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Mount Hub Pro v4.5x User Manual

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Congratulations on your purchase of the 'HitecAstro' Mount Hub Pro (MHP) V4. We hope you will find this device an invaluable addition to your observing equipment . The MHP is an integrated device consisting of

- ***4 Individually selected power outlets.***
- ***3 Controllable 'Dew Heater' Outputs.***
- ***A focus controller capable of driving any <u>unipolar</u> stepper motor based focuser or a DC motor from major manufactures such as Skywatcher and Meade.***
- ***A USB connection which enables the above to be controlled from any PC using Windows 7 or Windows 10***

A driver is available which will allow the focus controller to operate with any ASCOM compliant software such as Maxim DL, CCD Auto Pilot, or Focus Max.

Please read this documentation carefully to ensure optimum performance of your device.

Warranty

HitecAstro warrants that this product will be free from defects for a period of 12 months following purchase. This warranty is in addition to any statutory rights which may exist in your jurisdiction. This warranty only applies to use as described in this document. No other use is recommended or supported by HitecAstro. Any user repair attempt other than described in the troubleshooting section of this document or directed by HitecAstro will invalidate your warranty. HitecAstro and its affiliates disclaim any responsibility for any consequential damage or injury which may result from use of this device except as described in this document.

Connecting the device

Plug the cigar plug into a suitable output which delivers 12-15v DC Centre Positive. It is important that you check the polarity of your power supply before connecting. A mechanism is installed to protect against accidentally reversing the polarity.

Your power supply MUST be capable of delivering the current (measured in Amps) which is required by the MHP and ALSO any devices which is powered from the device. Ensure that the output voltage of your power supply does not exceed the recommended maximum rating of your equipment. Also check the polarity requirements for your equipment. Refer to the manufacturer's documentation to determine the rating for individual devices.

The voltage output from MHP ports will equal the input voltage with the following caveat. When devices place a load on your power supply the measured voltage will drop. This is a natural consequence of "Ohms Law" and does not mean you have a faulty MHP or power supply.

Your unit is fused at 15amps. Your equipment/focuser/heaters must not draw more than this amount of current. It should be noted that dew heaters can draw a very large amount of current. For example a 14" SCT dew removal tape can draw as much as 4.1 amps on its own. If you do draw more power that this and blow the 15amp fuse please refer to the 'troubleshooting' section later in this document for the fuse replacement procedure. Under no circumstances should you replace the fuse with one rated higher than 15amps. This is likely to cause damage to the unit and possibly your equipment and will void your warranty. Should you require more than 15 amps you will need multiple units.

It is **your responsibility** to ensure that your chosen power supply can deliver enough current to power the device (typically <0.5amps) and your chosen combination of dew heaters/focuser/ancillary equipment. Hitecastro will not currently recommend any particular brand of power supply. You should consult a specialist electrical retailer for advice on choice of PSU.

Installation and Setup

From V4.5 onwards, it is REQUIRED to install the ASCOM Platform before running any of the MHP V4 software or drivers.

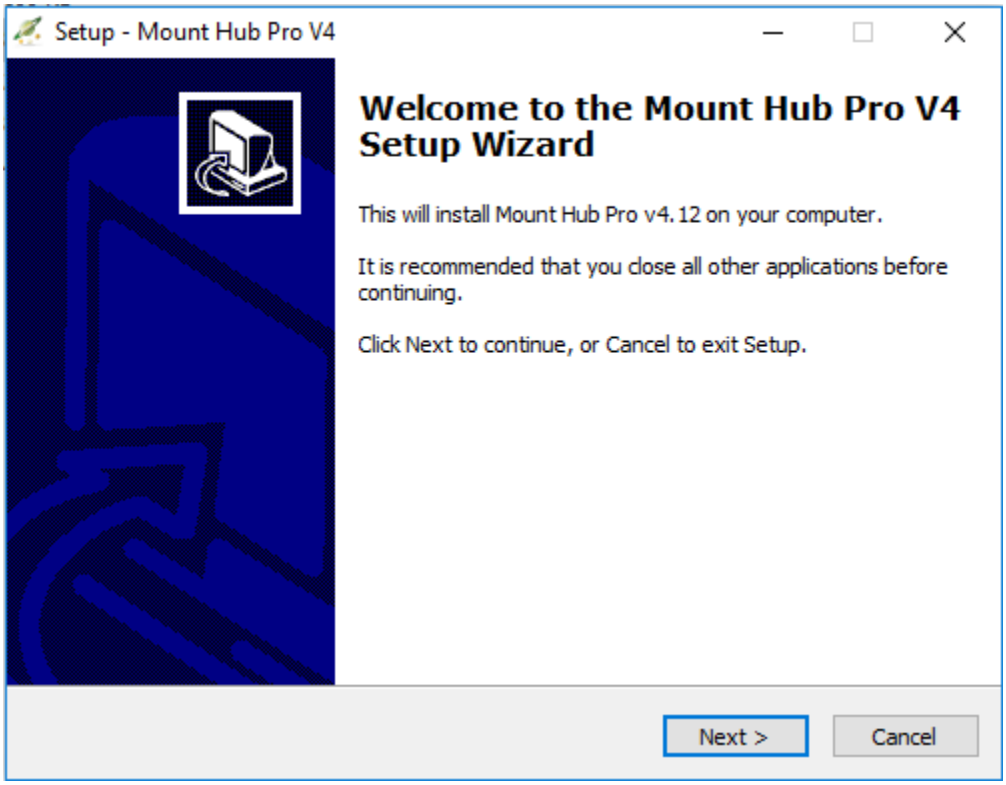
Carefully choose a location for your MHP which will minimize the opportunity for cables to snag or wrap around your telescope/mount when slewing to all parts of the sky. You can use the included bracket kit to assist mounting the unit. At this

stage do not connect it to the computer or ancillary equipment. Now complete the software setup.

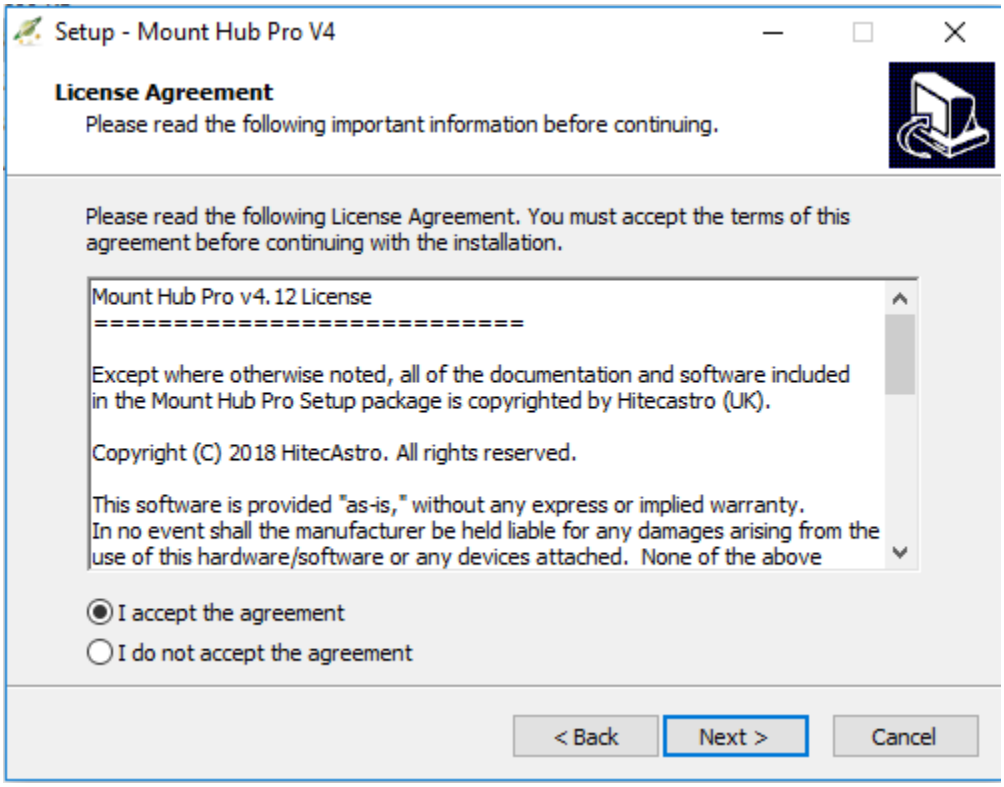
Download the latest version of the software suite from the Hitecastro website. From v4.5 onwards a single unified installer will install;

- MHP V4 Application Software
- MHP Focus ASCOM Driver
- MHP Switch ASCOM Driver

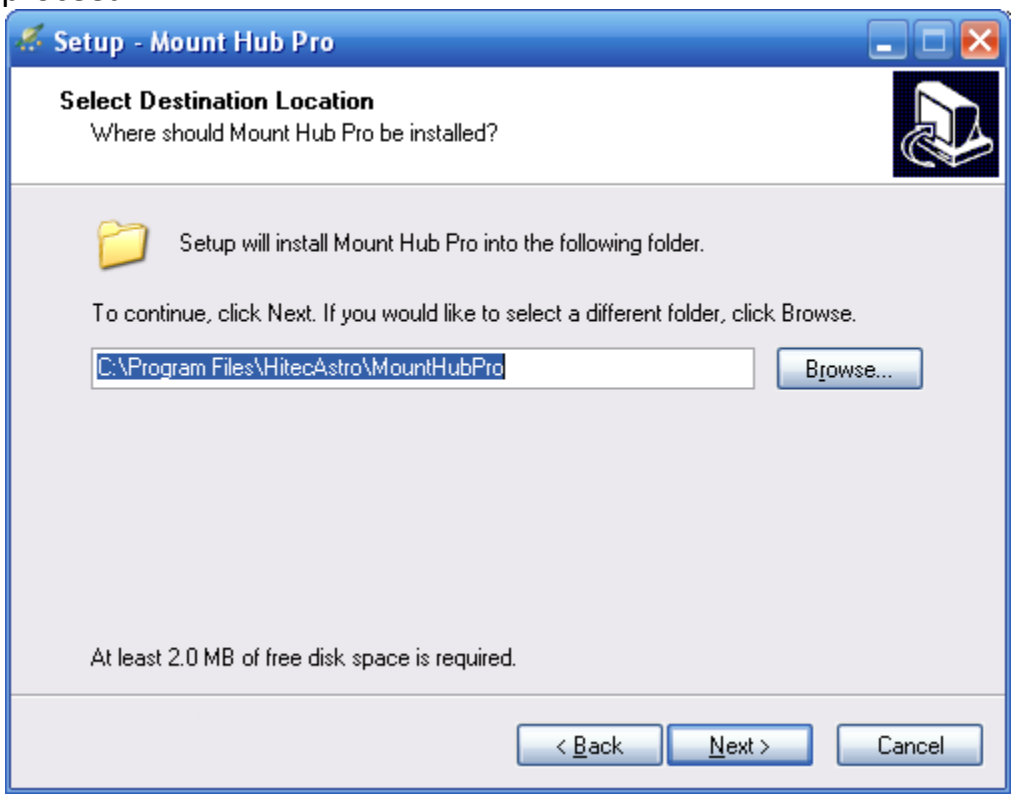
Run the setup program by double clicking on the software installer program. Click OK to begin setup. You will be presented with the following;



