

the 1990s, the number of people in the world who are under 15 years of age has increased by 100 million. The number of people aged 15 and over has increased by 150 million. The number of people aged 65 and over has increased by 100 million. The number of people aged 75 and over has increased by 50 million. The number of people aged 85 and over has increased by 20 million. The number of people aged 95 and over has increased by 10 million. The number of people aged 100 and over has increased by 5 million. The number of people aged 105 and over has increased by 2 million. The number of people aged 110 and over has increased by 1 million. The number of people aged 115 and over has increased by 500,000. The number of people aged 120 and over has increased by 250,000. The number of people aged 125 and over has increased by 125,000. The number of people aged 130 and over has increased by 62,500. The number of people aged 135 and over has increased by 31,250. The number of people aged 140 and over has increased by 15,625. The number of people aged 145 and over has increased by 7,812.5. The number of people aged 150 and over has increased by 3,906.25. The number of people aged 155 and over has increased by 1,953.125. The number of people aged 160 and over has increased by 976.5625. The number of people aged 165 and over has increased by 488.28125. The number of people aged 170 and over has increased by 244.140625. The number of people aged 175 and over has increased by 122.0703125. The number of people aged 180 and over has increased by 61.03515625. The number of people aged 185 and over has increased by 30.517578125. The number of people aged 190 and over has increased by 15.2587890625. The number of people aged 195 and over has increased by 7.62939453125. The number of people aged 200 and over has increased by 3.814697265625. The number of people aged 205 and over has increased by 1.9073486328125. The number of people aged 210 and over has increased by 0.95367431640625. The number of people aged 215 and over has increased by 0.476837158203125. The number of people aged 220 and over has increased by 0.2384185791015625. The number of people aged 225 and over has increased by 0.11920928955078125. The number of people aged 230 and over has increased by 0.059604644775390625. The number of people aged 235 and over has increased by 0.0298023223876953125. The number of people aged 240 and over has increased by 0.01490116119384765625. The number of people aged 245 and over has increased by 0.007450580596923828125. The number of people aged 250 and over has increased by 0.0037252902984619140625. The number of people aged 255 and over has increased by 0.00186264514923095703125. The number of people aged 260 and over has increased by 0.000931322574615478515625. The number of people aged 265 and over has increased by 0.0004656612873077392578125. 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File: external_power.kicad_sch

```

ENCODER_FEED_SETD
ENCODER_FEED_RESETD
ENCODER_BEND_SETD
ENCODER_BEND_RESETD
PROXIMITY_HEAD_OUTD
PROXIMITY_HEAD_IND
PROXIMITY_SHEAR_HOMED
PROXIMITY_SHEAR_CUTD
PROXIMITY_TOOL_IND
PROXIMITY_TOOL_OUTD
SHEAR_BUTTOND
PROXIMITY_HEAD_LIMD
PROXIMITY_HEAD_CWD
PROXIMITY_HEAD_CCWD
AUTO_BUTTOND
ESTOPD
FUSED

```

File: input_connections.kicad_sch

ENCODER_FEED_SEST	ENCODER_FEED_SEST
ENCODER_FEED_RESET	ENCODER_FEED_RESET
ENCODER_BEND_SEST	ENCODER_BEND_SEST
ENCODER_BEND_RESET	ENCODER_BEND_RESET
PROXIMITY_HEAD_IN	PROXIMITY_HEAD_IN
PROXIMITY_HEAD_LIM	PROXIMITY_HEAD_LIM
PROXIMITY_SHEAR_HOME	PROXIMITY_SHEAR_HOME
PROXIMITY_SHEAR_CUT	PROXIMITY_SHEAR_CUT
PROXIMITY_TOOL_IN	PROXIMITY_TOOL_IN
PROXIMITY_TOOL_OUT	PROXIMITY_TOOL_OUT
SHEAR_BUTTON	SHEAR_BUTTON
PROXIMITY_HEAD_LIM	PROXIMITY_HEAD_LIM
PROXIMITY_HEAD_CW	PROXIMITY_HEAD_CW
PROXIMITY_HEAD_CCW	PROXIMITY_HEAD_CCW
AUTO_BUTTON	AUTO_BUTTON
ESTOP	ESTOP
FUSE	FUSE

File: signal-processing.kicad_sch

ENCODER_FEED_SET	SHEAR_CUTO
ENCODER_FEED_RESET	SHEAR_HOME_D
ENCODER_BEND_SET	TOOL_OUT
ENCODER_BEND_RESET	TOOL_IN
PROXIMITY_HEAD_OUT	FEED_FORWARD
PROXIMITY_HEAD_IN	FEED_REVERSE_D
PROXIMITY_SHEAR_HOME	HEAD_CWD
PROXIMITY_SHEAR_CUT	HEAD_CWD_D
PROXIMITY_TOOL_IN	HEAD_OUT
PROXIMITY_TOOL_OUT	HEAD_IN
SHEAR_BUTTON	
PROXIMITY_HEAD_LIM	
PROXIMITY_HEAD_CW	
PROXIMITY_HEAD_CCW	
AUTO_BUTTON	
ESTOP	
FUSE	

➤ HMI_RXD

- SHEAR_CUT
- SHEAR_HOME
- TOOL_OUT
- TOOL_IN
- FEED_FORWARD
- FEED_REVERSE
- HEAD_CW
- HEAD_CCW
- HEAD_OUT
- HEAD_IN
- FUSED_GND
- VUSB-FUSED
- SBC-USB2-D+
- SBC-USB2-D-
- ATMEGA16U2-D-
- ATMEGA16U2-D+

