TMC2209

File: tmc2209.kicad_sch

TMC51X0

File: tmc51x0.kicad_sch

description

File: tmc2209_description.kicad_sch

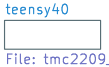
microcontroller

File: tmc2209_microcontroller.kicad_sch

stepper−controller

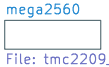
File: tmc2209_stepper−controller.kicad_sch

teensy40



File: tmc2209_teensy40.kicad_sch

mega2560



File: tmc2209_mega2560.kicad_sch

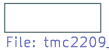
uno

File: tmc2209_uno.kicad_sch

unidirectional

File: tmc2209_unidirectional.kicad_sch

unidirectional−multiple



File: tmc2209_unidirectional_multiple.kicad_sch

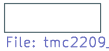
unidirectional−multiple−address

File: tmc2209_unidirectional_multiple_address.kicad_sch

unidirectional−multiple−uart

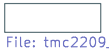
File: tmc2209_unidirectional_multiple_uart.kicad_sch

bidirectional−coupled



File: tmc2209_bidirectional_coupled.kicad_sch

bidirectional−coupled−multiple−address

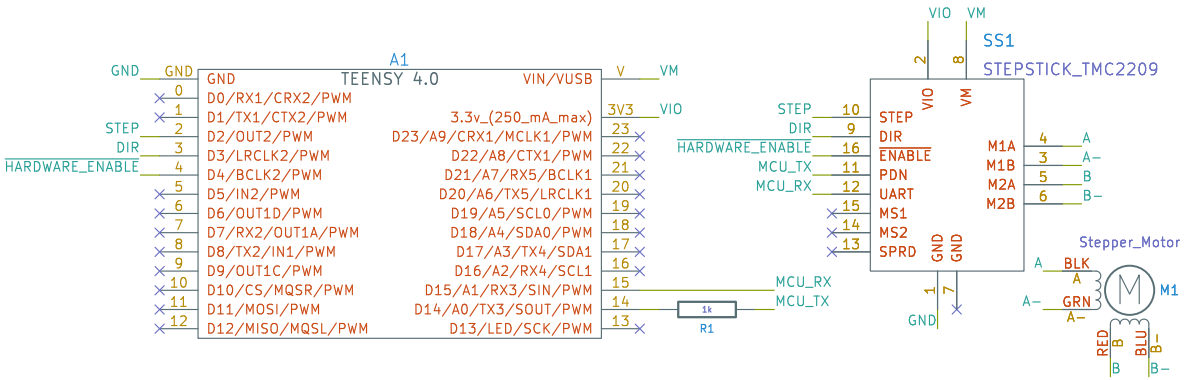


File: tmc2209_bidirectional_coupled_multiple_address.kicad_sch

bidirectional−coupled−multiple−uart

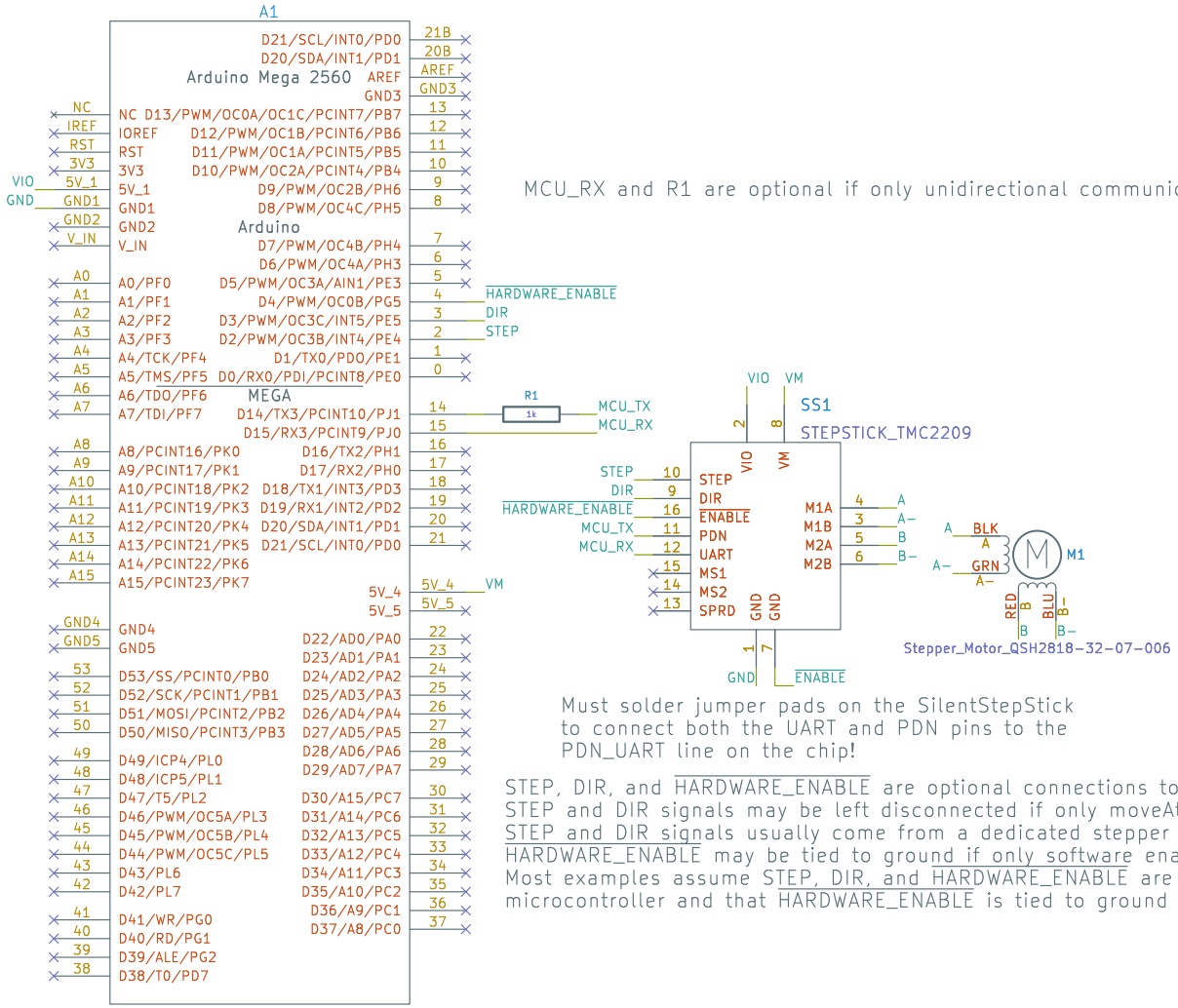
File: tmc2209_bidirectional_coupled_multiple_uart.kicad_sch

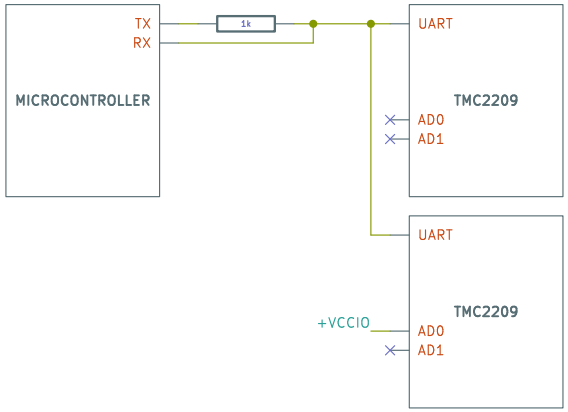
MCU_RX and R1 are optional if only unidirectional communication is desired.

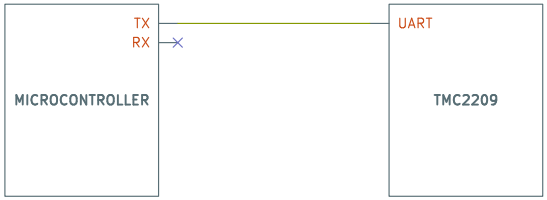


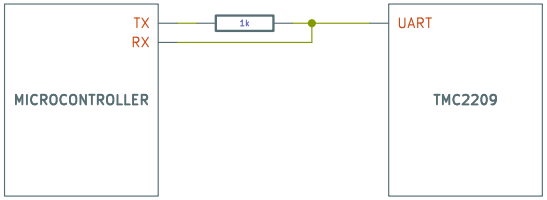
Must solder jumper pads on the SilentStepStick to connect both the UART and PDN pins to the PDN_UART line on the chip!

