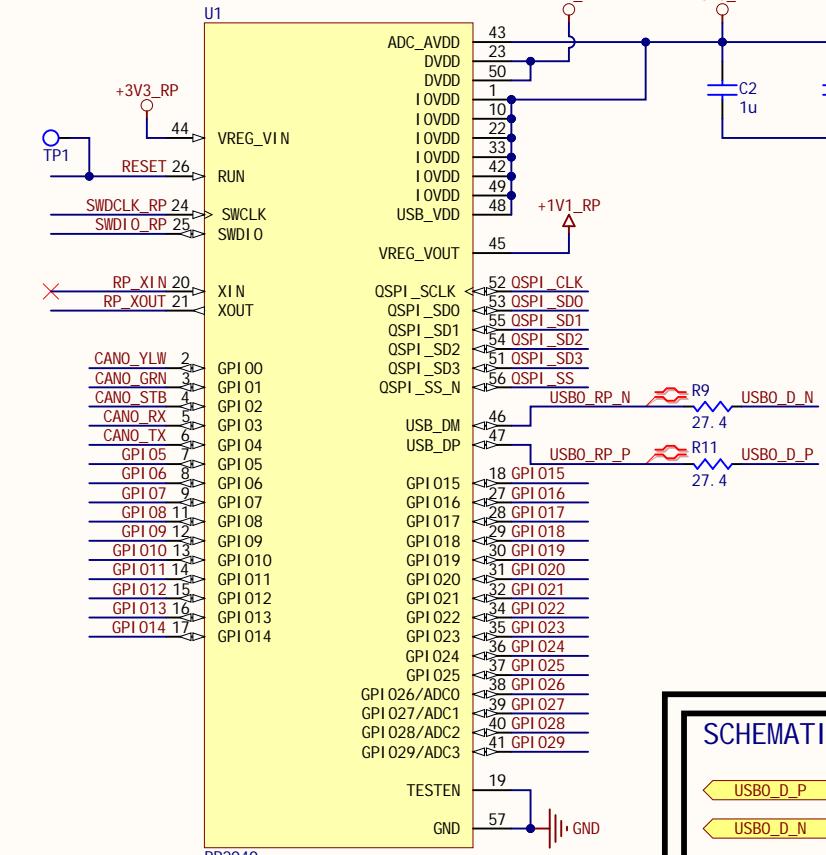
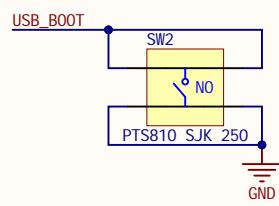