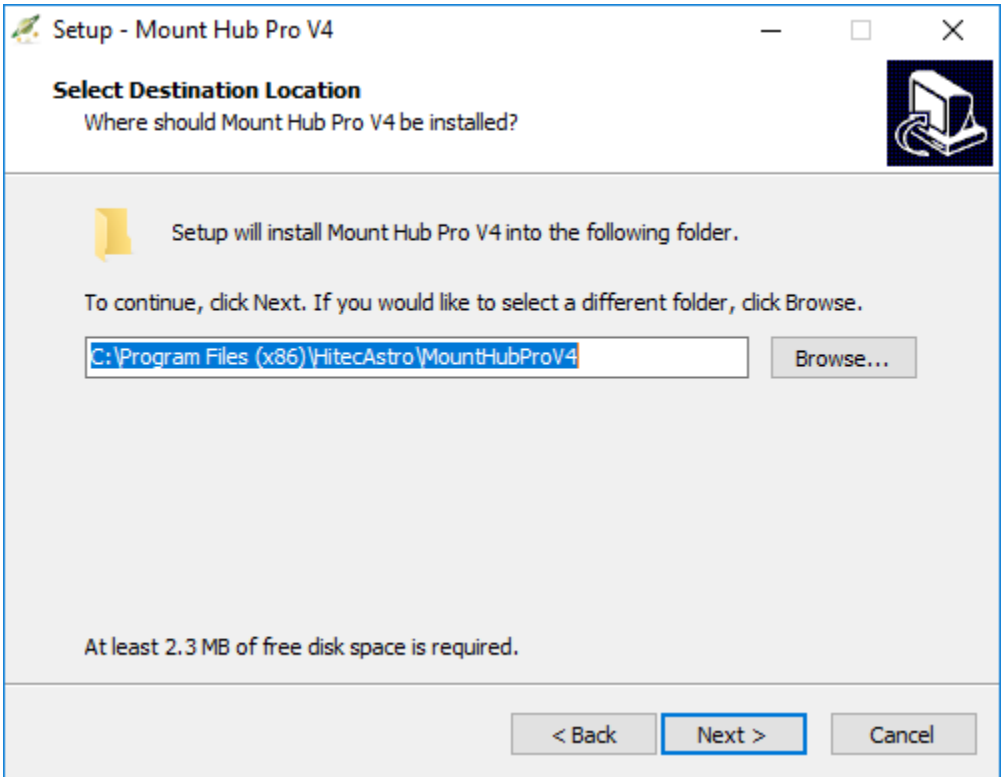
Click ‘Next’



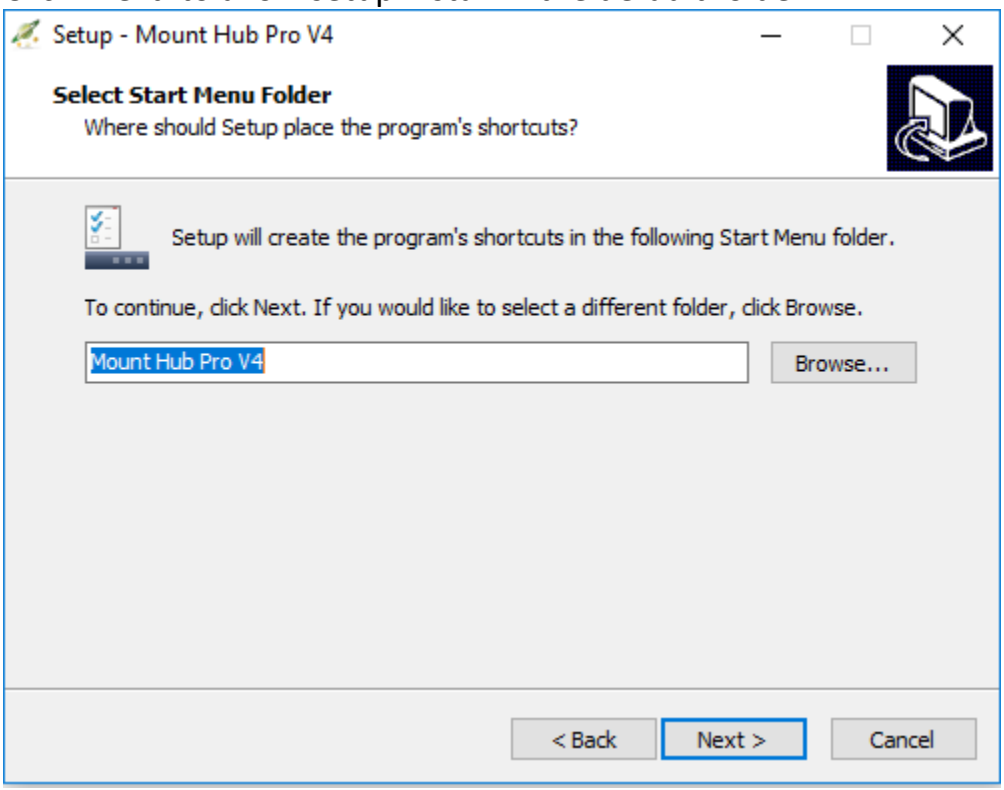
You must read and accept the license agreement before clicking 'Next' to proceed.



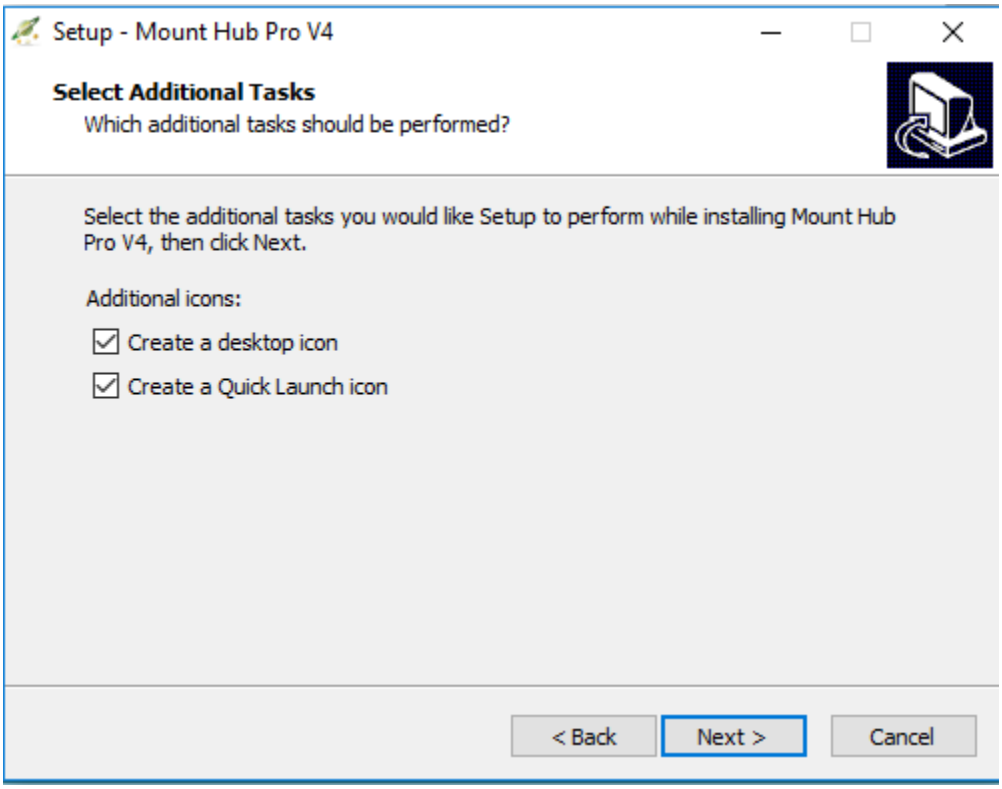
Click 'Next' to accept the default install location on your hard drive or you may choose an alternative location.



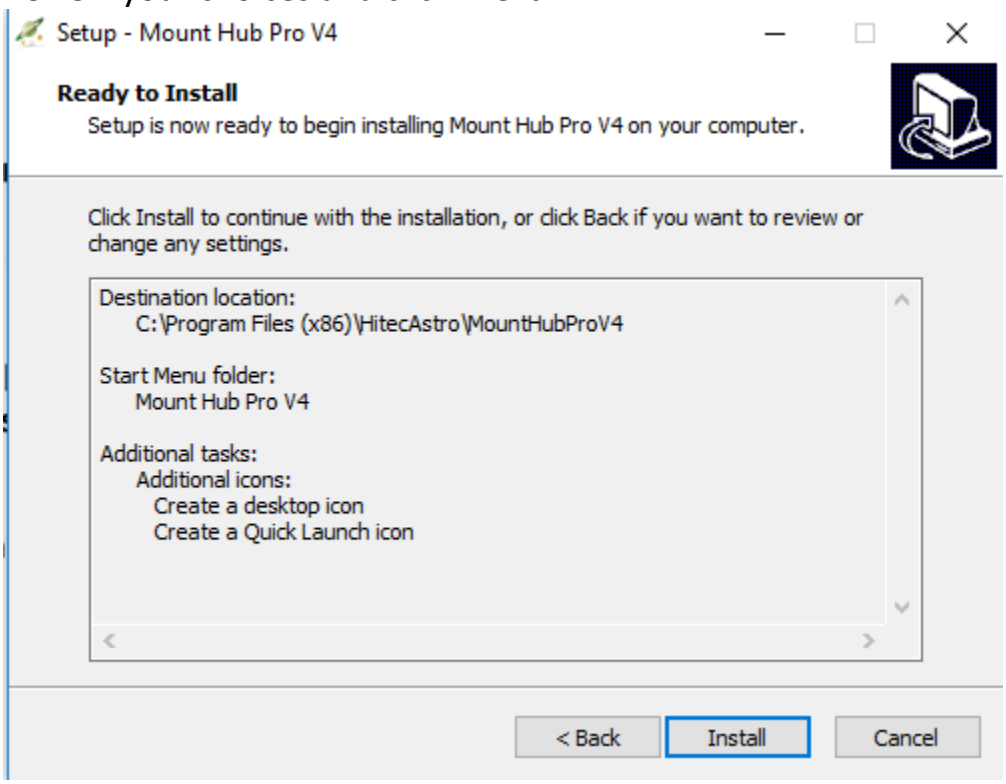
Click 'Next' to allow setup install in the default folder.



You can now choose a start menu folder. We recommend you accept the default.



Review your choices and click ‘Next’.



Now click ‘Install’ to allow the installation to begin.

You will be prompted to restart your computer. **You should restart your computer for the MHP software to operate correctly.**

Hardware Installation.

