

DEEP SKY DAD FLAT PANEL 2 MANUAL v1



Making flats can be quite cumbersome, especially if you stride towards automation and simplification of the process. Our flat panels can automate the process of creating flat frames with your refractor telescope, eliminating the need for improvised methods like using LCD screens, the sky with a t-shirt, and similar hacks. We are offering 4 main categories of flat panels:

- **Motorized Flap Panels (FP2)**
- **Flat Panels for Lenses (FTL2)**
- **Basic Flat Panels (FT2)**
- **Wall mounted Flat Panels (WFT2)**

Motorized Flap Panels (FP2)

Intro

Deep Sky Dad Flap Panel enables automation of making flats, protecting your optics from unwanted dust when not imaging and (optionally) preventing dewing issues of LED panel with built in heater.

Features



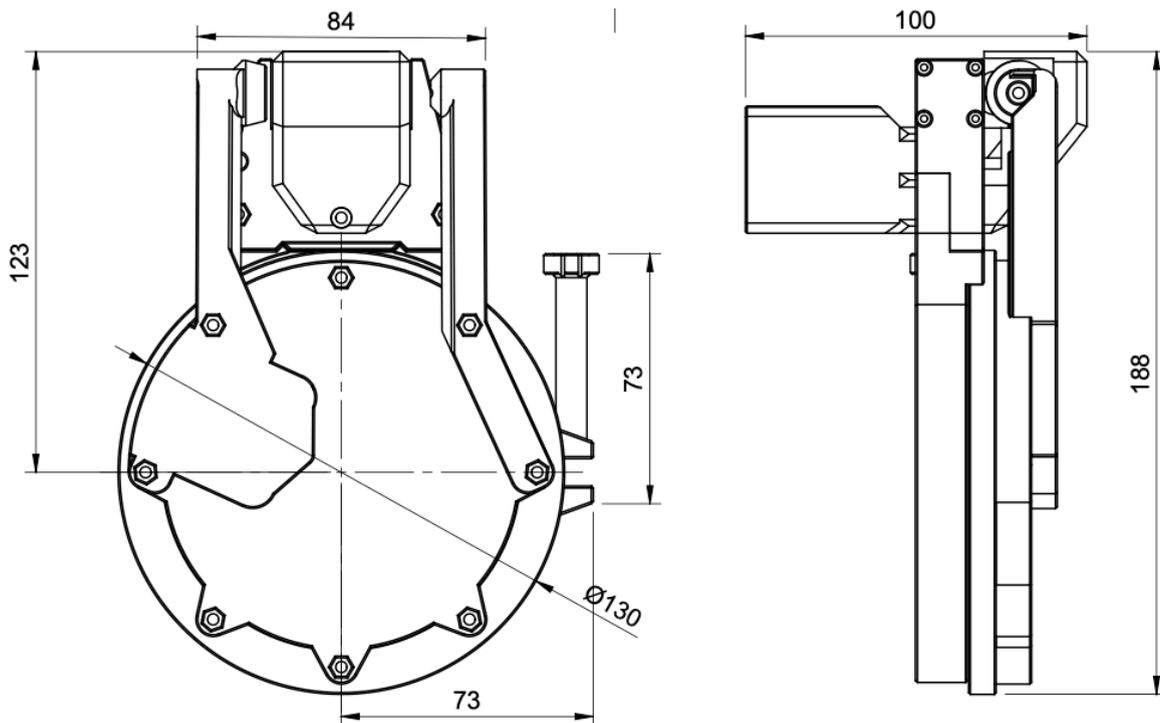
- Compact modular design
- Compression rings customized specifically for your telescope
- ARM cortex processor for good performance and connectivity
- Cross-platform control panel (Windows, Linux, Mac-OS)
- Easy installation (no bolts, 1x hand tightening knob)
- Dimmable LED light
- Servo motor with 270 degrees of motion and improved mechanics
- High brightness selection resolution (12-bit - 0-4096)
- Manual control with button
- Built in magnets, which snap the panel nice and tight when opened/closed
- Custom open position (**disabled by default**)
- Integrated obstacle detection (**disabled by default**)
- Automatic range calibration
- ASCOM support (up to 6 concurrent devices, with automatic port detection)
- INDI support
- ASIAIR support (**optional, with [special cable](#)**)
- Built-in LED heater to prevent dew accumulation on the LED surface (**optional**)
- PC connectivity: USB-C cable (**included**)
- Power requirements: 12V 3A (**not included**)

Dimensions

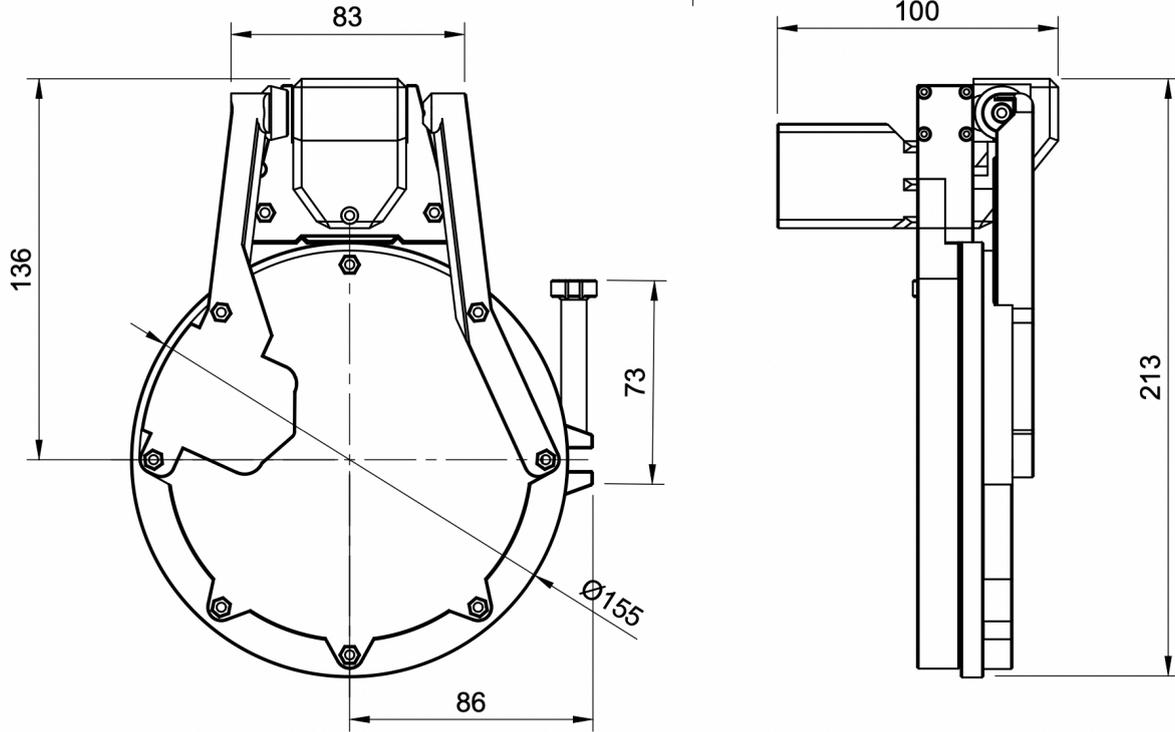
We are currently offering the following 5 different categories of flap panels:

Category	Dimensions (W x H x D in mm)	Min. dewshield dia. (mm)	Max. dewshield dia. (mm)	Effective LED diameter (mm)	Weight (g)
FLAP100	138 x 188 x 100	40	103	75	470
FLAP125	164 x 213 x 100	104	128	100	526
FLAP150	189 x 238 x 100	129	154	125	647
FLAP170	209 x 258 x 100	155	175	145	700
FLAP194	234 x 282 x 100	176	202	169	800
FLAP260	301 x 348 x 100	203	268	235	1175

