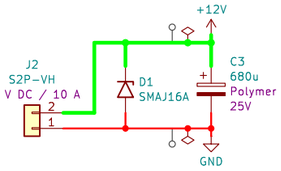
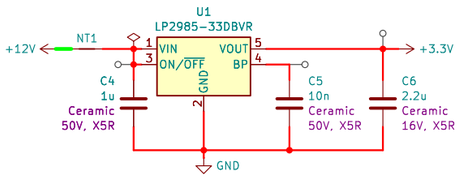
POWER INPUT

Input must be 9 to 16 V
Circuit protection
– External: 10 A fuse required, 16 AWG wire
– Internal: reverse polarity, overvoltage



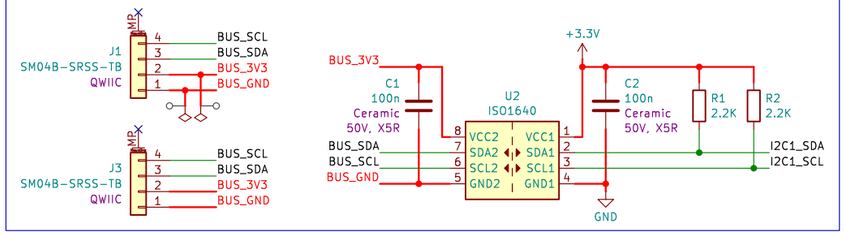
3.3 V POWER SUPPLY

Supplies 150 mA, ultra low quiescent current (microamps)



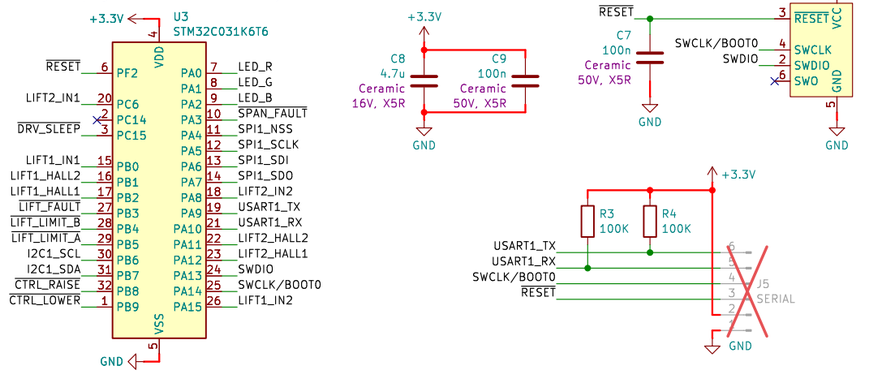
QWIIC INTERFACE

ISO1640 provides bidirectional isolation, hot swap, and ESD protection
– Side 1 drives the internal bus, intended for a low-capacitance node
– Side 2 drives the external bus, can withstand stronger ESD and short circuit events

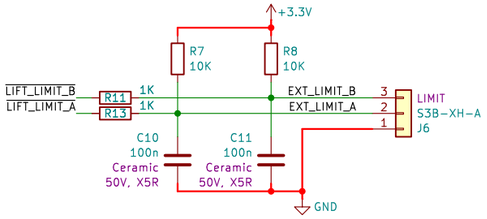


STM32C031 MICROCONTROLLER

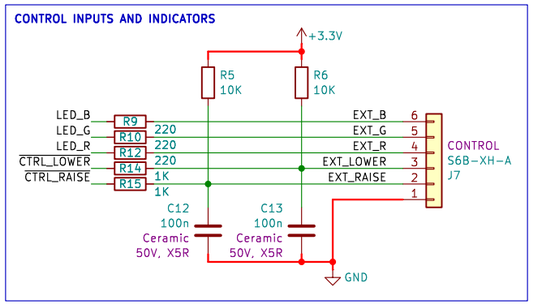
Programmed via SWD with STLINK-V3 and the Tag-Connect TC2030-CTX-NL-STDC14 cable
Header provided for serial debugging
Can also be programmed over I2C with the system bootloader



