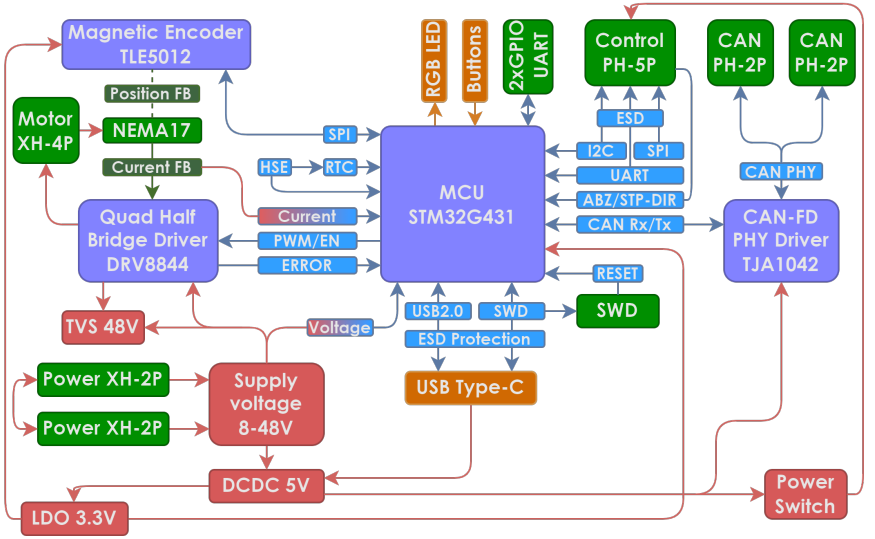
# CLN17V2 48V 1.75A$_{RMS}$ with Quad Half Bridge & FOC support driver for NEMA17




## Design Keynotes

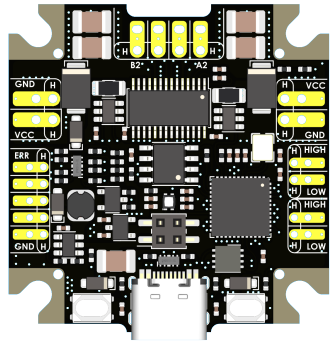
Design separated to power and logic sections.
The power section consists of the driver, necessary circuitry, reverse polarity protection, overcurrent protection, and overvoltage protection.

All components have a minimum of 20% voltages margin allowing them to withstand temporary voltage spikes up to 60V without any damage.

The analogue power supply has single connection point, with a 10uF bypass capacitor for power stabilization and a 100nF bypass near each consumer.

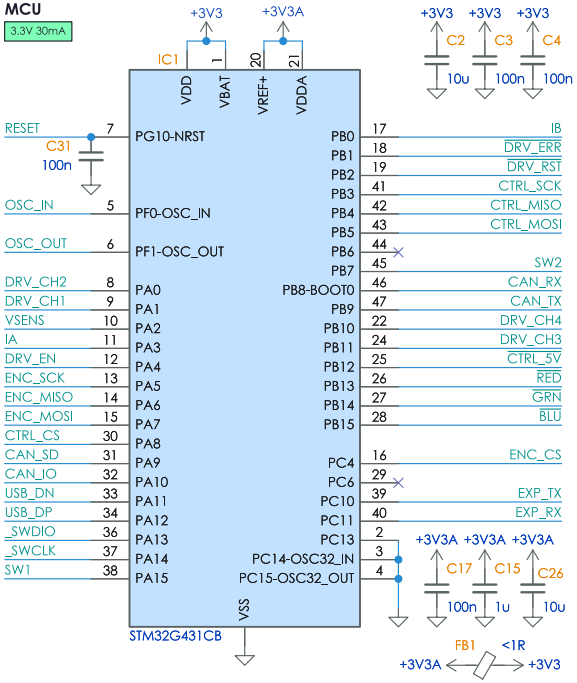
CAN-Bus and POWER connectors are interconnected, forming a Daisy Chain topology for simplified connection of multiple drivers.
Each POWER connector has a 2.5A current limit for safe operation.

All interfaces are protected against electrostatic discharge, overvoltage, and reverse polarity.
CTRL additionally has protection against over currents at rated voltage.
CAN-Bus and CTRL interfaces are compatible with 3.3V and 5V logic levels.



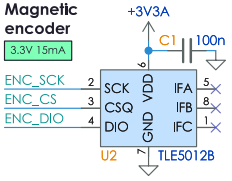
## MCU

3.3V 30mA




## Magnetic encoder

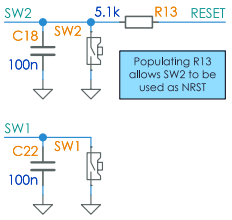
3.3V 15mA




MISO and MOSI are connected for Half-Duplex SPI

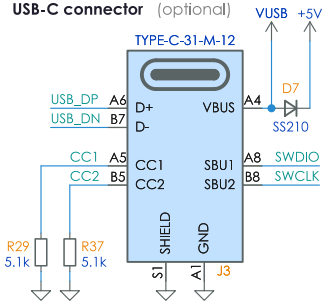
510Ω resistor to protect against push-pull logic collisions

## Buttons (optional)

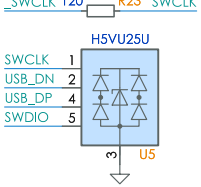



Populating R13 allows SW2 to be used as NRST

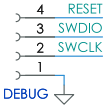
## USB-C connector (optional)




## USB Type-C IO Protection (optional)



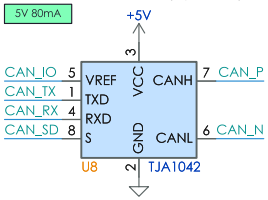

## POGO Debug




If RST is coupled to SW2, when external RST has resistance >10k, SW2 functions as RESET; <1k, it doesn't

## CAN-Bus transciever (optional)

5V 80mA



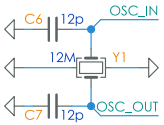

Compatible with transmitters where the 5th pin is VIO, EN or VREF. If pin is VREF the CAN_IO should be left floating, if EN or VIO the CAN_IO should be high.