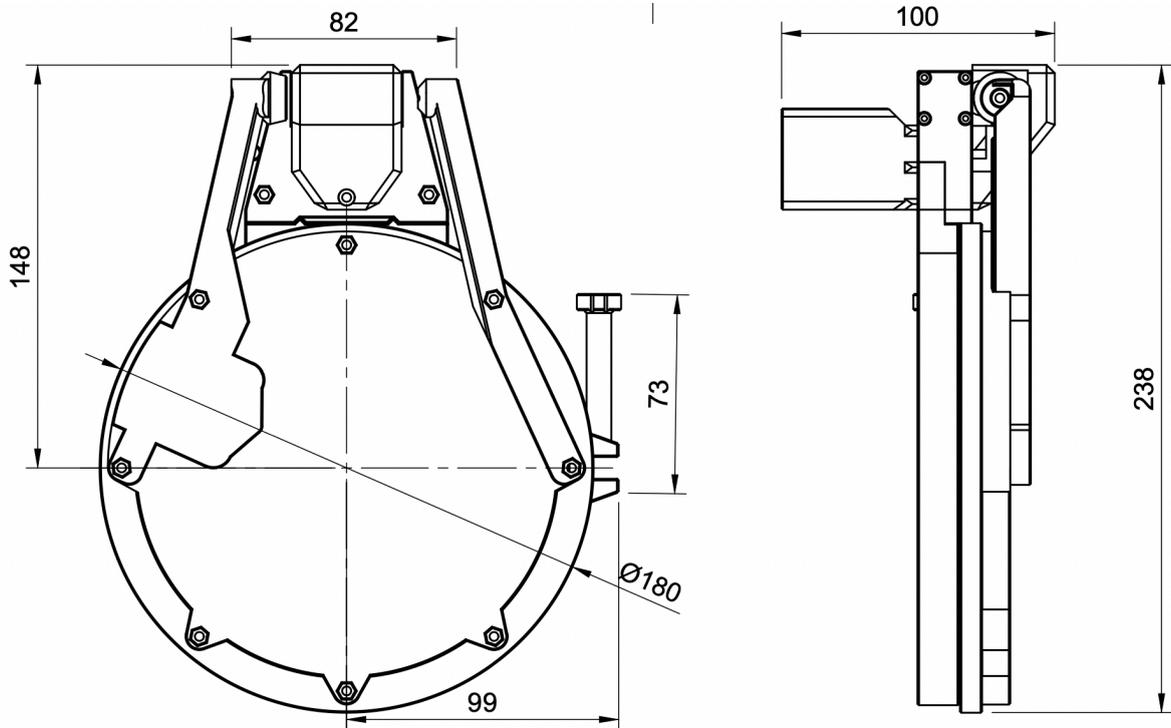
FLAP100



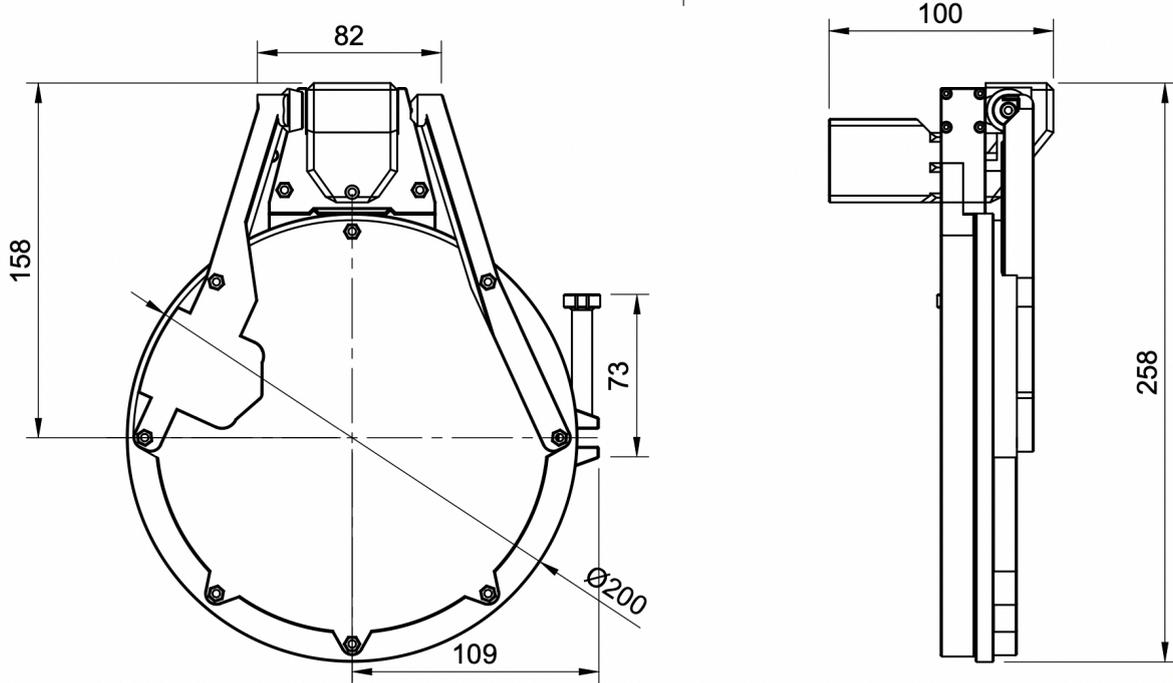
FLAP125



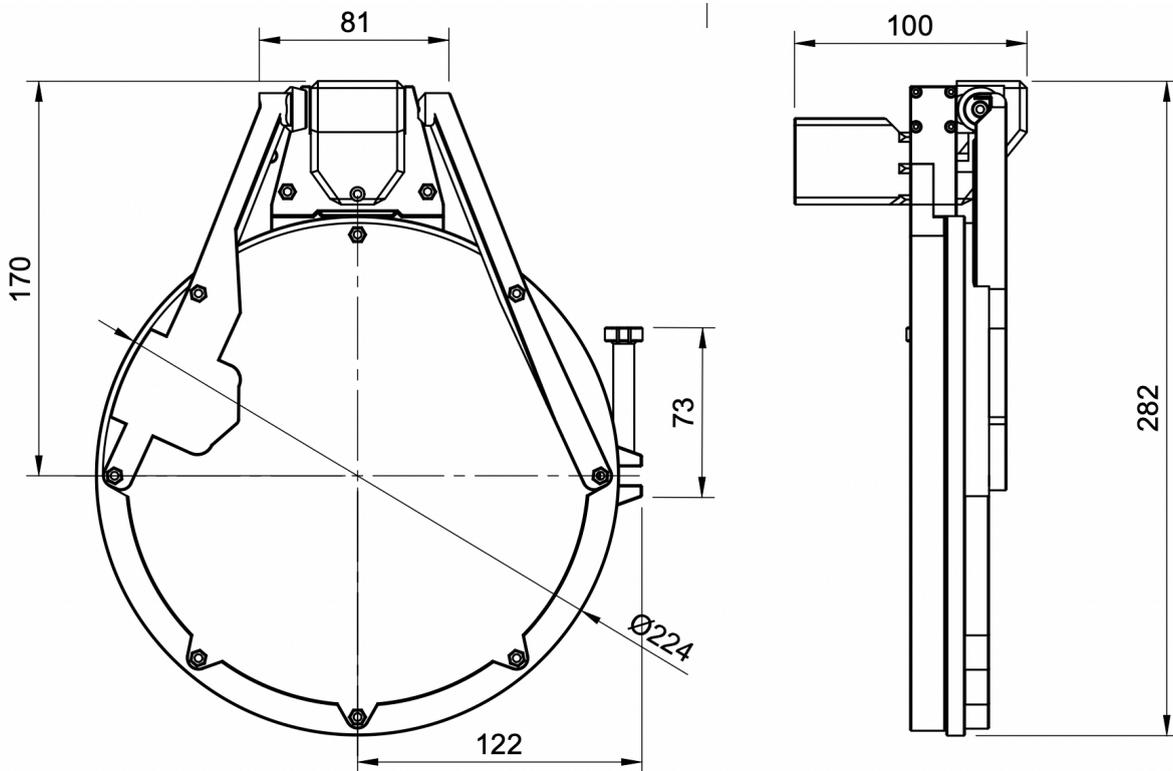
FLAP150



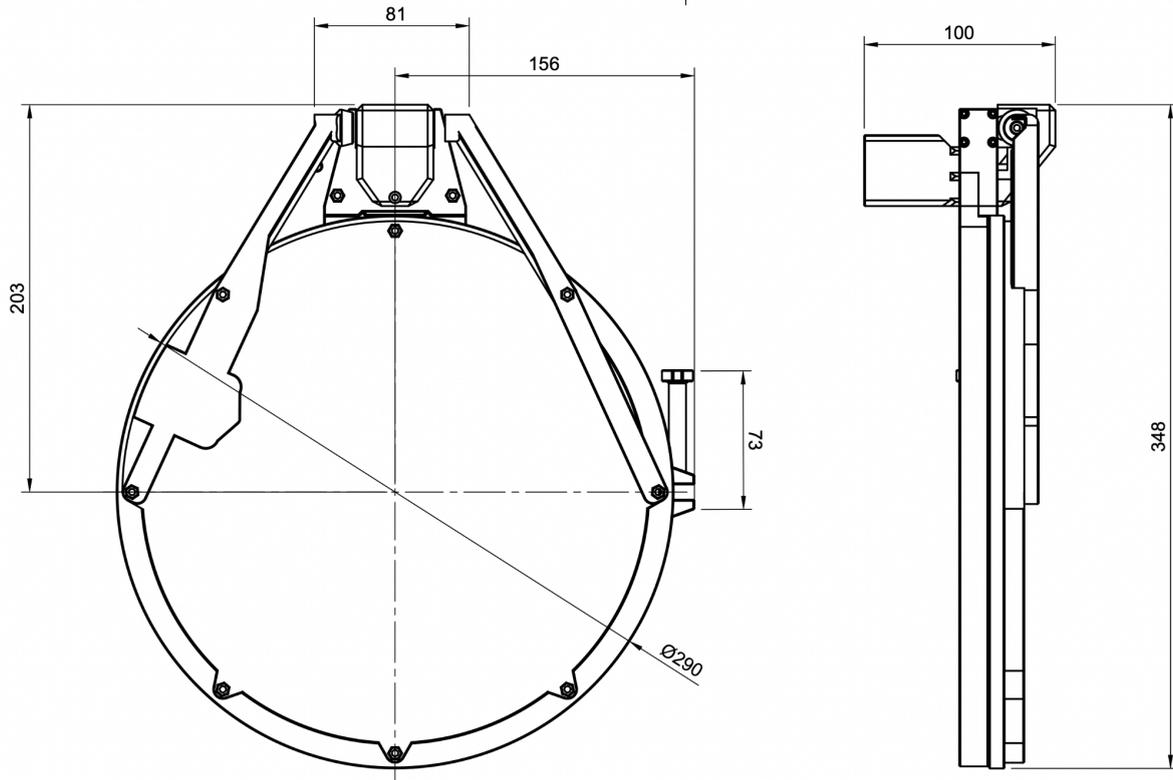
FLAP170



FLAP194



FLAP260



Installation

Installation of the flap panel is simple. Open the panel, slide it on so that the front is in line with the dew shield edge. Secure the flap in place with a hand tightening bolt, **do not overtighten, or plastic may crack!** After that, close the panel before powering it.



Mounting position

Gravity can affect the opening and closing action by counteracting motor movement or flexing 3D printed components. That is why it is important to position the flap panel correctly according to its size. There are 3 general mounting positions: TOP (flap opens above the opening of OTA), SIDE (flap opens to the side of the telescope opening) and BOTTOM (flap opens below the telescope opening). **These are positions relative to the ground, so telescope mount position has to be taken into account.**



TOP

SIDE

BOTTOM

Choosing the correct position ensures that the magnets can properly reach the LED ferromagnetic sticker or bolts when opening and closing. It is also advisable to always open and close in the same

telescope position (e.g. mount parked) so the movement is repeatable and components are not overstrained due to improper orientation. Below is a table of positions in relation to the flap size:

Category	TOP	SIDE	BOTTOM
FLAP100	YES	YES	YES
FLAP125	YES	YES	YES
FLAP150	YES	YES	YES*
FLAP170	YES	YES	YES*
FLAP194	YES	YES	YES*
FLAP260	YES	NO	NO

*range calibration might be required if you are using the flap at the bottom position

If you have chosen the closing position correctly and the flap is still not fully opening/closing, please try to perform automatic range calibration, described in the FAQ section.

Flat Panels for Lenses (FTL2)

Intro

Deep Sky Dad Flat Panel for Lenses can be a nice add-on to your lens setup or small refractor for the field work. The way it differs from standard flat panels is the fact that you can simply put it onto the different lens dewshields after you finish imaging via 3 tightening bolts. We are offering it in 3 different sizes: FTL100, FTL150 and FTL170.



Features

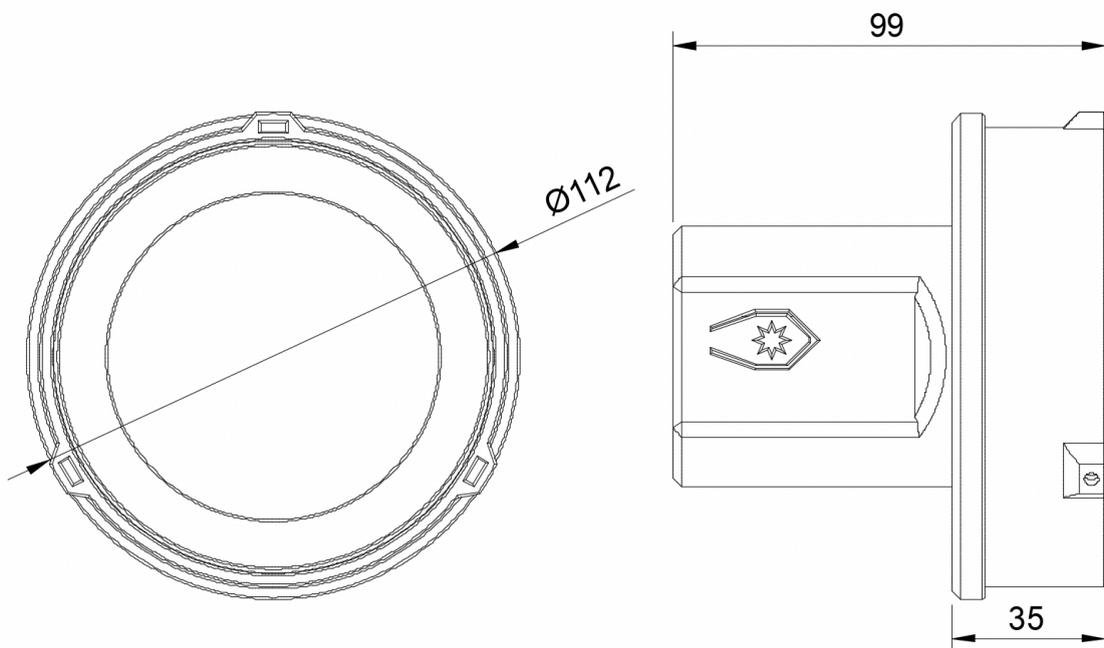
- Compact modular design
- ARM cortex processor for good performance and connectivity
- Cross-platform control panel (Windows, Linux, Mac-OS)
- Easy installation (3x hand tightening knob)
- Dimmable LED light
- High brightness selection resolution (12-bit - 0-4096)
- Manual control with button
- ASCOM support (up to 6 concurrent devices, with automatic port detection)
- INDI support
- ASI AIR support (**optional, with [special cable](#)**)
- PC connectivity: USB-C cable (**included**)
- Power requirements: 12V 3A (**not included**)