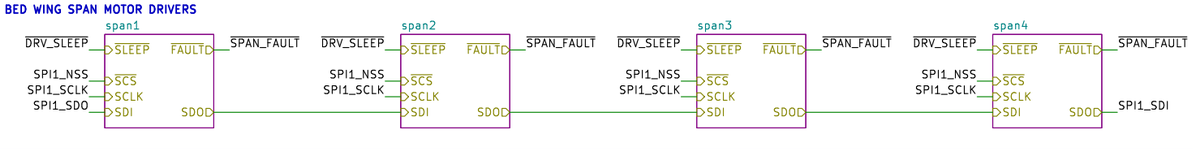
LIMIT SWITCHES



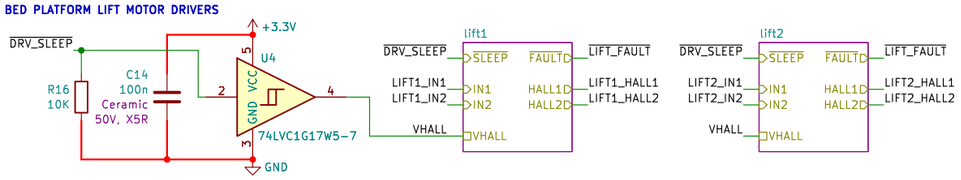
CONTROL INPUTS AND INDICATORS



BED WING SPAN MOTOR DRIVERS



BED PLATFORM LIFT MOTOR DRIVERS



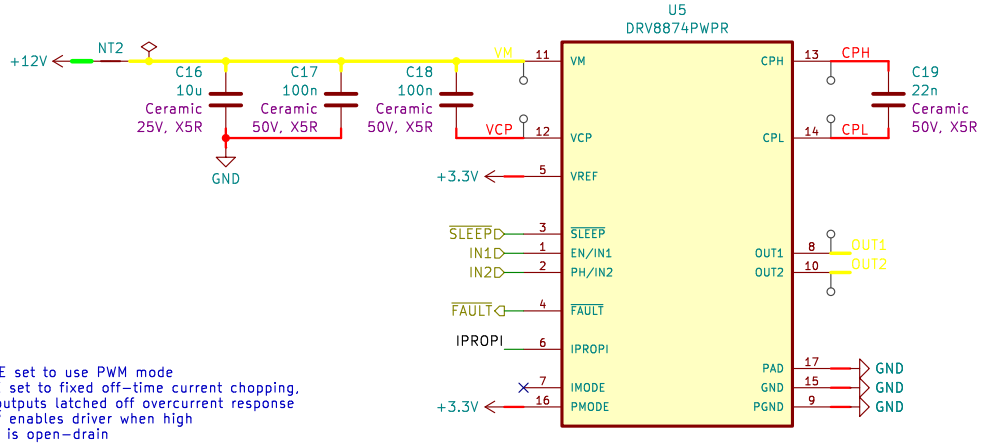
Brown Studios LLC
Sheet: /
File: bed-lift.kicad_sch

Title: Bed Lift Controller

Size: A3	Date: 2025-11	**Rev: v0.3**
KiCad E.D.A. 9.0.5		Id: 1/7

BED PLATFORM LIFT MOTOR DRIVER

Designed for 12 V DC motor load up to 3 A (6 A peak)

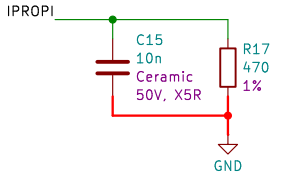


PMODE set to use PWM mode
IMODE set to fixed off-time current chopping, outputs latched off overcurrent response
$\overline{\text{SLEEP}}$ enables driver when high
$\overline{\text{FAULT}}$ is open-drain

