

# Sienci Longboard 32-bit CNC Controller

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Sienci CNC Controller  
Block\_diagram.SchDocSienci CNC Controller  
Board\_Diagram.SchDoc

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## Mechanical



**ZZ1**  
Assembly Note  
These assemblies are ESD sensitive, ESD precautions shall be observed.

**ZZ2**  
Assembly Note  
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

**ZZ3**  
Assembly Note  
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.

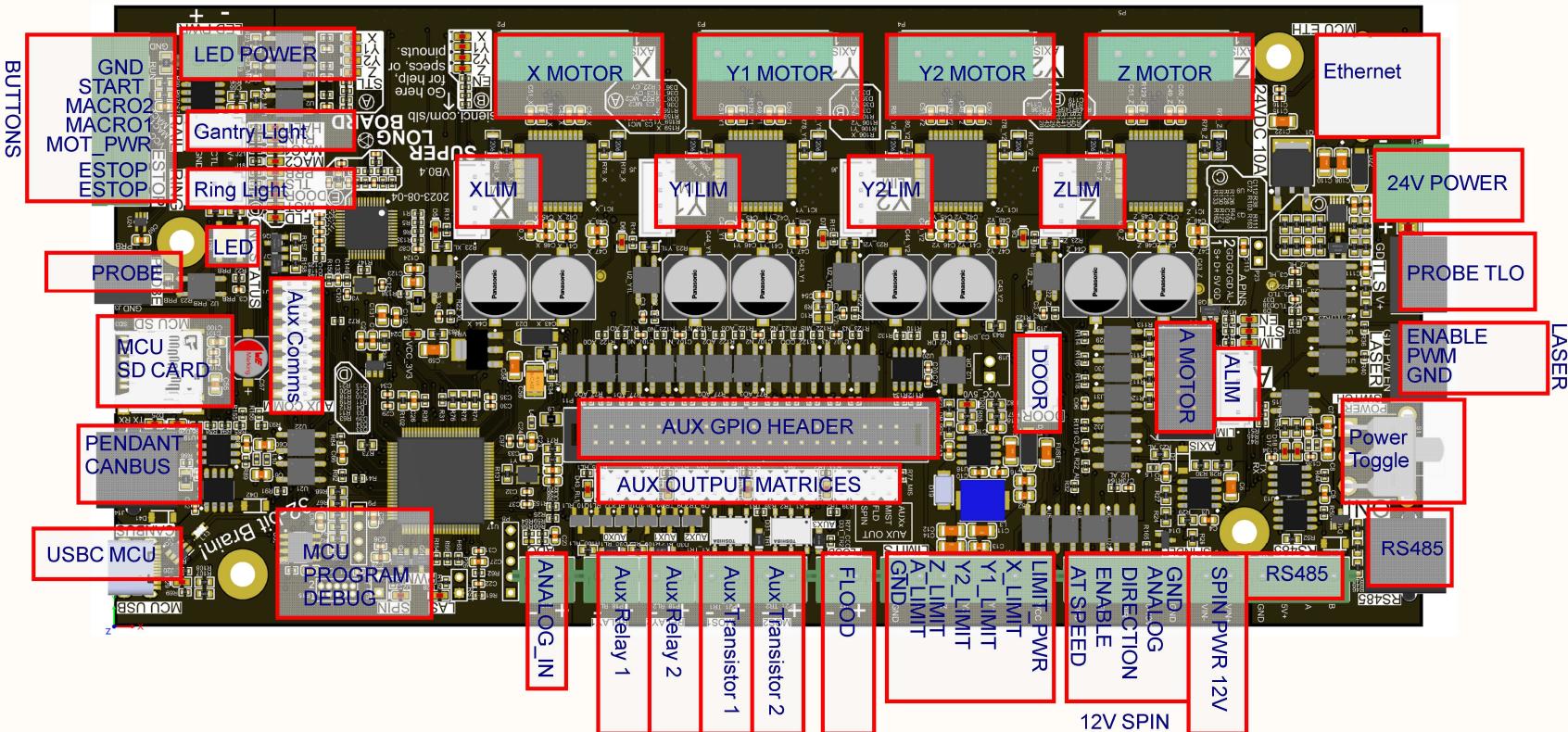
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PO Box 2084  
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PHONE: (778) 238-9336  
EMAIL: info@expatria.ca

SHEET Title Sheet		
PROJECT	REV	
Longboard_32bit.PriPCB	B6.1	
ENGR	DOCUMENT	
AM	Title Sheet.SchDoc	
SIZE	MODIFIED	SHEET
B	2024-01-302:03:55 PM	1 / 26

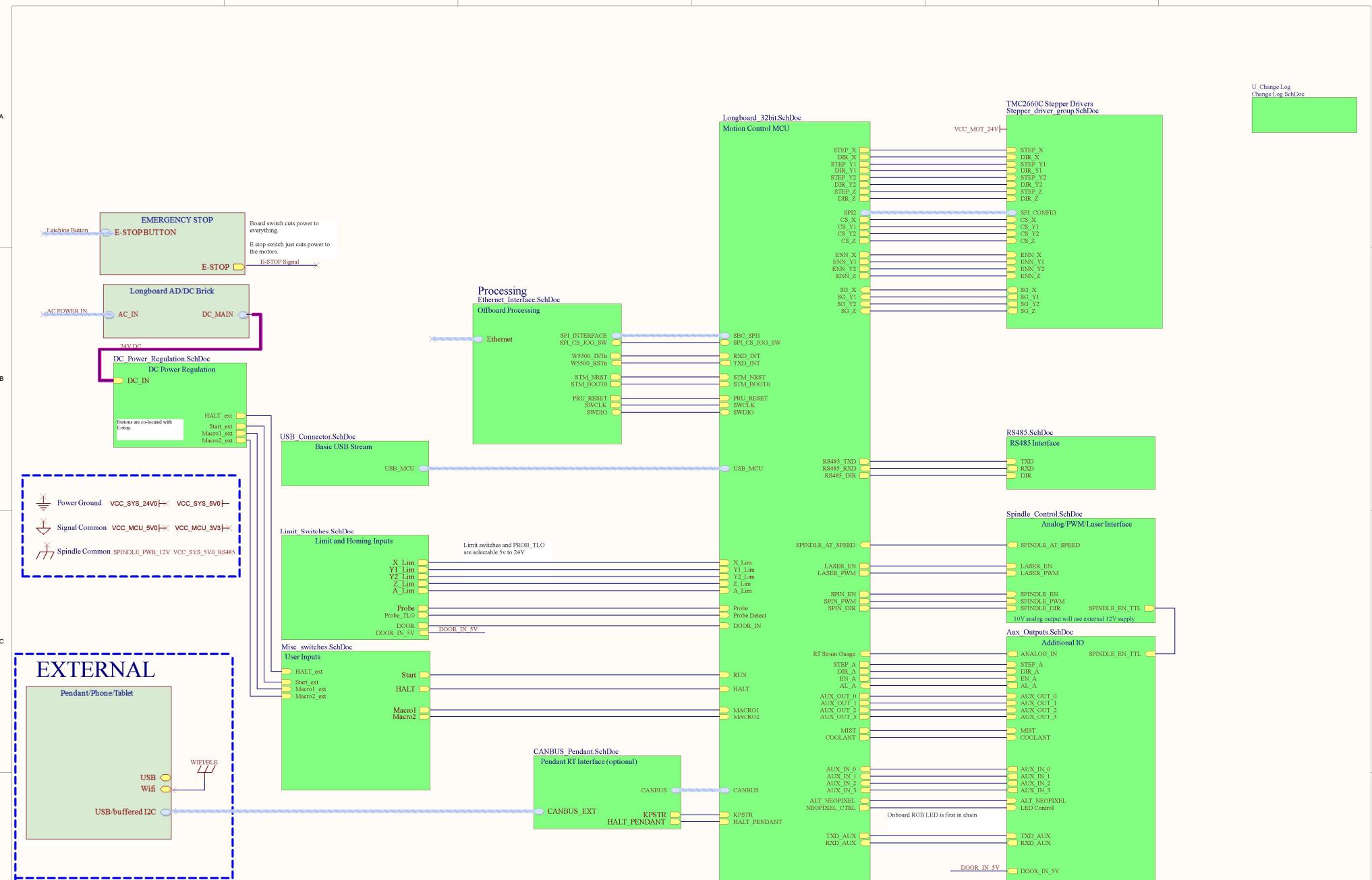
# Sienci Longboard 32-bit CNC Controller



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Board Diagram		REV
PROJECT	DOCUMENT	B6.1
ENGR	SIZE	
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AM	B	
Board_Diagram.SchDoc		
	MODIFIED	2024-01-30 03:55 PM
	SHEET	2 / 26



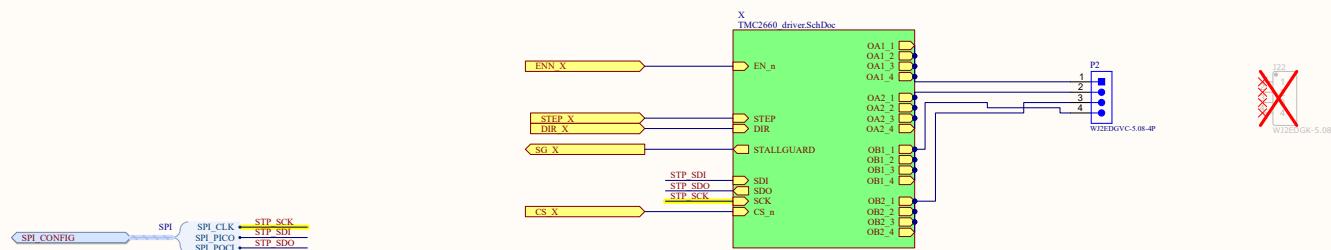
<https://resources.senci.com/view/lmk2-longboard-details/>

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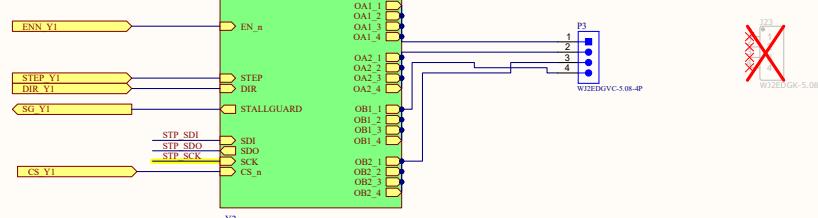
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Longboard\_32bit.PriPCB  
ENR-DOCUMENT  
AM-Block\_diagram.SchDoc  
ED-Block\_diagram.Pcb  
C-2024-01-30T03:56:PM

BLOCK DIAGRAM	
PROJECT PO Box 2000 Munich BC V8 1B1 PHONE: (778) 238-8336 EMAIL: info@expatia.ca	REV B6.1 ENR-DOCUMENT AM-Block_diagram.SchDoc ED-Block_diagram.Pcb C-2024-01-30T03:56:PM SHEET 3 / 26

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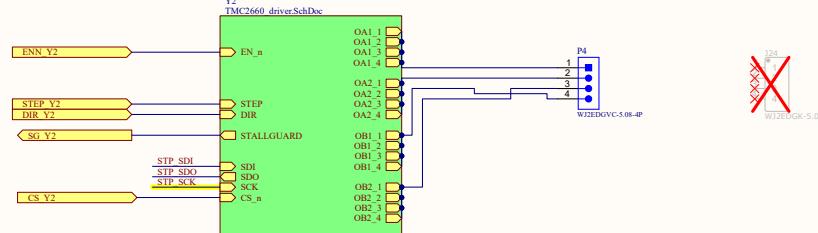


