Rapid-CoreX

DATE : 09/09/2024

REV : 1.0.0

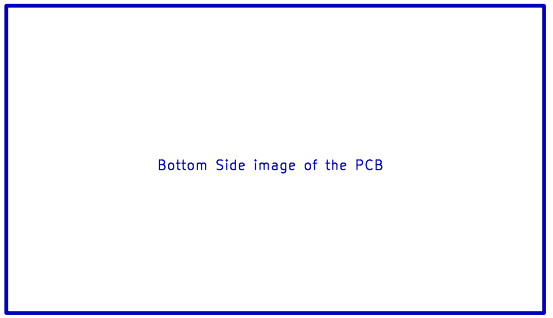
Designer : AR Lipson

Index

Index

Top Side

Bottom Side



DESIGN NOTE:
Example text for informational design notes.

DESCRIPTION:
Description about How it can be used.

LAYOUT NOTE:
Example text for critical layout guidelines.

Part No:
Put part no of the component

Block_Diagram

Project_Architecture

project architecture , block diagram , additional pages need ot be mentioned

Sheet: /
File: Rapid_Core-RCP.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 1/12

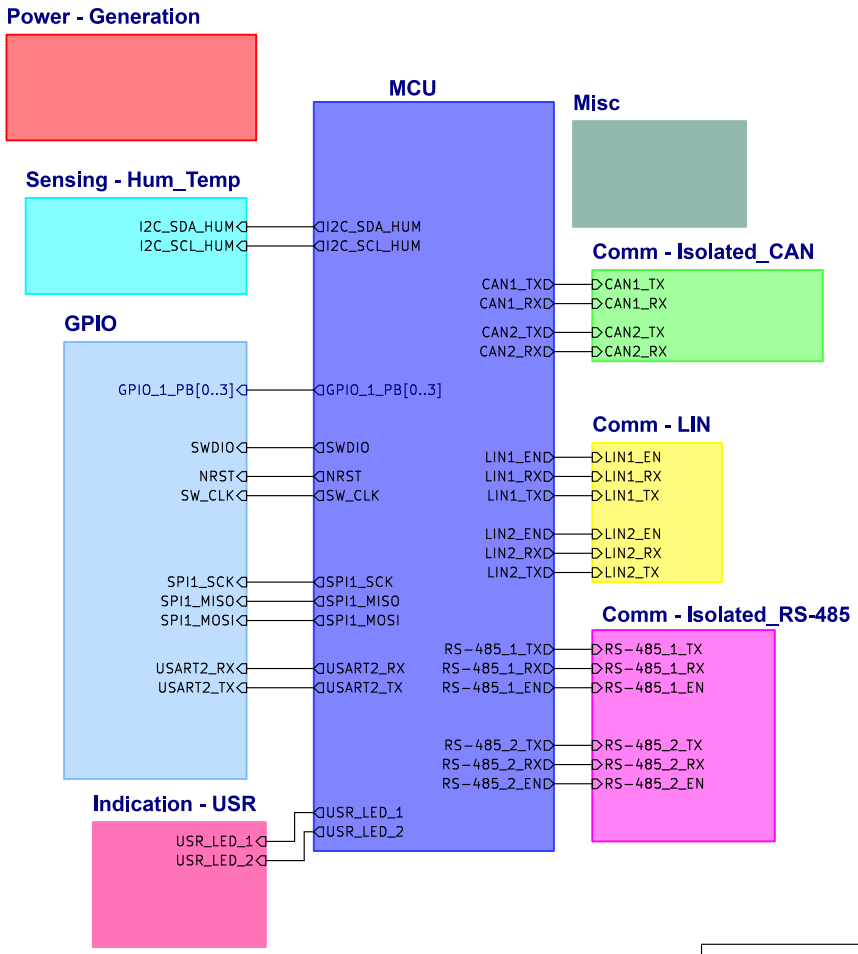
[2] Block_Diagram

Sheet: /Block_Diagram/
File: Block_Diagram.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 2/12