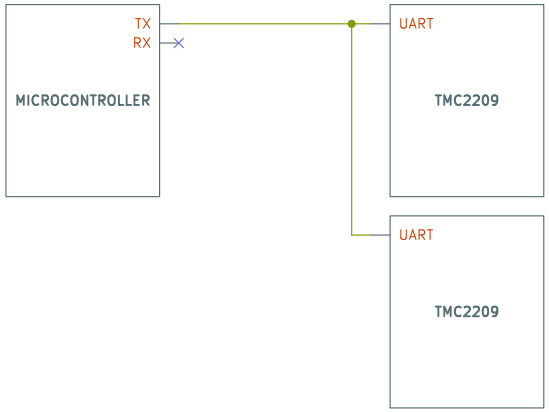
STEP, DIR, and HARDWARE_ENABLE are optional connections to the microcontroller.
STEP and DIR signals may be left disconnected if only moveAtVelocity method is used.
STEP and DIR signals usually come from a dedicated stepper controller, like the TMC429.
HARDWARE_ENABLE may be tied to ground if only software enable is desired.
Most examples assume STEP, DIR, and HARDWARE_ENABLE are not connected to the microcontroller and that HARDWARE_ENABLE is tied to ground on the TMC2209.

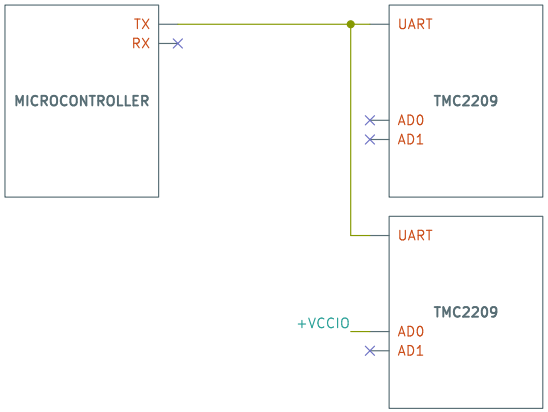

A1
Arduino Mega 2560
Arduino
MEGA
MCU_RX and R1 are optional if only unidirectional communication is desired.
R1
1k
MCU_TX
MCU_RX
HARDWARE_ENABLE
DIR
STEP
VIO
VM
SS1
STEPSTICK_TMC2209
ENABLE
PDN
UART
MS1
MS2
SPRD
M1A
M1B
M2A
M2B
GND
BLK
GRN
RED
BLU
M1
Stepper_Motor_QSH2818-32-07-006
Must solder jumper pads on the SilentStepStick
to connect both the UART and PDN pins to the
PDN_UART line on the chip!
STEP, DIR, and HARDWARE_ENABLE are optional connections to the microcontroller.
STEP and DIR signals may be left disconnected if only moveAtVelocity method is used.
STEP and DIR signals usually come from a dedicated stepper controller, like the TMC429.
HARDWARE_ENABLE may be tied to ground if only software enable is desired.
Most examples assume STEP, DIR, and HARDWARE_ENABLE are not connected to the
microcontroller and that HARDWARE_ENABLE is tied to ground on the TMC2209.