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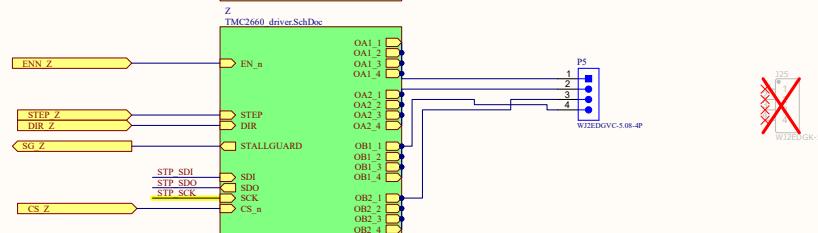
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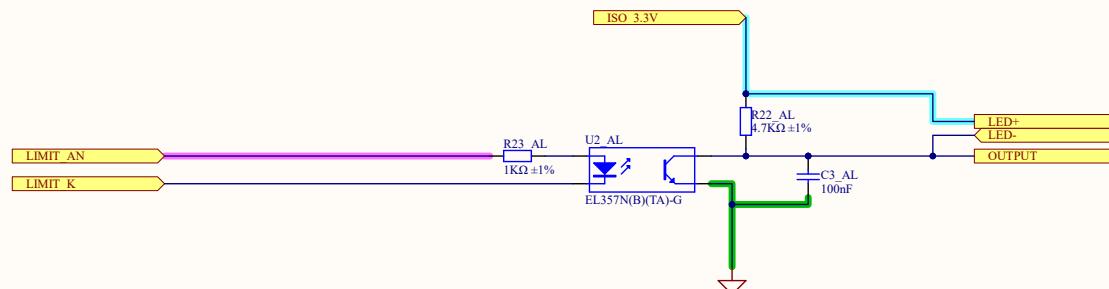
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SHEET Coupler 12V input		REV B6.1
PROJECT	Longboard 32bit.PriPCB	REV
ENGR	DOCUMENT	
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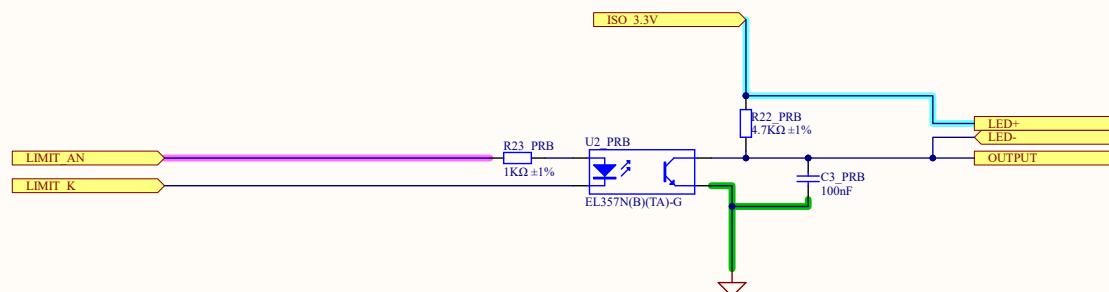
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SHEET Coupler 12V input		
PROJECT	REV	
Longboard 32bit.PriPCB	B6.1	
ENGR	DOCUMENT	
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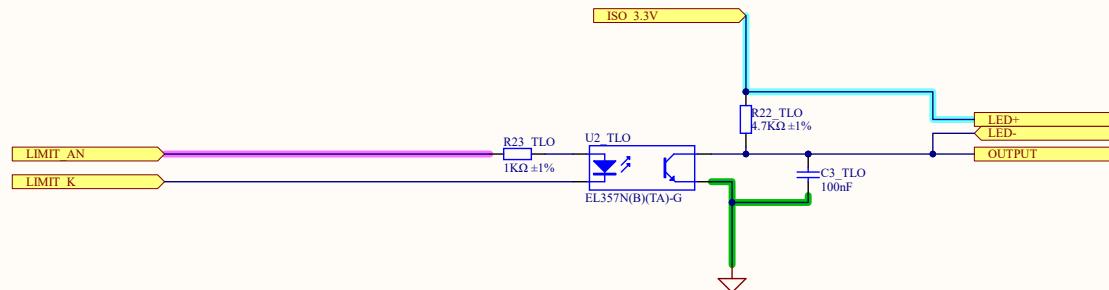
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SHEET Coupler 12V input		
PROJECT	REV	
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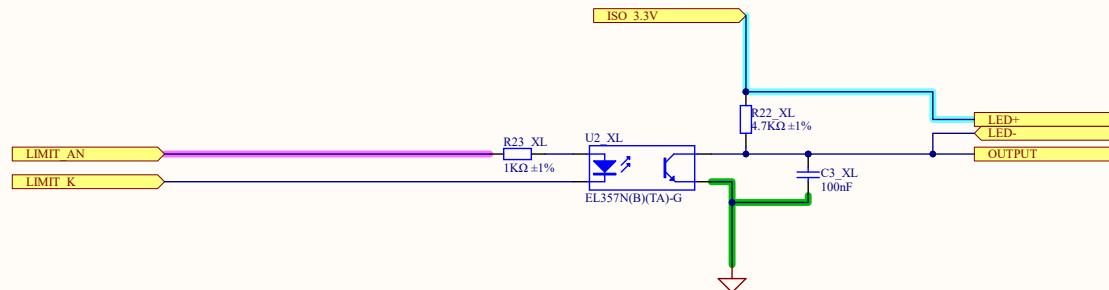
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SHEET Coupler 12V input		REV B6.1
PROJECT	Longboard 32bit.PriPCB	REV
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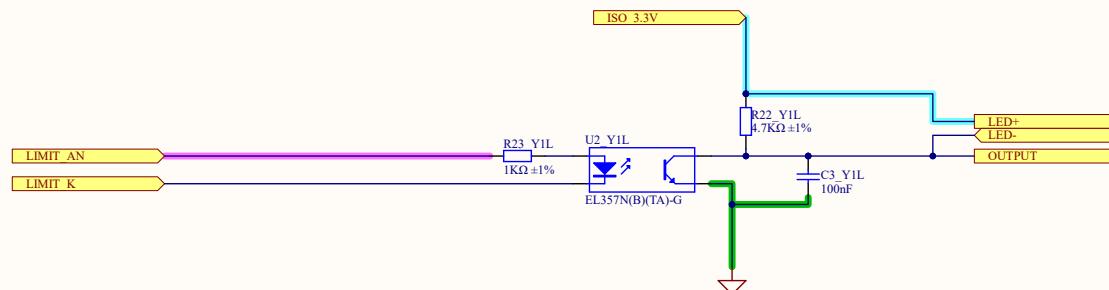
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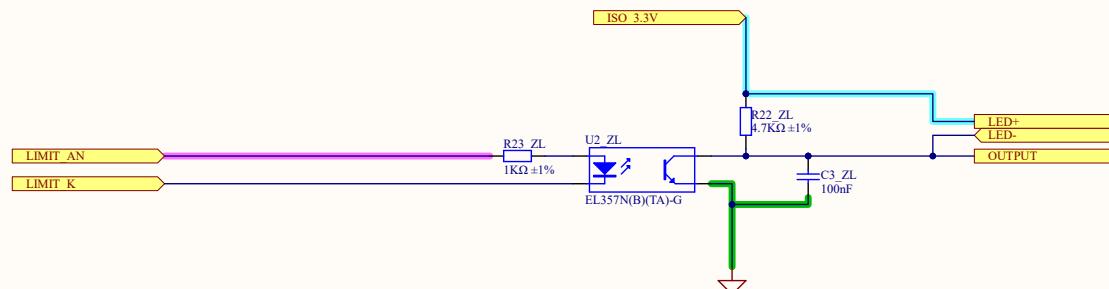
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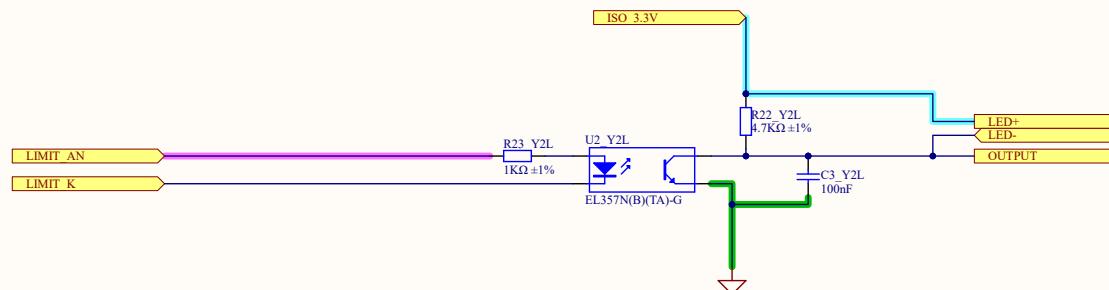
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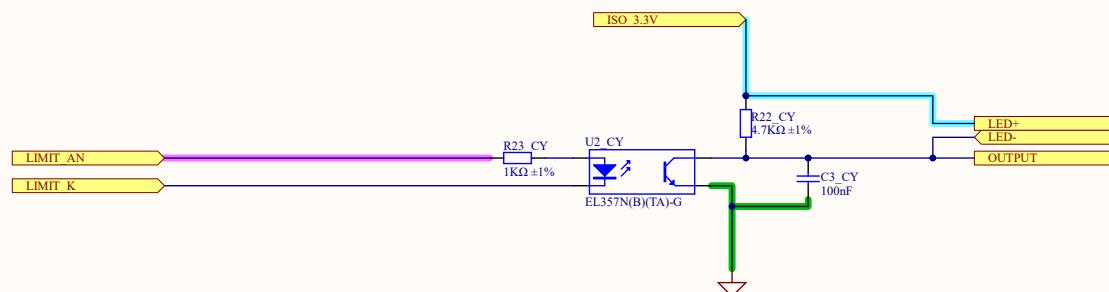
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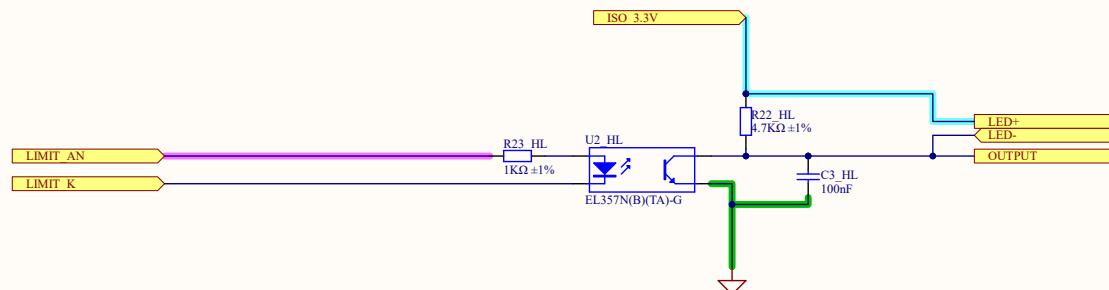
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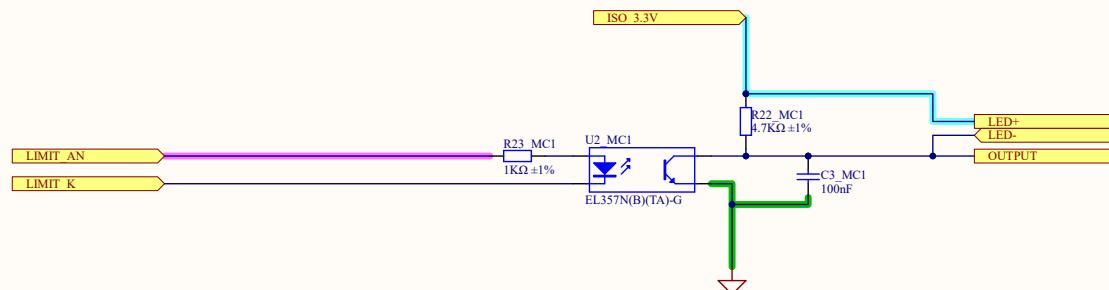
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SHEET Coupler 12V input		
PROJECT	REV	
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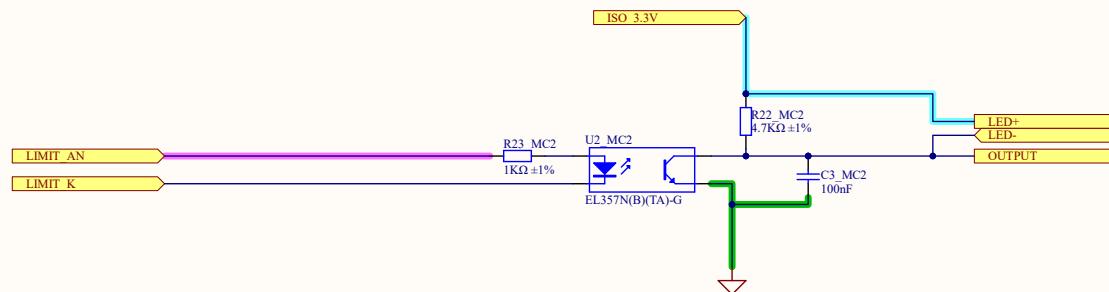
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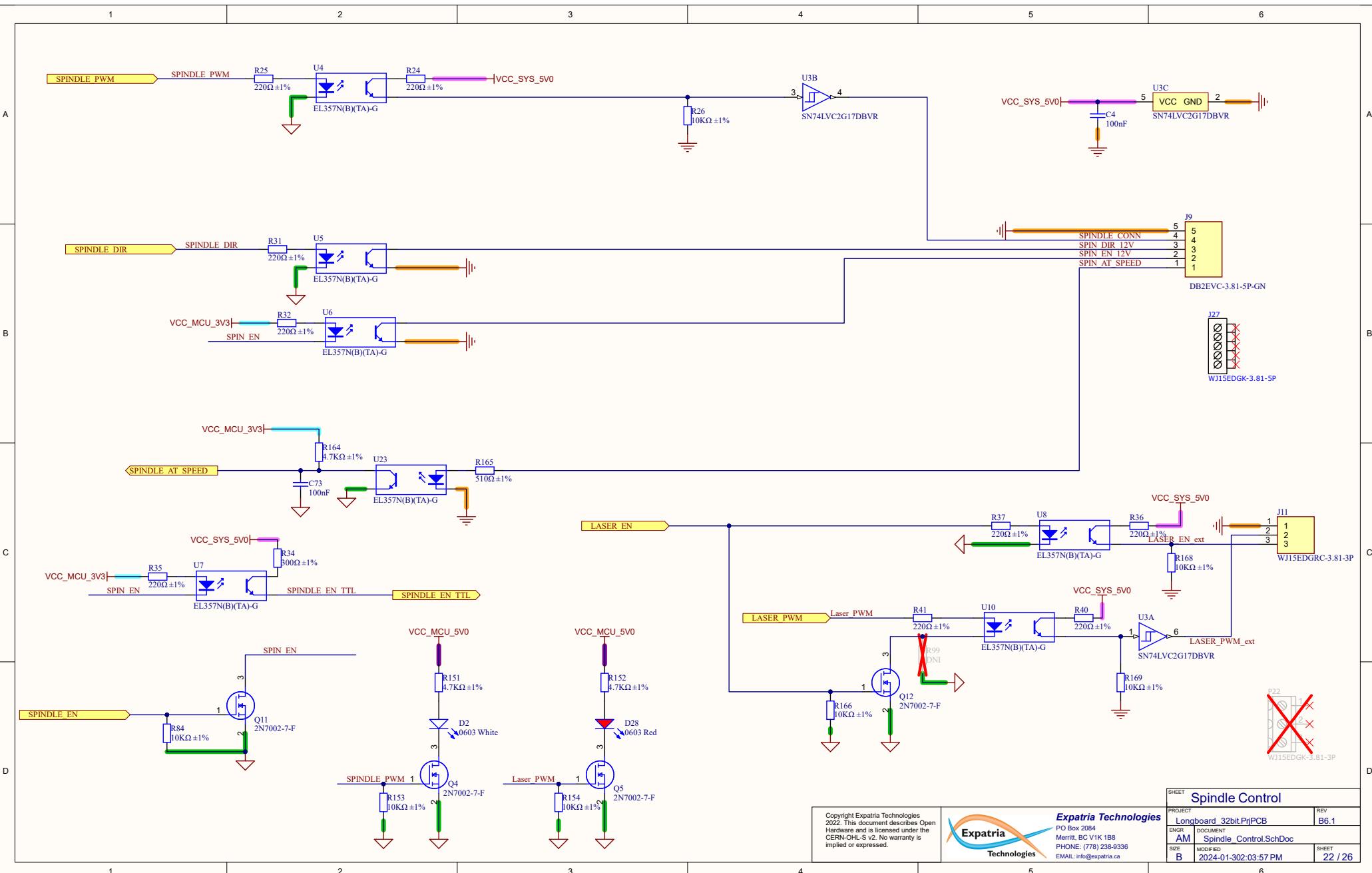
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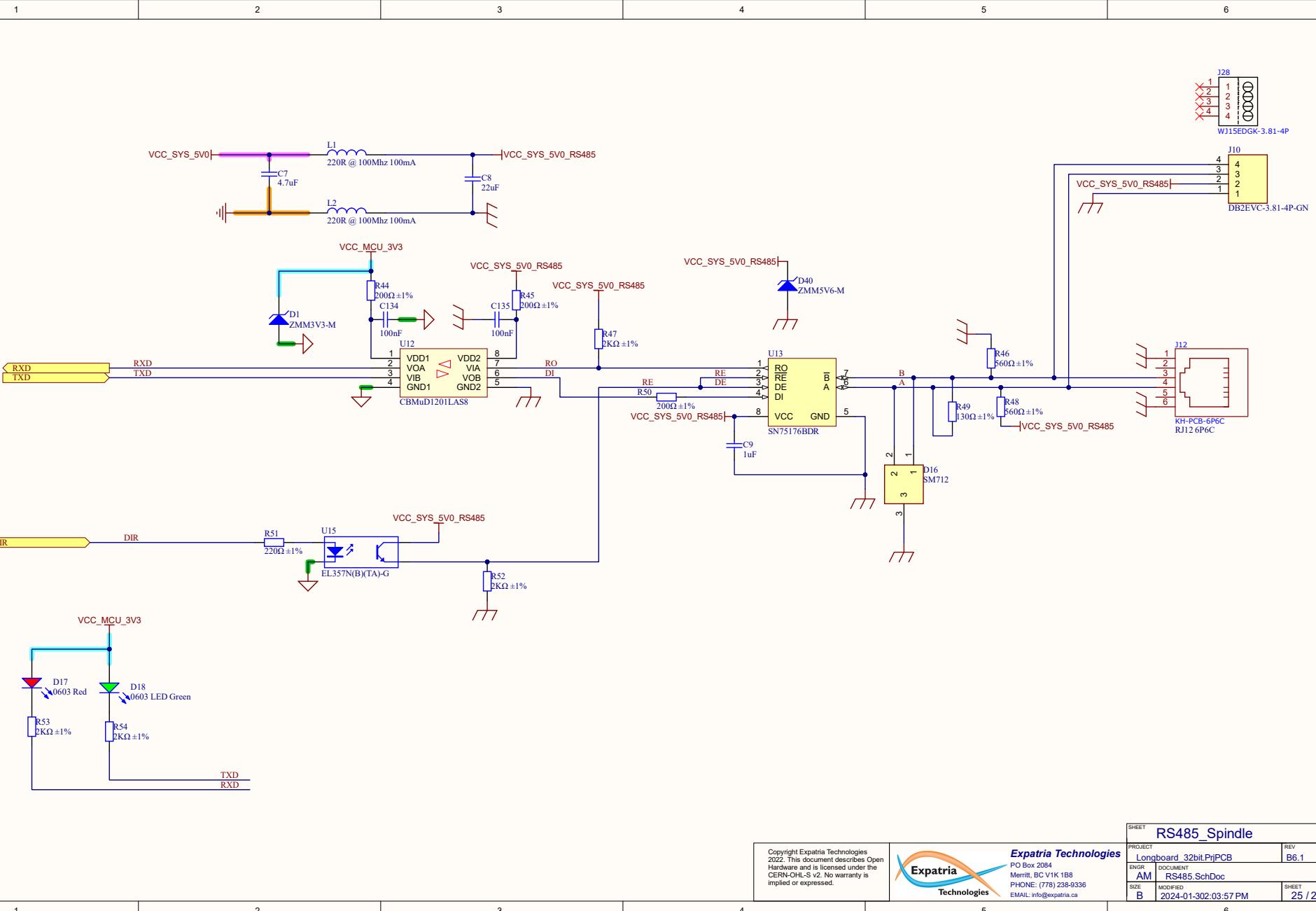