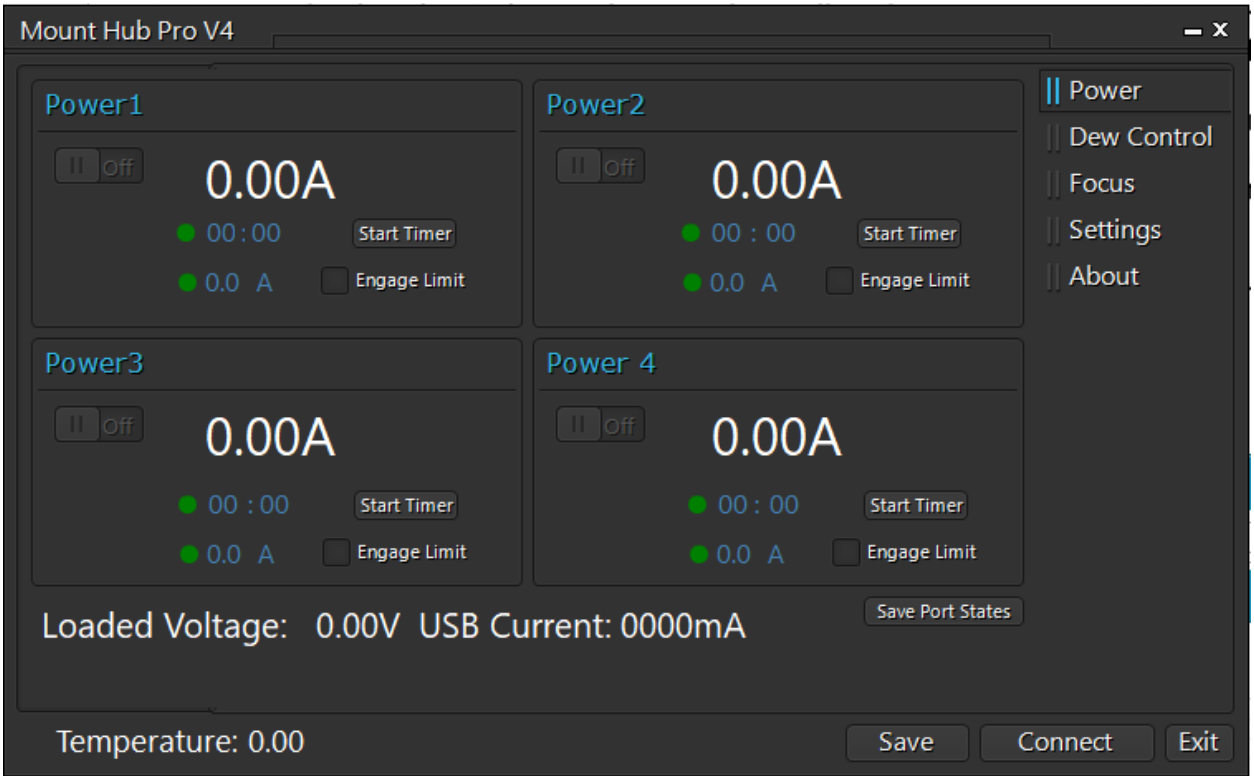
Connect the cigar plug to an appropriate power outlet as described in the beginning of this document.
Connect a standard USB cable (supplied) to the MHP and plug the computer end into an available USB 2 or USB 3 port. The device should be automatically detected and you should receive a windows message *'Your hardware is installed and ready to use'*.

There is no specific driver required since your MHP uses a standard driver which is part of windows.

MHP is a USB 2.0 device as is the inbuilt USB hub. However It is compatible with USB 3.0 ports on your computer.

Now disconnect the power and plug in any dew heaters/equipment and connect your focuser. *Note: It is not necessary to use all features of the device.*

Now start the MHP PC application.



The above is a typical output screen of the PC application. Assuming the device has been connected correctly click the 'Connect' button. The text on the connect button changes to 'Connected' and the various controls are enabled. You should probably test a power port now to confirm everything is working ok.

If you have any problem connecting to the MHP V4, we recommend that you check that the unit is powered and the USB cable is connected.

We now go on to describe the process of connecting your MHP to your hardware.

Connecting a Dew Heater Tape/Pad.

Plug your dew heater to a chosen outlet on the MHP. You may choose any output. It is not necessary to plug in and out in any order. We recommend that you disconnect the MHP before connecting or disconnecting heaters or other devices.

Dew ports 1 and 2 also support the use of an Electroluminescence (EL) panel. Bu using a suitable EL panel you can adjust the brightness of the panel by using the MHP software. Dew port 3 does NOT support an EL panel.

Connecting Ancillary Equipment to the Power Outputs.

Equipment should be connected via the provided cable with a 2.1mm power plug on each end. Should you choose to provide your own cables you should note that all powered outputs are **CENTRE POSITIVE**. Reversing this polarity may result in damage to your equipment. If in doubt, contact support or your dealer.

It is your responsibility to ensure that the polarity of any connected equipment is correct. The provided cables provide CENTER POSITIVE output. If you are in any doubt please contact the manufacturer of your equipment and show them this notice.

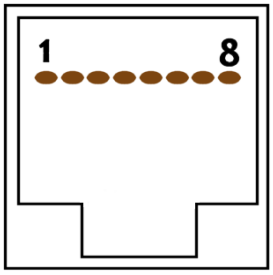
Connecting a Focuser Motor

All focus (stepper and DC) motors require a gearbox to operate effectively. Without a gearbox a focus motor will not have enough torque to actually move your focuser especially if there is heavy equipment such as CCD cameras attached.

MHP supports both stepper and DC focus motors. Both are connected via the RJ45 socket on the MHPV4. You should use the included focus motor adaptor to connect your chosen motor. Your adaptor cable is fitted with a DB9 connector for stepper motors and a phono socket for DC motors.

Feathertouch MSM series motors can be used with an optional adaptor. As of the time of writing, newer feathertouch motors use bi-polar motors and are not supported. Contact us if you need advice as to whether a particular feathertouch motor will work.

First let's look at the layout of the RJ45 socket.



With this in mind the pinout of this socket is as follows.

1. DC Motor +
2. Stepper 12v *
3. Stepper 12v *
4. Stepper A+
5. Stepper A-
6. Stepper B+
7. Stepper B-
8. DC Motor –

* Both Stepper 12v rails should be connected together.

At the other end the pinouts are as follows

DB9 (Stepper motor)

Pin 1 Stepper B-
Pin 2 Stepper B+
Pin 3 Stepper A-
Pin 4 Stepper A+
Pin 5 Stepper 12V
Pin 6 – 9 Not used.

If your stepper motor moves in the wrong direction you can correct this in software. Alternatively you can reverse the order of the stepper motor wires A+ A- B+ B- so that they are wired B- B+ A- A+

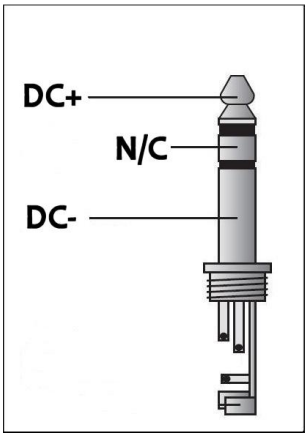
If you wish to connect to a non robo-focus standard stepper motor you must first ensure that at the very least your focus motor is a unipolar stepper motor rated at

12vDC you must then adhere to the connection scheme above. If you are unsure of the connections it is UNLIKELY that you will cause any damage by taking a 'try and see' approach. If your motor is connected correctly you will be able to slew the focus motor in a very smooth fashion using either the MHP hand controller or the software focus functionality. A jumpy motor is a symptom of incorrect wiring.

DO not connect the focus output to any other motor other than a unipolar (5 or 6 wire) stepper motor.

Connecting a DC Motor

Phono DC Socket

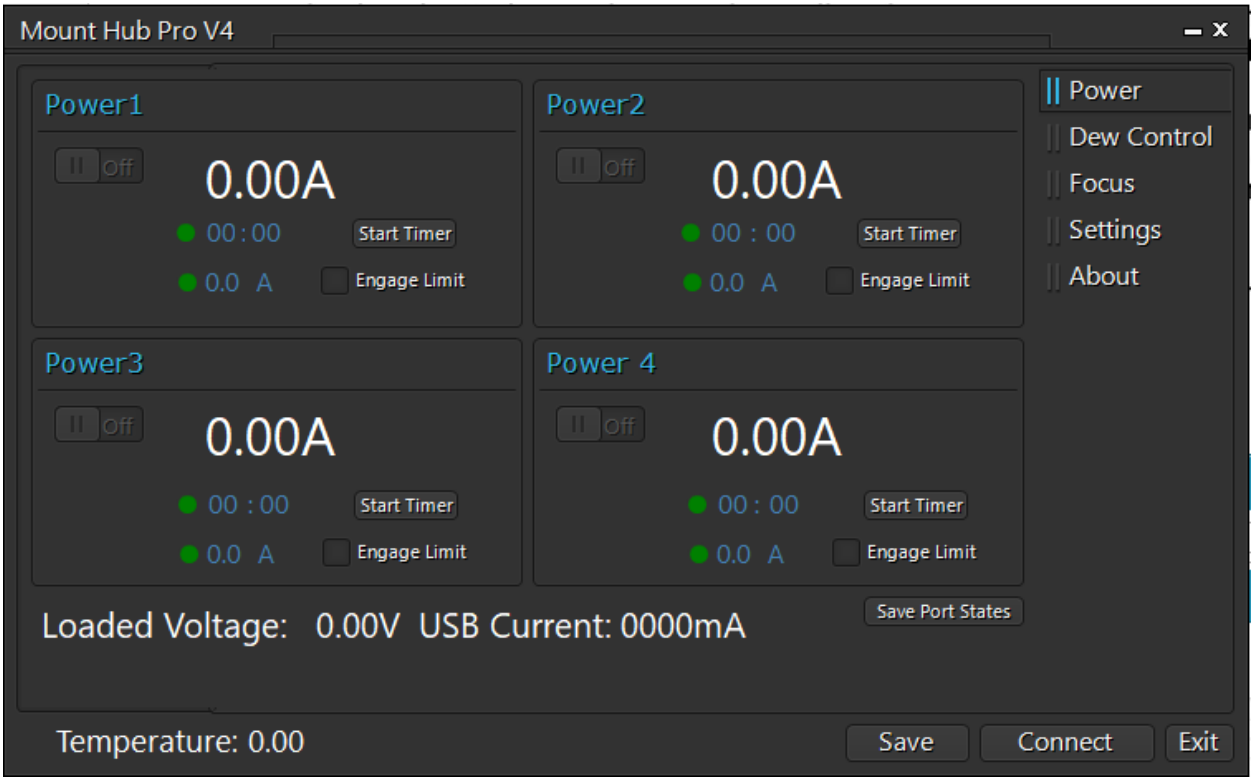


If you wish to reverse the direction of the DC motor rotation you can safely swap around DC+ and DC-. Alternatively, you can achieve the same result via the PC software.

The voltage output on the DC motor port is very close to the input voltage from your power supply. Ensure that the DC motor you use is rated for this voltage. Most times this is very close to 12V. Plugging a motor which is not rated to handle this voltage will damage your motor.

Operating the PC Software.

Your MHP is supplied with PC software which allows you access to all of the features of the MHP. This software should be installed as described earlier in this document. The detailed features of the software are described below



Software Layout.

The software is laid out with tabs on the right side which present you with functionality related to that area such as Focus or Power. You click the tab of choice to use the functionality you are interested in.