Dimensions

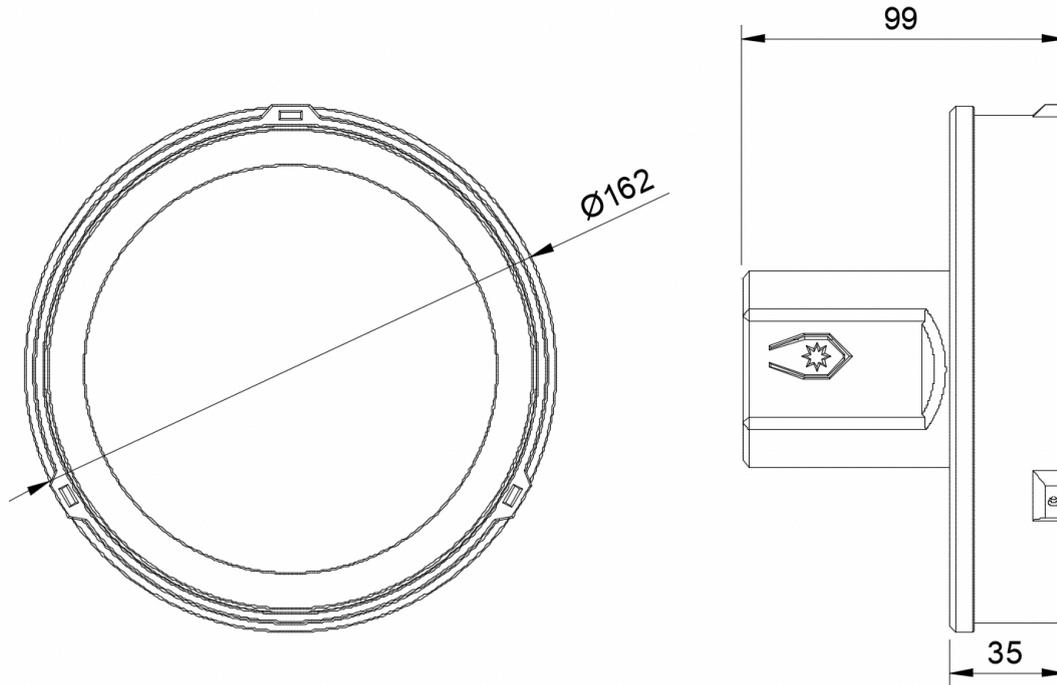
We are currently offering the following 3 different sizes of flat lens panels:

Category	Dimensions (D x d)	Min. dewshield dia. (mm)	Max. dewshield dia. (mm)	Effective LED diameter (mm)	Weight (g)
FTL100	112 x 99	16	84	75	230
FTL150	162 x 99	66	134	125	380
FTL170	182 x 99	86	154	145	430

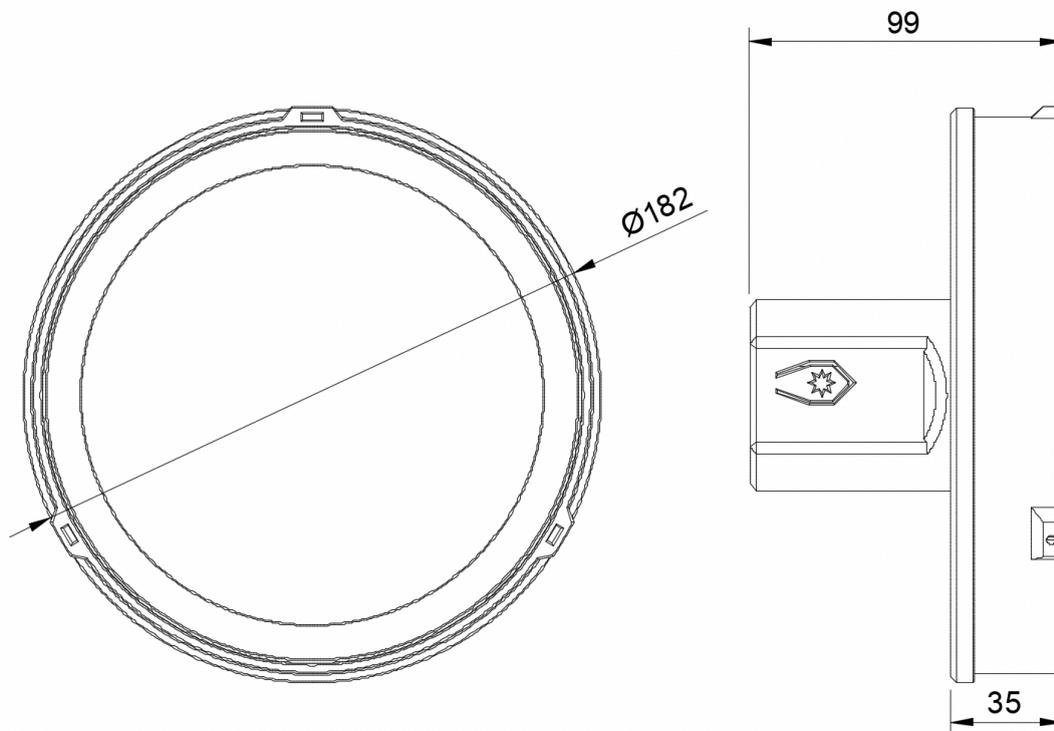
FTL100



FTL150

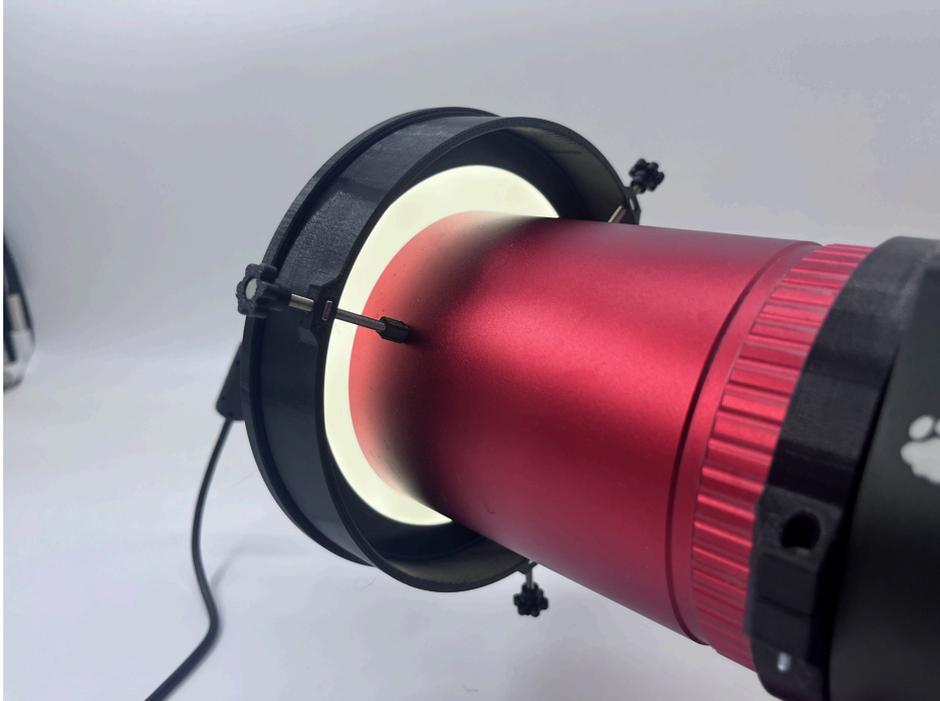


FTL170



Installation

Installation of the flat lens panel is simple. Put it on the front of the lens/lens dewshield, so the LED rests as close to the lens as possible. Tighten it with 3 bolts so it's firmly attached.



Flat Panels (FT2)

Intro

The Deep Sky Dad Flat Panel is a classic among flat panels and a natural upgrade from DIY alternatives like T-shirts, tablets, and similar makeshift solutions. Despite lacking advanced features, it provides an excellent entry point into frame calibration, offering affordability and a compact design. We offer our flat panels in four different sizes.



Features

- Compact design
- ARM cortex processor for good performance and connectivity
- Cross-platform control panel (Windows, Linux, Mac-OS)
- Dimmable LED light
- High brightness selection resolution (12-bit - 0-4096)
- Manual control with button
- ASCOM support (up to 6 concurrent devices, with automatic port detection)
- INDI support
- ASIAIR support (**optional, with [special cable](#)**)
- PC connectivity: USB-C cable (**included**)
- Power requirements: 12V 3A (**not included**)

Dimensions

We are currently offering the following 4 different categories of flat lens panels:

Category	Dimensions (D x d)	Effective LED diameter (mm)
FT170	177 x 14	140
FT194	201 x 14	164
FT260	267 x 14	230
FT300	307 x 14	270

Wall Mounted Flat Panels (WFT2)

Intro

The Deep Sky Dad Wall Flat Panel can be installed inside observatories, positioned near the telescope pier or tripod, allowing the telescope to be parked in alignment with the panel. This is particularly useful for larger telescopes with a truss design, where automated flap panels can pose challenges due to space constraints, as motorized flaps require room to open and close. The panel features an integrated input port and comes with a separate control box, which connects via a male DC connector.