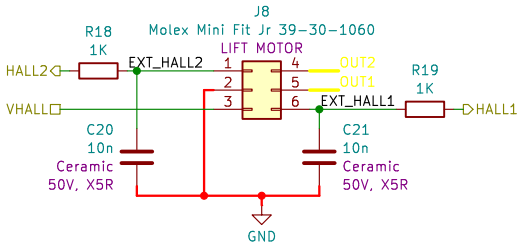
Internal pull-down on $\overline{\text{SLEEP}}$, IN1, and IN2 keeps motor off until MCU is initialized

CURRENT LIMIT

Set overcurrent protection trip current
Itrip (A) = 450 * Vref (V) / Ripropi (Ω)
Given Vref = 3.3 V, Ripropi = 470 Ω, Itrip = 3.16 A



CONNECTOR FOR PA-09 LINEAR ACTUATOR



Brown Studios LLC

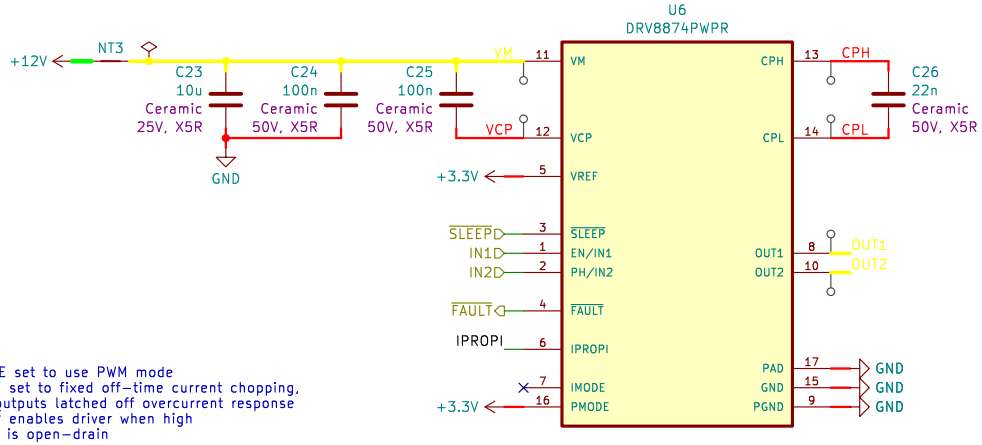
Sheet: /lift1/
File: lift.kicad_sch

Title: Bed Lift Controller

Size: A4	Date: 2025-10	**Rev: v0.2.1**
KiCad E.D.A. 9.0.5		Id: 2/7

BED PLATFORM LIFT MOTOR DRIVER

Designed for 12 V DC motor load up to 3 A (6 A peak)

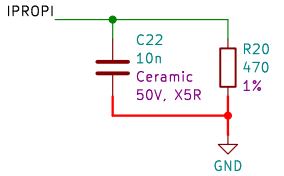


PMODE set to use PWM mode
IMODE set to fixed off-time current chopping, outputs latched off overcurrent response
$\overline{\text{SLEEP}}$ enables driver when high
$\overline{\text{FAULT}}$ is open-drain

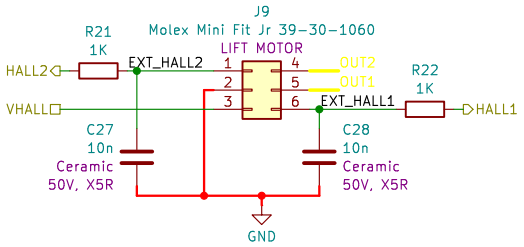
Internal pull-down on $\overline{\text{SLEEP}}$, IN1, and IN2 keeps motor off until MCU is initialized

CURRENT LIMIT

Set overcurrent protection trip current
Itrip (A) = 450 * Vref (V) / Ripropi (Ω)
Given Vref = 3.3 V, Ripropi = 470 Ω, Itrip = 3.16 A



