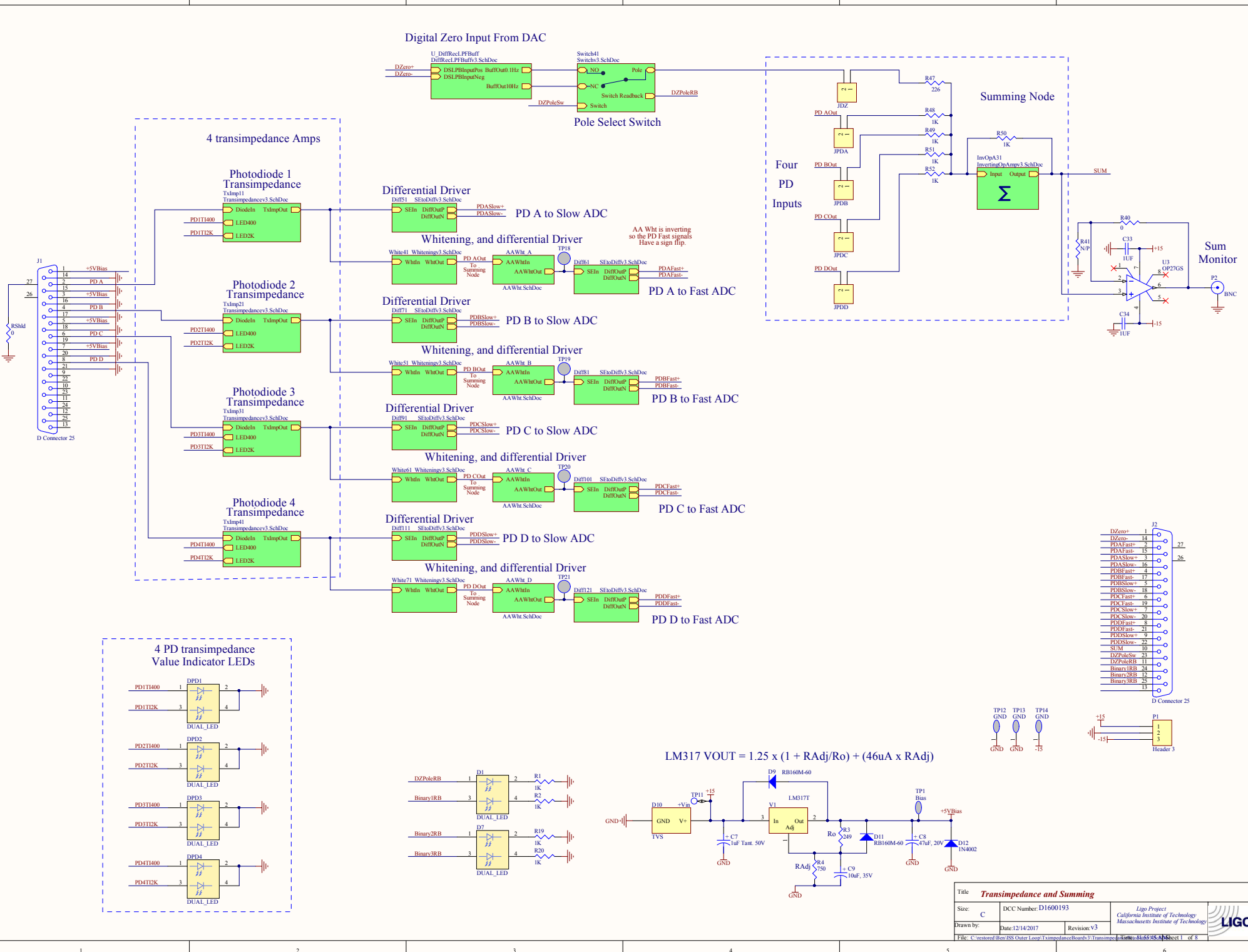
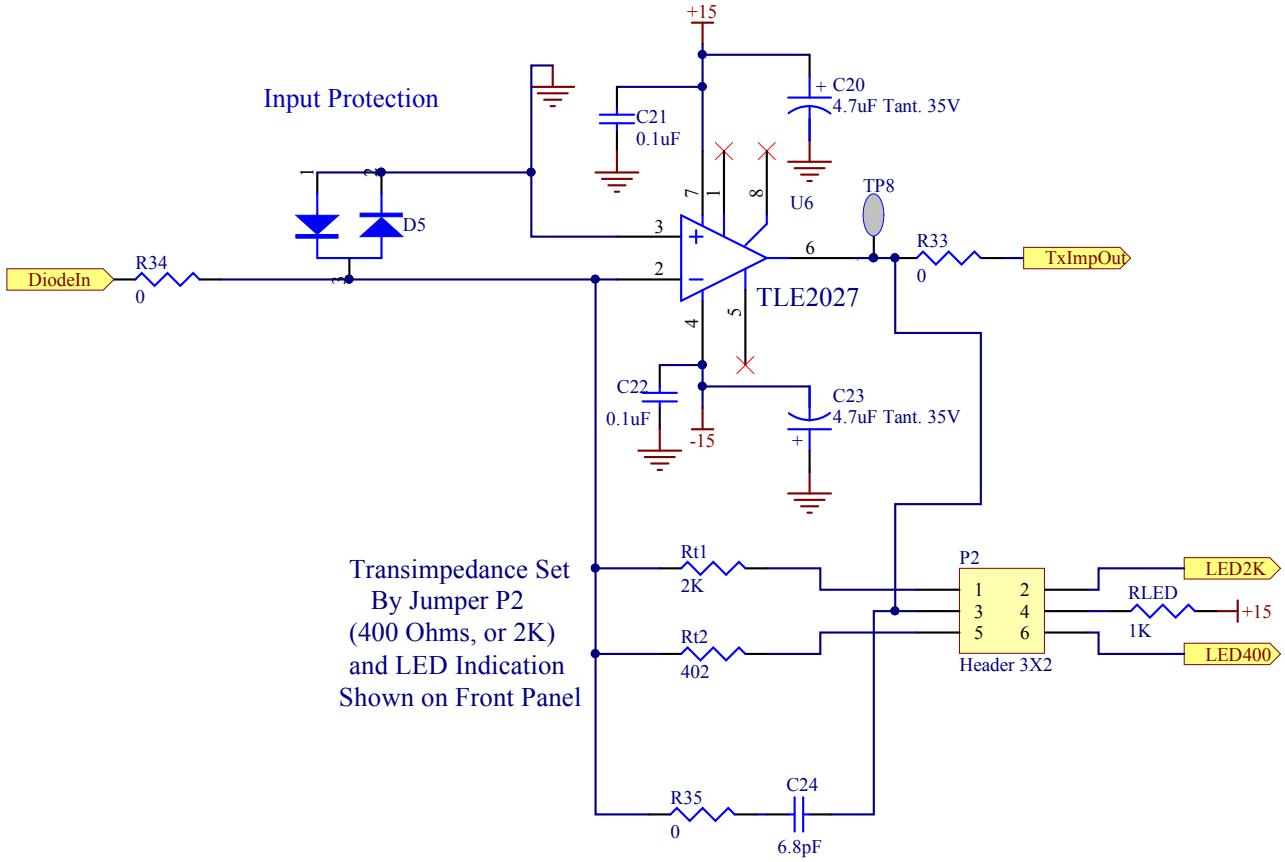