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SHEET Coupler 12V input		
PROJECT	REV	
Longboard 32bit.PriPCB	B6.1	
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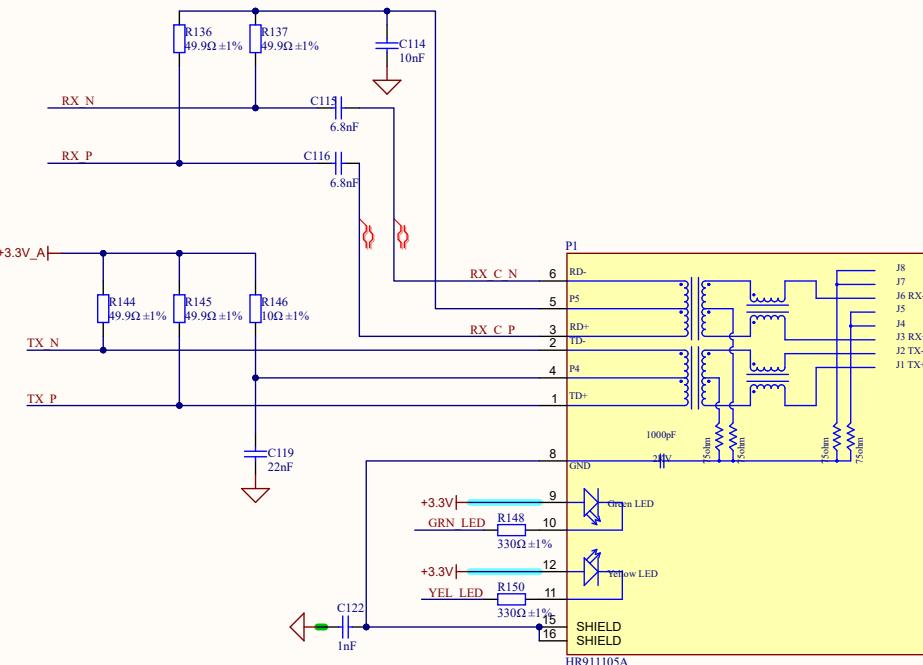
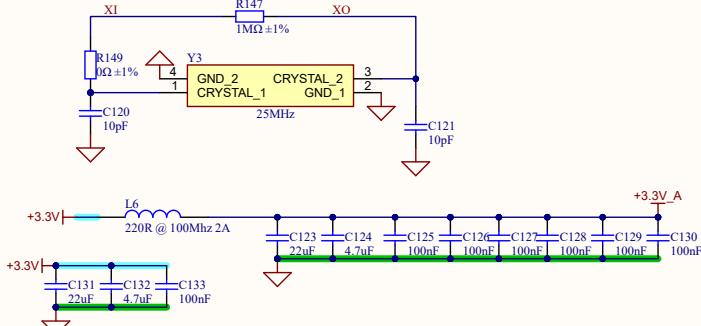
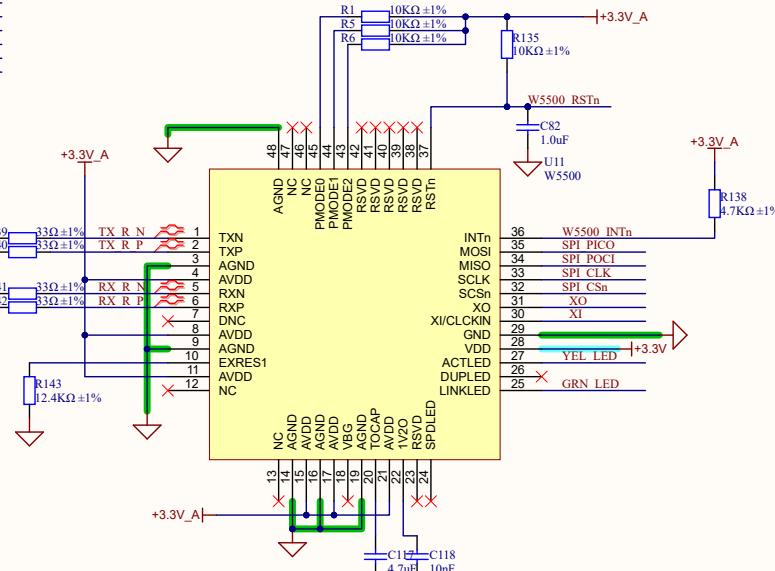
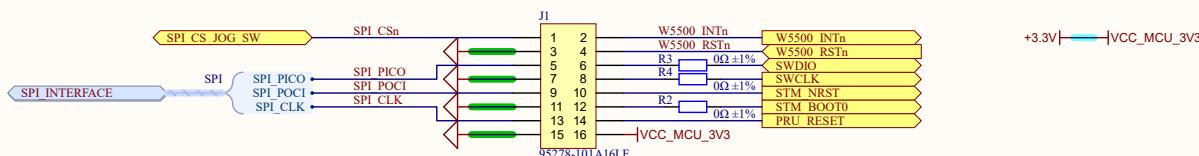


