Table Of Contents

Document history

Credits

General information
- Reading material / usefull weblinks

Schematics
- Original schematics
- Schematics from Jeff
  - Amp left / right
  - Powersupply
- Double Bridge Board

Drill Layout
- Power Supply
- Amp Bord
- DB Board

Part list
- Amp board (per channel)
- Power supply
- Double Bridge Board

Matching R5 to Q1

Hint MOSFET

Hint R8 bias adjusting

Document history

20190714	• Initial document
20190718	• add: Part list for power supply
20190719	• add: Schematics Double Bridge Board • add: Part list for Double Bridge Board • add: Hint from Jeff for R8 adjusting
20190807	• add: Credits • add: Drill Layout
20190930	• Add: Hint MOSFET
20200206	• add: Tranformer & rectiver to the part list

Credits

- Nelson Pass from First Watt for sharing his design and spending the needed Lovoltech LU1014 for free!
- Jeff Young for sharing his gerber files and his support for me in "KiCad"!
- And to all others that the make it possible!

General information

- All pics can be clicked to enlarge.

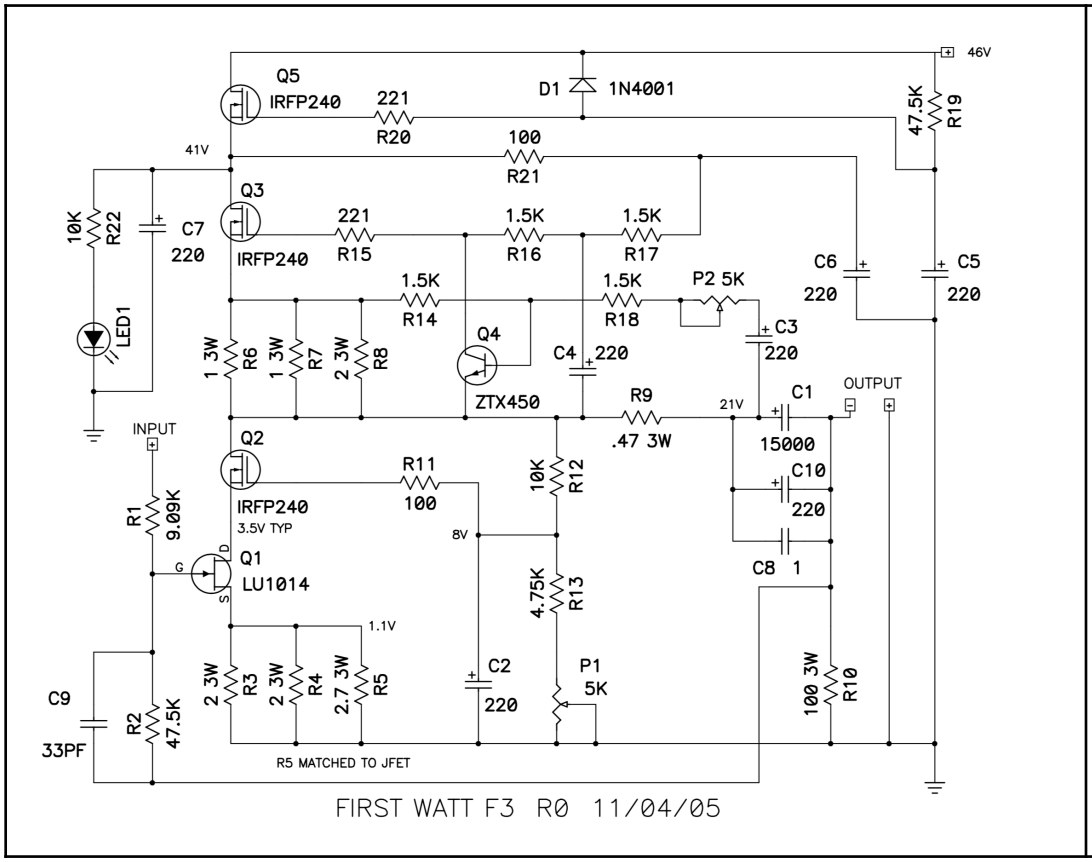
Reading material / usefull weblinks

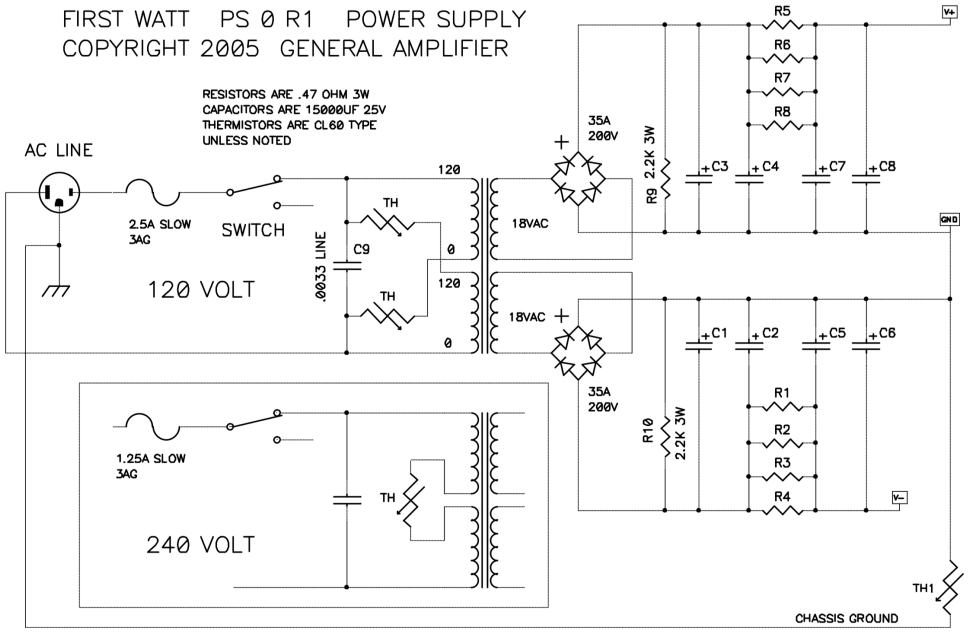
- First Watt - Homepage
- First Watt - Products
- First Watt - F3 - Owners Manual
- First Watt - F3 - Product Manual
- First Watt - F3 - Service Manual
- diyaudio.com - F3 Builders Thread

