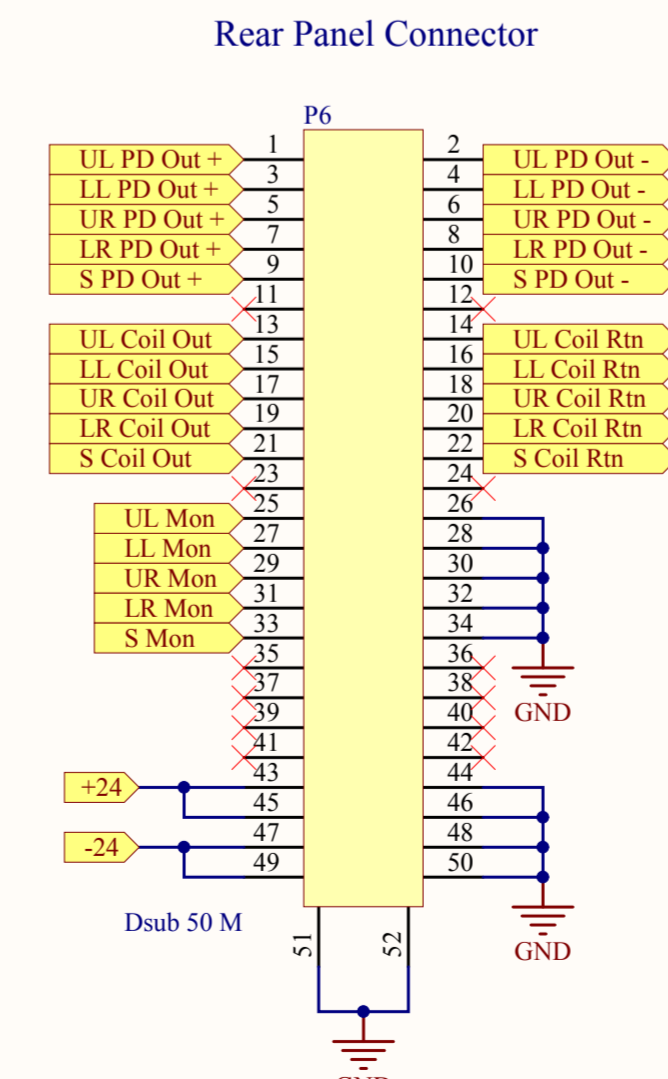
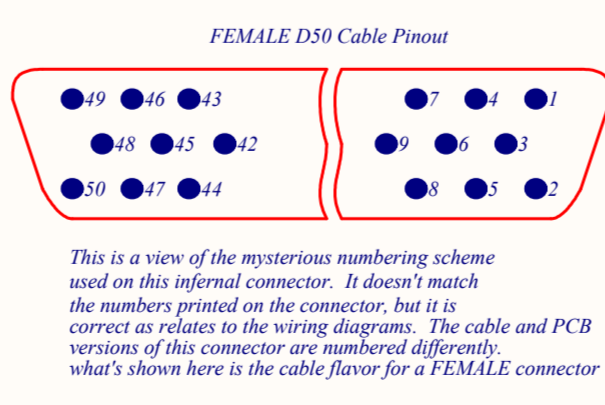