Features

- ARM cortex processor for good performance and connectivity
- Cross-platform control panel (Windows, Linux, Mac-OS)
- Installation via pre-drilled holes in the edge of the panel
- Dimmable LED light
- High brightness selection resolution (12-bit - 0-4096)
- Manual control with button
- ASCOM support (up to 6 concurrent devices, with automatic port detection)
- INDI support
- ASIAIR support (**optional, with [special cable](#)**)
- PC connectivity: USB-C cable (**included**)
- Power requirements: 12V 3A (**not included**)

Dimensions

We are currently offering the following 2 different sizes of flat lens panels:

Category	Dimensions (W x H x D)
WFT3030	328 x 328 x 18
WFT6060	628 x 628 x 18

FAQ

Basics

Can I use FP2 drivers, control panel and firmware for all categories of flat panels? (FP2, FTL2, FT2 and WFT2)

Yes, the FP2 drivers and software work for all our flat panels categories.

What kind of power adapter can I use?

We recommend using a 12V DC power adapter, as the units are fine-tuned for this specific voltage. The socket specification is tip positive, 5.5mm x 2.1mm. If you don't have a 12V adapter available, the units can also operate within a voltage range of 12V to 14V without any issues. The current output of the power adapter should be around 3A for flap panels (FP2) and at least 1A for all the other flat panel categories. Adapters with current rating > 3A will not damage the unit.

When I connect the USB-C cable to the PC, the flat panel is not detected. What can I do?

If you are using Windows 10 or higher, Linux or Mac OS, you should be ready to go. You can open our control panel (downloaded from [Software and documentation](#) page) and the flat panel should appear in the dropdown. If the device is not found, try following:

- different USB-C cable
- direct connection (without USB hub)
- using USB 2.0 port (instead of 3.0)
- reconnecting the power while USB is already connected

If you are using Windows 7 or older, please contact support at info@deepskydad.com

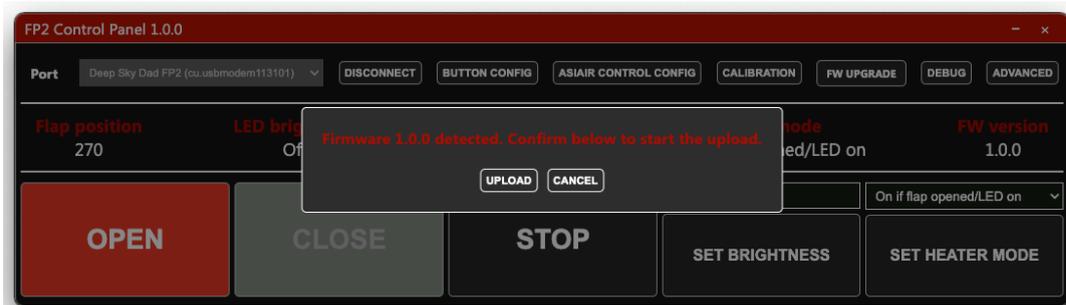
How can I upgrade the firmware?

Firmware upgrade is a simple yet delicate procedure. That is why I have put together simple and straightforward step-by-step instructions for installing the latest firmware.

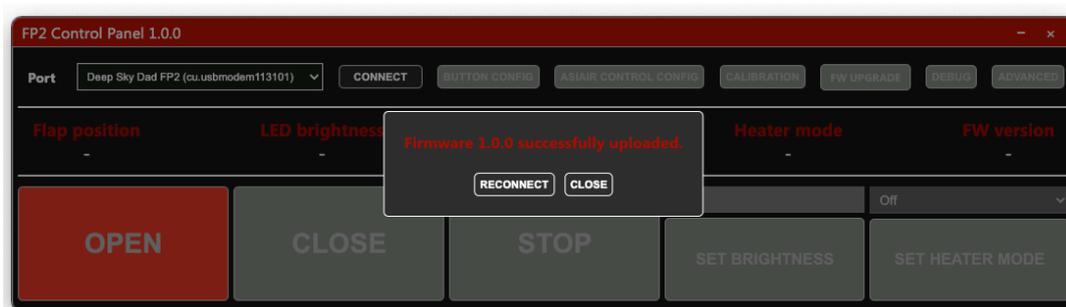
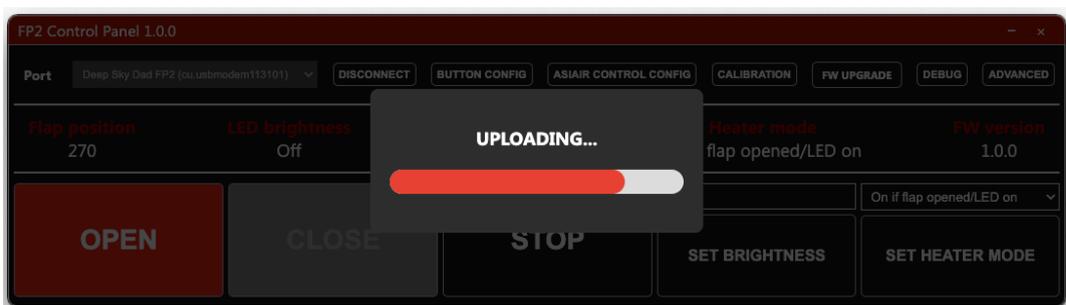
1. Connect the unit directly to the computer via USB-C cable. Make sure DC power is also connected
2. Download FP2 Control Panel and latest FP2 firmware from our [Software and documentation section](#)
3. Start control panel, and connect to the flap panel



4. Click »FW UPGRADE« and select the .dsd file. The dialog with selected firmware version will open. Click Upload to begin the firmware upgrade procedure



5. The firmware upload will begin, and once completed, a message dialog will appear:



6. Click reconnect if you wish to test the flap or click close to finish the procedure.
7. If the upload fails, an error message will appear. If you encounter a timeout error, try unplugging the power and then retrying the upgrade process. In case you do not manage to upgrade the firmware, contact us at info@deepskydad.com.

How do I reset the flat panel to the factory defaults?

There are 3 ways you can reset the flat panel to factory defaults:

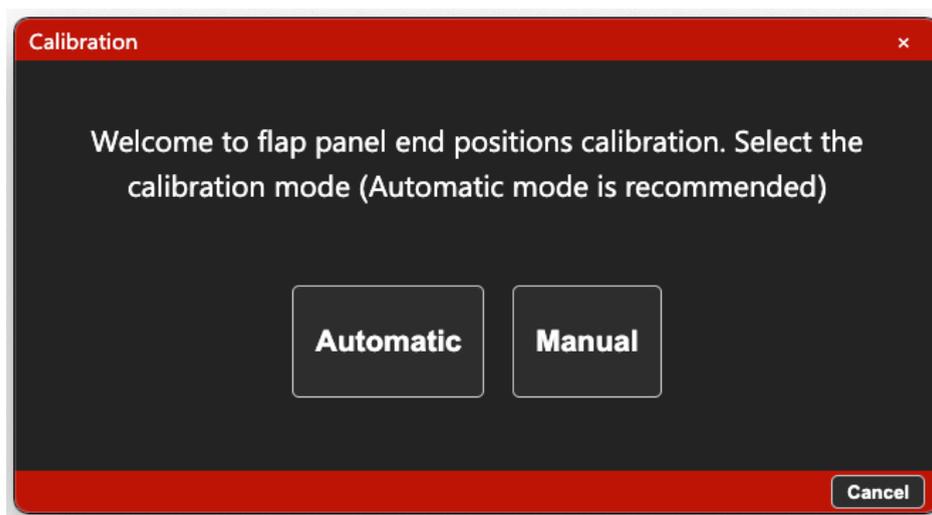
- via **manual button**: press and hold the manual button, connect power and keep on holding the button for about 10s until the LED stops flashing
- in the **FP2 Control Panel**: Connect power cable and USB-C cable to the flap panel. Open our control panel, select the flap in question and click the Connect button. Open **Advanced** dialog and click **Reset to factory defaults**
- in **ASCOM** settings: Connect power cable and USB-C cable to the flap panel. Open ASCOM settings, select the flap in question, expand **Advanced** section and click **Reset** button

Now your flat panel is reset to factory defaults. If you reset the motorized flap panel, you also have to perform range calibration, described below.

