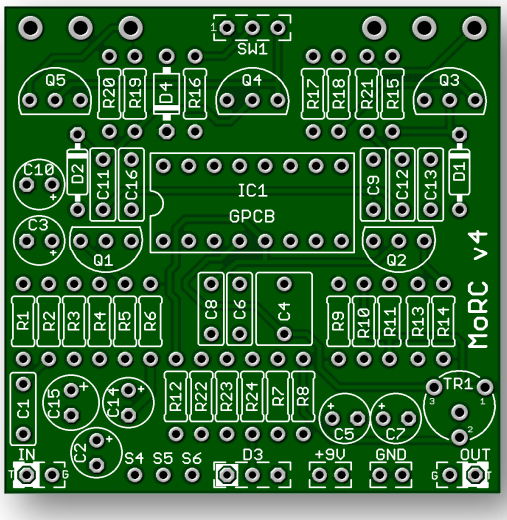
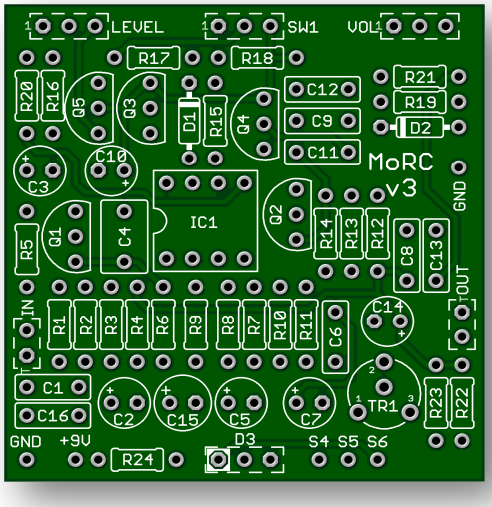
GuitarPCB.com - MoRC v4 2020 & v3

This is our modified version of the Ross Compressor™. The MoRC is also extremely similar to the vintage Dynacomp™ as well but enhanced for sonic clarity and sustain that will last for days. Most notably this circuit will not alter your tone in the way that some commercial versions were known for with regards to Treble response.
We are indebted to R.G.Keen, Mark Hammer and Phillip Bryant for their modification suggestions.
This is a quiet and transparent Compressor however it can get squishy when you turn it up for the Classic Country licks or Southern Rock. Long, sustaining Solos per the Gilmour feel are also easily attained with this circuit.

This document covers the **New v4 2020 version** as well as older versions. New with the 2020 version are On-Board potentiometers and the **LM13700** chip which replaces the highly counterfeited CA3080. It is worth noting that the LM13700 OTA being used will function identically to the CA3080 and will produce the same excellent results.

New v4 MoRC 2020





New 2020 (W x H) 1.95” x 1.95”

Old v3 version (W x H) 1.95” x 1.80”

***The part list aside from IC1 and D4 is identical in both versions. You must use the LM13700 in the New MoRC v4 2020 and D4 is a protection diode. Use on-board Potentiometers in the new v4 2020.**

Part	Value
R1	1M
R2	10k
R3	470k
R4	470k
R5	10k
R6	10k
R7	1M
R8	220k
R9	220k
R10	1M
R11	15k
R12	150k
R13	10k

Part	Value
R14	10k
R15	1M
R16	10k
R17	150k
R18	39k
R19	1M
R20	27k
R21	10k
R22	56k
R23	27k
R24	3k3
D4	1N4001

