Sim cockpit led dimmer module v1.1 Dec 2, 2023

Skills needed

Basic understanding of electronics and wiring

Basic soldering skills

This module is not suitable for children without adult supervision.

Tools and parts needed

Small flat head screwdriver

Soldering tools, wire cutters

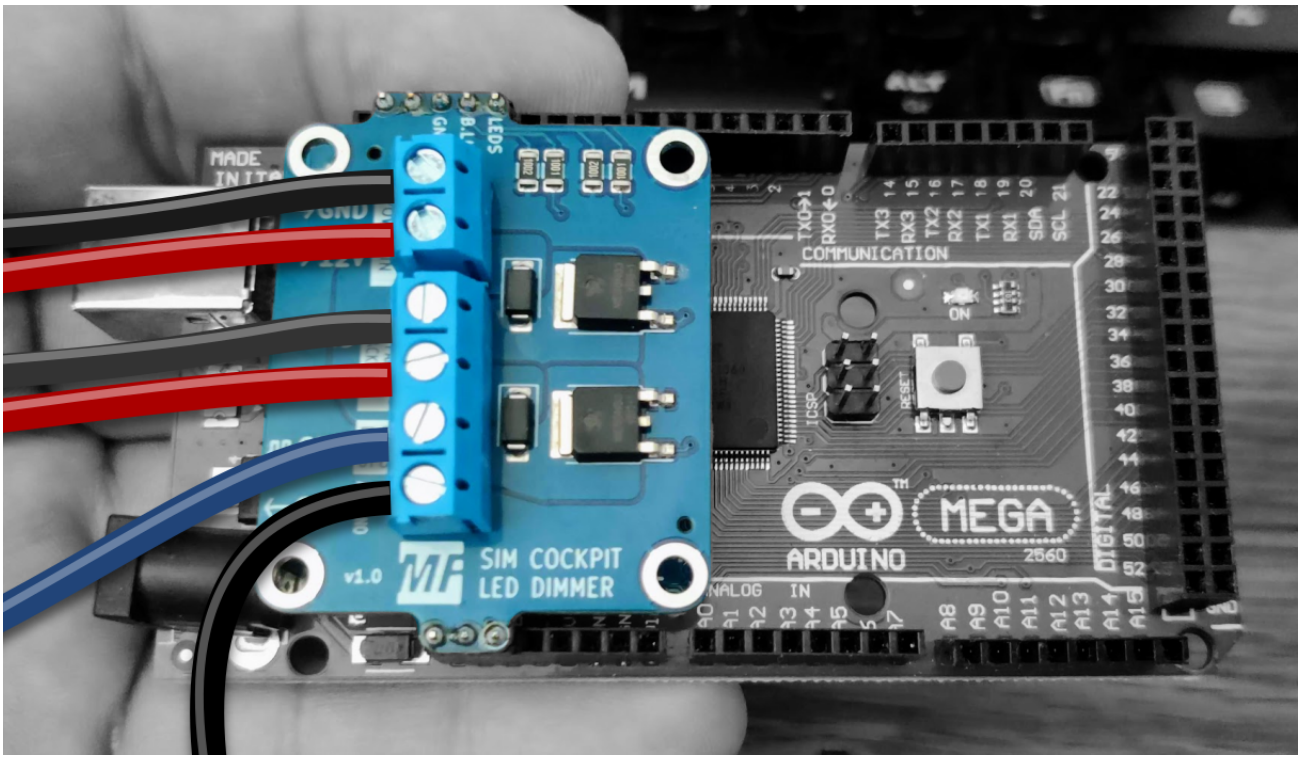
12V power supply powerful enough for the backlight leds

Wire with suitable gauge to connect your led strips

Restrictions & Warnings

Indoor use only. Incorrect use or installation can result in personal injury or fire.

This is not a toy - not suitable for children without adult supervision.