Connect Button

When initially started all of the control buttons on the software are disabled. Once the unit has been connected correctly, click the connect button. The text in this control changes to 'Connected' and all of the controls are enabled.
After a short few seconds after connecting successfully you will see the loaded voltage change to represent the voltage which the MHP is operating under. You will also see the current which is being drawn by the USB hub and any devices connected to it.

Loaded Voltage: 12.6v USB Current: 0122mA

The loaded voltage may differ from the input voltage of your power supply. This difference will be greater when the unit is under 'load' powering devices. When a device is drawing power there is a voltage drop at your power supply. This is 'Ohms Law' in action!! Therefore the displayed voltage is the 'Loaded voltage' and takes account of this voltage drop caused by loading the MHP.

You will also see the temperature label change to "Wait" after a few more seconds the actual measured temperature will display the ambient temperature.

Temperature: 19.2°C

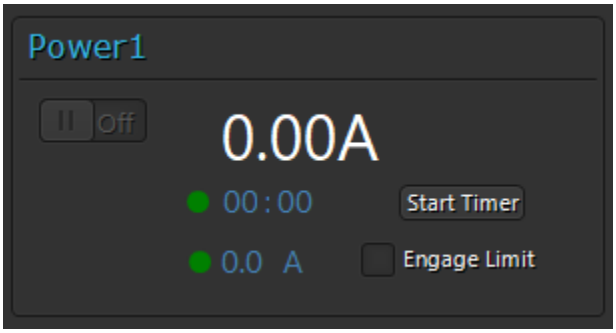
Be sure to keep the metal end of the temperature probe clear of sources of heat which may affect the accuracy of the temperature measurement.

Save Button

The save button is used to ensure that the settings you make are saved and restored the next time you run the software. You should press this when you have made your settings choices. Most settings will be lost unless you press this button after making those settings.

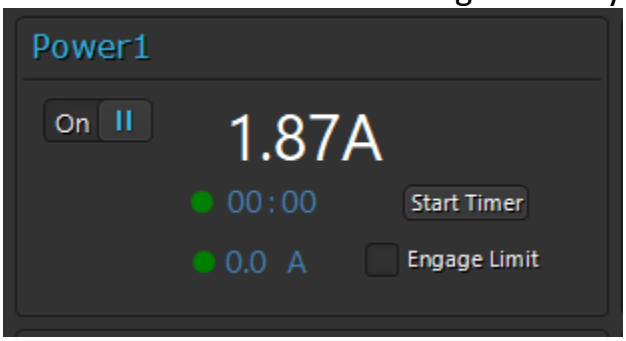
Power Tab

The Power tab is dominated by 4 Power panels.



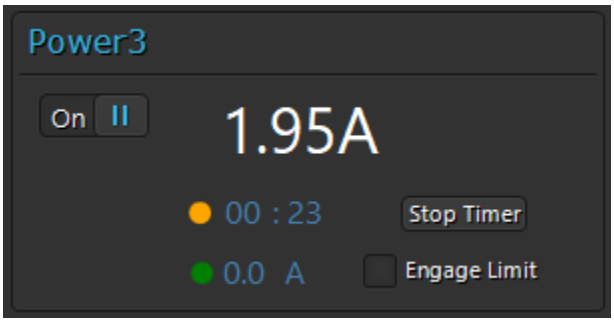
These are used to control each individual power ports. In its simplest use just click the on/off switch to turn on/off power to that port.

When turned on a particular panel will indicate that is on and will also display the current in AMPS which is being drawn by the connected device.

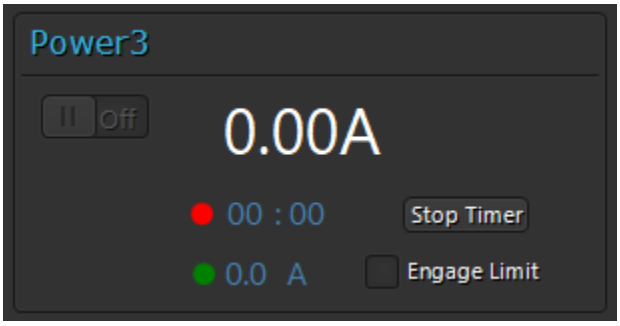


Timer.

Each power panel has an individual timer which can be programmed to turn off a device after a fixed period of time. To set the timer roll your middle mouse button over the minutes to set the timer. Click the "Start Timer" button. The power port will turn on. The LED next to the set time will turn orange to indicate that timer mode is active.



Power will remain on until the set time elapses. When the timer elapses the power port will be turned off and the LED will turn red.

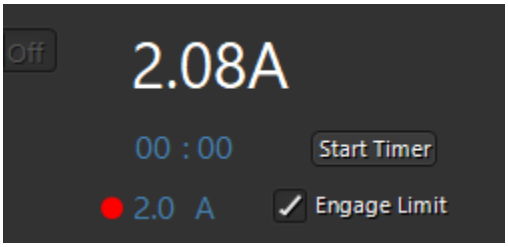


Current Limiter.

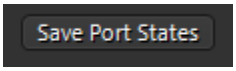
To help ensure that problems with connected equipment don't end up causing damage to either the MHP or other equipment, you can set a "software fuse" which will cause that port to power off if it draws more current than the limit you set. To set this up correctly first turn on the port with the device connected and see how many AMPS the device uses. Ensure that the device is drawing the max current it may require (for example if the device is a CCD camera, turn on the cooler to 100%. If it is your mount slew both axes at full speed simultaneously). Once you understand how much current your device needs add around 1amp to that and set that as the limit. To set the limit, again roll your middle mouse wheel over the numeric value until the limit is set. Then click the engage limit checkbox.

A green LED to the left of the limit value indicates that the current being drawn is not within 90% of the limit set. And orange LED indicates that the current is between 90% to 99% of the limit.

If the current drawn exceeds the limit set. The power port is turned off. It will not turn on again until it is toggled manually.



‘Save Port States’ Button.

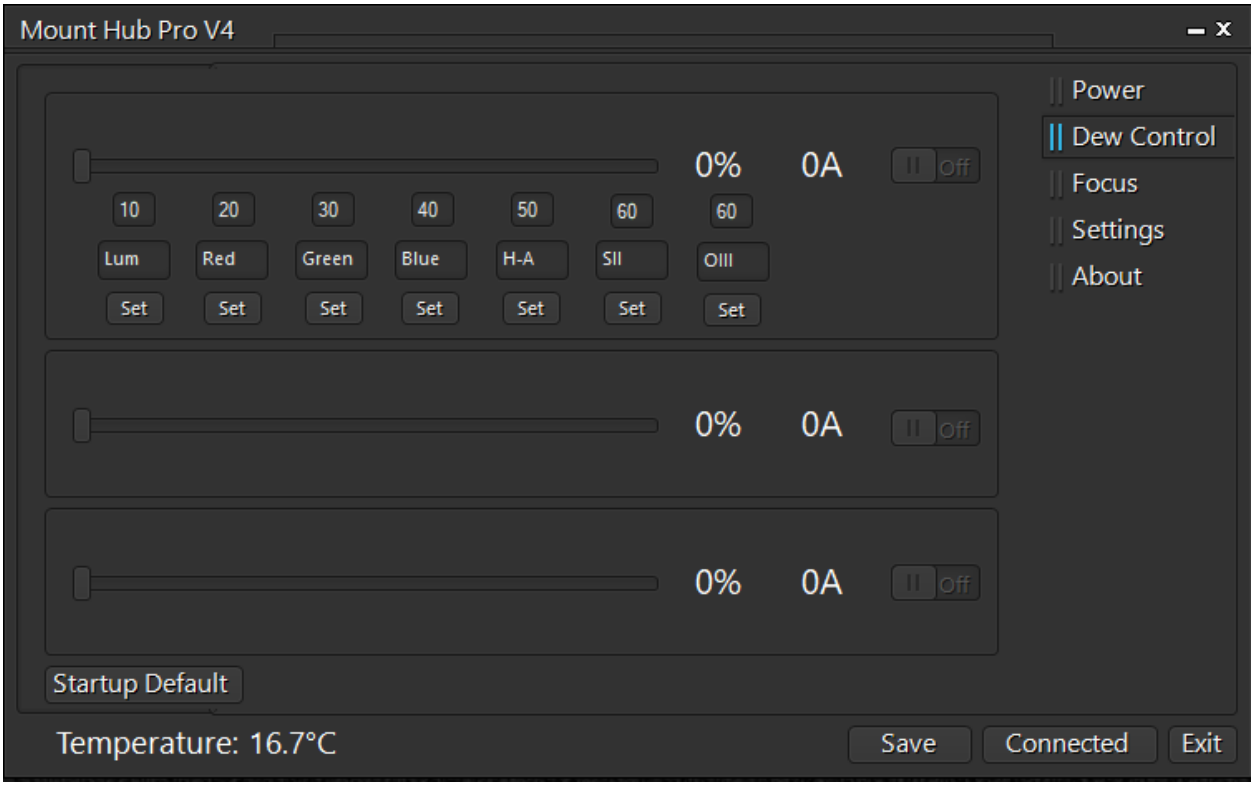


This new feature allows you to decide which of the power ports are switched on or off when the device is powered up. Note that the saved power port state is independent of software and will be effective even if the software or PC is not running. This effectively allows you to set a power port to be ‘always on’. Set all 4 ports on or off as you wish. Click the ‘Save Port States’ button. The next time the unit is powered those ports will be on or off as chosen. Note that although this does not require the software or PC to be running, the previously described timer or current limiting fuses will not be effective unless the software is running.

The net effect of this feature allows chosen ports to be “always on”. This replaces the need for separate “always on” ports which existed on previous versions of MHP.

Please consider carefully the consequences of powering ports on startup by using the “Save Port State” feature. This could have undesired consequences when your equipment starts.

Dew Control Tab.

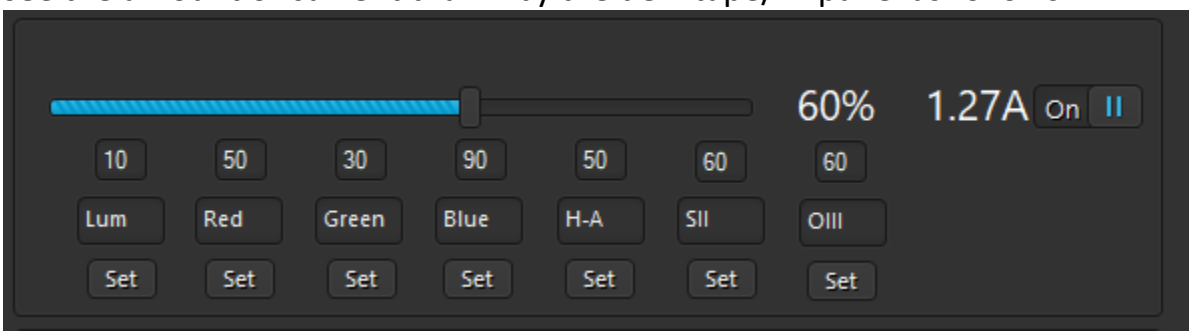


This area allows control of connected dew tapes or electroluminescence panels. From top to bottom we have Port 1, Port 2 and Port 3

Only Ports 1 and 2 support EL panels. Using port3 for an EL panel will result in flickering panel or the panel not operating

Port 1 has a set of text boxes which allow you to setup presets for an EL panel to operate with particular filters. You can set up to 7 presets each of which can have filter name and a power value (between 1 and 100) to represent the power level applied to the EL panel. You could also use this section to set presets for particular dewing conditions when used with a dew tape. E.g. “Light Dew”, “Heavy Dew” etc. Remember to press Save when you have set the values so that they are remembered next time you start the software.