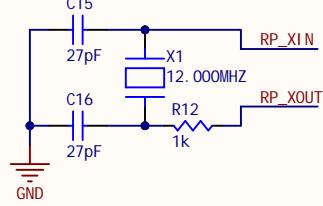
# MICROCONTROLLER



## BOOTSEL



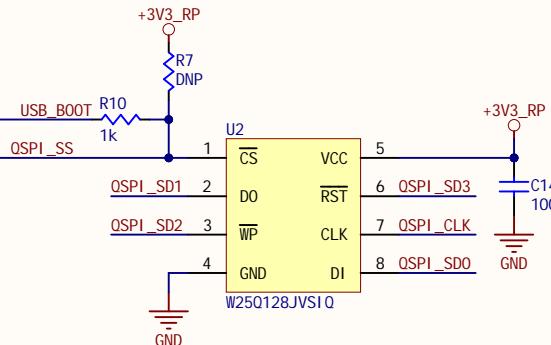
## OSCILLATOR



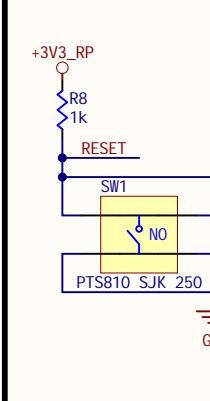
## SCHEMATIC PORTS

- USB0\_D\_P
- USB0\_D\_N
- CANO\_TX
- CANO\_RX
- CANO\_STB
- CANO\_YLW
- CANO\_GRN
- SWDIO\_RP
- SWDCLK\_RP
- RESET

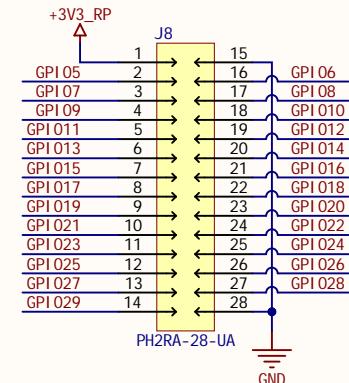
## FLASH



## RESET



## EXPOSED GPIO PINS



**NOTES:**

- SEE RP2040 DATASHEET AND THE RP2040 HARDWARE DESIGN GUIDE FOR DETAILS.
- 1UF BULK DECOUPLING CAPS HAVE PRIORITY PLACEMENT.
- USE 10K RESISTOR FOR DNP IF CS IS NOT AT VCC ON STARTUP.
- RP2040 USES FLASH CS AS BOOTSEL.

[5] CANO COMMUNICATION RELIES ON "CAN2040" PIO IMPLEMENTATION (Kevin OConnor/can2040 ON GIT HUB).

Project/Vehicle: TGIS - Main PCB

Author(s):  
 -Yovany Molina  
 -Blake Sanders  
 -\*  
 -\*  
 -\*

Machine Intelligence Laboratory  
 1889 Museum Rd  
 Room 3001  
 Gainesville, FL, 32611

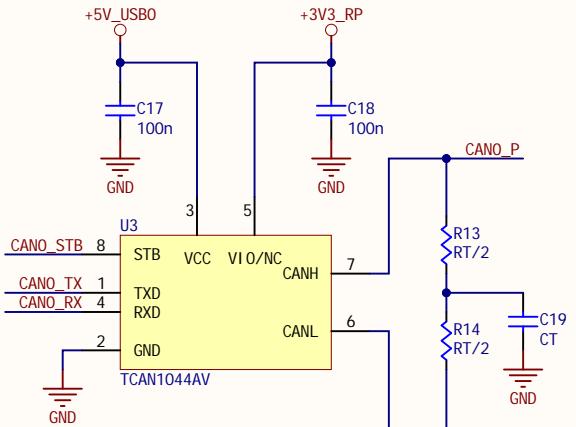


Git Repo: <https://github.com/yomole/TailGator>  
 Git Hash:

Date: 1/18/2024 Revision: A Size: A File: Microcontroller.SchDoc

Sheet 2 of 4

# CAN TRANSCEIVER



## SCHEMATIC PORTS

CANO_P	CANO_P
CANO_N	CANO_N
CANO_TX	CANO_TX
CANO_RX	CANO_RX
CANO_STB	CANO_STB

**NOTES:**

- [1] REPLACE RT, CT (IF NEEDED) WITH APPROPRIATE TERMINATION RESISTORS AND SPLIT TERMINATION CAPACITORS FOR THE GIVEN CAN NETWORK.
- [2] IO SUPPLY VOLTAGE IS 3.3V TO WORK WITH ANY EXISTING SN65HVD230 CAN TRANSCEIVERS.
- [3] CAN FD IS BACKWARDS COMPATIBLE WITH CAN 2.0, BUT NOT VICE-VERSA.

Project/Vehicle: TGIS - Main PCB

Author(s):

- Yovany Molina
- Blake Sanders
- \*
- \*
- \*

Revisor(s):

- \*
- \*
- \*
- \*

Machine Intelligence Laboratory

1889 Museum Rd  
Room 3001  
Gainesville, FL, 32611

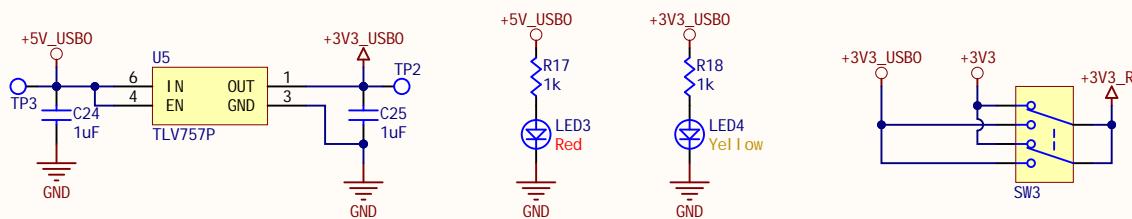


Git Repo: <https://github.com/yomole/TailGator>  
Git Hash:

