Firefly

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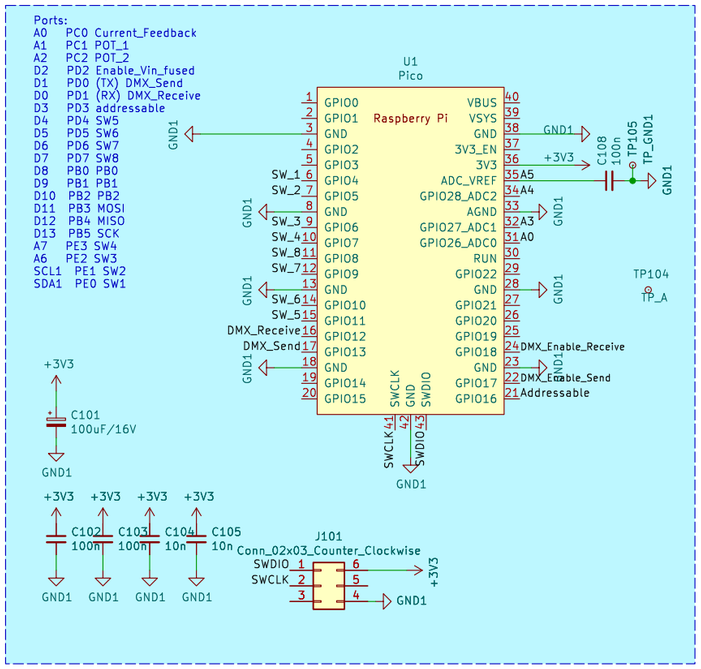
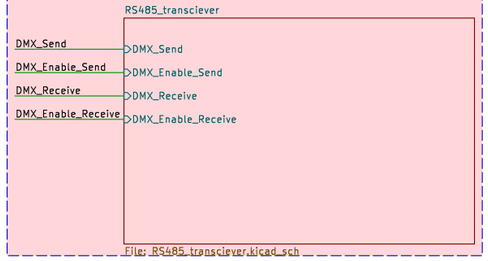
Year: 2025.

MCU Option Raspberry Pico



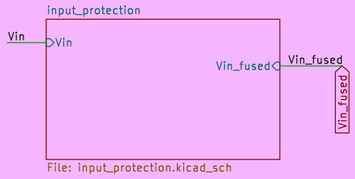
DMX512

A RS-485 transceiver can optionally be mounted for sending and receiveing DMX512.
See sheet DMX512 for configuration.



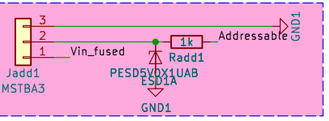
Input Protection

There is 2 options for input protection:
* A classic fuse
* Highside High Current Power Switch

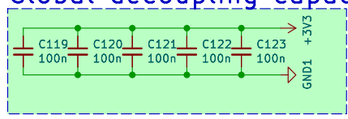


Addressable LED

Make sure to feed Vin with the right voltage for the LED strip.
Usually 5V for addressable LED strip.
Place connector close to Vin_fused.

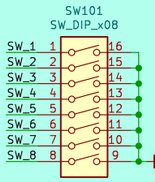


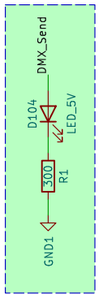
Global decoupling capacitors

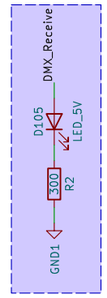


User Interface

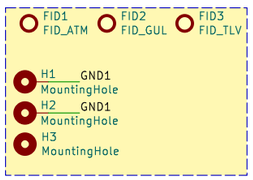
2 potentiometers can be utilized to hue and brightness for example.
The pot's give out max 3.3V.
Dip switches are used for slave devices addressing.

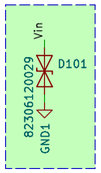


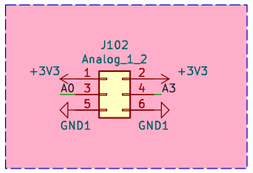


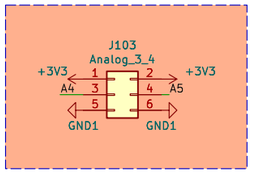


Mechanical



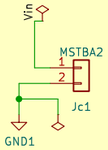




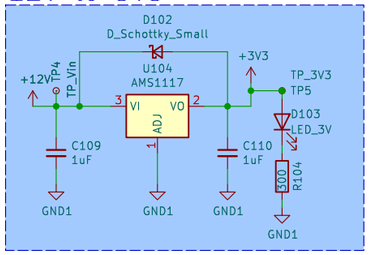


Input Connectors

Make sure to feed Vin with voltage that the LED strip can handle 5-30VDC.
Two connector options for power:
* Phoenix Contact MSTBA
* Barrel Jack 2x6.4mm