Each dew port has a slider which you can drag to set the power level. Once the correct power level is set to the desired value, click the On/Off button. You will see the amount of current drawn by the dew tape/EL panel as follows

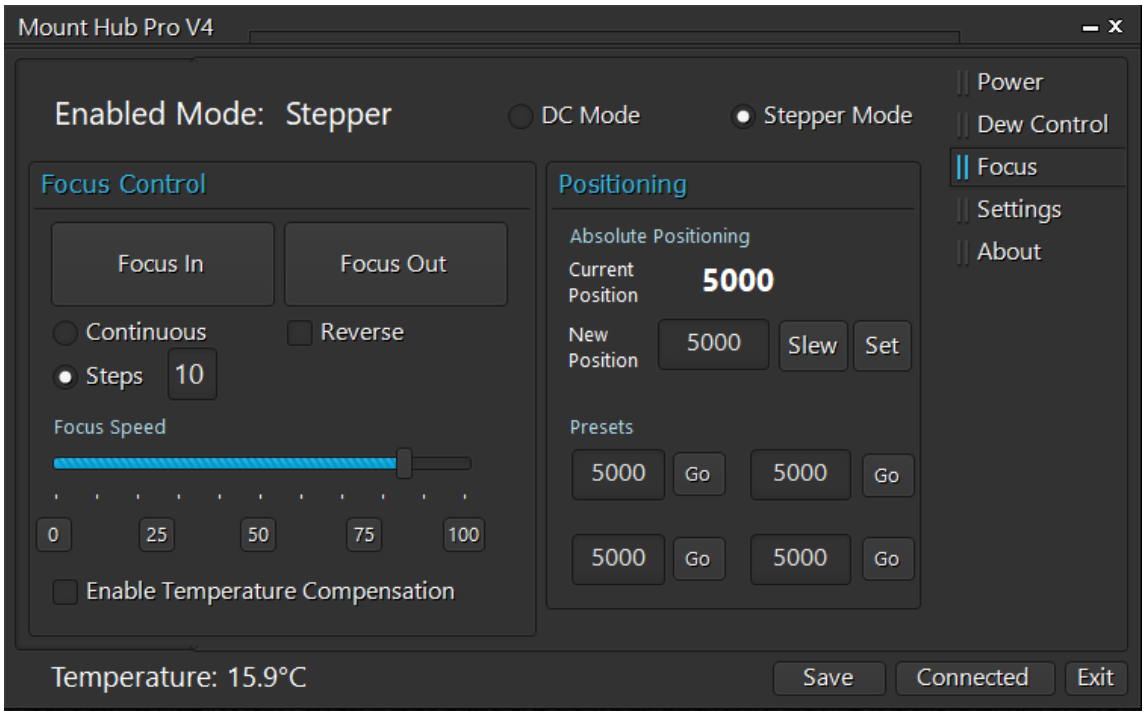


The Startup Default button will cause the currently set values be stored to the device and when next started the device will activate these ports at those power levels. This is handy so that your dew tapes will be powered when starting the device without having to run the software or even connect the device to a PC.

Please consider the consequences of powering dew tapes on startup by using the startup default feature. This could have undesired consequences especially in warm weather.

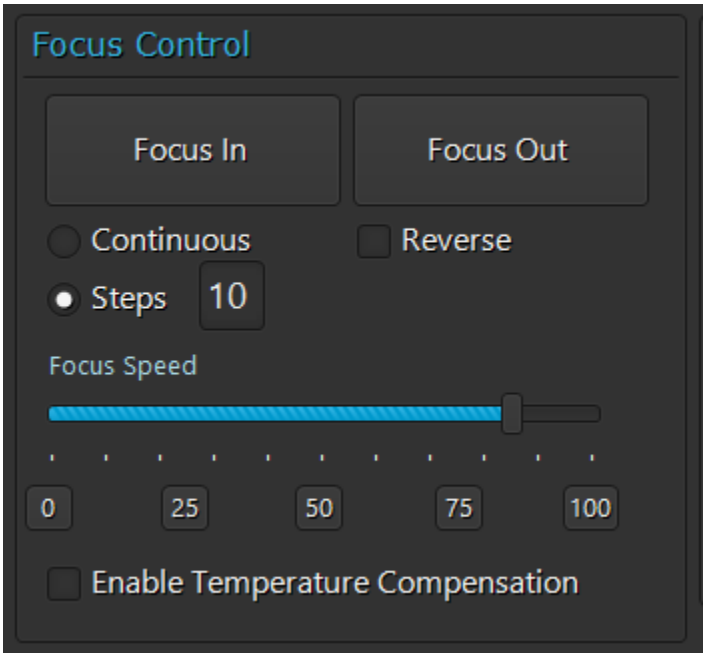
Focus Tab

Hitecastro are now pleased to offer optional high quality stepper or DC focus motor based units designed to accommodate almost all types of focuser. Please contact us with your requirement.



This area allows a connected focuser to be operated.

The first thing to note is that the DC or stepper mode selector radio button. This allows you to switch between controlling a stepper motor or DC motor seamlessly. Yes you can have both connected at the same time!



The focus control section is where you actually control your focuser.

In continuous mode pressing the “Focus In” or “Focus Out” button will slew the focuser continually until you release the button. This is intended for course adjustment of your focuser.

For finer control select the “Steps” option. With this selected pressing the “Focus In” or “Focus Out” button will move the focuser a fixed number of steps. This number is set by adjusting the text box next to the Steps radio button. In DC mode steps are simulated by moving the motor a fixed amount of time. This is not as accurate as a true stepper motor and can be considered to be approximated/simulated steps. Therefore you should not expect to achieve the same level of accuracy as you would with a stepper motor.
The “Focus Speed” slider as the name suggests controls the speed of the focus motor from 0 (slowest) to 100 (fastest).

Not all motors will be able to support the fastest speed that the slider can be set to. If you notice your stepper motor buzzing and not moving, back off the slider until the motor starts moving smoothly. This is the fastest speed your motor can operate at.

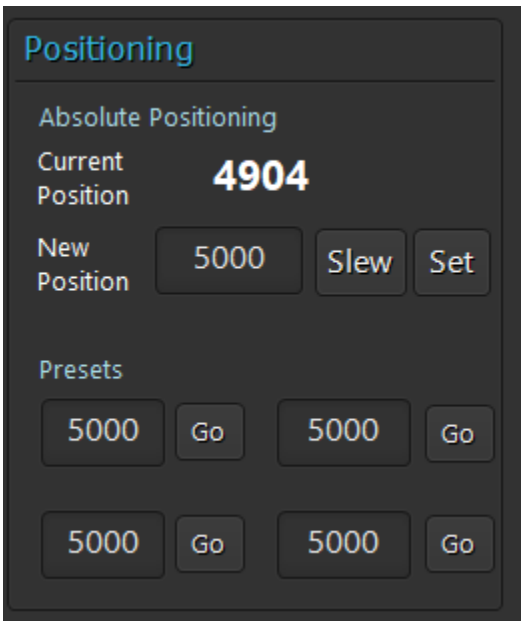
The actual speed at which your focuser will slew is dependent on two factors.

- The resolution of your stepper motor.
- The ratio of the motor gearbox.

We recommend a ratio of between 50:1 and 70:1 to provide a good balance between focus speed and torque.

All focus stepper motors require a gearbox to operate effectively. Without a gearbox a stepper motor will not have enough torque to actually move your focuser especially if there is heavy equipment such as CCD cameras attached.

Absolute Positioning and Presets.



The first item of note here is the “Current Position” This is the step position the selected focuser is currently positioned at this will update when you move the focuser to a new position. There are separate “Current Position” values for the stepper and DC focus controller. Changing between stepper and DC mode will also switch to the current position for that focuser.

The “New Position” text box and associated buttons allows you to either slew the focuser to a specific step position or update the “Current Position” without moving the focuser. Enter a new position into the textbox and press “Slew” the focuser will move to the new position and the current position will update.

Entering a value and pressing “Set” will update the current position but will not move the focuser.

Your MHP software is capable of repeatedly setting your focuser to the exact same position time after time. The current position of your focuser is displayed. To move to a new position enter a value in the New Position field and click the slew button underneath. Your focuser slews from the old position to the new position. The position you just entered becomes the new current position.

Example 1:

Current Position: 3000
New Position: 4000

Press “Slew”

This will cause the focuser to move outward by 1000 steps and the Current Position is updated to 4000

Example 2:

Current Position: 3000
New Position: 2500
Press “Set”

The focuser will now move. The current position is set.

Presets

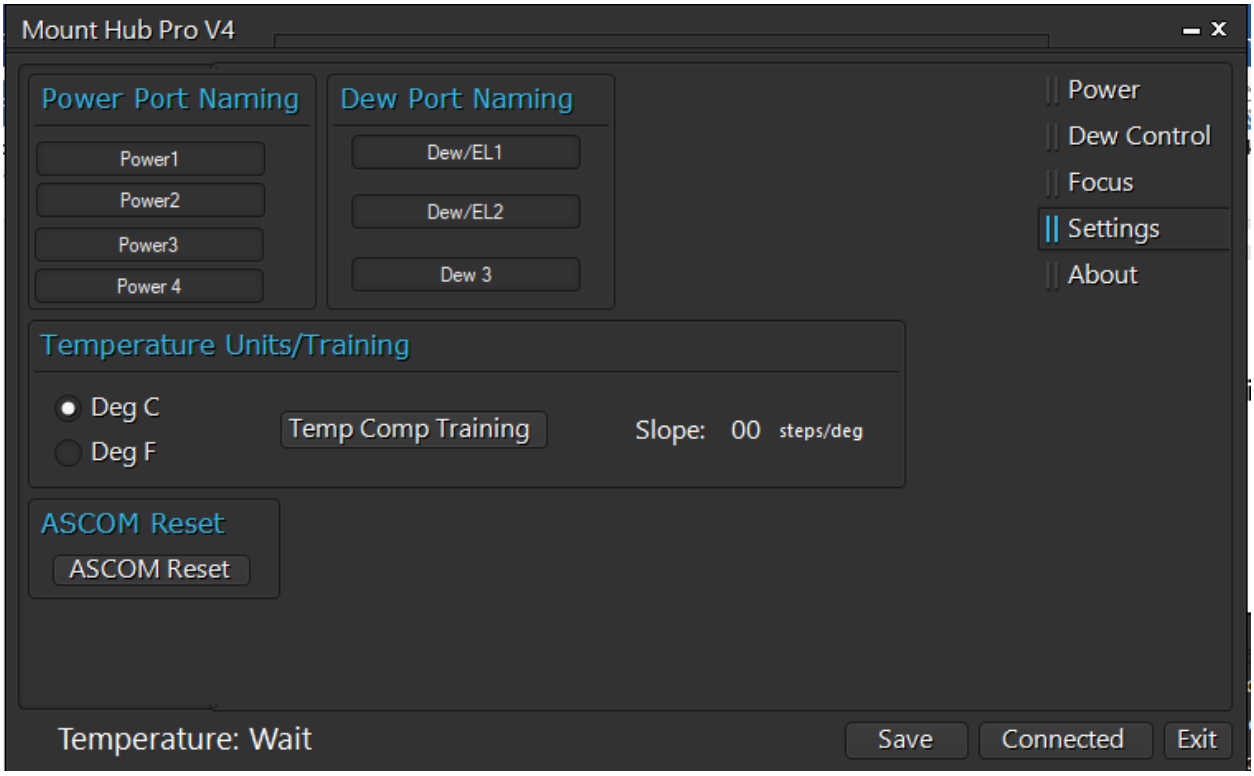
You may set specific step positions in each of the 4 preset boxes. Pressing the associated “Go” button causes the focuser to slew to that position. Remember to press the “save” button to remember these presets.

