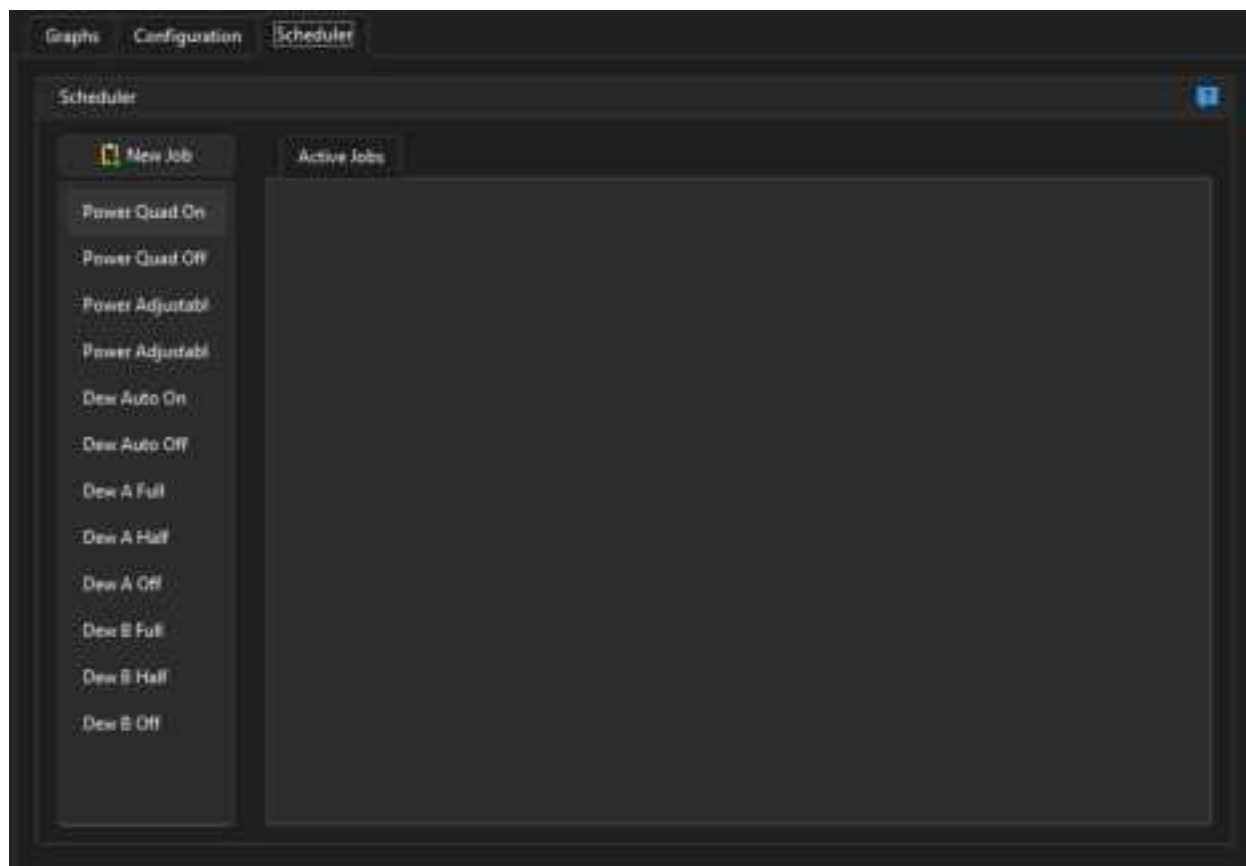
Graphs

Exportable Environmental conditions and Power metrics graphs



Scheduler

A built-in scheduler lets you add tasks at specific dates and times.



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 Advance Gen2 has a pair of M3-threaded holes on the bottom cover spaced 27.5mm apart. (blue/black enclosure)

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

PPB Adv Gen2 is compatible with:

- Pegasus Astro A-Plate SKU: PEG-APLATE
- Universal Clamp SKU: PEG-USCLAMP*
- Pegasus Shoe SKU: PEG-SHOE*
- Small Factor Top Plate for PPBADV SKU: PEG-PLATE-PPBADV
- Pair of Black Aluminum Dovetail Brackets for PPBADV SKU: PEG-BRACK-PPBADV



***Compatible only with Blue and Black enclosure.**

TECHNICAL SPECIFICATION

Supply Voltage	12V – 13.8V DC
Power Input connector	DC 2.1mm (up to 10Amps)
Connectivity	USB3 – Type B USB Connector
4 x 12 Outputs	Maximum Current 10 Amps in total. 2.1mm Center Positive Software: ON/OFF all ports
2 Channel x 12 PWM Outputs	Maximum Current 5A Each, Black Colored RCA Connector, Pulse Width Modulated (Suitable for Dew Heaters or Flatbox) 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 $\pm 0.5^{\circ}\text{C}$ 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	100mm x 71mm x 24mm
Weight	250 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 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

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