TX
RX
1k
MICROCONTROLLER
UART
TMC2209
AD0
AD1
UART
TMC2209
+VCCIO
AD0
AD1


TX
RX
MICROCONTROLLER
UART
TMC2209

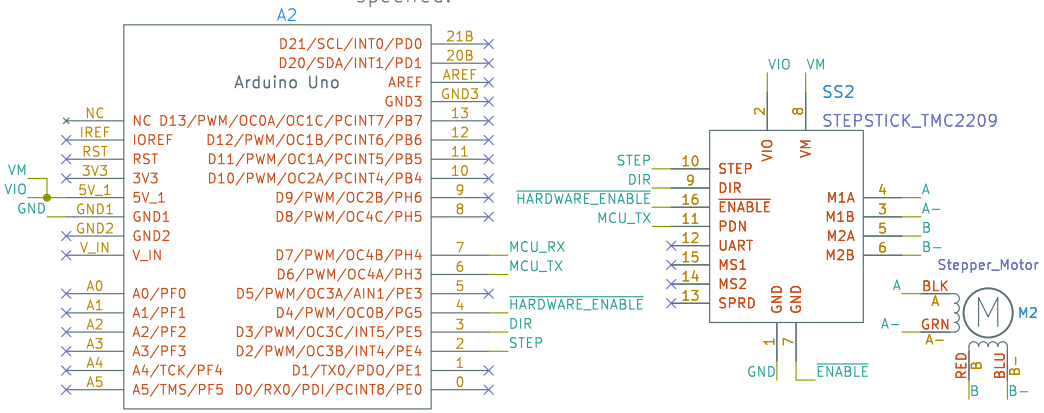

TX
RX
1k
UART
MICROCONTROLLER
TMC2209


TX
RX
MICROCONTROLLER
UART
TMC2209
UART
TMC2209


TX
RX
MICROCONTROLLER
UART
TMC2209
AD0
AD1
UART
TMC2209
+VCCIO
AD0
AD1

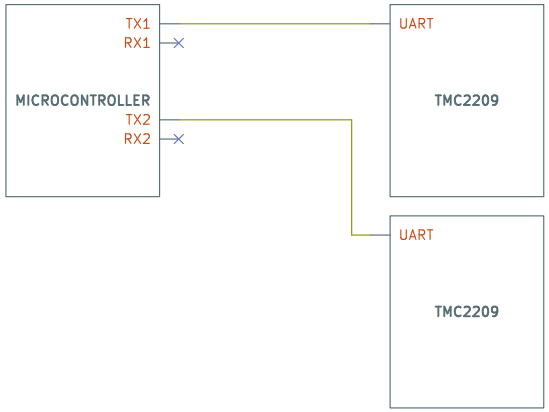
RX and TX pins must be changed in the SoftwareSerial example:
const uint8_t RX_PIN = 7;
const uint8_t TX_PIN = 6;

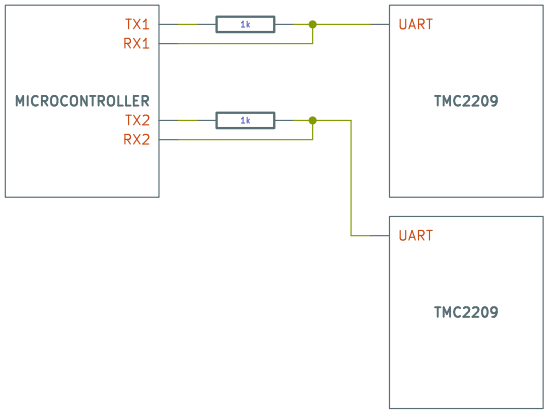
Arduino Uno is only capable of unidirectional communication, so only TX is connected and used, but the SoftwareSerial library requires that the RX pin must be reserved and specifed.

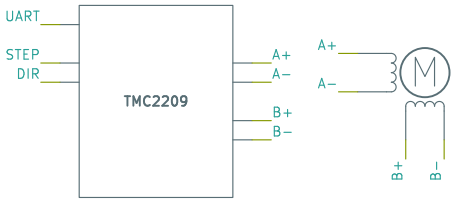


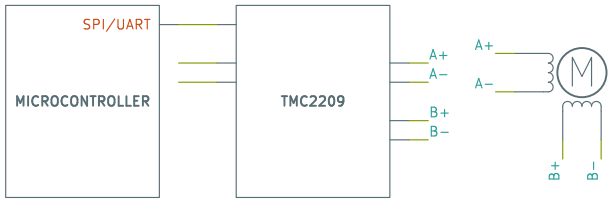
Must solder jumper pads on the SilentStepStick to connect both the UART and PDN pins to the PDN_UART line on the chip!