CONNECTOR FOR PA-09 LINEAR ACTUATOR



Brown Studios LLC

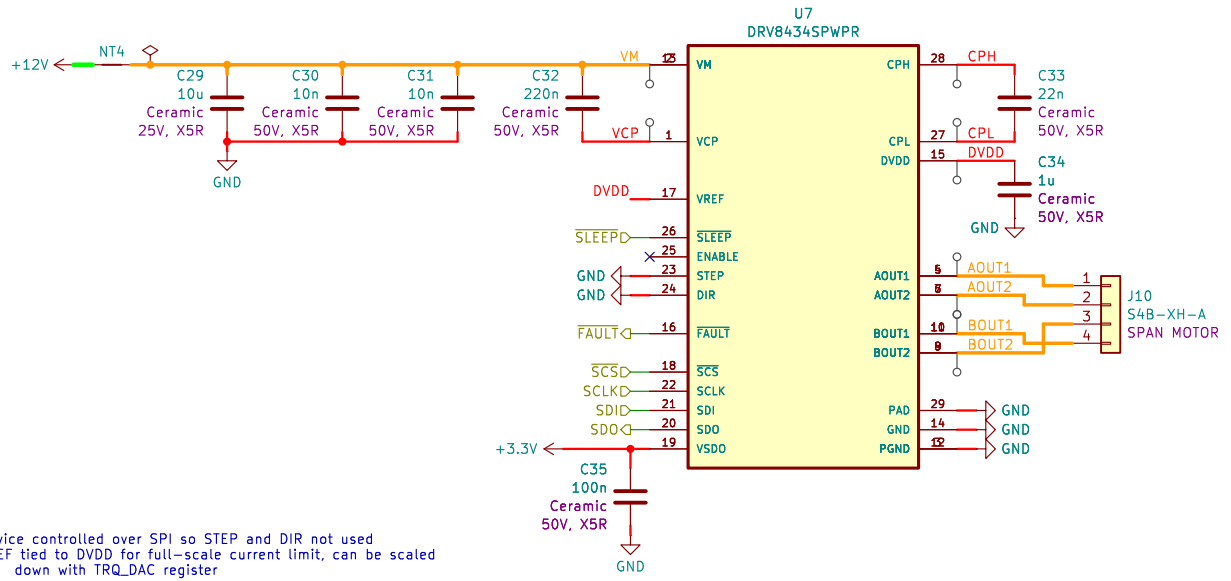
Sheet: /lift2/
File: lift.kicad_sch

Title: Bed Lift Controller

Size: A4	Date: 2025-10	**Rev: v0.2.1**
KiCad E.D.A. 9.0.5		Id: 3/7

BED WING SPAN MOTOR DRIVER

Designed for 12 V DC stepper motor load up to 1.8 A rms (2.5 A peak)

