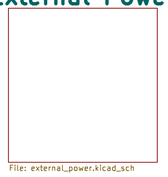
External Power

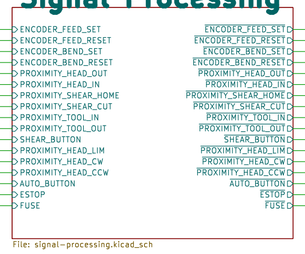


File: external_power.kicad_sch

Input Connections

File: input_connections.kicad_sch

Signal Processing



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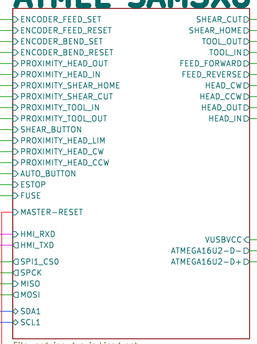
ATMEL SAM3X8



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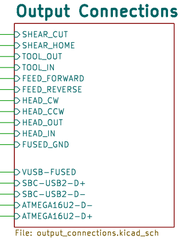
Output Connections



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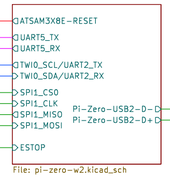
Pi Zero 2W SBC



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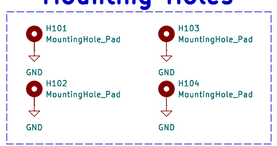
Mounting Holes



Rev	Date	Author	Change Description
X1	12/08/24	Connor M.	Initial release
X2	05/31/25	Connor M.	Removed HMI header, Added HMI SBC board support. Added schmitt triggers on all inputs. Integrated Arduino Due.

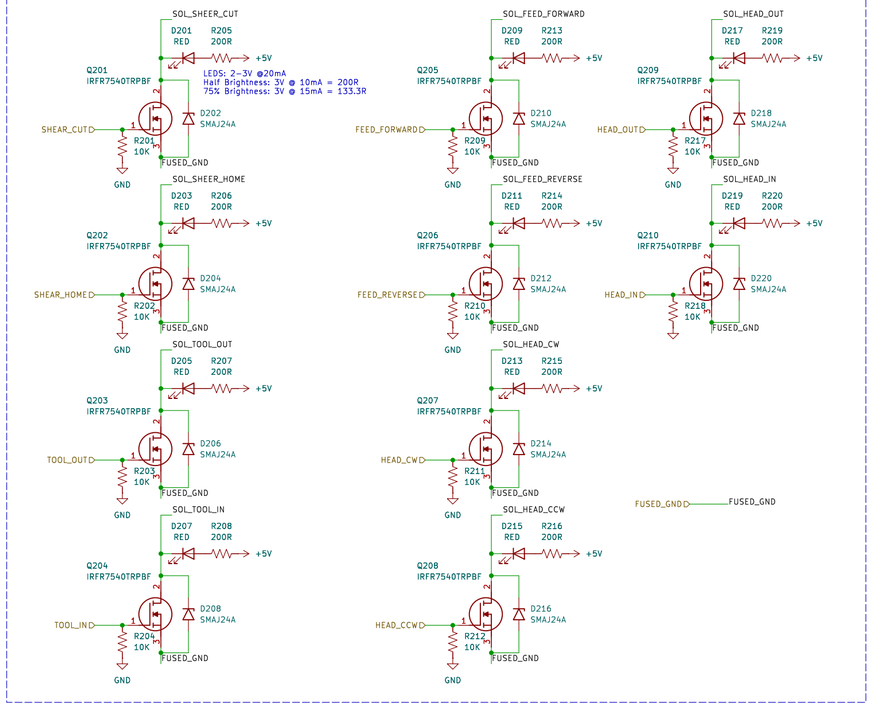
Hardware: Connor McMillan (connor@mcmillan.website)
Firmware: John Gilcreast (johngilcreast@gmail.com)
McMillan Enterprises

