DRV8874 control logic: Standard Motorshield Assignments: PH/EN Mode (PMODE Low) Channel A: Arduino Header direction a 1 brake a 3 nSleep/EN/PH out1/2 ZZ 00 D12 - Direction 0 X X D3 - PWM (work duty) 1 0 X 01 D9 - Brake` 1 1 0 74HC04 74HC04 74HC04 AO - current sensing. 1 1 1 10 10_direction_b_n Channel B: nSleep = high / pwm Switch IOREF alt_fault_n_a15 alt_fault_n_b16 alt_pwm_a17 def_pwm_a18 03 = not brake / pwm RESET D13 - Direction = dir D11 - PWM (work duty) U2A 74HC08 D8 - Brake AREF 30 aref 74HC08 PWM Mode (PMODE High) A1 - current sensing 74HC32 74HC32 AO 9 def_sen_a A1 10 def_sen_b A2 11 alt_sen_a A3 12 alt_sen_b SDA/A4 13 alt_direction_b SCL/A5 14 alt_pwm_b nSleep/in1/2 $0 \times X$ ZZ 01 New Addistions: 1 0 0 D4 - fault_n_a 1 0 1 def_pwm_b<mark>26</mark> p11 def_direction_a27 p12 def_direction_b28 p13 D10 - fault_n_b 1 1 0 10 SDA/A4 31sda SCL/A5 32scl 00 U2D 74HC08 74HC08 in1 = pwm and (dir or brake)74HC32 74HC32 in2 = pwm and (not dir or brake) brake_b 1 brake_b_4 \$ Arduino_UNO_R3 direction_b_2 direction_b_n 5 DRV8874 Mode Select GND JP1 IOREF SolderJumper_3_Bridged12 out1a 1 J1 out2a 2 Phoenix Contact MC 1,5/ 2-G-3,5 out1a_1 out2a_2 DRV8874 Motor Driver Alternative pinout to allow stacking out1b 1 J3 out2b 2 Phoenix Contact MC 1,5/ 2-G-3,5 Low: EN/PH High: PWM SolderJumper_3_Bridged12 SolderJumper_3_Bridged12 out1b 1 J4 out2b 2 dnp Z: Independent def_pwm_a_alt_pwm_a def_pwm_b___alt_pwm_b C5 10u 35V + 100n 10u 35V = C7 100n JP4 JP6 100n GND GND in1_a__pwm_a SolderJumper_3_Bridged12 SolderJumper_3_Bridged12 vcna def_direction_a____alt_direction_a def_direction_b i2c headers en/in1a direction a direction b IOREF brake_b_n C10 IOREF C9 IOREF JP7 SolderJumper_3_Bridged12 SolderJumper_3_Bridged12 pwm_b en/in1b_1 ph/in2b_2 PH/IN2 en/in1a_1_EN/IN1 def_brake_a____alt_brake_a def_brake_b___alt_brake_b 0UT1 8 out1a 0UT2 10 out2a ph/in2a 2 PH/IN2 SolderJumper_4 nSleepa 3 nSleep nSleepb 3 nSleep Oout2h brake_b en/in1b OUT2 GND JP10 pmode 16 PMODE NFAULT 4 fault_n_a IMODE 2 IPROPI 6 sen_a pmode 16 PMODE nFAULT 4 fault_n_b JP11 SolderJumper_3_Bridged12 SolderJumper_3_Bridged12 7 IMODE 2 IPROPI 6 sen_b JP12 def_sen_b___alt_sen_b def_sen_a__alt_sen_a SolderJumper_3_Bridged12 OLED Header R3 1k5 R4 1k5 in2_a___direction_a DRV8874PWPR DRV8874PWPR sen_b IOREF sen a JP13 ph/in2a GND sen_switch_a sen_switch_b SolderJumper_3_Bridged12 SolderJumper_3_Bridged12 def_fault_n_b___alt_fault_n_b JP15 def_fault_n_a__alt_fault_n_a 100R 100R SolderJumper 3 Bridged12 ioref_is_3V3_not_5V_1 Q1 n_channel Q1 A03400A in2_b___direction_b A03400A n_channel conducts if gate high ioref is 3V3 not 5V ph/in2b DRV8874 Current Sensing: GND JP16 OpAmp as IORef Comparator 0.000455 A_prop per A SolderJumper_3_Bridged12 Power Sheet Status LEDs nSleena 5V = 0.000455*(1500+780)*A => A=4.823.3V = 0.000455*1500VIN R9 100k out1b 100n | V_prop is limited to VRef inside DRV8874 SolderJumper_3_Bridged12 File: power.kicad_sch R13 47k R10 47k R11 47k R12 47k R14 47k ioref_is_3V3_not_5V nSleepb

Z D1 ⋧ 0603_LED

GND

D2 D3 D4 D4 0603_LED 0603_LED

Engineer: Erwin Peterlin

Sheet: / File: motor—shield.kicad_sch

Size: A3 Date: 2023-01-30 KiCad E.D.A. kicad (6.0.10)

Title: Motor Shield (DCC-EX compatible)

Rev: Prototype A

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O FID1 Toolinghole_jlc

FID2
Toolinghole_jlc
FID3
Toolinghole_jlc

R15

C12

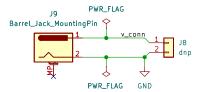
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LMV321

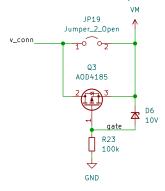
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GND

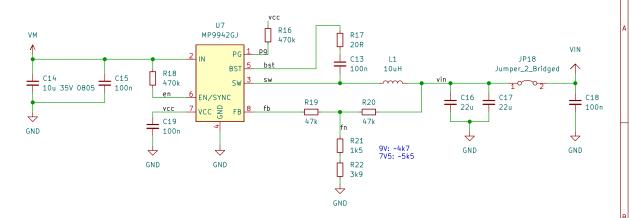
Barrel Jack



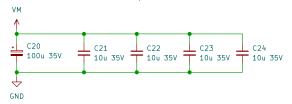
Reverse Polarity Protection

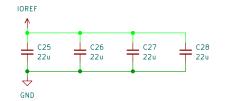


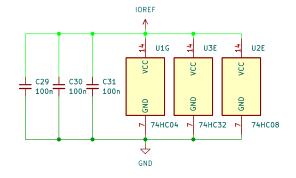
VIN DCDC Buck Converter



Bulk Caps







Engineer: Erwin Peterlin

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Sheet: /Power/ File: power.kicad_sch

Title: Motor Shield (DCC-EX compatible)

 Size: A4
 Date: 2023-02-02
 Rev: Prototype A

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 Id: 2/2