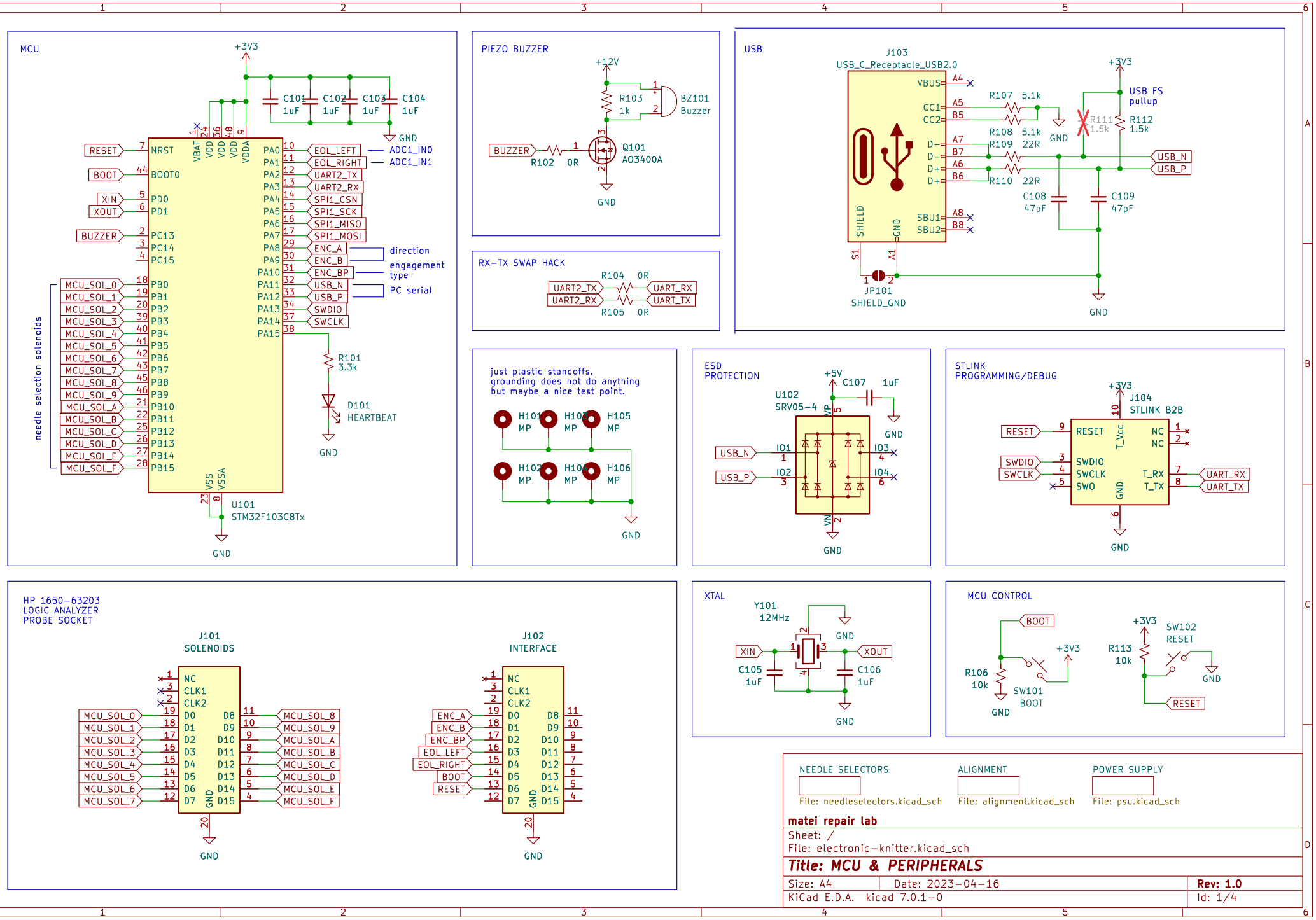
MCU
+3V3
C101 1uF
C102 1uF
C103 1uF
C104 1uF
GND
RESET
BOOT
XIN
XOUT
BUZZER
NRST
BOOT0
PD0
PD1
PC13
PC14
PC15
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
EOL_LEFT
EOL_RIGHT
UART2_TX
UART2_RX
SPI1_CSN
SPI1_SCK
SPI1_MISO
SPI1_MOSI
ENC_A
ENC_B
ENC_BP
USB_N
USB_P
SWDIO
SWCLK
ADC1_IN0
ADC1_IN1
direction
engagement type
PC serial
needle selection solenoids
MCU_SOL_0
MCU_SOL_1
MCU_SOL_2
MCU_SOL_3
MCU_SOL_4
MCU_SOL_5
MCU_SOL_6
MCU_SOL_7
MCU_SOL_8
MCU_SOL_9
MCU_SOL_A
MCU_SOL_B
MCU_SOL_C
MCU_SOL_D
MCU_SOL_E
MCU_SOL_F
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PB8
PB9
PB10
PB11
PB12
PB13
PB14
PB15
VBAT
VDD
VDD
VDD
VDDA
VSS
VSSA
R101 3.3k
D101 HEARTBEAT
U101 STM32F103C8Tx
PIEZO BUZZER
+12V
R103 1k
BZ101 Buzzer
BUZZER
R102 0R
Q101 AO3400A
RX–TX SWAP HACK
R104 0R
R105 0R
UART2_TX
UART2_RX
UART_RX
UART_TX
USB
J103 USB_C_Receptacle_USB2.0
VBUS
CC1
CC2
D–
D–
D+
D+
SHIELD
GND