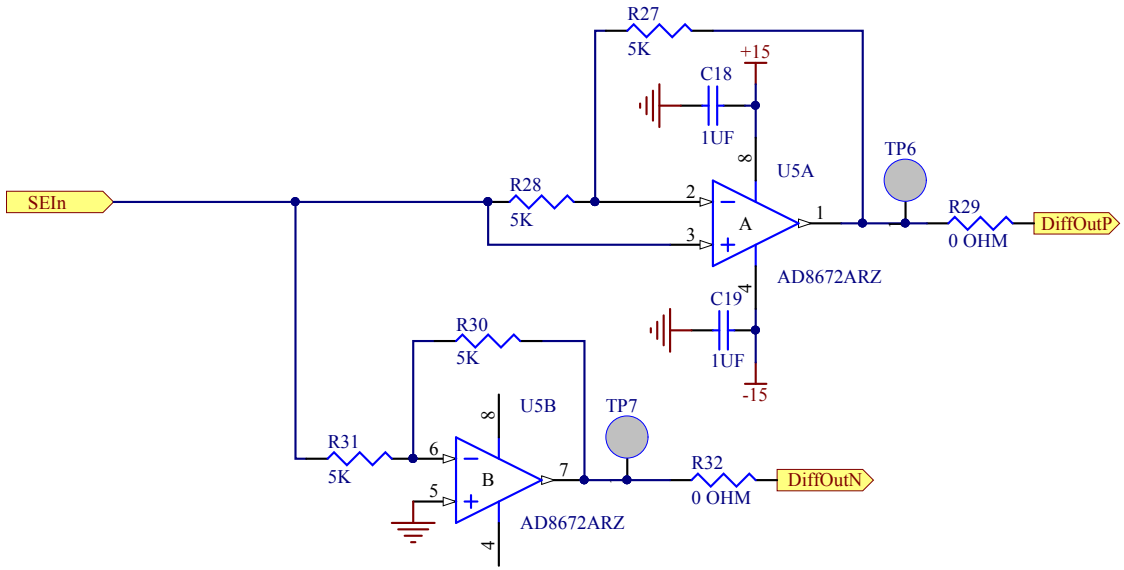

