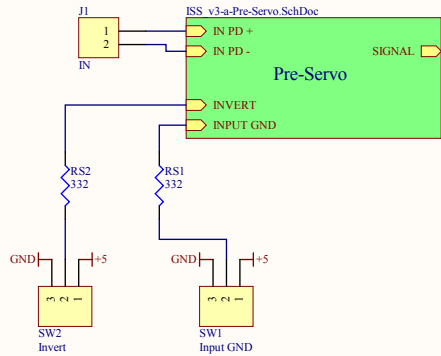
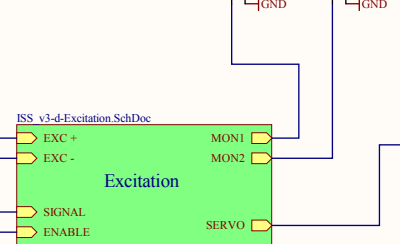


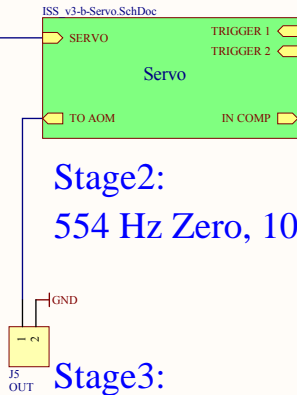
$$(IN * 1.33 - 5)$$



3.98 MHz Pole



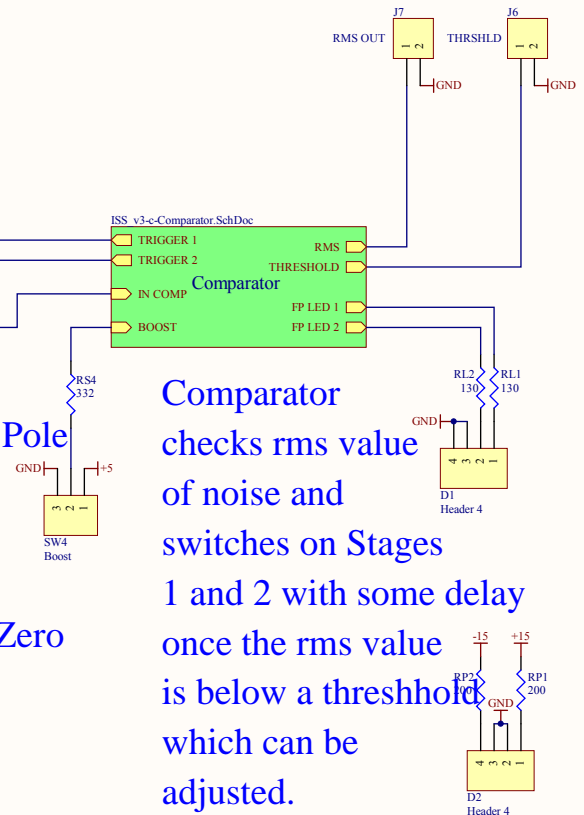
Stage1: Gain of 6.36  
Always On



Stage2:  
554 Hz Zero, 10kHz Pole

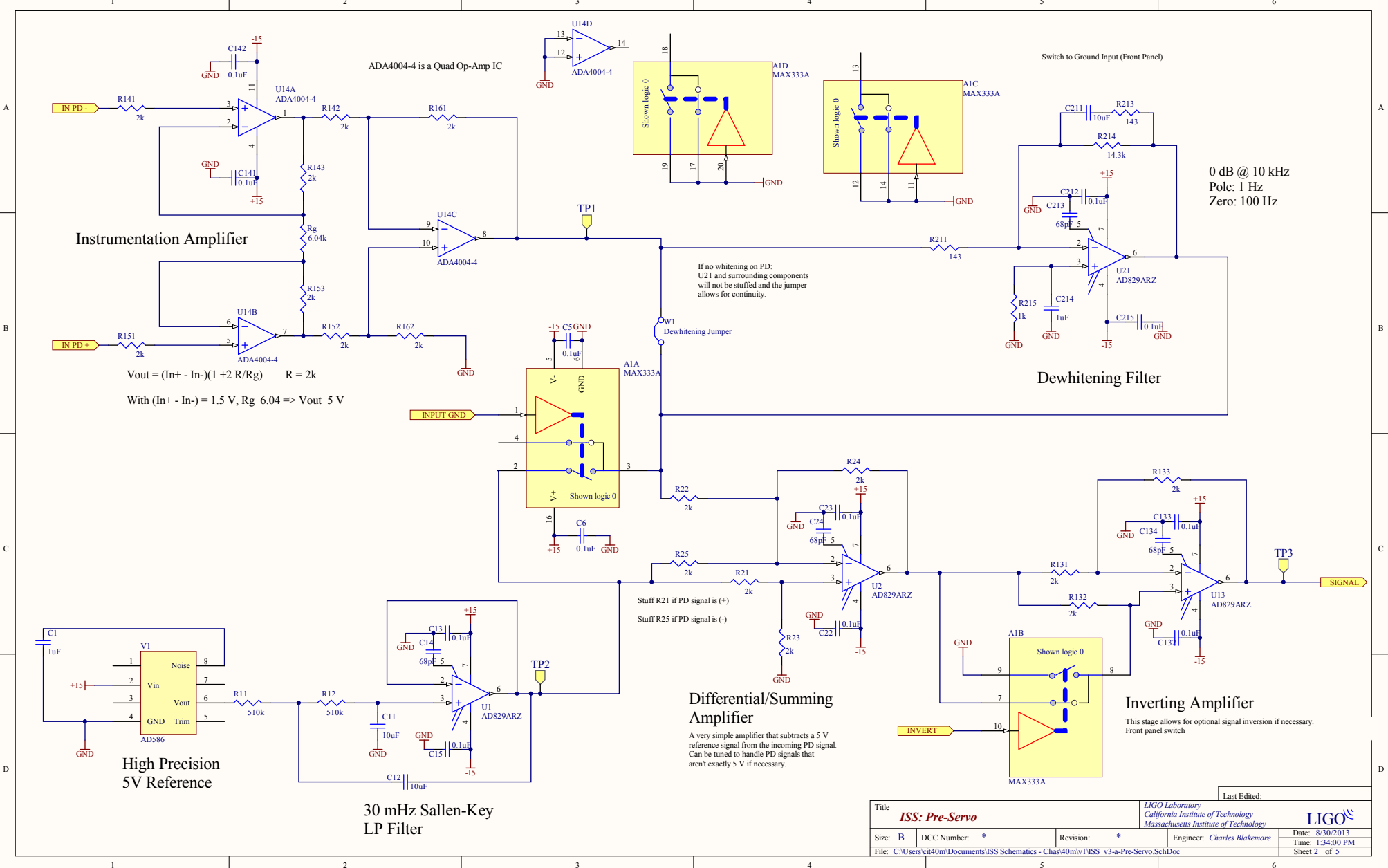
Stage3:  
0Hz Pole, 4.57MHz Zero

Comparator checks rms value of noise and switches on Stages 1 and 2 with some delay once the rms value is below a threshold which can be adjusted.



Last Edited:

Title <b>ISS: Layout + Front Panel Ports/Switches</b>			LIGO Laboratory California Institute of Technology Massachusetts Institute of Technology		LIGO	
Size: B	DCC Number: *	Revision: *	Engineer: Charles Blakemore		Date: 8/30/2013	Time: 1:34:00 PM
File: C:\Users\cit40m\Documents\ISS Schematics - Chas40m\1\ISS_v3.SchDoc					Sheet 1 of 5	



**Instrumentation Amplifier**

$$V_{out} = (In+ - In-)(1 + 2R/R_g)$$

$$\text{With } (In+ - In-) = 1.5 \text{ V, } R_g = 6.04 \Rightarrow V_{out} = 5 \text{ V}$$

**30 mHz Sallen-Key LP Filter**

**Differential/Summing Amplifier**

A very simple amplifier that subtracts a 5 V reference signal from the incoming PD signal. Can be tuned to handle PD signals that aren't exactly 5 V if necessary.