Sheet: /
File: MEP-MAXI-85V-1-REV-2-Interface-Board.kicad_sch

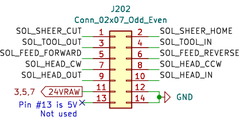
Title: MEP MAXI 85V-1 REV 2 Interface Board

Size: A2	Date: 2025-05-31	**Rev: X2**
KiCad E.D.A. 9.0.2		Id: 1/7

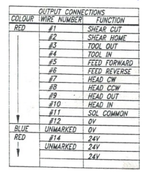
Solenoid MOSFETs



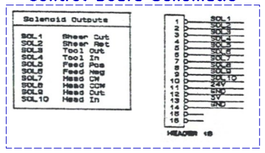
MEP MAXI



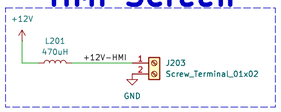
Terminal Board Wiring



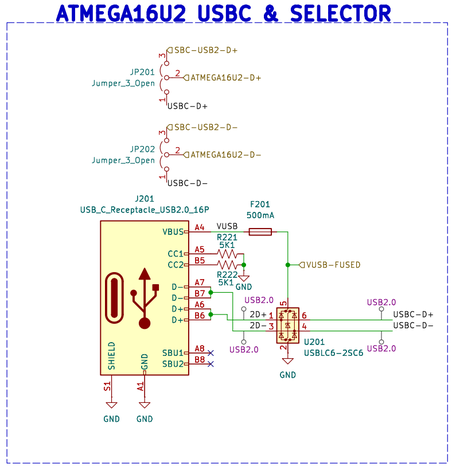
Control Board Schematic



HMI Screen



ATMEGA16U2 USBC & SELECTOR



Hardware: Connor McMillan (connor@mcmillan.website)
Firmware: John Gilcreast (johngilcreast@gmail.com)
McMillan Enterprises

Sheet: /Output Connections/
File: output_connections.kicad_sch

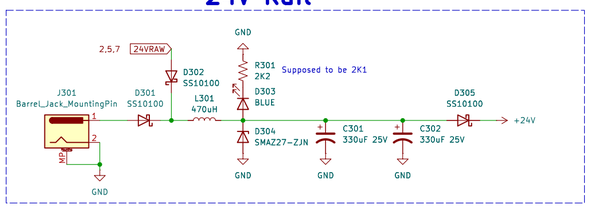
Title: MEP MAXI 85V-1 REV 2 Interface Board

Size: A2	Date: 2025-05-31	**Rev: X2**
KiCad E.D.A. 9.0.2		Id: 2/7

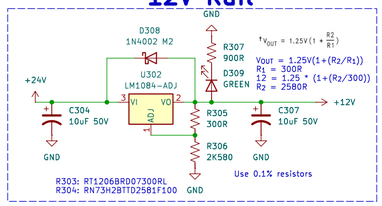
Notes

LEDS: 2-3V @20mA
Half Brightness: 3V3 @ 10mA = 30R
Half Brightness: 5V @ 10mA = 200R
Half Brightness: 12V @ 10mA = 900R
Half Brightness: 24V @ 10mA = 2100R

