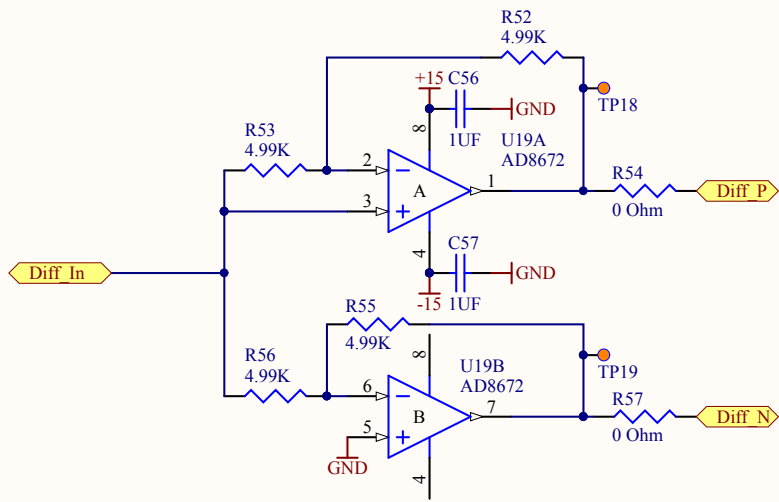


Revisions and Modifications for version 5:

1. Used shorter heat sinks for regulators so it will fit in a 1U chassis.
2. Finned voltage reference is a 10V part. The bill of materials had this at 5V.
3. R42 changed from 750 to 2.21k to provide about 15VDC regulated power for the laser diode.
4. Added a 499k resistor to pick up the Vref connection, thus improving the accuracy of the current monitor.
5. Put a FET back onto the base drive of the main current modulator to eliminate base current error.
6. Changed R44 to 10k to make current readout more reasonable.
7. Diode protection of U9 by back-to-back diodes across positive and negative inputs.
8. Change C14 from 68pF to 27pF for less compensation of the AD829.
9. Add provision to drive the chassis rear panel LEDs for +/- 15VDC.
10. Change C39 to 100pF.
11. Change C35 to 10nF to 1uF, should update footprint to leaded plastic capacitor.
12. Q1 E-B Backwards on PCB.
13. Change R31 from 100 to 50 ohms to increase the current range.
14. Added protection diode to Q1 base (D12).


Version 6:

1. Due to several MHz oscillation in the high frequency current source, R40 changes from 1k to zero ohms.

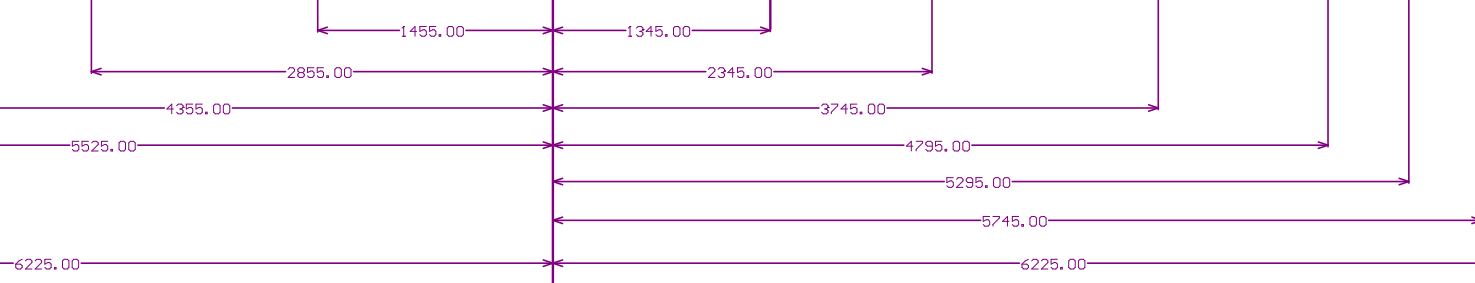
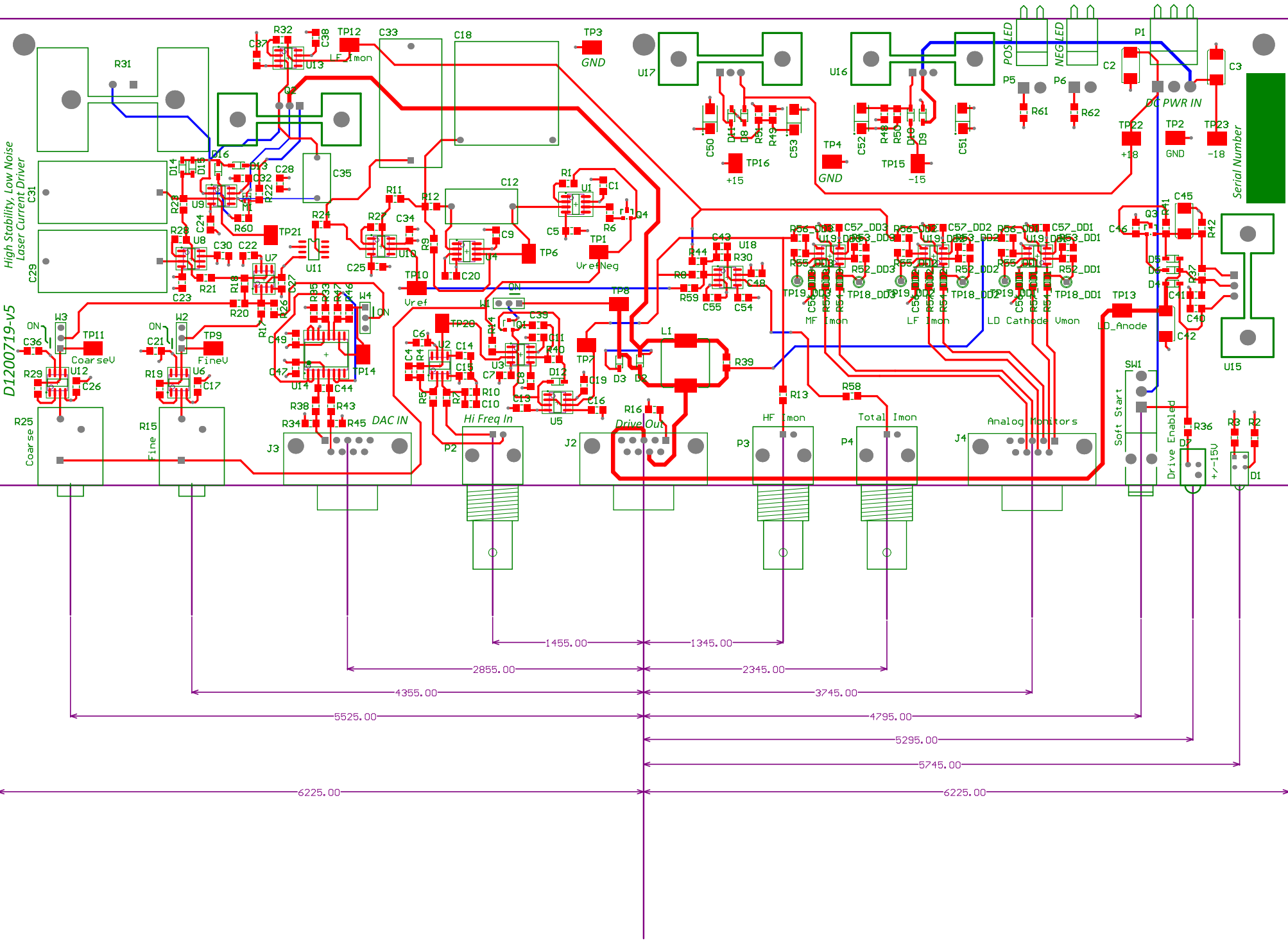


Typical LIGO differential driver circuit for the monitor signals.