**Dewhiting Filter**

0 dB @ 10 kHz  
 Pole: 1 Hz  
 Zero: 100 Hz

**Inverting Amplifier**

This stage allows for optional signal inversion if necessary. Front panel switch

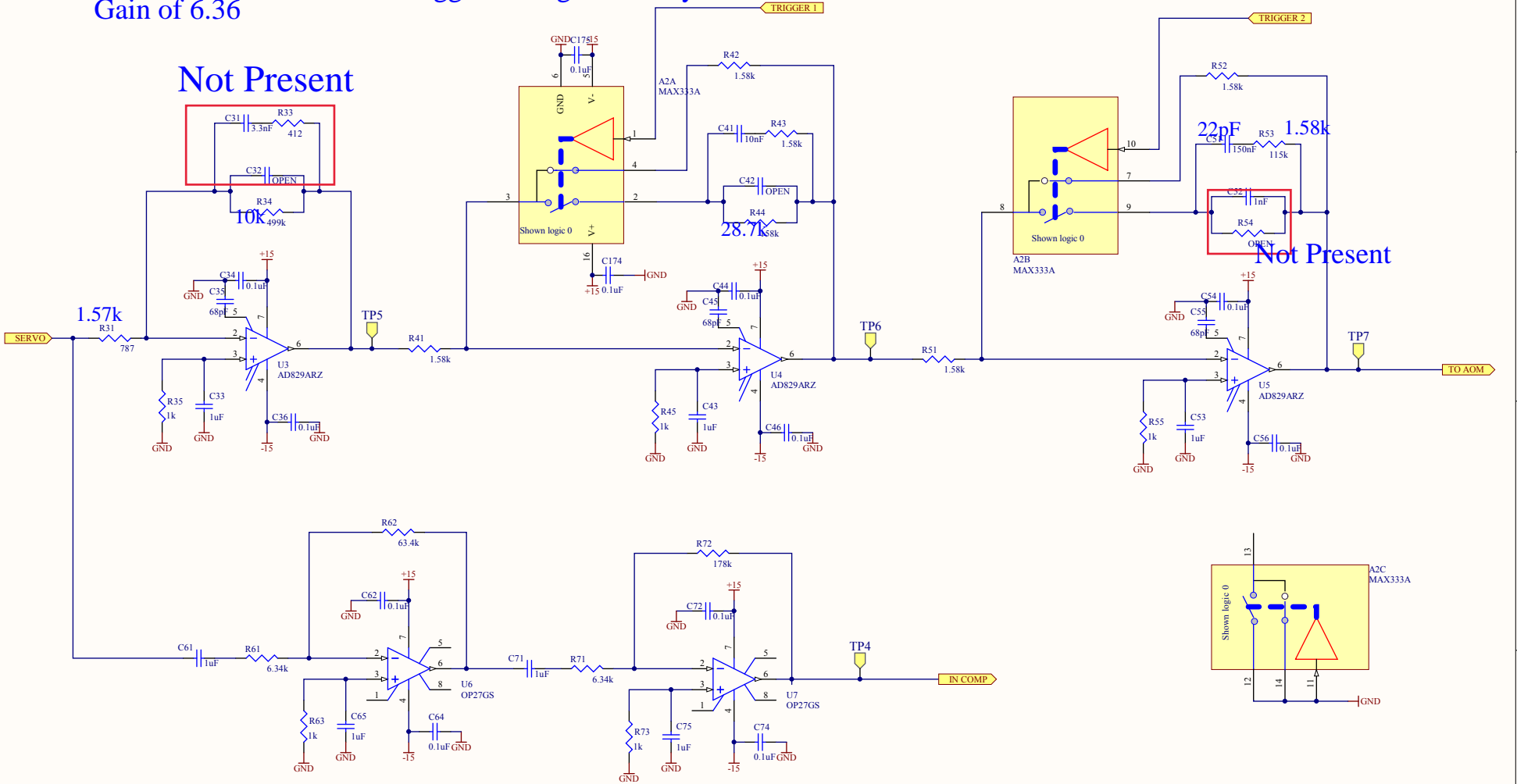
Title		Revision: *		Date: 8/30/2013	
<b>ISS: Pre-Servo</b>		Engineer: Charles Blakemore		Time: 1:34:00 PM	
Size: B		DCC Number: *		File: C:\Users\cit40m\Documents\ISS Schematics - Chas40m\1\ISS v3-a-Pre-Servo_Sch.Doc	
Last Edited:		LIGO Laboratory California Institute of Technology Massachusetts Institute of Technology		LIGO	
Sheet 2 of 5					