Digital Zero Input From DAC
U_DiffRecLPFBuff
DiffRecLPFBuffv3.SchDoc
DZero+
DZero-
DSLPFBInputPos
DSLPFBInputNeg
BuffOut0.1Hz
BuffOut10Hz
Switch41
Switchv3.SchDoc
NO
NC
Pole
Switch Readback
Switch
DZPoleRB
DZPoleSw
Pole Select Switch
4 transimpedance Amps
Photodiode 1 Transimpedance
Photodiode 2 Transimpedance
Photodiode 3 Transimpedance
Photodiode 4 Transimpedance
TxImp11
TxImp21
TxImp31
TxImp41
Transimpedancev3.SchDoc
DiodeIn
TxImpOut
LED400
LED2K
PD1TI400
PD1TI2K
PD2TI400
PD2TI2K
PD3TI400
PD3TI2K
PD4TI400
PD4TI2K
Differential Driver
Diff51
Diff71
Diff91
Diff111
SEtoDiffv3.SchDoc
SEIn
DiffOutP
DiffOutN
PDASlow+
PDASlow-
PDBSlow+
PDBSlow-
PDCSlow+
PDCSlow-
PDDSlow+
PDDSlow-
PD A to Slow ADC
PD B to Slow ADC
PD C to Slow ADC
PD D to Slow ADC
Whitening, and differential Driver
White41
White51
White61
White71
Whteningv3.SchDoc
WhtIn
WhtOut
PD AOut
PD BOut
PD COut
PD DOut
To Summing Node
AAWht_A
AAWht_B
AAWht_C
AAWht_D
AAWhtIn
AAWhtOut
AAWht.SchDoc
TP18
TP19
TP20
TP21
Diff81
Diff101
Diff121
PDAFast+
PDAFast-
PDBFast+
PDBFast-
PDCFast+
PDCFast-
PDDFast+
PDDFast-
PD A to Fast ADC
PD B to Fast ADC
PD C to Fast ADC
PD D to Fast ADC
AA Wht is inverting so the PD Fast signals Have a sign flip.
Four PD Inputs
JDZ
JPDA
JPDB
JPDC
JPDD
Summing Node
R47
226
R48
1K
R49
1K
R51
1K
R52
1K
R50
1K
InvOpA31
InvertingOpAmpv3.SchDoc
Input
Output
SUM
Sum Monitor
R40
0
R41
N/P
C33
1UF
C34
1UF
+15
-15
U3
OP27GS
P2
BNC
J1
D Connector 25
RShld
0
+5VBias
PD A
PD B
PD C
PD D
J2
DZero+
DZero-
PDAFast+
PDAFast-
PDASlow-
PDBFast+
PDBFast-
PDBSlow-
PDCFast+
PDCFast-
PDCSlow-
PDDFast+
PDDFast-
PDDSlow-
SUM
DZPoleSw
DZPoleRB
Binary1RB
Binary2RB
Binary3RB
TP12
TP13
TP14
GND
P1
Header 3
4 PD transimpedance Value Indicator LEDs
DPD1
DPD2
DPD3
DPD4
DUAL_LED
D1
D7
R1
R2
R19
R20
1K
LM317 VOUT = 1.25 x (1 + RAdj/Ro) + (46uA x RAdj)
D9
RB160M-60
D10
TVS
GND
V+
+Vin
TP11
V1
LM317T
In
Out
Adj
R3
249
Ro
RAdj
R4
750
D11
RB160M-60
D12
1N4002
TP1
Bias
+5VBias
C7
1uF Tant. 50V
C8
47uF, 20V
C9
10uF, 35V
Title
Transimpedance and Summing
Size:
C
DCC Number: D1600193
Drawn by:
Date:12/14/2017
Revision: V3
Ligo Project
California Institute of Technology
Massachusetts Institute of Technology
LIGO
File: C:\restored\Ben\ISS Outer Loop\TxImpedanceBoardv3\TransimpedanceBoardv3.SchDoc
Sheet 1 of 8

