Sheet: MCU

Processor

File: mcu.sch

Sheet: Power

Power conversion

File: power.sch

Sheet: Stepper drivers

Stepper drivers

File: stepper_drv.sch

Sheet: IO & Communication

I/O
Communication

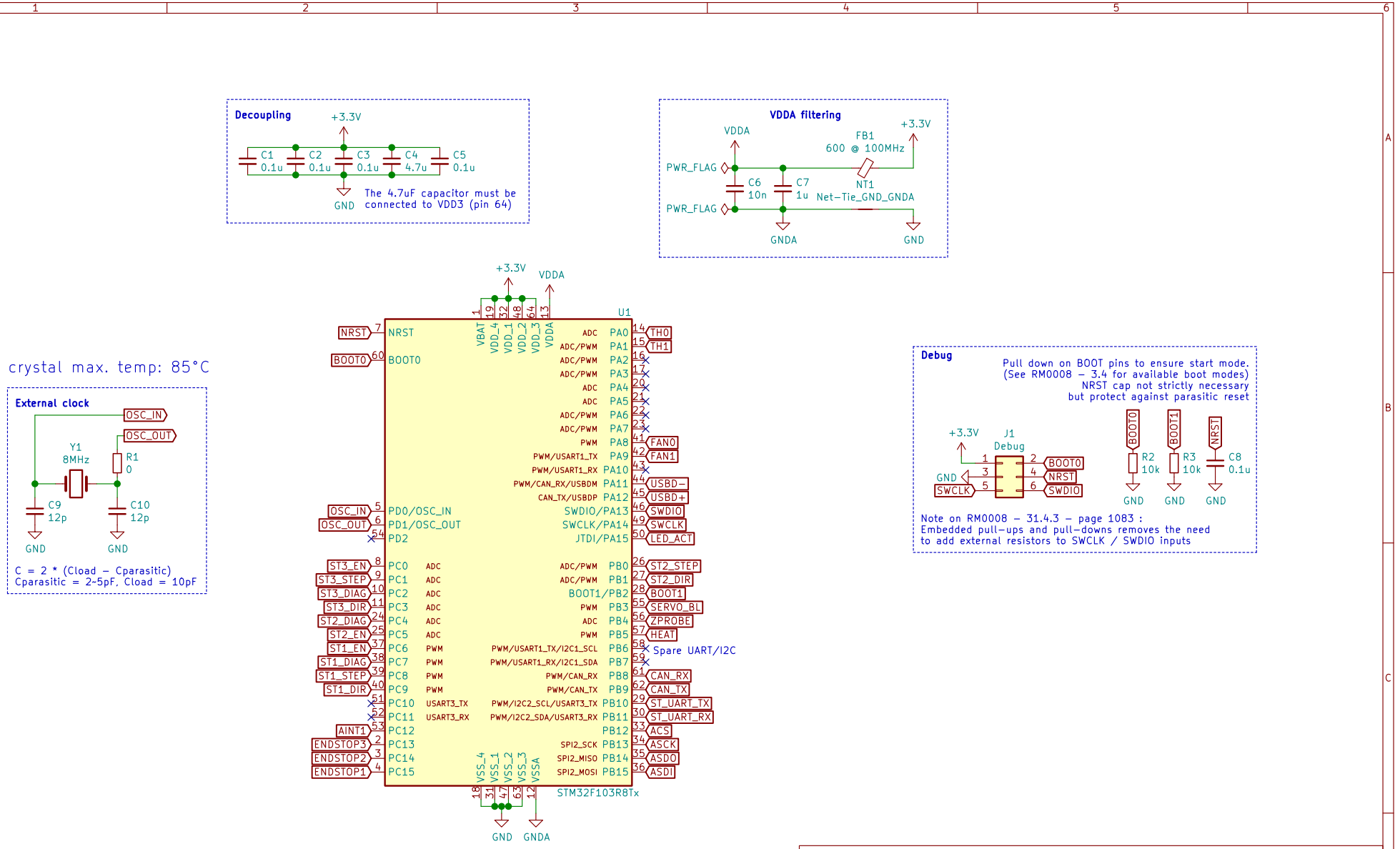
File: io_com.sch

LGR

Sheet: /
File: TriStepToolboard.sch

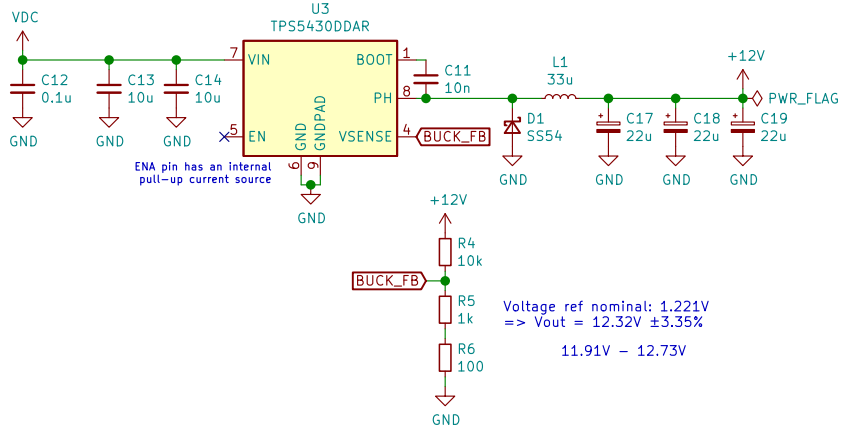
Title: Tri-steppers CAN Tool Board

Size: A4	Date: 2021-08-20	**Rev: 0.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 1/5



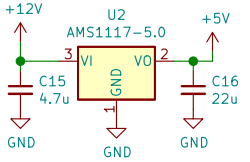
LGR		
Sheet: /MCU/		
File: mcu.sch		
Title: Tri-steppers CAN Tool Board		
Size: A4	Date: 2021-08-20	**Rev: 0.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 2/5

24–36V input, 12V 3A output