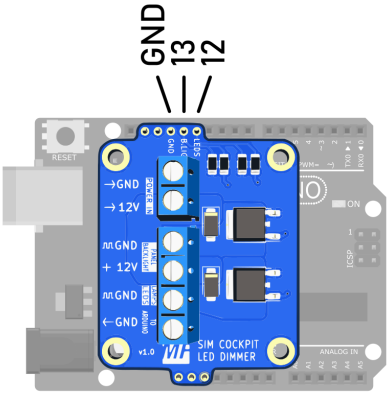


Purpose and use

This diy-module is designed to provide adjustable brightness for **panel backlight** and **indicator lights** for flight simulator cockpit projects. When combined with MobiFlight open source software, lights can be synchronized between the simulated cockpit environment and the physical cockpit.

This module contains two independent dimming circuits, so backlight and indicator lights can be controlled separately.

This module can be used as a "shield" on top of a regular sized Arduino like the MEGA 2560 or Uno. Solder the provided pin headers to the holes on the sides of the module (on the bottom side!) and push the module on top of the Arduino. Take care to align the "BACKLIGHT", "LEDS" and "GND" pins of the module to pins 12, 13 and GND on the Arduino. The three unlabeled pins on the other side are not connected to anything, but they help as mechanical support to keep the module better in place.



Installation and wiring

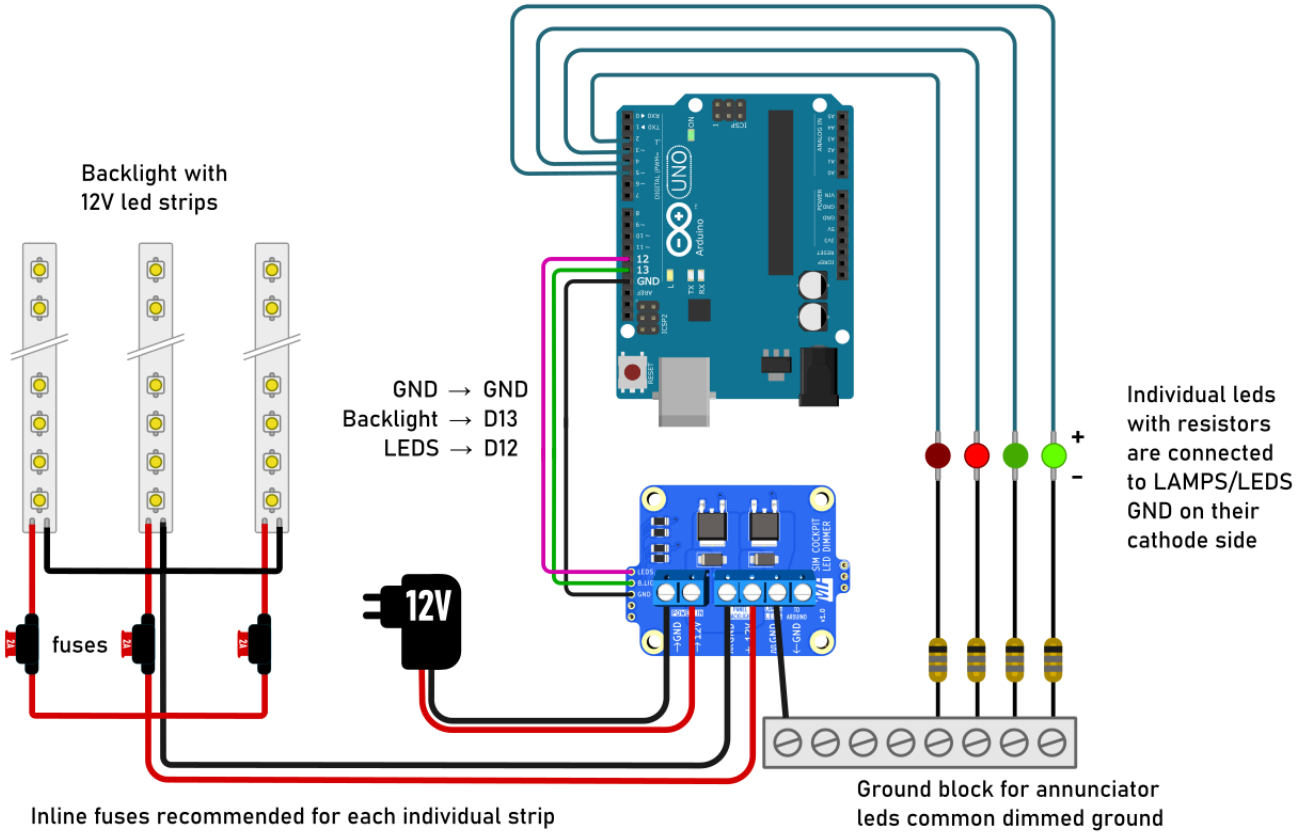
See the wiring diagram further down this document for a visual guide on how to connect everything together.