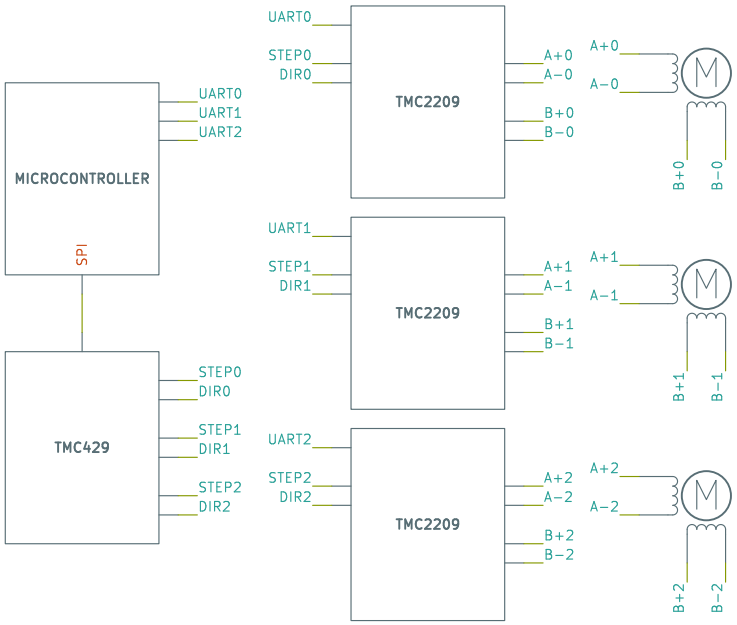
STEP, DIR, and HARDWARE_ENABLE are optional connections to the microcontroller.
STEP and DIR signals may be left disconnected if only moveAtVelocity method is used.
STEP and DIR signals usually come from a dedicated stepper controller, like the TMC429.
HARDWARE_ENABLE may be tied to ground if only software enable is desired.
Most examples assume STEP, DIR, and HARDWARE_ENABLE are not connected to the microcontroller and that HARDWARE_ENABLE is tied to ground on the TMC2209.


TX1
RX1
MICROCONTROLLER
TX2
RX2
UART
TMC2209
UART
TMC2209

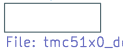

TX1
RX1
MICROCONTROLLER
TX2
RX2
1k
1k
UART
TMC2209
UART
TMC2209


UART
STEP
DIR
TMC2209
A+
A–
B+
B–
A+
A–
M
B+
B–


SPI/UART
MICROCONTROLLER
TMC2209
A+
A–
B+
B–
A+
A–
M
B+
B–


MICROCONTROLLER
SPI
UART0
UART1
UART2
TMC429
STEP0
DIR0
STEP1
DIR1
STEP2
DIR2
UART0
STEP0
DIR0
TMC2209
A+0
A−0
B+0
B−0
A+0
A−0
B+0
B−0
UART1
STEP1
DIR1
TMC2209
A+1
A−1
B+1
B−1
A+1
A−1
B+1
B−1
UART2
STEP2
DIR2
TMC2209
A+2
A−2
B+2
B−2
A+2
A−2
B+2
B−2