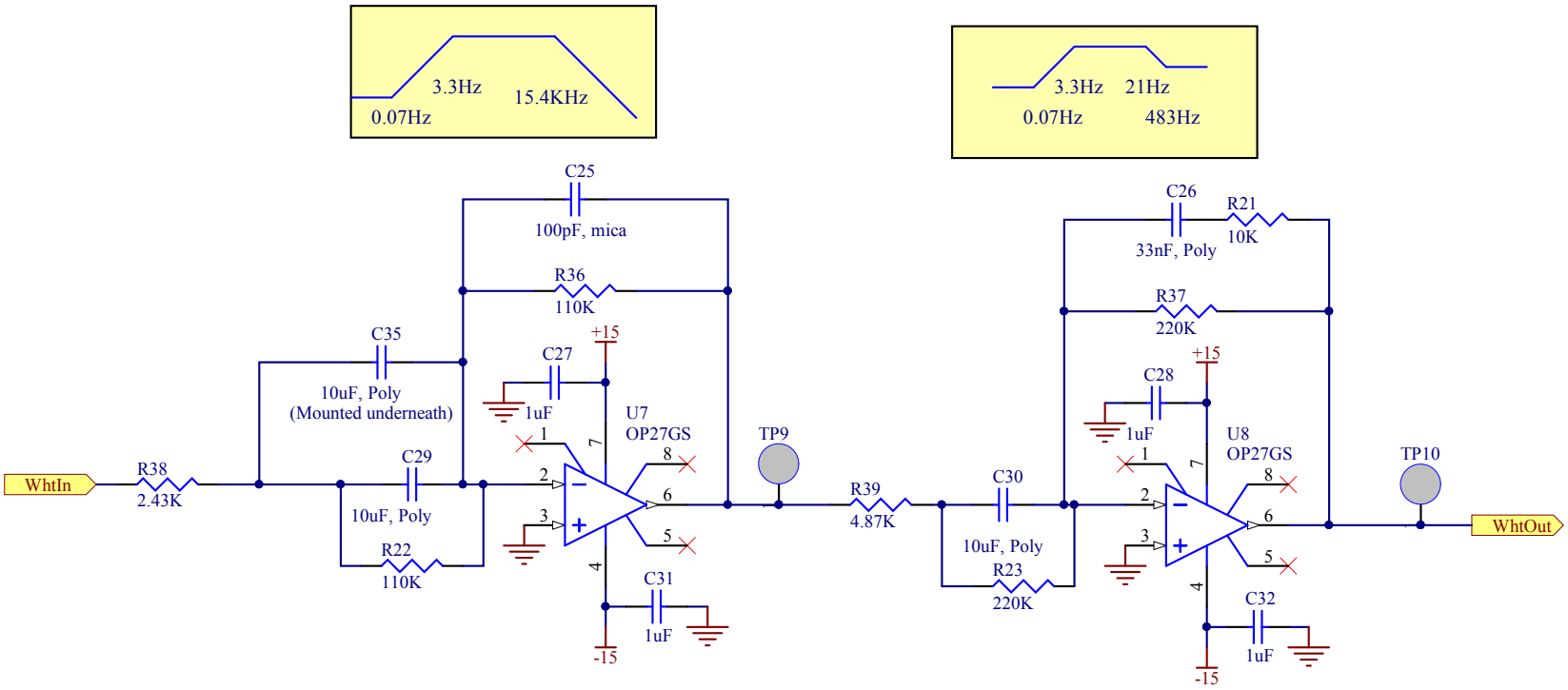


Title	***Transimpedance Stage***		
Size: A	DCC Number: D1600193		*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3	
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\Transimpedance.SchDoc		Time: 11:55:45 AM	Sheet 2 of 8