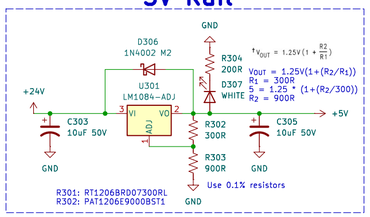
24V Rail



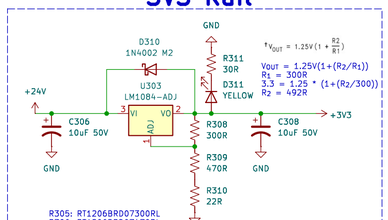
12V Rail



5V Rail



3V3 Rail



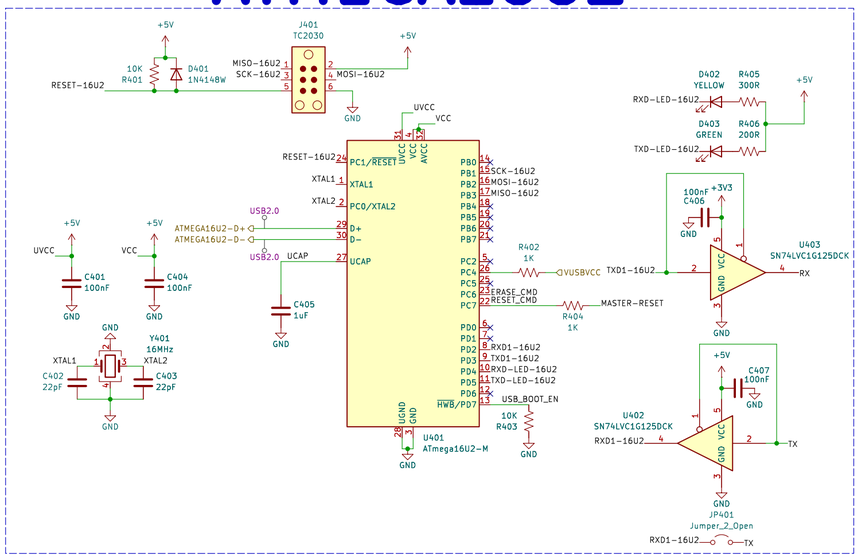
Hardware: Connor McMillan (connor@mcmillan.website)
Firmware: John Gilcreast (johngilcreast@gmail.com)
McMillan Enterprises

Sheet: /External Power/
File: external_power.kicad_sch

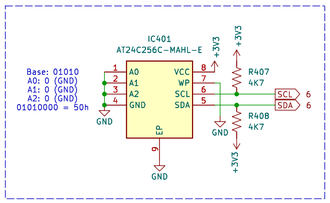
Title: MEP MAXI 85V-1 REV 2 Interface Board