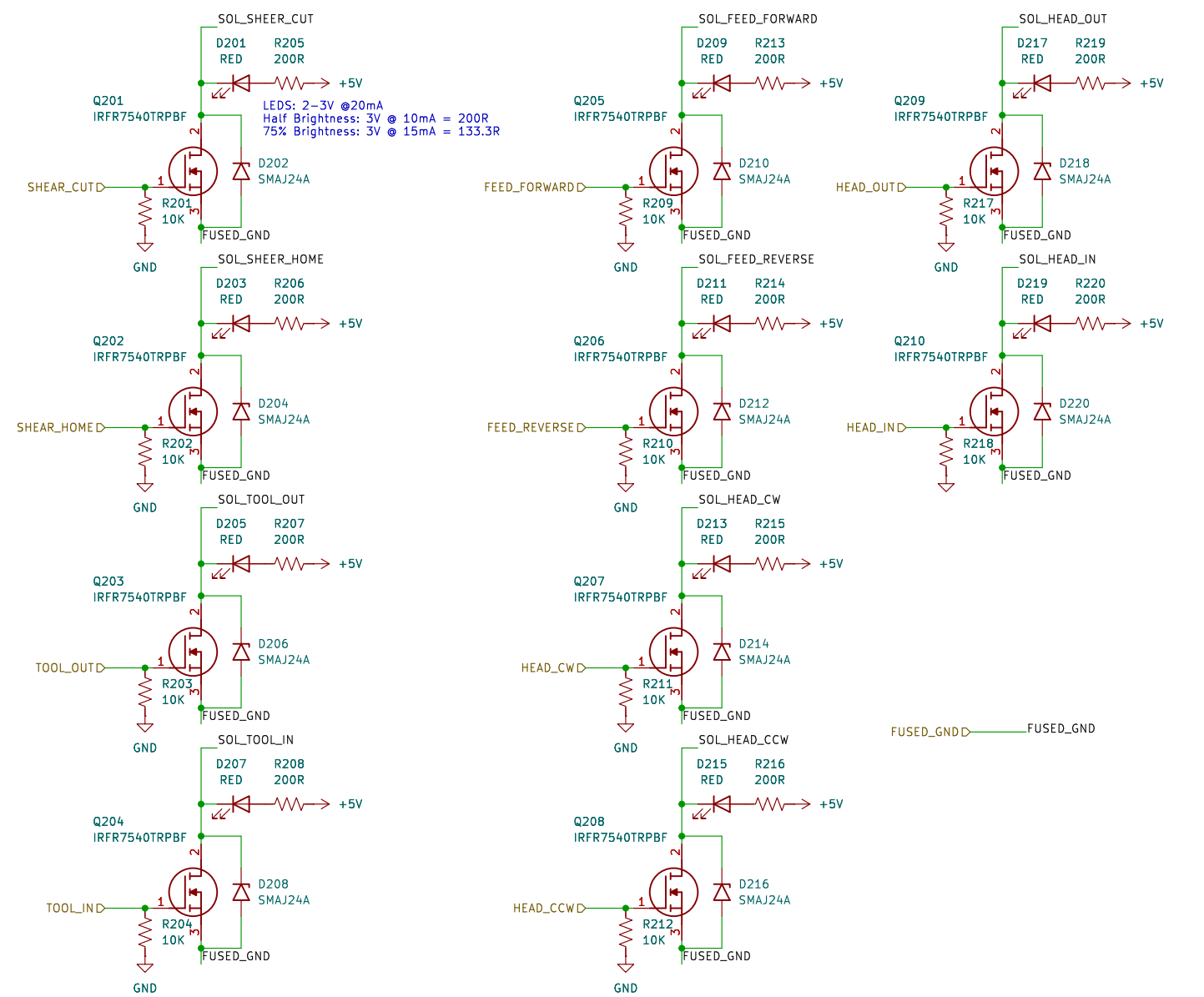
- QATSAM3X8E-RESET
- QUART5_TX
- QUART5_RX
- QTWI0_SCL/UART2_TX
- QTWI0_SDA/UART2_RX
- QSPI1_CS0
- QSPI1_CLK
- QSPI1_MISO
- QSPI1_MOSI

File: pi-zero-w2.kicad_sch

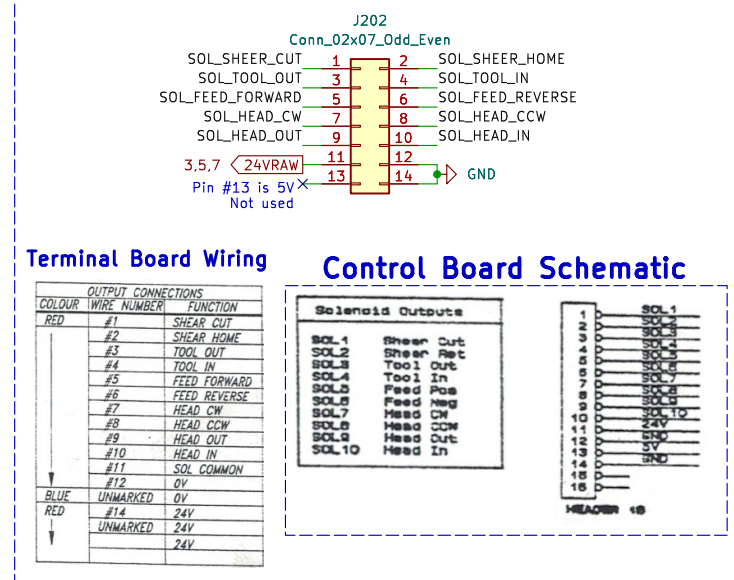
The diagram shows a 4-pin header with pins labeled H101, H102, H103, and H104. Each pin is connected to a GND symbol. The pins are arranged in two columns: H101 and H102 on the left, and H103 and H104 on the right. Each pin is labeled with its identifier and the text "MountingHole_Pad".