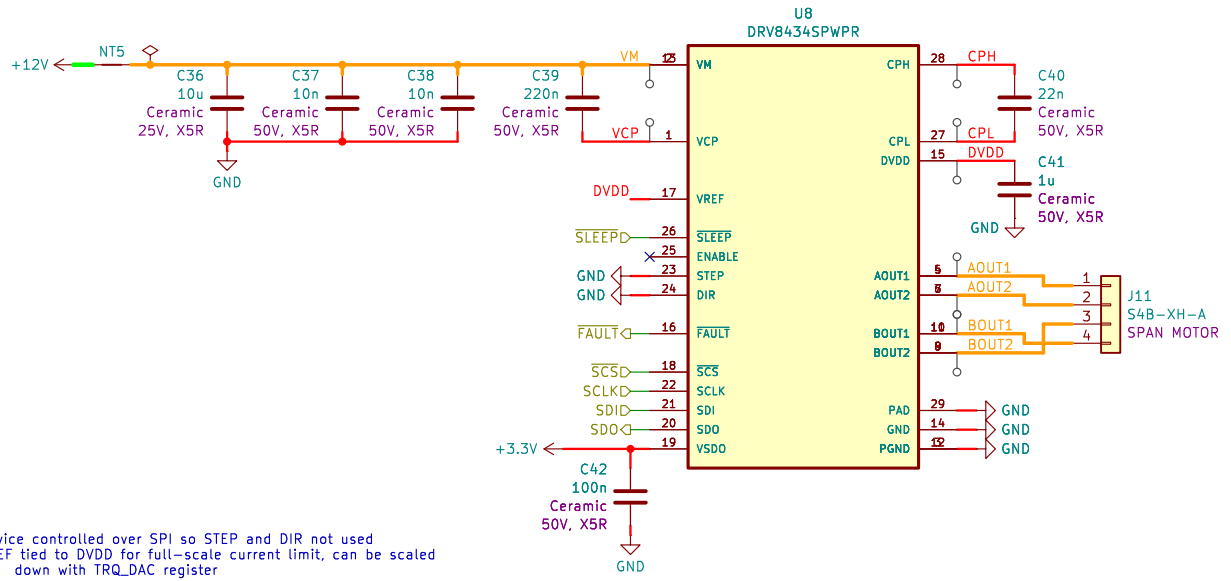


Device controlled over SPI so STEP and DIR not used
VREF tied to DVDD for full-scale current limit, can be scaled down with TRQ_DAC register

Brown Studios LLC		
Sheet: /span1/		
File: span.kicad_sch		
Title: Bed Lift Controller		
Size: A4	Date: 2025-10	**Rev: v0.2**
KiCad E.D.A. 9.0.5		Id: 4/7

BED WING SPAN MOTOR DRIVER

Designed for 12 V DC stepper motor load up to 1.8 A rms (2.5 A peak)

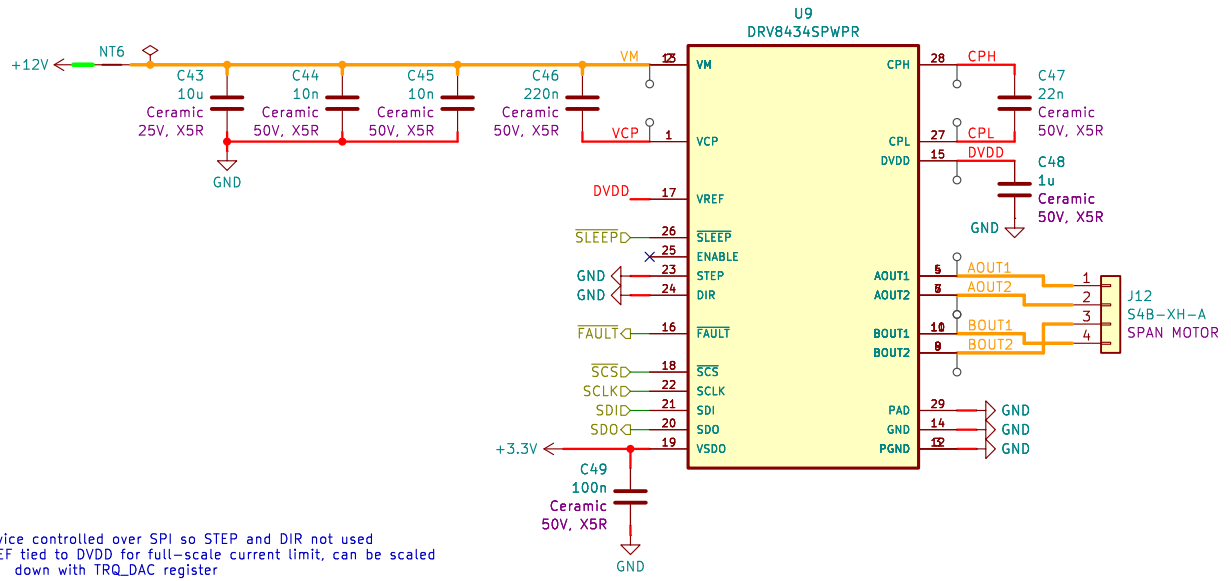


Device controlled over SPI so STEP and DIR not used
VREF tied to DVDD for full-scale current limit, can be scaled down with TRQ_DAC register