Size: A2	Date: 2025-05-31	**Rev: X2**
KiCad E.D.A. 9.0.2		Id: 3/7

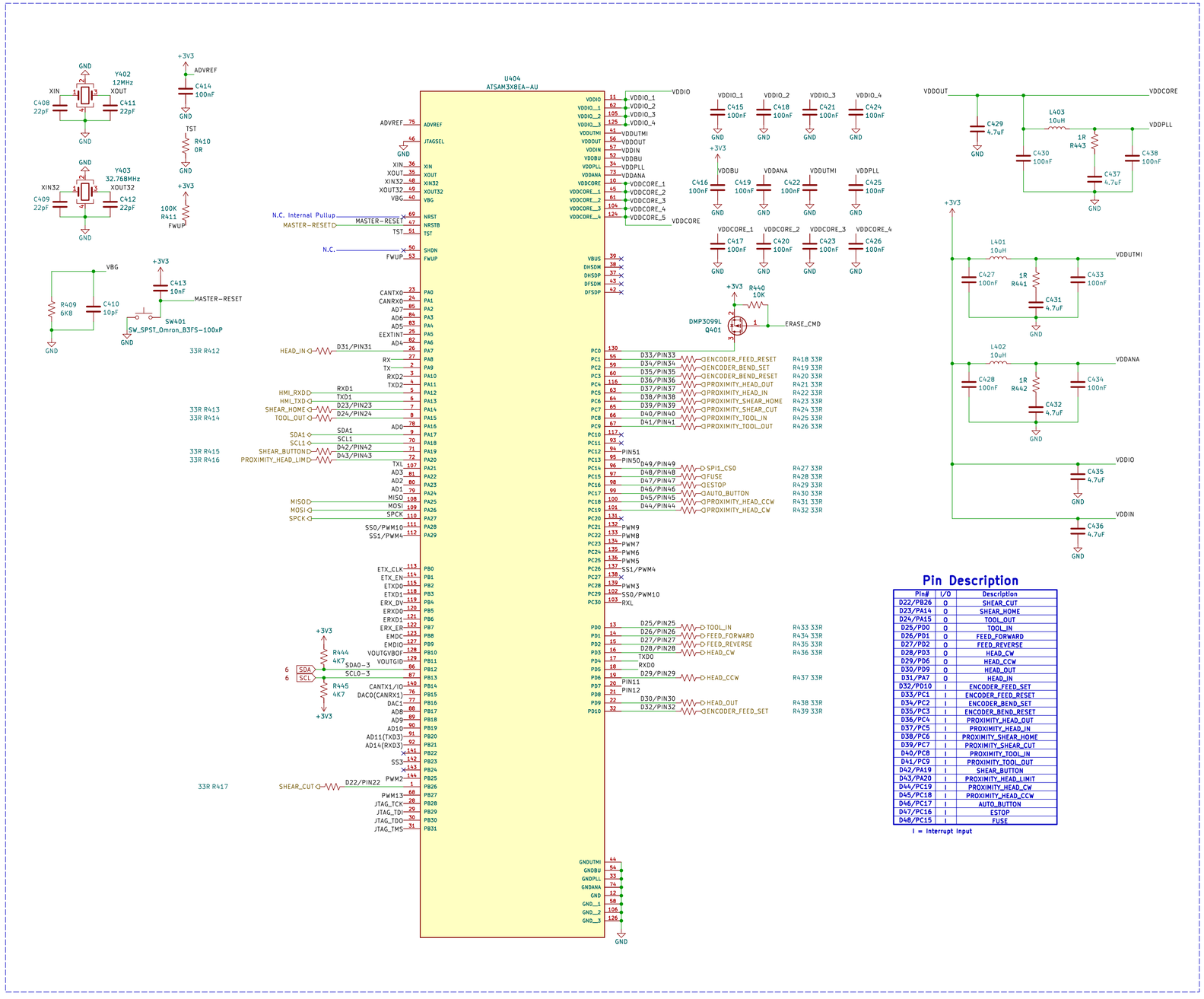
ATMEGA16U2



I2C EEPROM



ATMEL SAM3X8



Pin Description

Pin#	I/O	Description
D22/PB26	O	SHEAR_CUT
D23/PA14	O	SHEAR_HOME
D24/PA15	O	TOOL_OUT
D25/PD0	O	TOOL_IN
D26/PD1	O	FEED_FORWARD
D27/PD2	O	FEED_REVERSE
D28/PD3	O	HEAD_CW
D29/PD6	O	HEAD_CCW
D30/PD9	O	HEAD_OUT
D31/PA7	O	HEAD_IN
D32/PD10	I	ENCODER_FEED_SET
D33/PC1	I	ENCODER_FEED_RESET
D34/PC2	I	ENCODER_BEND_SET
D35/PC3	I	ENCODER_BEND_RESET
D36/PC4	I	PROXIMITY_HEAD_OUT
D37/PC5	I	PROXIMITY_HEAD_IN
D38/PC6	I	PROXIMITY_SHEAR_HOME
D39/PC7	I	PROXIMITY_SHEAR_CUT
D40/PC8	I	PROXIMITY_TOOL_IN
D41/PC9	I	PROXIMITY_TOOL_OUT
D42/PA19	I	SHEAR_BUTTON
D43/PA20	I	PROXIMITY_HEAD_LIMIT
D44/PC19	I	PROXIMITY_HEAD_CW
D45/PC18	I	PROXIMITY_HEAD_CCW
D46/PC17	I	AUTO_BUTTON
D47/PC16	I	ESTOP
D48/PC15	I	FUSE

I = Interrupt Input

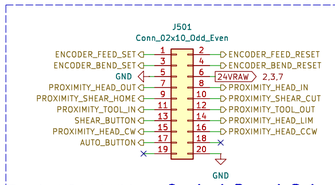
Hardware: Connor McMillan (connor@mcmillan.website)
Firmware: John Gilcreast (johngilcreast@gmail.com)
McMillan Enterprises