[illegible]

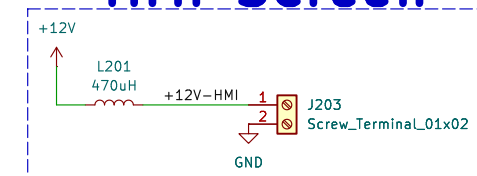
Solenoid MOSFETs



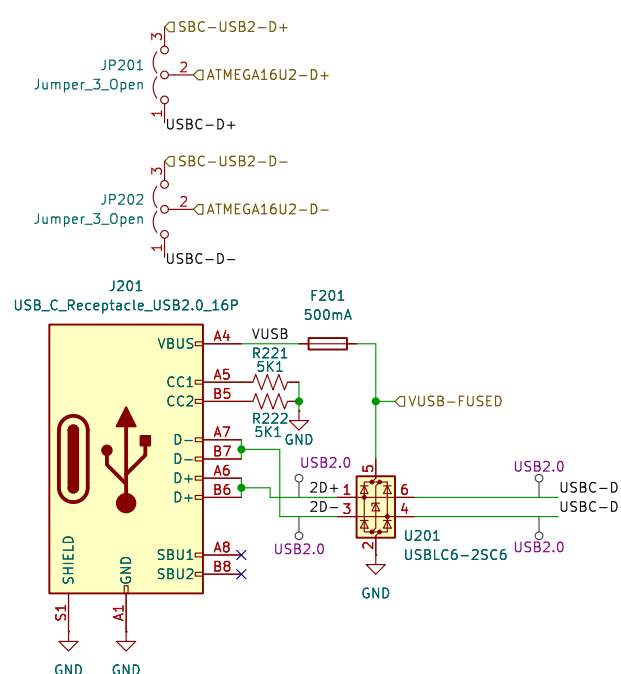
MEP MAXI



HMI Screen



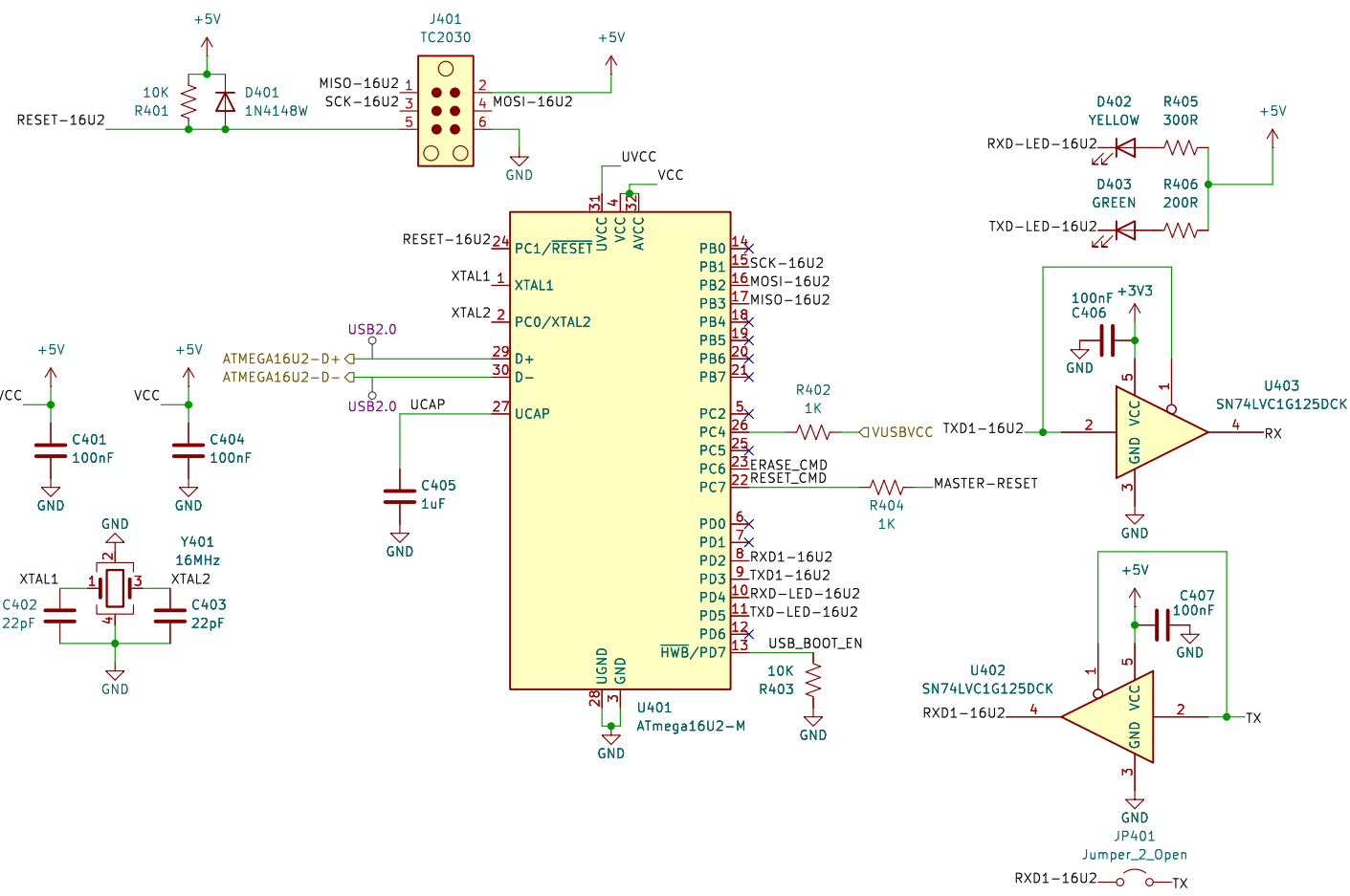
ATMEGA16U2 USBC & SELECTOR



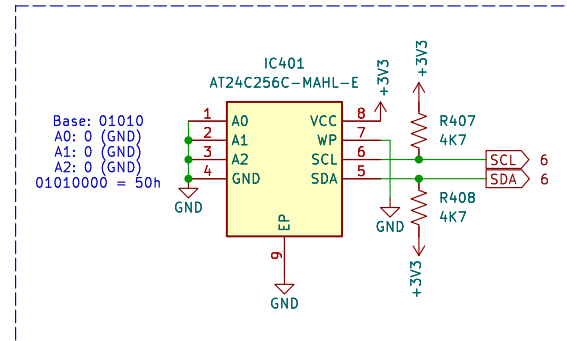
LEDs: 2-3V @20mA
Half Brightness: 3V @ 10mA = 30R
Half Brightness: 5V @ 10mA = 200R
Half Brightness: 12V @ 10mA = 900R
Half Brightness: 24V @ 10mA = 2100R