PWM Buck converter

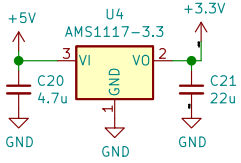


Design from Webench Power Designer tool (TI website)
https://webench.ti.com/appinfo/webench/scripts/SDP.cgi?ID=02CDADFF2B393FC6

12V input, 5V 1A output
Low Drop–Out linear regulator



5V input, 3.3V 800mA output
Low Drop–Out linear regulator

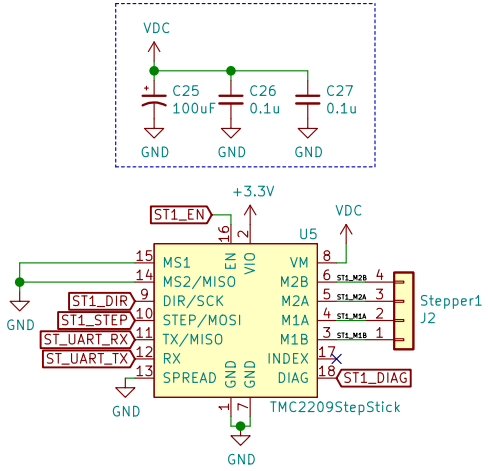


Current consumption on 3V3 rail

STM32: 50mA max all peripheral enabled (datasheet 5.3.5)
CAN transceiver : 60mA (180mA with bus fault)
LEDs (x2) :

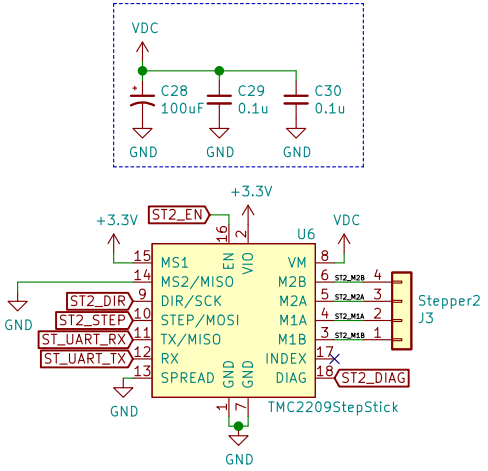
LGR		
Sheet: /Power/		
File: power.sch		
Title: Tri–steppers CAN Tool Board		
Size: A4	Date: 2021–08–20	**Rev: 0.1**
KiCad E.D.A. kicad (5.1.10)–1		Id: 3/5