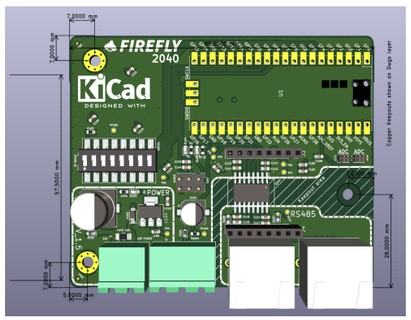
12V to 3V3



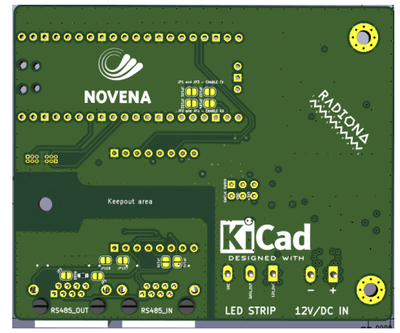
12V

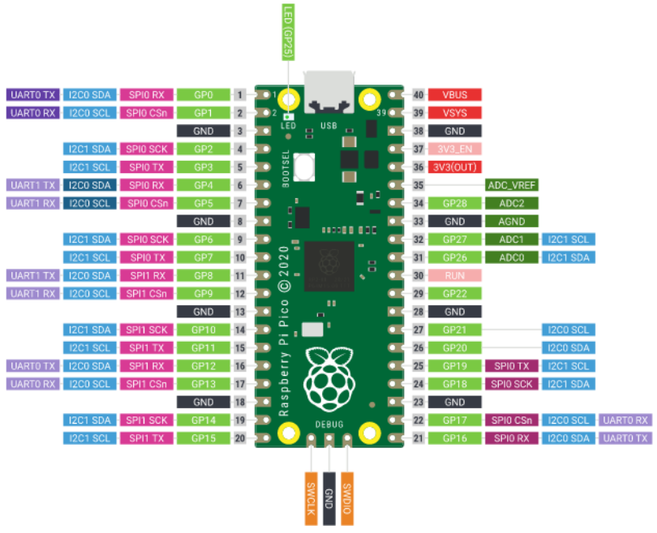
Vin - 12V from switching power supply

TOP VIEW



BOTTOM VIEW





Raspberry Pi

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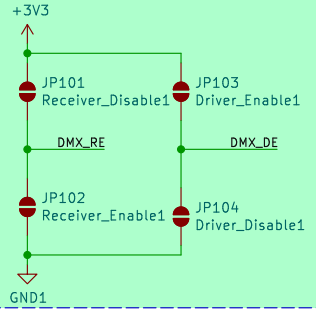
Configure Transceiver (Rx & Tx)

To receive data on the DMX bus; RE (Receiver Enable) must be pulled low, or high for disable.
For sending data; Tx to Rx link must be enabled, and DE (Driver Enable) must be pulled high, or low to disable.

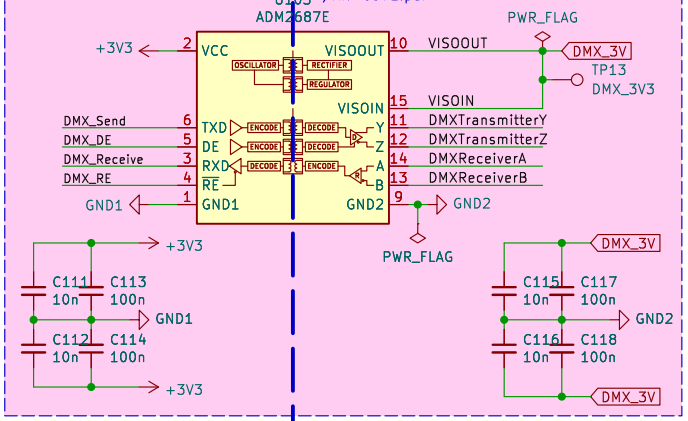
RE and DE can be controlled from the MCU, or hard coded via these jumper links.