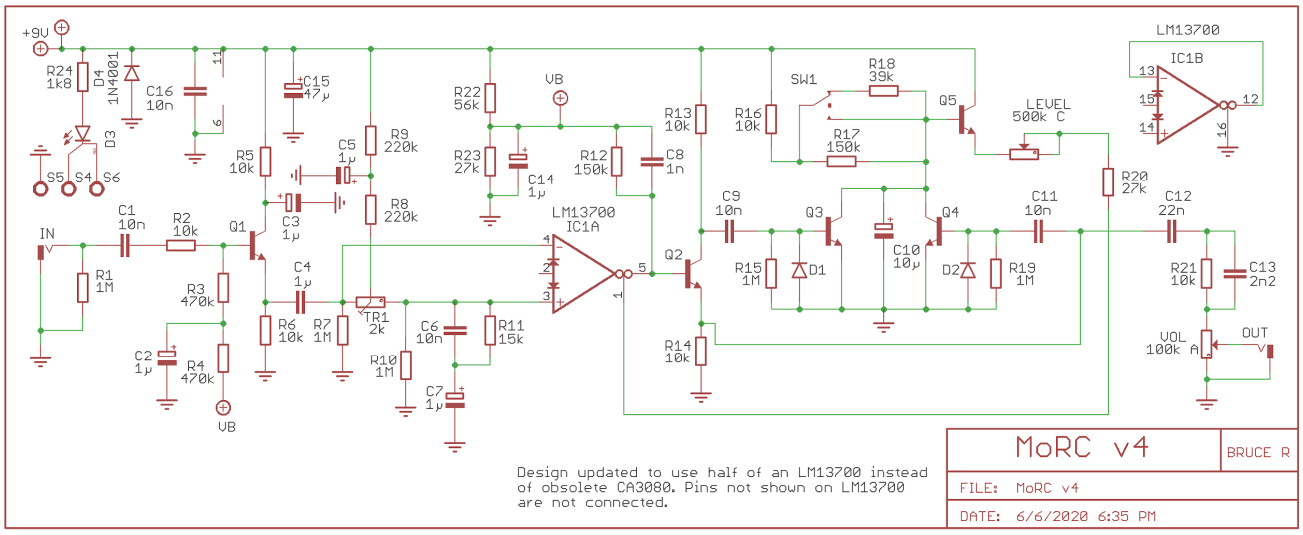
Part	Value
C1	10n
C2	1uF
C3	1uF
C4	1uF
C5	1uF
C6	10n
C7	1uF
C8	1n
C9	10n
C10	10uF
C11	10n
C12	22n
C13	2n2

Part	Value
C14	1uF
C15	47uF
C16	10n
D1	1N914
D2	1N914
D3	BiColor LED CA
IC1	***LM13700** / **CA3080** **v2020** / **v3**
Q1-Q5	2N5088
LEVEL	*C500k
VOL	*A100k
SW1	SPDT On OFF On
TR1	2k

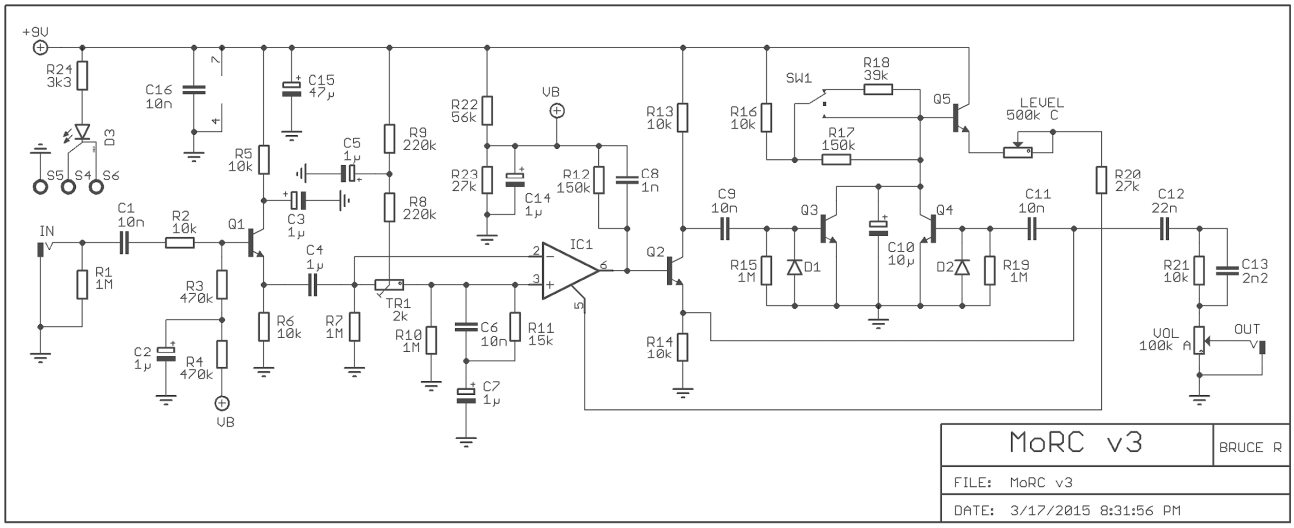
Build Notes:

- New v4 2020 board allows use of On-Board potentiometers and adds D4 as a protection diode.
- New v4 2020 board can only use the LM13700 chip. Older versions must use a CA3080 chip.
- If you don't want to include the Release Switch modification, do not install SW1 and R18, change R16 to 150k and replace R17 with a jumper. This is a subtle mod designed to cater to picking attack & release (see Pg. 5).
- P1 is a 500k reverse log pot which gives smoother control for sustain. A 500k Lin pot will work here but the control won't be as smooth.
- C4 is a 1µF non-polarized film capacitor, 680nF could be used here should not affect the sound.
- Set the trim pot, TR1, to the mid position – you can be more accurate by measuring the resistance between lugs 1 and 2 and between lugs 2 and 3, both values should be the same. If you hear "thumps" whilst playing, the trim pot should be finely adjusted until the "thumps" disappear.

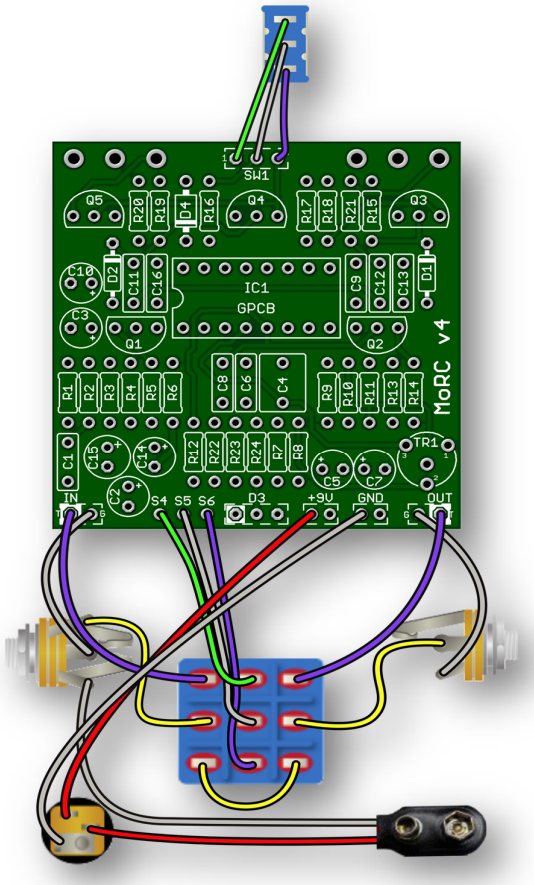
New v4 2020 Schematic (LM13700 Chip)

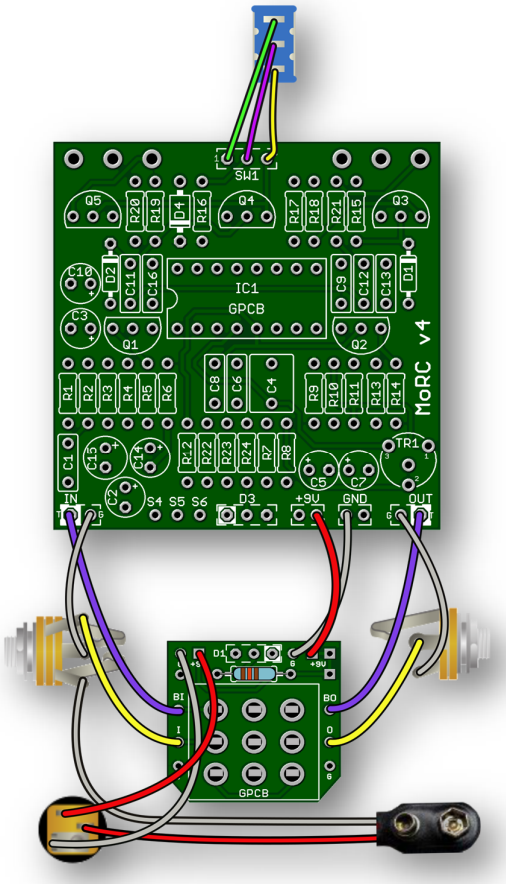


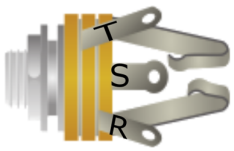
Older v3 version schematic (CA3080 Chip)