SBU1
SBU2
A4
A5
B5
A7
B7
A6
B6
A8
B8
S1
A1
R107 5.1k
R108 5.1k
R109 22R
R110 22R
R111 1.5k
R112 1.5k
USB FS pullup
C108 47pF
C109 47pF
JP101 SHIELD_GND
just plastic standoffs.
grounding does not do anything
but maybe a nice test point.
H101 MP
H102 MP
H103 MP
H104 MP
H105 MP
H106 MP
ESD PROTECTION
U102 SRV05-4
+5V
C107 1uF
VP
VN
IO1
IO2
IO3
IO4
STLINK PROGRAMMING/DEBUG
J104 STLINK B2B
RESET
SWDIO
SWCLK
SWO
T_Vcc
T_RX
T_TX
NC
HP 1650–63203 LOGIC ANALYZER PROBE SOCKET
J101 SOLENOIDS
J102 INTERFACE
NC
CLK1
CLK2
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
XTAL
Y101 12MHz
C105 1uF
C106 1uF
MCU CONTROL
BOOT
SW101 BOOT
R106 10k
R113 10k
SW102 RESET
NEEDLE SELECTORS
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POWER SUPPLY
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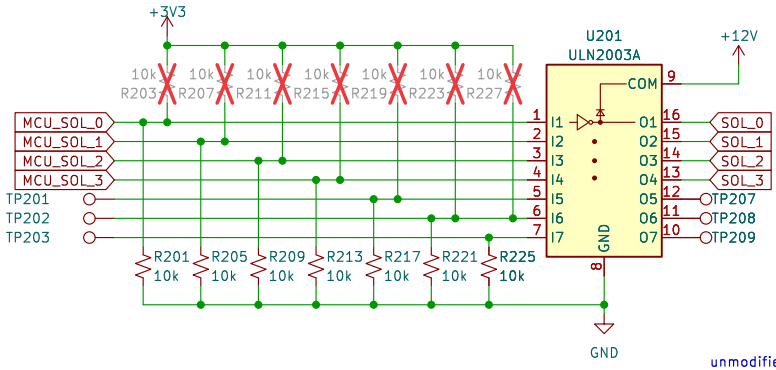
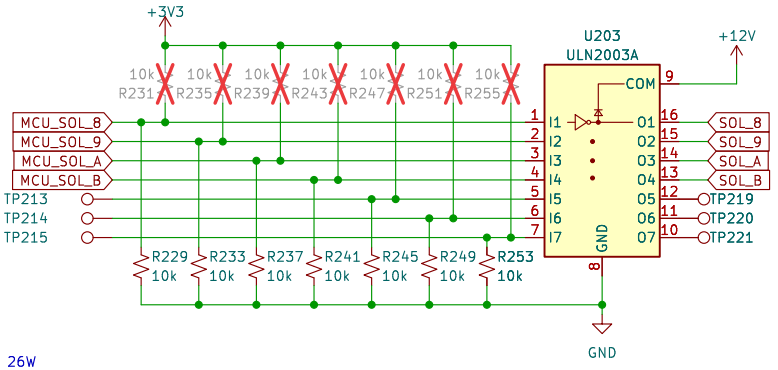
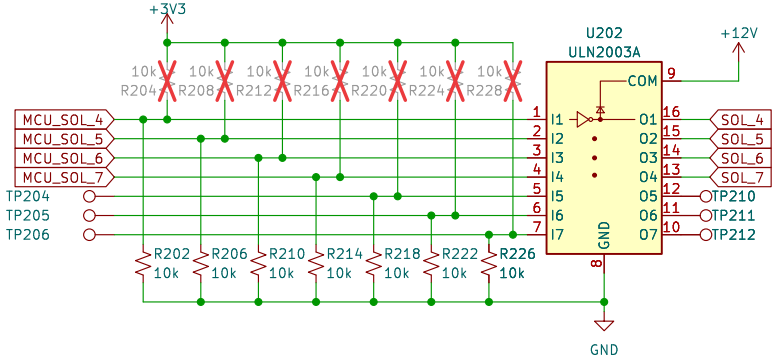
SOLENOID DRIVERS