[3] Project_Architecture



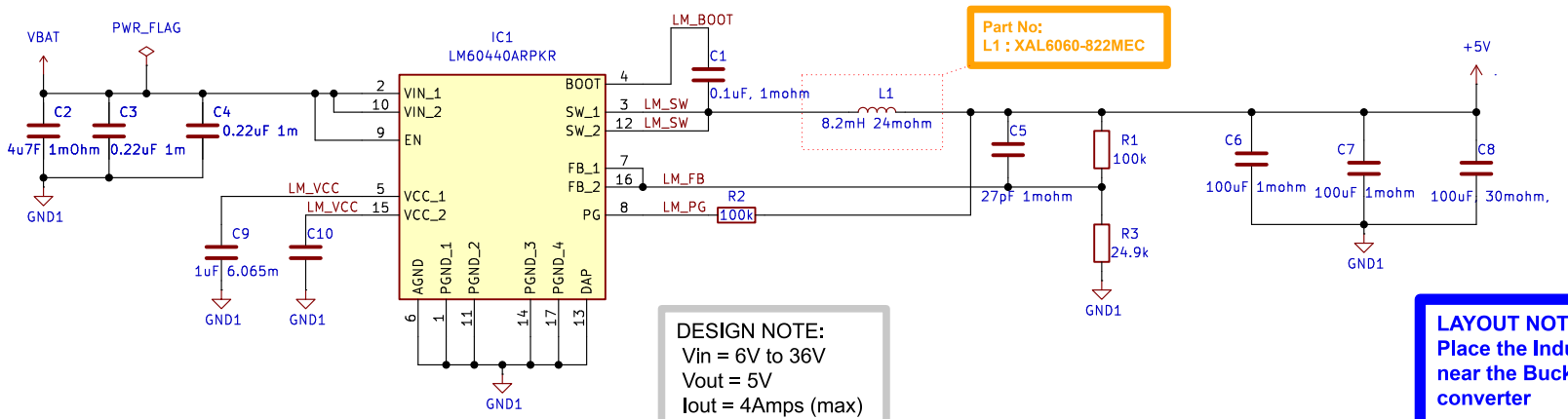
Sheet: /Project_Architecture/
File: Project_Architecture.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 3/12

[4] Power - Generation

Synchronus Buck Converter

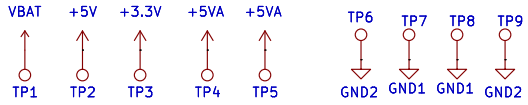


DESIGN NOTE:
Vin = 6V to 36V
Vout = 5V
Iout = 4Amps (max)

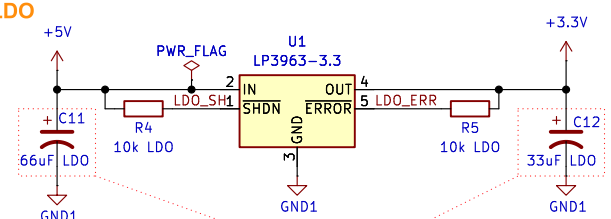
LAYOUT NOTE:
Place the Inductor near the Buck converter

Ref : Refered from WEBENCH Ti

Test Points



LDO

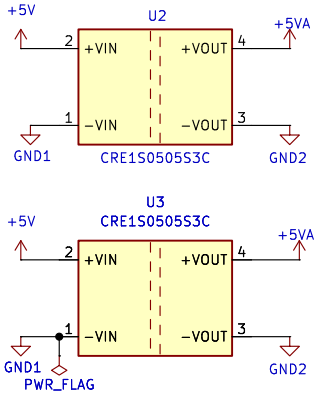


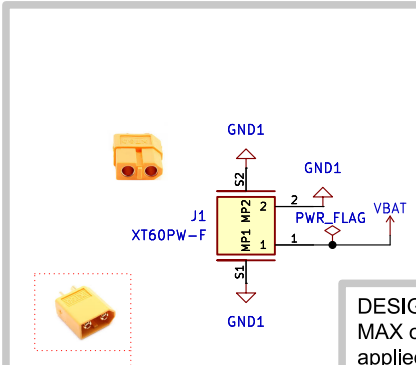
Part No:
C1 : EEE-FN1A680R
C6 : EEE-FN1A330R

DESIGN NOTE:
Vin = 5V
Vout = 3.3V
Iout = 3Amps (max)

Ref : Refered From the Data_sheet

Isolated Power Supply





DESCRIPTION:
MALE matching connector

DESIGN NOTE:
MAX of 44v can be applied

DESIGN NOTE:
Do not hot-plug when powered!