- Actual group buy state

Schematics

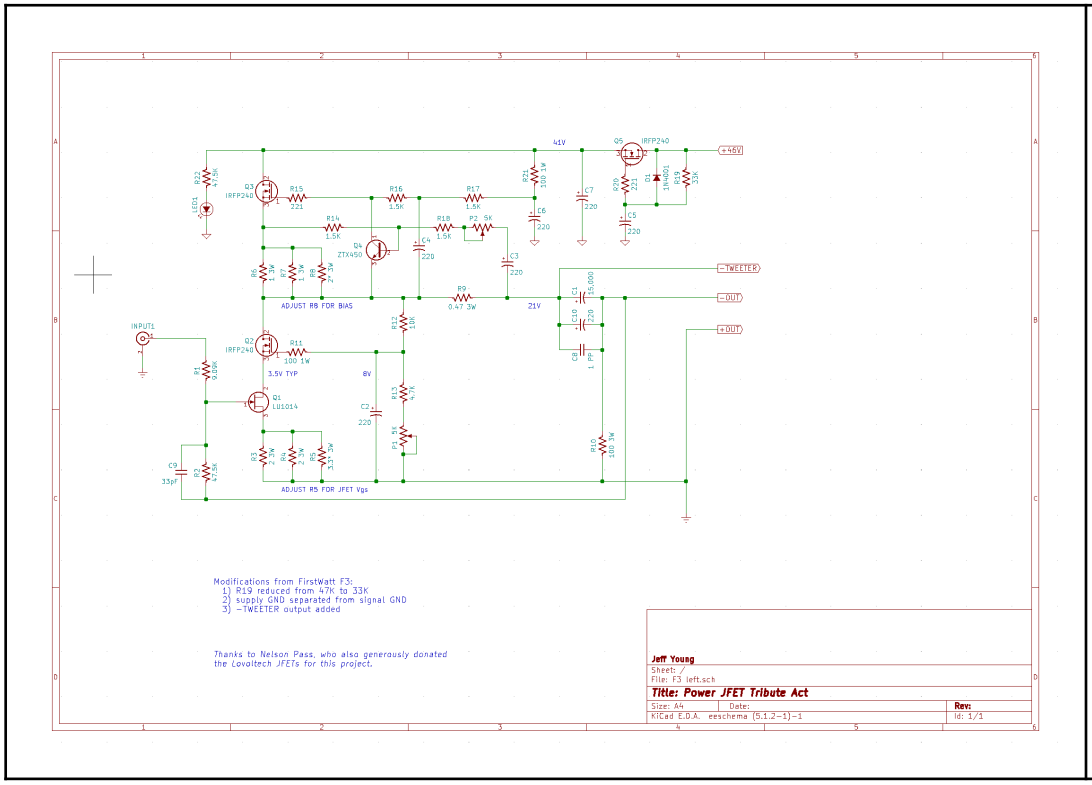
Original schematics

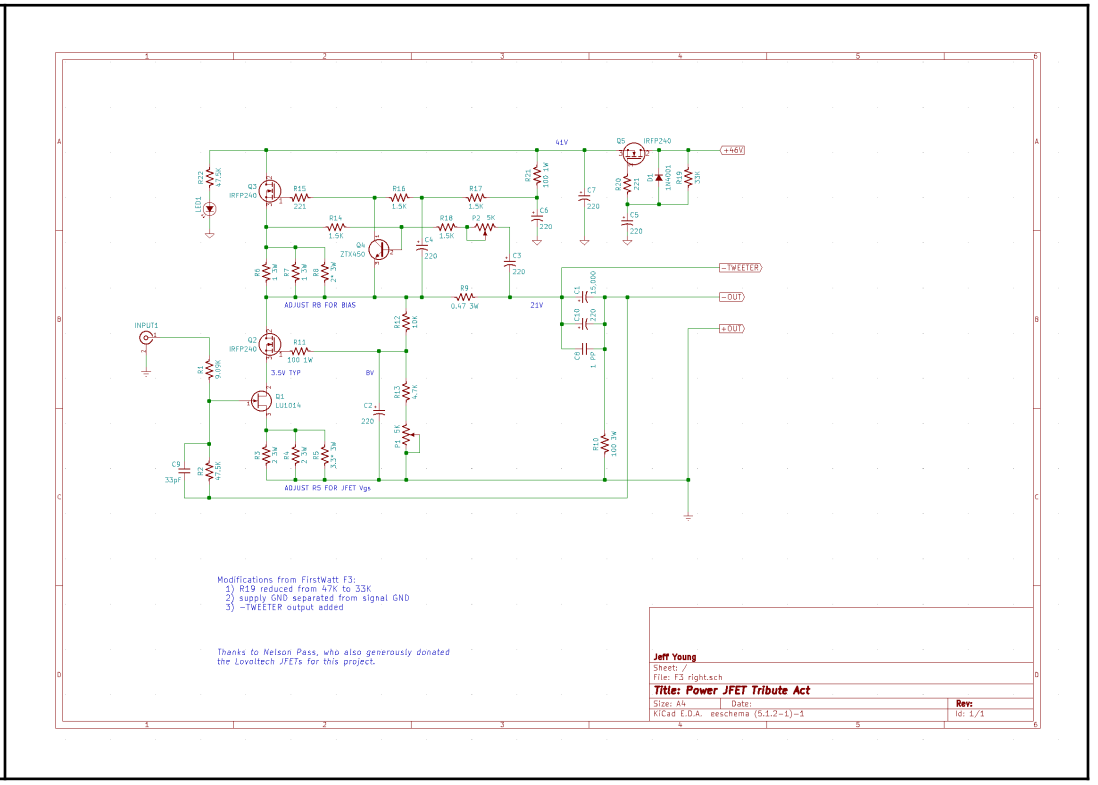




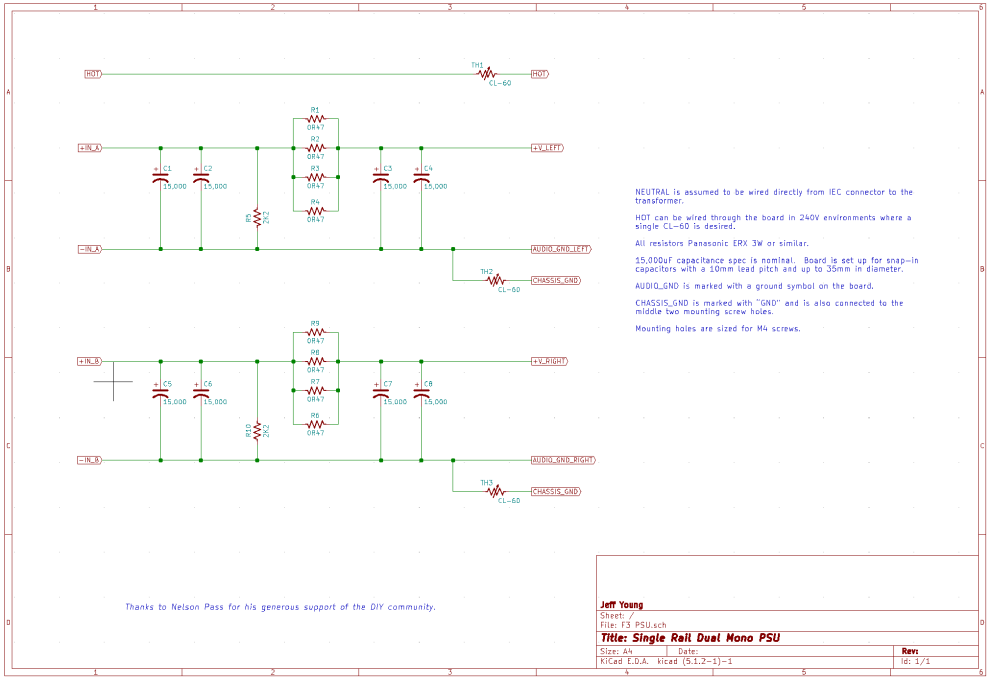
Schematics from Jeff

Amp left / right

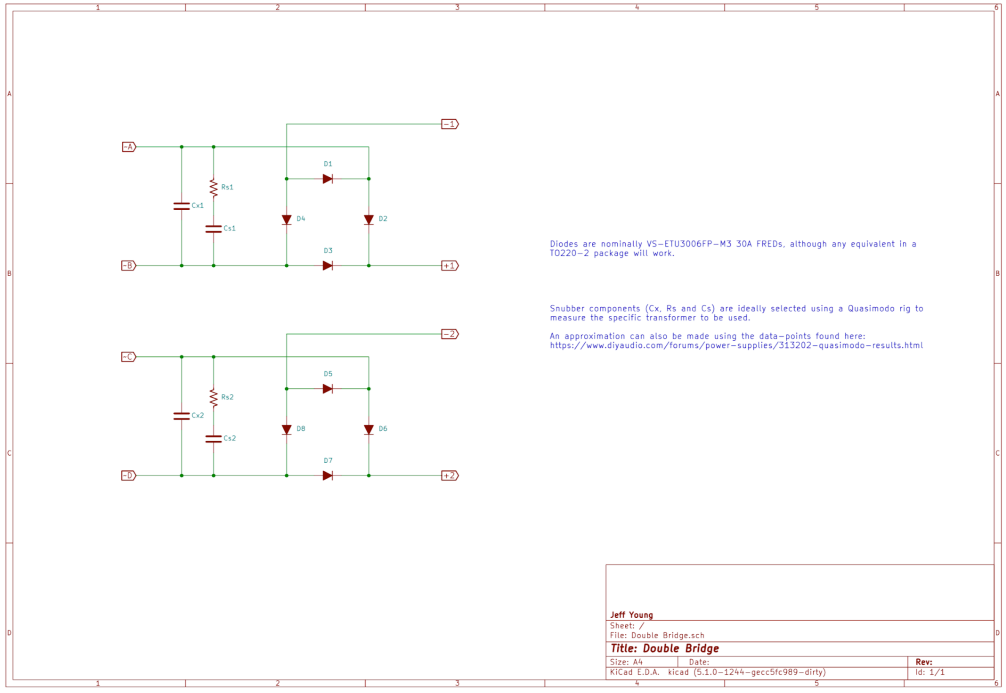




Powersupply

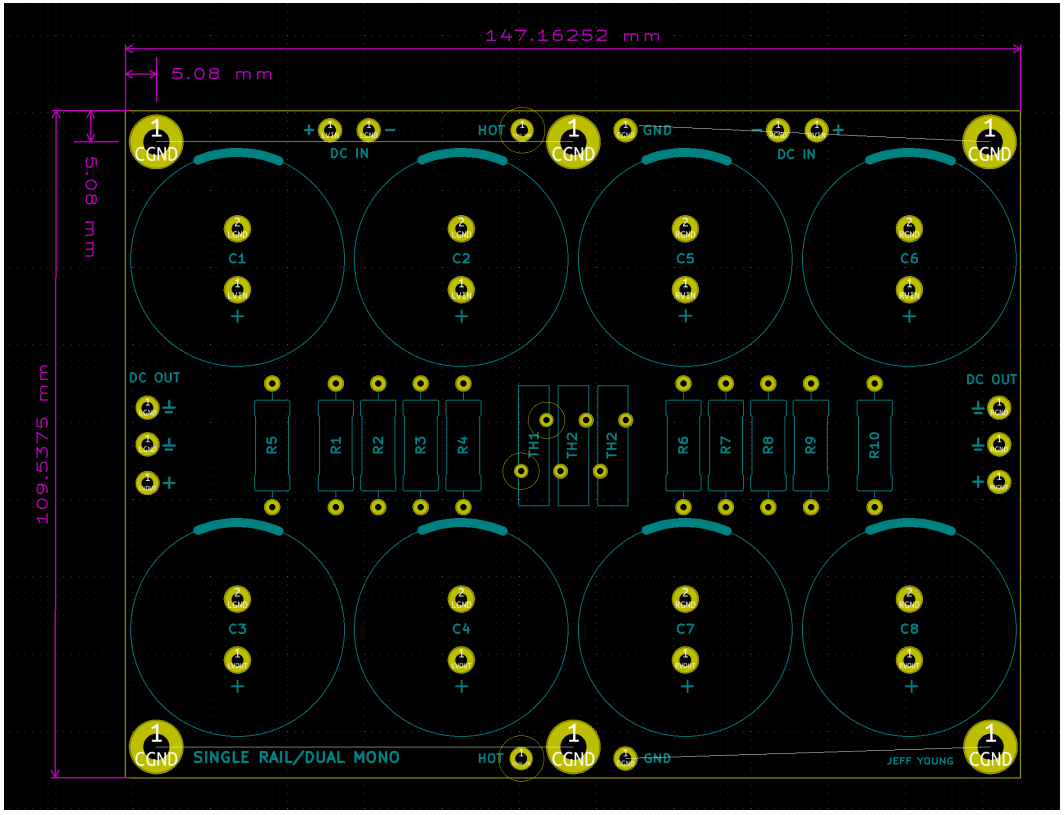


Double Bridge Board

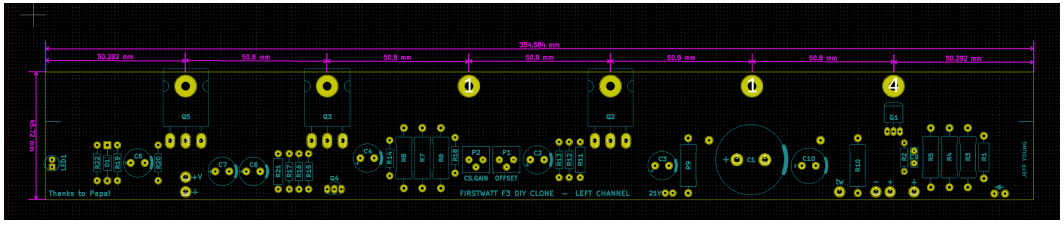


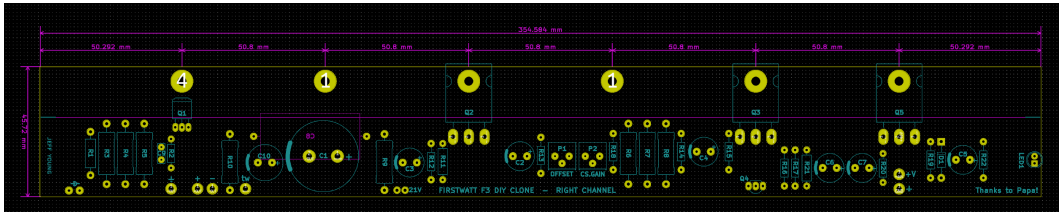
Drill Layout