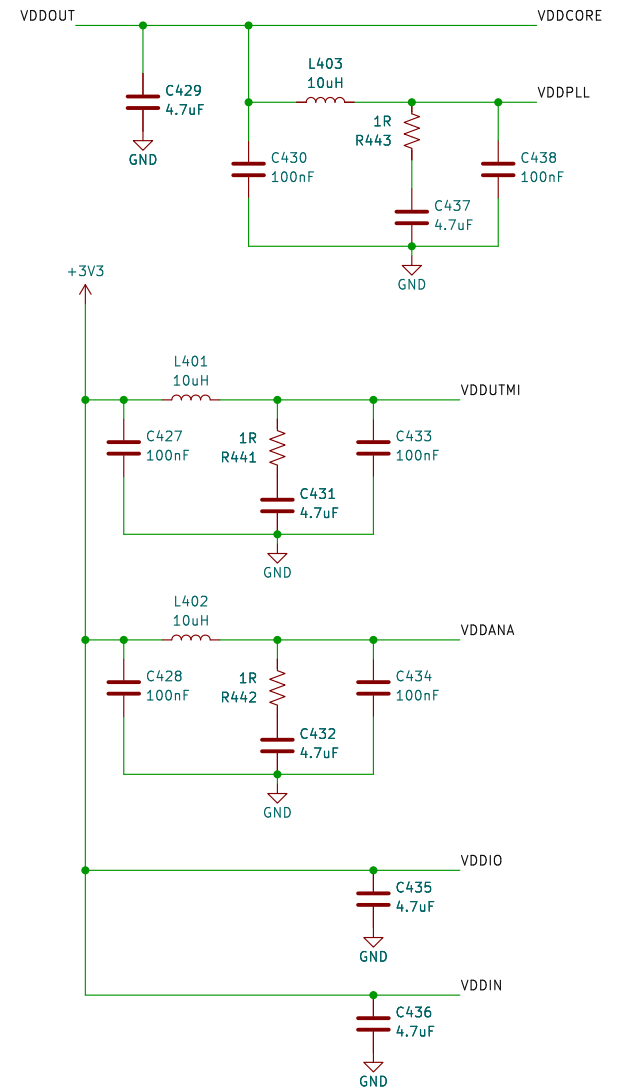
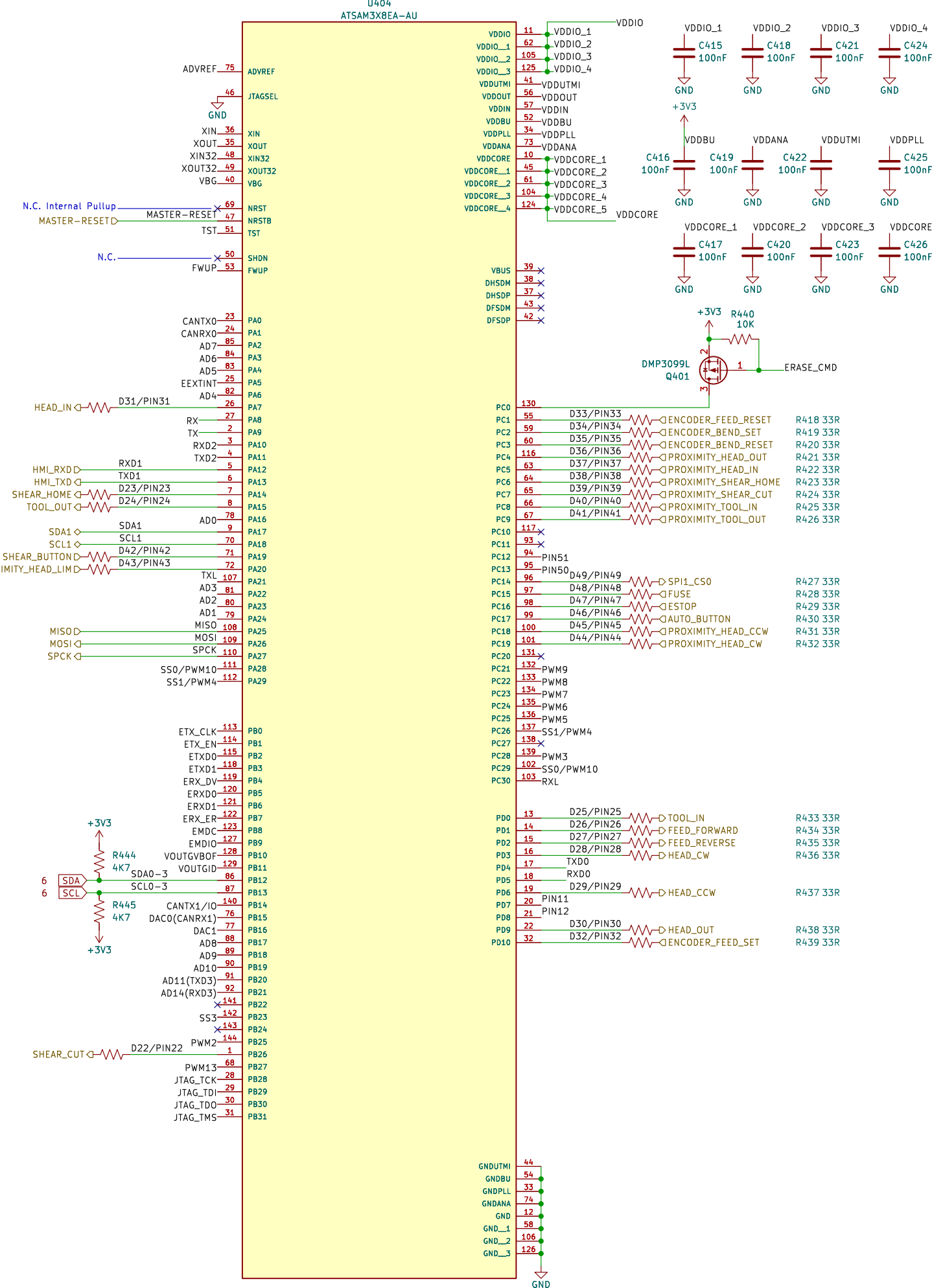
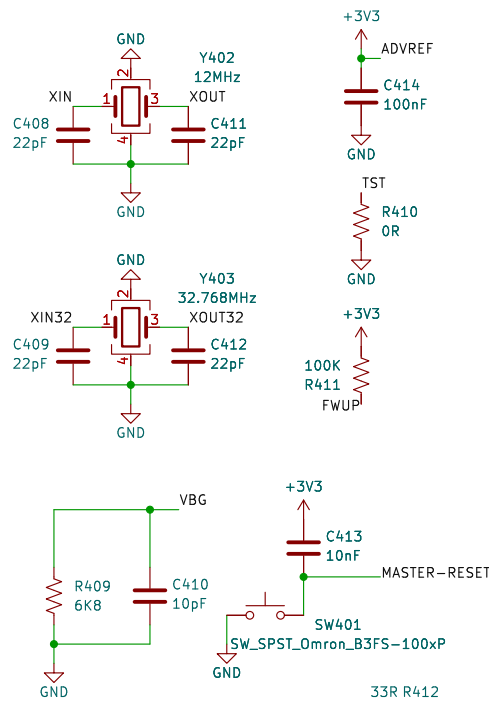
ATMEGA16U2



I2C EEPROM



ATMEL SAM3X8



Pin Description

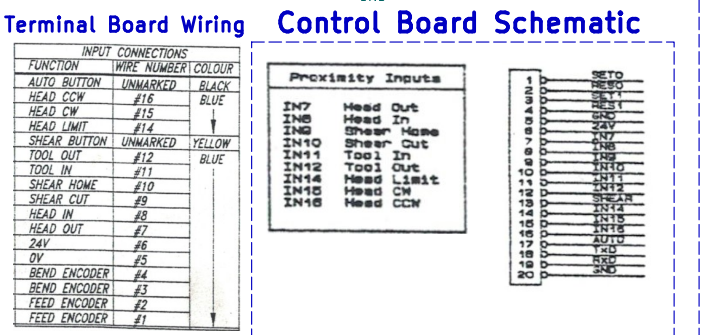
Pin#	I/O	Description
D22/PB26	O	SHEAR_CUT
D23/PA14	O	SHEAR_HOME
D24/PA15	O	TOOL_OUT
D25/PD0	O	TOOL_IN
D26/PD1	O	FEED_FORWARD
D27/PD2	O	FEED_REVERSE
D28/PD3	O	HEAD_CW
D29/PD6	O	HEAD_CCW
D30/PD9	O	HEAD_OUT
D31/PA7	O	HEAD_IN
D32/PD10	I	ENCODER_FEED_SET
D33/PC1	I	ENCODER_FEED_RESET
D34/PC2	I	ENCODER_BEND_SET
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