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RS485_Spindle	
PROJECT	REV
Longboard 32bit.PriPCB	B6.1
ENGR	DOCUMENT
	RS485.SchDoc
SIZE	MODIFIED
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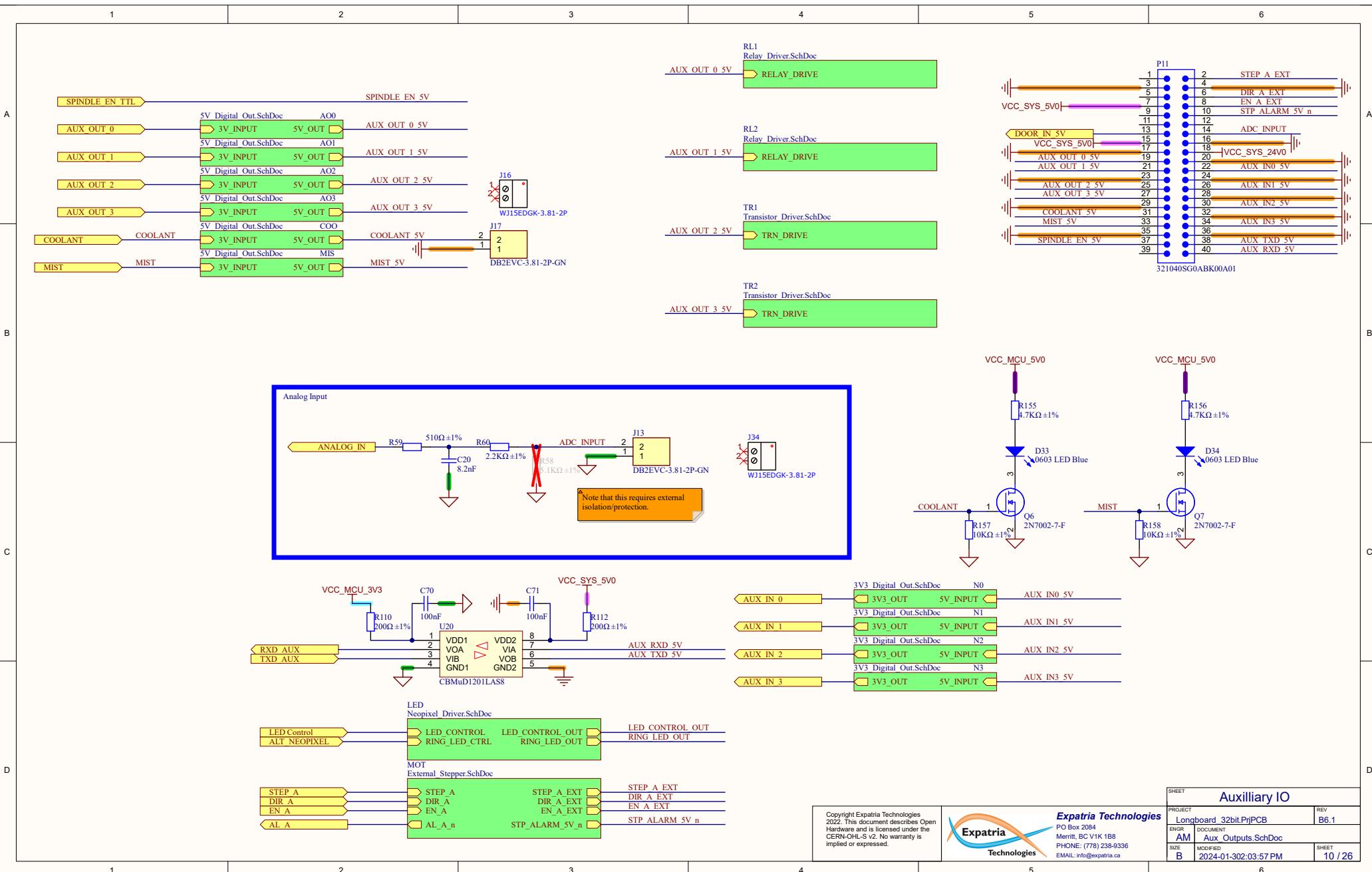
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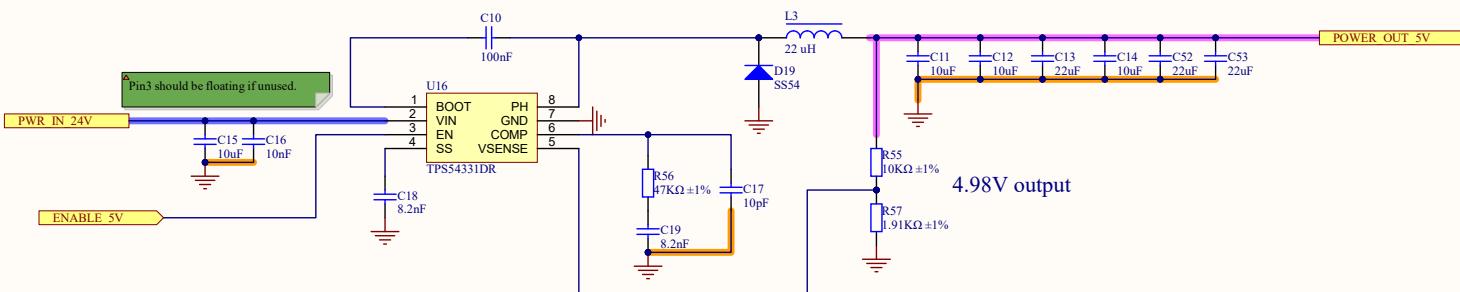
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SHEET 7 / 26	
<b>Ethernet Interface</b>	
PROJECT	REV B6.1
Longboard 32bit.PriPCB	
ENGR	DOCUMENT
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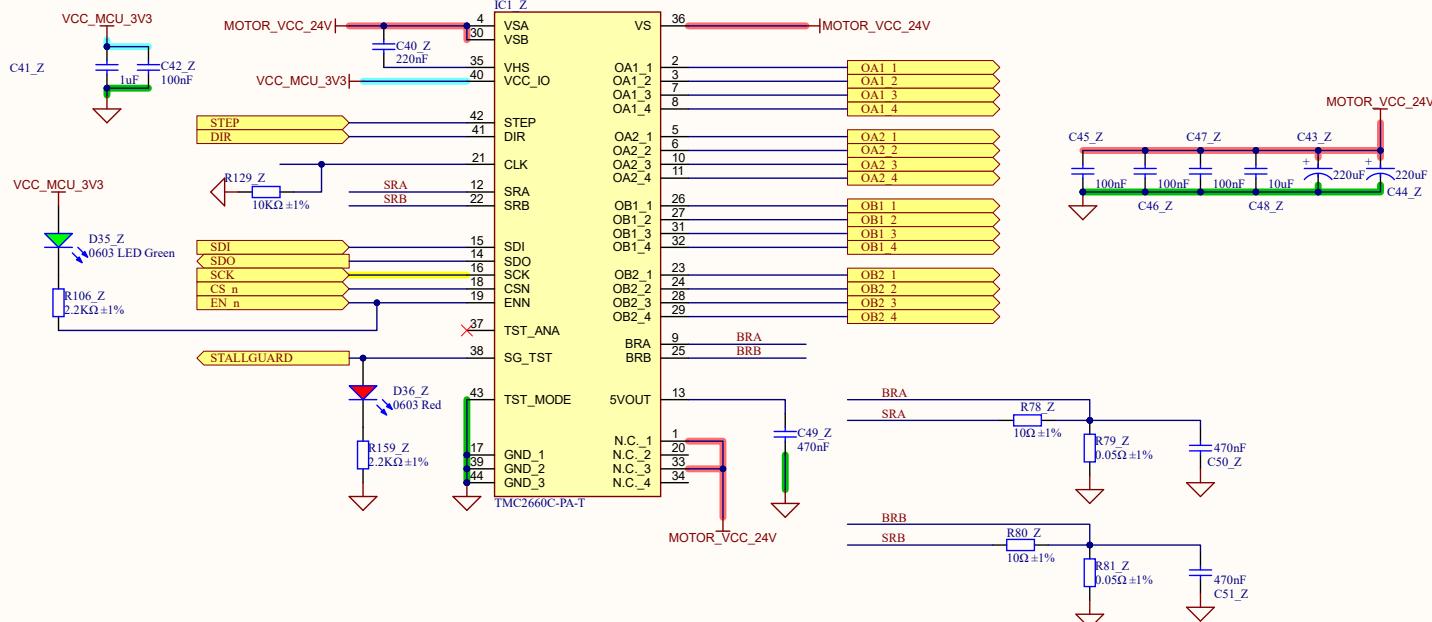


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SHEET 5V Power Supply	
PROJECT Longboard 32bit.PriPCB	REV B6.1
ENGR AM DOCUMENT 5V Power Supply.SchDoc	
SIZE B MODIFIED 2024-01-30T03:58:57 PM	SHEET 21 / 26

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TMC2660 Driver		
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ENGR	AM	B6.1
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B	2024-01-30 03:58 PM	9 / 26

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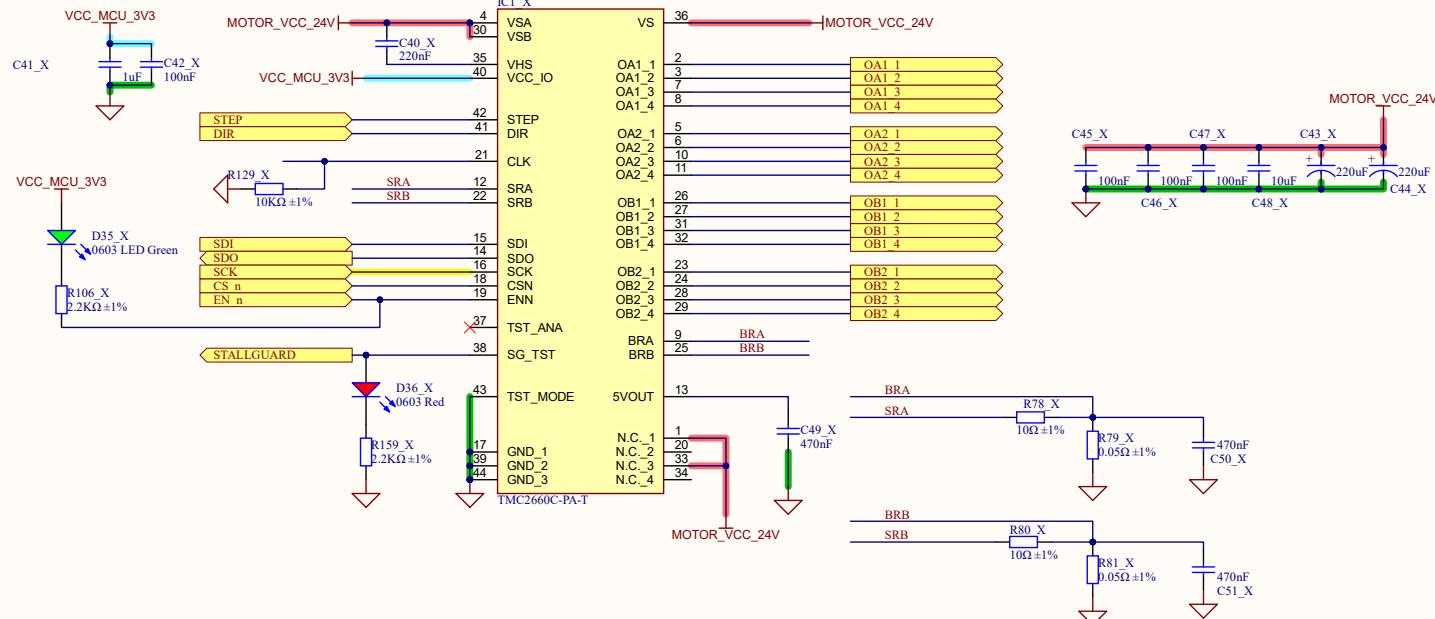
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TMC2660 Driver		
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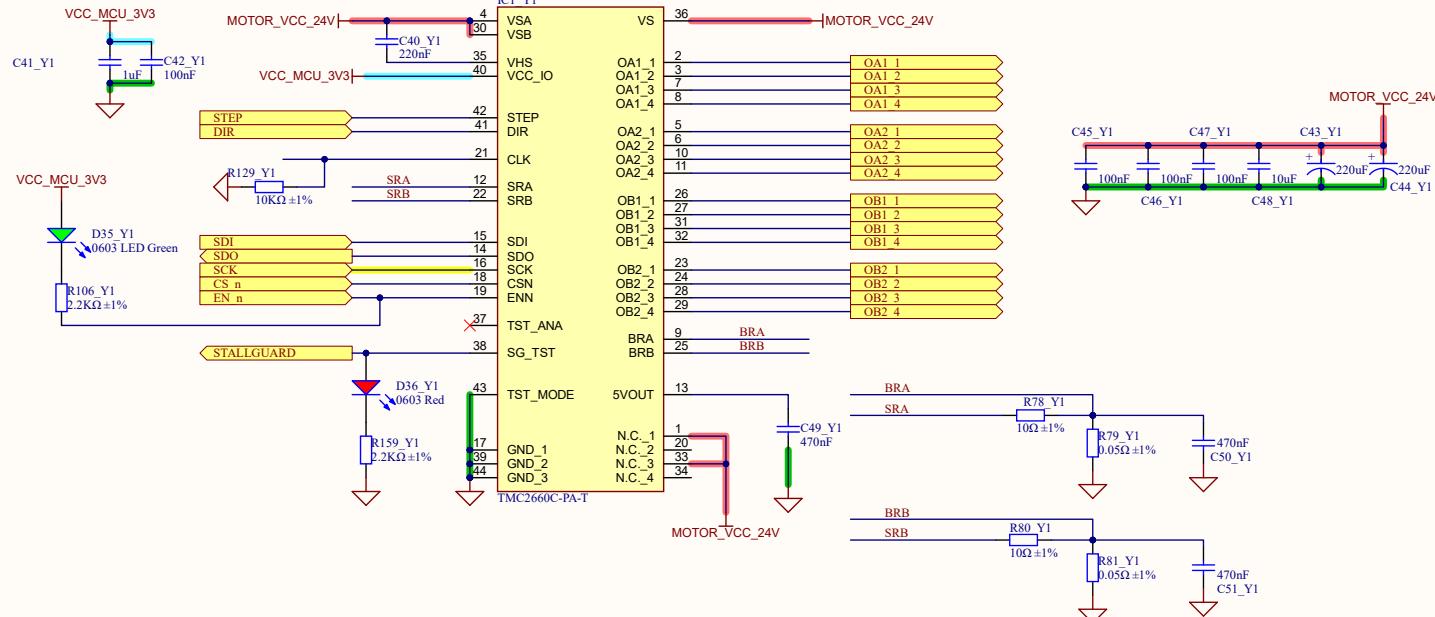
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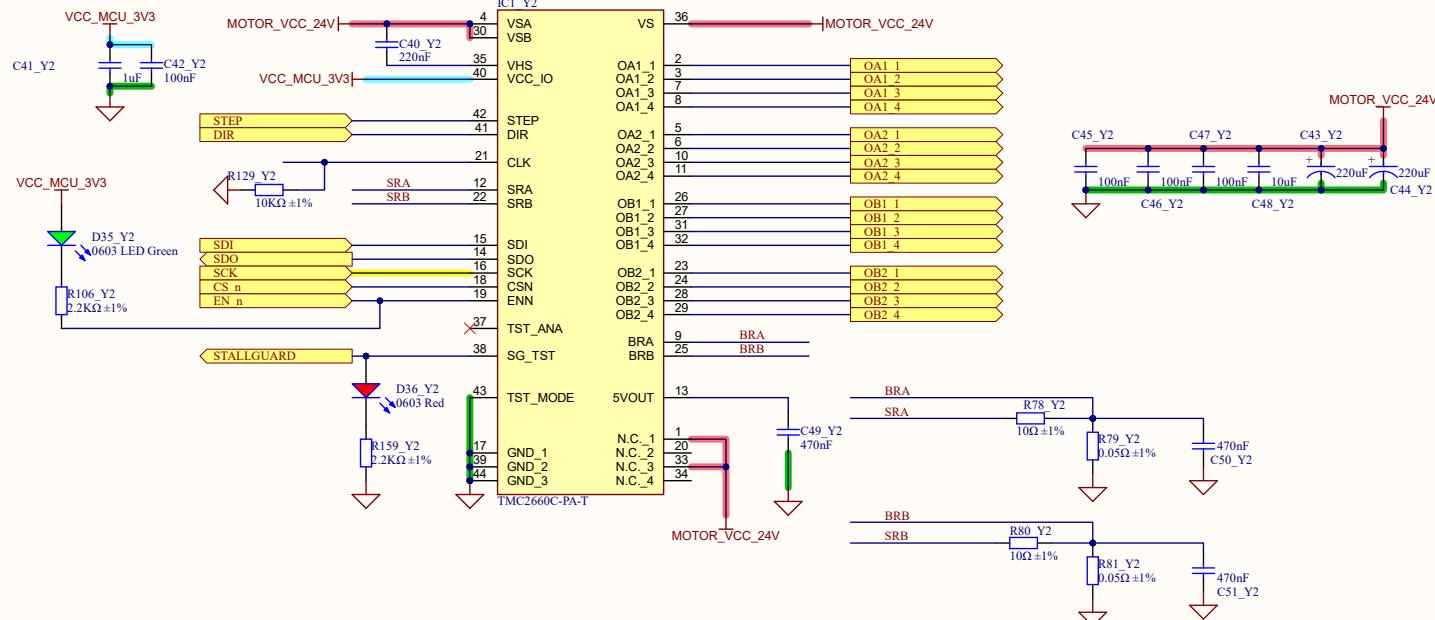
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TMC2660 Driver		
PROJECT	Longboard 32bit.PriPCB	REV
ENGR	AM	B6.1
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SIZE	MODIFIED	SHEET
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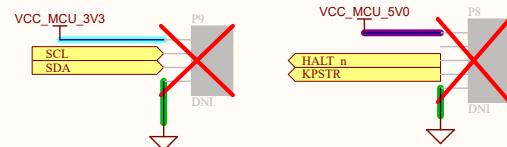
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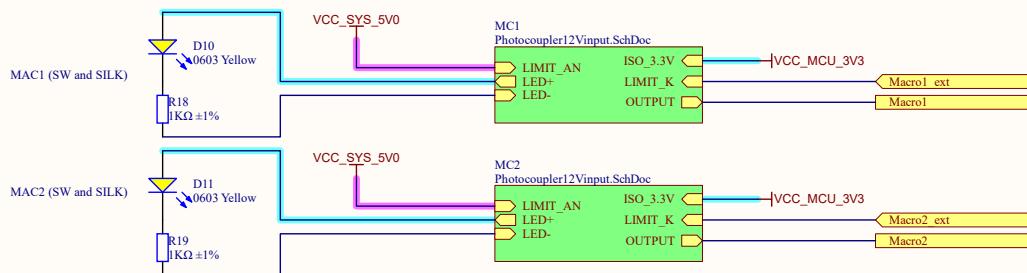
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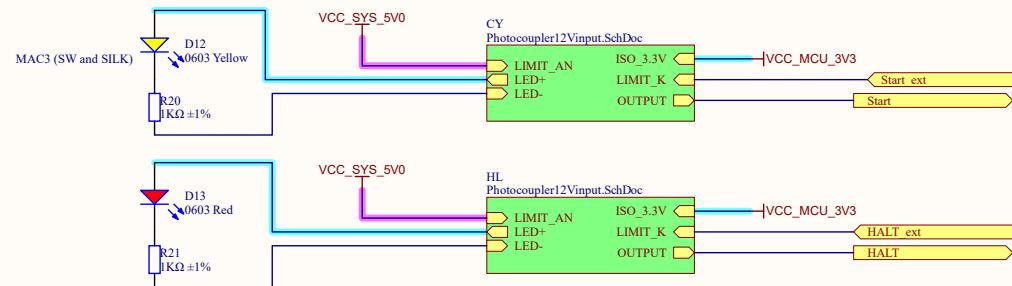
Pendant is in MCU domain  
HALT is active low.