Power Supply

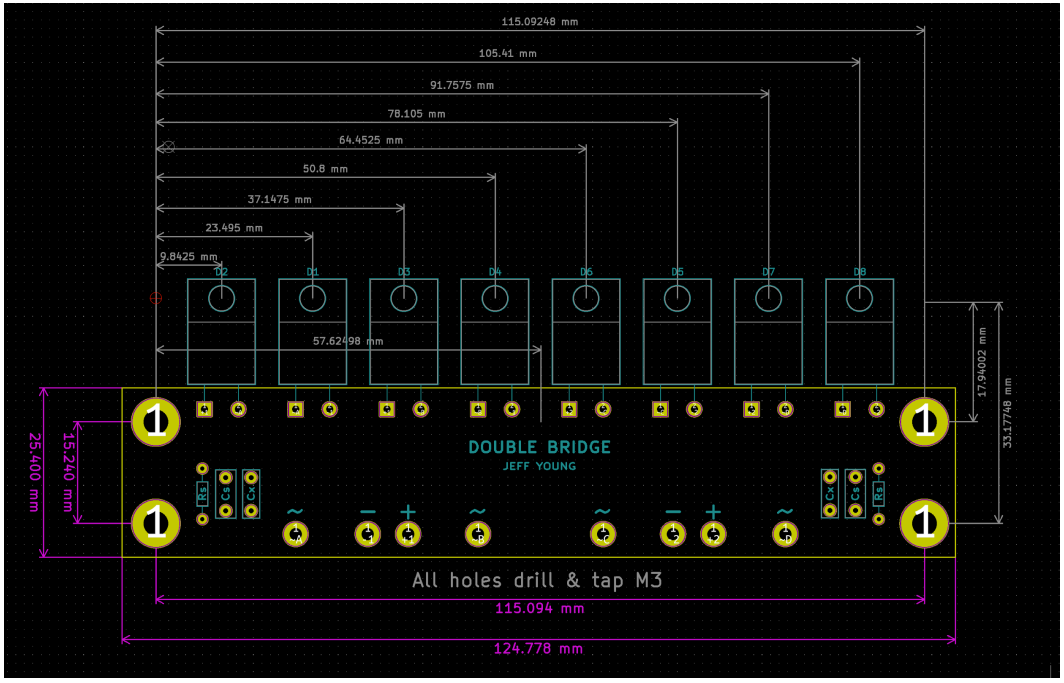


Amp Bord


354.584 mm
50.292 mm
50.8 mm
FIRSTWATT F3 DIY CLONE – LEFT CHANNEL
Thanks to Papa!


354.584 mm
50.292 mm
50.8 mm
FIRSTWATT F3 DIY CLONE – RIGHT CHANNEL
Thanks to Papa!

DB Board


115.09248 mm
105.41 mm
91.7575 mm
78.105 mm
64.4525 mm
50.8 mm
37.1475 mm
23.495 mm
9.8425 mm
D2
D1
D3
D4
D6
D5
D7
D8
57.62498 mm
17.94002 mm
33.17748 mm
25.400 mm
15.240 mm
DOUBLE BRIDGE