Sheet: /ATMEL SAM3X8/
File: arduino_due_io.kicad_sch

Title: MEP MAXI 85V-1 REV 2 Interface Board

Size: A2 | Date: 2025-05-31 | Rev: X2
KiCad E.D.A. 9.0.2 | Id: 4/7

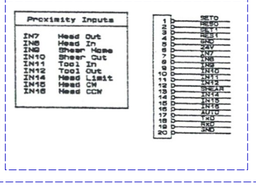
INPUT CONNECTIONS



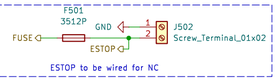
Terminal Board Wiring

INPUT CONNECTIONS		
FUNCTION	WIRE NUMBER	COLOUR
AUTO_BUTTON	UNMARKED	BLACK
HEAD_CCW	#16	BLUE
HEAD_CW	#15	
HEAD_LIMIT	#14	
SHEAR_BUTTON	UNMARKED	YELLOW
TOOL_OUT	#12	BLUE
TOOL_IN	#11	
SHEAR_HOME	#10	
SHEAR_CUT	#9	
HEAD_IN	#8	
HEAD_OUT	#7	
24V	#6	
0V	#5	
BEND_ENCODER	#4	
BEND_ENCODER	#3	
FEED_ENCODER	#2	
FEED_ENCODER	#1	

Control Board Schematic



ESTOP



Hardware: Connor McMillan (connor@mcmillan.website)
Firmware: John Gilcreast (johngilcreast@gmail.com)
McMillan Enterprises

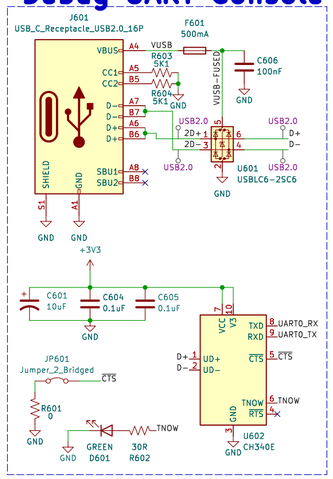
Sheet: /Input Connections/
File: input_connections.kicad_sch

Title: MEP MAXI 85V-1 REV 2 Interface Board

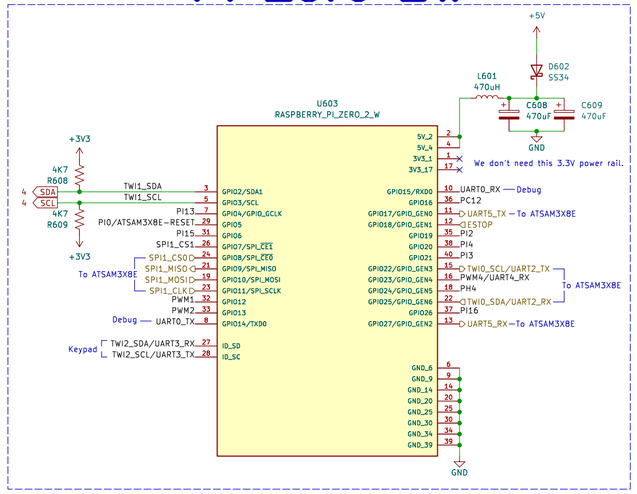
Size: A2	Date: 2025-05-31	**Rev: X2**
KiCad E.D.A. 9.0.2		Id: 5/7

