

Adim Controller

by Wa-chur-ed Observatory

User Guide

Thank you for purchasing the Adim Controller (the “Controller” or “Adim”). This brief will provide the very simple information you need to use Adim effectively. Adim is a USB and/or manual PWM (Pulse Width Modulation) controller for 12VDC devices that can be controlled via PWM. It is primarily intended to be a “dimmer” for flat calibration lights, such as our Ab Light. It can also be used to control the brightness of other 12VDC lights (LED or incandescent), or to control the speed of a 12VDC fan, etc.

Adim can provide up to 1.5 amps of current at 12VDC (Ab Light draws only about 0.25 amps). The PWM operates at 2kHz, so there is no visible flicker, and relatively fast shutter speeds can be used when capturing flat frames (>1/20 second is recommended, as this is 100 times the duration of a single cycle, thus reducing any “shutter shading” to 1% of the total exposure).



The Controller is designed to take 12VDC power, which is connected to the device through a 5.5mm x 2.1mm barrel connector next to the USB jack. Input voltages of up to 15VDC will not harm the device, and voltage as low as 7VDC will also work properly, although some flat calibration lights may not produce any light at such a low voltage. There is also an identical barrel connector on the opposite side of the enclosure for the output. Note that it is possible to accidentally swap these two connections! This will not damage the Controller. In fact, with a DC voltage applied to the output Adim will appear to operate normally, but there will be no “output” on the input connector.

The Controller works in “steps” that are in a logarithmic scale. In the default mode (at power up) each step up doubles the brightness and each step down halves the brightness. That is, each step is one “stop” (in photographic terms). You can also easily select steps of $\frac{1}{2}$ or $\frac{1}{4}$ stop. However, near the low end of the range it is not possible to accurately produce steps of these smaller sizes, so the “bad” levels are skipped. When using the provided Windows app to control the brightness it will allow you to select any level in $\frac{1}{4}$ stop increments, but the actual output (and the numeric output level displayed) will be at the closest settable level. In manual mode turning the knob always goes to the next possible level (up or down) at the currently selected step size, but there is no numeric indication of the output level unless you are running the Adim application.

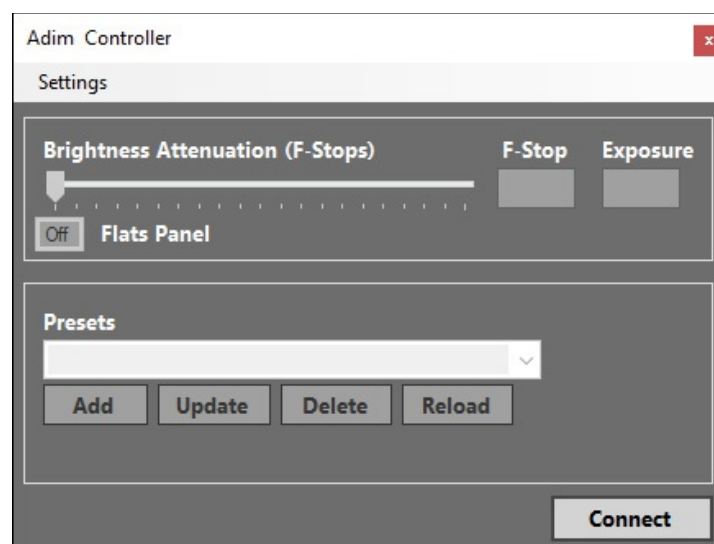
MANUAL OPERATION

Whether the Controller is connected to a host computer (via USB) or not, the knob on the controller can be used to adjust the brightness manually. If the Adim app is running it will show the output level you have selected. At power up the LED just above the knob will be green, indicating that each step is 1 full stop. Push the knob in (“click” it) to switch to $\frac{1}{2}$ stop increments and the LED will change to amber. Click it again to switch to $\frac{1}{4}$ stop increments and the LED will change to red. A third click returns to full stop/green mode.