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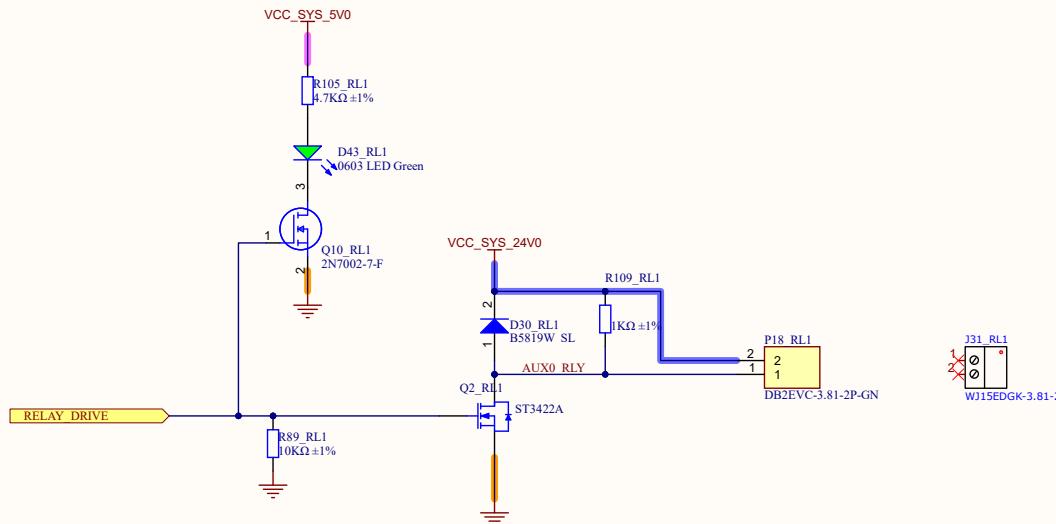
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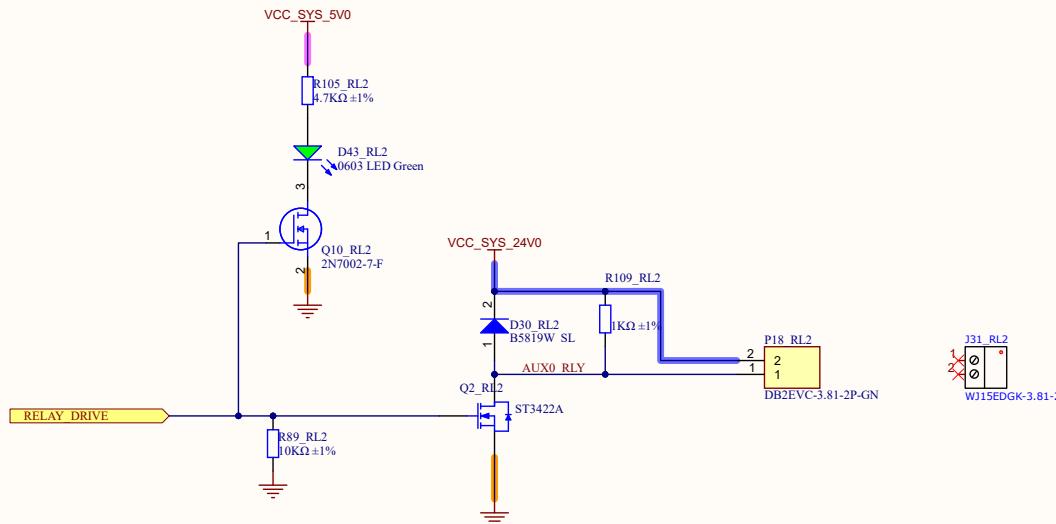
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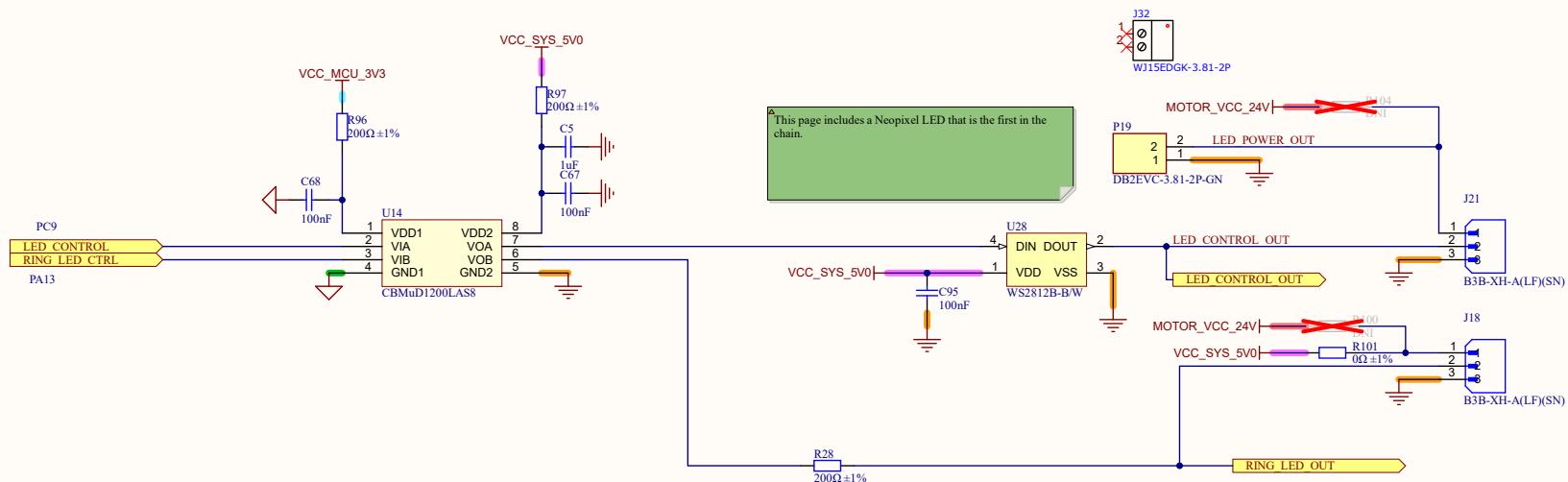


