

# Alnitak Astrosystems Flat-Fielding Devices

## Installation Manual Software Reference Guide



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## Generic Information

The following information applies to all Alnitak AstroSystems devices.

### Choosing brightness settings

The brightness range has been designed to accommodate a variety of telescopes and filters. The low end should be used for normal wide band imaging filters, and the upper end for narrow band filter such as Ha, OIII, and S2. Experiment with various setting for each filter. Current imaging practice is to adjust the brightness level to give mid-range ADU values (around 30000 for a 16 bit camera) with short exposure times. We suggest a 2 second exposure for wideband filters. Narrow band filters will require longer exposure times (and higher brightness settings) to reach acceptable ADU values.

### Caring for your Product

Very little maintenance should be required beyond gentle cleaning of the diffuser (the white plastic that the light shines through). We suggest cleaning the diffuser with a soft optical cloth after blowing off any particles to minimize scratching. Heavy soiling may require gentle rubbing with a glass cleaner or mild soap and water.

### Flat fielding strategies

We have found that it is best to take darks at night so that there is no risk of light leaks in the optical path. With these devices, there's no rush to get all your filters exposed at twilight, so don't scrimp on exposures. Remember that the noise levels decrease as the square root of the number of exposures, so a master flat of 36 frames will have half the noise of a master flats consisting of 10 frames.

Don't forget to take a set of dark frames of the same exposure length (and temperature) as the flat frames. No bias frames are needed if the flat and darks are of the same exposure length. For short flat field frames (<10s) you may find that simple bias frames are adequate for dark subtraction. In all cases, make sure you dark (or bias) correct your flat field frames before using them to flat field your images.

You can find out more about flat fielding on our website: [www.alnitakastro.com](http://www.alnitakastro.com).

# Installing the Drivers

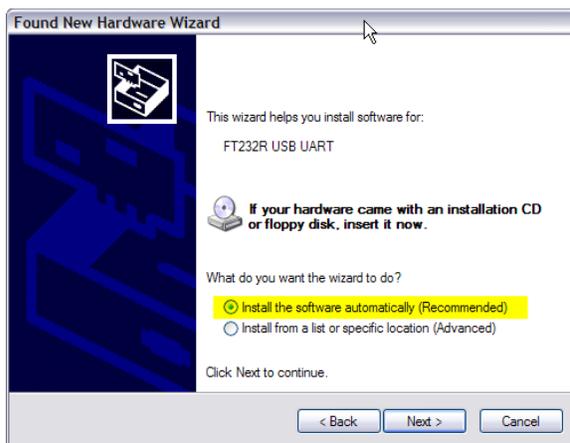
When the device is plugged into the PC for the first time, a driver may need to be installed. If the PC is connected to the web, the driver will be found, downloaded and installed by Windows. The driver is also installed in the directory where the Alnitak application was installed. If you don't have an internet connection you can navigate to the CDM folder created by unzipping the CDM zipfile in the applications folder. See Known Issues in section 3 for more detail.

## *Windows XP™ :*

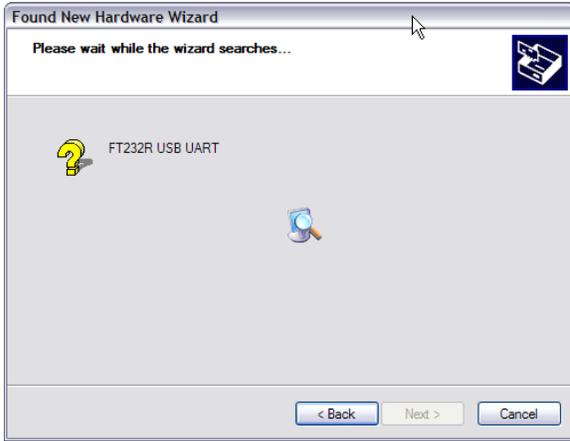
If connected to the web, click on the Found New Hardware balloon Under "...search for software?" select Yes, this time only, and Next. If not connected to the web, select No, and navigate to the driver included in the Alnitak installation directory.



Click "Install the software automatically and Next



You should see the following screen



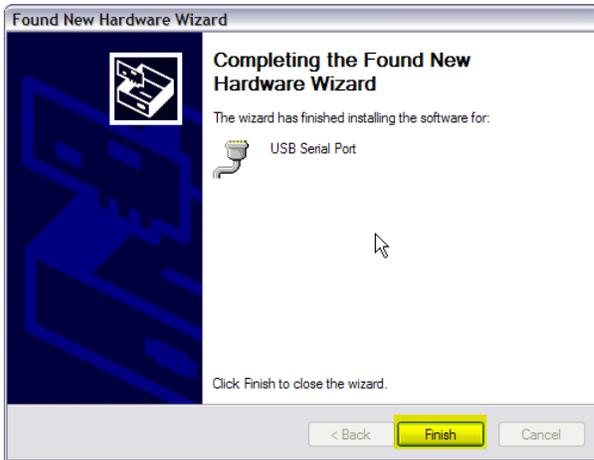
Click Finish.