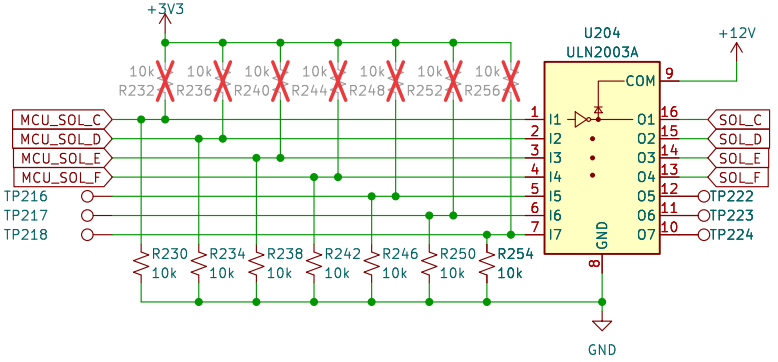




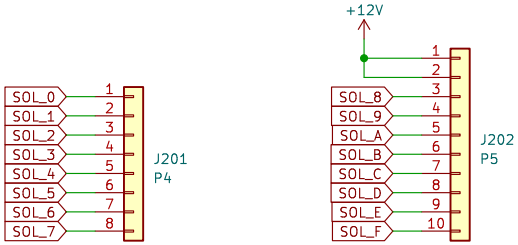
unmodified machine is 26W
assuming all power is
used by solenoids = 130mA each

ULN2003A dissipation is 500mA





SOLENOID
CONNCECTORS



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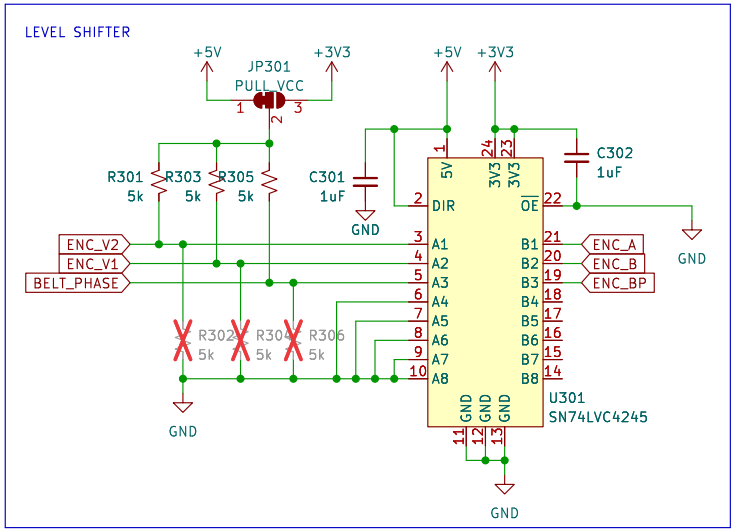