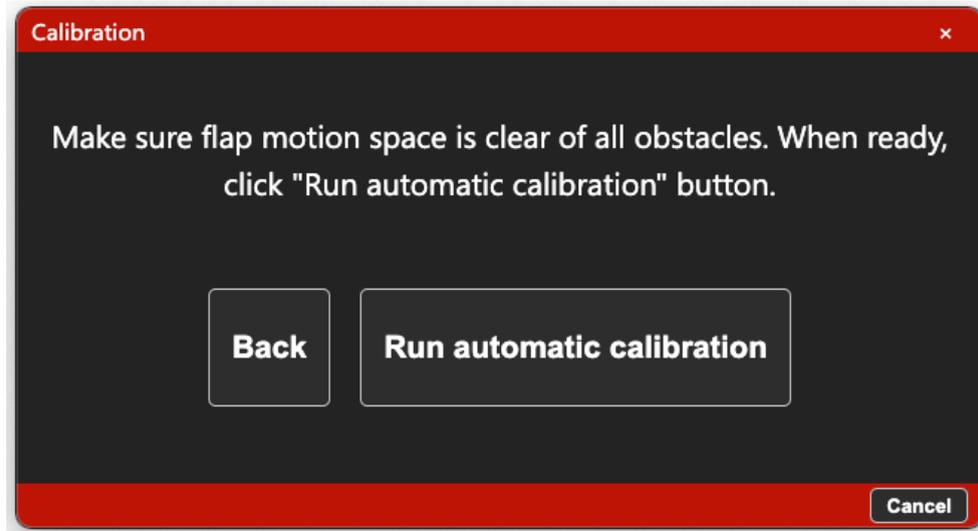
How do I perform motorized flap panel range calibration?

First, make sure flap motion space is clear of all obstacles. There are 2 ways to perform motorized flap panel range calibration:

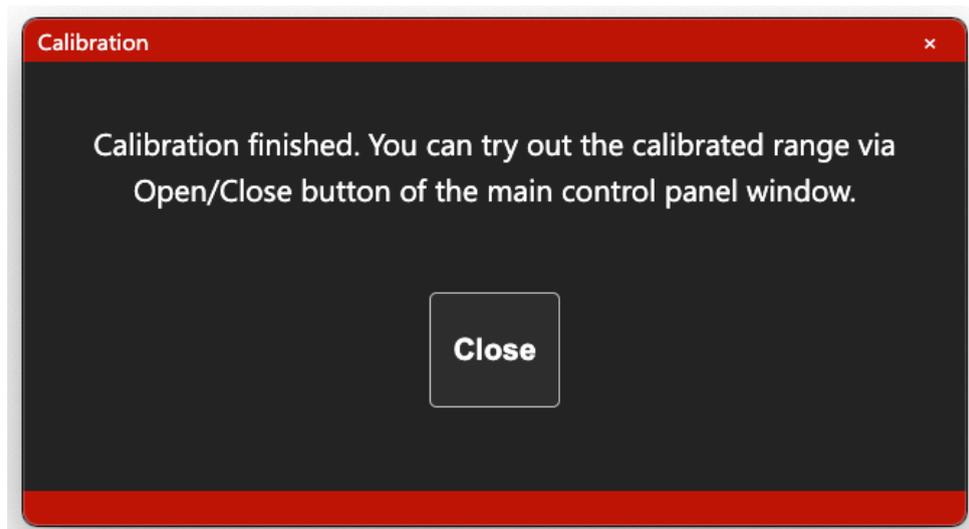
- via **manual button**: before connecting the power to the flap, press and hold the manual button. Now connect the power and keep on holding the button. Once the LED panel starts flashing, release the button. Now the flap will move and stop in the closed position. By short pressing the button, the flap will now perform automatic range calibration. After calibration is finished, The LED will
- in the **FP2 Control Panel**: Connect power cable and USB-C cable to the flap panel. Open our control panel, select the flap in question and click the Connect button. After that, click the calibration button in the top toolbar to open the automatic range calibration wizard.



Select Automatic and after that click Run automatic calibration



The procedure will automatically start in similar manner as manual button calibration and after its finished, a dialog is displayed:



USB cable remote control

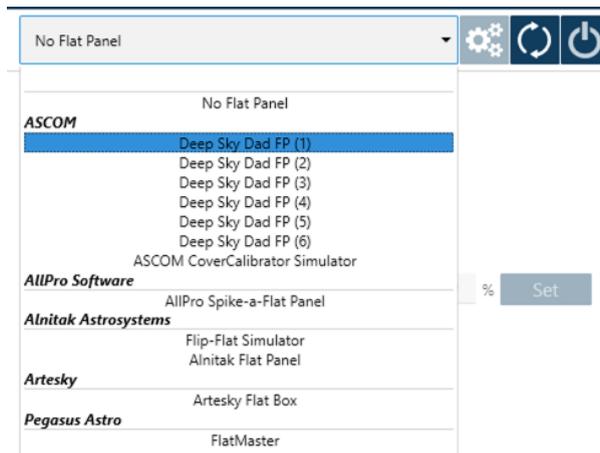
When you connect the flap panel to your PC via USB cable, you can remotely control it via ASCOM (SGPro, N.I.N.A, Voyager, APT,...), INDI or FP2 Control Panel.

ASCOM (Windows)

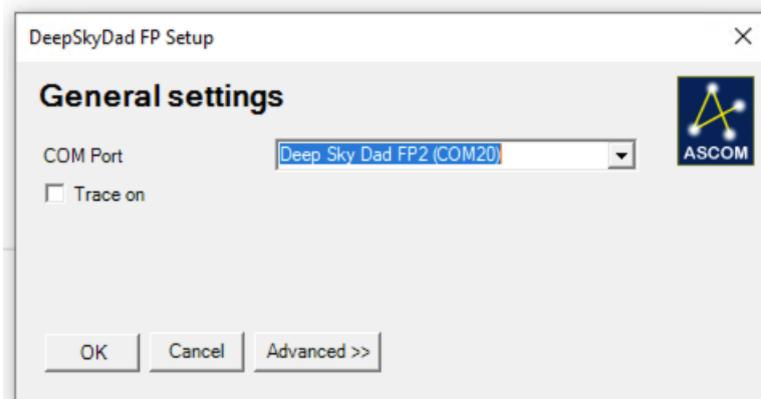
In Windows, we recommend you to use the ASCOM Cover Calibrator driver for control. This requires ASCOM Platform 6.5, which introduced the Cover Calibrator device. This way, you can automate our flap in any of the popular astronomy softwares (N.I.N.A, APT, SGPro, Voyager,...). We will use N.I.N.A. for a short demonstration below.

Basic usage

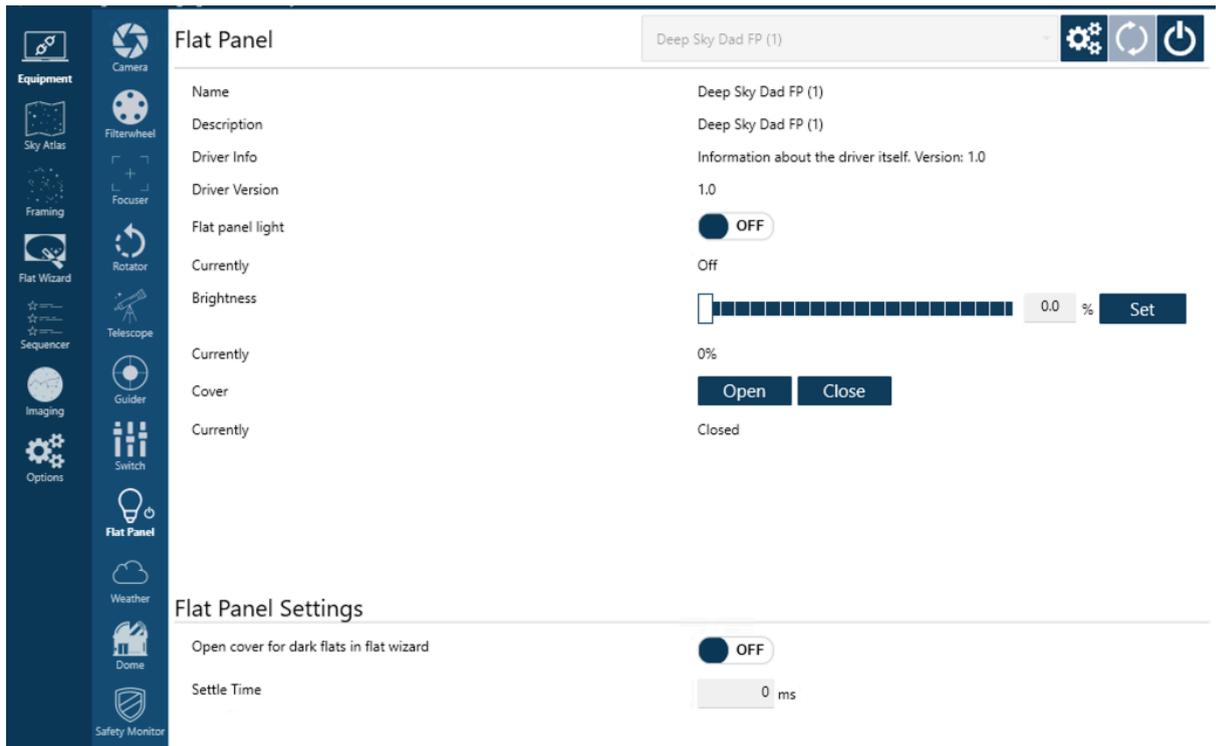
1. Download and install latest version of ASCOM driver from our [Software and documentation](#) page
2. Open N.I.N.A, navigate to *Equipment* -> *Flat Panel*
3. Select one of 6 *Deep Sky Dad FP* devices