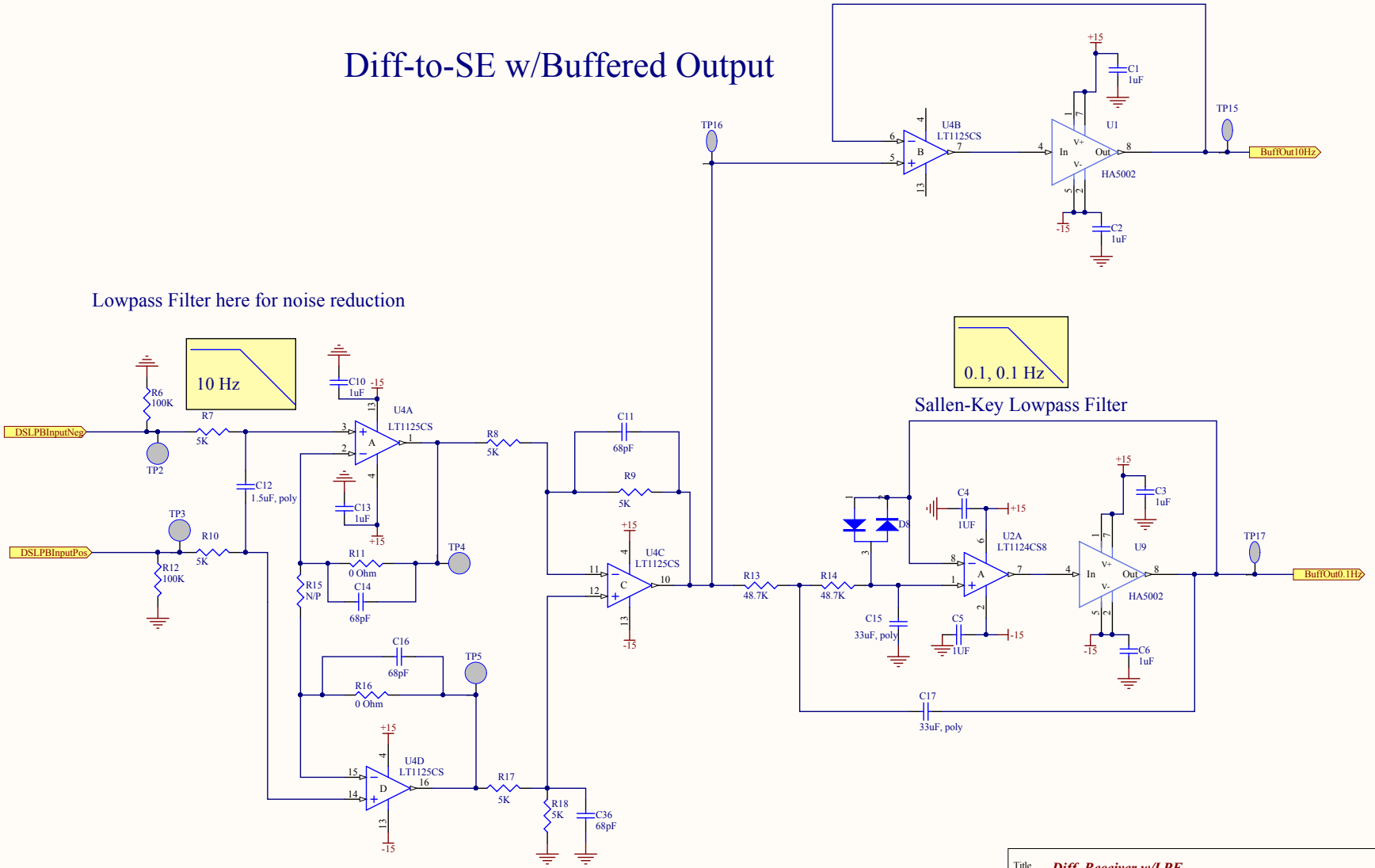
Title	***Single-Ended to Differential***		
Size: A	DCC Number: D1600193		*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3	
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\SEtoDiffv3.SchDoc	Time: 11:55:45 AM	Sheet 3 of 8	

