

Ease of build	Medium
-partscount	Medium
-density	High
Parts sourcing	Easy
Enclosure fitting	Normal
Debugging level	Easy

3-band parametric EQ V2.01

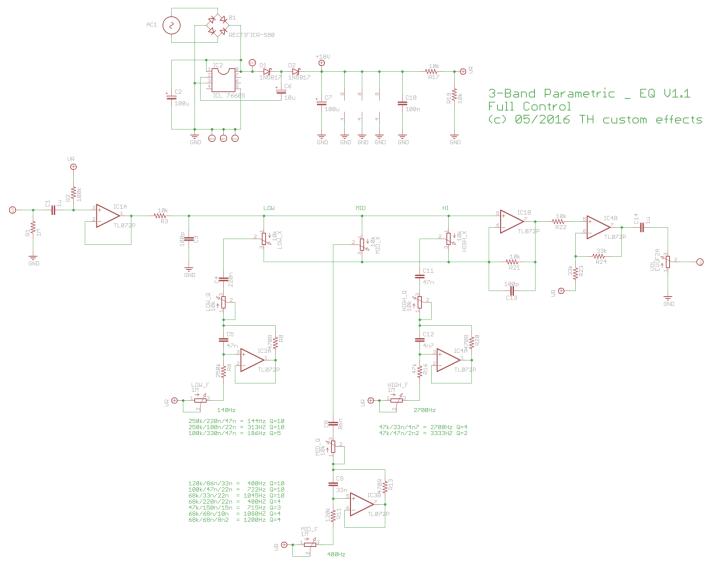
Full-Control Version with all pots

This implementation of the 3-band parametric EQ is the full control type. Frequency and Q adjustment are possible via pots. You can dial in the parameters while you work. This design uses a charge pump to double the power for more headroom and less distortion. It also contains a rectifier to eliminate the always present problem of polarity protection.

V2.0 features a new layout to provide more space between pots for easier use. General

It uses OpAmps as gyrators. There are already several frequencies calculated and they show on the schematic.

Additionaly you can use Jack Ormans online calculator to find the correct parts values if you need a special frequency or Q. Please visit <u>http://www.muzique.com/lab/gyrator.htm</u> to find out more about it. Schematic





