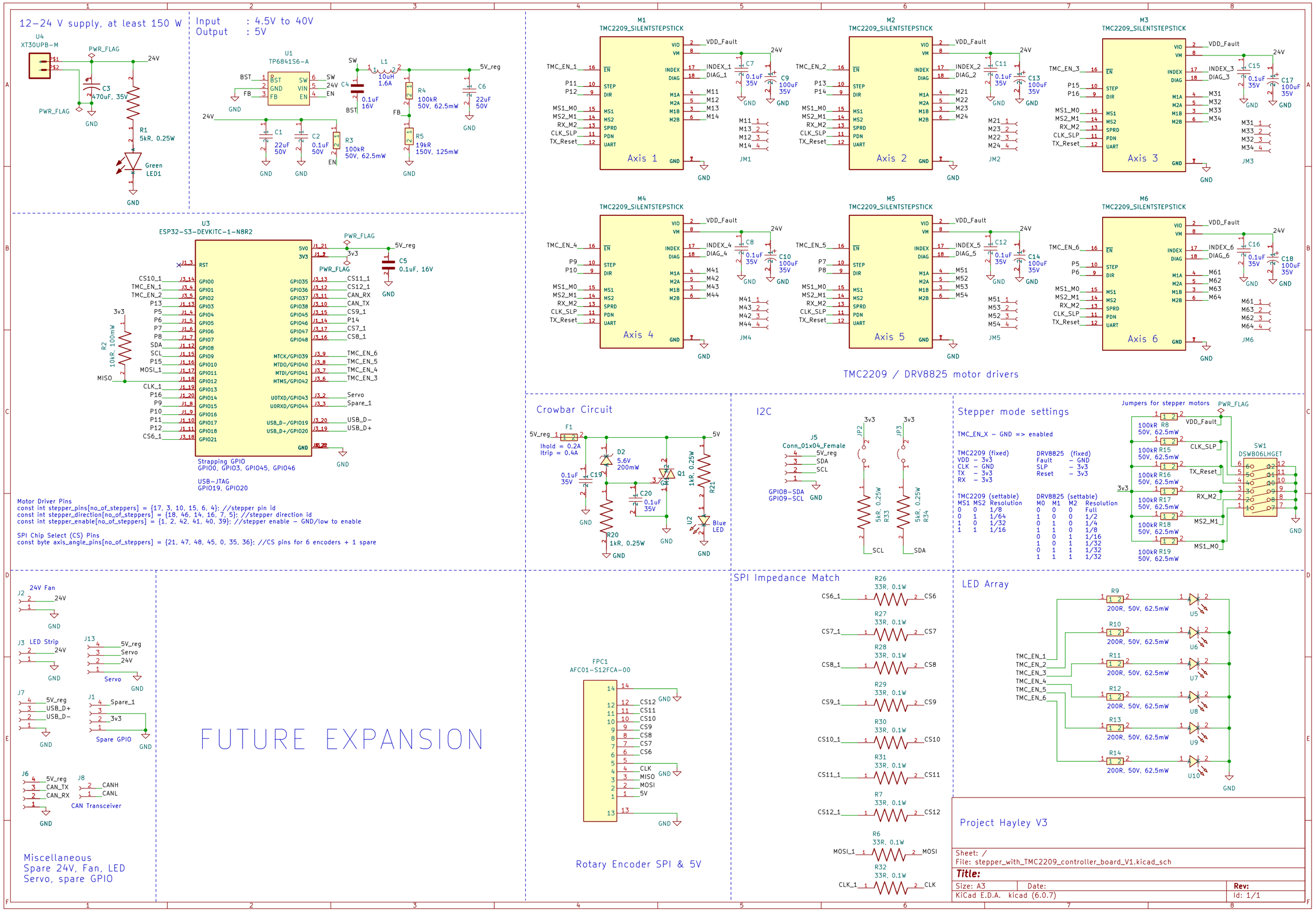
12-24 V supply, at least 150 W
U4
XT30UPB-M
PWR_FLAG
24V
C3
470uF, 35V
R1
5kR, 0.25W
Green
LED1
GND
Input : 4.5V to 40V
Output : 5V
U1
TP6841S6-A
BST
SW
GND
FB
VIN
EN
C4
0.1uF
16V
L1
10uH
1.6A
5V_reg
R4
100kR
50V, 62.5mW
C6
22uF
50V
C1
22uF
50V
C2
0.1uF
50V
R3
100kR
50V, 62.5mW
R5
19kR
150V, 125mW
M1
M2
M3
M4
M5
M6
TMC2209_SILENTSTEPSTICK
Axis 1
Axis 2
Axis 3
Axis 4
Axis 5
Axis 6
VDD_Fault
INDEX_1
DIAG_1
INDEX_2
DIAG_2
INDEX_3
DIAG_3
INDEX_4
DIAG_4
INDEX_5
DIAG_5
INDEX_6
DIAG_6
TMC_EN_1
TMC_EN_2
TMC_EN_3
TMC_EN_4
TMC_EN_5
TMC_EN_6
MS1_M0
MS2_M1
RX_M2
CLK_SLP
TX_Reset
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
0.1uF
35V
100uF
35V
JM1
JM2
JM3
JM4
JM5
JM6
TMC2209 / DRV8825 motor drivers
U3
ESP32-S3-DEVKITC-1-N8R2
5V0
3V3
RST
GPIO00
GPIO01
GPIO02
GPIO03
GPIO04
GPIO05
GPIO06
GPIO07
GPIO08
GPIO09
GPIO10
GPIO11
GPIO12
GPIO13
GPIO14
GPIO15
GPIO16
GPIO17
GPIO18
GPIO21
GPIO35
GPIO36
GPIO37
GPIO38
GPIO45
GPIO46
GPIO47
GPIO48
MTCK/GPIO39
MTDO/GPIO40
MTDI/GPIO41
MTMS/GPIO42
U0TXD/GPIO43
U0RXD/GPIO44
USB_D-/GPIO19
USB_D+/GPIO20
CS10_1
TMC_EN_1
TMC_EN_2
P13
P5
P6
P7
P8
SDA
SCL
P15
MOSI_1
CLK_1
P16
P9
P10
P11
P12
CS6_1
CS11_1
CS12_1
CAN_RX
CAN_TX
CS9_1
P14
CS7_1
CS8_1
TMC_EN_6
TMC_EN_5
TMC_EN_4
TMC_EN_3
Servo
Spare_1
USB_D-
USB_D+
R2
10kR, 100mW
MISO
C5
0.1uF, 16V
Strapping GPIO
GPIO0, GPIO3, GPIO45, GPIO46
USB-JTAG
GPIO19, GPIO20
Motor Driver Pins
const int stepper_pins[no_of_steppers] = {17, 3, 10, 15, 6, 4}; //stepper pin id
