VERSION 1.2

JULY 27, 2019

# POCKET POWERBOX

PRODUCT MANUAL

BY PEGASUS ASTRO

INTRO

Thank you for purchasing our Pegasus Astro – Pocket Powerbox. **Pocket Powerbox** (in short PPB) is suitable for the "grab and go" astronomer / photographer. Device can provide 10 Amps of electric power, has four 12V outputs, two dew heater channels, a 8V DSLR/Camera power output and an environmental sensor to constantly monitor humidity and temperature. Controller can adjust the dew heaters consulting the sensor temperature / humidity values and calculating the dew point of the environment.

CONTROLLER CARE

- Controller is protected from moisture but it is not waterproof and it should be kept clean and dry.
- Excessive moisture for long periods of time can damage electronics and connectors
- Do not allow solvents or chemicals to come into contact with the device
- Store controller indoor in a dry room when not in use for long time
- Do not touch the internal components as they may get hot when in use
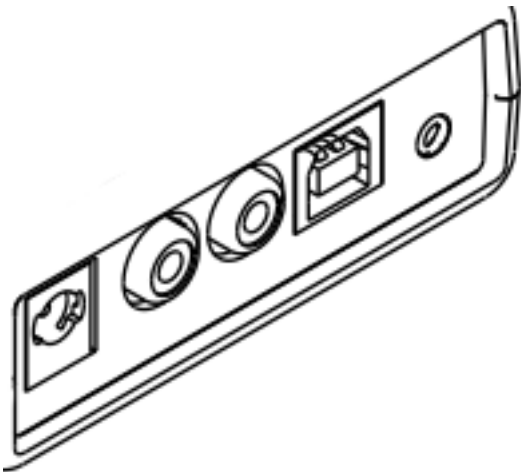
DESIGN OVERVIEW
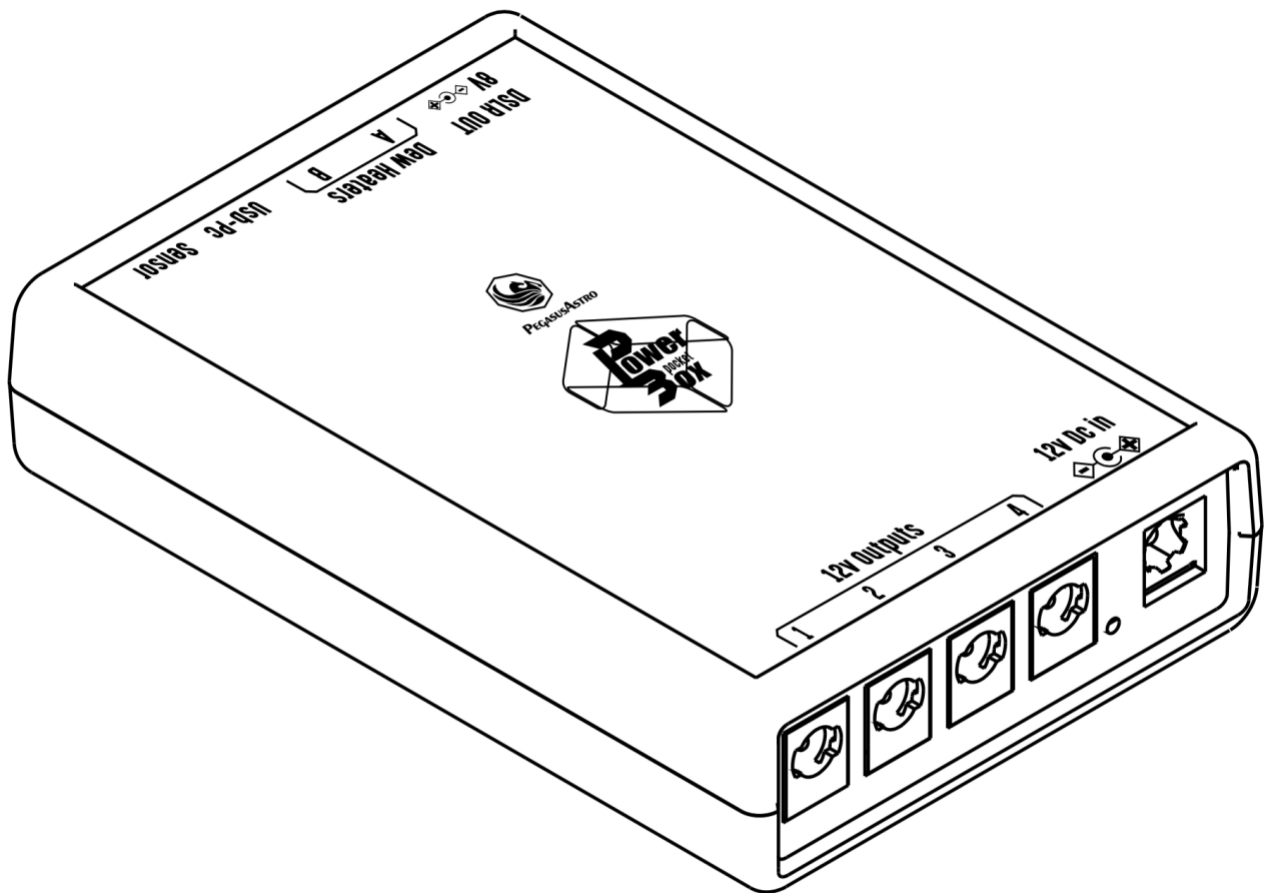
Front Side View: *From left to right*
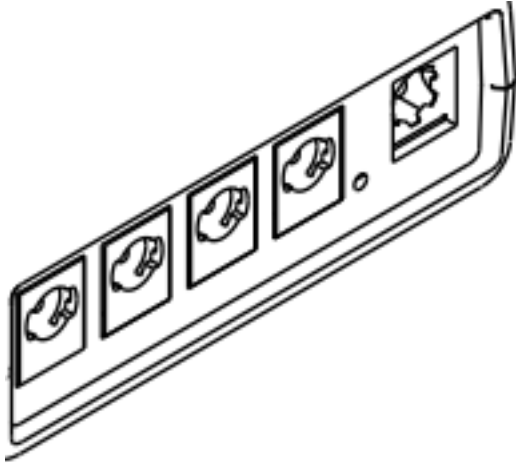
- 4 x 12V Outputs, 2.1mm, Center Pin Positive
- Red Led Indicator
- Power Input, 2.1mm, Center Pin Positive