JEFF YOUNG
Rs
Cs
Cx
All holes drill & tap M3
115.094 mm
124.778 mm

Part list

Amp board (per channel)

Reference	Quantity	Value	Description	Manufacturer	Manufacturer Series	Supplyer	Supplyer Partnumber
C1	1	15000uF 25V	CAP ALUM 15000UF 20% 25V SNAP	United Chemi-Con	KMH	Digikey	565-2857-ND
	0		Alu-Elektrolytkondensatoren einrastend 15000uF 25 Volt			Mouser	661-EKMH250N153MQ45T
C10	1	220uF 35V	CAP ALUM 220UF 20% 35V RADIAL	Elna America	SILMIC (RFS)	Digikey	604-1066-ND
	0		Aluminium-Elektrolyt-Kondensatoren Radial bedrahtet 220uF 35V 20% Audio SILMIC II			Mouser	555-RFS35V221MI6#5
C2, C3, C4, C5, C6, C7	6	220ufF 50V	CAP ALUM 220UF 20% 50V RADIAL	Nichicon	UKA	Digikey	493-15334-ND
	0		Aluminium-Elektrolyt-Kondensatoren Radial bedrahtet 50Volts 220uF 20% Tol.			Mouser	647-UKA1H221MPD
C8	1	1uF	-	Mundorf Supreme	-	-	-
	0			Clarity Cap	ESA	-	-
C9	1	33pF	CAP MICA 33PF 5% 300V RADIAL	Cornell Dubilier Electronics (CDE)	CD5 (Silver Mica)	Digikey	338-3072-ND
	0		Glimmerkondensatoren 33pF 300V +/-5%			Mouser	598-CD5EC330JO3F
D1	1	1N4001	DIODE GEN PURP 50V 1A DO204AL	Vishay Semiconductor Diodes Division	SUPERECTIFIER	Digikey	1N4001GP-E3/73GICT-ND
	0		Gleichrichter Vr/50V Io/1A Glass Passivated			Mouser	625-1N4001GP-E3/73
LED1	1	Blue	LED BLUE DIFFUSED T/H	Visual Communications Company - VCC	VAOL-5LSBY2	Digikey	VAOL-5LSBY2-ND