A second driver will be installed in the same way

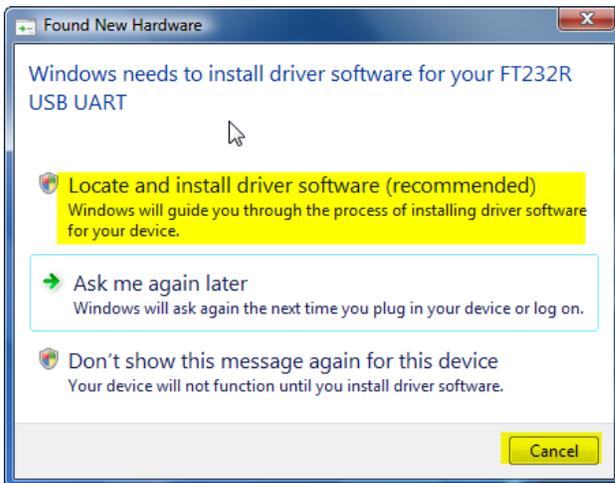


Now click Finish and the install is complete

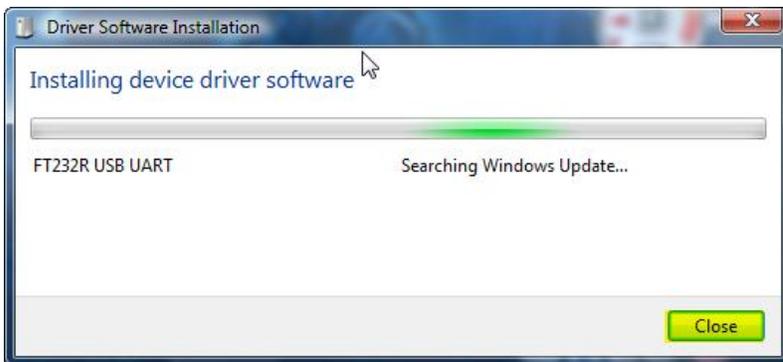


### **Windows Vista™:**

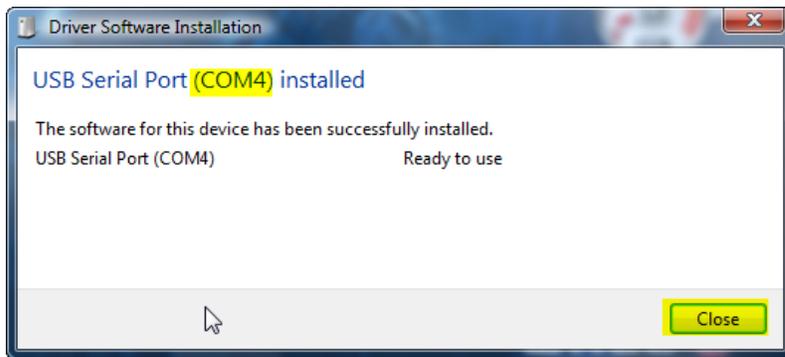
If connected to the web, click on the “Locate and install driver software.”



Windows will search the web for the first driver and install it. Repeat for second driver.



When Windows has installed both drivers, the COM port that is being used by the Alnitak device will be displayed as shown below. Click Close to finish.



## Windows Alnitak Astrosystems Controller application Installation

This application was developed using Microsoft Visual Studio C# 2005. It requires the user's PC to have Microsoft .NET 2.0 SP1 installed before it can be used. The Flat-Man installer will do that for you if necessary. Your PC must be connected to the web for this to be successful. If Microsoft Internet Explorer™ is your default browser the installation will be done from within the browser. You can also use other browsers but you will need to save the .NET installer and then run it outside of the web browser.

### Using the command line application, AACmd.exe

This is a command line application for controlling Flip-Flat, Flat-Man and Flat-Man XL. The Windows application must be closed before the AACmd.exe application can be run.

From the command prompt type "<path>/AACmd" followed by a COM port number and a command and, optionally a switch (where the path points to the installation directory).

The (case insensitive) single letter commands are:

- A find all Alnitak devices and the COM ports they are associated with
- C close (**works with Flip-Flat only**)
- O open (**works with Flip-Flat only**)
- L turn on light
- D turn off light
- Bxxx set brightness. Can be a 1,2, or 3 digit number between 0-255
- G get brightness from device
- V get AACmd.exe version number
- F get device firmware version number
- S silent: issue command and close window immediately after command has completed. If this command is not used the console window displays for 3 seconds.

For example:

“AACmd” A will list the COM ports of connected devices

"AACmd" 6 o will open the Flip-Flat on COM 6.

A message will be displayed in the command window reflecting the result or an error message. The command window will remain open for 3 seconds.

“AACmd” b34 s will set the brightness to level 34 and immediately close the console window. Note: if a number outside the 0-255 range is entered it will be limited to 0-255.

A file named fflog.txt (in the same directory as AACmd.exe) will be generated (and appended to) whenever AACmd is run.

## Using AACmd with CCD Autopilot

AACmd.exe permits access to the device controls from within other applications.

AACmd can be used with CCD Autopilot. Check the [CCDAutopilot help file](#) for the latest instructions on integration.