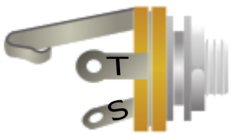


Board wiring diagram for the new v4 2020 version:



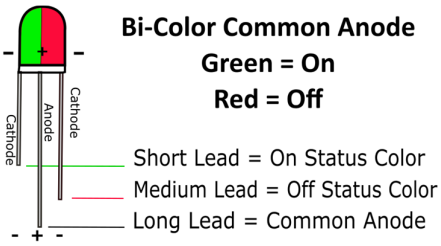


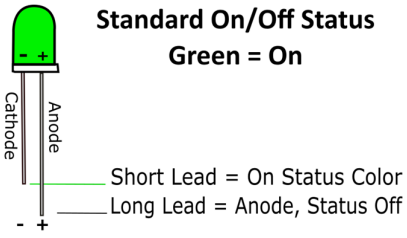


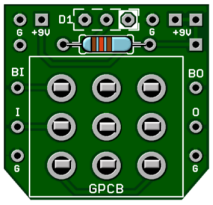


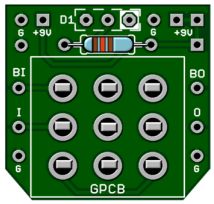
Be sure your In/Out Jack wiring is correct. A Stereo Jack (for battery use only) has a RING lug which is used to connect to the battery ground. If you do not intend to use a battery there is no need for a Stereo Jack. If using Stereo then only use the Tip and Sleeve lugs. S4, S5 & S6 is only needed when the LED is wired to the Main Board.

If using our convenient 3PDT Wiring Boards (below) here is an LED wiring guide. You may use Common Anode Bi-Color or Standard On/Off. The wiring boards use the same symmetrical layout as if wiring straight to the switch.