A CAN transmitter supporting 1 MBit/s can be placed, as well as transmitters supporting CAN-FD with data rate of 2, 5, and 8MBit/s.

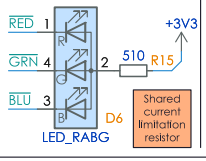
## CAN-Bus Daisy Chain + Protection


Only a differential line to prevent ground loops

## HSE OSC (optional)

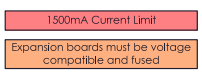



## RGB LED (optional)




Shared current limitation resistor

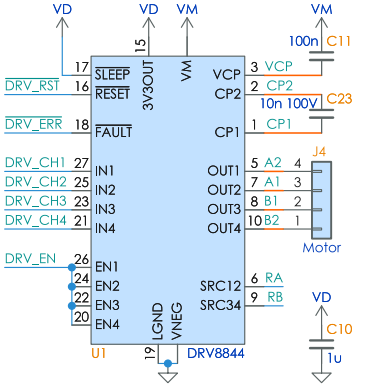
## Expansion board connector (optional)




1500mA Current Limit

Expansion boards must be voltage compatible and fused

## DRV8844 Quad Half-Bridge Driver



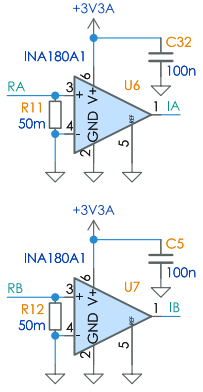

Operate only with AABB/BBAA connection of motor coils

For currents >1.25A a heatsink is required

Incorrect connection can be detected by software

Cannot be used with BLDC motors

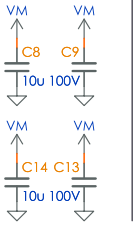
## Current Sense



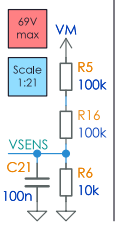

Resistor 50mΩ 1W 3A max

Unidirectional or bidirectional shunt amplifier 20V/V

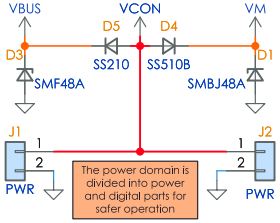
## VM bypass cap




## VM sense

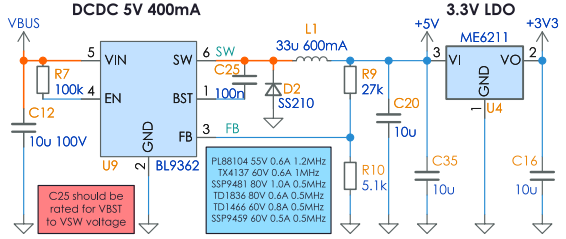



## Power Daisy Chain + Protection

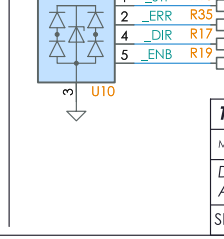



The power domain is divided into power and digital parts for safer operation

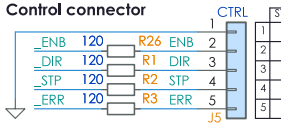
## DCDC 5V 400mA




## 3.3V LDO




## Control connector




| | STP-DIR | USART2 | I2C-3 | SPI3 | TIM3 |
|---|---|---|---|---|---|
| 1 | GND | GND | GND | GND | GND |
| 2 | ENB | 5V | SCL | CS | 5V |
| 3 | DIR | CK | SDA | MOSI | A |
| 4 | STP | RX | RX | MISO | B |
| 5 | ERR | TX | TX | SCK | Z |

Compatible with 3.3V and 5V logic

Speed up to 5MHz

Push-Pull or Open-Drain configuration

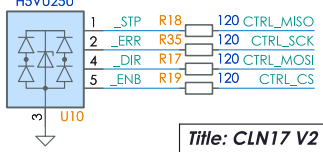
Avoid reverse polarity

Not to exceed 5V

Do not use more than 250mA in 5V output mode

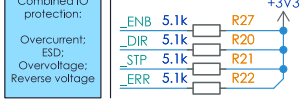
It is possible to power the digital part via the ENB pin when 5V is applied. However, this also means that the EN control must be either Open-Drain or connected via a current limiting resistor

## Control IO protection

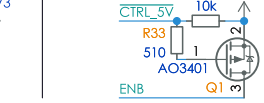



Combined IO protection:
Overcurrent; ESD; Overvoltage; Reverse voltage

## Control IO PullUp




## ENB 5V (optional)




# Title: CLN17 V2 Closed-Loop Stepper Motor Driver

More information on https://creapunk.com/cln17

Designed by Anton Khrustalev



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Sheet: Root | Sheet #: 1/1 | Date: 2024-04 | Rev: 1.2