### NOTE:

**As of version 1.1.0.0, the name of this application has changed from “ffcommand” to “AACmd” and the name of the folder that contains it in your Program Files/Alnitak Astrosystems folder has changed from Flip-Flat Controller to Alnitak Astrosystems Controller. For existing customers using the command line program from CCD Autopilot or other telescope control applications, if you upgrade to version 1.1.0.0 you will need to change the path and filename information in your control application so your device will continue to work properly.**

## Upgrading firmware

Alnitak Astrosystems products have field-updatable firmware. Please do not attempt to update firmware unless specifically instructed to do so by us.

## Known issues

1) Some users have reported a timeout is reached before the cover reaches the open or closed limit when the unit is plugged into a powered USB hub with several other USB devices connected. We suggest only high quality powered hubs be used with Alnitak devices. If you do have timeout problems, remove some of the devices from the hub, plug the device directly into a USB port on the computer, or add another self-powered

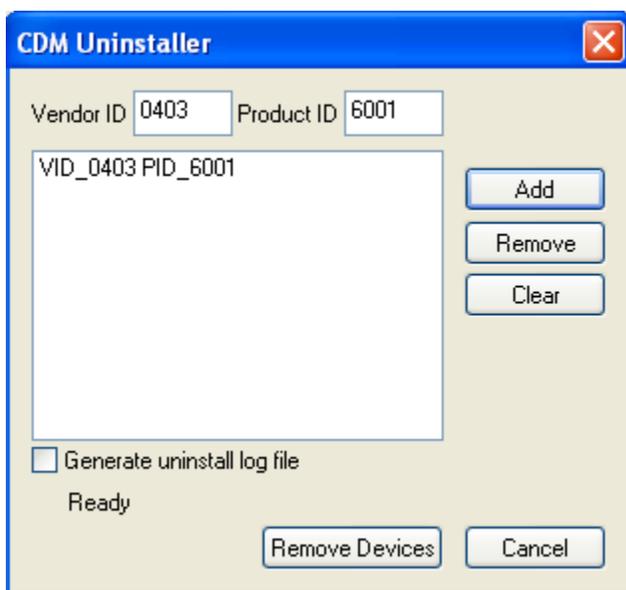
USB hub in daisy-chain fashion to the first USB hub that only has the device plugged into it. Bus powered hubs may not work with the Alnitak device.

2) We use an FTDI USB-to-serial converter in our control electronics that is quite common in astronomical (and other) USB accessories. The Alnitak Astrosystems controller uses the latest FTDI drivers and .dll's, and these will be installed automatically (as per our manual's instructions) when you first plug in the USB cable from one of our products if you have no other FTDI USB accessories.

If you have already installed other FTDI components on your PC they may interfere with our product's proper installation. These FTDI problems come in two flavors:

1. Some cameras don't play nice with early versions of our software. Contact us if you have an older unit and start having problems with a new (to you) camera. Our latest software takes care of this and we can let you know how to upgrade your older unit.
2. We have found that if your drivers are old, you may get an "I/O" error when you start up our controller application. You should update all FTDI devices on your PC to the same driver version. Open Device Manager, expand Ports, right-click Properties, and the Driver tab to check and update each device using an FTDI chipset. The current version as of this writing is 2.8.14.0. Be sure all devices are using the same driver version.

If you do get the error, you will need to run an FTDI uninstaller program that we have included in the Alnitak Astrosystems installation directory. To run the uninstaller, navigate to the installation directory and unzip the CDMUninstaller archive. Once the archive is expanded, run CDMUninstallerGUI.exe. You'll get a window like this after you click on the "Add" button:



Click on the "Remove Devices" button to remove the old FTDI files.

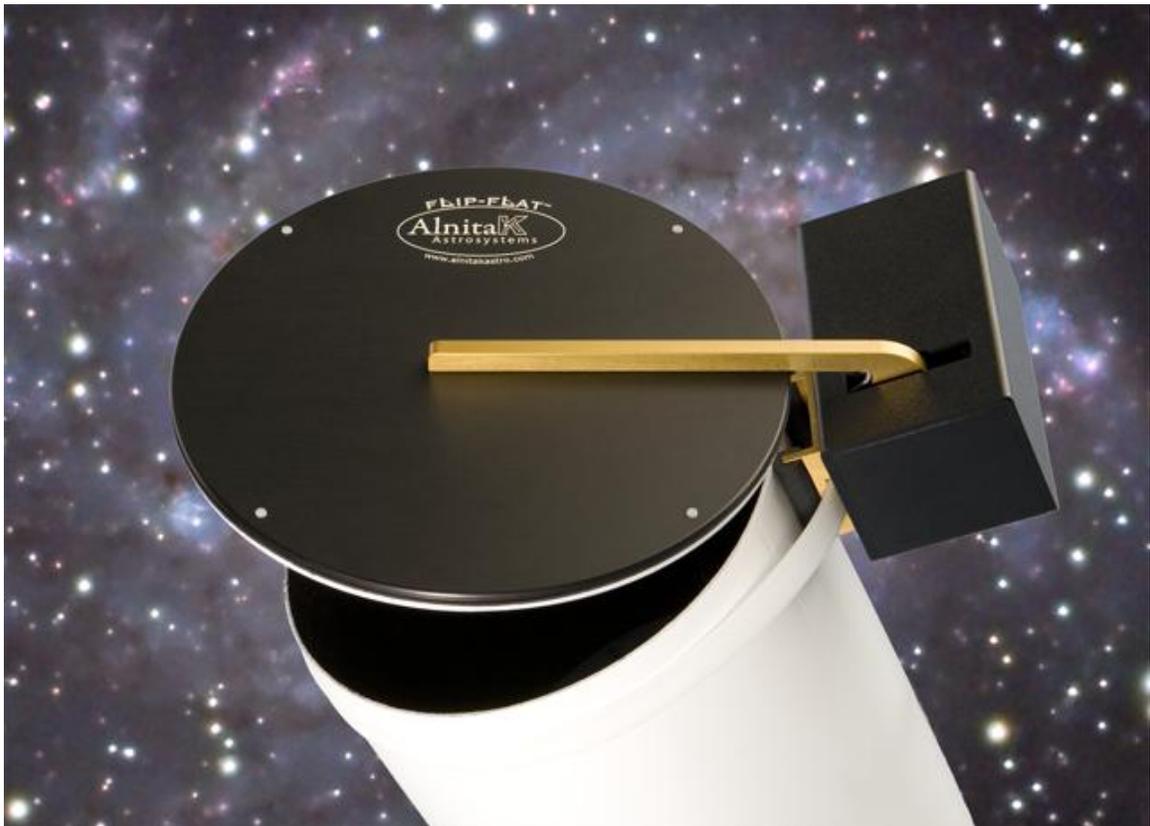
Now unplug the USB cable from your Alnitak Astrosystems device and reboot your computer. Once the computer has restarted, plug the USB cable back in and let the computer check the web for drivers. You should see the "device installed correctly."