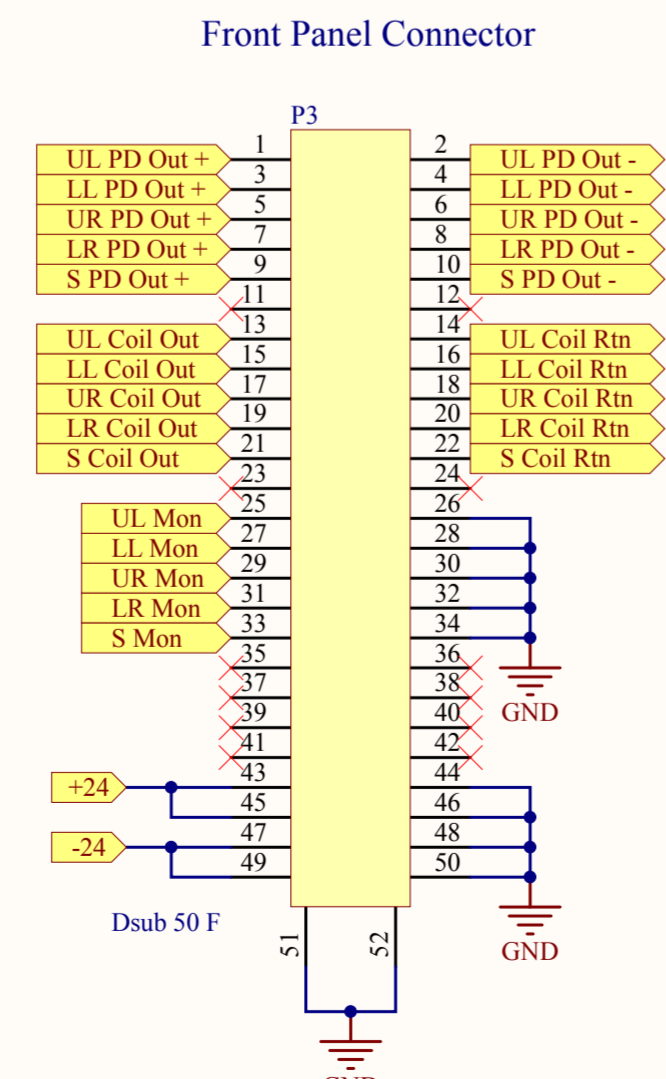
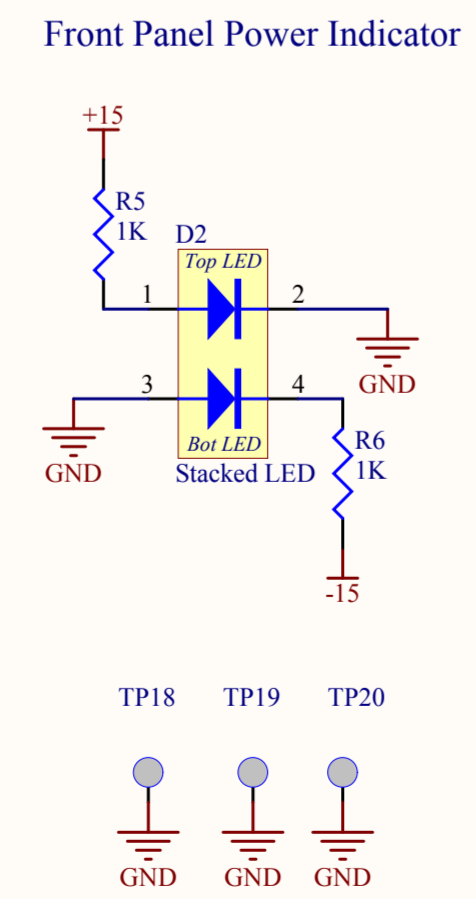