Date: 1/18/2024 | Revision: A | Size: A | File: Transceivers.SchDoc

Sheet 3 of 4

# RP2040 POWER



**NOTES:**  
 [1] POWER FOR THE RP2040 CAN COME FROM THE USB HOST OR THE TGIS 3V3 RAIL.

Project/Vehicle: TGIS - Main PCB

Machine Intelligence Laboratory  
1889 Museum Rd



Room 3001  
Gainesville, FL, 32611

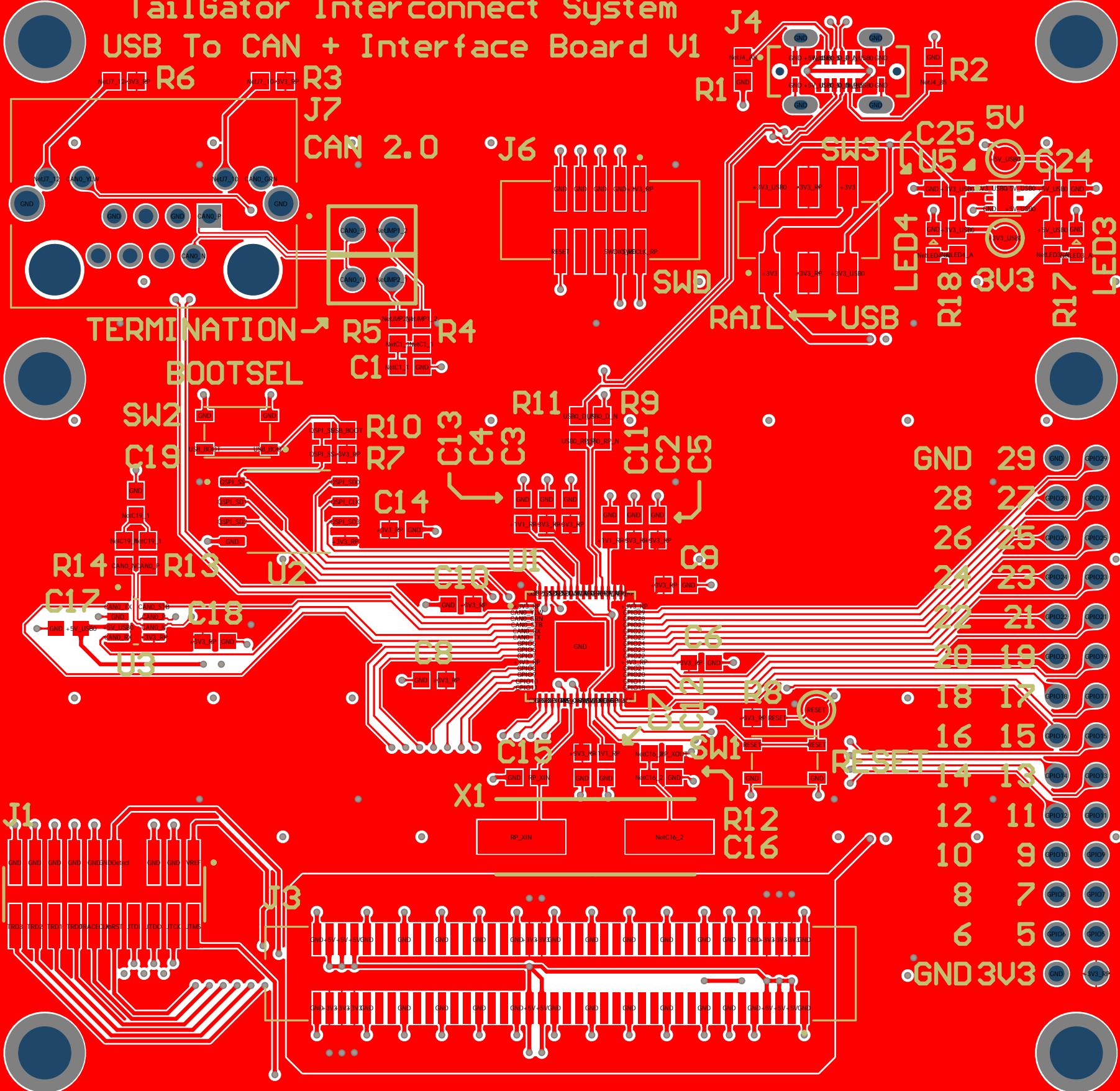
Git Repo: <https://github.com/yomole/TailGator>  
Git Hash:

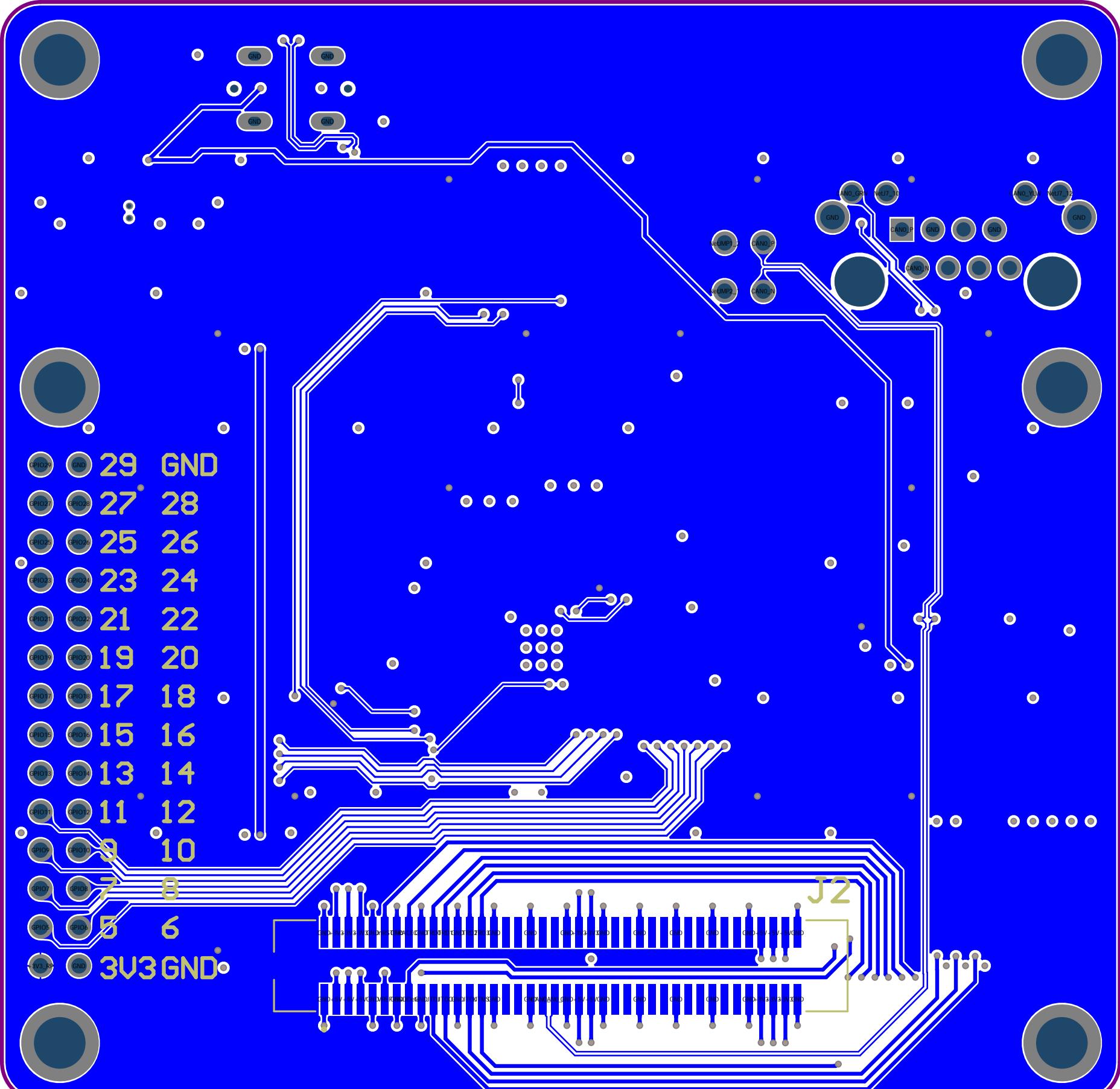
Date: 1/18/2024 | Revision: A | Size: A | File: Power.SchDoc