We have found that some systems require you to manually select the driver files. We have included all the necessary drivers from FTDI in our install directory as a zipped file called "CDM xxxxx WHQL Certified.zip" (where xxxxx is the version number). If windows prompts you for FTDIbus.sys, you can unzip the folder to a newly created folder you should call "CDMxxxxx". Navigate to that new folder and then to the i386 folder inside when Windows asks where the drivers are located.

Once the proper files have been installed, all legacy FTDI USB accessories will still work.



## Quick Start and Software Reference



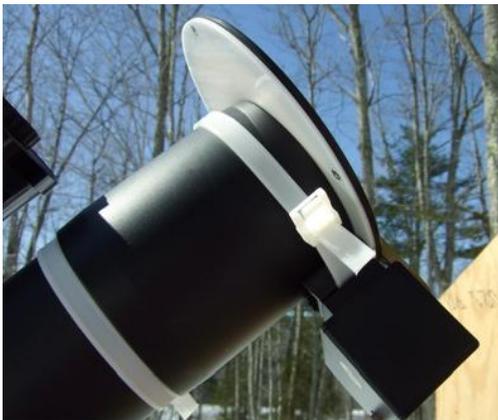
# Flip-Flat Quick Start Guide

1. Carefully unpack the Flip-Flat.
2. Slide the long white plastic mounting strap through the slot in the gold mounting bracket and then form a circle with it by sliding the flat end through the catch slot.



**Figure 1. Mounting strap threaded through mount.**

3. Manually rotate the Flip-Flat cap so that it is closed (perpendicular to the mounting bracket).
4. Place the mounting strap around the telescope dew shield/OTA end and pull it snug.
5. Adjust the mounting strap so that the cap is seated tightly to the dew shield/OTA and tighten the mounting strap. The top of the mounting bracket should be roughly flush with the top of the dew shield/OTA. Cut the mounting strap, leaving an inch or so protruding so that adjustments can be made in the future.



**Figure 2. The Flip-Flat mounted to a retractable dew shield. Note the additional zip tie below the dew shield to keep it from sliding down.**

6. If mounting to a retractable dew shield, it may be necessary to fix the dew shield into place. A second large zip tie (included) can be positioned against the bottom of the dew shield so that it cannot slip down.
7. Download and run the application installer. You can download it from [www.alnitakastro.com/support/downloads](http://www.alnitakastro.com/support/downloads).

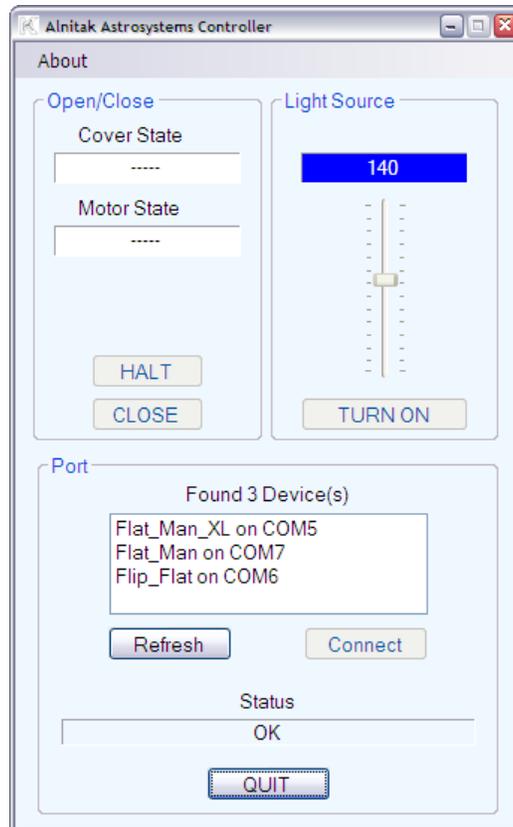
8. Plug in the USB cable. Install the com port driver when prompted (either by letting Windows find it on the web or by pointing to the directory you installed the application to.)
9. Start the Windows Alnitak Controller application.
10. Ensure that the Flip-Flat has been found on the appropriate port (see software installation instructions).
11. Push the close button until the application reports that the Flip-Flat is closed.
12. Push the open button to ensure that the Flip-Flat cap opens and the application reports that the Flip-Flat is open.