Back Side View: *From left to right*

- 8V DSL Output , 2.1mm, Center Pin Positive
- 2 x Channel 12V PWM Duty Cycle Outputs – For dew heaters / flatbox / fans (6 Amps each)
- USB type B Input
- Stereo 3.5mm socket, Environmental Sensor

What is inside the box

Pocket Powerbox	Velcro Belt	1 x DC Cable (2.1mm) to Cigarette Lighter (8A fused)
4 x Power Cables (1 meter)	1 x USB2 Cable Type B (1.8m)	1 x Environmental Sensor

POWER INPUT

Controller can accept voltage ranges from DC 11V – 14.5V *. We strongly recommend to use a branded linear or low ripple power supply unit of **12V-13.8V DC**. A 13.8V lead (or calcium/lead) 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 10-15Amps of current.

Under no circumstance exceed DC 15V input as you will cause a severe damage to the internal controller

Unit has been designed with reverse polarity protection. If you accidentally reverse the power source polarity, the unit will cut the power. The controller is fitted with a 2.1mm DC power connection 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 4 seconds. *(The 4 seconds wait time duration is on purpose for a new firmware upload process)*

* Above 14.5V the Pocket Powerbox will shut down all 12V output ports to save your precious equipment from overvoltage.

DATA CONNECTIVITY

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

12V POWER OUTPUTS

Pocket Powerbox device has:

- Four (4) 12V DC unregulated outputs. All outputs are driven by a single Smart Mosfet, capable to deliver up to 10 Amps of current (in total). This mosfet incorporates a broad range of smart features like diagnose and protection.

  12V Channel can be switched ON/OFF via software
  Each 12V power output has the following specification:

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

DEW HEATER OUTPUTS

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

Auto-Dew: A smart function exists in the controller's firmware: The controller consults the environmental readings of the dew point and automatically adjust power of the Dew Heaters. This functionality can be switched on / off from the software and **the setting is stored in controller's memory**

Please notice: Dew heater outputs are also suitable to light a flat panel or turn your telescope's fans.

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

BUILT IN POWER SENSORS

Main output channel (4 x 12V) incorporates a current 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.

Please note that there is no current meter for Dew Channels and for DSLR Output.

A DC voltmeter is installed after controller's power input. (Measures 5 – 15 Volts)
A current meter is installed after controller's power input. (Measures 0 – 30 Amps)

DSLR OUTPUT

A 2.1mm DSLR Output provide 8V and 3A of current (max). You can use a wide range of our Battery Couplers (NIKON / Canon / Fuji / Sony) to provide constant power to your DSLR / Mirrorless camera.

Voltage type	Port
8V DC regulated	2.1mm DC Power Jack / Center Pin Positive

DSLR Output can turn ON/OFF via software

ENVIRONMENTAL SENSOR

The stock probe is an external temperature / humidity sensor which is attached to the PPB controller. It comes with length of 60cm 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 gets temperature readings every 15 seconds.

A mini stereo socket connects the temperature/humidity sensor with the Pocket Powerbox controller.

Note: Please ensure that the sensor is plugged into the sensor port before powering up the device.

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.

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 (overvoltage) exists and controller had already shut down the ports. Check diagnose message in software
Permanently Off	Controller not operational or LED switched off from software

MOUNTING

Device is very light weighted. A typical Velcro which is included in the package can secure in place the controller on the telescope.

RECOMMENDATION.

- It is wise 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 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 disconnect
- Pay extra attention of you are using a "step up voltage converter" in the DC input. You need at least 6 Amps to power all of your devices. (We don't recommend step up converters – buy a good battery or a decent linear PSU).

DIMENSIONS

Size (Width, Depth, Height)	109mm x 74mm x 25mm
Weight	250 grams

FREQUENTLY ASKED QUESTIONS

Question	Answer
What kind of power supply do I need?	We strongly suggest to use a good linear 12V / 10A branded power supply. Cheap units will lead to

	voltage drops on high load and ripple effect. This will cause issues and artifacts to your precious CCD / CMOS Camera.
What type of cable do I need to use for input?	If you are going to make a custom input cable notice that you need at least a AWG 17 cable. Make also sure that you do not exceed 2meters (6feet) to reduce voltage drops.
I would like to use the Pocket Powerbox to my remote observatory. What if the device freezes for some reason?	We have good news for you. The device has a hardware watchdog and resets itself if the microcontroller is not responsive after 2 seconds
My observatory is in a very cold place. Is there any issue with the electronics of the device?	All electronic components were selected to support temperature ranges from -40 to +80 °C. Moreover, USB2 Hub Chip is an industrial model which fully complies with this temperature range.
What if I accidentally reverse polarity?	Pocket Powerbox has an input reverse polarity protection. Device will not power on and of course will not allow any voltage to flow to outputs.
Can I upgrade the firmware?	Of course, device has been designed to support firmware upgrade for future features or bug fixes.

Optional Accessories

Battery Couplers for DSLR /Mirrorless Cameras (Wide range of types for NIKON/Canon/Sony/Fuji cameras	Power cable for Skywatcher EQ8 or Power cable for Skywatcher EQ6R / EQ6-AZ	Power Supply Unit 12v/10A 2.1mm Plug

Device is covered by two (2) years warranty

Designed and Assembled in Greece