Driver 1



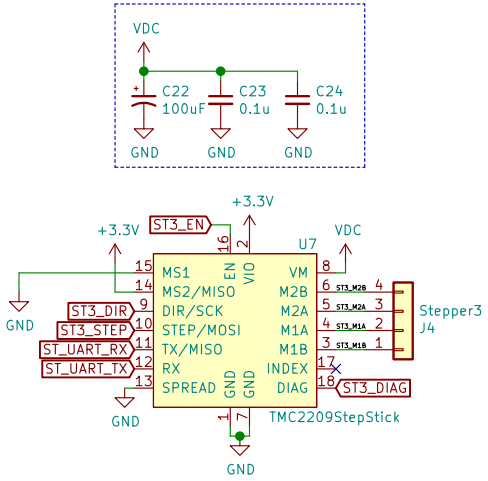
Driver 1 UART address: 0

Driver 2



Driver 2 UART address: 1

Driver 3



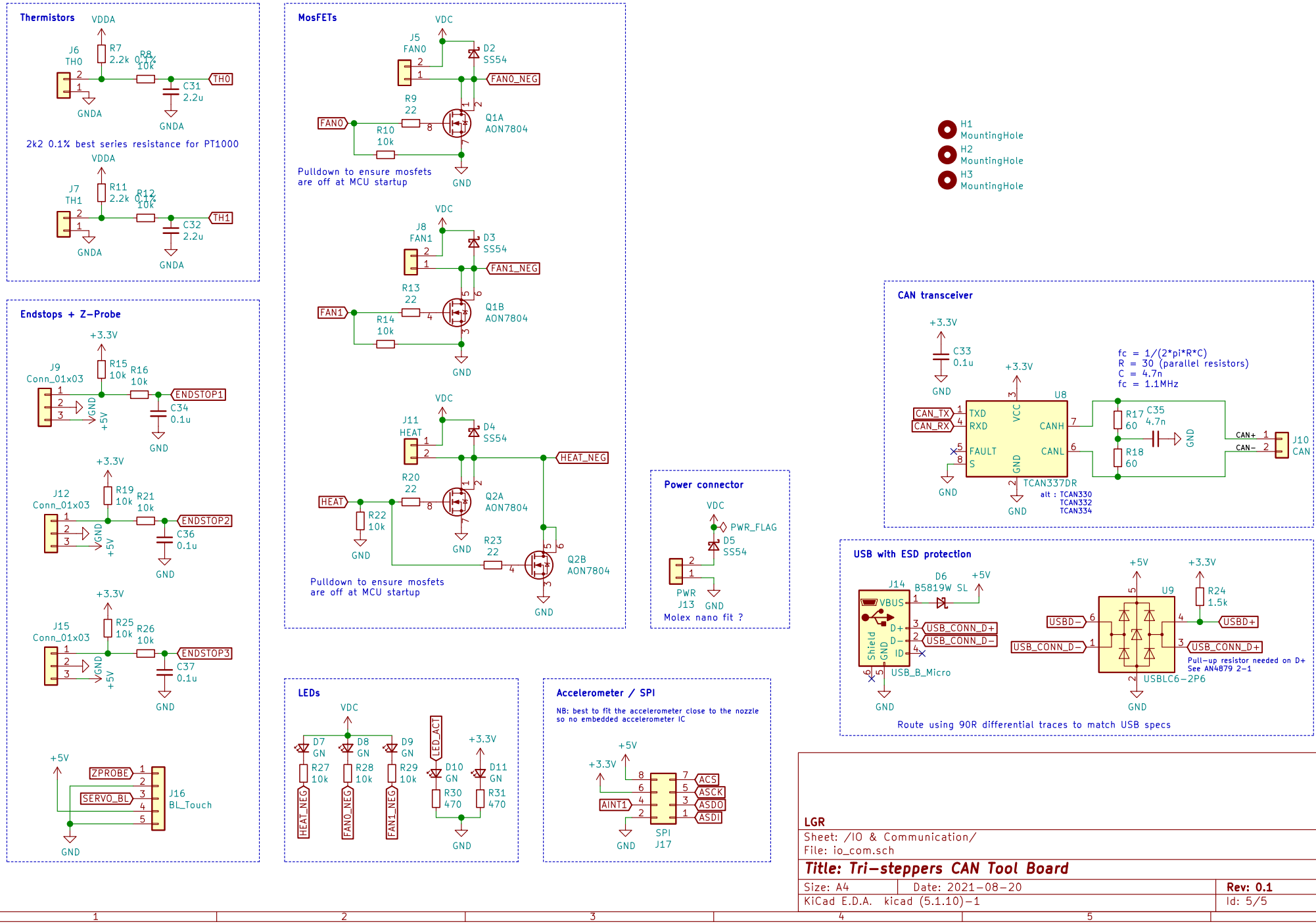
Driver 3 UART address: 2

LGR

Sheet: /Stepper drivers/
File: stepper_drv.sch

Title: Tri-steppers CAN Tool Board

Size: A4	Date: 2021-08-20	**Rev: 0.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 4/5


Thermistors
VDDA
J6
TH0
R7
2.2k
R8
10k
0.1%
C31
2.2u
TH0
GNDA
GNDA
2k2 0.1% best series resistance for PT1000
VDDA
J7
TH1
R11
2.2k
R12
10k
0.1%
C32
2.2u
TH1
GNDA
GNDA
MosFETs
VDC
J5
FAN0
D2
SS54
FAN0_NEG
R9
22
FAN0
R10
10k
Q1A
AON7804
GND
Pulldown to ensure mosfets
are off at MCU startup
VDC
J8
FAN1
D3
SS54
FAN1_NEG
R13
22
FAN1
R14
10k
Q1B
AON7804
GND
VDC
J11
HEAT
D4
SS54
HEAT_NEG
R20
22
HEAT
R22
10k
Q2A
AON7804
R23
22
Q2B
AON7804
GND
Pulldown to ensure mosfets
are off at MCU startup
Endstops + Z-Probe
+3.3V
J9
Conn_01x03
R15
10k
R16
10k
ENDSTOP1
GND
+5V
C34
0.1u
GND
+3.3V
J12
Conn_01x03
R19
10k
R21
10k
ENDSTOP2
C36
0.1u
+3.3V
J15
Conn_01x03
R25
10k
R26
10k
ENDSTOP3
C37
0.1u
+5V
ZPROBE
SERVO_BL
J16
