Quick Design Summary

- Capable of driving two PMSM or DC motors @ 48V, 20A
- Automatic overcurrent protection with adjustable current limit
- Break resistor support
- Versatile encoder interface supporting SE, RS-422 and DHTL encoders
- 3 extra +-40 inputs per motor for high voltage industrial sensors
- Motor hall sensor support
- Amplified back emf feedback for better sensorless control
- 2x CAN2.0B
- CANFD 5Mbit/s
- EtherCAT slave controller
- USB 2.0 device interface
- LCD connector
- UEXT connector for arbitrary expansion
- 8 analog 5v capable inputs supporting inductive joystick and potentiometers
- 4 analog 5v control outputs
- 8 button inputs with hardware debouncing
- 8 flexible LED outputs with programmable light patterns

STM32 Peripheral Assignments

Timers

TIM1: motor 1
TIM2: motor 1 enc
TIM3: motor 1 hall
TIM4: motor 2 enc
TIM5: motor 2 hall
TIM8: motor 2

ADC1

ADC1_CH1:
ADC1_CH2:
ADC1_CH3: motor 1 cur A
ADC1_CH4: motor 1 cur B
ADC1_CH5:
ADC1_CH6: motor 1 volt A
ADC1_CH7:
ADC1_CH8:
ADC1_CH9:
ADC1_CH10: motor 1 volt B
ADC1_CH11: motor 1 volt C

ADC2

ADC2_CH1:
ADC2_CH2:
ADC2_CH3:
ADC2_CH4:
ADC2_CH5:
ADC2_CH6:
ADC2_CH7:
ADC2_CH8: motor 2 cur A
ADC2_CH9: motor 2 cur B

This is a draft
Incomplete!

Switch/Button IN
GPIO
USB
EEPROM
Encoder Interface Power SW
Analog IN 5V
Analog OUT 5V
Button LEDs
Overcurrent limit ADJ
Back-EMF ADC Pre-Amp w/ offset
Drive 1
Drive 2
Motor Sensors 1
Motor Sensors 2
CAN 2.0B
LCD
UEXT
CANFD/2.0B
EtherCAT
Brake Resistor
Supply Voltage Sense
Power

Voltage follower inputs
– Allow connecting any impedance potentiometer without distortion
– Allow connecting 5V actively driven signal

Input current limit

Clamp to 3.6v

Swing: 0.3~5.7V

Check addresses

50A MAX

@20A: 0.06V
@70A: 0.21V

3.3V @ 48V

5V @ 48V

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Title: Electric Motor Control Board

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