description



File: tmc51x0_description.kicad_sch

microcontroller

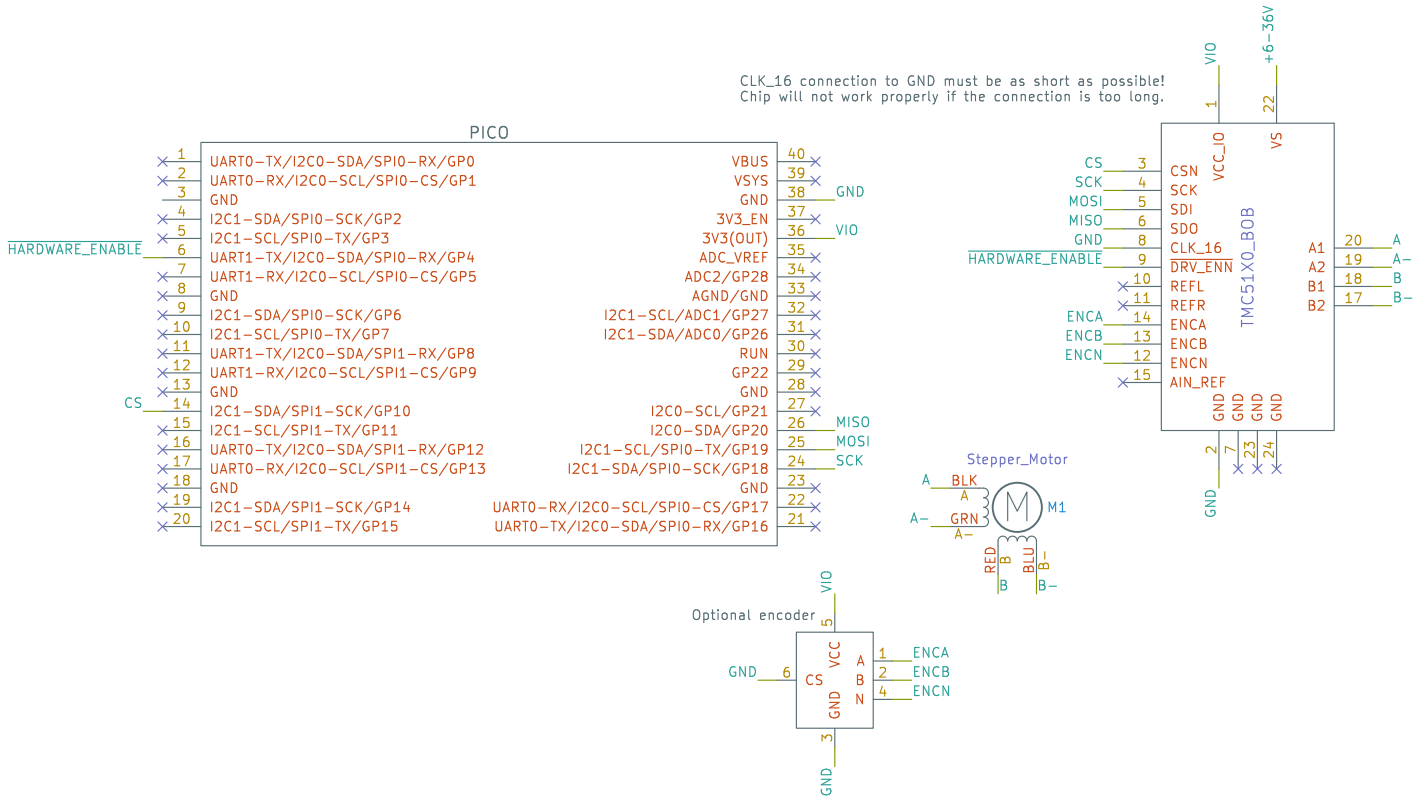
File: tmc51x0_microcontroller.kicad_sch

tmc51x0-bob

File: tmc51x0_bob.kicad_sch

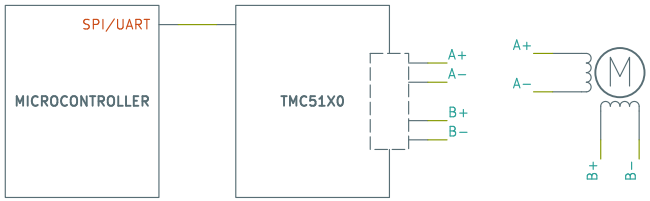
tmc51x0-eval

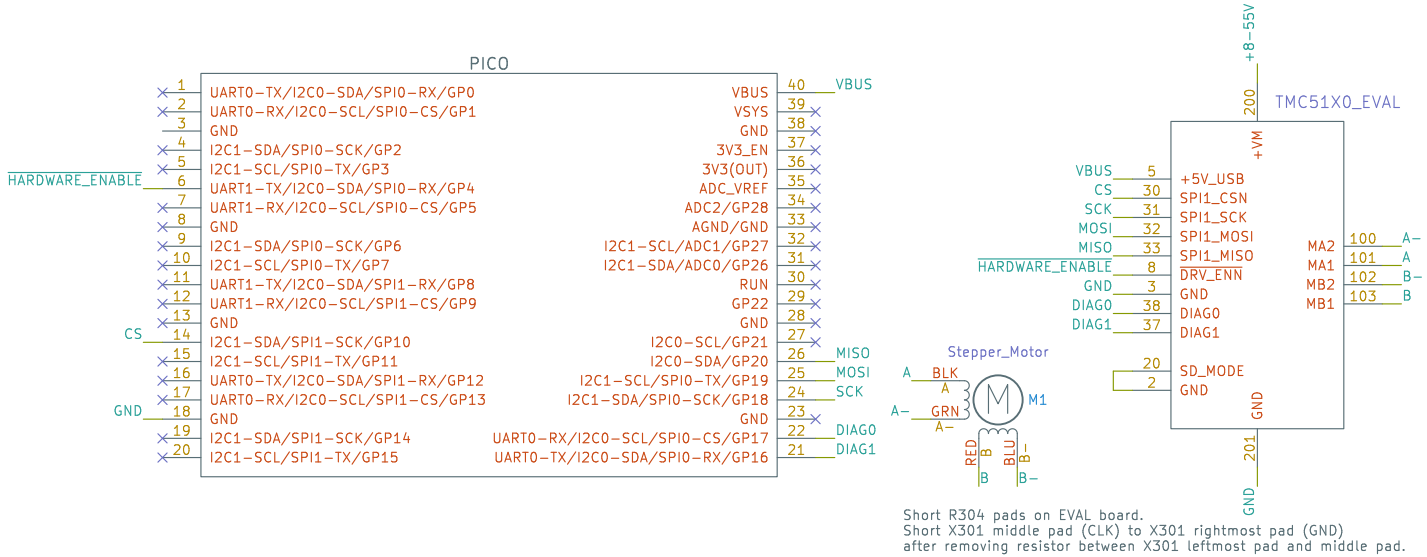
File: tmc51x0_eval.kicad_sch


CLK_16 connection to GND must be as short as possible!
Chip will not work properly if the connection is too long.
PICO
UART0-TX/I2C0-SDA/SPI0-RX/GP0
UART0-RX/I2C0-SCL/SPI0-CS/GP1
GND
I2C1-SDA/SPI0-SCK/GP2
I2C1-SCL/SPI0-TX/GP3
UART1-TX/I2C0-SDA/SPI0-RX/GP4
UART1-RX/I2C0-SCL/SPI0-CS/GP5
GND
I2C1-SDA/SPI0-SCK/GP6
I2C1-SCL/SPI0-TX/GP7
UART1-TX/I2C0-SDA/SPI1-RX/GP8