Bill of materials

ResistorsR111MR21100kR3, R17, R19, R21, R22510kR61100k*R6, R13, R203470kR11, R16247k*R23, R24233k<*R23=20k for gainCapacitorsC, C/11MLCC2, C72100bpolarized electro 5-8mm Ø/8mm / 25VC3, C132100pceramC41330n*box filmC5147n*box filmC61100LFpolarized electro 5-8mm Ø/8mm / 25VC81150mbox filmC91100LFpolarized electro 5-8mm Ø/8mm / 25VC81150mbox filmC91100mbox filmC10100mbox filmC11133n*box filmPotesB11CBRHSDH140Bridge recitifierPotsBass, Mid, High3100k linPotame1100k lin9mm AlphaPotame1100k lin9mm AlphaFreq35k/10k lin9mm AlphaFreq35k/10k lin9mm AlphaFreq1100k lin9mm AlphaFreq1100k lin9mm AlphaFreq35k/10k lin9mm AlphaFreq1100k lin9mm AlphaFreq1100k lin9mm AlphaFreq1100k lin9mm Alpha		Parts	Qty	Value	Description
R3, R17, R19, R21, R22510kR61100k*R6, R13, R203470RR11, R16247k*R23, R24233kR23, R24230kC4, C14110LCC2, C72100uFC3, C132100pC41330n*C5147n*C61100uFC701100uFC81150n*C901150n*C100100nized electro 5-8mm Ø / 8mm / 25VC81150n*C911330n*C101100nized electro 5-8mm Ø / 8mm / 25VC81150n*C101100nized electro 5-8mm Ø / 8mm / 25VC81150n*C91150n*Diodes811C1133n*Diodes811C1133n*Diodes811C1131*Diodes811C1131*Diodes8as, Mid, HighJ100k logPots8as, Mid, HighQ3Sk/10k lig9mm AlphaC113Diodes10k ligReq3J10k ligPota3Sk/10k lig9mm AlphaC113Diode9mm AlphaC113Diode9mm Alpha	Resistors	R1	1	1M	
R6 1 100k* R8, R13, R20 3 470R R11, R16 2 47k* R23, R24 2 33k *R23=20k for gain C1, C14 1 1uF MLCC C2, C7 2 100uF polarized electro 5-8mm Ø / 8mm / 25V C3, C13 2 100u cram C4 1 330n* box film C5 1 47n* box film C6 1 100F polarized electro 5-8mm Ø / 8mm / 25V C8 1 150n* box film C6 1 100F polarized electro 5-8mm Ø / 8mm / 25V C8 1 150n* box film C10 1 150n* box film C11 1 33n* box film C12 1 4n* box film Diodes 81 CBRHSDH1-400 Bridge rectifier D1, D2 1 MS17 Schottky diode Pots Bass, Mid,		R2	1	100k	
R8, R13, R203470RR11, R16247k*R23, R24233kR23, R24233kR23, R24233kR23, R242100FC1, C141MLCCC2, C72100FC3, C132100FC41330N*C5147n*C6410arized electro 5-8mm Ø / 8mm / 25VC841100FC941100FC941100FC101100FC11133N*C1214n7*DiodesB11C1214n7*DiodesB12PotsBass, Mid, High3Quime1100klogYolume1100klogQuime35k/10klinPicq35k/10klinFreq31MklinFreq31MklinYolume31MklinYolume31MklinYolume31MklinYolume3Yolume3KSYolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume3Yolume <td< th=""><td></td><td>R3, R17, R19, R21, R22</td><td>5</td><td>10k</td><td></td></td<>		R3, R17, R19, R21, R22	5	10k	
R1, R16 2 47k* R23, R24 2 33k *R23=20k for gain Capacitos (1, C14 1 10° R2, C7 2 1000° polarized electro 5-8mm Ø / 8mm / 25V C3, C13 2 1000° ceram C4 1 330° box film C5 1 47n° box film C6 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C8 1 100° polarized electro 5-8mm Ø / 8mm / 25V C9 1 100° polarized electro 5-8mm Ø / 8mm / 25V Didoes		R6	1	100k*	
R2A 2 33k *R23=20k for gain Capacitors C1, C14 1 MLC C2, C7 2 100uF polarized electro 5-8mm Ø / 8mm / 25V C3, C13 2 100uF obarized electro 5-8mm Ø / 8mm / 25V C4 1 330n* box film C5 1 47n* box film C6 1 100F polarized electro 5-8mm Ø / 8mm / 25V C8 1 150n* box film C9 1 150n* box film C10 1 100F box film C11 1 33n* box film C12 1 CBRHSDH1-40L Bridge rectifier Diodes B1 1 CBRHSDH1-40L Bridge rectifier D1, D2 2 1NS17 Schottky diode Pots Bass, Mid, High 3 10b kin 9mm Alpha Queme 1 100b kog 9mm Alpha Queme 3 MIM in 9mm Alpha		R8, R13, R20	3	470R	
Capacitors C1, C14 1 1 MLCC C2, C7 2 1000F polarized electro 5-8mm Ø / 8mm / 25V C3, C13 2 1000F cram C4 1 330n* box film C5 1 47n* box film C6 1 100F polarized electro 5-8mm Ø / 8mm / 25V C8 1 150n* box film C9 1 150n* box film C10 1 100F box film C11 1 330n* box film C12 1 47n* box film Diodes B1 CBRHSDH1-40F Bridge rectifier D1, D2 2 1N581* Schottky diode Pots Bass, Mid, High 3 10k In 9mm Alpha Q 3 5k/10k In 9mm Alpha Q 3 5k/10k In 9mm Alpha Freq 3 TL072(IP) Or better		R11, R16	2	47k*	
C2, C7 2 100uF polarized electro 5-8mm Ø / 8mm / 25V C3, C13 2 100u ceram C4 1 330n* box film C5 1 47n* box film C6 1 10uF polarized electro 5-8mm Ø / 8mm / 25V C8 1 10uF polarized electro 5-8mm Ø / 8mm / 25V C8 1 10uF polarized electro 5-8mm Ø / 8mm / 25V C8 1 10uF polarized electro 5-8mm Ø / 8mm / 25V C8 1 150n* box film C9 1 150n* box film C10 1 100n box film C11 1 33n* box film C12 1 4n7* box film Diodes B1 CBRHSDH1-40L Bridge rectifier D1, D2 2 1N581 Schottky diode Pots Bass, Mid, High 3 10k lin 9mm Alpha Q 3 5k/10k lin 9mm Alpha Q 3 1M lin 9mm Alpha Freq		R23, R24	2	33k	*R23=20k for gain