const int stepper_direction[no_of_steppers] = {18, 46, 14, 16, 7, 5}; //stepper direction id
const int stepper_enable[no_of_steppers] = {1, 2, 42, 41, 40, 39}; //stepper enable - GND/low to enable
SPI Chip Select (CS) Pins
const byte axis_angle_pins[no_of_steppers] = {21, 47, 48, 45, 0, 35, 36}; //CS pins for 6 encoders + 1 spare
Crowbar Circuit
F1
5V_reg
Ihold = 0.2A
Itrip = 0.4A
D2
5.6V
200mW
C19
0.1uF
35V
C20
0.1uF
35V
Q1
R20
1kR, 0.25W
R21
1kR, 0.25W
U2
Blue
LED
5V
I2C
J5
Conn_01x04_Female
5V_reg
SDA
SCL
GPIO8-SDA
GPIO9-SCL
3v3
JP2
JP3
5kR, 0.25W
R33
R34
Stepper mode settings
TMC_EN_X - GND => enabled
TMC2209 (fixed)
VDD - 3v3
CLK - GND
TX - 3v3
RX - 3v3
TMC2209 (settable)
MS1 MS2 Resolution
0 0 1/8
0 1 1/64
1 0 1/32
1 1 1/16
DRV8825 (fixed)
Fault - GND
SLP - 3v3
Reset - 3v3
DRV8825 (settable)
M0 M1 M2 Resolution
0 0 0 Full
1 0 0 1/2
0 1 0 1/4
1 1 0 1/8
0 0 1 1/16
1 0 1 1/32
0 1 1 1/32
1 1 1 1/32
Jumpers for stepper motors
R8
100kR
50V, 62.5mW
R15
R16
R17
R18
R19
SW1
DSWB06LHGET
J2
24V Fan
J3
LED Strip
J13
Servo
J7
USB_D+
USB_D-
J1
Spare GPIO
J6
CAN_TX
CAN_RX
J8
CANH
CANL
CAN Transceiver
Miscellaneous
Spare 24V, Fan, LED
Servo, spare GPIO
FUTURE EXPANSION
FPC1
AFC01-S12FCA-00
CS12
CS11
CS10
CS9
CS8
CS7
CS6
CLK
MISO
MOSI
5V
Rotary Encoder SPI & 5V
SPI Impedance Match
R26
R27
R28
R29
R30
R31
R7
R6
R32
33R, 0.1W
MOSI_1
CLK_1
LED Array
R9
R10
R11
R12
R13
R14
200R, 50V, 62.5mW
U5
U6
U7
U8
U9
U10
Project Hayley V3
Sheet: /
File: stepper_with_TMC2209_controller_board_V1.kicad_sch
Title:
Size: A3
Date:
Rev:
KiCad E.D.A. kicad (6.0.7)
Id: 1/1