Sheet 4 of 4

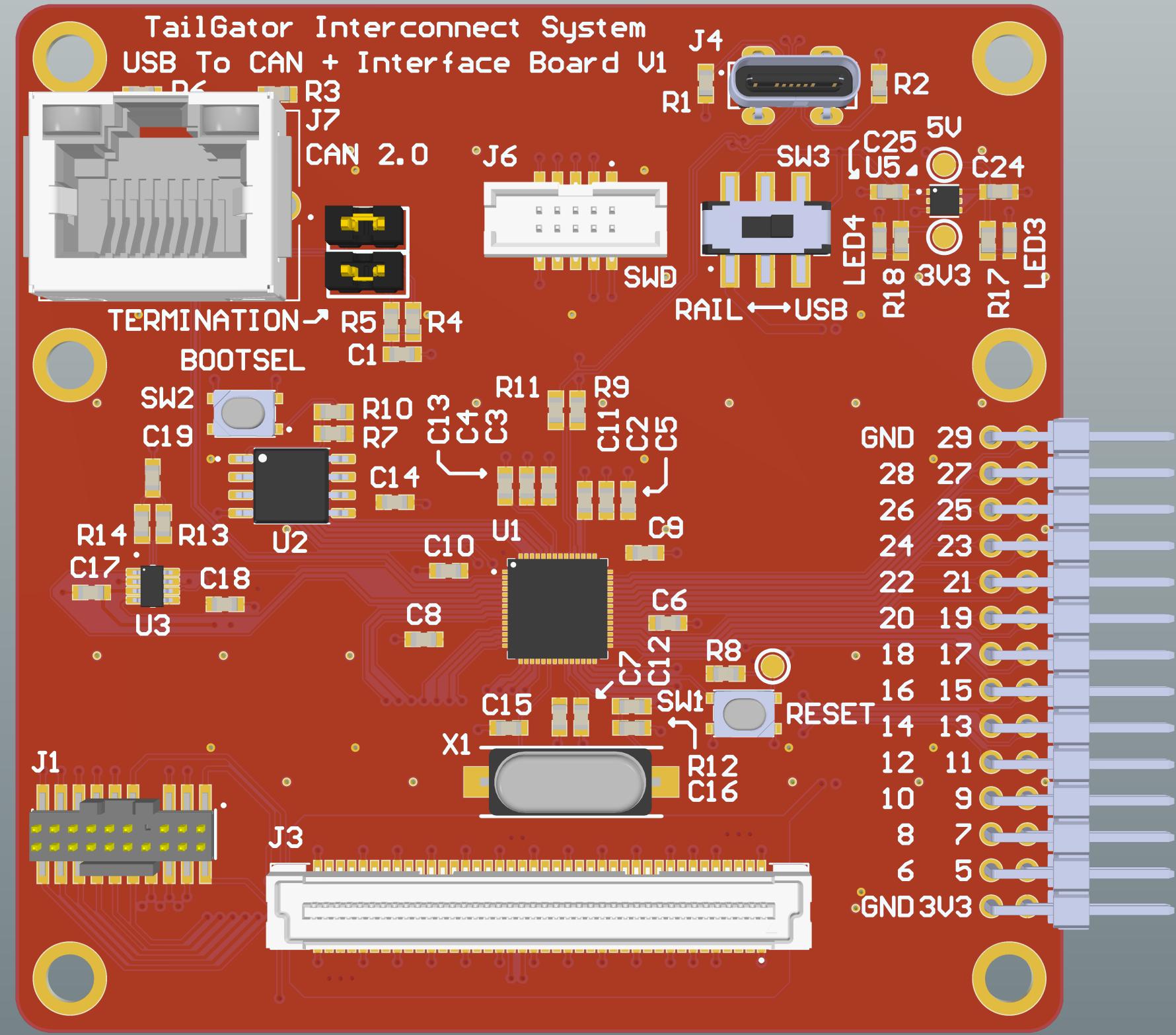
# TailGator Interconnect System

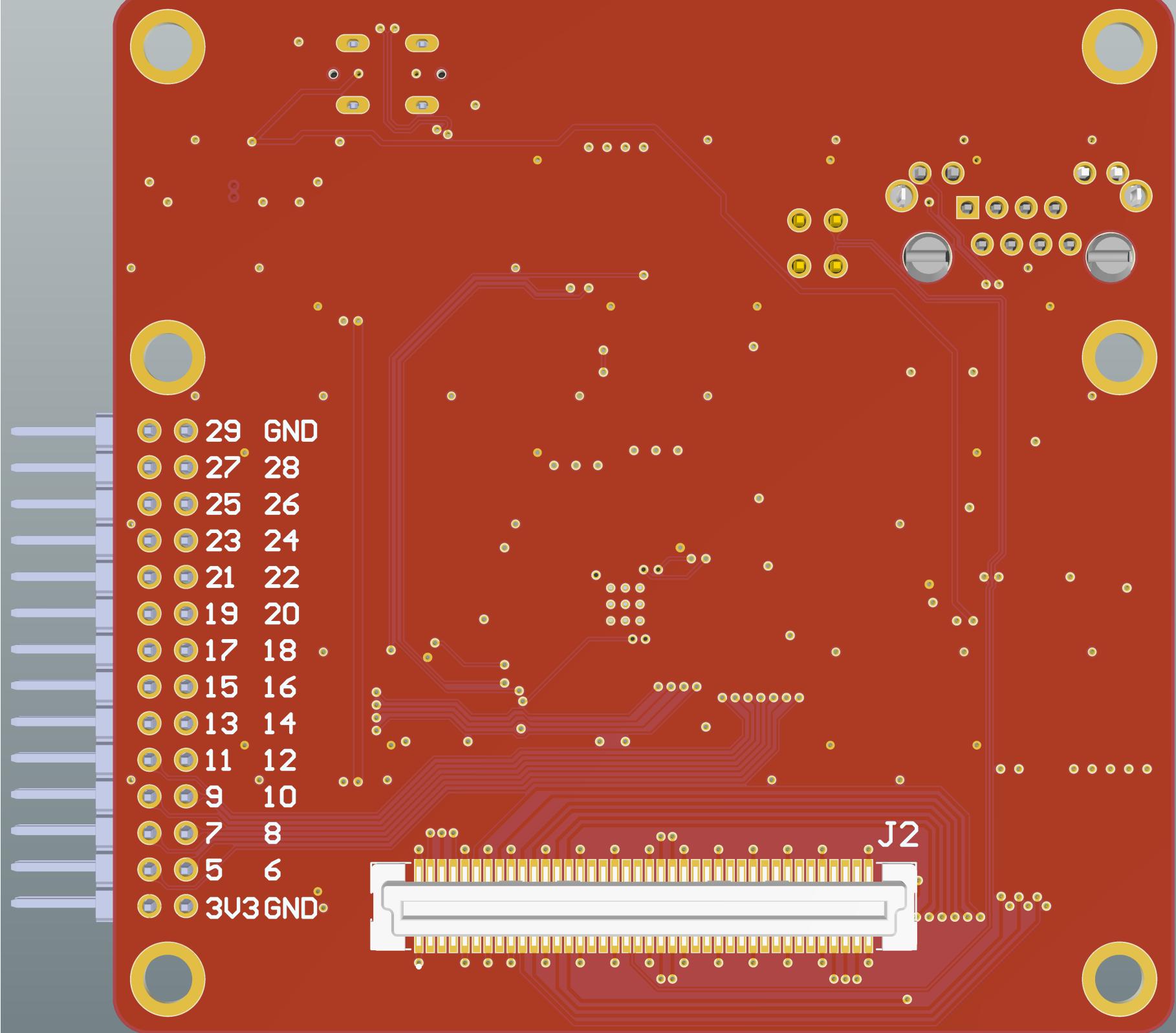
## USB To CAN + Interface Board V1





TailGator Interconnect System  
USB To CAN + Interface Board V1





Comment	Description	Designator	Footprint	LibRef	Quantity
Cap		C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C24, C25	CAPC0603	Cap	21
FTSH-110	Connector Header Surface Mount 20 position 0.050" (1.27mm)	J1	SAMTEC_FTSH-110-01-L-DV-007	FTSH-110-01-L-DV-007-K	1
10144517-081802LF	CONN RCPT1 80POS SMD GOLD	J2	AMPHENOL_10144517-081802LF	10144517-081802LF	1
10144518-083802LF	CONN PLUG 3 80POS SMD GOLD	J3	AMPHENOL_10144518-083802LF	10144518-083802LF	1
USB4120-03	USB-C (USB TYPE-C) USB 2.0 Receptacle Connector 24 (16+8 Dummy) Position Surface Mount, Through Hole	J4	GCT_USB4120-03-C_REV A	USB4120-03	1
3221-10	Connector Header Surface Mount 10 position 0.050" (1.27mm)	J6	CNC_3221-10-0300-00	3221-10-0300-00	1
RJHSE-3381	Jack Modular Connector 8p8c (RJ45, Ethernet) Vertical Shielded	J7	AMPHENOL_RJHSE3381	RJHSE-3381	1
PH2RA-28-UA	Connector Header Through Hole, Right Angle 28 position 0.100" (2.54mm)	J8	PH2RA-28-UA	PH2RA-28-UA	1
LED		LED3, LED4	LED0603	LED	2