If Trigger1 is logic 1: 554Hz Zero, 10kHz Pole  
 If Trigger1 is logic 0: Unity Gain Buffer

If Trigger2 is logic 1: 0Hz Pole, 4.57MHz zero  
 If Trigger2 is logic 0: Unity Gain Buffer

Gain of 6.36

Not Present



Not Present

Title		Last Edited:	
<b>ISS: Servo</b>		LIGO Laboratory California Institute of Technology Massachusetts Institute of Technology	
Size: B	DCC Number: *	Revision: *	Engineer: Charles Blakemore
File: C:\Users\cit40m\Documents\ISS Schematics - Chas40m\1\ISS v34-Servo.SchDoc			Date: 8/30/2013 Time: 1:34:00 PM Sheet 3 of 5

# AD8436 RMS-to-DC Converter

Here, the AD8436 is connected according to the manufacturer recommendations. Pin connections on the AD8436 come directly from the manufacturer's datasheet. ([www.analog.com/static/imported-files/data\\_sheets/AD8436.pdf](http://www.analog.com/static/imported-files/data_sheets/AD8436.pdf))

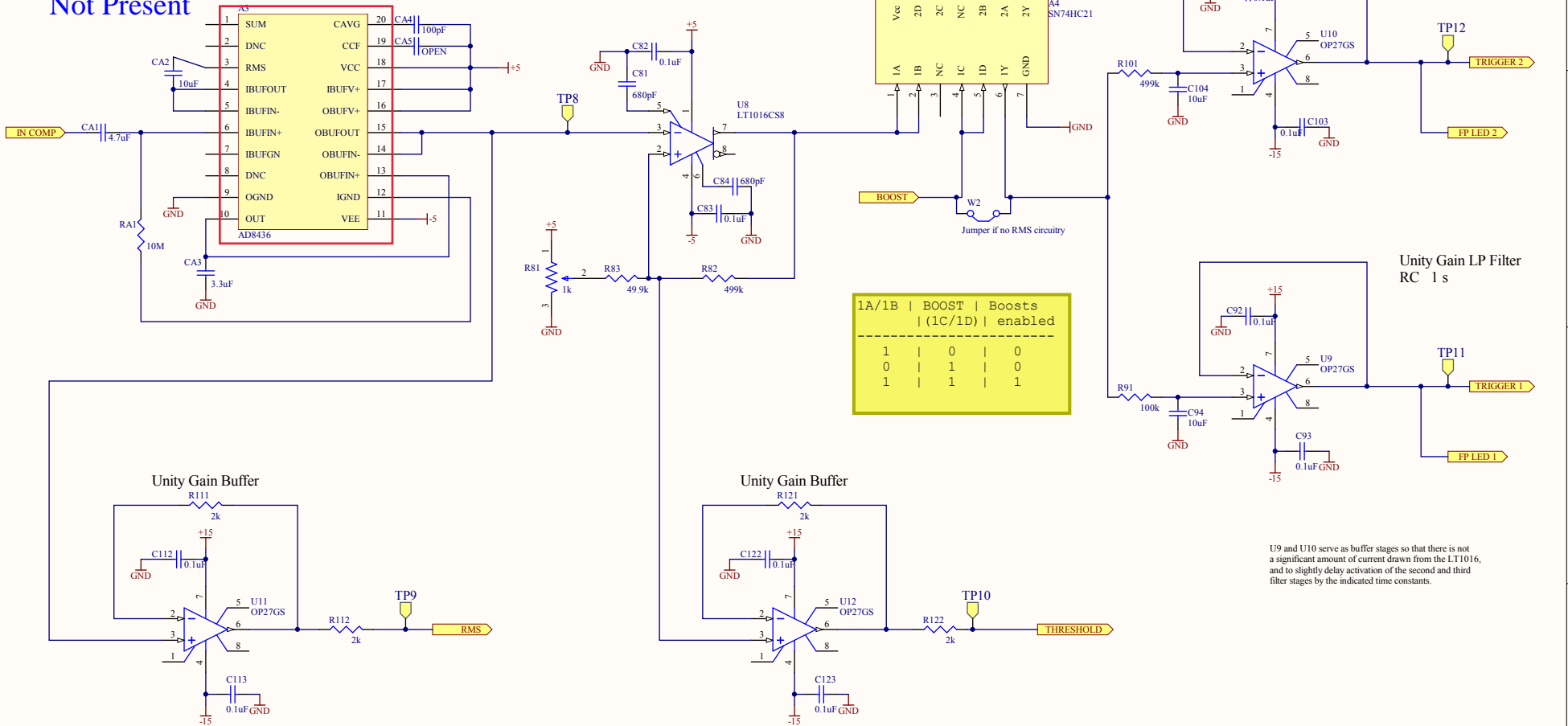
This is a very simple design to accomplish basic RMS-to-DC conversion and should work quite effectively for the type of inputs we're interested in.

The LT1016 and accompanying circuitry has two states. If the DC-voltage from the AD8436 is larger than the threshold established by the potentiometer then the LT1016's output is set at 0 V.

If the DC-voltage input is lower than the threshold, then the LT1016's output is 3.5 V (based on datasheet).

The ratio R83/R82 sets the hysteresis. If Voh is the high level output of the comp. and Vol is the low level then  $\Delta V = (R83/R82) * (Voh - Vol)$