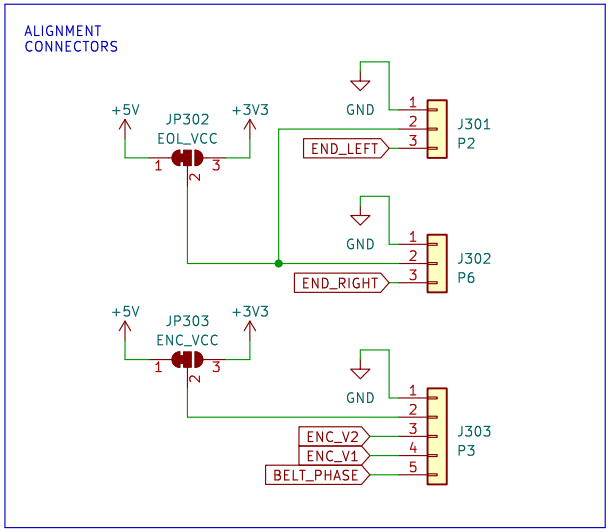

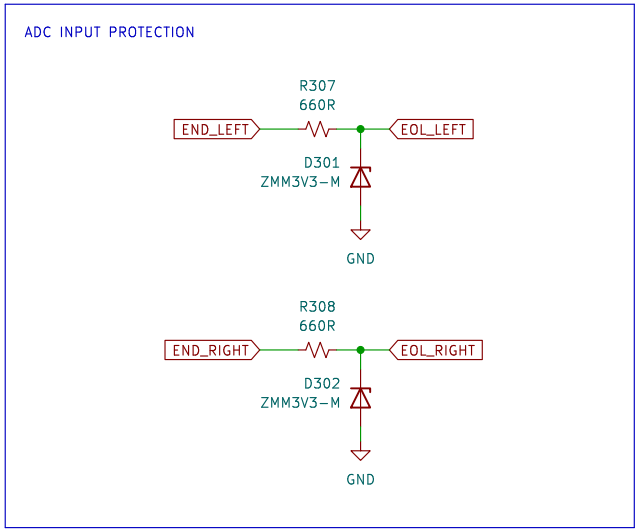

5.4 Encoder PC Board

The encoder PC board emits signals required in the detection of the direction and amount of carriage movement and in solenoid selection. It is connected to the main PC board by a connector (S3).

The V1 (Pin 4 of S3), V2 (Pin 3 of S3), and BP (Pin 5 of S3) signals are configured as shown in figure 5-3 below:

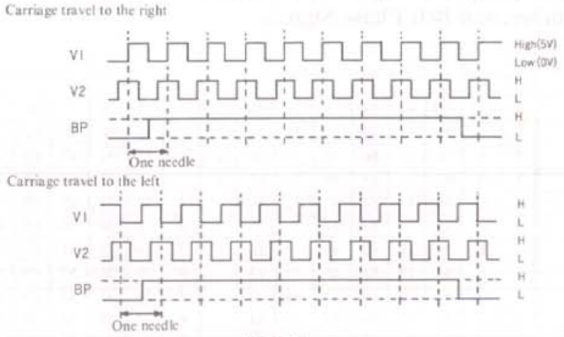

Figure 5-3

The amount and direction of movement of the carriage are detected via the V1 and V2 signals, and the type of engagement between the belt and the carriage is detected via the BP signal (Belt phase signal). There are two types of engagement, discriminated between by sensing whether the BP signal is high or low when the carriage passes the position sensor.

5.3 Left Position Sensor PC Board and Right Position Sensor PC Board

The left and right position sensor PC boards are what send out the carriage position signal. It is connected to the main PC board by a connector (S2, S6).

The position sensor signal (pin 3 of S2, S6) is normally DC 1.6 - 1.8V, but when the K carriage sensor magnet approaches the position sensor, it becomes DC 3.5V or more, and less than DC 0.7V when the L carriage approaches. When G carriage sensor magnet approaches, it begins at DC 0.7V and thereafter immediately changes to DC 3.2V or more. It is by these changes in voltage that the computer is able to determine which carriage has passed by (refer to Fig. 5-2).