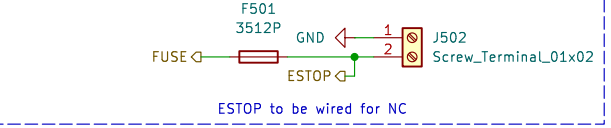
J501
Conn_02x10_Odd_Even

Signal	Pin	Signal	Pin
ENCODER_FEED_SET	1	ENCODER_FEED_RESET	2
ENCODER_BEND_SET	3	ENCODER_BEND_RESET	4
GND	5	GND	6
PROXIMITY_HEAD_OUT	7	PROXIMITY_HEAD_IN	8
PROXIMITY_SHEAR_HOM	9	PROXIMITY_SHEAR_CUT	10
PROXIMITY_TOOL_IN	11	PROXIMITY_TOOL_OUT	12
SHEAR_BUTTON	13	PROXIMITY_HEAD_LIM	14
PROXIMITY_HEAD_CCW	15	PROXIMITY_HEAD_CCW	16
AUTO_BUTTON	17		18
	19		20

GND



ESTOP to be wired for NC



[illegible]

Pinout diagram for J605 connector:

- Pin 1: GND
- Pin 2: USB3-D+
- Pin 3: USB3-D-
- Pin 4: Pi-Zero-USB2-D-+
- Pin 5: Pi-Zero-USB2-D-+
- Pin 6: GND
- Pin 7: EPHY-RXN
- Pin 8: EPHY-RXP
- Pin 9: EPHY-TXN
- Pin 10: EPHY-TXP
- Pin 11: GND
- Pin 12: LRADC
- Pin 13: PC15
- Pin 14: PC16
- Pin 15: PH10/IR_RX
- Pin 16: PWRON
- Pin 17: GND
- Pin 18: TV-OUT
- Pin 19: GND
- Pin 20: LINEOUTL
- Pin 21: LINEOUTR
- Pin 22: GND
- Pin 23: GND
- Pin 24: GND

Additional labels and connections:

- Keypad: Pins 1-4
- We don't need this 5V power rail.: Pins 5-8
- We don't need this 3.3V power rail.: Pins 9-13
- Red arrow pointing to Pin 24: S
- Bottom labels: J605, GND, Conn_03x24_MountingPin

J603
Conn_02x05_Odd_Even

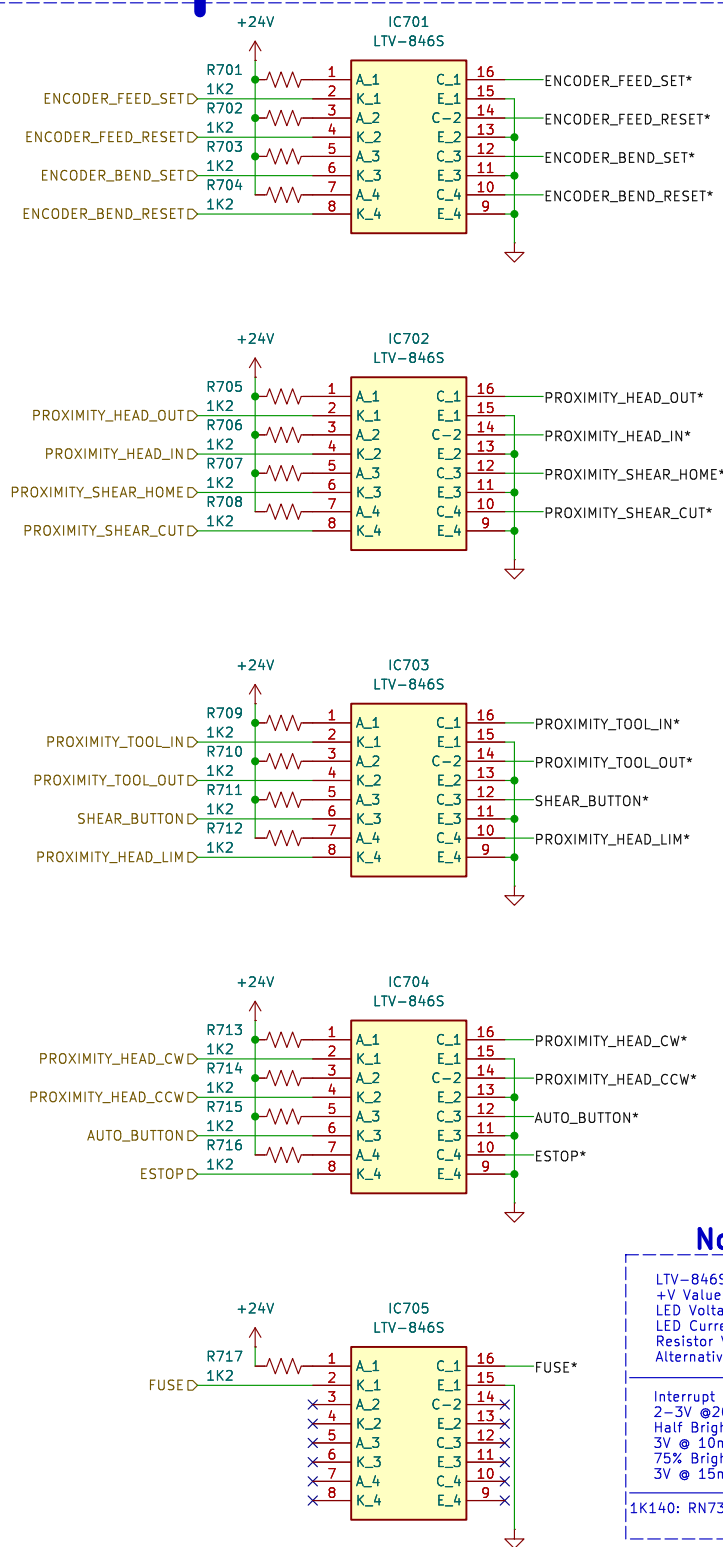
Pin	Signal
1	GND
2	USB3-D-
3	USB3-D+
4	GND
5	TWI2_SDA/UART3_RX
6	TWI2_SCL/UART3_TX
7	GND
8	+5V
9	PWRSW
10	GND

