

[illegible][illegible]

External power supply  
(laying out for 5V-30V)

standard 5.08 mm pitch  
screw terminal

CN1

4  
3  
2  
1

CAN\_V-IN

CAN\_L

CAN\_H

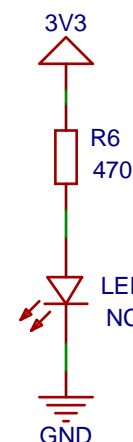
GND

The diagram shows a 4-pin screw terminal block labeled CN1. The pins are numbered 1, 2, 3, and 4 from bottom to top. Pin 1 is connected to a red wire. Pin 2 is connected to a green wire labeled CAN\_H. Pin 3 is connected to a green wire labeled CAN\_L. Pin 4 is connected to a green wire labeled CAN\_V-IN. The CAN\_V-IN wire is connected to a ground symbol labeled GND. The text 'External power supply (laying out for 5V-30V)' is written in blue above the terminal block. The text 'standard 5.08 mm pitch screw terminal' is written in black below the terminal block.

# LED

limiting LED current to 3mA,  
we do not want them too bright :)

red for power  
2.1V / 25mA forward voltage/current



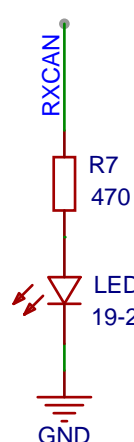
3V3

R6  
470

LED2  
NCD0805R1

GND

yellow for RX, TX and ESP alive indicator  
2V/25mA forward voltage/current

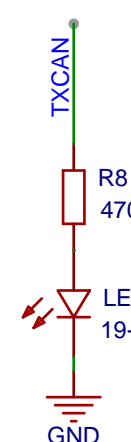


RXCAN

R7  
470

LED3  
19-213/Y2C-CQ2R2L/3T(CY)

GND

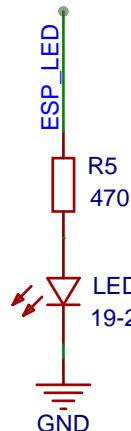


TXCAN

R8  
470

LED4  
19-213/Y2C-CQ2R2L/3T(CY)

GND



ESP LED

R5  
470

LED1  
19-213/Y2C-CQ2R2L/3T(CY)

GND

[illegible]

# External GPIO

some GPIO to spring connector

3V3

GND

TMS IO4

TDI IO5

TCK IO6

TDO IO7

IO8

TXD0

RXD0

CN2

KF141V-2.54-10P

3V3

RESET

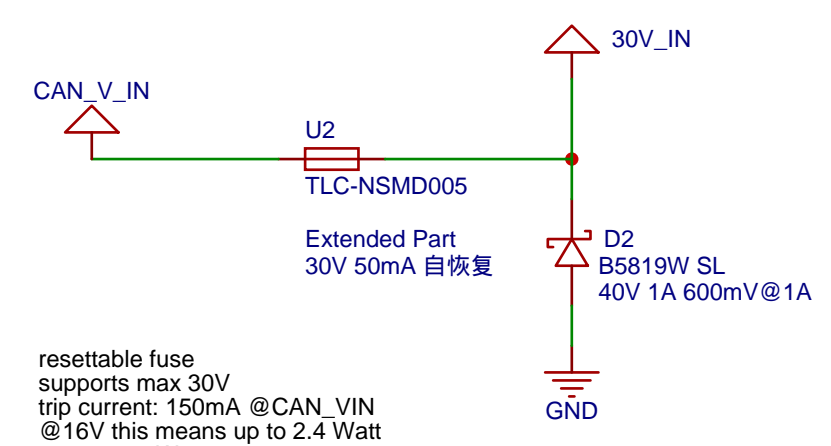
IOX SDA

IOX SCL

IOX INT

# Power Supply

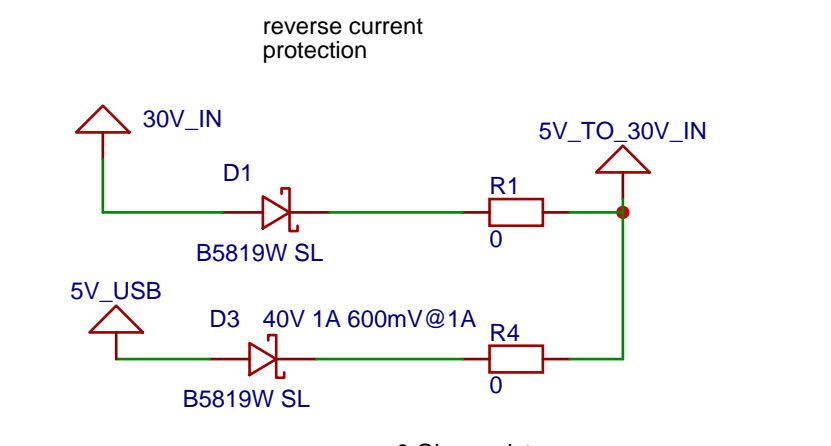
## CAN PWR: short and reverse polarity protection