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SHEET Relay Driver		REV B6.1
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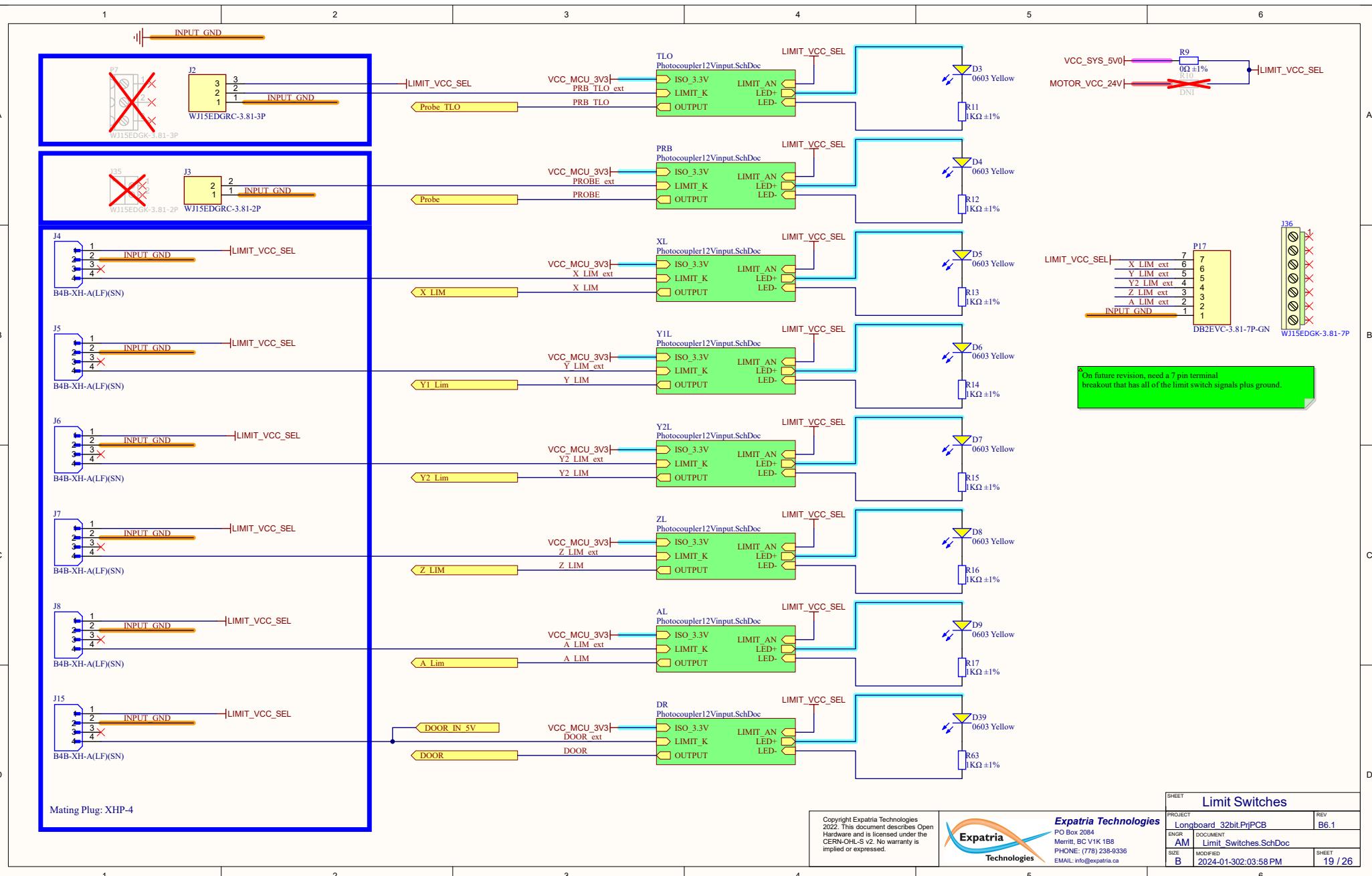


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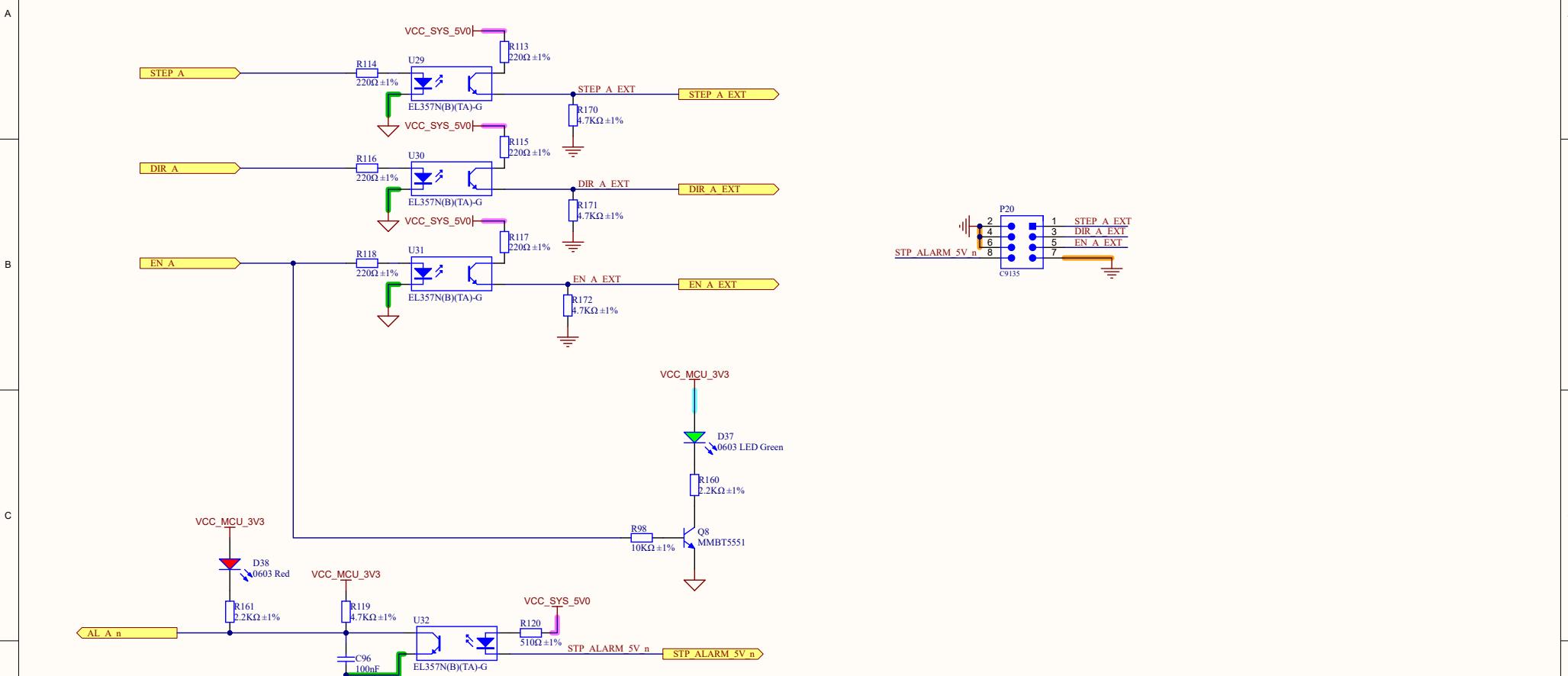
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PROJECT Longboard 32bit.PriPCB	REV B6.1
ENGR AM Neopixel_Driver.SchDoc	
SIZE B	MODIFIED 2024-01-302:03:58 PM
	SHEET 12 / 26



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EMAIL: info@expatria.ca

SHEET		Limit Switches	
PROJECT	REV	Longboard 32bit.PriPCB	B6.1
ENGR	DOCUMENT	Limit_Switches.SchDoc	
SIZE	MODIFIED	2024-01-30 03:58 PM	SHEET
B			19 / 26



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SHEET External Stepper	
PROJECT Longboard 32bit.PriPCB	REV B6.1
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SIZE B Modified 2024-01-30T03:59:PM	SHEET 13 / 26

1 2 3 4 5 6

A

A

B

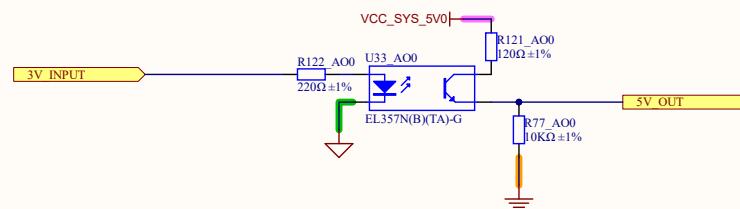
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SHEET 5V Isolated Output		
PROJECT	REV	
ENGR	DOCUMENT	
Longboard 32bit.PriPCB	B6.1	
AM	5V_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59 PM	SHEET 14 / 26

1 2 3 4 5 6

1 2 3 4 5 6

A

A

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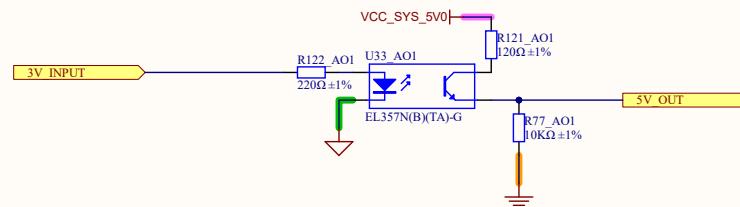
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SHEET 5V Isolated Output		
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AM	5V_Digital_Out.SchDoc	
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1 2 3 4 5 6

1 2 3 4 5 6

A

A

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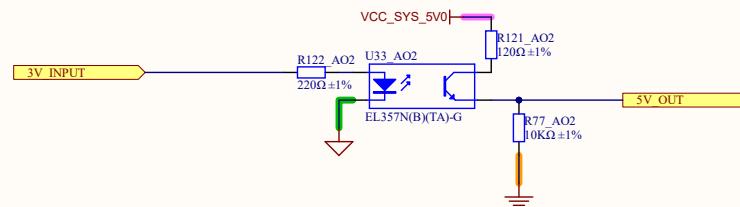
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SHEET 5V Isolated Output		
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Longboard 32bit.PriPCB	B6.1	
AM	5V_Digital_Out.SchDoc	
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1 2 3 4 5 6

1 2 3 4 5 6

A

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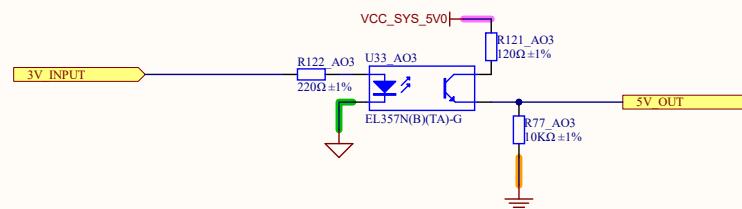
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SHEET 5V Isolated Output		
PROJECT	REV	
ENGR	DOCUMENT	
Longboard 32bit.PriPCB	B6.1	
AM	5V_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59 PM	SHEET 14 / 26
EMAIL: info@expatria.ca		

1 2 3 4 5 6

1 2 3 4 5 6

A

A

B

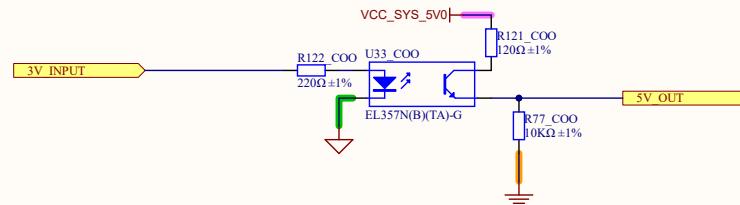
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SHEET 5V Isolated Output		
PROJECT	REV	
ENGR	DOCUMENT	
Longboard_32bit.PriPCB	B6.1	
AM	5V_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59 PM	SHEET 14 / 26

1 2 3 4 5 6

1 2 3 4 5 6

A

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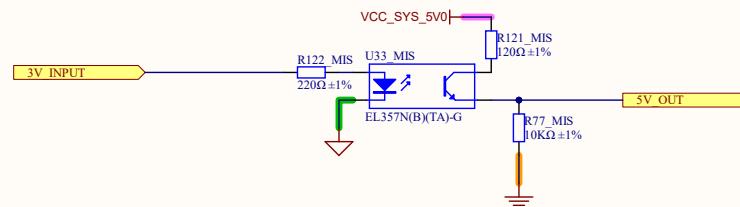
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SHEET 5V Isolated Output		
PROJECT	REV	
ENGR	DOCUMENT	
Longboard_32bit.PriPCB	B6.1	
AM	5V_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59 PM	SHEET 14 / 26

1 2 3 4 5 6

1 2 3 4 5 6

A

A

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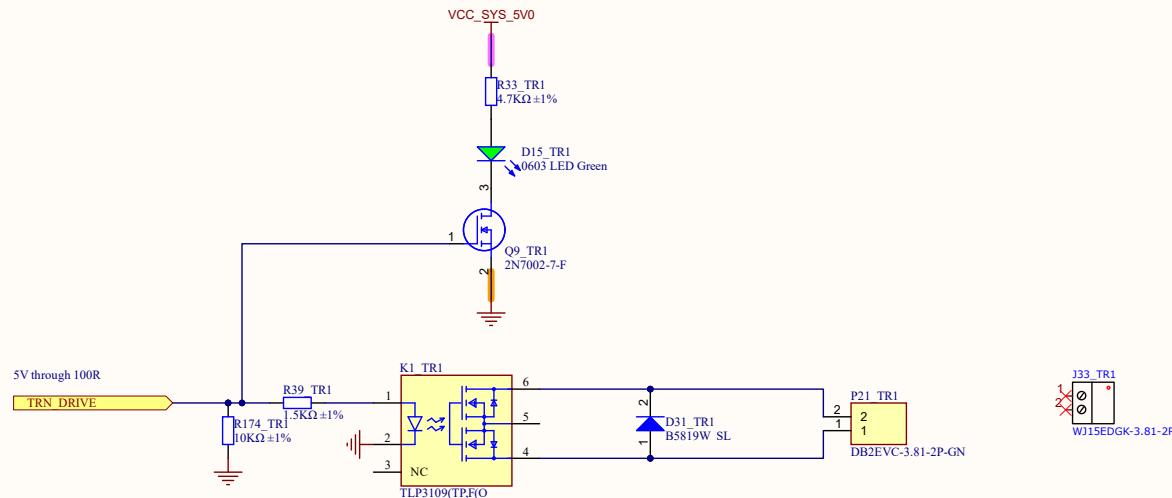
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1 2 3 4 5 6

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**Expatria Technologies**  
PROJECT Longboard 32bit.PriPCB  
REV B6.1  
ENGR DOCUMENT Transistor\_Driver.SchDoc  
SIZE B MODIFIED 2024-01-30T03:59:PM  
SHEET 16 / 26