	0		Standard-LEDs Durchsteckmontage Blue Diffused 462nm 1500mcd			Mouser	593-VAOL-5LSBY2
P1, P2	2	5K	TRIMMER 5K OHM 0.5W PC PIN TOP	Bourns Inc.	3386P	Digikey	3386P-502LF-ND
	0		Abgleichwiderstände Durchgangsbohrung 3/8" 5Kohms 10% 0.5Watts Square			Mouser	652-3386P-1-502LF
Q1	1	LU1014	-	Lovoltech	POWERJFET	Papa	Papa
Q2, Q3, Q5	3	IRFP240	MOSFET N-CH 200V 20A TO-247AC	Vishay Siliconix	-	Digikey	IRFP240PBF-ND
	0		MOSFET N-CH 200V HEXFET MOSFET			Mouser	844-IRFP240PBF
Q4	1	ZTX450	TRANS NPN 45V 1A E-LINE	Diodes Incorporated	-	Digikey	ZTX450-ND
	0		Bipolartransistoren - BJT NPN Medium Power			Mouser	522-ZTX450
R1	1	9k09	Metal Film Resistors Through Hole 1W 9.09Kohms 1%	Vishay Dale	CMF60	Mouser	CMF609K0900FHEK
	0		RES 9.09K OHM 1/2W 1% AXIAL	Vishay Dale	CMF55	Digikey	CMF9.09KHFCT-ND
R10	1	100R 3W		Panasonic Electronic Components	ERX		
	0		RES 100 OHM 3W 5% AXIAL	TE Connectivity Passive Product	RR, Neohm	Digikey	A138380CT-ND
	0		Metallschichtwiderstände Durchgangsloch RR03 5% 100R AMMO			Mouser	279-RR03J100RTB
R11, R21	2	100R 1W	Metal Film Resistors Through Hole 1W 100ohms 1%	Vishay Dale	CMF60	Mouser	71-CMF60100R00FHEK
R12	1	10K	RES 10.0K OHM 1/2W 1% AXIAL	Vishay Dale	CMF55	Digikey	CMF10.0KHFCT-ND
R13	1	4k7	RES 4.70K OHM 1/2W 1% AXIAL	Vishay Dale	CMF55	Digikey	CMF4.70KHGCT-ND
R14, R16, R17, R18	4	1k5	RES 1.50K OHM 1/4W 1% AXIAL	Vishay Dale	CMF55	Digikey	CMF1.50KHFCT-ND
R15, R20	2	221R	RES 221 OHM 1/2W 1% AXIAL	Vishay Dale	CMF55	Digikey	CMF221HFCT-ND
R19	1	33K* (33k2)	- RES 33.2K OHM 1/2W 1% AXIAL	Vishay Dale	CMF55	Digikey	- CMF33.2KHGCT-ND

R2, R22	1	47k5	RES 47.5K OHM 1/2W 1% AXIAL	Vishay Dale	CMF55	Digikey	CMF47.5KHFCT-ND
R4, R3	2	2R 3W	RES 2 OHM 2W 5% AXIAL	Panasonic Electronic Components	ERX	Digikey	P2.0W-2BK-ND
R5	1	3R3* 3W	RES 3.3 OHM 3W 5% AXIAL	Panasonic Electronic Components	ERX	Digikey	P3.3W-3BK-ND
R6, R7	2	1R 3W	RES 1 OHM 3W 5% AXIAL	Panasonic Electronic Components	ERX	Digikey	P1.0W-3BK-ND
R8	1	2R* 3W	RES 2 OHM 3W 5% AXIAL	Panasonic Electronic Components	ERX	Digikey	P2.0W-3BK-ND
R9	1	0R47 3W	RES 0.47 OHM 3W 5% AXIAL	Panasonic Electronic Components	ERX	Digikey	P0.47W-3BK-ND
ISO PAD	4	ISO-PAD					
	1		Transformer 2 x 36V / 300VA				
	2		Double rectifer				

Power supply

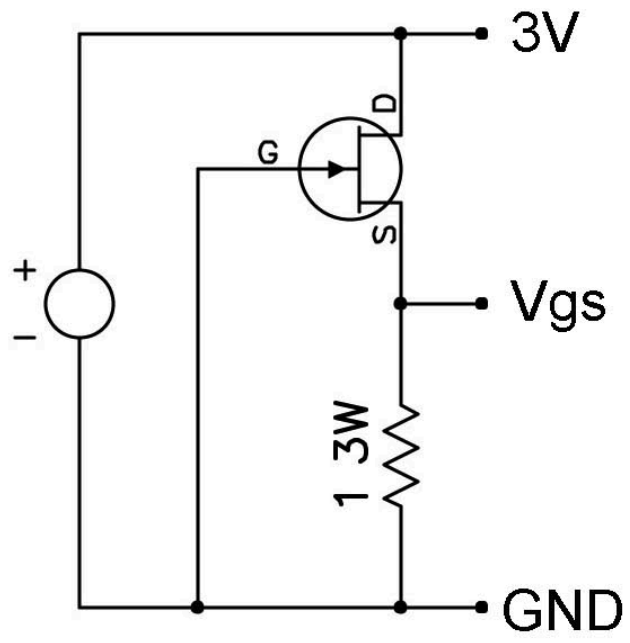
Reference	Quantity	Value	Description	Manufacturer	Manufacturer Series	Supplyer	Supplyer Partnumber
C1, C2, C3, C4, C5, C6, C7, C8	8	8200uF 63V	CAP ALUM 8200UF 20% 63V SNAP	United Chemi-Con	KMH	Digikey	565-2917-ND
R1, R2, R3, R4, R6, R7, R8, R9	8	0R47	RES 0.47 OHM 3W 5% AXIAL	Panasonic Electronic Components	ERX	Digikey	P0.47W-3BK-ND
R5, R10	2	2k2 3W	RES 2.2K OHM 3W 5% AXIAL	Panasonic Electronic Components	ERG	Digikey	P2.2KW-3BK-ND
Th1, Th2, Th3	3	CL-60	ICL 10 OHM 25% 5A 19.56MM	Amphenol Advanced Sensors	ICL	Digikey	KC006L-ND