Sheet: /Project_Architecture/Power - Generation/
File: Power - Generation.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
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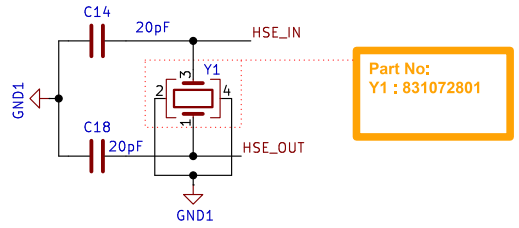
[5] MCU

HSE



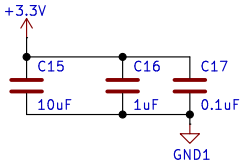
Part No:
Y1 : 831072801

LAYOUT NOTE:
Route the Trace with less amount of distance , avoid Via on the lines

Design Note:
C_s = 5pF(Stray Capacitance)
C_l = 15pF(Crystal Capacitance)

Cap = (C_s - C_l)x2
Cap = (15-5)x2 –> 20pF

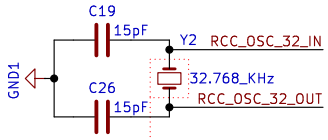
Analog Filtering



Ref : AN4488

LAYOUT NOTE:
Place the caps near the VDD pins for better performance

LSE



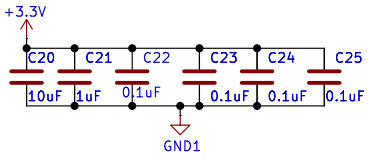
Part No:
Y2 : CM8V-T1A-32.768KHZ-12.5PF-20PPM-TB-QA

LAYOUT NOTE:
Route the Trace with less amount of distance , avoid Via on the lines

Design Note:
C_s = 5pF(Stray Capacitance)
C_l = 12.5pF(Crystal Capacitance)