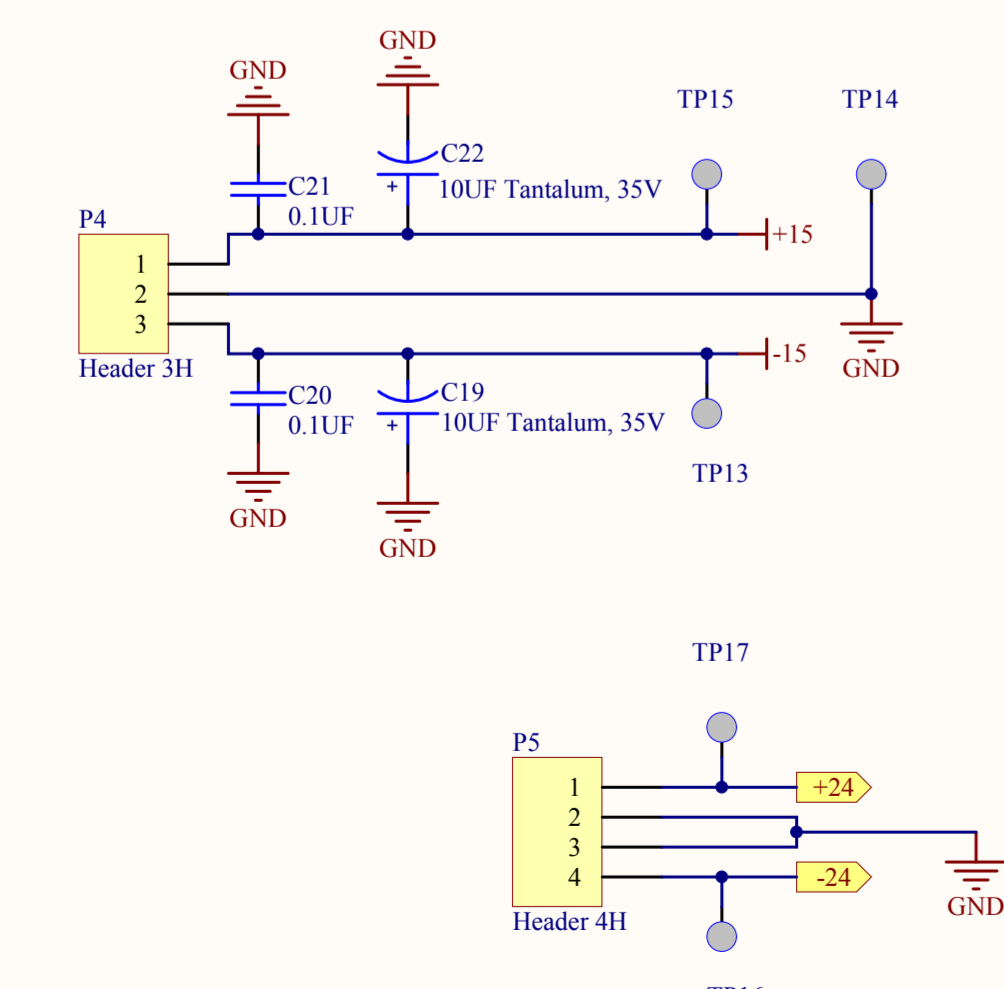
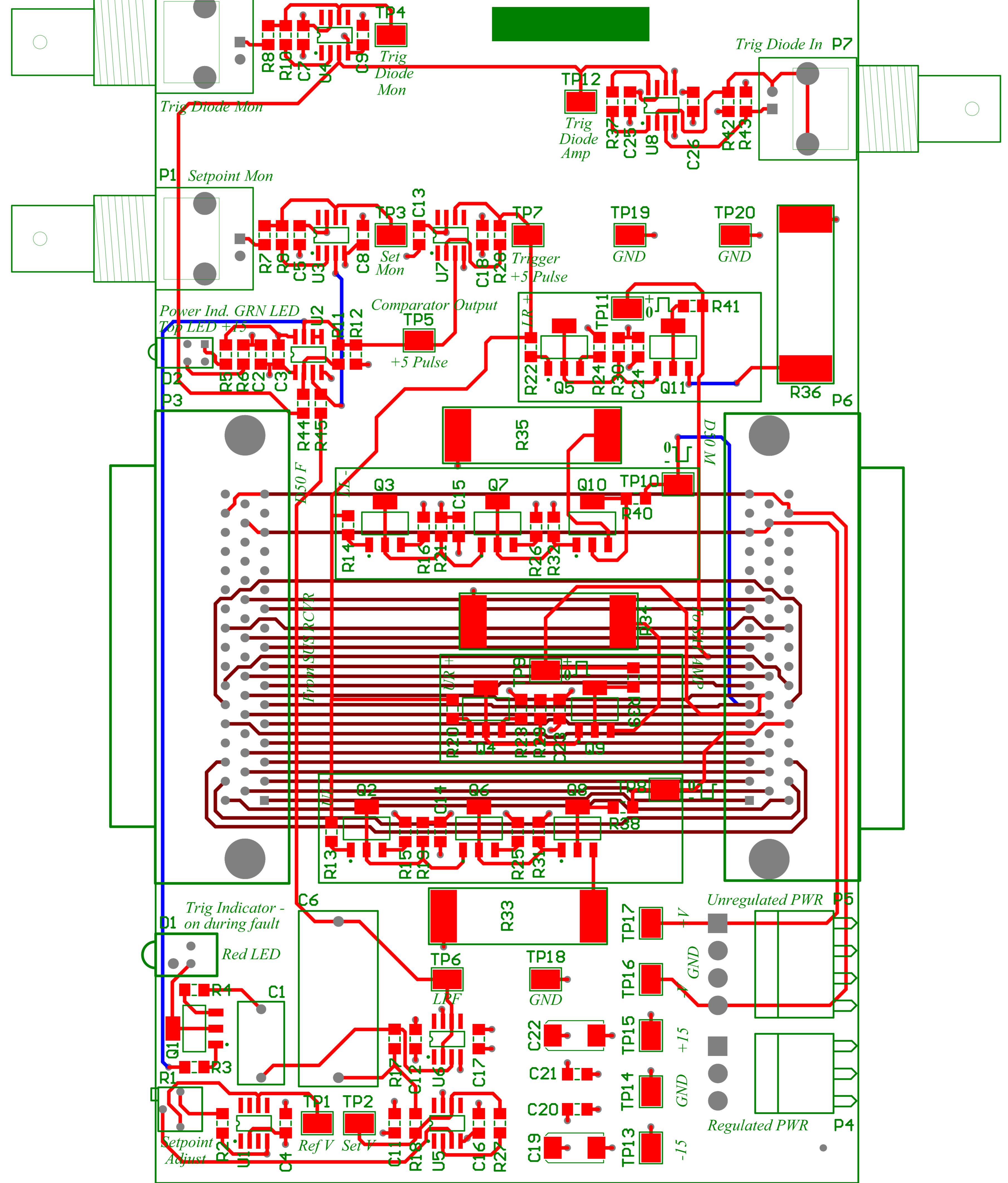


