Build documentation for:

ROLAND 100M 121 VCF

Layouts and documentation by

FREQUENCY CENTRAL

What's changed:

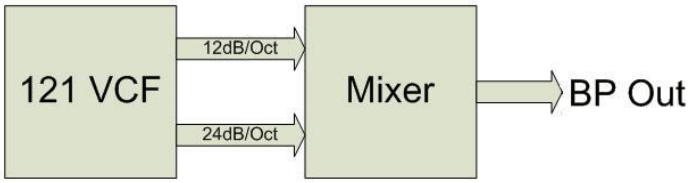
- CA3080 used instead of BA662A
- 2 x LF351 used instead of 4558
- 2 x back to back 22uF caps used instead of 10uF BP caps
- Addition of 12dB/Oct output
- Fixed HPF not included

Colour coding:

Red traces: +12v
Brown traces: Ground
Green traces: -12v
Grey pads: Inputs/Outputs
Blue pads: Expansion (see text)
Orange pads: Fit 2 x back to back (negative to negative) 22uF caps (see text)

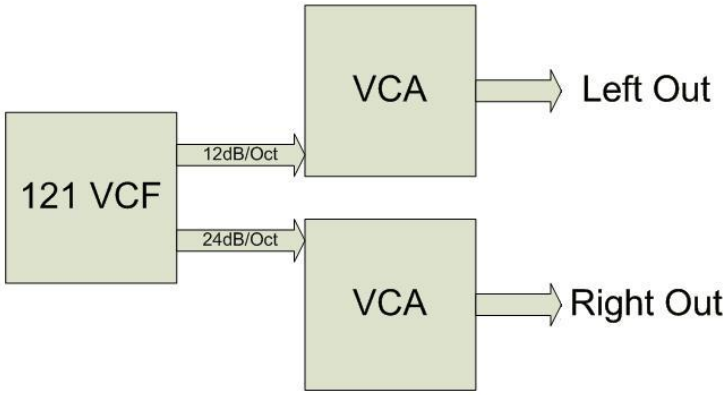
12dB/Oct Output:

This output has a shallower cutoff than the 24dB/Oct output, and the frequency range is slightly offset. The 12dB/Oct output is taken from the output of the second stage. It is fed through a transistor inverting amplifier (basically a modified EH LPB1). The 12dB/Oct output is 180° out of phase with the 24dB/Oct output, therefore mixing them together results in bandpass filtering:

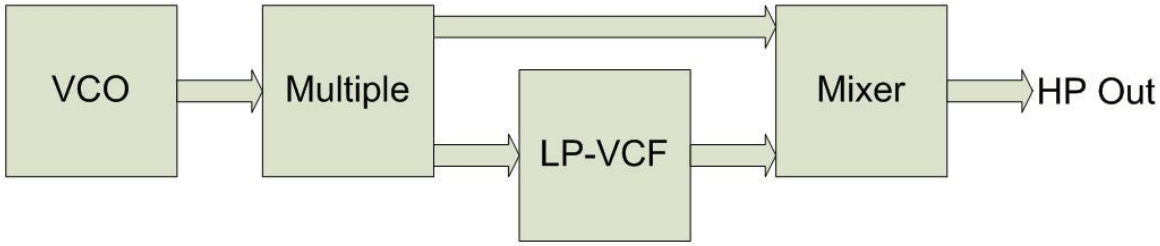


In practice, you'll probably be able to use two inputs of a VCA rather than having to use a dedicated mixer. The two outputs **should** be of equal volume so that 100% phase cancellation occurs, but you may need to slightly tweak the volume of one or the other, allowing for resistor tolerances.

Also worth feeding the two outputs to two different VCAs for stereo effects.



