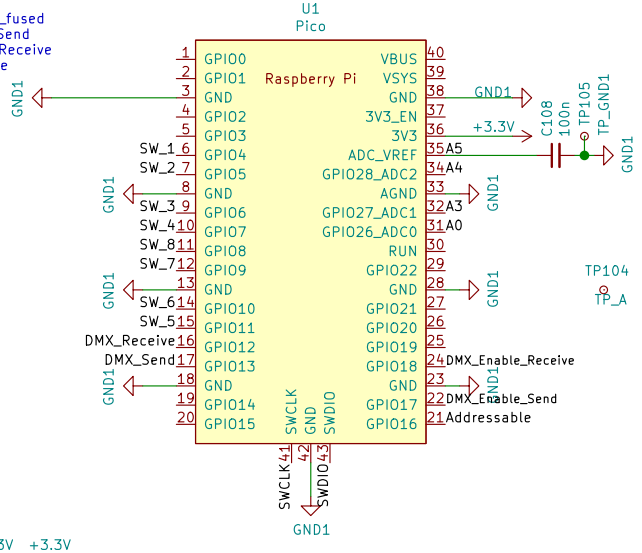
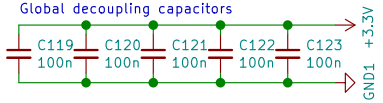
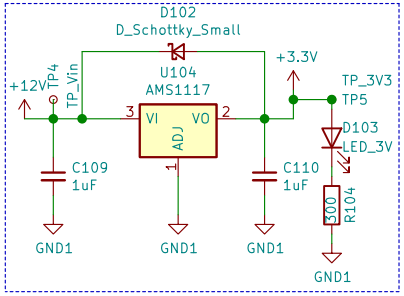
MCU Option Raspberry Pico

Ports:
A0 PC0 Current_Feedback
A1 PC1 POT_1
A2 PC2 POT_2
D2 PD2 Enable_Vin_fused
D1 PD0 (TX) DMX_Send
D0 PD1 (RX) DMX_Receive
D3 PD3 addressable
D4 PD4 SW5
D5 PD5 SW6
D6 PD6 SW7
D7 PD7 SW8
D8 PB0 PB0
D9 PB1 PB1
D10 PB2 PB2
D11 PB3 MOSI
D12 PB4 MISO
D13 PB5 SCK
A7 PE3 SW4
A6 PE2 SW3
SCL1 PE1 SW2
SDA1 PE0 SW1



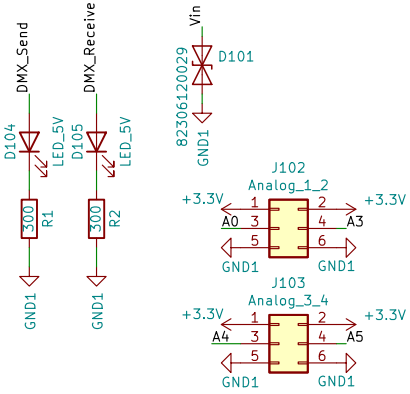


12V to 3V3



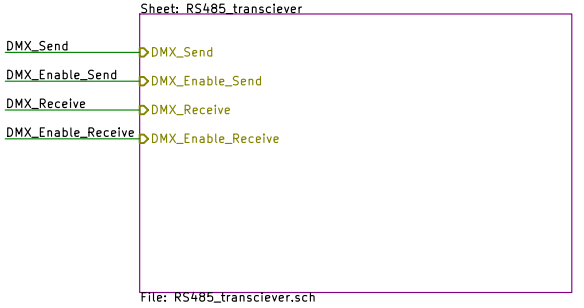
12V

Vin – 12V from switching power supply



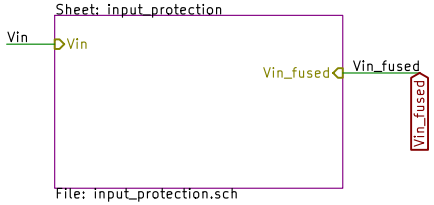
DMX512

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



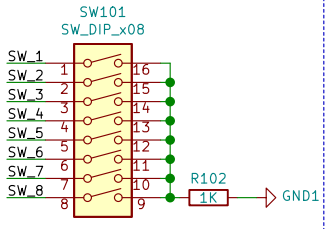
Input Protection

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



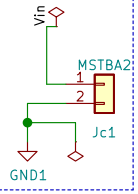
User Interface

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.

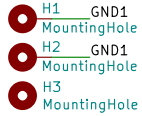


Input Connectors

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

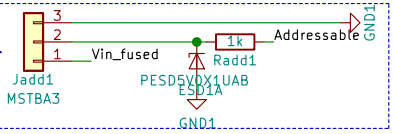


Mechanical



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.