J604
Conn_Coaxial

PWRON — R607 510R — PWRSW — C607 100nF — GND

PWRSW — SW601 SW_SPST_0mron_B3FS-100xP — GND

Optoisolators



Notes

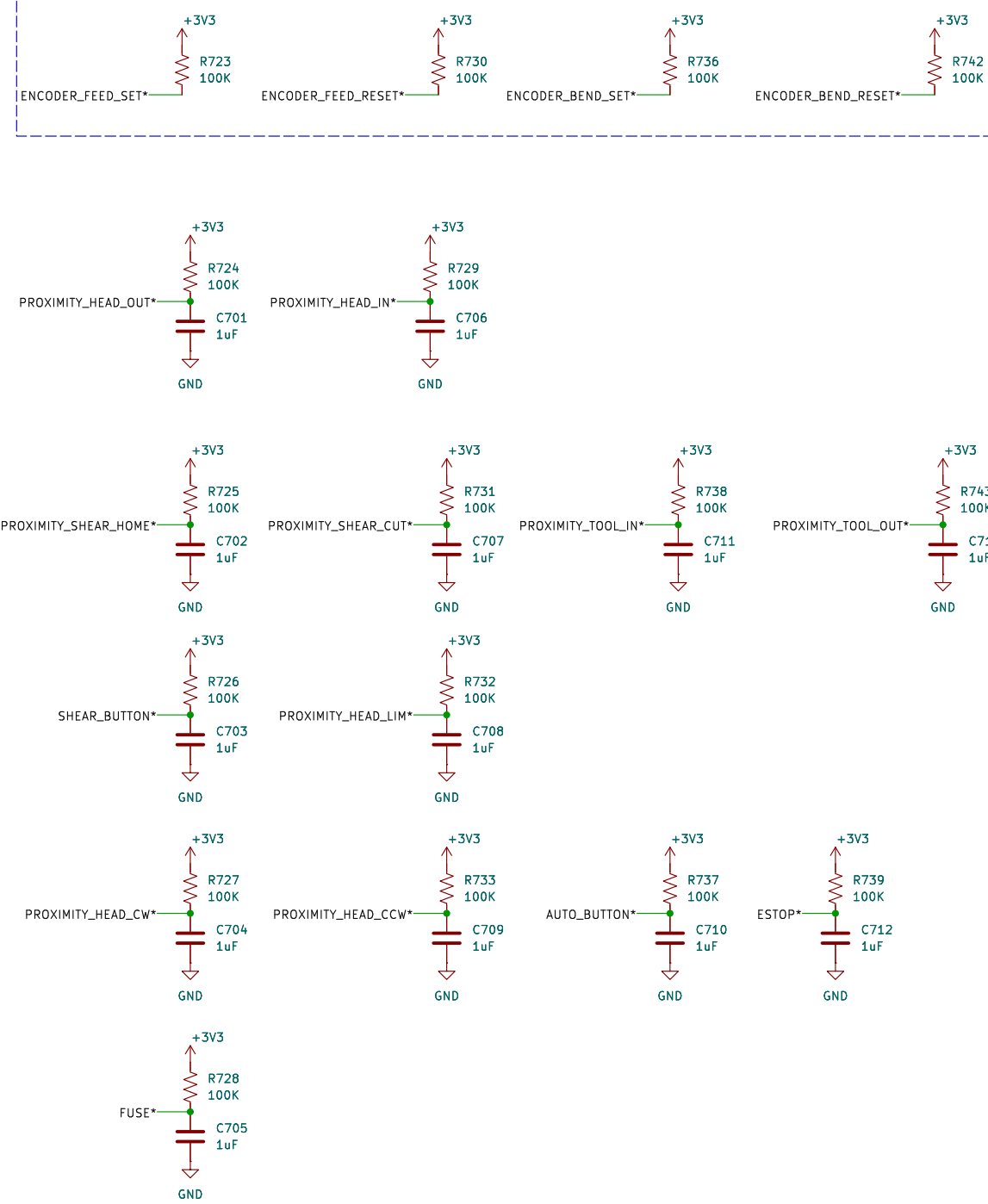
LTV-8465
+V Value: 24V
LED Voltage Drop: 1.2V
LED Current: 20mA
Resistor Value: 1K140
Alternative Value: 1K2