RS-485 Transceiver

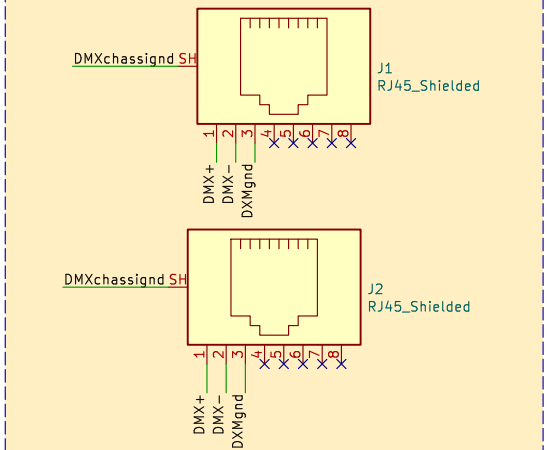
For sending and receiving DMX512 a Analog Devices ADM268 is used which isolates the RS-485 bus from the low voltage micro controller side.

* Place capacitors as close to ADM2687E for noise suppression.
* Avoid sharp corners around the isolation barrier and ground plane.
See Analogs application notes for further tips: https://www.analog.com/media/en/technical-documentation/application-notes/AN-0971.pdf

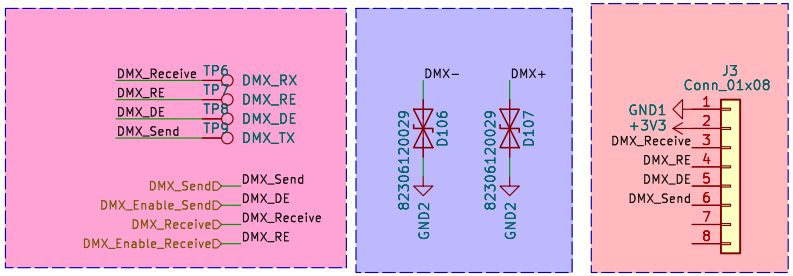


DMX Connectors

Neutrik female (NC3FAAH2) and male (NC3MAAH) 3 pin XLR connector is used for DMX512.

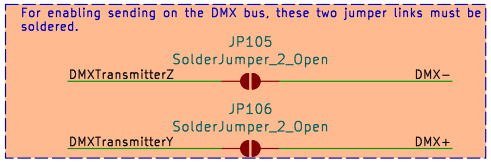


MCU Interface



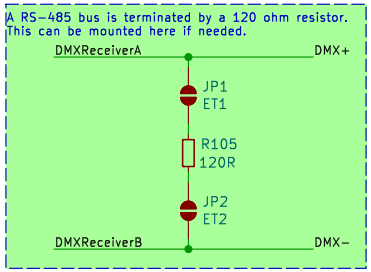
Link Tx to Rx (Optional)

For enabling sending on the DMX bus, these two jumper links must be soldered.



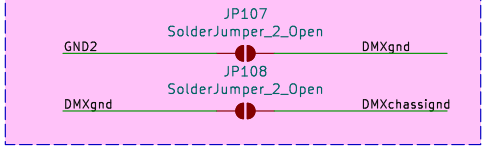
Terminators

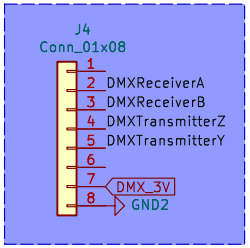
A RS-485 bus is terminated by a 120 ohm resistor. This can be mounted here if needed.



Link Ground (Optional)

Options for linking ground and shield of XLR connectors with RS-485 side of the transceiver.





Isolation Barrier

Isolation Barrier

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Sheet: /RS485_transciever/
File: RS485_transciever.kicad_sch

Title: Firefly v 0.4

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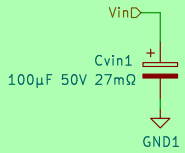
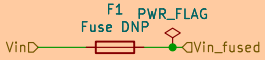
Decoupling and Breakout Pin Header



Classic Fuse (Option 1)

A much cheaper option then the high side switch, but one time use only.
Populate with a appropriate 1206 fast blow fuse.
Example: Fuse Fast Blow 10A 1206 MCCFB1206TFF/10



Highside Power Switch (Option 2)

The Infineon BTS50055-1TMC is a highside high current power switch with buildt in reverse polarity and temperature protection.
It's also used to measure current consumption: Current_Feedback as analog output.
To enable the high power switch Enable_Vin_fused must be driven low.
Both Current_Feedback and Enable_Vin_fused goes to the MCU so it can act on over current and act as a breaker.

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Sheet: /input_protection/
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