UART1-RX/I2C0-SCL/SPI1-CS/GP9
GND
I2C1-SDA/SPI1-SCK/GP10
I2C1-SCL/SPI1-TX/GP11
UART0-TX/I2C0-SDA/SPI1-RX/GP12
UART0-RX/I2C0-SCL/SPI1-CS/GP13
GND
I2C1-SDA/SPI1-SCK/GP14
I2C1-SCL/SPI1-TX/GP15
VBUS
VSYS
GND
3V3_EN
3V3(OUT)
ADC_VREF
ADC2/GP28
AGND/GND
I2C1-SCL/ADC1/GP27
I2C1-SDA/ADC0/GP26
RUN
GP22
GND
I2C0-SCL/GP21
I2C0-SDA/GP20
I2C1-SCL/SPI0-TX/GP19
I2C1-SDA/SPI0-SCK/GP18
GND
UART0-RX/I2C0-SCL/SPI0-CS/GP17
UART0-TX/I2C0-SDA/SPI0-RX/GP16
HARDWARE_ENABLE
CS
GND
MISO
MOSI
SCK
VIO
TMC51X0_BOB
CSN
SCK
SDI
SDO
CLK_16
DRV_ENN
REFL
REFR
ENCA
ENCB
ENCN
AIN_REF
VCC_IO
VS
GND
+6-36V
A1
A2
B1
B2
A
A-
B
B-
Stepper_Motor
BLK
GRN
RED
BLU
M1
Optional encoder
VCC
CS
GND
ENCA
ENCB
ENCN

