

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.

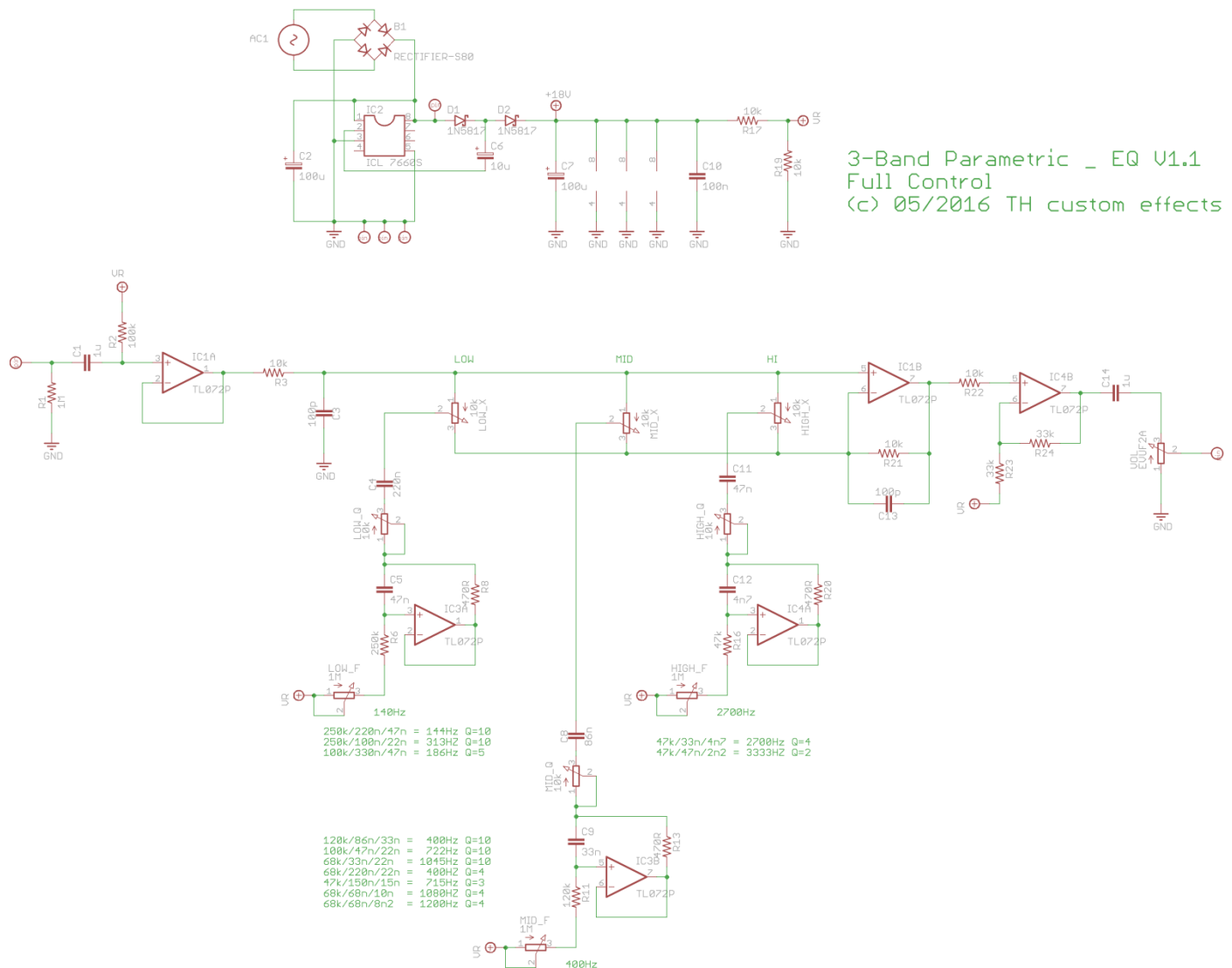
V2.0 features a new layout to provide more space between pots for easier use.