A

A

B

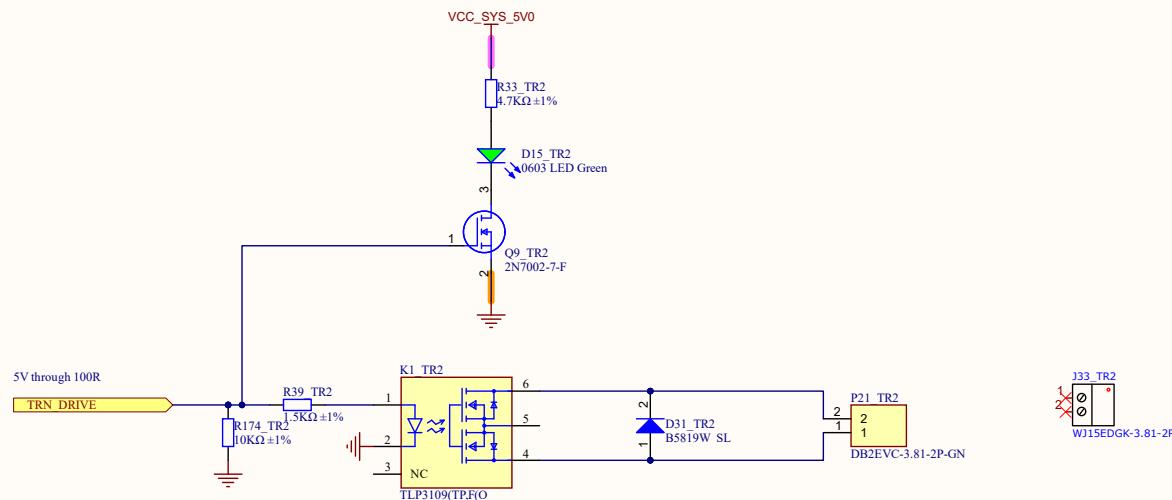
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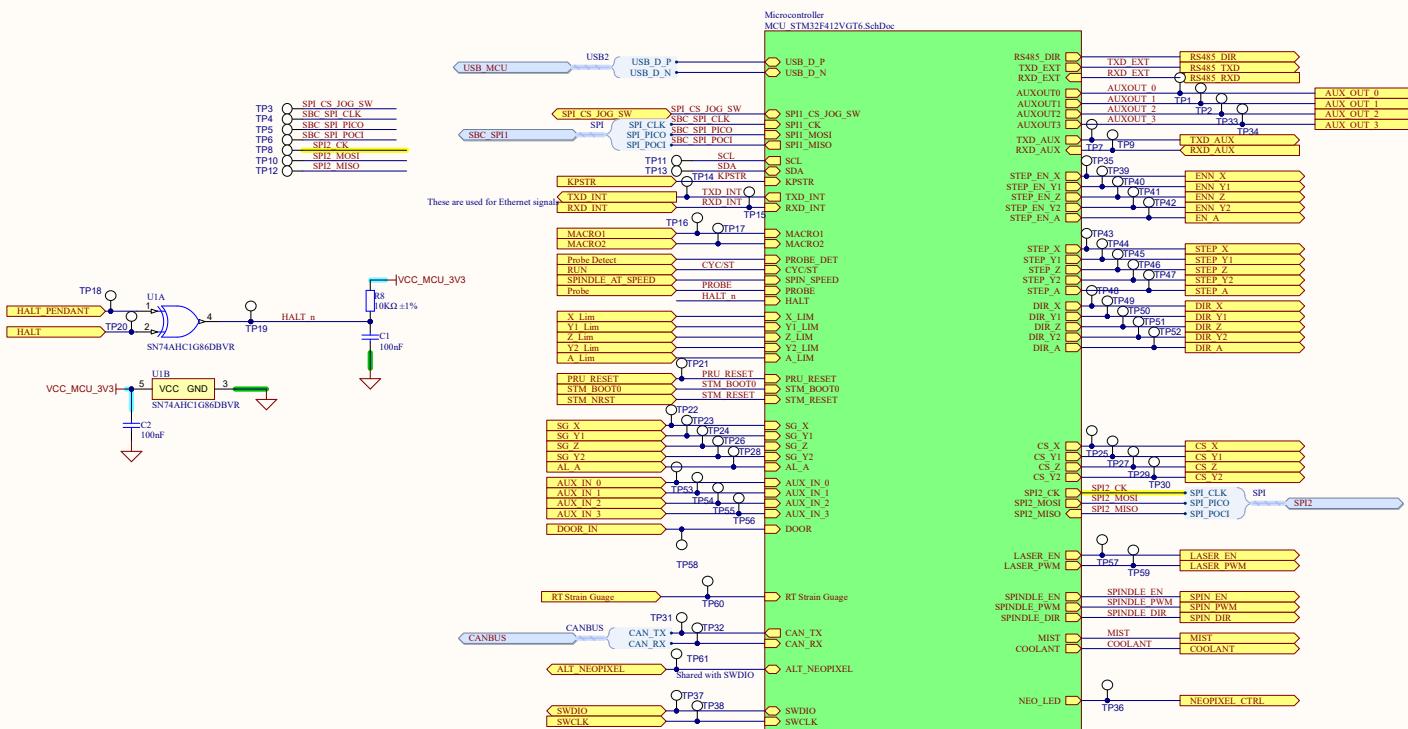
C

D

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A



B

A

B

C

D

1 2 3 4 5 6

A

A

B

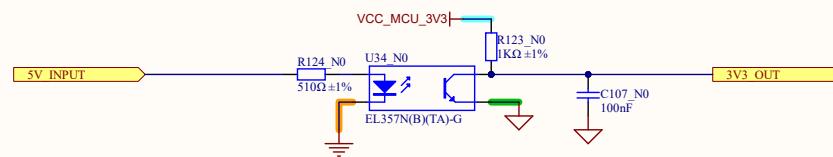
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SHEET 3.3V Isolated Output		REV B6.1
PROJECT	Longboard 32bit.PriPCB	REV
ENGR	DOCUMENT	
AM	3V3_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59:59 PM	SHEET 15 / 26

1 2 3 4 5 6

1 2 3 4 5 6

A

A

B

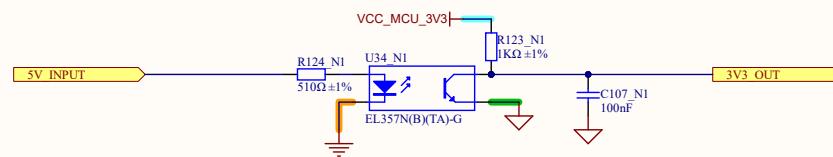
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SHEET 3.3V Isolated Output		REV B6.1
PROJECT	Longboard 32bit.PriPCB	REV
ENGR	DOCUMENT	
AM	3V3_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59 PM	SHEET 15 / 26

1 2 3 4 5 6

1 2 3 4 5 6

A

A

B

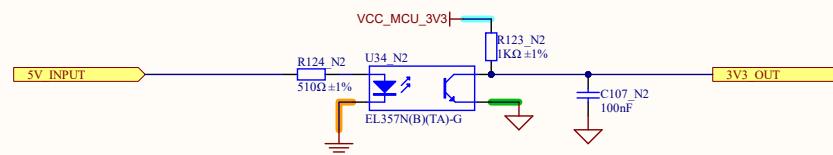
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SHEET 3.3V Isolated Output		REV B6.1
PROJECT	Longboard 32bit.PriPCB	REV
ENGR	DOCUMENT	
AM	3V3_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-30T03:59 PM	SHEET 15 / 26

1 2 3 4 5 6

1 2 3 4 5 6

A

A

B

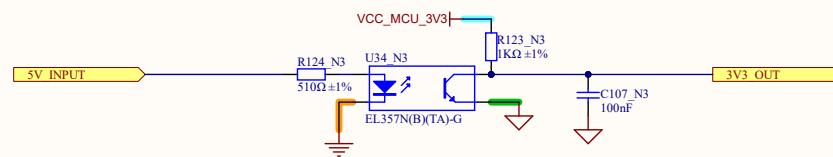
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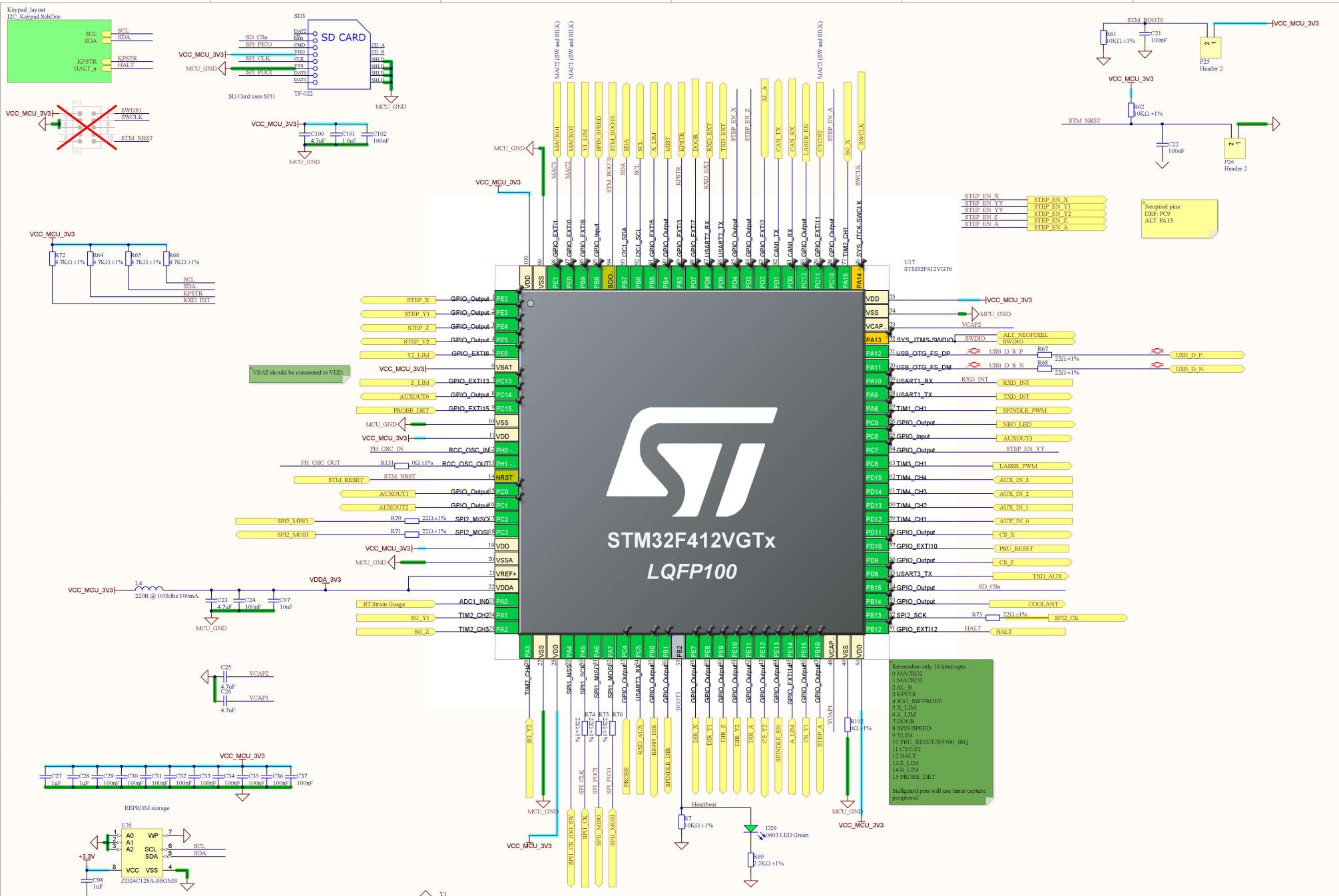


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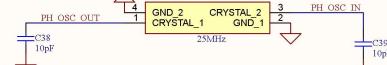
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PROJECT	Longboard 32bit.PriPCB	REV
ENGR	DOCUMENT	
AM	3V3_Digital_Out.SchDoc	
SIZE B	MODIFIED 2024-01-302:04:00 PM	SHEET 15 / 26

1 2 3 4 5 6



**Figure 7-1.** Device Addressing

A 16-bit memory address bus diagram showing bits A15 to A0. The most significant bit is labeled MSB and the least significant bit is labeled LSB.