Cap = (C_s - C_l)x2
Cap = (12.5-5)x2 –> 15pF

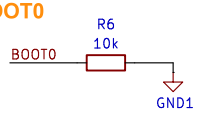
Digital Filtering



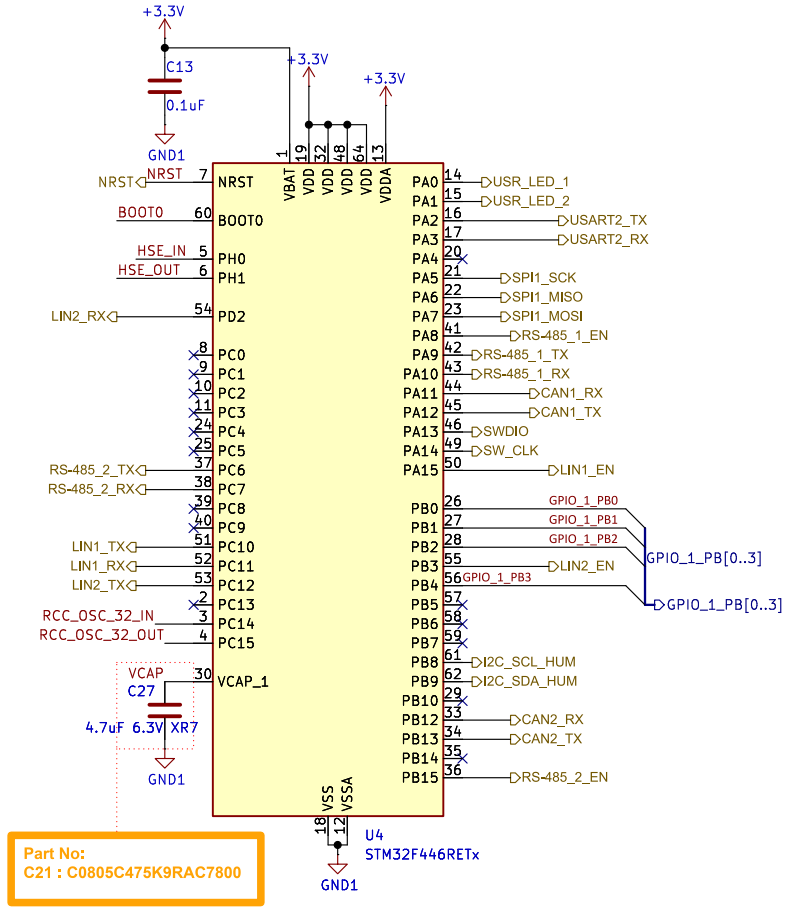
Ref : AN4488

LAYOUT NOTE:
Place the caps near the VDD pins for better performance

BOOT0



MCU IO Domain



Part No:
C21 : C0805C475K9RAC7800

Ref : Pinout reference from the STM32Cube MX

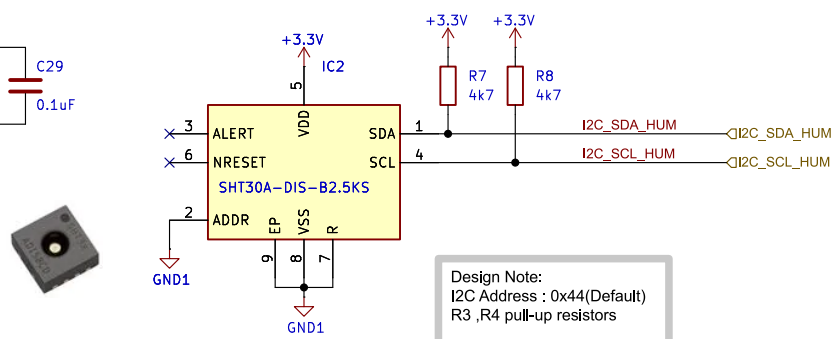
Sheet: /Project_Architecture/MCU/
File: MCU.kicad_sch

Title: Rapid–Core

Size: A4	Date: 2024–09–09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 5/12

[6] Sensing - Hum_Temp

SHT30A-DIS-B2.5KS

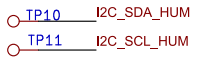


Design Note:
I2C Address : 0x44(Default)
R3 ,R4 pull-up resistors

LAYOUT NOTE:
SDA and SCL lines need to be a Diff pair

Ref : Refered from the Data sheet of the sensor

Test Points



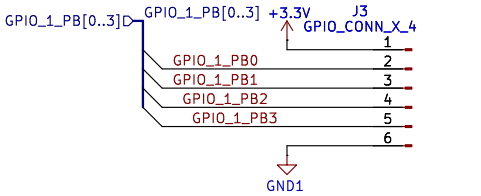
Sheet: /Project_Architecture/Sensing – Hum_Temp/
File: Sensing – Hum_Temp.kicad_sch

Title: Rapid-Core

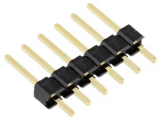
Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 6/12

[7] GPIO

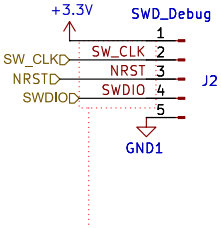
GPIO Pins



DESCRIPTION:
External GPIO Controllable Devices can be connected and controlled



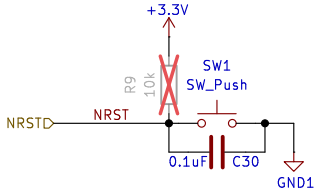
SWD Debug



DESCRIPTION:
Debug Interface for MCU

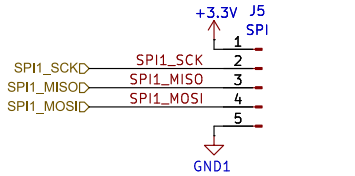
LAYOUT NOTE:
Do not use via on clk and IO line

NRST Button



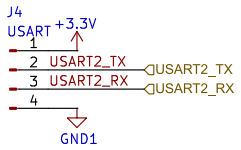
Part No:
SW1 : PTS636SK25FSMTR LFS

External SPI



DESCRIPTION:
External SPI device can be connected ex: Memory card or any other sensors