Res		R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R17, R18	RES0603	Res	16
PTS810 SJK250	Tactile Switch SPST-NO Top Actuated Surface Mount	S/W1, S/W2	SW PTS810_SJM_250_SMT R_LFS	PTS810 SJK250 SMTR LFS	2
JS202011SCQN	Slide Switch DPDT Surface Mount	S/W3	SW JS202011SCQN	JS202011SCQN	1
TP		TP1, TP2, TP3	TPAD-60MIL	TP	3
RP2040	ARM® Cortex®-M0+- Microcontroller IC 32-Bit Dual-Core 133MHz External Program Memory 56-QFN (7x7)	U1	QFN40P700X700X90-57N	SC0914(13)	1
W25Q128JVS IQ	FLASH - NOR Memory IC 128Mbit SPI - Quad I/O, QPI, DTR 133MHz 8-SOIC	U2	SOIC127P790X216-8N	W25Q128JVS IQ	1
TCAN1044AV	1/1 Transceiver Half CANbus TSOT-23-8	U3	SOT65P280X110-8N	TCAN1044AVDDFRQ1	1
TLV757P	Linear Voltage Regulator IC Positive Fixed 1 Output 1A 6-WSON (2x2)	U5	VREG_TLV75733PDRVR	TLV75733PDRVR	1
12.000MHZ	12 MHz ±20ppm Crystal 18pF 50 Ohms HC-49/US	X1	ABLS-12.000MHZ	ABLS-12.000MHZ	1

## Electrical Rules Check Report

Class	Document	Message
		Successful Compile for T GIS USB to CAN.PrjPcb

## Design Rules Verification Report

Filename : C:\Users\molyo\OneDrive\Desktop\MIL\TailGator\PCB\TailGator Interconnect System.m\TGIS USB to CAN\TGIS USB to CAN\USBtoCAN.PcbDoc

Warnings 0