…and I'm assuming you guys know how to patch a highpass filter out of a lowpass filter right? Here's how:



Then it's just a case of a little mixing, you'll find that the LP filtered signal is a little quieter than the direct signal, so set it to maximum and lower the volume of the direct signal until 100% phase cancellation occurs. In the above diagram you can use either the 12dB/Oct or the 24dB/Oct. So…….with this little filter you can do:

- 24dB/Oct lowpass
- 12dB/Oct lowpass
- 12dB/Oct bandpass
- 24dB/Oct highpass
- 12dBOct highpass

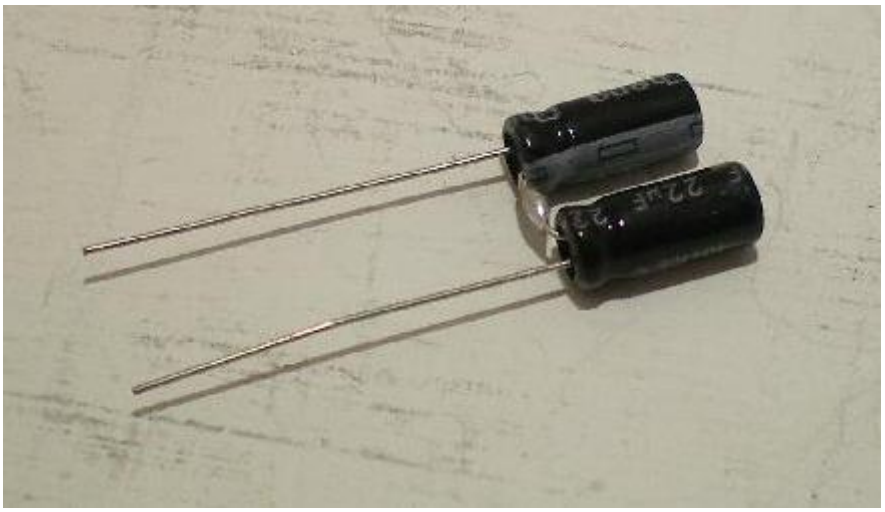
Blue pads:

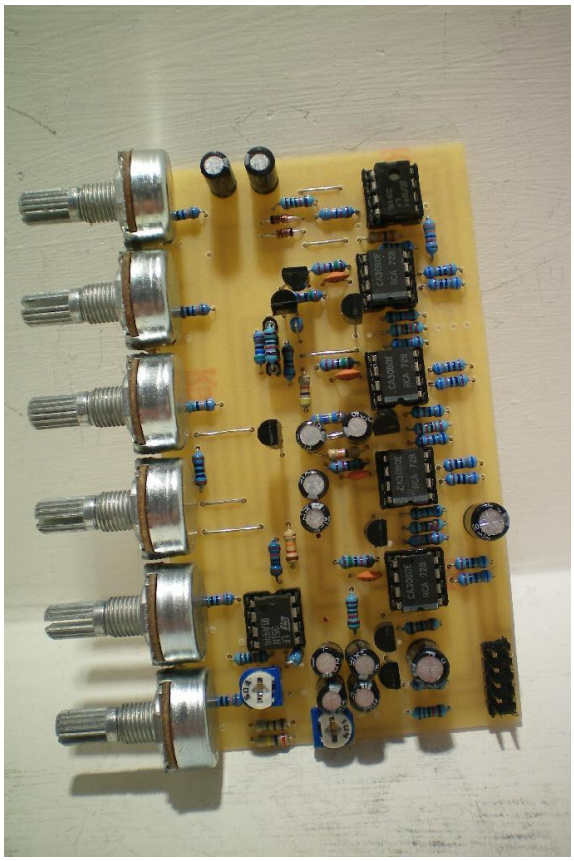
- The three (3) blue pads between the Level pots allow for an additional audio input and mixing resistor.
- The three (3) blue pads between the CV pots allow for an additional CV input and mixing resistor.
- The six (6) blue pads in the lower half of the layout are 'taps' for various stage outputs. I'm convinced there's more fun to be had with this VCF, so I included extra pads for future expansion. Thinking I might run them to a mixer, with the option to

flip the phase of each, for various and weird 6dB/Oct, 18 dB/Oct, offset bandpass and highpass insanity.

Orange pads:

The 12dB/Oct output was basically an afterthought when I realised I had a small amount of space left in the middle of the PCB after finishing the basic layout. So I added the transistor inverting amplifier. As I didn't want to start from scratch to incorporate the mod, the layout requires that you make up a bipolar cap out of two back to back (negative to negative) 22uF caps (C15 and C16) for insertion into the orange pads. Here's how:





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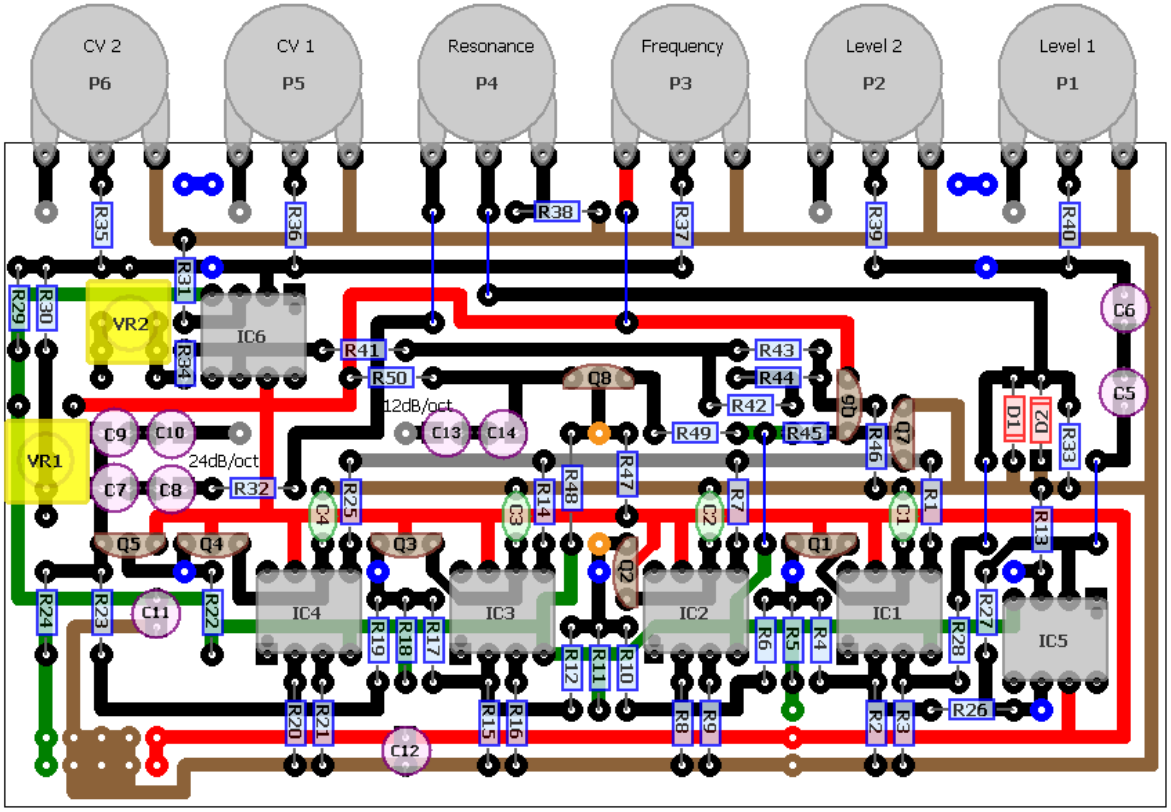
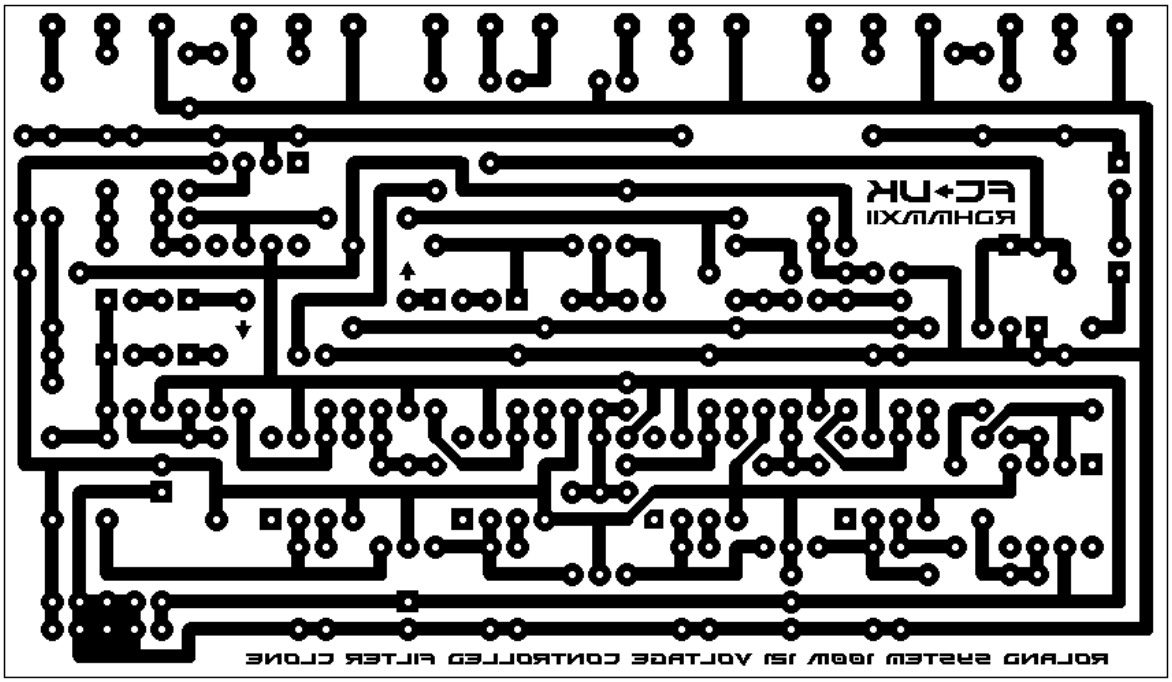
Layout by frequencycentral