Overall DC Gain = .957

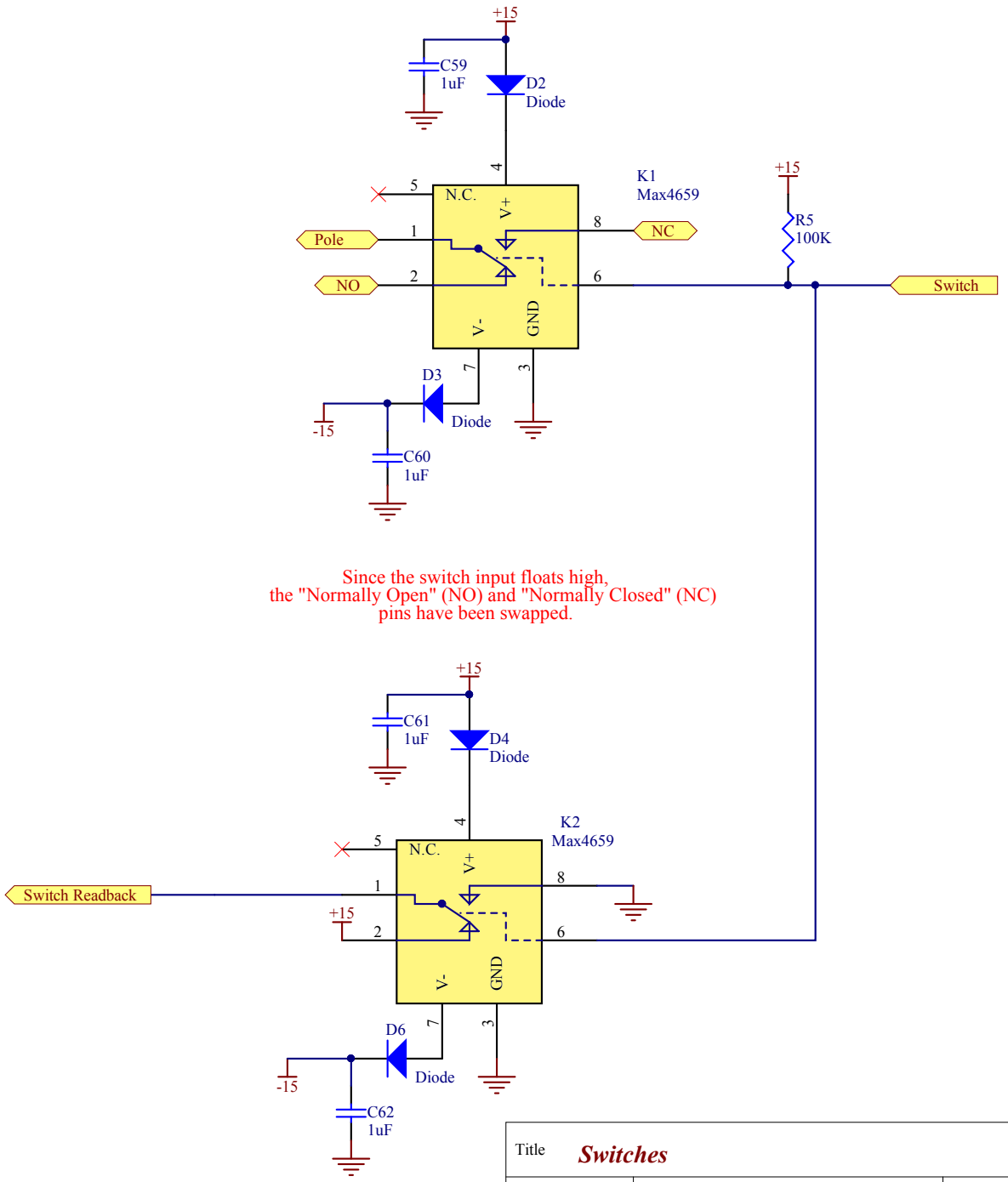


Title: ***Whitening***			
Size: A	DCC Number: D1600193		*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3	
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\Whiteningv3.SchDoc		Time: 11:55:45 AM	Sheet 4 of 8