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

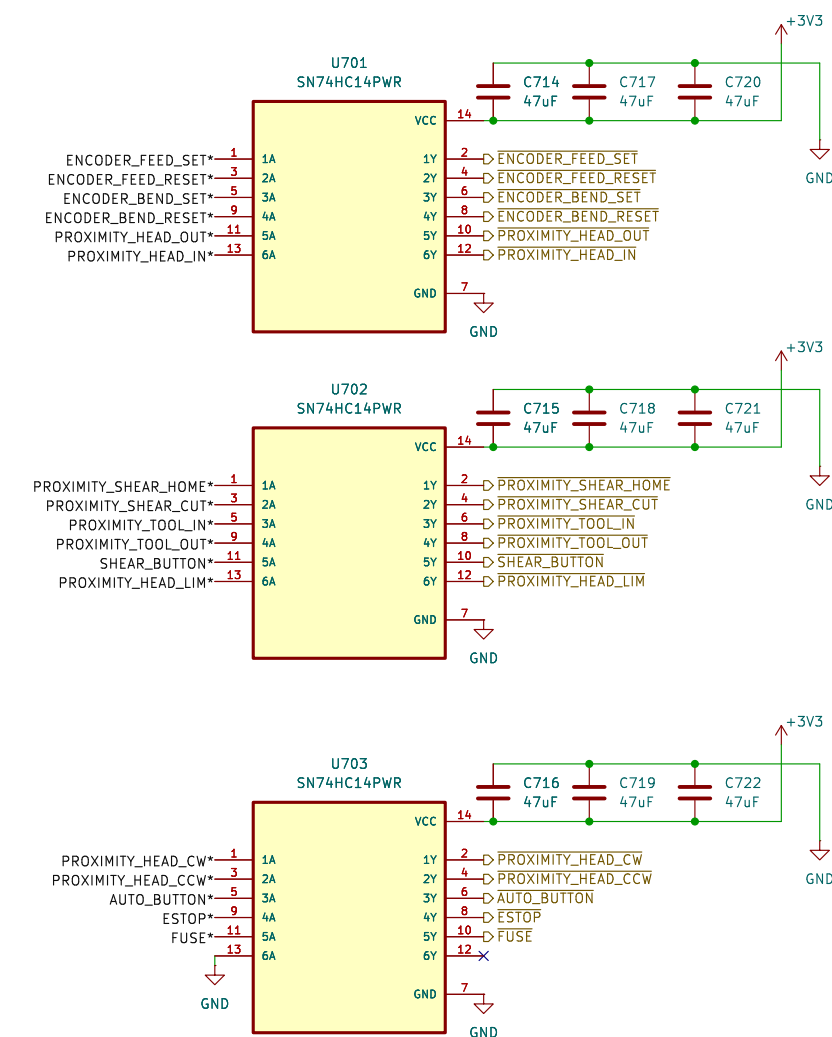
1K140: RN73R2ATD1141025

Delay

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



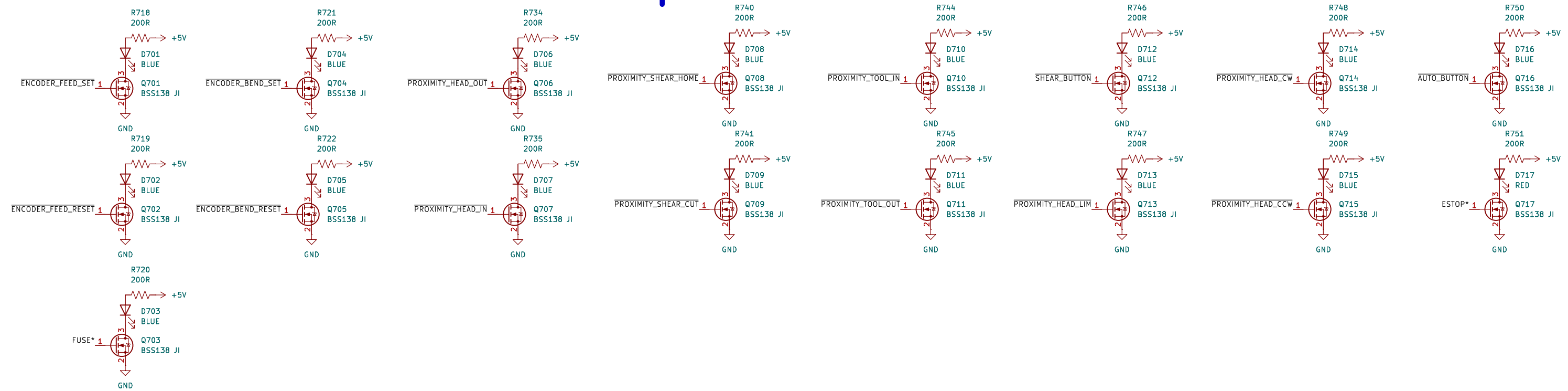
Schmitt Trigger Inverters



Test Points



Interrupt LED Indicators



Hardware: Connor McMillan (connor@mcmillan.website)

Firmware: John Gilcreast (johngilcreast@gmail.com)

McMillan Enterprises

Sheet: /Signal Processing/

File: signal-processing.kicad_sch

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

Size: A2

Date: 2025-05-31

KiCad E.D.A. 9.0.2

Rev: X2

Id: 7/7

