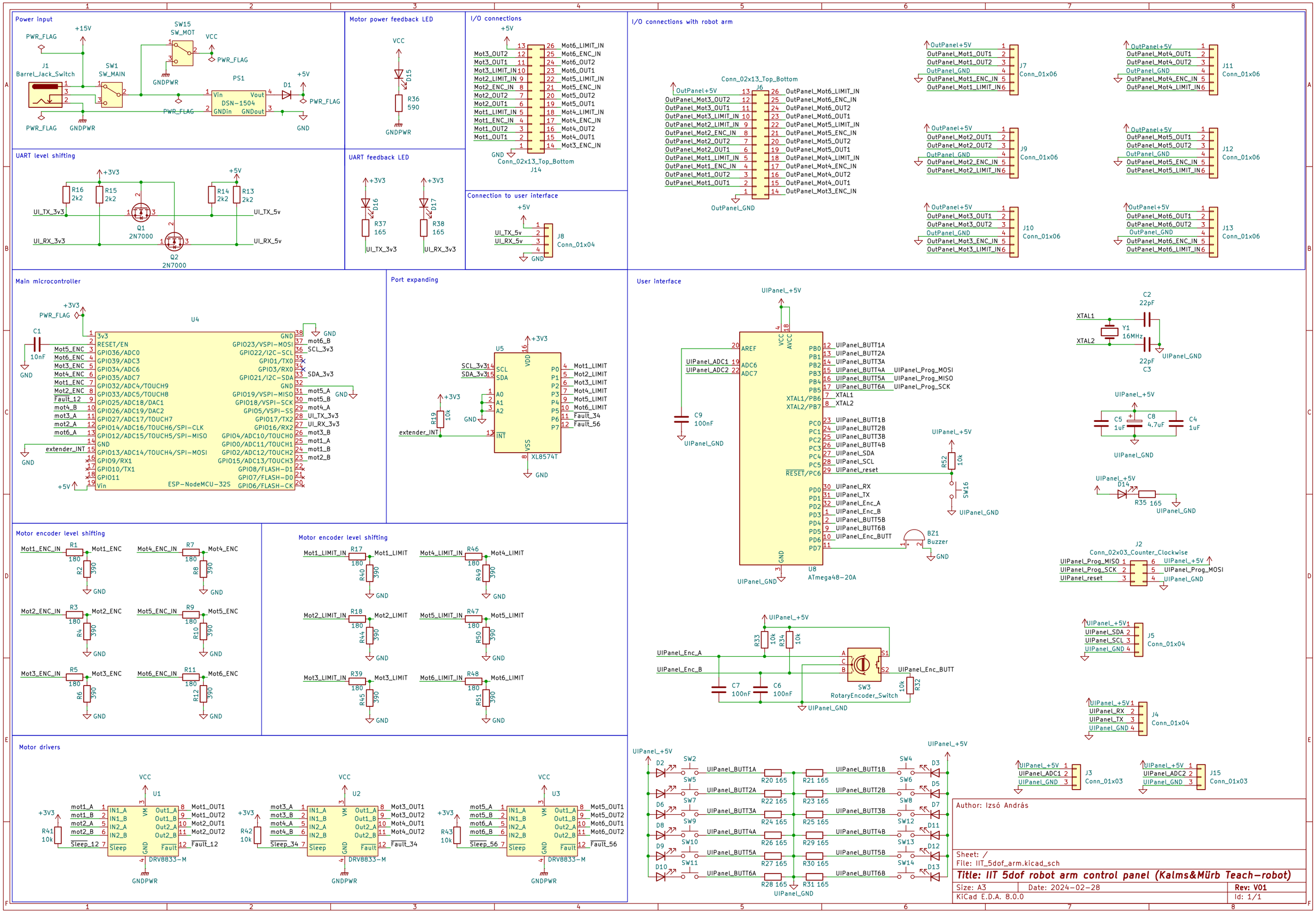
Power input
J1
Barrel_Jack_Switch
SW1
SW_MAIN
SW15
SW_MOT
PS1
DSN-1504
Vin
Vout
GNDin
GNDout
D1
+15V
+5V
VCC
PWR_FLAG
GNDPWR
GND
Motor power feedback LED
D15
R36
590
I/O connections
J14
Conn_02x13_Top_Bottom
Mot3_OUT2
Mot3_OUT1
Mot3_LIMIT_IN
Mot2_LIMIT_IN
Mot2_ENC_IN
Mot2_OUT2
Mot2_OUT1
Mot1_LIMIT_IN
Mot1_ENC_IN
Mot1_OUT2
Mot1_OUT1
Mot6_LIMIT_IN
Mot6_ENC_IN
Mot6_OUT2
Mot6_OUT1
Mot5_LIMIT_IN
Mot5_ENC_IN
Mot5_OUT2
Mot5_OUT1
Mot4_LIMIT_IN
Mot4_ENC_IN
Mot4_OUT2
Mot4_OUT1
Mot3_ENC_IN
I/O connections with robot arm
J6
OutPanel+5V
OutPanel_Mot3_OUT2
OutPanel_Mot3_OUT1
OutPanel_Mot3_LIMIT_IN
OutPanel_Mot2_LIMIT_IN
OutPanel_Mot2_ENC_IN
OutPanel_Mot2_OUT2
OutPanel_Mot2_OUT1
OutPanel_Mot1_LIMIT_IN
OutPanel_Mot1_ENC_IN
OutPanel_Mot1_OUT2
OutPanel_Mot1_OUT1
OutPanel_Mot6_LIMIT_IN
OutPanel_Mot6_ENC_IN
OutPanel_Mot6_OUT2
OutPanel_Mot6_OUT1
OutPanel_Mot5_LIMIT_IN
OutPanel_Mot5_ENC_IN
OutPanel_Mot5_OUT2
OutPanel_Mot5_OUT1
OutPanel_Mot4_LIMIT_IN
OutPanel_Mot4_ENC_IN
OutPanel_Mot4_OUT2
OutPanel_Mot4_OUT1
OutPanel_Mot3_ENC_IN
OutPanel_GND
J7
Conn_01x06
OutPanel_Mot1_OUT1
OutPanel_Mot1_OUT2
OutPanel_Mot1_ENC_IN
OutPanel_Mot1_LIMIT_IN
J11
OutPanel_Mot4_OUT1
OutPanel_Mot4_OUT2
OutPanel_Mot4_ENC_IN
OutPanel_Mot4_LIMIT_IN
J9
OutPanel_Mot2_OUT1
OutPanel_Mot2_OUT2
OutPanel_Mot2_ENC_IN
OutPanel_Mot2_LIMIT_IN
J12
OutPanel_Mot5_OUT1
OutPanel_Mot5_OUT2
OutPanel_Mot5_ENC_IN
OutPanel_Mot5_LIMIT_IN
J10
OutPanel_Mot3_OUT1
OutPanel_Mot3_OUT2
OutPanel_Mot3_ENC_IN
OutPanel_Mot3_LIMIT_IN
J13
OutPanel_Mot6_OUT1
OutPanel_Mot6_OUT2
OutPanel_Mot6_ENC_IN
OutPanel_Mot6_LIMIT_IN
UART level shifting
R16
2k2
R15
2k2
R14
2k2
R13