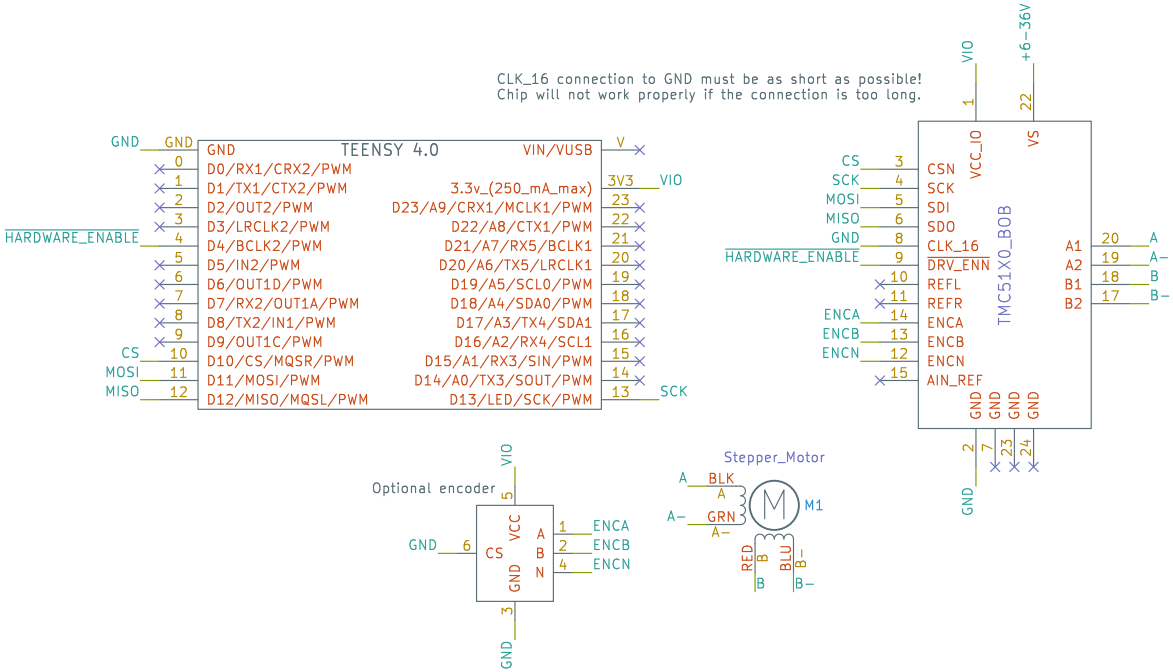
pico

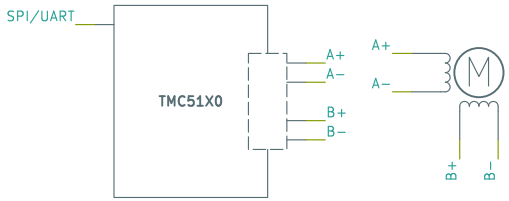
File: tmc51x0_tmc51x0_eval_pico.kicad_sch


SPI/UART
MICROCONTROLLER
TMC51X0
A+
A–
B+
B–
A+
A–
M
B+
B–



Short R304 pads on EVAL board.
Short X301 middle pad (CLK) to X301 rightmost pad (GND)
after removing resistor between X301 leftmost pad and middle pad.


CLK_16 connection to GND must be as short as possible!
Chip will not work properly if the connection is too long.
TEENSY 4.0
GND
D0/RX1/CRX2/PWM
D1/TX1/CTX2/PWM
D2/OUT2/PWM
D3/LRCLK2/PWM
D4/BCLK2/PWM
D5/IN2/PWM
D6/OUT1D/PWM
D7/RX2/OUT1A/PWM
D8/TX2/IN1/PWM
D9/OUT1C/PWM
D10/CS/MQSR/PWM
D11/MOSI/PWM
D12/MISO/MQSL/PWM
VIN/VUSB
3.3v_(250_mA_max)
D23/A9/CRX1/MCLK1/PWM
D22/A8/CTX1/PWM
D21/A7/RX5/BCLK1
D20/A6/TX5/LRCLK1
D19/A5/SCL0/PWM
D18/A4/SDA0/PWM
D17/A3/TX4/SDA1
D16/A2/RX4/SCL1
D15/A1/RX3/SIN/PWM
D14/A0/TX3/SOUT/PWM
D13/LED/SCK/PWM
HARDWARE_ENABLE
CS
MOSI
MISO
SCK
VIO
+6-36V
TMC51X0_BOB
CSN
SCK
SDI
SDO
CLK_16
DRV_ENN
REFL
REFR
ENCA
ENCB
ENCN
AIN_REF
VCC_IO
VS
A1
A2
B1
B2
Optional encoder
VCC
ENCA
ENCB
ENCN
Stepper_Motor
BLK
GRN
RED
BLU
M1


SPI/UART
TMC51X0
A+
A–
B+
B–
A+
A–
M
B+
B–

teensy40

File: tmc51x0_tmc51x0_bob_teensy40.kicad_sch

pico

File: tmc51x0_tmc51x0_bob_pico.kicad_sch