General

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

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

Schematic



Bill of materials

	Parts	Qty	Value	Description
Resistors	R1	1	1M	
	R2	1	100k	
	R3, R17, R19, R21, R22	5	10k	
	R6	1	100k*	
	R8, R13, R20	3	470R	
	R11, R16	2	47k*	
	R23, R24	2	33k	*R23=20k for gain
Capacitors	C1, C14	1	1uF	MLCC
	C2, C7	2	100uF	polarized electro 5-8mm Ø / 8mm / 25V
	C3, C13	2	100p	ceram
	C4	1	330n*	box film
	C5	1	47n*	box film
	C6	1	10uF	polarized electro 5-8mm Ø / 8mm / 25V
	C8	1	150n*	box film
	C9	1	15n*	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
	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
	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)

$250k/220n/47n = 144Hz \text{ } Q=10$
 $250k/100n/22n = 313Hz \text{ } Q=10$
 $100k/330n/47n = 186Hz \text{ } Q=5$

Mids (R11/ C8/ C9)

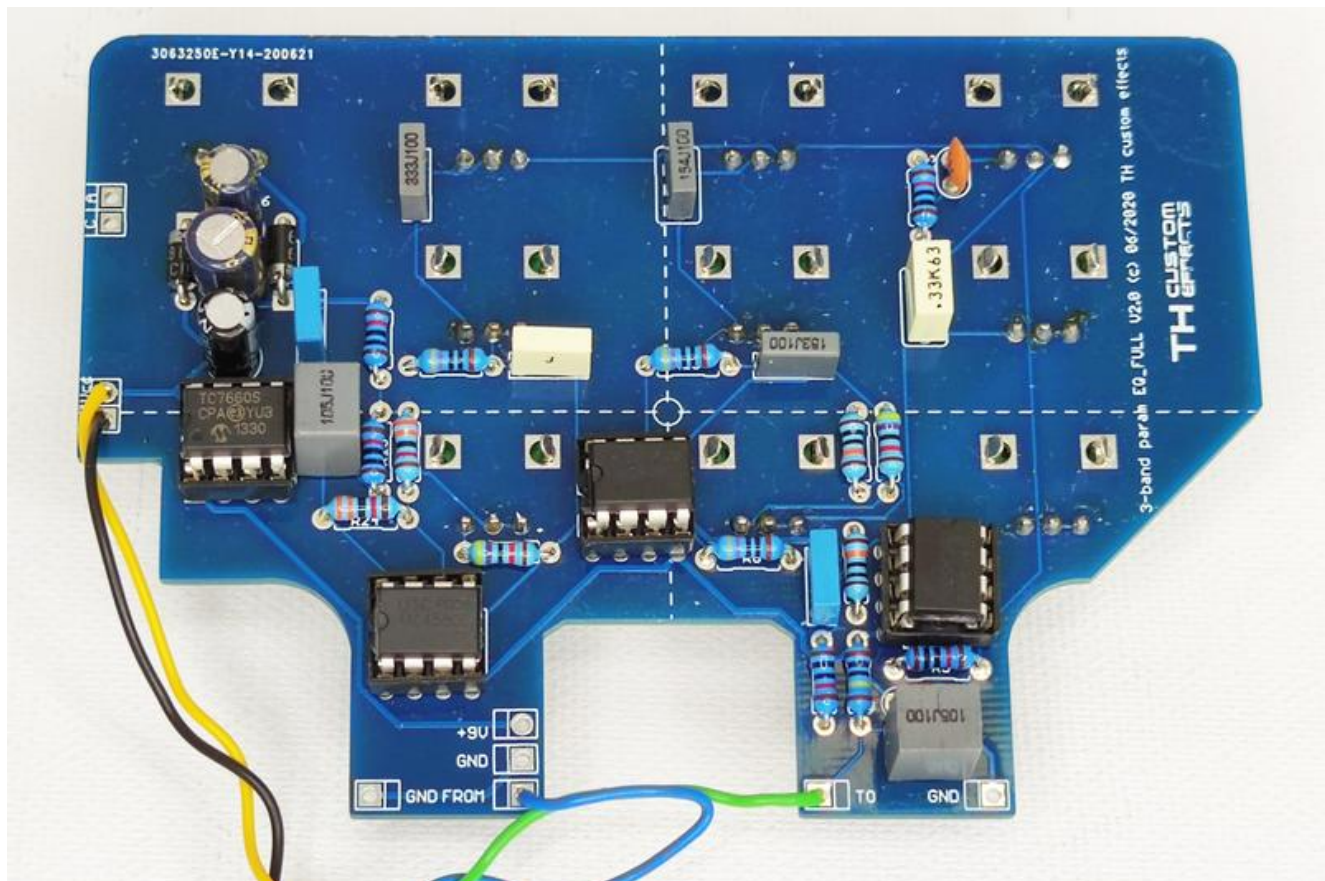
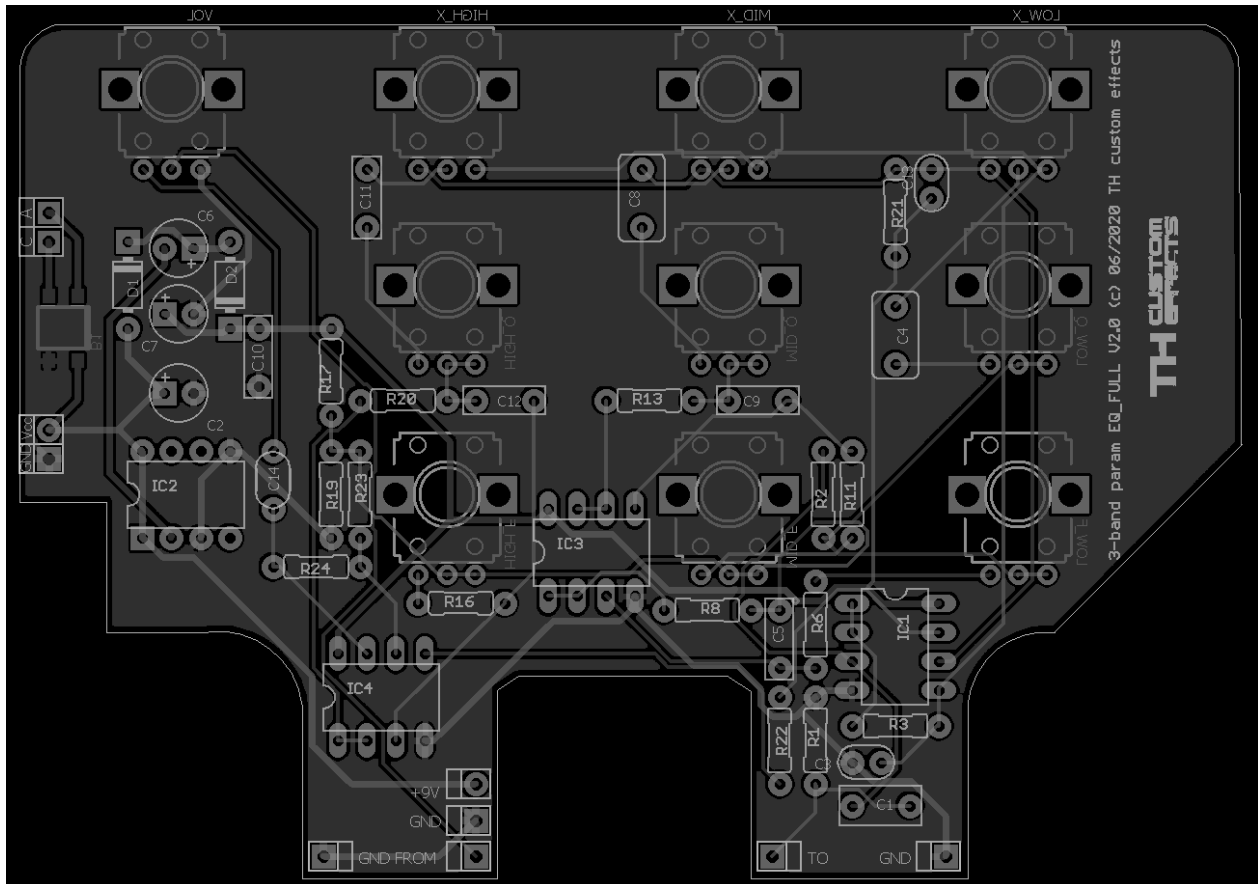
$120k/86n/33n = 400Hz \text{ } Q=10$
 $100k/47n/22n = 722Hz \text{ } Q=10$
 $68k/33n/22n = 1045Hz \text{ } Q=10$
 $68k/220n/22n = 400Hz \text{ } Q=4$
 $47k/150n/15n = 715Hz \text{ } Q=3$
 $68k/68n/10n = 1080Hz \text{ } Q=4$
 $68k/68n/8n2 = 1200Hz \text{ } Q=4$