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Sheet: /
File: firefly.sch

Title: Firefly

Size: A4	Date: 2020-09-09	**Rev: 0.1**
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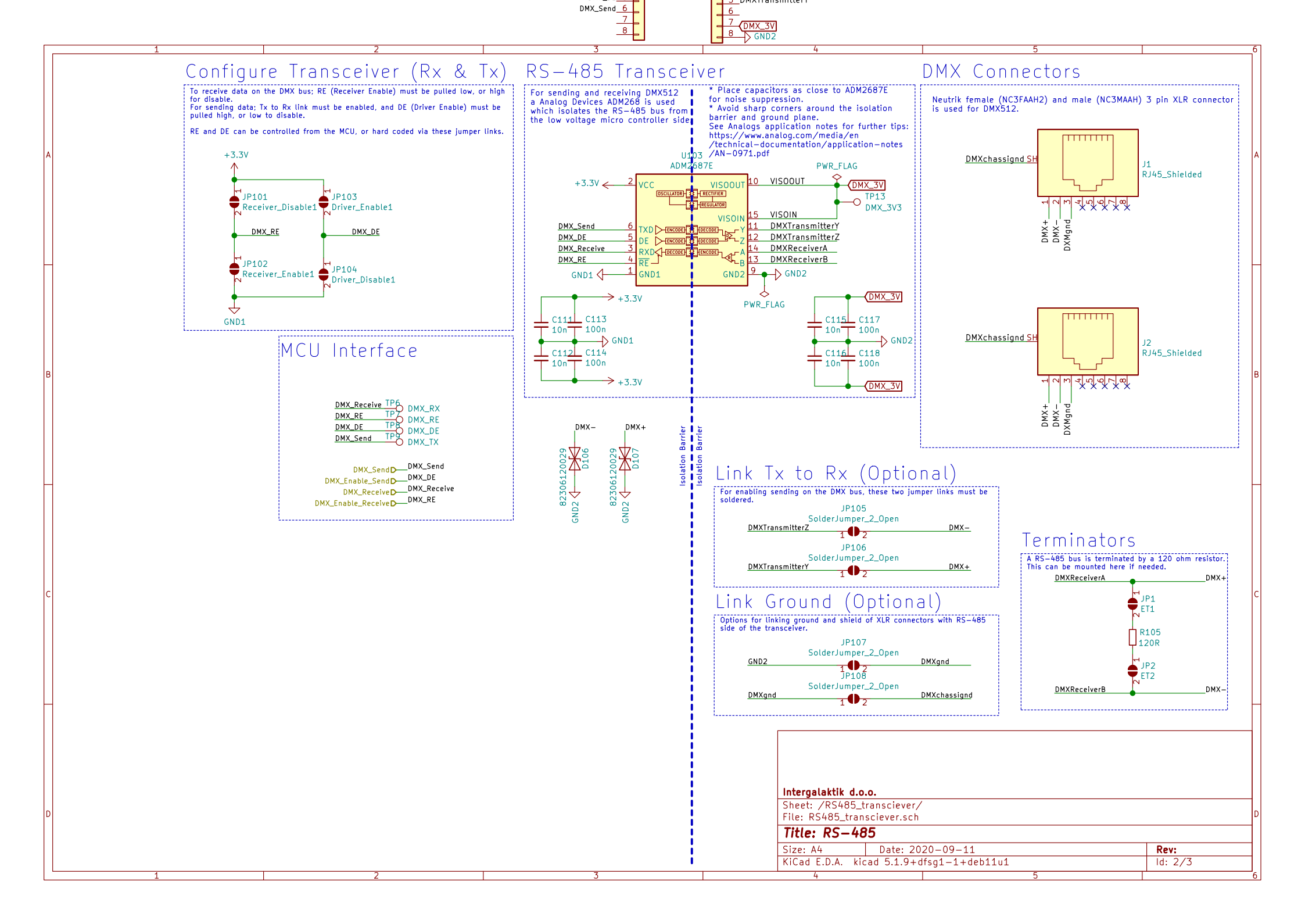
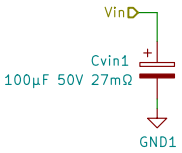

DMX_Send
DMX_3V
GND2
Configure Transceiver (Rx & Tx)
To receive data on the DMX bus; RE (Receiver Enable) must be pulled low, or high for disable.
For sending data; Tx to Rx link must be enabled, and DE (Driver Enable) must be pulled high, or low to disable.
RE and DE can be controlled from the MCU, or hard coded via these jumper links.
+3.3V
JP101
Receiver_Disable1
JP103
Driver_Enable1
DMX_RE
DMX_DE
JP102
Receiver_Enable1
JP104
Driver_Disable1
GND1
MCU Interface
DMX_Receive
DMX_RE
DMX_DE
DMX_Send
TP6
TP7
TP8
TP9
DMX_RX
DMX_RE
DMX_DE
DMX_TX
DMX_Send
DMX_Enable_Send
DMX_Receive
DMX_Enable_Receive
DMX_Send
DMX_DE
DMX_Receive
DMX_RE
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
U103
ADM2687E
VCC
VISOUT
VISOIN
TXD
DE
RXD
RE
GND1
GND2
OSCILLATOR
RECTIFIER
REGULATOR
ENCODE
DECODE
PWR_FLAG
DMX_3V
TP13
DMX_3V3
DMXTransmitterY
DMXTransmitterZ
DMXReceiverA
DMXReceiverB
C111 10n
C113 100n
C112 10n
C114 100n
C115 10n
C117 100n
C116 10n
C118 100n
82306120029
D106
D107
DMX-
DMX+
Isolation Barrier
DMX Connectors
Neutrik female (NC3FAAH2) and male (NC3MAAH) 3 pin XLR connector is used for DMX512.
DMXchassigndSH
J1
RJ45_Shielded
J2
DMX+
DMX-
DXMgnd
Link Tx to Rx (Optional)
For enabling sending on the DMX bus, these two jumper links must be soldered.
JP105
SolderJumper_2_Open
JP106
Link Ground (Optional)
Options for linking ground and shield of XLR connectors with RS-485 side of the transceiver.
JP107
JP108
DMXgnd
DMXchassigndSH
Terminators
A RS-485 bus is terminated by a 120 ohm resistor. This can be mounted here if needed.
JP1
ET1
R105
120R
JP2
ET2
Intergalaktik d.o.o.
Sheet: /RS485_transciever/
File: RS485_transciever.sch
Title: RS-485
Size: A4
Date: 2020-09-11
Rev:
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1
Id: 2/3

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/ File: input_protection.sch		
Title: Input protection		
Size: A4	Date: 2020-09-11	**Rev:**
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