C3, C132100pceramC41330n*box filmC5147n*box filmC61100Fpolarized electro 5-8mm Ø / 8mm / 25VC81150n*box filmC9115n*box filmC101100nbox filmC11133n*box filmC1214n7*box filmDiodesB11CBRHSDH1-40LBridge rectifierD1, D221N581Schottky diodePotsBass, Mid, High310k lin9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better	Capacitors	C1, C14	1	1uF	MLCC
C41330n*box filmC5147n*box filmC6110uFpolarized electro 5-8mm Ø/8mm/25VC81150n*box filmC9115n*box filmC101100nbox filmC11133n*box filmC1214n7*box filmDiodesB11CBRHSDH1-40LBridge rectifierD1, D221N581Schottky diodePotsBass, Mid, High310k lin9mm AlphaQ35k/10k lin9mm AlphaIcsIC1, IC3, IC43TL072(IP)Or better		C2, C7	2	100uF	polarized electro 5-8mm Ø / 8mm / 25V
C5147n*box filmC6110uFpolarized electro 5-8mm Ø / 8mm / 25VC81150n*box filmC9115n*box filmC101100nbox filmC11133n*box filmC1214n7*box filmDiodesB11CBRHSDH1-401Bridge rectifierD1, D221N5817Schottky diodePotsBass, Mid, High310k lin9mm AlphaQume1100k log9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TLD72(IP)Or better		C3, C13	2	100p	ceram
C6110uFpolarized electro 5-8mm Ø / 8mm / 25VC81150*box filmC9115n*box filmC101100nbox filmC11133n*box filmC1214n7*box filmDiodesB11CBRHSDH140LBridge rectifierD1, D221N581Schottky diodePotsBass, Mid, High310k ling9mm AlphaQue35k/10k ling9mm AlphaFreq31M ling9mm AlphaICSVolune3TLD72(IP)Or better		C4	1	330n*	box film
C8 1 150n* box film C9 1 150n* box film C10 1 100n box film C11 1 33n* box film C12 1 4n7* box film Diodes B1 1 CBRHSDH1-40L Bridge rectifier D1, D2 2 1N5817 Schottky diode Pots Bass, Mid, High 3 10k lin 9mm Alpha Qume 1 100k log 9mm Alpha ICq 3 5k/10k lin 9mm Alpha Freq 3 1M lin 9mm Alpha ICs IC1, IC3, IC4 3 TL072(IP) Or better		C5	1	47n*	box film
C9115n*box filmC101100nbox filmC11133n*box filmC1214n7*box filmDiodesB11CBRHSDH1-40Bridge rectifierD1, D221N5817Schottky diodePotsBass, Mid, High310k lin9mm AlphaQume1100k log9mm AlphaFreq35k/10k lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better		C6	1	10uF	polarized electro 5-8mm Ø / 8mm / 25V
C101100nbox filmC11133n*box filmC1214n7*box filmDiodesB11CBRHSDH1-40LBridge rectifierD1, D221N5817Schottky diodePotsBass, Mid, High310k lin9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better		C8	1	150n*	box film
C11133n*box filmC1214n7*box filmDiodesB11CBRHSDH1-40Bridge rectifierD1, D221N5817Schottky diodePotsBass, Mid, High3100k log9mm AlphaVolume1100k log9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better		C9	1	15n*	box film
C1214n7*box filmDiodesB11CBRHSDH1-40LBridge rectifierD1, D221N5817Schottky diodePotsBass, Mid, High310k ln9mm AlphaVolume1100k log9mm AlphaQ35k/10k ln9mm AlphaFreq31M ln9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better		C10	1	100n	box film
DiodesB11CBRHSDH1-40LBridge rectifierD1, D221N5817Schottky diodePotsBass, Mid, High3100k log9mm AlphaVolume1100k log9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better		C11	1	33n*	box film
D1, D221N5817Schottky diodePotsBass, Mid, High310k lin9mm AlphaVolume1100k log9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better		C12	1	4n7*	box film
PotsBass, Mid, High310k lin9mm AlphaVolume1100k log9mm AlphaQ35k/10k lin9mm AlphaFreq31M lin9mm AlphaICsIC1, IC3, IC43TL072(IP)Or better	Diodes	B1	1	CBRHSDH1-40L	Bridge rectifier
Volume 1 100k log 9mm Alpha Q 3 5k/10k lin 9mm Alpha Freq 3 1M lin 9mm Alpha ICs IC1, IC3, IC4 3 TL072(IP) Or better		D1, D2	2	1N5817	Schottky diode
Q 3 5k/10k lin 9mm Alpha Freq 3 1M lin 9mm Alpha ICs IC1, IC3, IC4 3 TL072(IP) Or better	Pots	Bass, Mid, High	3	10k lin	9mm Alpha
Freq 3 1M lin 9mm Alpha ICs IC1, IC3, IC4 3 TL072(IP) Or better		Volume	1	100k log	9mm Alpha
ICs IC1, IC3, IC4 3 TL072(IP) Or better		Q	3	5k/10k lin	9mm Alpha
		Freq	3	1M lin	9mm Alpha
IC2 1 ICL 7660S Voltage doubler	ICs	IC1, IC3, IC4	3	TL072(IP)	Or better
		IC2	1	ICL 7660S	Voltage doubler