Your Flip-Flat is ready to use. Please note that the light will only turn on when the cap is closed. You should periodically check the tightness of the mounting strap and retighten, if necessary.

# Windows Alnitak Astrosystems Controller application using Flip-Flat

## Controls

The Alnitak Astrosystem Controller works with the Flip-Flat, the Flat-Man, the Flat-Man L, and the Flat-Man XL.



### **REFRESH Button**

Used to update the list of Alnitak Astro devices connected to the computer. If clicked immediately after connecting or disconnecting a device, the button text will change to “WAIT” while the computer virtual COM port is being configured. This could take up to 8 seconds. The list will be updated after configuration has completed.

### **CONNECT Button**

This will connect to a SELECTED device from the list above. If only one device is listed, the button will be active immediately. If more than one device is listed,

the user must select one before clicking this button. You may also just double click the desired device in the list.

### ***CLOSE / OPEN* Button (Flip-Flat Only)**

When clicked, the OPEN / CLOSE button causes the Flip-Flat cover to open or close. The button label will alternate depending on the state of the cover. Note, this option will not be available for flat-fielding devices other than the Flip-Flat.

### ***HALT / RESUME* Button (Flip-Flat Only)**

If the HALT button is clicked while the cover is moving, it will stop immediately. The button label then changes to RESUME which, when clicked will restart the cover in the same direction it was moving before the HALT button was clicked.

### ***TURN / TURN OFF* Button**

Clicking the TURN ON button, when enabled will turn on the flat light source. This button is only enabled while the cover is closed. When the light is on, the button label changes to TURN OFF. Clicking it then turns off the light source. If the OPEN button is clicked while the light is on, the light will turn off and the TURN ON button will become disabled until the cover is closed again,

### ***BRIGHTNESS* Slider**

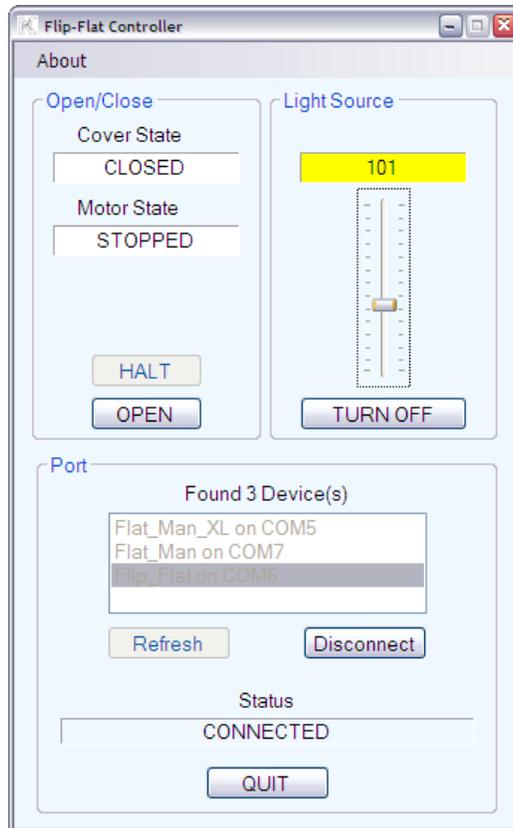
The brightness slider adjusts the brightness of the light. You can also use the up and down arrows to fine tune the brightness. The slider is enabled or disabled along with the TURN ON / TURN OFF button depending the state of the cover.

### ***About***

Clicking the About button in the menu bar opens an About menu that shows information about the controller application as well as the version numbers of the Flip-Flat firmware and the Flip-Flat Library used to create the controller application.

### ***QUIT***

Clicking the QUIT button causes the application to exit.



## Display Text Boxes and Labels

### Cover State (Flip-Flat Only)

Indicates the status of the cover. When the cover is closed or open it will display “CLOSED” or “OPEN”. When the cover is either moving or halted and is between open and closed the display will show “NOT AT LIMIT.” If the open or closed limit is not reached within the timeout period (about 15 seconds) “TIMEDOUT” will be displayed. A timeout may result from low USB power if the Flip-Flat is plugged into a hub. Make sure that you use only high quality self-powered hubs for the Flip-Flat.

### Motor State (Flip-Flat Only)

Indicates whether the cover motor is “RUNNING” or “STOPPED”.

## **Brightness**

Numeric text box that indicates the value of the brightness that is being used by the Flip-Flat hardware. When the slider is moved this display will show the instantaneous value. The background color will be blue if the light is off and yellow if it is on.

## **Found x Device(s)**

Displays the number of Alinitak devices of all types connected to the computer

## **Device List**

Lists all Alinitak Astro devices connected to the computer, the device type and the virtual COM port that is associated with each.