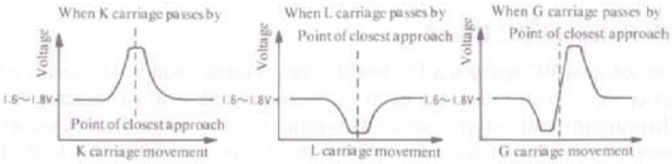

Figure 5-2

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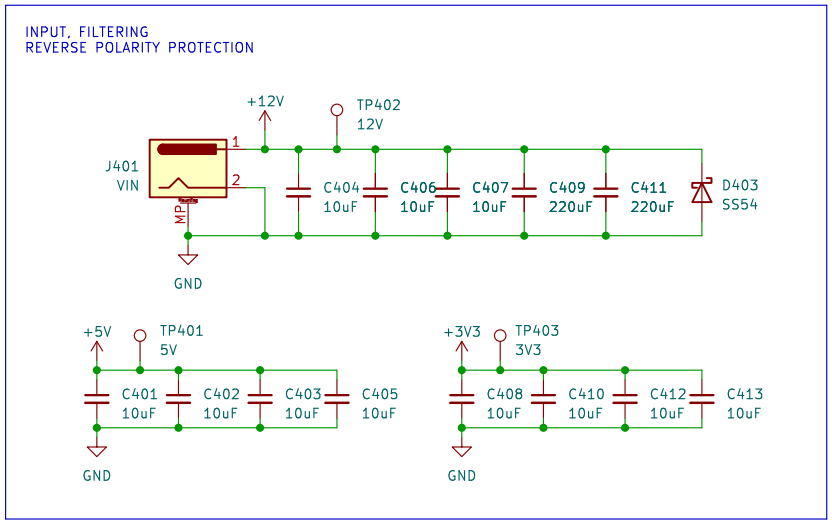

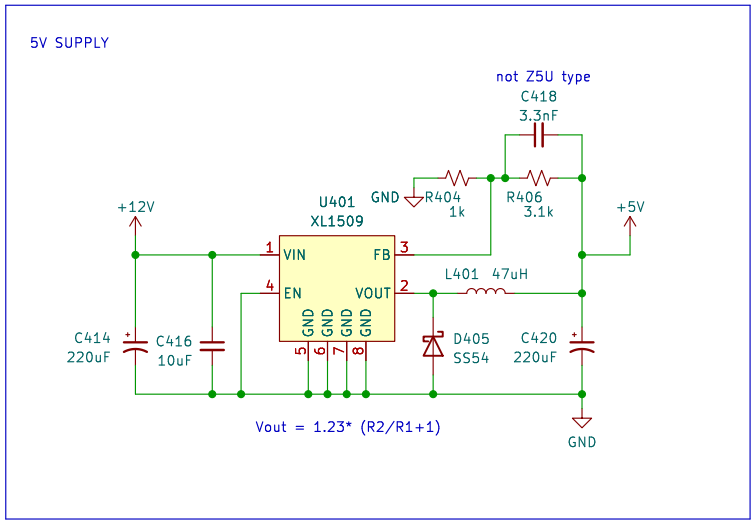

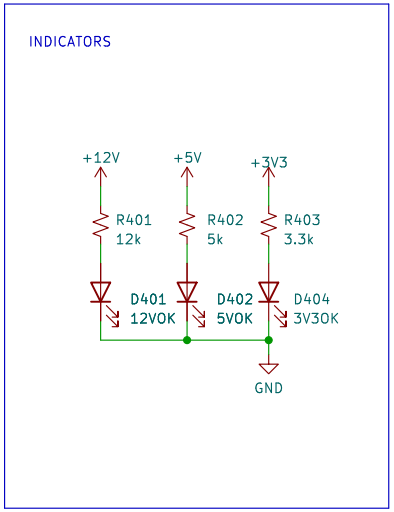

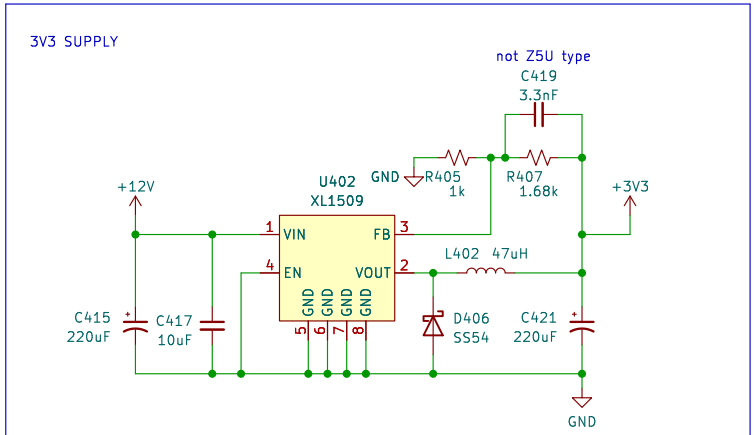

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