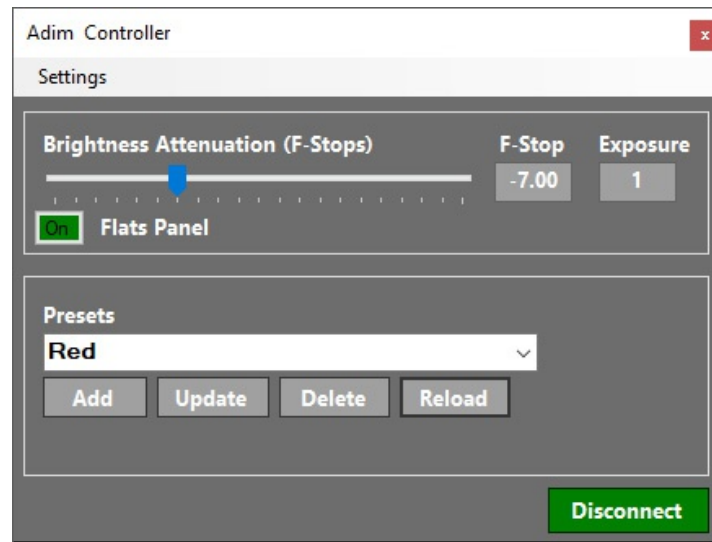
Adim APPLICATION

Adim Controller is provided with a Windows application that can be used to operate the device through your computer. After providing power to the Controller, connect a USB cable (type A male to type B male) between the Controller and computer. It will automatically be recognized as an HID (human interface device), so the driver is installed automatically by Windows, and there is no need to select a COM port. To install the Adim application simply launch (double click) the provided “Setup.exe” and follow the on-screen prompts, skipping any warnings that Windows may generate.

With the Controller powered on and USB cable connected, launch the Adim application. You should then see something like this:



Click the Connect button to create a connection between the application and the device. The window will then change to:



Click the On/Off button to toggle the output on/off. The slider can be moved by dragging it as you hold down the left mouse button, and the brightness will immediately change. The F-Stop field shows the current brightness relative to full power brightness. Thus setting the slider all the way to the right shows as 0 and lower values show as negative F-Stops, down to -10 stops. The leftmost position of the slider is -10 stops. At this dimmest setting you may not be able to see any light from the flat calibration light unless you are in a very dark environment, but it is still "on". Use the On/Off toggle button to turn the output off completely.

The Exposure field does not actually do anything, but is provided as a place for you to enter an exposure value that you determine to be correct for the set output level. It will be remembered when you click the Add or Update buttons.

The Presets field allows you to define a number of labeled output levels. Any text can be entered here and will be remembered when you click the Add or Update buttons. The current output level will also be remembered and associated with the label. After creating one or more entries you can select one of the memorized labels by clicking the down arrow on the right side of the Presets field. The presets can be used to remember any variations you may need, such as different filters, cameras, gain/ISO settings, and telescopes. For example, a DSLR user who always uses the same ISO setting and other parameters might need only one preset, and could call it "My System". If different cameras or ISO settings are used the labels might be "Canon R6 – ISO 800" and so forth. If you use a monochrome camera and filter wheel, the preset labels might be Red, Green, Blue, etc. These labels are simply a way to associate a set of parameters with your selected output value and exposure time. Only the output level is actually changed when you select a preset. It is up to you to set the exposure time and filter selection in your image capture application. To simplify the operation, you may want to determine a single exposure time and adjust the output level to produce the desired exposure, thus avoiding the need to change the exposure when you change the filter. You may need or want to use different exposures for narrowband and broadband (RGB) filters.

When you have entered a new label (in a previously blank preset) or modified an existing label the Add button will become green and you can click it to save the label, exposure, and output level. Similarly, if you select an existing preset and adjust the output level or exposure the Update button

will become green and you can click it to save the new parameters. If you have modified the output level or exposure, but do not wish to save it (a temporary adjustment), click the Reload button to restore the previously saved parameters. You can also remove a preset by selecting from the drop down list then clicking the Delete button.

The Settings menu has just three options; Setup, FW Update, and Adim Reset. The Setup submenu contains a few self-explanatory options, such as whether the Controller should turn off the output when the app disconnects. The FW Update option allows you to flash new firmware into the Controller, should it ever be needed. Selecting this option will begin a process that gives you on-screen instructions to select a firmware code file and flash it into the Controller. This should only be done when necessary, and with care, since errors in flashing the code can turn the Controller into a Brick. The Adim Reset option causes a hardware reset of the Controller. It is not likely that you will ever need to use this option, but if the Controller is misbehaving you can try this Reset. A power off/power on cycle is more likely to fix any problem, but it might not be possible to do that remotely.