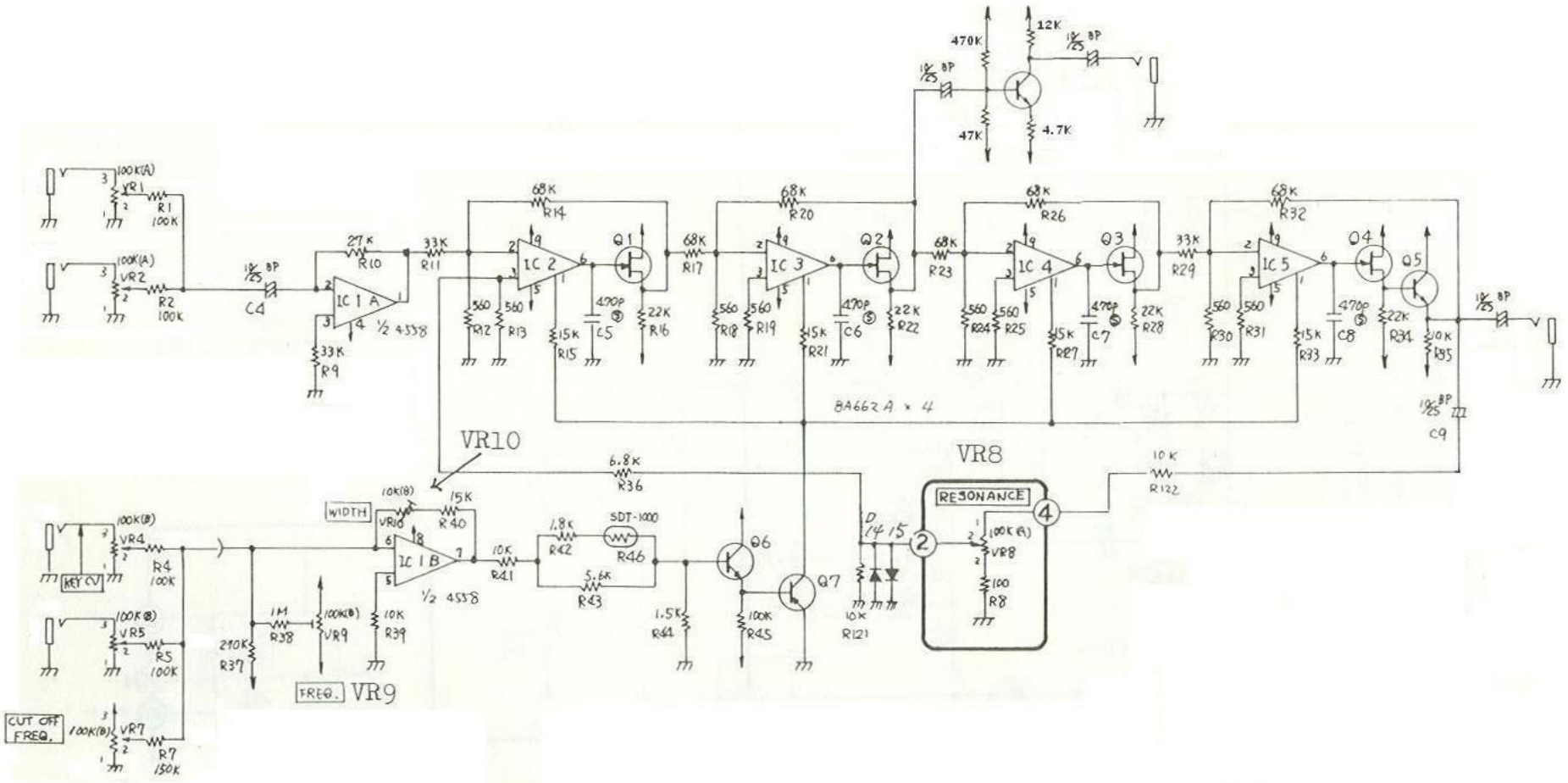


Resize to 48% for printing

R1: 15K R2: 560R R3: 560R R4: 68K R5: 22K R6: 68K R7: 15K R8: 560R R9: 560R R10: 68K R11: 22K R12: 68K R13: 33K R14: 15K R15: 560R R16: 560R R17: 68K R18: 22K R19: 33K R20: 560R R21: 560R R22: 22K R23: 68K R24: 10K R25: 15K R26: 33K R27: 27K R28: 6.8K R29: 270K R30: 1M R31: 10K R32: 10K R33: 10K R34: 15K R35: 100K R36: 100K R37: 150K R38: 100R R39: 100K R40: 100K R41: 10K R42: 1.8K R43: 5.6K R44: SDT-1000* (see below) R45: 100K R46: 1.5K R47: 470K R48: 47K R49: 4.7K R50: 12K	C1: 470pF C2: 470pF C3: 470pF C4: 470pF C5: 22uF C6: 22uF C7: 22uF C8: 22uF C9: 22uF C10: 22uF C11: 100uF C12: 100uF C13: 22uF C14: 22uF C15: 22uF (see text) C16: 22uF (see text)	IC1: CA3080 IC2: CA3080 IC3: CA3080 IC4: CA3080 IC5: LF351 IC6: LF351 Q1: BF245 Q2: BF245 Q3: BF245 Q4: BF245 (matched) or any DSG FET - observe correct pinout. I ended up using 2N5485 which are the opposite pinout. The layout shows correct pinout for BF245. Q5: BC547 NPN Q6: BC547 NPN Q7: BC557 PNP Q8: BC547 NPN D1: 1n4148 D2: 1n4148	P1: 100k Log Alpha16mm P2: 100k