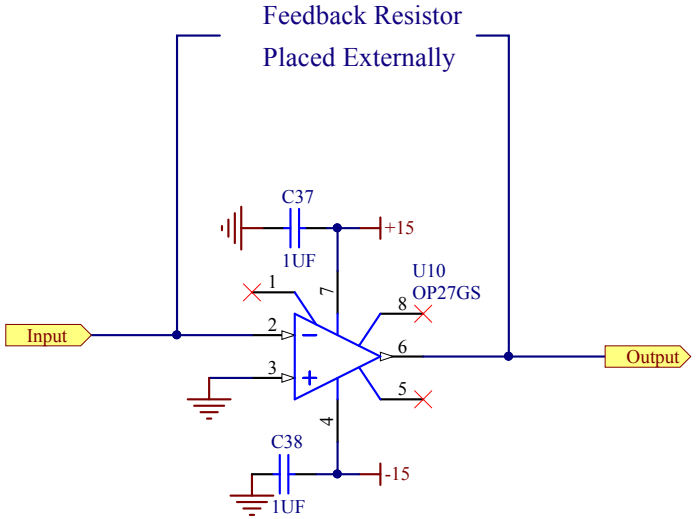
Diff-to-SE w/Buffered Output



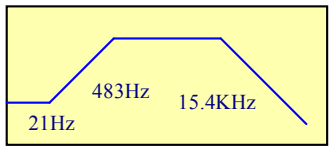
Title	***Diff. Receiver w/LPF***	
Size: B	DCC Number: D1600193	*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\DiffRecLPF.SchDoc	Time: 11:55:45 AM	Sheet 5 of 8

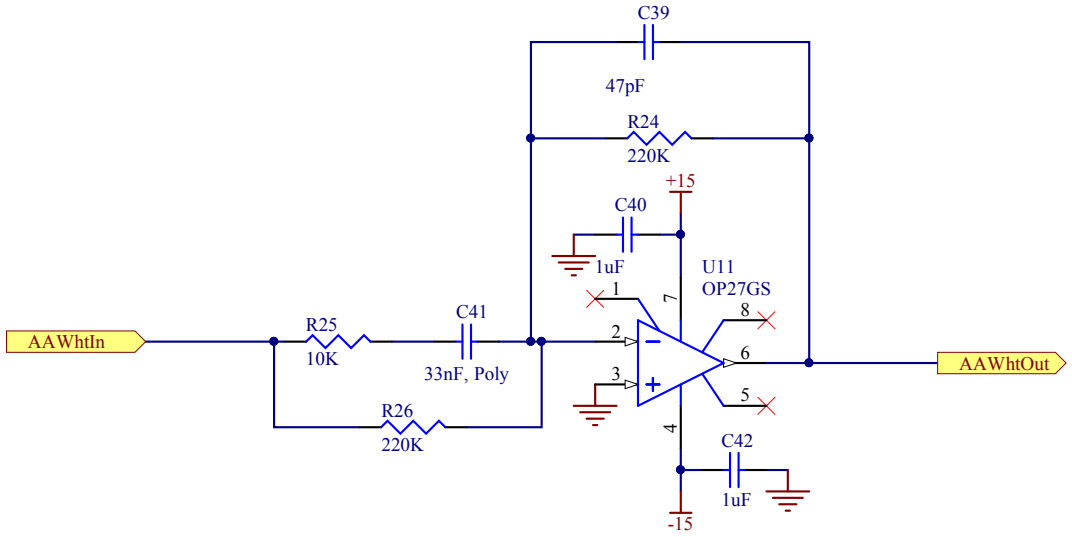


Title	***Switches***		
Size: A	DCC Number: D1600193		*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3	
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\Switchv3.SchDoc	Time: 11:55:45 AM	Sheet 6 of 8	