Last Edited: 2/18/2016

Title Differential Driver		LIGO Laboratory California Institute of Technology Massachusetts Institute of Technology		
Size: A	DCC Number: *	Revision: V5	Engineer: R.S. Abbott	
Date: 10/31/2016				Sheet 2 of 2
Time: 4:25:17 PM				

D1200719-v5
High Stability, Low Noise
Laser Current Driver



LIGO Bill of Materials

Source Data From: Laser Diode Driver v6.PrjPcb
 Board Designed By: R.S. Abbott
 Board D-number: D1200719
 Board Revision: V5
 Variant: None

Creation Date: 10/31/2016 4:25:24 PM
 Print Date: 31-Oct-16 4:25:30 PM

Designator	Comment	Description	Digikey Part Number	Manufacturers Part Number	Quantity
C1, C5, C9, C20	1UF	Polarized Cap	PCC2234CT-ND		4
C2, C3	10UF Tantalum, 35V	Capacitor	478-1701-1-ND	TAJX106K035RNJ	2
C4, C10, C43	4.7nF	Capacitor	478-1484-1-ND		3
C6, C7, C11, C13, C15, C17, C19, C21, C22, C23, C24, C25, C26, C27, C30, C32, C34, C36, C37, C38, C40, C46, C47, C48, C49, C55, C56_DD1, C56_DD2, C56_DD3, C57_DD1, C57_DD2, C57_DD3	1UF	CAP 1.0UF 50V CERAMIC F 1206, Capacitor	478-1580-1-ND		32
C8, C16, C54	88pF	Capacitor	478-1478-1-ND		3
C12	2.7UF	Capacitor	EF1275-ND		1
C14	27pF	Capacitor	399-9341-1-ND		1
C18	10UF	Capacitor	EF1106-ND		1
C28, C41	100nF	Capacitor	478-1556-1-ND		2
C29, C31, C33	20uF	Polarized Cap	478-2592-ND		3
C35	1uF	Capacitor	EF1105-ND	ECQ-E 1105KF	1
C42	100pF	Capacitor	311-1181-1-ND		1
C44	22uF	Polarized Cap	478-1712-1-ND		1
	5.6nF	CAP 1.0UF 50V CERAMIC F 1206	PCF1305CT-ND		1
C45, C50, C51, C52, C53	10uF, 10UF Tantalum, 35V	Polarized Cap	478-4973-1-ND	TAJX106M035RNJ	5
D1	DUAL LED	Dual Led Indicator	67-1321-ND		1
D2, D3, D4, D5, D6, D8, D9, D10, D11, D12, D13, D14, D15, D16	RB160M-60	1 Amp General Purpose Rectifier, High Conductance Fast Diode	RB160M-60CT-ND		14
D7	LED-GREEN	LED GREEN T1-3/4 RT ANG PCB	L20015-ND		1
J2	D Connector 9	Receptacle Assembly, 9 Position, Right Angle	6E17C-009S-AJ-120-ND		1
J3	Male D9	Receptacle Assembly, 9 Position, Right Angle	6E17C-009P-AJ-121-ND		1
J4	D9 Female	Receptacle Assembly, 9 Position, Right Angle	A32117-ND		1
L1	Inductor	Inductor	308-1331-1-ND		1
M1	NMOS	ROHM N-Channel MOSFET	2SK3019TLCT-ND		1
P1	Header 3	Header, 3-Pin	WM5236-ND		1
P2, P3, P4	BNC	Header, 2-Pin	A32244-ND		3
P5, P6	Header 2	Header, 2-Pin	A31688-ND		2
Part1	TO-220 Heatsink	For BOM Only	HS404-ND		1
Part2, Part3, Part4, Part5	TO-220 Heatsink	For BOM Only	HS403-ND		4