Not Present

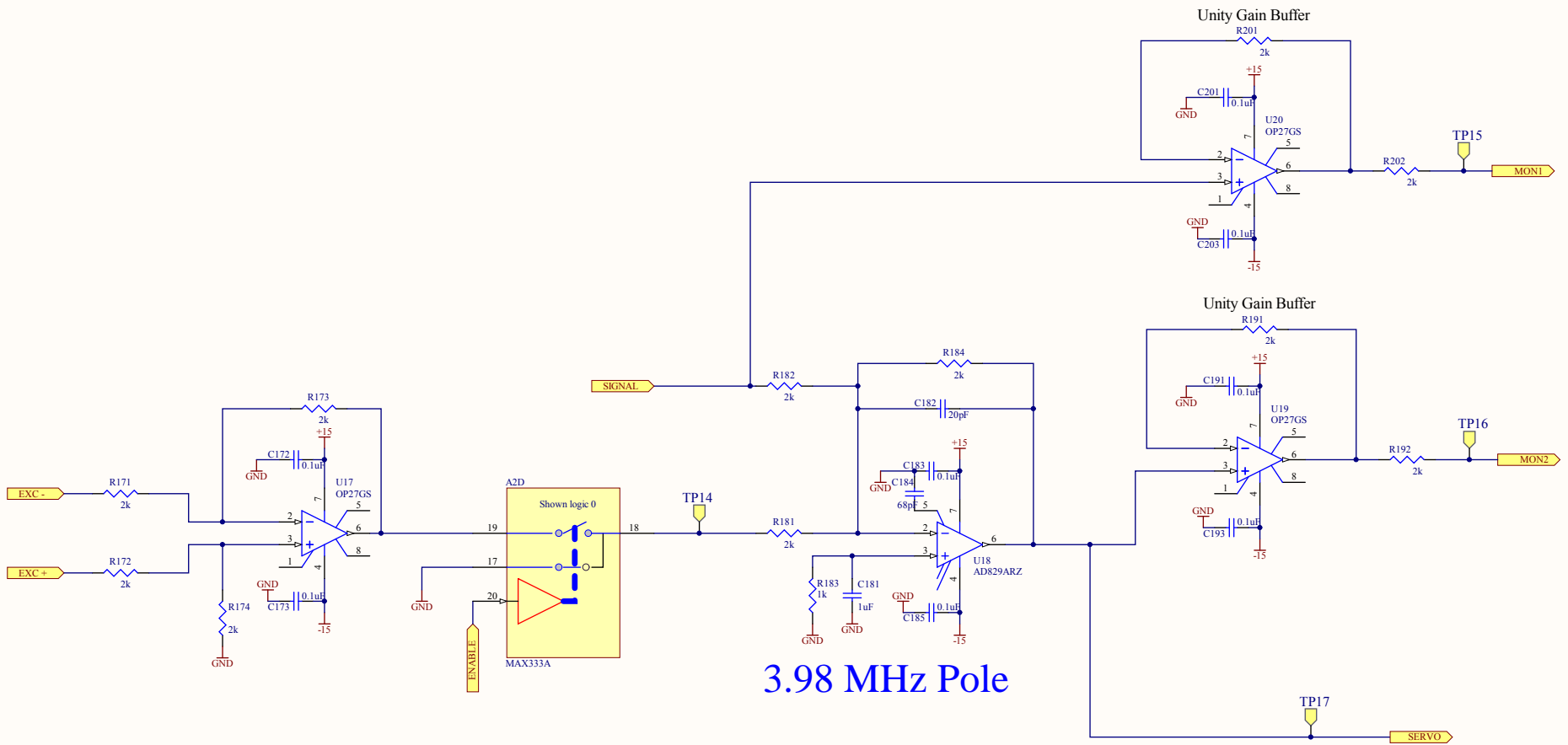


1A/1B	BOOST	Boosts
(1C/1D)  enabled		
1	0	0
0	1	0
1	1	1

U9 and U10 serve as buffer stages so that there is not a significant amount of current drawn from the LT1016, and to slightly delay activation of the second and third filter stages by the indicated time constants.

Last Edited:

Title		LIGO Laboratory California Institute of Technology Massachusetts Institute of Technology		LIGO	
ISS: Comparator + Triggering				Date: 8/30/2013	
Size: B	DCC Number: *	Revision: *	Engineer: Charles Blakemore	Time: 1:34:00 PM	
File: C:\Users\cit40m\Documents\ISS Schematics - Chas40m\1\ISS v3-e-Comparator.SchDoc				Sheet 4 of 5	



3.98 MHz Pole

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Title		LIGO Laboratory California Institute of Technology Massachusetts Institute of Technology		LIGO	
Size: B	DCC Number: *	Revision: *	Engineer: Charles Blakemore	Date: 8/30/2013	Time: 1:34:00 PM
File: C:\Users\cit40m\Documents\ISS Schematics - Chas40m\1\ISS v3-4-Excitation.SchDoc					
				Sheet 5 of 5	



# D1300694-v1 40m/Caltech ISS Board



Serial Number  
[Redacted]