Brown Studios LLC		
Sheet: /span2/		
File: span.kicad_sch		
Title: Bed Lift Controller		
Size: A4	Date: 2025-10	**Rev: v0.2**
KiCad E.D.A. 9.0.5		Id: 5/7

BED WING SPAN MOTOR DRIVER

Designed for 12 V DC stepper motor load up to 1.8 A rms (2.5 A peak)

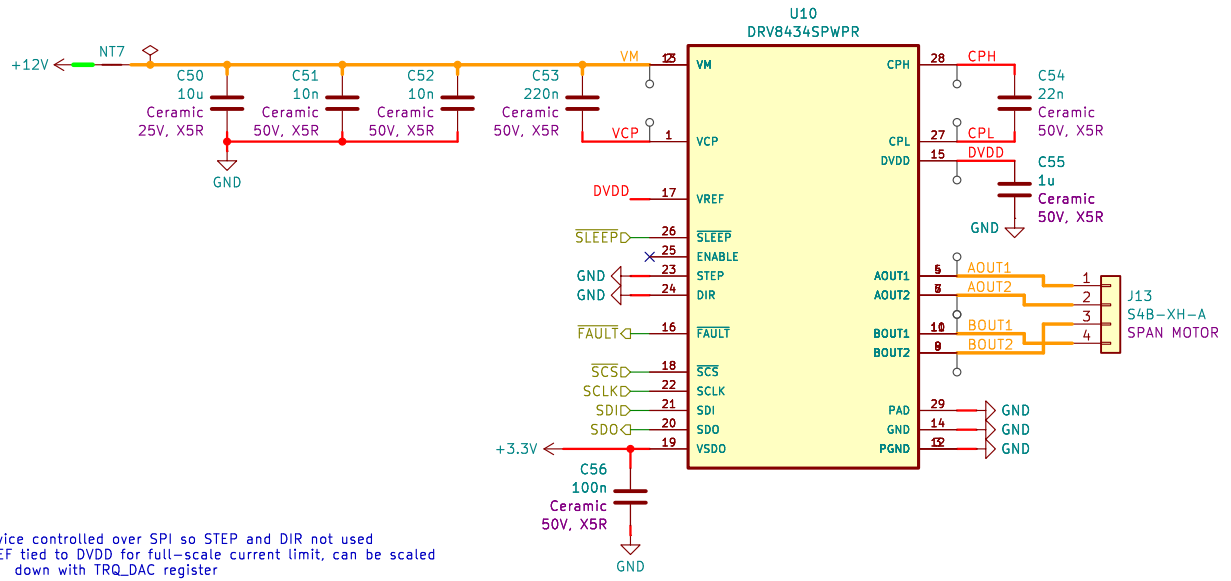


Device controlled over SPI so STEP and DIR not used
VREF tied to DVDD for full-scale current limit, can be scaled down with TRQ_DAC register

Brown Studios LLC		
Sheet: /span3/		
File: span.kicad_sch		
Title: Bed Lift Controller		
Size: A4	Date: 2025-10	**Rev: v0.2**
KiCad E.D.A. 9.0.5		Id: 6/7

BED WING SPAN MOTOR DRIVER

Designed for 12 V DC stepper motor load up to 1.8 A rms (2.5 A peak)



Device controlled over SPI so STEP and DIR not used
VREF tied to DVDD for full-scale current limit, can be scaled down with TRQ_DAC register

Brown Studios LLC		
Sheet: /span4/		
File: span.kicad_sch		
Title: Bed Lift Controller		
Size: A4	Date: 2025-10	**Rev: v0.2**
KiCad E.D.A. 9.0.5		Id: 7/7