External USART/UART



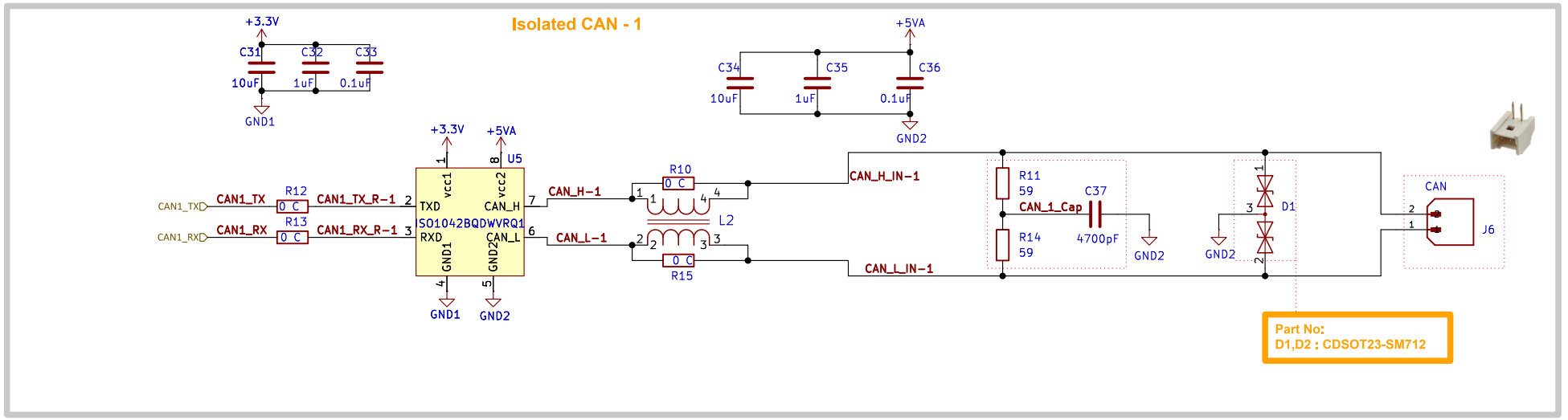
DESCRIPTION:
External USART/UART device can be connected ex: Memory card or any other sensors

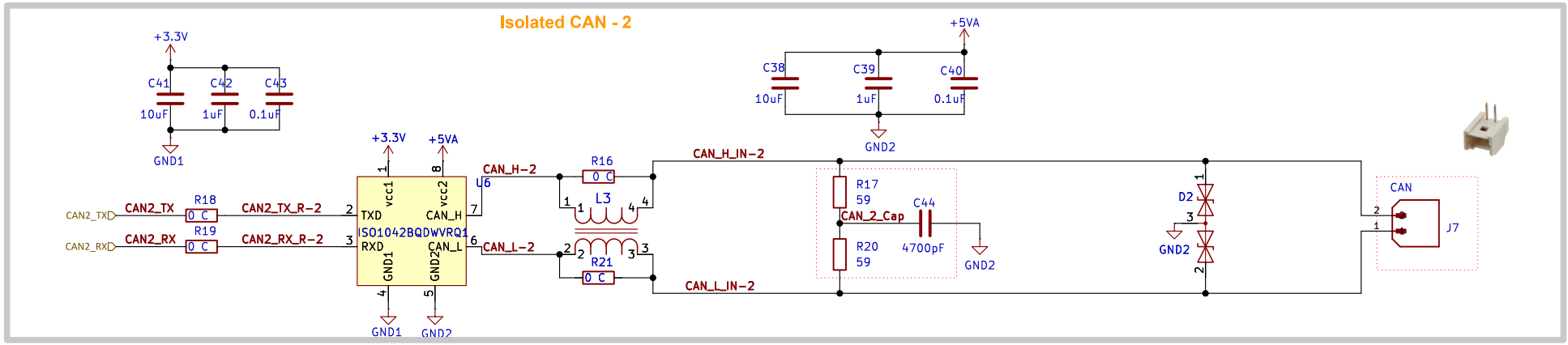
Sheet: /Project_Architecture/GPIO/
File: General.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 7/12

[8] Comm - Isolated_CAN





Test Points CAN - 1

- TP12 CAN1_TX
- TP13 CAN1_RX
- TP14 CAN_H_IN-1
- TP15 CAN_L_IN-1

Test Points CAN - 2

- TP16 CAN2_TX

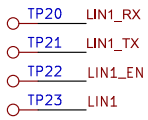
Sheet: /Project_Architecture/Comm – Isolated_CAN/
File: Comm – Isolated_CAN.kicad_sch