The diagram shows a circuit for CAN PWR protection. It features a green wire connected to a terminal labeled 'CAN\_V\_IN'. This wire passes through a resettable fuse labeled 'U2 TLC-NSMD005'. After the fuse, the wire continues to a terminal labeled '30V\_IN'. A diode labeled 'D2 B5819W SL 40V 1A 600mV @ 1A' is connected in parallel with the wire, with its cathode to the '30V\_IN' terminal and its anode to 'GND'.

resettable fuse  
supports max 30V  
trip current: 150mA @CAN\_VIN  
@16V this means up to 2.4 Watt  
max 400 mW

## Power or-ing: USB XOR external power



The diagram illustrates a power or-ing circuit. It shows two input sources: '30V\_IN' and '5V\_USB'. The '30V\_IN' line passes through a diode 'D1 B5819W SL' (cathode to input, anode to output). The '5V\_USB' line passes through a diode 'D3 40V 1A 600mV @ 1A B5819W SL' (cathode to input, anode to output). The outputs of these diodes are connected to a common output line labeled '5V\_TO\_30V\_IN'. This output line passes through a resistor 'R1 0' and then through another resistor 'R4 0' before reaching the final output terminal. A label 'reverse current protection' is placed above the circuit.

reverse current  
protection

0 Ohm resistors,  
to shut one power off completely  
and as testpoints

CAN\_V\_IN

U2  
TLC-NSMD005

Extended Part  
30V 50mA 自恢复

D2  
B5819W SL  
40V 1A 600mV@1A

30V\_IN

GND

resettable fuse  
supports max 30V  
trip current: 150mA @ CAN\_V\_IN  
@16V this means up to 2.4 Watt  
max 400 mW

reverse current protection

30V\_IN

D1

B5819W SL

R1

0

5V\_TO\_30V\_IN

5V\_USB

D3

40V 1A 600mV @ 1A

B5819W SL

R4

0

0 Ohm resistors, to shut one power off completely and as testpoints

# ESP32 as System on Module C3-Mini

see [https://www.espressif.com/sites/default/files/documentation/esp32-c3-wroom-02\\_datasheet\\_en.pdf](https://www.espressif.com/sites/default/files/documentation/esp32-c3-wroom-02_datasheet_en.pdf)  
"Fig 7 Peripheral Schematics"

The diagram illustrates the peripheral connections for the ESP32-C3-WROOM-02-N4 module. It includes the following components and connections:

- Chip Enable:** A 3V3 supply is connected to the EN pin (pin 1) through a 10k resistor (R9). The EN pin is also connected to the SW1 switch (pin 2). The SW1 switch is connected to the K2-1157SP-I4SW-01 extended part (pin 3). The K2-1157SP-I4SW-01 extended part is connected to the EN pin (pin 4) through a 100nF capacitor (C11). The EN pin is also connected to the SW1 switch (pin 2).
- Boot option:** A 3V3 supply is connected to the IO9\_BOOT pin (pin 1) through a 10k resistor (R14). The IO9\_BOOT pin is also connected to the SW2 switch (pin 2). The SW2 switch is connected to the K2-1157SP-I4SW-01 extended part (pin 3). The K2-1157SP-I4SW-01 extended part is connected to the IO9\_BOOT pin (pin 4) through a 100nF capacitor (C9).
- Power and Ground:** A 3V3 supply is connected to the module. Ground (GND) is connected to the module.
- Peripheral Connections:** The module is connected to various peripheral pins, including IO0, IO1, IO2, IO3, IO19, IO18, IO10, RXD0, and TXD0. These connections are made through resistors (R21, R24, R25, R29, R31, R32, R33) and capacitors (C8, C9).

[illegible]

Assembly options to bypass the CAN controller and use the CAN controller directly

MCP\_TXCAN R19 TXCAN  
0

IOI9 R23 TXCAN  
0

MCP\_RXCAN R26 RXCAN  
0

IOI8 R30 RXCAN  
0

3V3 GND

C16 100nF

TXCAN

RXCAN

U6 SN65HVD230DR

1 8 RS CANH 3 7 6 VCC CANL R 5 GND

R270 GND

CAN H R28 CAN L 120

2.54-1\*2 Extended Part

RSlope GND = high speed (never power save/ IDLE)

optional 120 Ohm termination via Jumper.


Only required, if the bus is not terminated, yet on BOTH sides

Leave open, if this device is added to an existing system.

The CAN Bus of my Tecalor TTF 07 cool heatpump operates at 5V.

Fortunately, CAN supports a mixed 3V3 and 5V operation:  
<https://www.analog.com/en/technical-articles/can-bus-transceivers-operate-from-33v-or-5v-and-withstand-60v-faults.html>  
(Analog.com is a well-established manufacturer. They know what they are publishing!)

--> This means we can use a 3V3 transceiver and can be on the same 3V3 powerail as the ESP. No need to go to 5V

Schematic		Update Date			2023-03-17
Page		Create Date			2023-03-07
Drawed	Martin Kaiser	ESPHome_Heatpump_CAN			
Reviewed	-				
		VER	SIZE	PAGE	OF 1
 EasyEDA		V0.1	A3		