Circuit DC parameters:  
 The shutter chassis has an internal voltage regulator board that provides power to this circuit board. The shutter chassis derives power from the same feed as the satellite box  
 Quiescent Power Draw (not triggered)  
 +24 = 80mA  
 -24 = 50mA  
 Power Draw when triggered (all osems hooked up, and associated coil driver having 100 ohm series output resistors)  
 +24 = 475mA  
 -24 = 365mA



Revision Notes:  
 Rev A - Initial Release of board  
 Rev B - Corrected the footprint of the NPN and PNP transistors  
 Changed from driving "Coil Out" to "Coil Rtn" due to error in suspension wiring diagram  
 Changed hysteresis on LM311 due to instability  
 Flipped trigger indicator diode polarity due to error  
 Changed biasing component values on transistor stages to optimize response  
 Rev B1 - Resistor R2 value changed from 1k to 0 ohms as the default in order to allow values of trigger voltage down to zero  
 Updated the current draw numbers to reflect the higher current when triggered  
 Rev B2 - Series resistors R33, R34, R35 and R36 changed from 274 ohms to 100 ohms to provide higher current to the Tip/tilt coils  
 Updated the pulsed voltage labels at each coil interface to reflect the higher current pulses  
 Rev B3 - Changed from driving "Coil Rtn" to "Coil Out" (basically going back to the way things were originally)  
 Changed TP11 drive point to "LL Coil Out" from "LR Coil Rtn"  
 Changed TP10 drive point to "LR Coil Out" from "LL Coil Rtn"  
 Changed TP9 drive point to "UL Coil Out" from "UR Coil Rtn"  
 Changed TP8 drive point to "UR Coil Out" from "UL Coil Rtn"  
 [This change was made to put the current insertion point during shutter action to the supply leg of the coils instead of the return leg.  
 I verified this is now correct at LLO, V. Sandberg has verified the polarities and connections are the same at LHO.  
 Updated the current pulse cartoons to reflect the correct polarity at each drive point

LIGO-D080252 Rev.B OMC Tip/Tilt Shutter



Trig Indicator -  
D1 on during fault  
Red LED

Setpoint  
Adjust

TP1 TP2  
Ref V Set V

TP3 C13  
Set Mon

TP4 Trig Diode Mon  
TP5 +5 Pulse  
TP6 LNF

TP7 Trigger +5 Pulse  
TP8 GND  
TP9 GND  
TP10 W0/D  
TP11 GND  
TP12 Trig Diode Amp  
TP13 -15  
TP14 GND  
TP15 +15  
TP16 GND  
TP17 +V  
TP18 GND

TP19 GND  
TP20 GND  
P6  
P5 Unregulated PWR  
P4 Regulated PWR

P7 Trig Diode In

P2  
P1 Setpoint Mon  
P3  
D2  
D1

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45  
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15  
U1 U2 U3 U5 U6 U7 U8  
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11  
D1 D2