Title: Rapid-Core

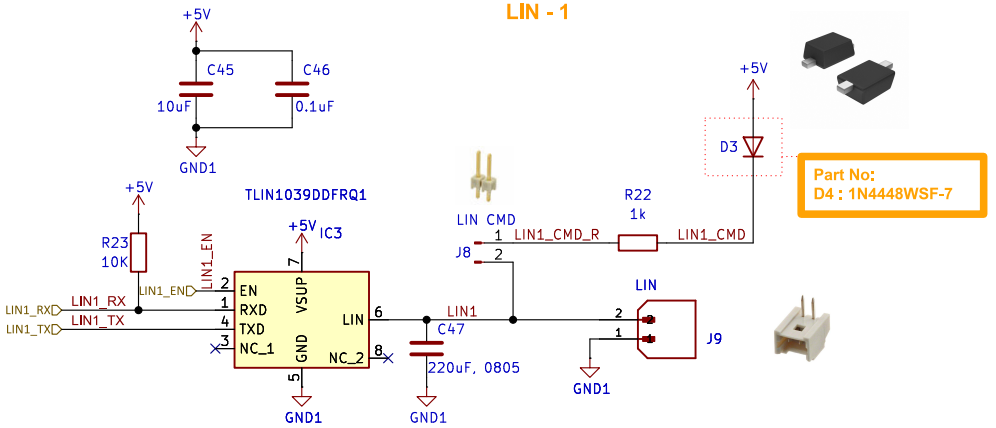
Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 8/12

[9] Comm - LIN

Test Points LIN - 1

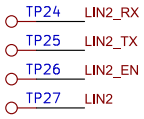


LIN - 1

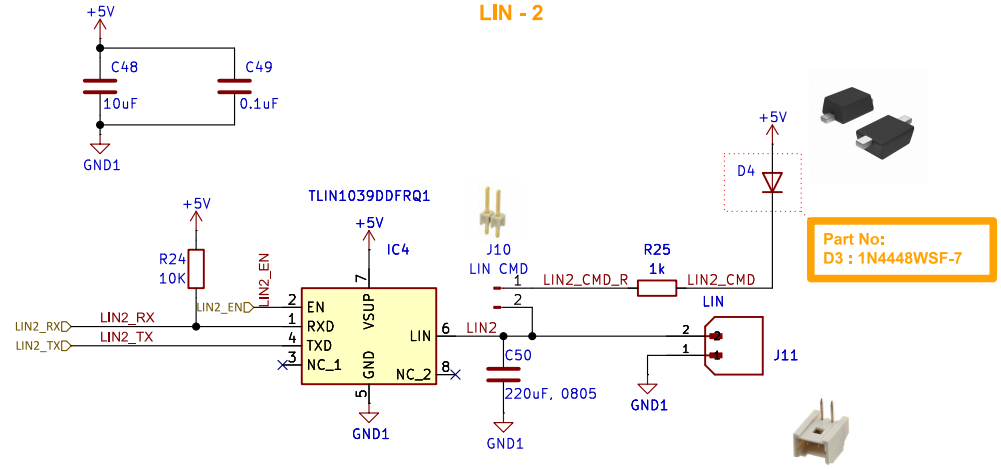


DESIGN NOTE:
1. If J9 is closed the tranceiver acts a Commander.
2. If J9 is open the transceiver acts a Responder.