4. Open ASCOM settings and select the flat panel



5. Click OK and connect to the flap



6. And you are ready to automate your flat frames! You can open/close the panel, control LED brightness etc.

Built in heater (optional)

If you also purchased optional built in heater to prevent dewing, you can choose heating mode and power in advanced ASCOM settings

1. Open ASCOM settings, click Advanced
2. On the right side you have 2 sections. Heater and System. We are currently interested in Heater, where you can select the heater mode ()
 - a. **Off** – heater is off at all times
 - b. **On** – heater is on at all times*
 - c. **On if flap open/LED active (default)** – heater is on when flap is opened or LED light is on*

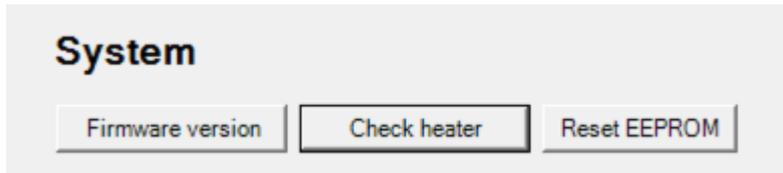


3. Selected heater settings are applied **when you connect to the flap next time.**

*heater contains built in thermistor, which constantly measures temperature and prevents overheating, should you forget to turn heater off

System controls

1. Open ASCOM settings, click Advanced
2. On the right side you have 2 sections. Heater and System. We are currently interested in System, which contains 3 buttons:
 - a. Firmware version – currently installed firmware version (in case you have ASCOM connectivity issues, click this button)
 - b. Check heater – checks whether heater is present
 - c. Reset EEPROM – resets unit settings to factory defaults

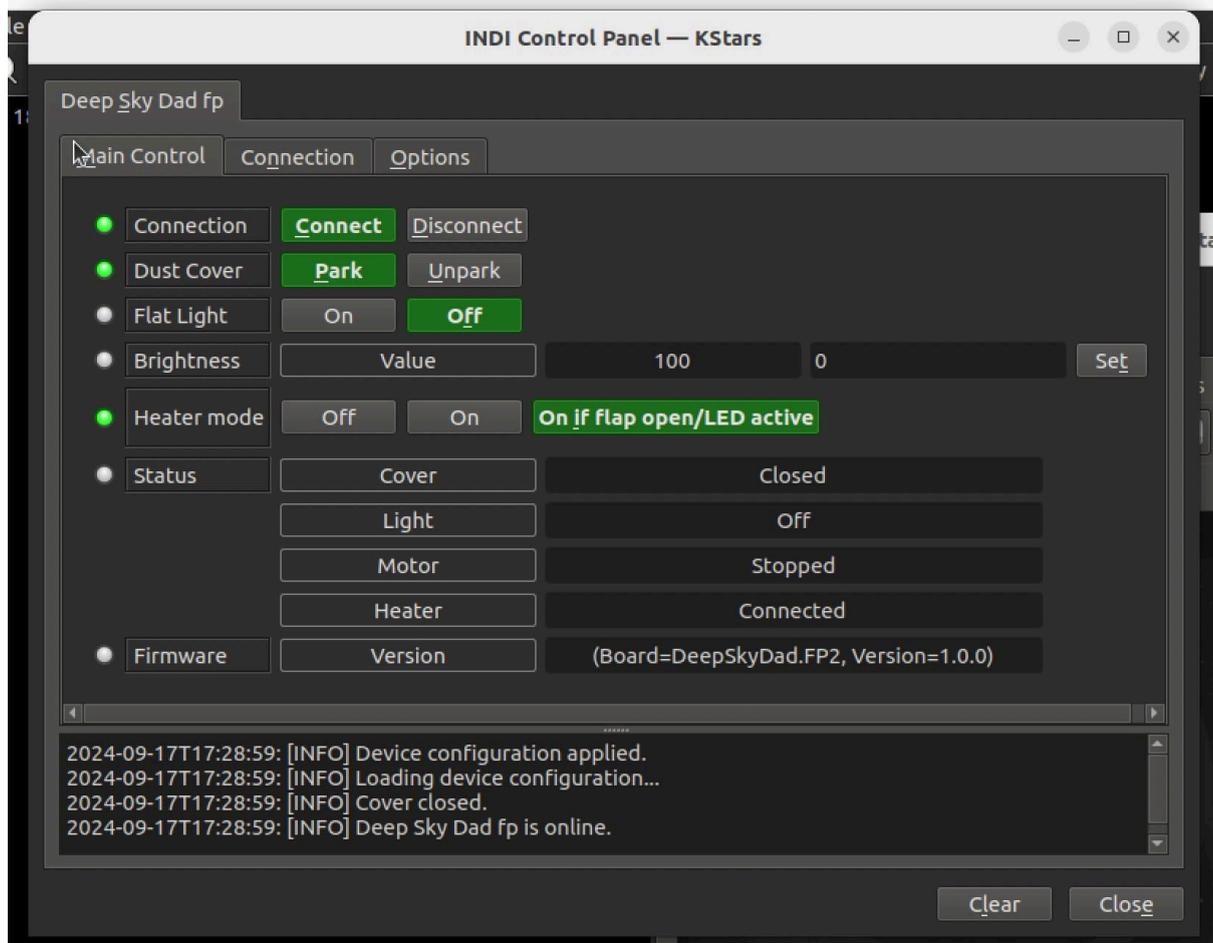


INDI (Linux)

In Linux, you can control our flap panel with the Deep Sky Dad FP INDI driver.

Basic usage

Select the correct ttyUSB device (e.g. ttyUSB0) and click connect. You can park/unpark the flap and control the LED brightness (0-4096). Statuses are displayed below the button interface.



Built in heater (optional)

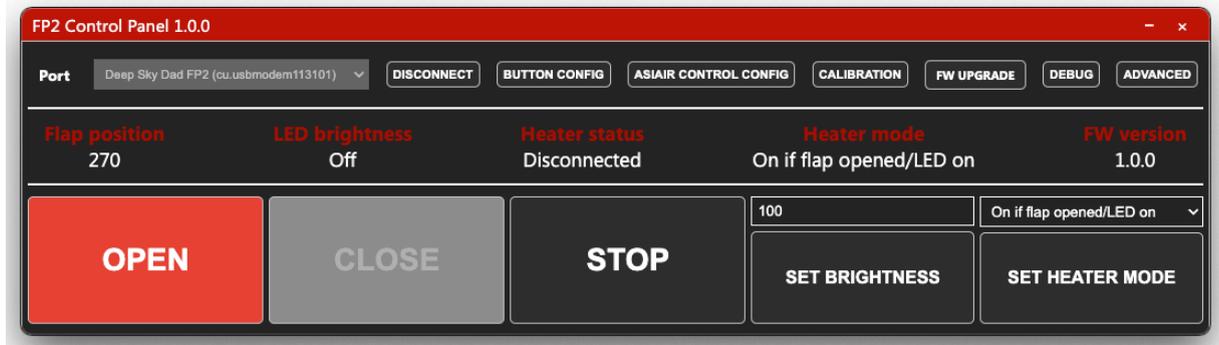
If you also purchased optional built in heater to prevent dewing, you can choose heating mode in INDI Main Control tab:

- Off** – heater is off at all times
- On** – heater is on at all times*
- On if flap open/LED active** – heater is on when flap is opened or LED light is on*

**heater contains built in thermistor, which constantly measures temperature and prevents overheating, should you forget to turn heater off*

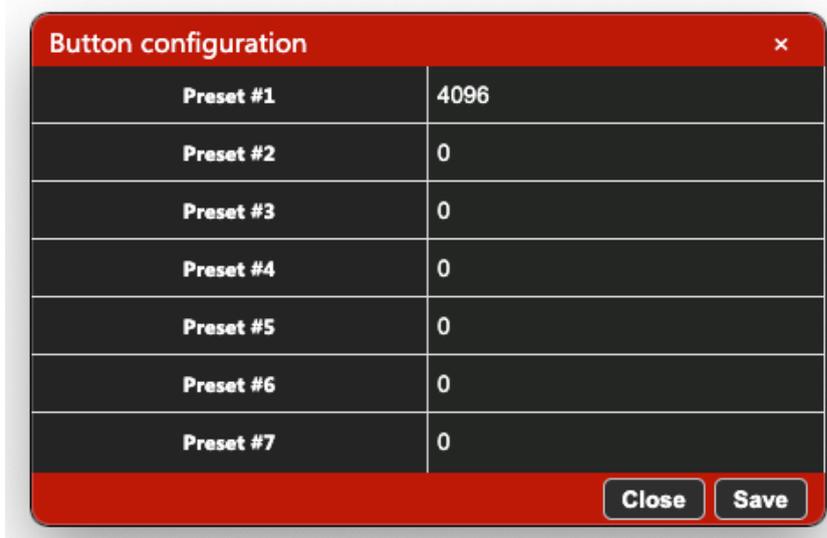
FP2 Control Panel (Windows, Linux, Mac OS)

If you wish to control our panel without 3rd party software, you can do so in Deep Sky Dad FP2 Control Panel:



Features:

- Opening/closing the flap
- LED brightness control (0-4096, 0 is off)
- Heater mode
 - Off
 - On
 - On if flap opened/LED on (default)
- Configure brightness presets for manual button



- Configure ASI AIR behavior

ASI AIR configuration
✕

Enable "Shutdown ASI AIR" Mode (?)	<input type="checkbox"/>
OFF (?)	LID OPENED, LED OFF
5% (?)	LID CLOSED, LED OFF
10% (?)	1
15% (?)	2
20% (?)	3
25% (?)	4
30% (?)	6
35% (?)	8
40% (?)	10
45% (?)	20
50% (?)	30
55% (?)	50
60% (?)	100
65% (?)	200
70% (?)	500
75% (?)	1000
80% (?)	2000
85% (?)	3000
90% (?)	4096

Close
Save

- Firmware upgrade
- Automatic range calibration wizard
- Debug output, in case you have to send us the state of the flat panel

- Advanced settings
 - **Circuit LED** - on/off, on by default
 - **Motor opening offset** - if > 0, this causes the motor to start at a specified offset from fully opened position (0-800). This can reduce motor gears strain at the beginning of the motion. 300 by default
 - **Motor closing offset** - if > 0, this causes motor to start at specified offset from fully closed position (0-800). This can reduce motor gears strain at the beginning of the motion. 300 by default
 - **Motor settle time** - if > 0, this keeps the motor on for a specified number of milliseconds (0ms-2000ms) after it has reached either of end positions. 0 by default
 - **Custom open position angle** - you can select a custom opened position angle between 0-180 degrees from fully opened position. 0 by default (flap will open all the way). **WARNING: use this feature at your own risk, as custom option position can cause additional strain to the servo motor gears and shortens the lifespan. This feature must be off for the FLAP260 category**
 - **Custom open position current threshold** - maximum custom open position holding current threshold (20-400). **WARNING: If maximum hold current is exceeded, the flap will automatically close to prevent servo motor damage. Use this feature at your own risk, as custom option position can cause additional strain to the servo motor gears and shortens the lifespan. This feature should be off for the FLAP260 category**
 - **Obstacle detection threshold** - maximum motor current draw in mA during the flap motion (500-2000, 2000 is recommended). If set to 0, this feature is disabled. Otherwise the motor will go back to its starting position when the motor current draw is larger from the entered value (indicating the flap could have hit an obstacle). 0 by default. **WARNING: use this feature at your own risk, as this could cause flap motion interference when set to wrong value**

Advanced ×	
Circuit LED (?)	<input checked="" type="checkbox"/>
Motor opening offset (?)	300
Motor closing offset (?)	300
Motor settle time (?)	0
Custom open position angle (?)	160
Custom open position current threshold (?)	400
Obstacle detection treshold (?)	0

ASIAIR cable remote control

ASIAIR cable is an accessory designed to seamlessly integrate with the ZWO ASIAIR (**ASIAIR PRO and ASIAIR PLUS only**) for effortless control of your Deep Sky Dad flat panel directly from the ZWO ASIAIR app. You can also check our demonstration in our [Youtube video](#).

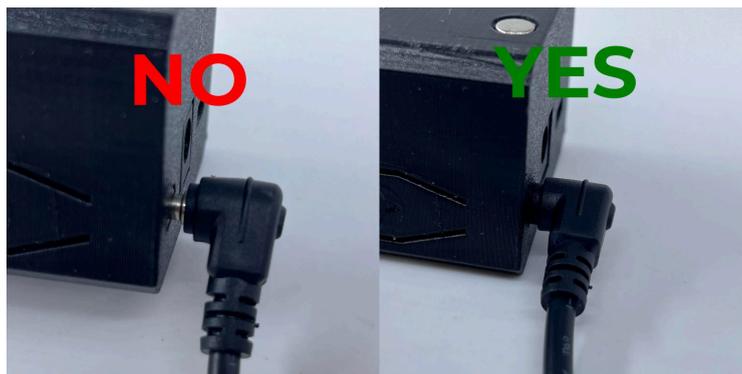
Basic usage

Brief Explanation of Control Behavior via ASIAIR cable (we highly recommend you check out our demonstration [Youtube video](#)):

Behavior	Main power DC port	ASIAIR cable DC port
Flap closed, LED on (DC port slider brightness control)	ON	ON
Flap opened, LED off	ON	OFF
Flap off	OFF	ON/OFF

In case you are experiencing problems with your ASIAIR cable, please perform the tests listed below and send us the results to info@deepskydad.com

- Unplug the ASIAIR cable and check main flap panel power is connected to DC input
- Short press manual button on the flap panel. Does LED brightness change? (It should)
- Long press the manual button on the flap panel. Does the flap panel open/close? (It should)
- Plug in the ASIAIR cable DC plug to the control port on ASIAIR and audio jack plug to the flap panel. Push the audio jack connector all the way in (this is crucial, if the connector is not pressed all the way in, connection with ASIAIR will not be established)



- Short press manual button on the flap panel. **Does LED brightness change? (It should not)**
- Long press the manual button on the flap panel. **Does the flap panel open/close? (It should not)**
- Change the value of the control port on ASIAIR to 100%. **Does the flap panel close and the LED turn on? (It should)**

If above tests fail to resolve the issues, connect the flap panel via USB cable to the Windows/Linux/Mac OS PC (while leaving ASI AIR cable connected). Run Deep Sky Dad FP2 control panel. Connect to the flap panel's COM port and click the "DEBUG" button in the upper right corner. A file save dialog will appear, allowing you to save the debug text file to your disk. Please send this file, along with a description of the issue you're experiencing, to info@deepskydad.com.

Manual control

Manual operation is possible via a built-in button.

- Single press of button iterates through brightness presets
- Long press opens/closes the panel
- If you press the button again while moving, the flap stops at current position

Warranty and returns

All our products have a 2 years warranty. We will replace any malfunctioning units in this period free of charge. Warranty does not apply to any malfunction caused by improper usage (wrong power supply,) or physical damage to the unit.

The customer covers return shipping costs when sending back the unit for repair or replacement. If the unit was purchased via dealer, the dealer is responsible for customer service.