It may not be apparent at first that this feature allows you to set your focus position to suit a wide variety of your telescope eyepieces and CCD equipment. Let's see how you can do this.

Temperature Compensation (Stepper Mode Only)

Enabling this checkbox enables temperature compensated focusing. This requires previous extensive setup/training. Without this training this option will have no effect. You will find the training button on the "Settings" Tab.

Settings Tab

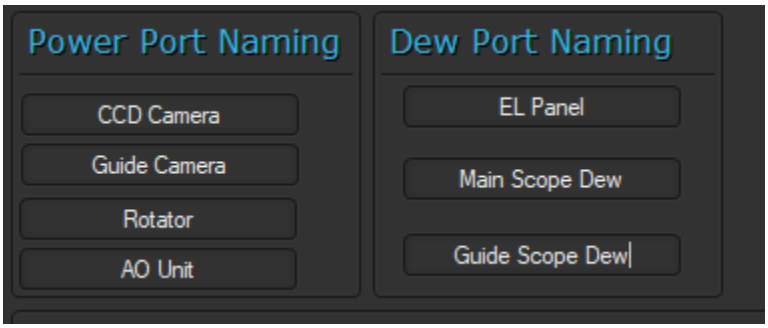


Power Port Naming/ Dew Port Naming

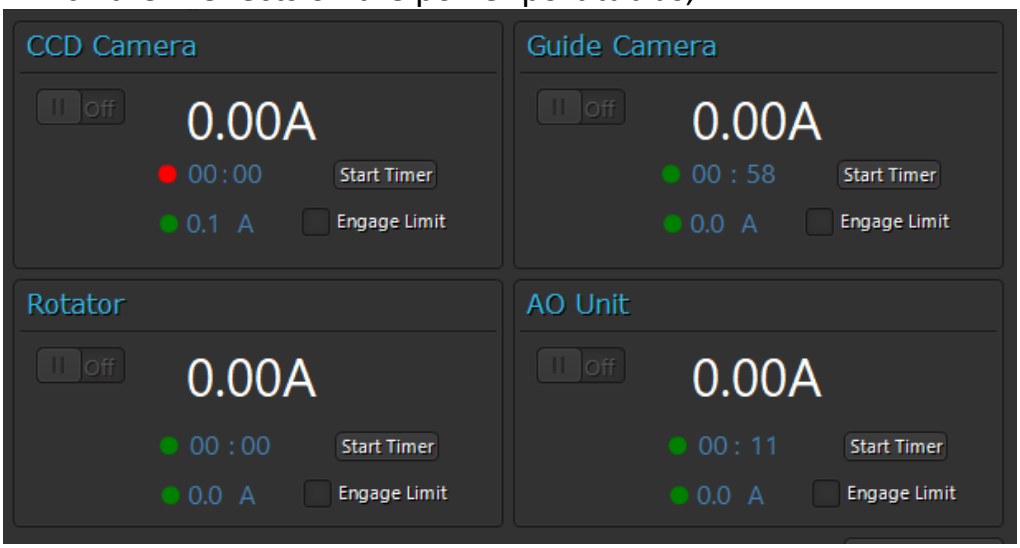
Enter meaningful names for each of your power ports/ Dew Ports. These names will be reflected on the Power/Dew Control tabs.

ASCOM Reset

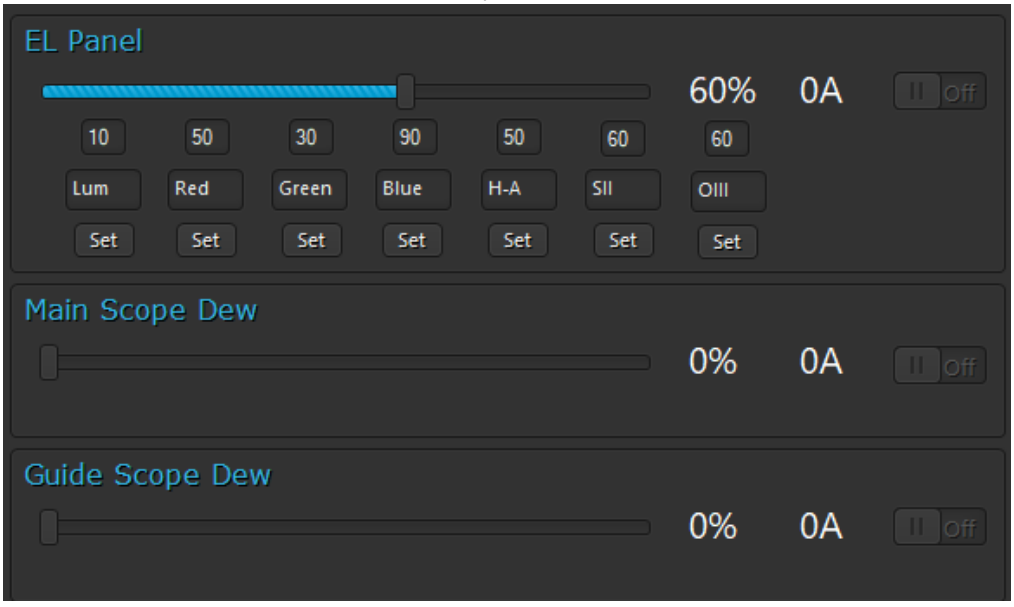
If the ASCOM Drivers are not connected/disconnected properly press the ASCOm Reset button to clean up the ASCOM profile and restore normal functionality to the software.



Which then reflects on the power port tab as;



…and on the dew control tab as;

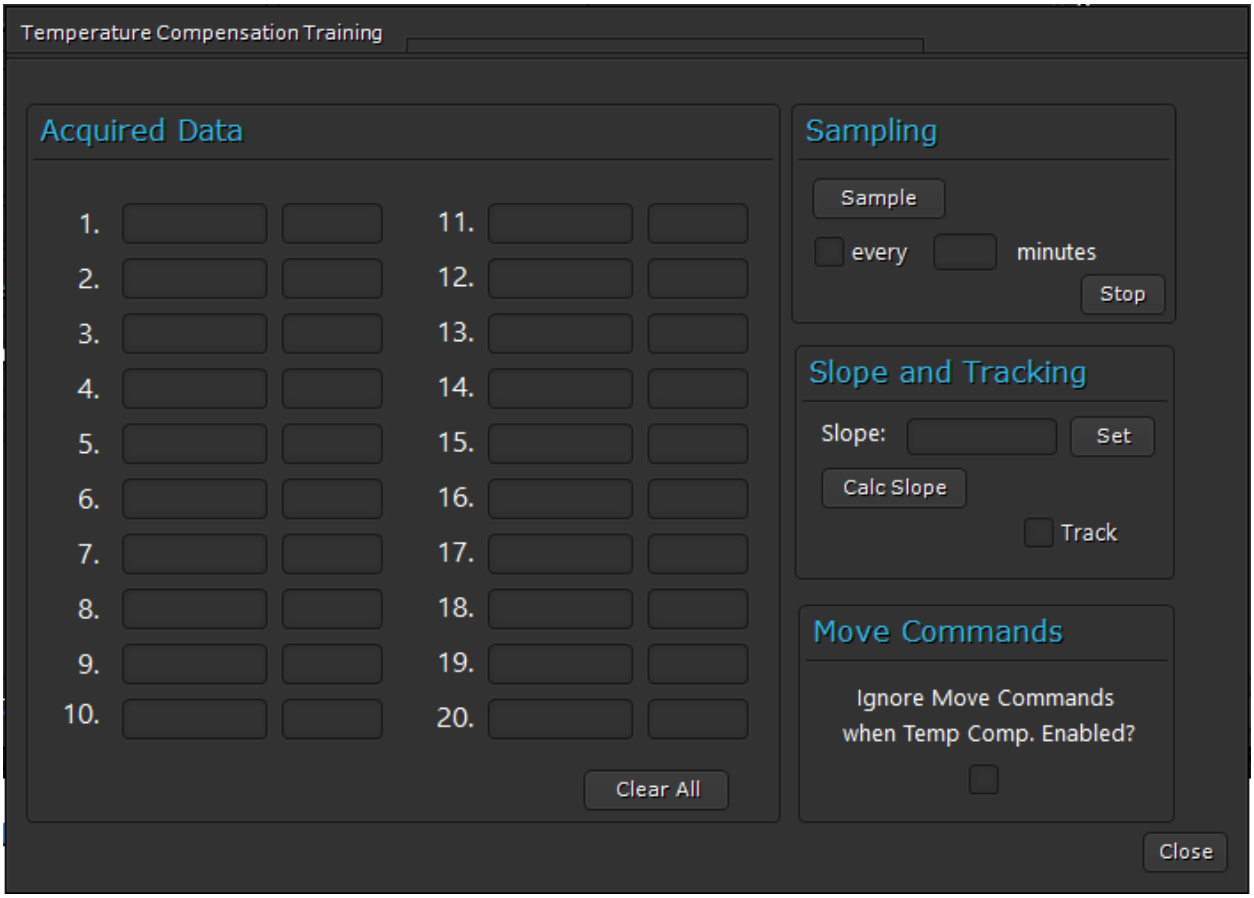


Temperature Units/Training.

Choose to have the displayed temperature in degrees Celsius or Fahrenheit by selecting the corresponding radio button.