Pi Zero 2W

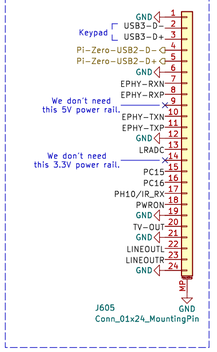
Debug UART Console



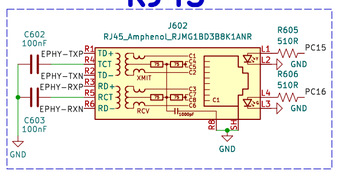
Pi Zero 2W



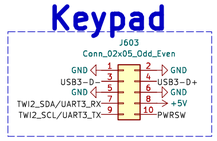
Pi Zero 2W FPC



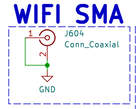
RJ45



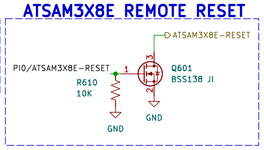
Keypad



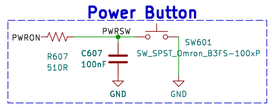
WIFI SMA



ATSAM3X8E REMOTE RESET



Power Button

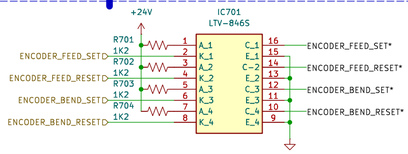


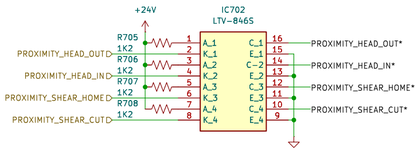
Hardware: Connor McMillan (connor@mcmillan.website)
Firmware: John Gilcreast (johngilcreast@gmail.com)
McMillan Enterprises
Sheet: /Pi Zero 2W SBC/
File: pi-zero-w2.kicad_sch

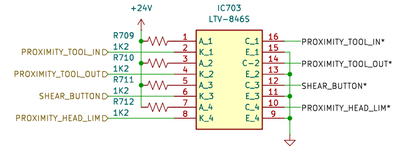
Title: MEP MAXI 85V-1 REV 2 Interface Board

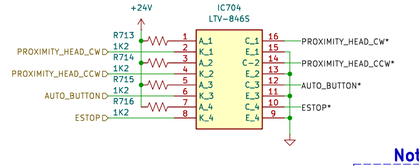
Size: A2	Date: 2025-05-31	**Rev: X2**
KiCad E.D.A. 9.0.2		Id: 6/7

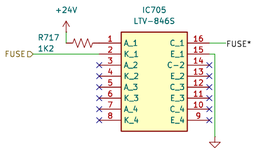
Optoisolators











Notes

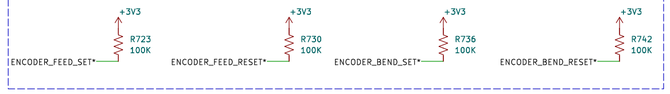
LTV-846S
+V Value: 24V
LED Voltage Drop: 1.2V
LED Current: 20mA
Resistor Value: 1K140
Alternative Value: 1K2

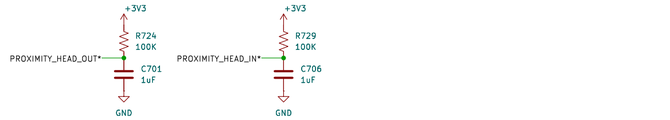
Interrupt LEDS:
2-3V @20mA
Half Brightness:
3V @ 10mA = 200R
75% Brightness:
3V @ 15mA = 133.3R

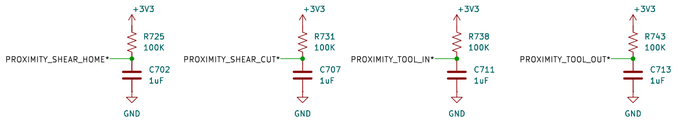
1K140: RN73R2ATTD1141D25

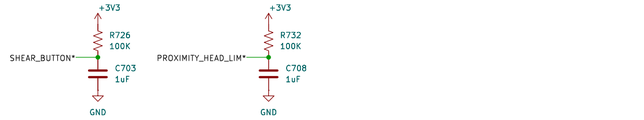
Delay

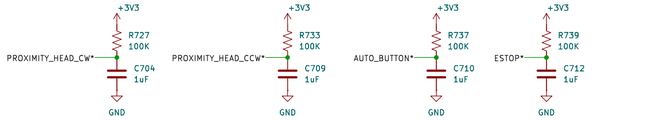
Encoder signals should not be delayed, otherwise the pulses of the encoder will not register above a certain RPM.