## **Status**

Status of the connection to a device or the refresh process.

# **Using the command line application, AACmd.exe**

See the previous section on using the command line application.

## Quick Start and Software Reference

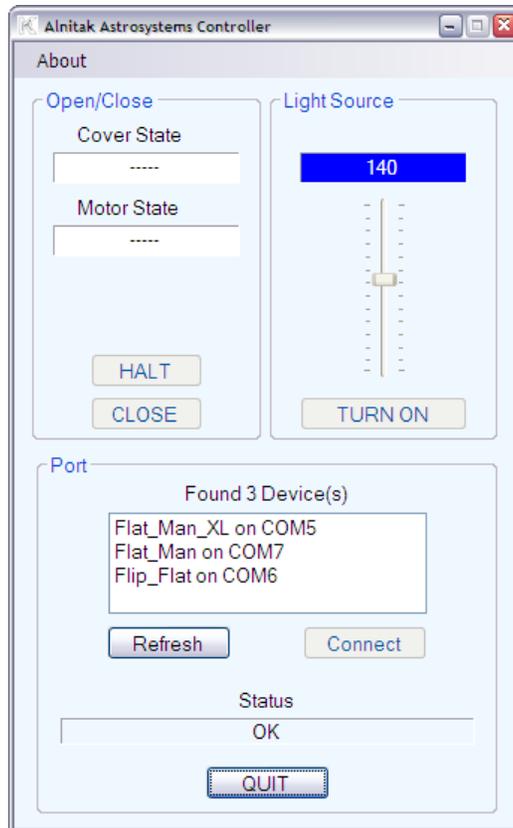


# Flat-Man, Flat-Man-L Quick Start Guide

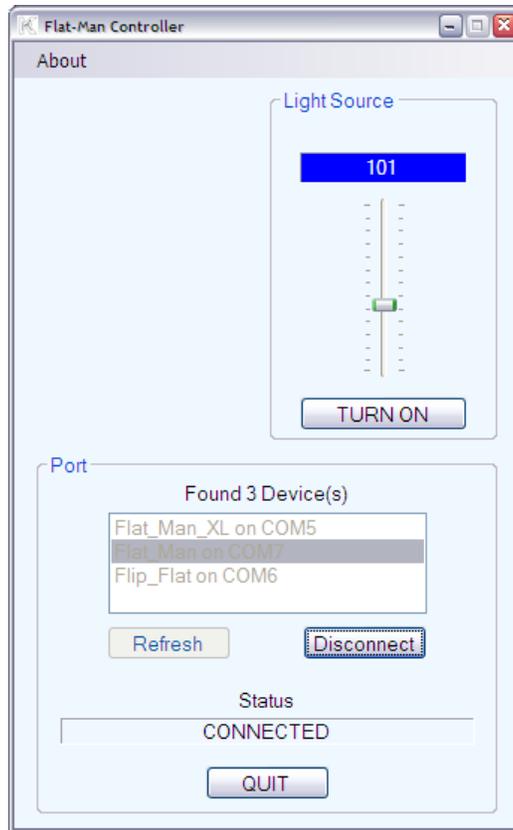
1. Download and run the application installer. You can download it from [www.alnitakastro.com/support/downloads](http://www.alnitakastro.com/support/downloads)
2. Plug in the USB cable. Install the com port driver when prompted (either by letting Windows find it on the web or by pointing to the directory you installed the application to.)
3. If you are using a Flat-Man-L you must connect the AC adapter to the DC input next to the USB port of the device and connect the AC cord to a suitable outlet.
4. Point your scope towards the zenith and rest the Flat-Man on the end making sure that it is centered so that the entire field of view will be lighted. Alternatively, you can remove one of the #6-32 screws and use that hole to mount the unit to a tripod or wall with a longer screw. If you mount it perpendicular to the park position of the telescope, you will have a remotely operable flat fielding device.
5. Start the Windows Alnitak Astrosystems Controller application.
6. Select the Flat-Man or Flat-Man-L from the list of devices and click Connect.
7. Click the TURN ON button and adjust the brightness to the desired value.
8. Your Flat-Man is ready to use.

## Windows Alnitak Astrosystems Controller

When you launch the Alnitak Controller it will look like this:



If you have more than one Alnitak Astrosystems device connected to the computer there will be more than one device in the list in the Port window. Select the Flat-Man or Flat-Man-L and click the Connect button (or just double click your selection). The window will change to indicate that the application is connected to the device like this:



The title denotes that the application has detected that it is connected to either a Flat-Man or Flat-Man-L. All controls associated with moving the cover are no longer displayed.

### ***REFRESH* Button**

Used to update the list of Alnitak Astro devices connected to the computer. If clicked immediately after connecting or disconnecting a device, the button text will change to “WAIT” while the computer virtual COM port is being configured. This could take up to 8 seconds. The list will be updated after configuration has completed.

### ***CONNECT* Button**

This will connect to a **SELECTED** device from the list above. If only one device is listed, the button will be active immediately. If more than one device is listed, the user must select one before clicking this button. You may also just double click the desired device in the list.

### ***TURN / TURN OFF* Button**

Clicking the **TURN ON** button, when enabled will turn on the flat light source. When the light is on, the button label changes to **TURN OFF**. Clicking it then turns off the light source.