Power supply
Connect the 12V power supply to the "Power In" GND/12V screw terminals, pay attention to polarity. If unsure, check the power supply wires with a multimeter before connecting. The power supply should be rated for whatever amount of leds you plan to use for your backlighting. It is good to allow some margin to be on the safe side of what the power supply can provide.

Backlight
Connect the GND and 12V screw terminals marked with BACKLIGHT to your led strip. You can split the led strips into sections and wire them in parallel to make wiring easier for different parts of your simulator cockpit.

Add automotive inline fuses on the positive wires of each led strip you install in parallel, to cut power in case of malfunction and to prevent electrical fire. You should select a fuse size approximately 150% of the current the leds consume at full brightness under normal operation, but not significantly more, or it might not trip when needed.. You can find inline fuse holders on most auto parts stores.

Warning and Indicator lights.
Warning and indicator lights can be connected to the digital pins on the Arduino as usual, but connect the ground pins to the screw terminal that is labeled "LAMPS AND LEDS GND". You will also need to use suitable current limiting resistors for the leds. If unsure, use 330 ohms. See the four example leds in the wiring diagram below. In practice it is useful to use a common ground screw terminal block for connecting all the ground wires together. If you have several Arduinos with led lights, you can use the same ground block for all of them. In that case you can also use the "To Arduino GND" connector to tie all the grounds together on all of the Arduinos.



Visual wiring example

MobiFlight Configuration

All configuration files and this documentation can be found by scanning the QR code in the anti-static bag, or by visiting github.com/MobiFlight/mobiflight-pcbs/dimmer-board.

Define two "LED Output" devices on the Arduino that you connected the module into in "Mobiflight Modules". Set the pins as follows:

1. "Backlight dim" on pin 13,
2. "Annunciator dim" on pin 12

Remember to upload the configuration to the Arduino, and select the "Outputs" tab on MobiFlight Connector. **Create two output configuration items**, one for Backlight and another for Annunciators. Remember to enable PWM for both.

Use the test function to test that the backlight works, and test that different values do alter the brightness. You can connect these output configs to a generic backlight sim variable, for example this one should work for many default aircraft on Microsoft Flight Simulator 2020, but it depends on the add-on aircraft on the simulator too, some use custom variables.

```
Microsoft > Generic > Lights > LIGHT BACKLIGHT INTENSITY
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Remember that you need to set the "lamps and leds" circuit on pin 12 to a non-zero value to make your indicator leds light up, so you need to test the dimmed leds in "run" mode of MobiFlight, and set *both* the dimmer pin 12 and your indicator led pin on, to have the led light up! So while this works as intended, it's something to keep in mind when testing!

Module Schematic

The module consists of two N-type transistors (FET's) that are connected to the GPIO pins 12 and 13 of the Arduino. There are pulldown resistors for each.

Note: Pin13 is connected to the built in led on many Arduinos, so the backlight circuit will briefly blink when you start MobiFlight, and also if you are updating the firmware on the arduino.

This will not happen during simulated flights.