Test Points LIN - 2



LIN - 2



Sheet: /Project_Architecture/Comm – LIN/
File: Comm – LIN.kicad_sch

Title: Rapid–Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
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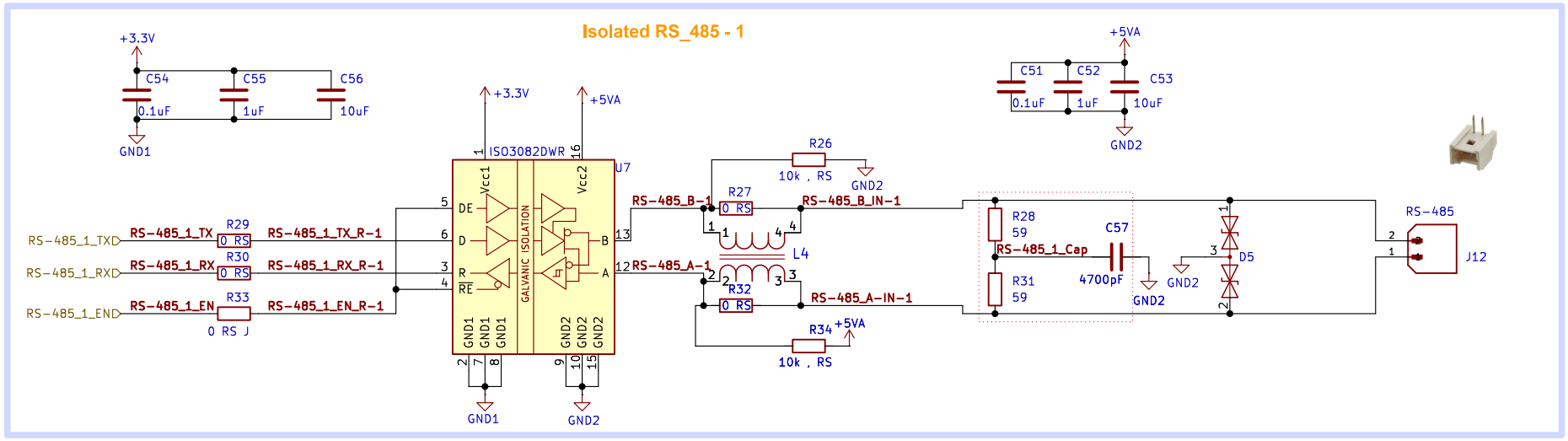
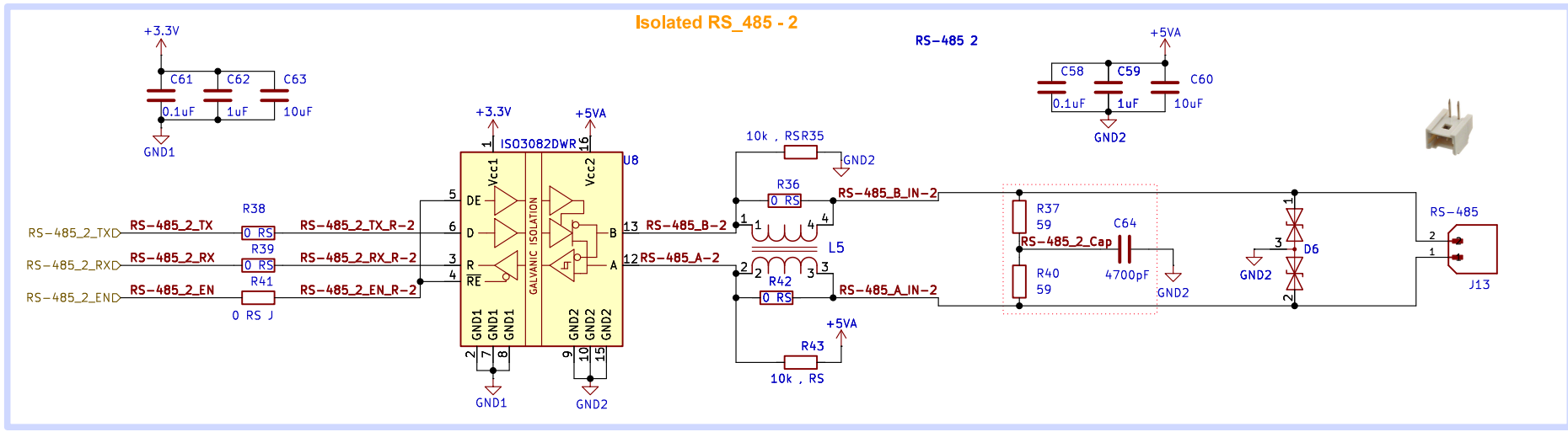
[10] Comm - Isolated_RS-485