2k2
Q1
2N7000
Q2
2N7000
UI_TX_3v3
UI_RX_3v3
UI_TX_5v
UI_RX_5v
UART feedback LED
D16
D17
R37
165
R38
165
Connection to user interface
J8
Conn_01x04
Main microcontroller
U4
ESP-NodeMCU-32S
C1
10nF
3v3
RESET/EN
GPIO36/ADC0
GPIO39/ADC3
GPIO34/ADC6
GPIO35/ADC7
GPIO32/ADC4/TOUCH9
GPIO33/ADC5/TOUCH8
GPIO25/ADC18/DAC1
GPIO26/ADC19/DAC2
GPIO27/ADC17/TOUCH7
GPIO14/ADC16/TOUCH6/SPI-CLK
GPIO12/ADC15/TOUCH5/SPI-MISO
GPIO13/ADC14/TOUCH4/SPI-MOSI
GPIO9/RX1
GPIO10/TX1
GPIO11
Vin
GPIO23/VSPI-MOSI
GPIO22/I2C-SCL
GPIO1/TX0
GPIO3/RX0
GPIO21/I2C-SDA
GPIO19/VSPI-MISO
GPIO18/VSPI-SCK
GPIO5/VSPI-SS
GPIO17/TX2
GPIO16/RX2
GPIO4/ADC10/TOUCH0
GPIO0/ADC11/TOUCH1
GPIO2/ADC12/TOUCH2
GPIO15/ADC13/TOUCH3
GPIO8/FLASH-D1
GPIO7/FLASH-D0
GPIO6/FLASH-CK
Mot5_ENC
Mot6_ENC
Mot3_ENC
Mot4_ENC
Mot1_ENC
Mot2_ENC
Fault_12
mot4_B
mot3_A
mot2_A
mot6_A
extender_INT
mot6_B
SCL_3v3
SDA_3v3
mot5_A
mot5_B
mot4_A
UI_TX_3v3
UI_RX_3v3
mot3_B
mot1_A
mot1_B
mot2_B
Port expanding
U5
XL8574T
SCL_3v3
SDA_3v3
A0
A1
A2
INT
VDD
VSS
P0
P1
P2
P3
P4
P5
P6
P7
Mot1_LIMIT
Mot2_LIMIT
Mot3_LIMIT
Mot4_LIMIT
Mot5_LIMIT
Mot6_LIMIT
Fault_34
Fault_56
R19
10k
extender_INT
User interface
UIPanel_+5V
U8
ATmega48-20A
AREF
ADC6
ADC7
UIPanel_ADC1
UIPanel_ADC2
C9
100nF
UIPanel_GND
PB0
PB1
PB2
PB3
PB4
PB5
XTAL1/PB6
XTAL2/PB7
PC0
PC1
PC2
PC3
PC4
PC5
RESET/PC6
PD0
PD1
PD2
PD3
PD4
PD5
PD6
PD7
UIPanel_BUTT1A
UIPanel_BUTT2A
UIPanel_BUTT3A
UIPanel_BUTT4A
UIPanel_BUTT5A
UIPanel_BUTT6A
UIPanel_Prog_MOSI
UIPanel_Prog_MISO
UIPanel_Prog_SCK
XTAL1
XTAL2
UIPanel_BUTT1B
UIPanel_BUTT2B
UIPanel_BUTT3B
UIPanel_BUTT4B
UIPanel_SDA
UIPanel_SCL
UIPanel_reset
UIPanel_RX
UIPanel_TX
UIPanel_Enc_A
UIPanel_Enc_B
UIPanel_BUTT5B