Log Alpha16mm P3: 100k Lin Alpha16mm P4: 100k Log Alpha16mm P5: 100k Lin Alpha16mm P6: 100k Lin Alpha16mm VR1: 100K (cutoff trim) VR2: 10K (width trim) **Jumpers: Six (6)****

*SDT-1000 is a 10K thermistor for temperature stability. If you're not so bothered about highly accurate 1v/oct tracking you can just use a regular 10K resistor.

**** Don't forget the six (6) jumpers!!**


100K(A)
VR1
R1
100K
100K(A)
VR2
R2
100K
C4
27K
R10
33K
R11
IC 1 A
½ 4558
33K
R9
68K
R14
IC 2
Q1
560
R12
560
R13
15K
R15
470P
C5
22K
R16
68K
R17
68K
R20
IC 3
Q2
560
R18
560
R19
15K
R21
470P
C6
22K
R22
68K
R23
68K
R26
IC 4
Q3
560
R24
560
R25
15K
R27
470P
C7
22K
R28
33K
R29
68K
R32
IC 5
Q4
Q5
560
R30
560
R31
15K
R33
470P
C8
22K
R34
10K
R35
C9
470K
12K
47K
4.7K
BA662A × 4
VR10
VR8
6.8K
R36
10K
R122
RESONANCE
100K(A)
VR8
100
R8
100K(B)
VR4
R4
100K
KEY CV
100K(B)
VR5
R5
100K
CUT OFF FREQ.
100K(B)
VR7
R7
150K
WIDTH
10K(B)
VR10
15K
R40
IC 1 B
½ 4558
10K
R41
1.8K
R42
SDT-1000
R46
5.6K
R43
1.5K
R44
Q6
Q7
100K
R45
10K
R121
1M
R38
100K(B)
VR9
10K
R39
210K
R37
FREQ. VR9

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