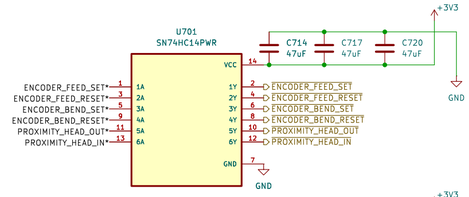


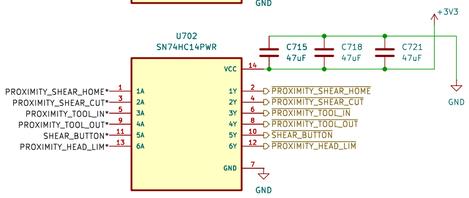


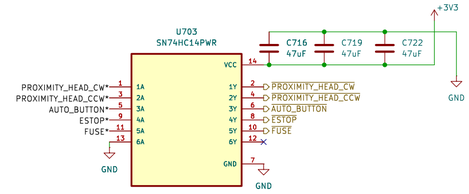




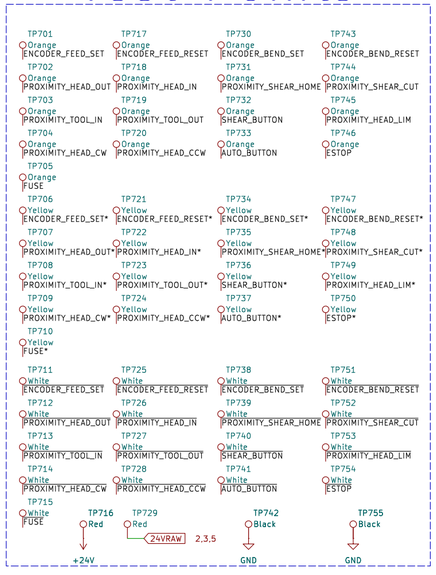
Schmitt Trigger Inverters



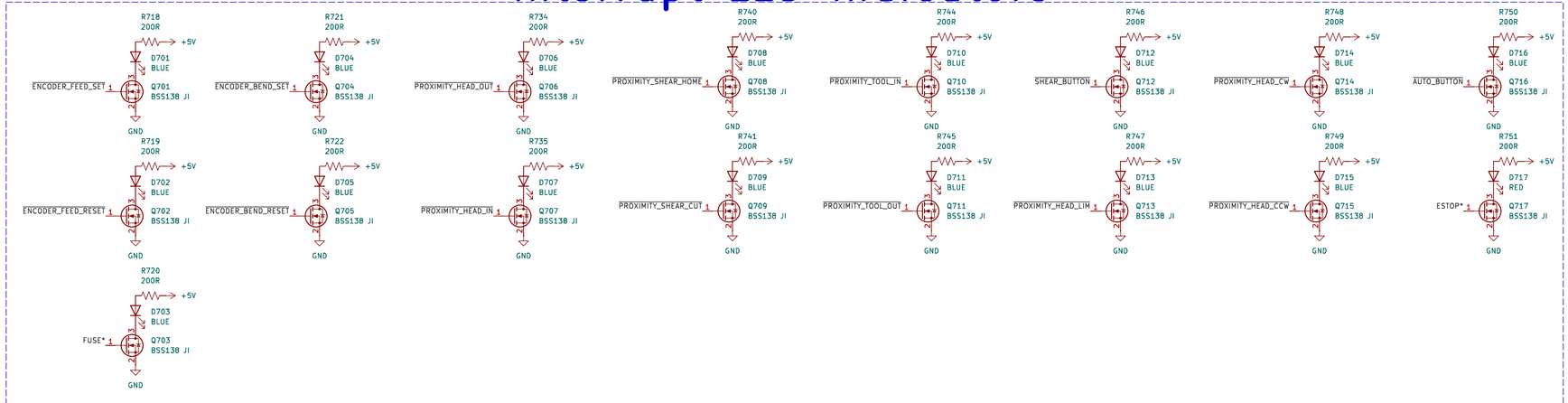




Test Points



Interrupt LED Indicators



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Sheet: /Signal Processing/
File: signal-processing.kicad_sch

Title: MEP MAXI 85V-1 REV 2 Interface Board

Size: A2 | Date: 2025-05-31 | Rev: X2
KiCad E.D.A. 9.0.2 | Id: 7/7