UIPanel_BUTT6B
UIPanel_Enc_BUTT
RS2
10k
SW16
BZ1
Buzzer
C2
22pF
Y1
16MHz
C3
C5
1uF
C8
4.7uF
C4
1uF
D14
R35 165
J2
Conn_02x03_Counter_Clockwise
UIPanel_Prog_MISO
UIPanel_Prog_SCK
UIPanel_reset
UIPanel_Prog_MOSI
J5
Conn_01x04
UIPanel_SDA
UIPanel_SCL
UIPanel_GND
R33
10k
R34
10k
C7
100nF
C6
100nF
SW3
RotaryEncoder_Switch
R32
10k
J4
Conn_01x04
UIPanel_RX
UIPanel_TX
UIPanel_GND
SW2
SW5
SW7
SW9
SW10
SW11
SW4
SW6
SW8
SW12
SW13
SW14
D2
D6
D8
D9
D10
D3
D5
D7
D11
D12
D13
R20 165
R22 165
R24 165
R26 165
R27 165
R28 165
R21 165
R23 165
R25 165
R29 165
R30 165
R31 165
J3
Conn_01x03
UIPanel_ADC1
UIPanel_GND
J15
Conn_01x03
UIPanel_ADC2
Motor encoder level shifting
Mot1_ENC_IN
Mot4_ENC_IN
Mot2_ENC_IN
Mot5_ENC_IN
Mot3_ENC_IN
Mot6_ENC_IN
Mot1_ENC
Mot4_ENC
Mot2_ENC
Mot5_ENC
Mot3_ENC
Mot6_ENC
R1
R7
R3
R9
R5
R11
R2
R8
R4
R10
R6
R12
180
390
Motor encoder level shifting
Mot1_LIMIT_IN
Mot4_LIMIT_IN
Mot2_LIMIT_IN
Mot5_LIMIT_IN
Mot3_LIMIT_IN
Mot6_LIMIT_IN
Mot1_LIMIT
Mot4_LIMIT
Mot2_LIMIT
Mot5_LIMIT
Mot3_LIMIT
Mot6_LIMIT
R17
R46
R18
R47
R39
R48
R40
R49
R44
R50
R45
R51
Motor drivers
U1
U2
U3
DRV8833-M
IN1_A
IN1_B
IN2_A
IN2_B
Sleep
GND
VM
Out1_A
Out1_B
Out2_A
Out2_B
Fault
mot1_A
mot1_B
mot2_A
mot2_B
Sleep_12
Mot1_OUT1
Mot1_OUT2
Mot2_OUT1
Mot2_OUT2
Fault_12
mot3_A
mot3_B
mot4_A
mot4_B
Sleep_34
Mot3_OUT1
Mot3_OUT2
Mot4_OUT1
Mot4_OUT2
Fault_34
mot5_A
mot5_B
mot6_A
mot6_B
Sleep_56
Mot5_OUT1
Mot5_OUT2
Mot6_OUT1
Mot6_OUT2
Fault_56
R41
10k
R42
10k
R43
10k
Author: Izsó András
Sheet: /
File: IIT_5dof_arm.kicad_sch
Title: IIT 5dof robot arm control panel (Kalms&Mürb Teach-robot)
Size: A3
Date: 2024-02-28
Rev: V01
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