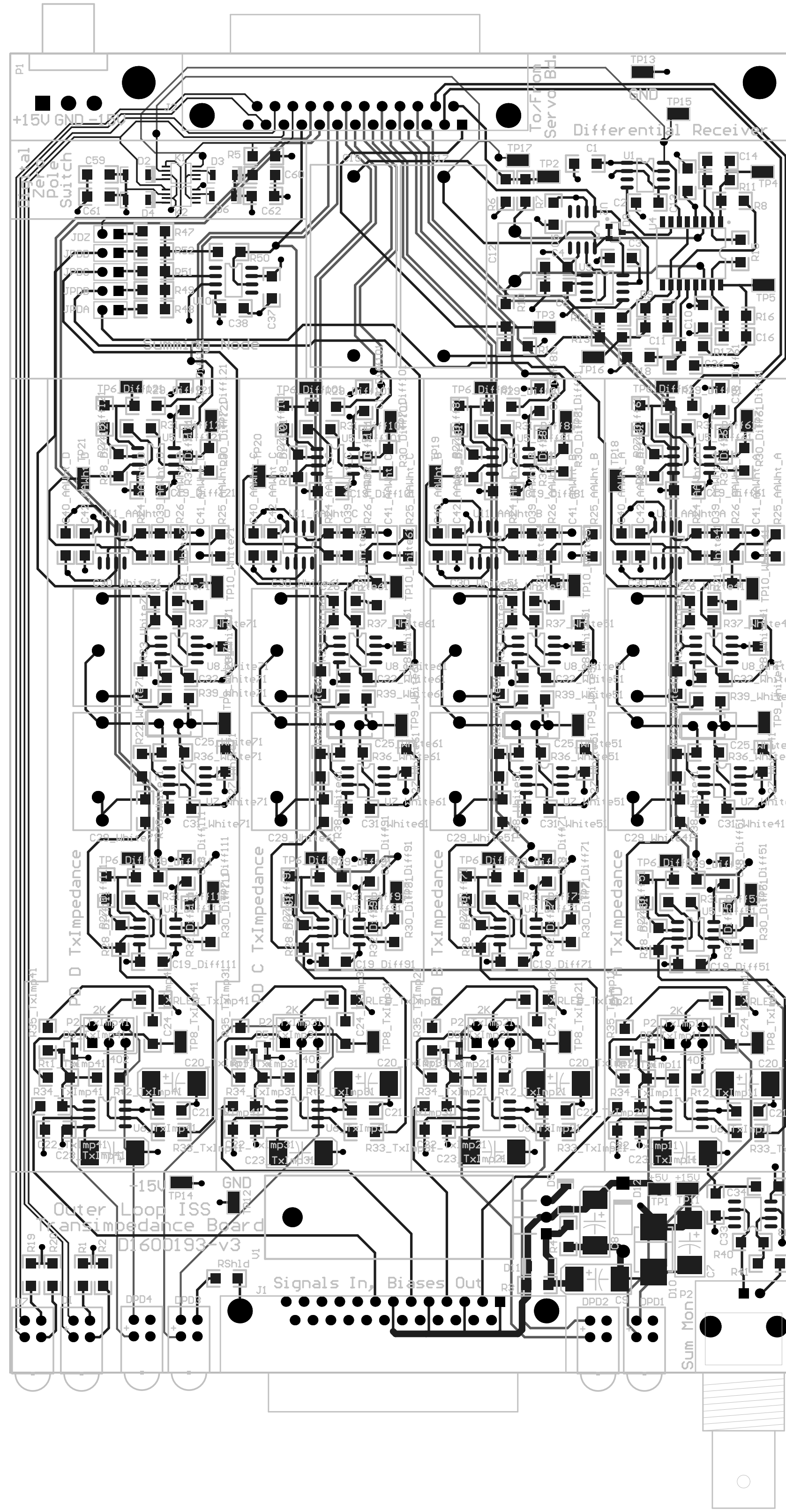


Title	***Inverting OpAmp***		
Size: A	DCC Number: D1600193		*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3	
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\InvertingOpAmp3.SchDoc		Time: 3:15:45 AM	Sheet 7 of 8





Title: *AA Whitening*			
Size: A	DCC Number: D1600193		*Ligo Project* *California Institute of Technology* *Massachusetts Institute of Technology*
Drawn by: Ben Abbott	Date: 12/14/2017	Revision: v3	
File: C:\restored\Ben\ISS Outer Loop\TximpedanceBoardv3\AAWht.SchDoc	Time: 11:55:45 AM	Sheet 8 of 8	


+15V GND -15V
Differential Receiver
Outer Loop ISS
Transimpedance Board
D1600193-v3
Signals In, Biases Out
Sum Mon
GND