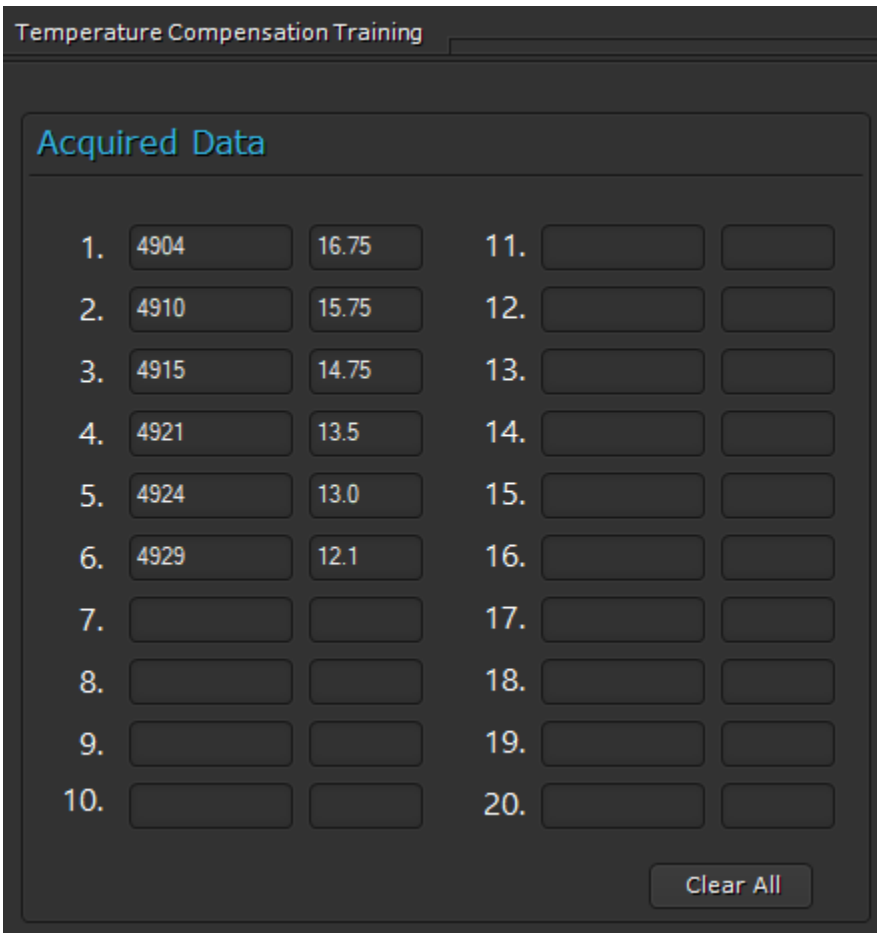
Pressing the “Temp Comp Training” button opens up a whole new window where you can train the software to adapt your focus as temperature changes.

Temperature Compensation is not a “magic bullet” which will improve your focus under any circumstances. It is really only useful if you live in a climate where the temperature falls rapidly and deeply after dark. In a temperate climate like the UK this almost never happens to the degree where you need to use temperature compensation. In this case, periodic refocusing between images is a better option. However, if you live in a climate where the temperate drops by a degree or more during the course of an image then consider temperature compensation to adjust your focus while imaging.

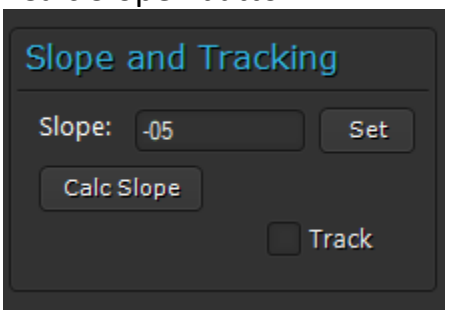


You will need to collect a set of data points which represent how much focus changes with temperature. Start with a focused scope and press the sample button. A data point is captured with the current step position and temperature. Wait until the temperature has changed by one degree and sample again. A

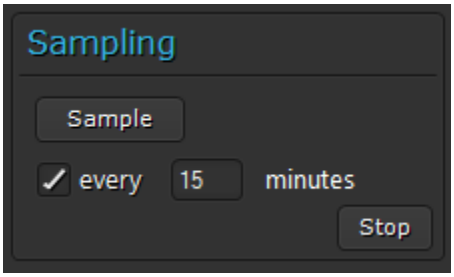
second data point is captured. Continue for as long as possible capturing as many data points as possible until the data section looks something like this



The more data points you capture the more accurate compensation will be. When the temperature stops falling or you have captured enough data. Press the “Calc Slope” button.

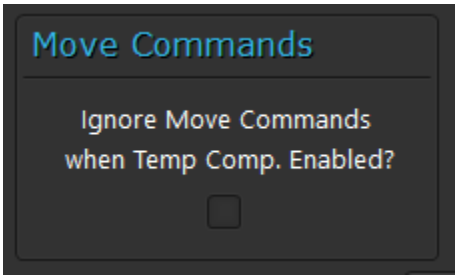


A slope value representing a number of steps per degree to compensate will be calculated. Press set to store this value. You can immediately press “track” to begin compensation.



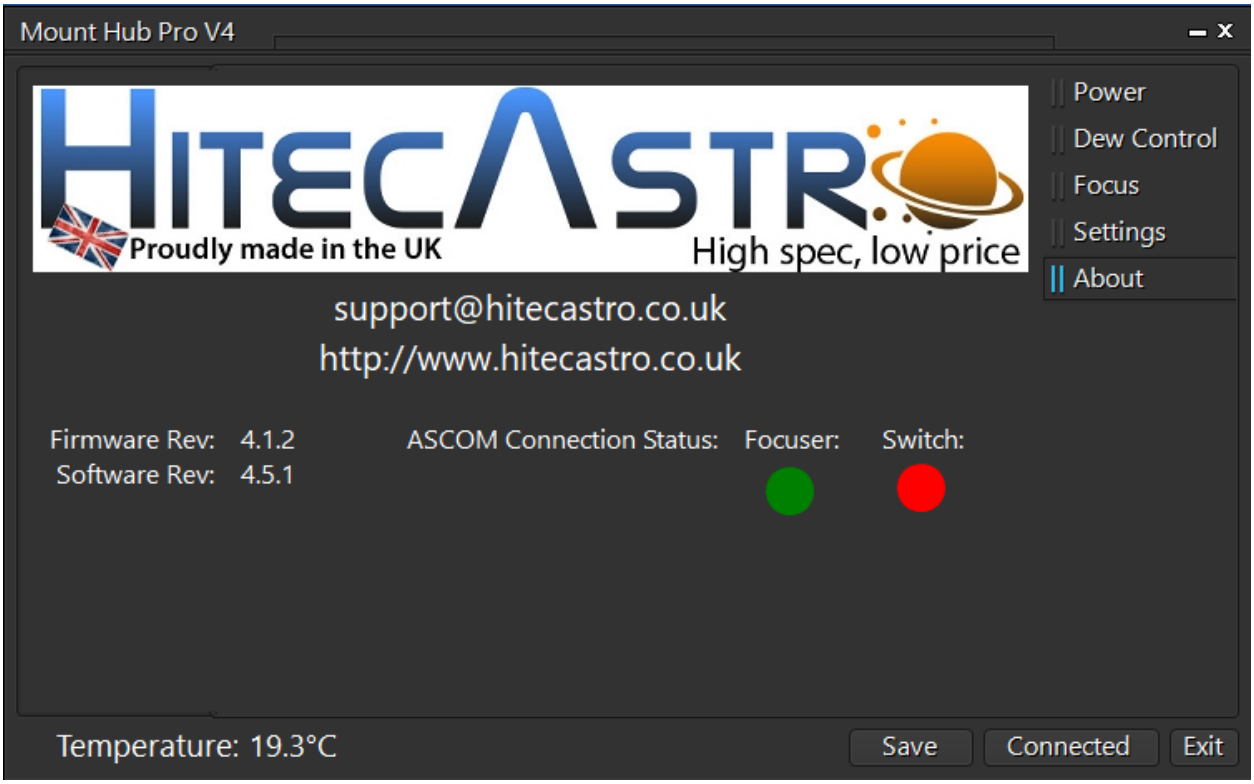
If you wish to automatically capture data you need to carefully set up as follows. In the “Sample every x minutes” section enter a value in minutes. Arrange for your auto focus software routine to complete before each sample so that the scope is perfectly focused each time a sample is taken. Check the box before “every” and press sample. Data points will be captured at the specified interval. We fully appreciate that in practice this automatic data acquisition is hard to achieve but if you can arrange it, you will be spared hours in cold weather waiting to take individual samples.

What represents and adequate number of samples will change with your local circumstances and equipment. We would recommend at least 5 points across a temperature difference of 5 degrees.



Finally the “Ignore Move Commands” checkbox will prevent the focuser being moved by any other means while temperature tracking is enabled.

About Tab



This page contains information about the software version. The connection status of the Focuser and Switch ascom drivers is displayed graphically.

ASCOM Focus Driver.

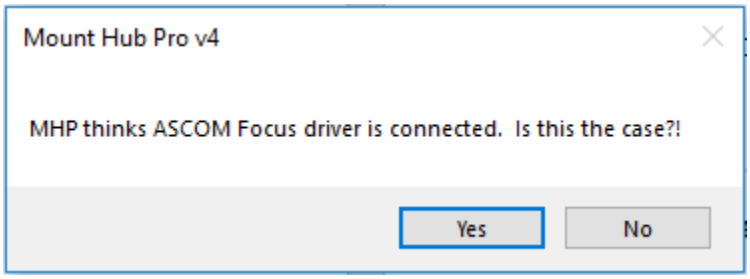
Installed at the same time as the focus driver is an ASCOM compliant driver for use with third party software or to enable you to write your own software to communicate with the focus portion.

Please Note: Before connecting the ASCOM Focus driver. Ensure the MHP Software is running and connected.

Connect to the "MHPV4 Focuser" driver from your third party application. Once connected the focus controls on the MHP Application software are disabled while the ASCOM driver is connected. This is to ensure that only ASCOM can command the focuser while the driver is connected.

Parameters such as focus speed etc must be configured before connecting the ASCOM driver and may not be changed while the ASCOM driver is connected

You should always disconnect the ASCOM driver from your third party software before exiting the MHP application. If you do not disconnect the ASCOM driver the MHP Software may believe it is still connected the next time you start the software. If this happens you will see a dialog box like this when you start the software.



If the ASCOM driver is not connected, click 'NO' and the ASCOM profile will reset to disconnected.

Only one driver is needed for both Stepper and DC motors. The driver will automatically operate whichever focus mode is selected in the software (DC or Stepper)

ASCOM Switch Driver.

Installed at the same time as the focus driver is an ASCOM compliant driver for use with third party software or to enable you to write your own software to communicate with the switched outputs such as the power and dew switches.

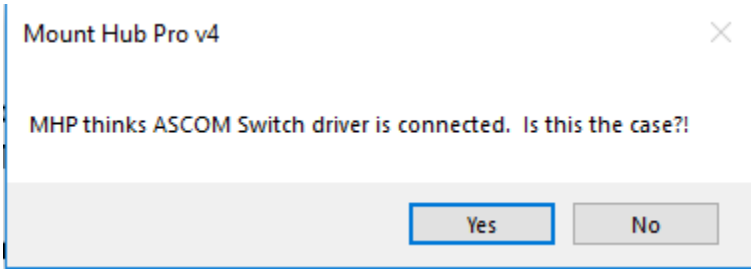
Please Note: Before connecting the ASCOM Switch driver. Ensure the MHP Software is running and connected.

Connect to the "MHPV4Switch" driver from your third party application. Once connected the switches can be operated through this third party software.

Currently the ASCOM Switch driver can command
Power ports 1 to 4
Dew ports 1 – 3

Parameters such as dew port duty cycle etc must be configured through the application software and may be configured while the driver is connected. If you change a switch state while the driver is connected that switch will immediately revert to its ASCOM state.

You should always disconnect the ASCOM driver from your third party software before exiting the MHP application. If you do not disconnect the ASCOM driver the MHP Software may believe it is still connected the next time you start the software. If this happens you will see a dialog box like this when you start the software.