3

6

A

A

B

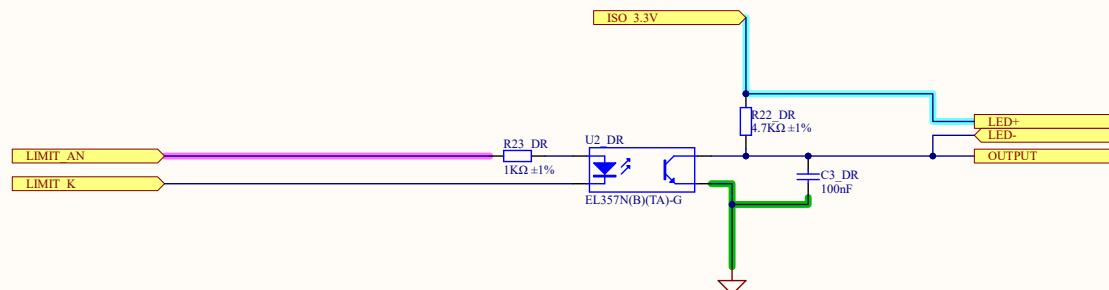
B

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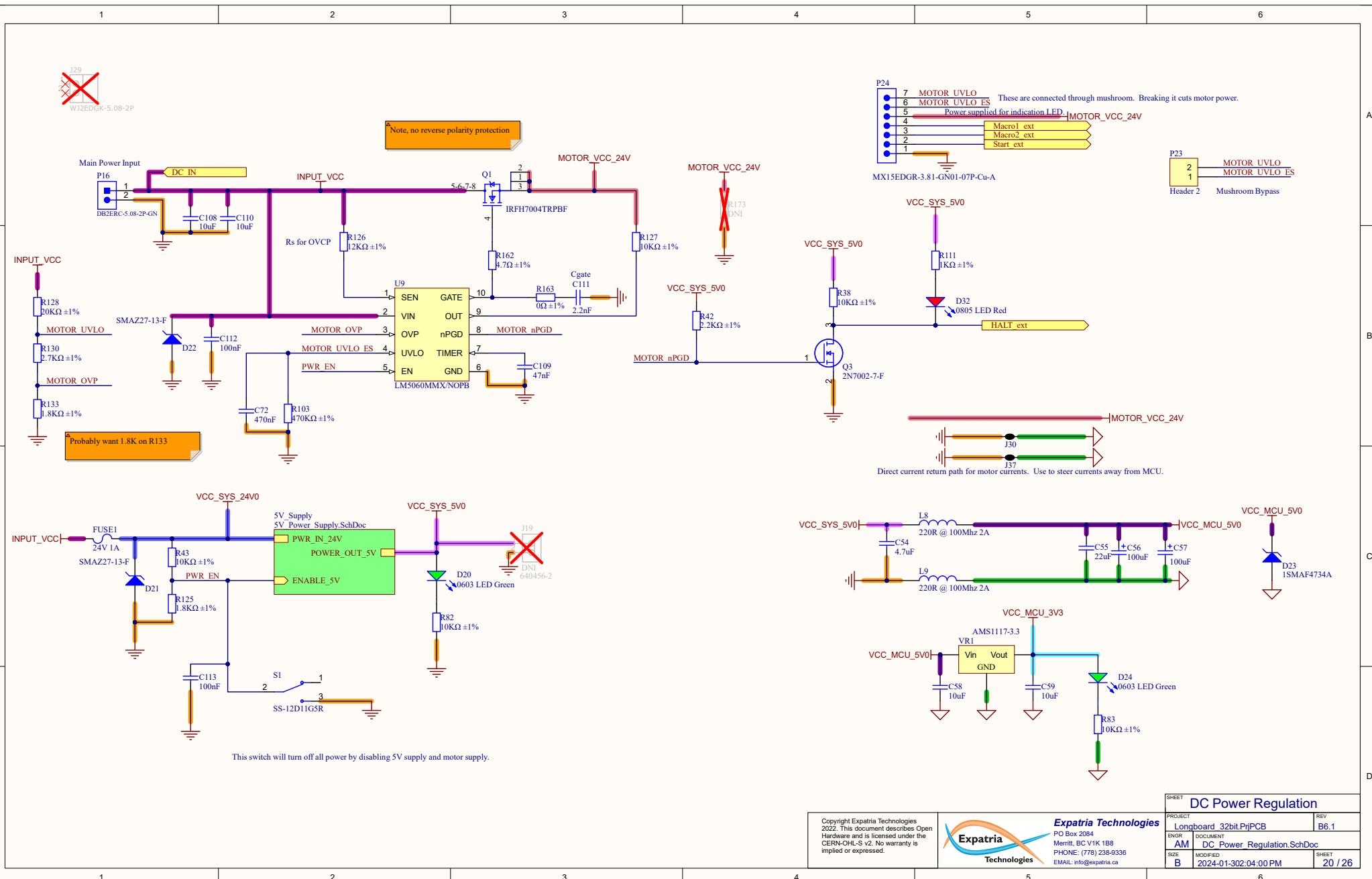
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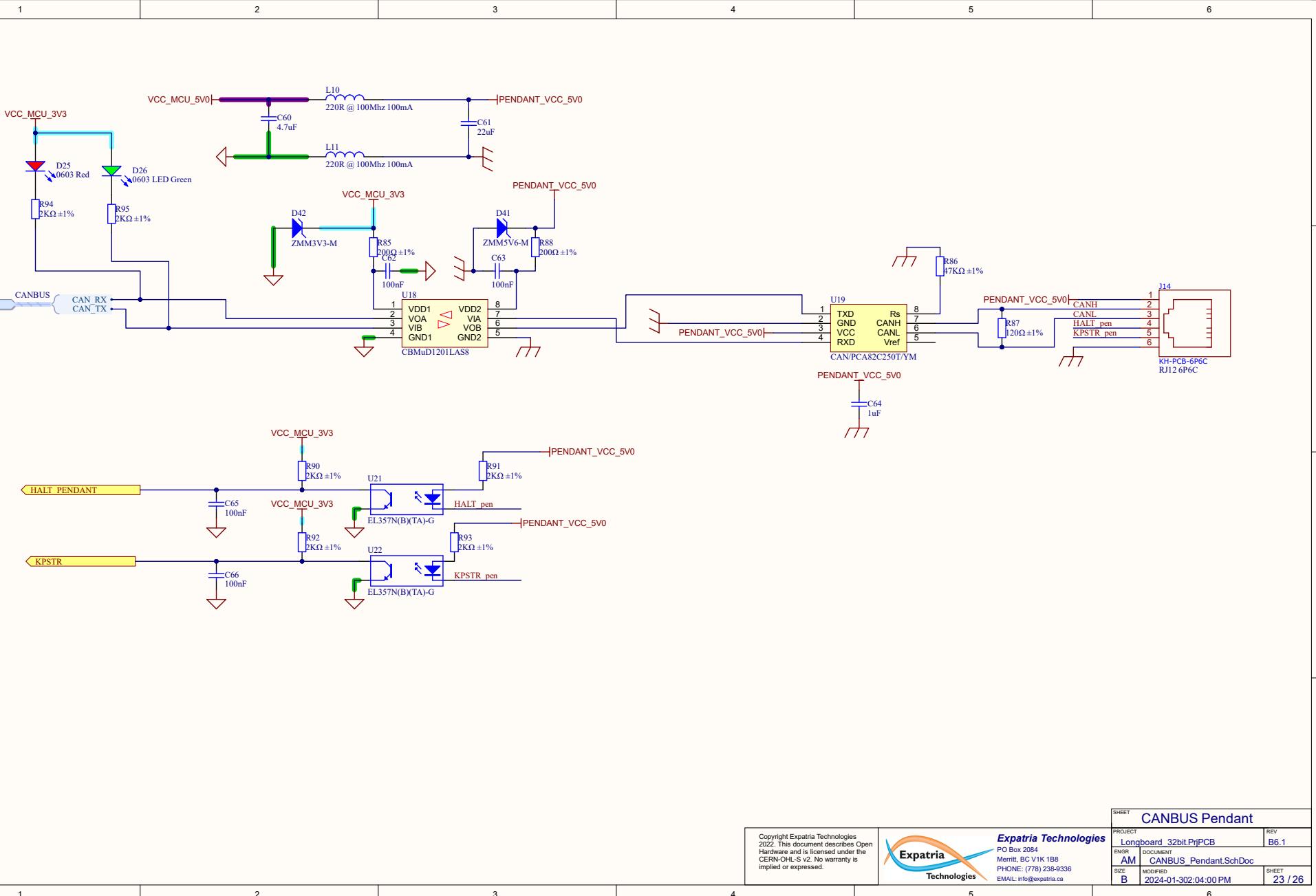


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SHEET Coupler 12V input		
PROJECT	REV	
Longboard 32bit.PriPCB	B6.1	
ENGR	DOCUMENT	
AM	Photocoupler12Vinput.SchDoc	
SIZE	MODIFIED	SHEET
B	2024-01-30T04:00 PM	18 / 26





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CANBUS Pendant	
PROJECT Longboard 32bit.PriPCB	REV B6.1
ENGR AM	DOCUMENT CANBUS Pendant.SchDoc
SIZE B	MODIFIED 2024-01-30 04:00 PM
	SHEET 23 / 26

**Change Log**

Date	Revision	Description
11/13/22	A1	Update connectors for 3.81mm and 5.08mm Update parts for BOM availability
12/10/22	A2	Update parts for BOM availability Swapped connectors Replaced CM4 module with two connectors for BOM inclusion
1/2/23	A3	Added A axis to aux breakout connector Connected VREF on MCU. Added test points Cleaned up block diagram Added buffer to CM4 power indicator.
1/4/23	A4	Update parts for availability Add L6 filter for USB Replaced J18 with ARJM11D7-502-AB-EW2 for magnetics Changed vertical DB2EVC-2.54-2P-GN to right angle DB2ERC-2.54-2P-GN Changed vertical DB2EVC-2.54-3P-GN to right angle DB2ERC-2.54-3P-GN Added matching 2.54mm plugs Change R9 to FITTED Change R10 to NOT_FITTED Changed B3B-XH-A(LF)(SN) to B4B-XH-A(LF)(SN)
07/18/23	B1	Removed Compute module Fixed 5V Regulator Enable pin SL1 Fixed BOOT1 pin location SL3 Removed D22 SL4 Revised MCU Pinout SL8 Added Toggle switch Added Aux limits terminal Swapped Laser Pinout Revised spindle terminal to be RS485 Updated header pinout Changed transistor drivers to photoMOS Added 5V 2 pin flood output Added additional Neopixel drive Added net tie for motor current return path Updated EL357 resistor values
07/18/23	B2	Updated LED and RS485 drive to use digital isolators Added LEDs to more I/O SL28 Added additional test points SL31 Connected Ring light LED to 5V onboard supply SL32

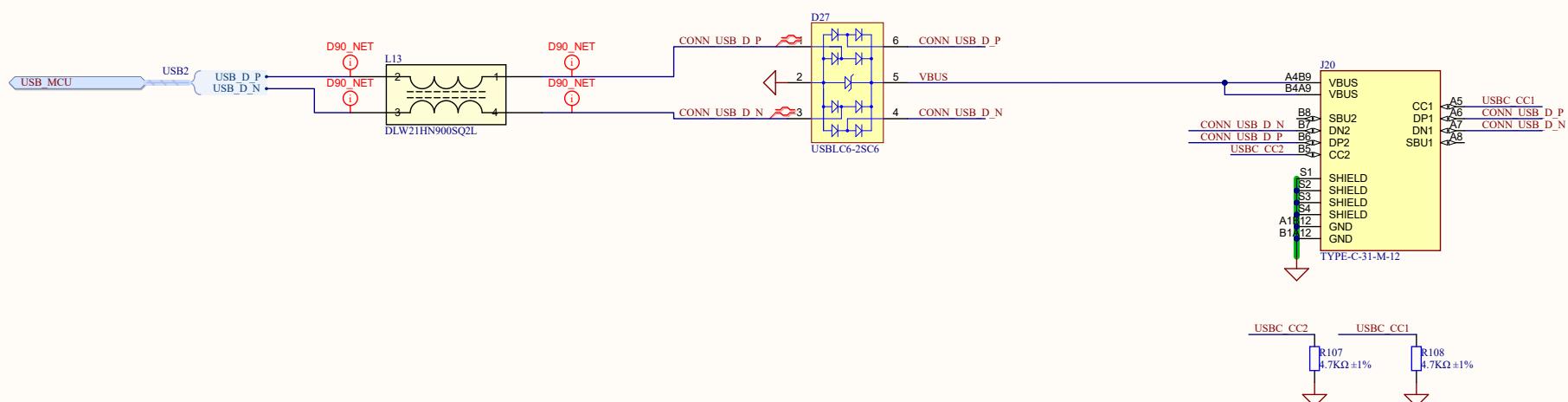
Date	Revision	Description
07/21/23	B3	Changed programming buttons to unpopulated headers Connected BOOT0 to macro buttons so that DFU can be initiated by users Added nuclear DNI Fan header Updated rocker switch to right angle part
07/28/23	B4	Updated parts for availability
10/02/23	B4.1	Replaced Q4-Q7 with 2N7002-7-F
10/13/23	B5	Removed neopixel buffer Changed polarity of spindle and laser outputs Added pull-down to relay driver. Made spindle output 5V TTL. Added buffer to TTL outputs Updated DC power section values
11/7/23	B6	Updated parts for availability Changed R126 to 12K as per SL-61

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Change Log	
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Longboard 32bit.PriPCB	B6.1
ENGR	DOCUMENT
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SIZE	MODIFIED
B	2024-01-30 04:00 PM
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	26 / 26

1 2 3 4 5 6



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SHEET 1 USBC MCU Connector	
PROJECT	REV
Longboard 32bit.PriPCB	B6.1
ENGR	DOCUMENT
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	SHEET 24 / 26

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