Highs (R16/ C11/ C12)

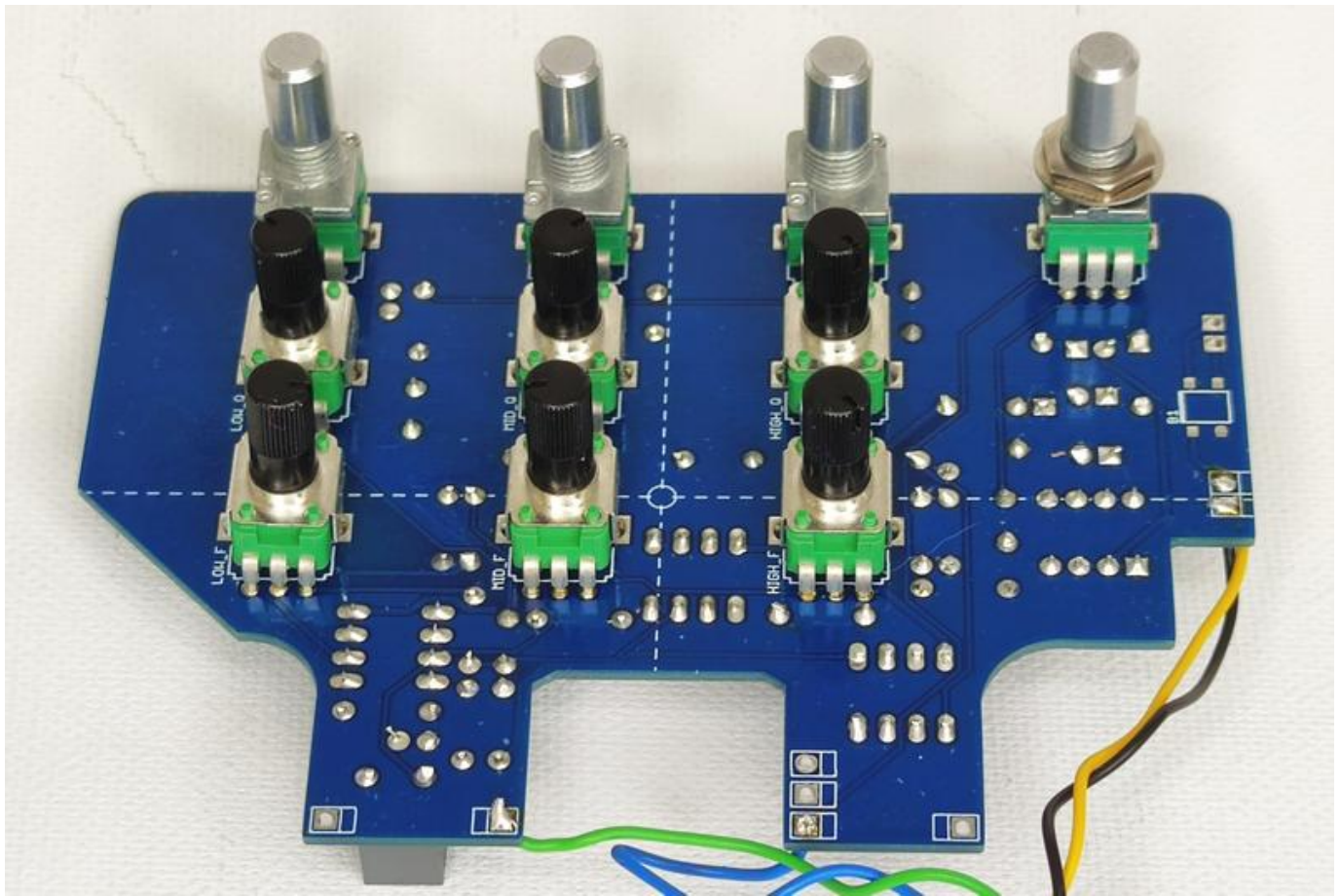
$47k/33n/4n7 = 2700Hz \text{ } Q=4$
 $47k/47n/2n2 = 3333Hz \text{ } Q=2$

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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