Part6, Part7	Panel Mount Locking Knob	For BOM Only	H-22-BA-SB-ND		2
Q1	2N6551	NPN General Purpose Amplifier	MMBT5551LT1GOSCT-ND		1
Q2	2N6292	SOT23 NPN Silicon Planar High-Performance Transistor	2N6292GOS-ND		1
Q3, Q4	2N2907, PN2907A	PNP General Purpose Amplifier	MMBT2907AFSCT-ND		2
R1, R13, R19, R27, R28, R29, R32, R58	499	Resistor	RNCP1206FTD499RCT-ND		8
R2, R3, R36, R61, R62	2K	Resistor	P2.0KECT-ND		5
R4, R5, R6, R7, R10, R22, R38, R41, R43, R60	1K	Resistor	PAT1.00KCT-ND	WSL1206000002EA9	10
R8, R59	499k	Resistor	RG32P499KBCT-ND		2
R9, R11	43.2K	Resistor	P43.2KFCT-ND		2
R12	24.3K	Resistor	P24.3KFCT-ND		1
R14, R52_DD1, R52_DD2, R52_DD3, R53_DD1, R53_DD2, R53_DD3, R55_DD1, R55_DD2, R55_DD3, R56_DD1, R56_DD2, R56_DD3	4.99k	Resistor	RNCP1206FTD4K99CT-ND		13
R15, R25	10k	Potentiometer	83A1A-B24-115L-ND		2
R16	2.1k	Resistor	RNCF1206DTE2K10CT-ND		1
R17, R34, R45	100k, 100K OHM	Resistor	CRT1206-BY-1003ELFCT-ND		3
R18, R20, R21, R23, R24, R26, R30, R44	10K	Resistor	CRT1206-BY-1002ELFCT-ND		8
R31	Res3	Resistor	696-1352-ND		1
R33, R35, R46, R47	3.01k	Resistor	F3.01KBCT-ND		4
R37, R49	249	Resistor	TNP249ACCT-ND		2
R39	OMIT	Resistor	OMIT		1
R40, R54_DD1, R54_DD2, R54_DD3, R57_DD1, R57_DD2, R57_DD3	0 Ohm, 0 ohms	Resistor	P0.0ECT-ND		7
R42	2.21k	Resistor	RNCP1206FTD2K21CT-ND		1
R48	125		RG32P125BCT-ND		1
R50	1.3K		RG32P1.3KBCT-ND		1
R51	2.7K		RG32P2.7KBCT-ND		1
SW1	SPDT	Rocker SPDT	450-1518-ND		1
TP1, TP2, TP3, TP4, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP20, TP21, TP22, TP23	TESTPNT	PCB Testpoint	5016KCT-ND		19
U1, U6, U7, U8, U9, U10, U12, U13	ADOP27AQ, OP27GS	Low-Noise, Precision Operational Amplifier, Ultra-Low Noise, Precision Operational Amplifier	OP27GSZ-ND		8
U2, U3, U5, U18	AD829	Video Operational Amplifier	AD829ARZ-ND	AD829ARZ	4
U4	OPA140AID	FET Input Operational Amplifier	296-28019-5-ND		1
U11	LT1021	Precision Voltage Reference	LT1021DCS8-10#BPF-ND		1
U14	LT1125CS	Quad Low Noise, High-Speed Precision Operational Amplifier	LT1125CSW#BPF-ND	LT1125CSW#BPF	1
U15, U17	LM317T	Three-Terminal Adjustable Output Positive Voltage Regulator	497-1575-5-ND		2
U16	LM337BT	3-Terminal Adjustable Negative Voltage Regulator	LM337FS-ND		1
U19_DD1, U19_DD2, U19_DD3	AD8672	High-Speed, Low-Power Dual Operational Amplifier	AD8672ARZ-ND		3
W1, W2, W3, W4	Jumper	Jumper Wire	644884-3-ND		4