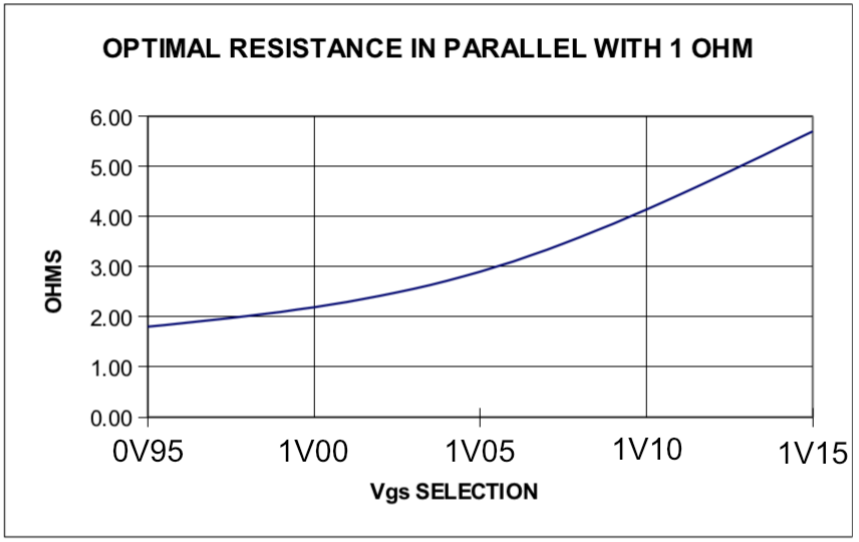
Double Bridge Board

Reference	Quantity	Value	Description	Manufacturer	Manufacturer Series	Supplyer	Supplyer Partnumber
D1, D2, D3, D4, D5, D6, D7, D8	8	600V 30A	DIODE GEN PURP 600V 30A TO220FP	Vishay Semiconductor Diodes Division	FRED Pt	Digikey	VS-ETU3006FP-M3-ND
Cx1, Cx2 Cs1, Cs2 Rs1, Rs2	Snubber components (Cx, Rs and Cs) are ideally selected using a Quasimodo rig to measure the specific transformer to be used. An approximation can also be made using the data-points found here: https://www.diyaudio.com/forums/power-supplies/313202-quasimodo-results.html						

Matching R5 to Q1

1. Use this schematics to messure your Vgs of the LUs	2. Then take a look on this sheet to find out how mutch resistance should be for R5





Hint MOSFET

Quote fom Jeff:

- R19 adjusts how quickly the voltage output ramps up. A larger resistor causes C5 to fill more slowly and the voltage to come up slower (although it always ends at ~ 41V).
  I think Nelson's version (47K5) comes up in something like 30 seconds, whereas mine (33K) comes up in 15 or 20 seconds. Both values will eliminate turn-on-thump, and one could choose to use even larger or even smaller resistors for slower or quicker times.

- As long as the JFET + R5 for each channel puts the JFET in its sweet spot, there's no requirement to match them.

- The cascode MOSFETs (Q2) are adjusted with P1, so no matching required.

- P2 controls how closely the CCS follows the output devices. There's no good way to measure this without a distortion meter so you might want to match the CCS MOSFETs (Q3) between channels, but there's a lot of wiggle room here and I'd be very surprised if you could hear any difference between them being matched and not.

- You could match the C-multiplier MOSFETs (Q5) for Vgs so that the rails were the exact same between channels, but again I'd be very surprised if you could hear the difference.

Hint R8 bias adjusting

- 2Ω = 1.65A (F3 design point)
- 1.5Ω = 1.75A
- 1Ω = 2A (ZV9 design point)

  Some folks had trouble getting to 21V in front of C1 with 1.65A bias.