## **BRIGHTNESS Slider**

The brightness slider adjusts the brightness of the light. You can also use the up and down arrows to fine-tune the brightness.

## **About**

Clicking the About button in the menu bar opens an About menu that shows information about the controller application as well as the version numbers of the device firmware and the Flip-Flat Library used to create the controller application.

## ***QUIT***

Clicking the QUIT button causes the application to exit.

## **Display Text Boxes**

### **Brightness**

Numeric text box that indicates the value of the brightness that is being used by the device hardware. When the slider is moved this display will show the instantaneous value. The background color will be blue if the light is off and yellow if it is on.

### **Found x Device(s)**

Displays the number of Alinitak Astro devices connected to the computer.

### **Device List**

Lists all Alinitak Astro devices connected to the computer, the device type and the virtual COM port that is associated with each.

### **Status**

Status of the connection to a device or the refresh process.

## **Using the command line application, AACmd.exe**

See the first section on using the command line application



## Quick Start and Software Reference



### Mounting the Flat-Man XL

There are three ¼" clearance holes, one in each rail of the panel frame that can be used to mount the panel. Since everyone's observatory is different, we have left the details of the mounting up to the user. Mount the panel perpendicular to the OTA in the park position. For best results, mount the panel as close to the OTA as possible to eliminate stray light and edge errors. We have found that mounting within 2-feet seems to work well for all but the widest field scopes.

# Flat-Man XL Quick Start Guide

The Flat-Man XL flat fielder devices come in several sizes. The high-voltage (HV) power supply provided is dependent upon the size of the panel. For the XL18 and XL24 the instructions are provided in section A below. For the XL30 and larger panels, skip down to section B below.

## Section A – Quick Start Guide for Flat-Man XL18 and XL24:

1. Carefully unpack the Flat-Man XL. You should have the following parts:
  - a. Flat-Man XL panel
  - b. HV Power supply
  - c. Line cord for HV supply
  - d. Flat-Man XL controller (black rectangular inverter)
  - e. USB cable
  - f. Long gray cable connecting panel to controller.
  - g. Short gray cable from the 4 pos controller to the 6 pos HV Supply connector.
  - h. Short gray cable from the 2 pos controller to the 2 pos HV Supply connector.



2. Plug the Flat-Man XL controller output cable into the HV power supply 6-position connector.

3. Plug 2 pos short cable between either 2 pos connector on the controller and the 2 pos receptacle on the HV supply.
4. Connect the USB cable between the Flat-Man XL controller and the computer or a self-powered USB hub.
5. Plug the 10 foot gray cable's white 2 pos plug into the remaining controllers's 2 pos receptacle and the round brown connector into the panel. Align the white dot on the round plug with the dot on the panel receptacle. Gently push the plug on and rotate the plug shell ¼-turn until you feel it click. Reverse this procedure to remove. *Do not twist the connector by more than ¼-turn.* Be careful not to impact or bend the connector while mated.
6. Plug the power supply into the AC mains. NOTE: We have found that the power cord fits very tightly into the connector on the back of the 600N inverter. You must use considerable force to insert it completely to prevent intermittent connection. When inserted properly there should be no more than 1/8" (3.5mm) gap between the receptacle and the body of the cable connector.
7. Download and run the application installer. You can download it from [www.alnitakastro.com/support/downloads](http://www.alnitakastro.com/support/downloads)
8. Turn on the power supply using the power rocker switch on the back.
9. Start the Windows Alnitak Controller application by clicking the Alnitak Controller icon on the desktop.
10. Connect to the device by selecting it from the list and clicking "Connect."
11. Click the "TURN ON" button and adjust the slider to your chosen value.
12. Click the "TURN OFF" button to turn off light.

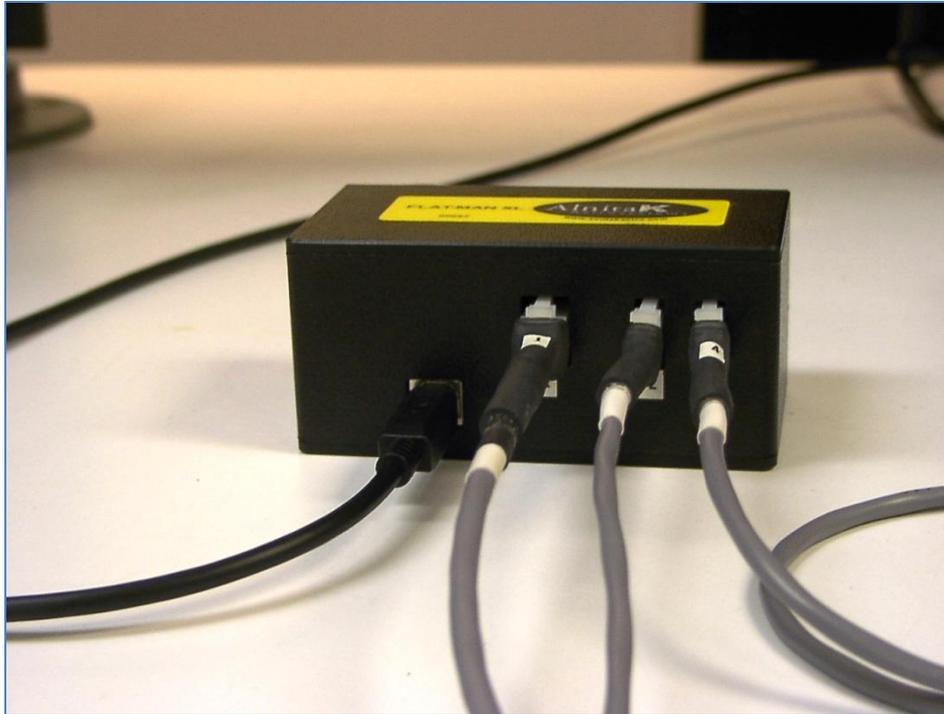
## Section B – Quick Start Guide for Flat-Man XL30 and larger:

**NOTE:** Do not plug in the line cord until all other cables are connected.



1. Carefully unpack the Flat-Man XL. You should have the following parts:
  - a. Flat-Man XL lamp panel,
  - b. HV Power supply (silver and blue inverter),
  - c. Line cord for HV supply,
  - d. Flat-Man XL Controller circuit (small black box),
  - e. USB cable – 12-ft (4m) length,
  - f. Long gray Lamp cable – 2-position XL controller to circular lamp connector,
  - g. Short gray HV cable – 4-pos HV Supply RED connector to 2-pos controller,
  - h. Short gray Control cable – 4-pos XL controller to 4-pin circular locking connector.
  
2. Connect the HV Control cable between the Flat-Man XL Controller (white 4-position plug) and the HV power supply (large, circular 4-position connector). This 4-pin Amp connector replaces the small, flat connector visible on the opposite side of the HV power supply. NOTE: XL-30 owners of the first generation Cevanna inverters should use care when releasing the flat 6-pin (4-contact) tab to disconnect the HV Control cable. Contact Optec for upgrade or conversion to the 4-pin Amp style connector.

3. Plug the short HV cable with the RED 4-position connector into the HV power supply socket on the same side as the line cord receptacle. Next, plug the other end of this short HV cable into either of the 2-position sockets on the Alnitak XL controller box.



4. Plug the 10-foot gray Lamp cable's white 2-position plug into the remaining 2-position socket on Alnitak XL controller box. Connect the round black connector into the panel receptacle. Align the white dot on the round plug with the dot on the panel receptacle. Gently push the plug on and rotate the plug shell  $\frac{1}{4}$ -turn until you feel it click. Reverse this procedure to remove. *Do not twist the connector by more than  $\frac{1}{4}$ -turn.* Be careful not to impact or bend the connector while mated.
5. Connect the USB cable between the Flat-Man XL controller box and the computer or a self-powered USB hub.
6. Use the supplied IEC wall power cord (or replace with any IEC cord suitable to the local wall plug configuration) into the AC mains wall socket. **NOTE:** the Cevanna HV Power Supply for the XL30 and larger lamp panels does NOT include an ON/OFF switch. For remote installations a web-switch is highly recommended for remote control of the inverter power. Alternatively, a common switched power strip can be used for ON/OFF capability.

8. Next, plug the 3-pin connector on the power cord into the input voltage socket on the HV Power supply as shown in the photo above. The HV Power supply will now be ON and fully powered. Check that the green LED on the front of the supply lights briefly before the red LED illuminates indicating the Alnitak XL control box now controls the HV power supply (inverter).
9. Download and run the Alnitak Controller application installer. You can download the most current version from [www.alnitakastro.com/support/downloads](http://www.alnitakastro.com/support/downloads).
10. Start the Windows Alnitak Controller application by clicking the Alnitak Controller icon on the desktop.
11. Connect to the device by selecting it from the list and clicking “Connect.”
12. Click the “TURN ON” button and adjust the slider to your chosen value.
13. Click the “TURN OFF” button to turn off light.

## **Remotely powering down the HV supply between sessions**

When you click the “OFF” button, the panel will go dark, but the power supply remains on. In remote situations, you may want to power the power supply with a remotely operated switch and then power it down between sessions.

## **Windows Alnitak Astrosystems controller application using the Flat-Man XL**

When a Flat-Man XL is connected, the title of the Windows application will say “Flat-Man XL Controller”. Otherwise it will work the same as it does with the Flat-Man. See the Flat-Man Software Reference above.

## **Using the command line application, AACmd.exe**

See the first section on using the command line application.

## Support

We maintain and monitor the Flip-Flat/Flat-Man/Flat-Man XL yahoo group at:

<http://tech.groups.yahoo.com/group/Flip-Flat/>

We post announcements of new software releases, new hardware, and interesting tips and tricks there.

## Warranty information

The Flip-Flat and Flat-Man are warranted for one year from date of purchase, return shipping not included. If your unit fails, and is not due to mishandling, neglect, or exposure to rain/snow, we will repair or replace it at our discretion. Breaking the seal on the unit will void the warranty. Please contact [sales@alnitakastro.com](mailto:sales@alnitakastro.com) if you have any problems with your unit.

## Trademarks

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Flip-Flat, Flat-Man, Flat-Man L and Flat-Man XL are trademarks of Alnitak AstroSystems.