BL_Touch
GND
Power connector
VDC
PWR_FLAG
D5
SS54
PWR
J13
GND
Molex nano fit ?
LEDs
VDC
D7
GN
D8
GN
D9
GN
R27
10k
R28
10k
R29
10k
HEAT_NEG
FAN0_NEG
FAN1_NEG
LED_ACT
+3.3V
D10
GN
D11
GN
R30
470
R31
470
GND
Accelerometer / SPI
NB: best to fit the accelerometer close to the nozzle
so no embedded accelerometer IC
+5V
+3.3V
ACS
ASCK
ASDO
ASDI
AINT1
SPI
J17
GND
H1
MountingHole
H2
MountingHole
H3
MountingHole
CAN transceiver
+3.3V
C33
0.1u
GND
+3.3V
U8
CAN_TX
CAN_RX
TXD
RXD
FAULT
S
VCC
GND
CANH
CANL
GND
TCAN337DR
alt : TCAN330
TCAN332
TCAN334
fc = 1/(2*pi*R*C)
R = 30 (parallel resistors)
C = 4.7n
fc = 1.1MHz
R17
60
C35
4.7n
R18
60
GND
CAN+
CAN-
J10
CAN
USB with ESD protection
J14
VBUS
D+
D-
ID
GND
Shield
USB_B_Micro
D6
B5819W SL
+5V
USB_CONN_D+
USB_CONN_D-
+5V
+3.3V
U9
USBD-
USBD+
USB_CONN_D-
USB_CONN_D+
USBLC6-2P6
R24
1.5k
Pull-up resistor needed on D+
See AN4879 2-1
GND
Route using 90R differential traces to match USB specs
LGR
Sheet: /IO & Communication/
File: io_com.sch
Title: Tri-steppers CAN Tool Board
Size: A4
Date: 2021-08-20
Rev: 0.1
KiCad E.D.A. kicad (5.1.10)-1
Id: 5/5