Variations

Here you find different values for different frequency spots. Please note that a Q of 10 defines small bandwidth (1/4 octave) and Q of 3 is about one Octave

Bass (R6 / C4 / C5)

250k/220n/47n = 144Hz Q=10 250k/100n/22n = 313HZ Q=10 100k/330n/47n = 186Hz Q=5 Mids (R11/ C8/ C9)

120k/86n/33n = 400Hz Q=10 100k/47n/22n = 722Hz Q=10 68k/33n/22n = 1045Hz Q=10 68k/220n/22n = 400HZ Q=4 47k/150n/15n = 715Hz Q=3 68k/68n/10n = 1080HZ Q=4 68k/68n/8n2 = 1200Hz Q=4

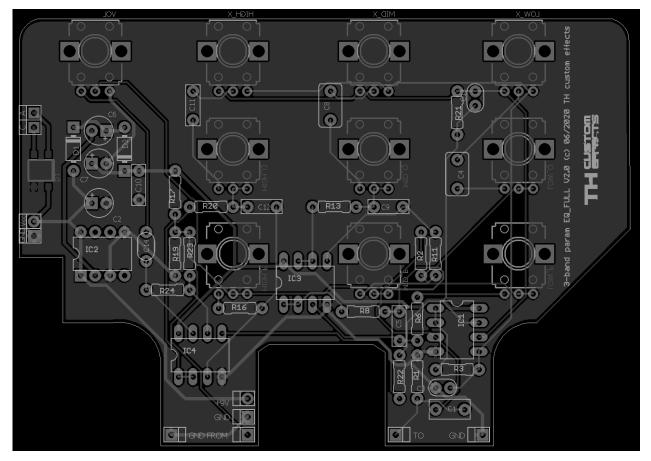
Highs (R16/ C11/ C12)

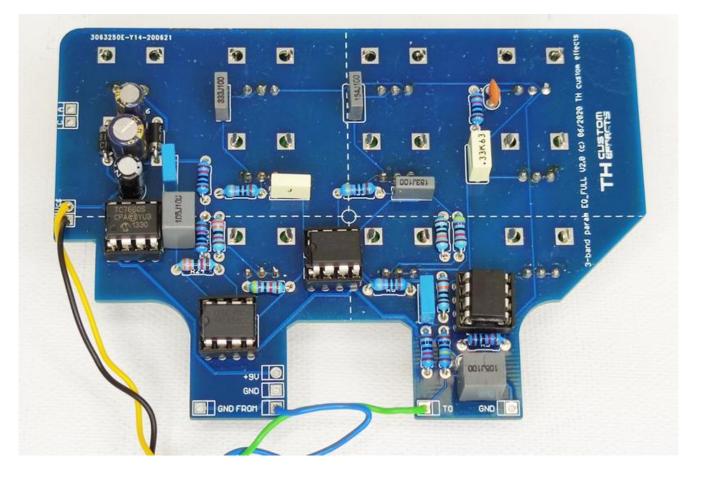
47k/33n/4n7 = 2700Hz Q=4 47k/47n/2n2 = 3333HZ Q=2



Building

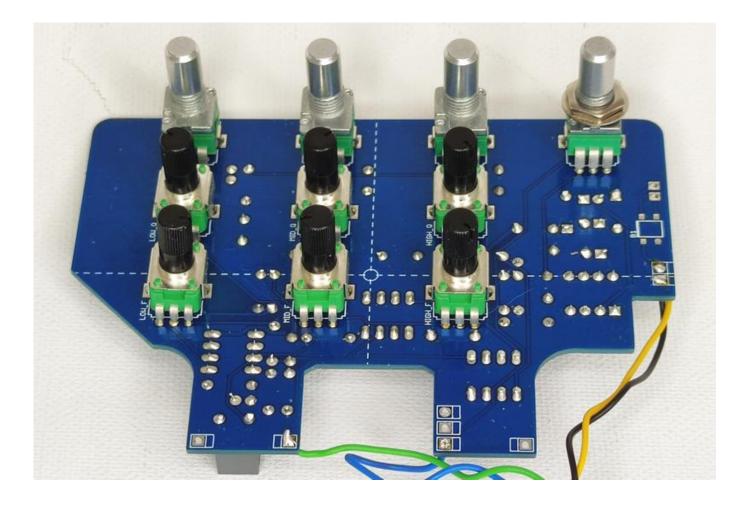
Start with populating the rectifier on the backside. Then diodes and all resistors. Put in sockets for the ICs next. Then MLCC and ceramic caps, then box film caps and electros at the last.







Pots are mounted from the backside.



Enclosure

This PCB does fit in a 1590BB enclosure.

Finally

The 3-band parametric EQ is a great tool for any purpose that needs manipulation of a specific frequency range in your signal. Be it a bass boost or taming high frequencies.

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