Rule Violations 0

Warnings	
Total	0
Rule Violations	
Clearance Constraint (Gap=4mil) (All),(All)	0
Short-Circuit Constraint (Allowed=No) (All),(All)	0
Un-Routed Net Constraint ( All )	0
Modified Polygon (Allow modified: No), (Allow shelved: No)	0
Width Constraint (Min=4mil) (Max=71497.938mil) (Preferred=4mil) (All)	0
Power Plane Connect Rule(Relief Connect)(Expansion=11.811mil) (Conductor Width=4mil) (Air Gap=4mil) (Entries=4)	0
Power Plane Connect Rule(Direct Connect )(Expansion=20mil) (Conductor Width=10mil) (Air Gap=10mil) (Entries=4)	0
Minimum Annular Ring (Minimum=3mil) (All)	0
Hole Size Constraint (Min=7.874mil) (Max=248.031mil) (All)	0
Hole To Hole Clearance (Gap=9.842mil) (All),(All)	0
Minimum Solder Mask Sliver (Gap=0mil) (All),(All)	0
Silk To Solder Mask (Clearance=4mil) (IsPad),(All)	0
Silk to Silk (Clearance=0mil) (All),(All)	0
Net Antennae (Tolerance=0mil) (All)	0
Board Clearance Constraint (Gap=0mil) (All)	0
Matched Lengths(Tolerance=10mil) (InNetClass("USB0_D"))	0
Matched Lengths(Tolerance=10mil) (InNetClass("USB0_RP"))	0
Matched Lengths(Tolerance=5mil) (InNetClass("CAN0"))	0
Height Constraint (Min=0mil) (Max=71497.938mil) (Preferred=500mil) (All)	0
Total	0