Test Points RS_485 - 1

- TP28 RS-485_1_TX
- TP29 RS-485_1_RX
- TP30 RS-485_1_EN
- TP31 RS-485_B_IN-1
- TP32 RS-485_A_IN-1

Test Points RS_485 - 2

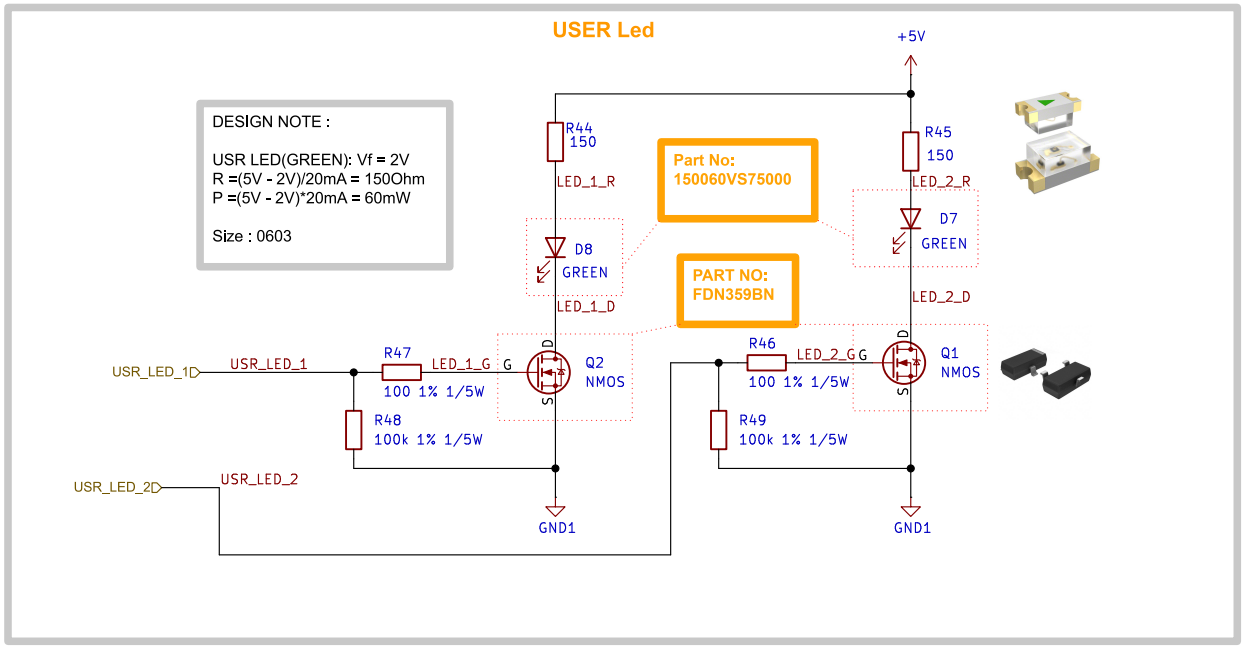
- TP33 RS-485_2_TX
- TP34 RS-485_2_RX
- TP35 RS-485_2_EN
- TP36 RS-485_B_IN-2
- TP37 RS-485_A_IN-2

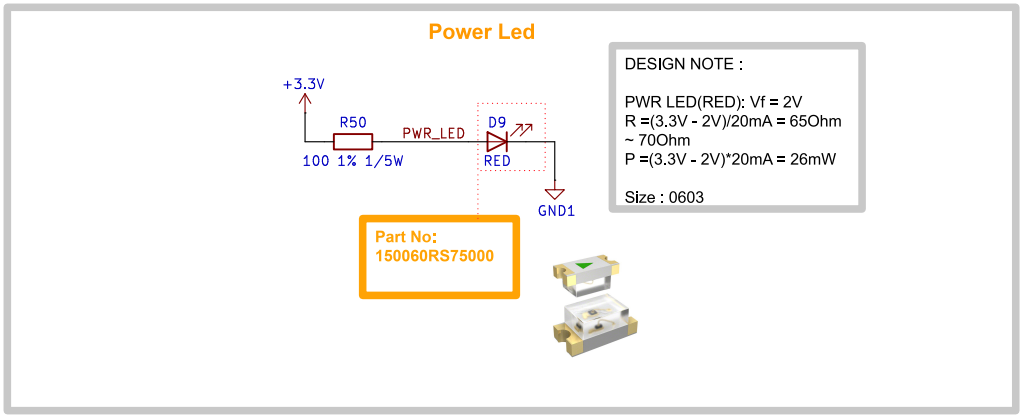
Sheet: /Project_Architecture/Comm – Isolated_RS-485/
File: Comm – Isolated_RS-485.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 10/12

[11] Indication - USR





Sheet: /Project_Architecture/Indication – USR/
File: Indication – USR.kicad_sch

Title: Rapid–Core

Size: A4	Date: 2024–09–09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 11/12

[12] Misc

Logo

Fiducials

Front

FID1 FID2

FID3

Mounting Holes

H1 H2

GND1 GND2

H3 H4

GND1 GND2

Sheet: /Project_Architecture/Misc/
File: Misc.kicad_sch

Title: Rapid-Core

Size: A4	Date: 2024-09-09	**Rev: 1.0.1**
KiCad E.D.A. 8.0.5		Id: 12/12