If the ASCOM driver is not connected, click 'NO' and the ASCOM profile will reset to disconnected.

Application Programming Interface (API)

From v4.5. The MHP can be scripted or operated through user written scripts or customized applications.

We cannot provide support for programming the MHP. It is your responsibility to understand how to program in whatever programming language you choose. The documentation below assumes you are using vb.net. Of course any other object oriented programming language can be used.

The MHP API leverages the ASCOM profile store. The basic process to operate a feature of the MHP is as follows.

Create an instance of the ASCOM "Profile" object and set its .devicetype to either "Focuser" or "Switch"
Set the appropriate Ascom Connected profile key to string value "True"

Write the appropriate value to the correct profile key.

The MHP software will monitor these keys while the ASCOM Connected key is set to "True". To stop the software monitoring, set the key to string Value "False" (all of this is case sensitive.)
Before using any .net interfaces ensure you have set a reference to ASCOM.Utilities in your project or script

Basic Connection example;

Vb.net

Connect to the Focuser

```
Imports ASCOM.Utilities
Public Class Form1
    Private Sub Form1_Load(sender As Object, e As EventArgs) Handles Me.Load
        Dim p As New Profile()
        Dim DriverID As String = "ASCOM.MHPV4.Focuser"
        p.DeviceType = "Focuser"
        p.WriteValue(DriverID, "S_AscomConnect_Focus", "True")
    End Sub
End Class
```

The focuser will move respond to move commands. To move the focuser set the "S_APOS" Key to the new value. The focuser will immediately slew to that value. E.g.

```
p.WriteValue(DriverID, "S_APOS", "5020")
```

The "S_CPOS" represents the current position of the focuser and can be read as follows

```
p.GetValue(DriverID, "A_CPOS")
```

When S_APOS and S_CPOS differ and the `S_AscomConnect_Focus` key is `true`, the focuser will slew to `S_APOS and S_CPOS` is set equal to `S_APOS`

Other parameters can be read and written in the same way a full list of parameters are as follows;
S_AscomConnect_Focus
Possible Values: String True, False
Comment: Must be set to true for any subsequent actions to occur.

S_CPOS
Possible Value: Integer
Comment: Represents the current position of the focuser in steps. Read Only. Any attempt to write to this key will be overwritten by the current position

S_APOS
Possible Value: Integer
Comment: Represents a new position for the focuser. Will cause the focuser to slew if this is different to S_CPOS

S_MOVING
Possible Value: 1, 0
Comment: Is set to 1 when the focuser is moving. Otherwise 0. Read Only.

AscomTemp
Possible Value: floating point
Comment: Represents the current temperature read by the MHP. Read Only

TempComp
Possible Value 1, 0

Comment: Enables temperature compensated focusing when set to 1 and a slope has been calculated, only if the focuser is in stepper mode. Set 0 to disable temperature tracking.
Note: Enabling this in DC mode will lead to unpredictable results.

Is Step
Possible Value: 1, 0
Comment: Used to determine if the focuser is in stepper mode (1) or DC mode (0). Used in conjunction with TempComp.

Connect to the Switch Interface

First set the switch interface to connected

```
Imports ASCOM.Utilities
Public Class Form1
    Private Sub Form1_Load(sender As Object, e As EventArgs) Handles Me.Load
        Dim p As New Profile()
        Dim DriverID As String = "ASCOM.MHPV4Switch.Switch"
        p.DeviceType = "Focuser"
        p.WriteValue(DriverID, "S_AscomConnect_Switch", "True")
    End Sub
End Class
```

This exposes 10 values which can be written to with 1 to set switch on and 0 to turn off as well as 3 values which can be set from 0 to 100 to represent the duty cycle of the dew ports

Key Value	**Description**
S1	Represents Power Port 1. Set 1 to turn on and 0 to turn off
S2	Represents Power Port 2. Set 1 to turn on and 0 to turn off
S3	Represents Power Port 3. Set 1 to turn on and 0 to turn off
S4	Represents Power Port 4. Set 1 to turn on and 0 to turn off
D1	Represents Dew Port 1. Set 1 to turn on and 0 to turn off
D2	Represents Dew Port 2. Set 1 to turn on and 0 to turn off
D3	Represents Dew Port 3. Set 1 to turn on and 0 to turn off

D1V	Represents Dew Port 1 duty cycle. Set from 0 to 100
D2V	Represents Dew Port 2 duty cycle. Set from 0 to 100
D3V	Represents Dew Port 3 duty cycle. Set from 0 to 100
S_AscomConnect_Switch	Write True to connect, False to disconnect. Must be set to True for the previous keys to be effective.

Troubleshooting

Q: My Mount Hub Pro does not operate at all.

A: Ensure that you have connected the device to an appropriate power supply. (12v centre positive) See 'Connecting the Device' earlier in this document. Disconnect and Reconnect the device. Also ensure that the 15amp fuse has not blown, see below.

Q: Fuse Replacement.

A: The 15 amp protection fuse may have blown. This fuse is located inside the cigar plug which connects to the power outlet. Procure a suitable replacement from your local electrical retailer (or contact Hitecastro). To replace unscrew the silver colored knurled ring at the tip of the cigar plug. Remove this taking care not to lose the tip inside the knurled ring. You will be able to remove the fuse inside and fit a replacement. Replace the knurled ring and tip carefully. When fitted correctly you should be able to push the tip in slightly with a firm press of your thumb.

Q: My MHP appears to operate properly but my heater tapes are not getting warm.

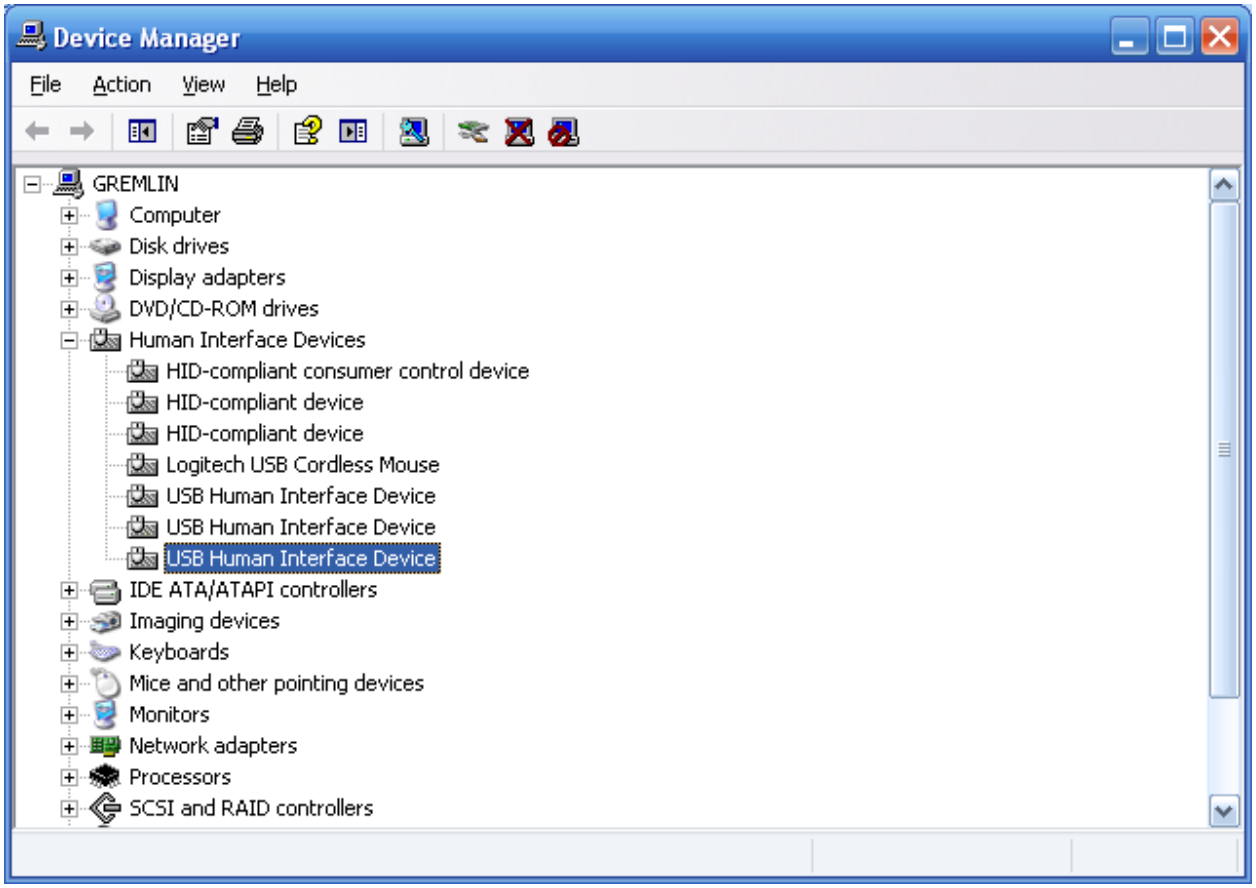
A: Note that heater tapes are not designed to get very warm. In fact when operated properly they may not even feel warm to the touch. In any case check that the heater tapes are plugged in securely. Dew heater tapes may also be quite fragile. Ensure that the tape is not damaged in any way according to the procedure advised by the tape manufacturer.

If you feel confident to do so you may measure the voltage of your heater output with a good quality voltmeter. With the heater output turned up full you should be able to measure a voltage corresponding to the full output voltage of your power supply. This voltage will decrease as the corresponding knob is decreased and will read close to 0v when turned fully anticlockwise. Take care not to create a short circuit by creating a direct connection between the positive and negative output on any channels. This may result in damage to your power supply. Do not undertake this procedure unless you are qualified to do so.

Q I click 'Connect' but nothing happens

A First ensure that all cables are seated correctly and the unit is correctly powered. If the unit was started before windows, disconnect and reconnect the power supply. If the unit still does not connect, check that the device has been detected by windows as a ‘USB Human Interface Device’ as follows.

Open Device Manager (Click Start->Run type ‘devmgmt.msc’ (without the quotes) and click ok. Device Manager Opens. Look for the area labeled ‘Human Interface Devices’. Click the ‘+’ sign to its left to expand this area. You may see many Human Interface Devices.



If the above does not solve your problem contact us by e-mailing

support@hitecastro.co.uk

or by contacting your retailer.

Declaration of Conformity for CE Marking.

EU Declaration of Conformity

This product carries the CE Mark in accordance with relevant European Union Directives. CE Marking is the responsibility of;

David A. Jackson and David M. Grennan, Hitecastro, 30 Waverley Place, Worksop, Nottinghamshire, S802SX, United Kingdom.

This product is designed for recreational use only and must not be used in any application where safety or personal injury may result from its failure.

This product is not a toy.

This product may cause unwanted interference in a domestic environment. The user may be required to take remedial measures.

Disposal

This product may not be disposed of along with domestic waste. To dispose of this item, take it to a local facility authorised to dispose of electrical waste covered under Electrical and Electronic Equipment (WEEE) regulations.

Links

Requirements for using our software

Dot Net Platform Version 4
http://www.microsoft.com/downloads/

ASCOM Platform
http://www.ascom-standards.org/