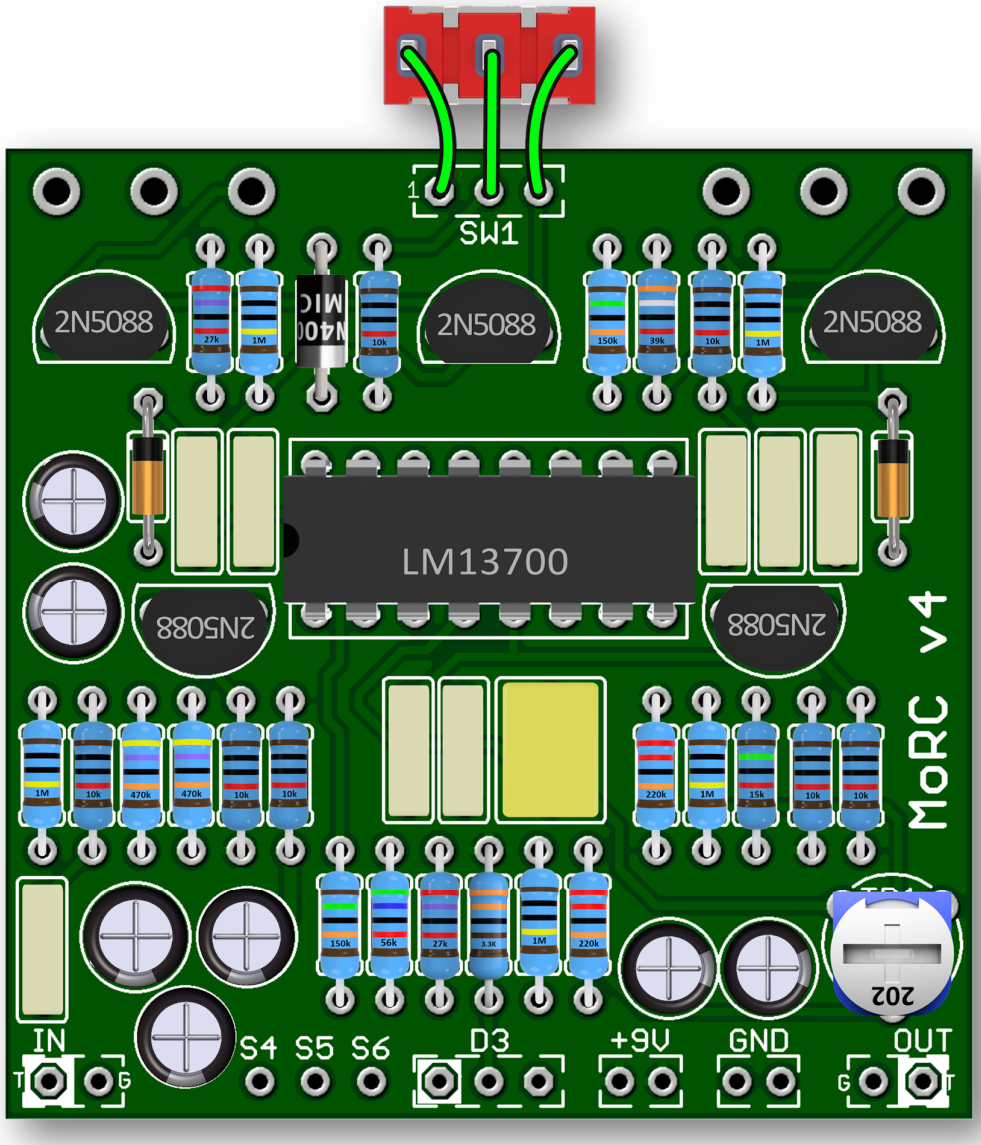






Note: If wiring the LED to our 3PDT board no need to connect S4, S5 & S6 or populate D3 or R24 (CLR) on the main board since you are wiring your LED directly to our board.

Direct Online Link: 3PDT Wiring Board Build Document



Populated Board example. Zoom in for proper color bands, text and more.

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Use the Board Silkscreen for hand wiring potentiometers & switches. (1) in the silkscreen means Potentiometer Lug 1.

Modifications: Please note that mods are not included with kits and you must be able to troubleshoot.

Circuit analysis below Courtesy of Tonmann.

The only parts I would modify for bass guitar are the release time (if at all) and the output capacitor.

The frequency response between the input jack and the inputs to IC1 is reasonably flat, the frequencies start to roll off at about 40Hz or so, which is just below open fourth (E) string. Increasing C1 will give you about 3dB extra which isn't a lot to be worried about, also it isn't really worth increasing the very low frequencies if we are going to compress them anyway.

Another point is that OTAs (Operational Transconductance Amplifier) tend to distort the output signal if they are either fed too much input signal or the gain is set too high - something to be avoided. A bit of attenuation at low frequencies (where the signal is largest) could be a good thing.

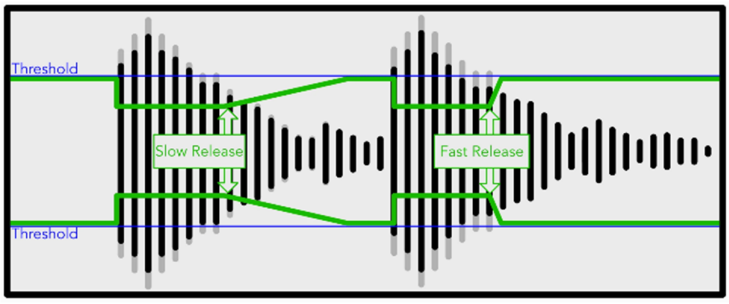
Bass players would normally look for a faster release time than a lead guitar - limit the gain for large signals and quickly restore the gain for following low level signals giving more of a tight rather than sustained sound.

The "timing" part of the circuit comprises the combination of R16 - R18 and C10. The speed at which Q5 turns on depends on how fast C10 changes from a discharged to a charged state; this is controlled by the resistance value of R16-R18, smaller resistance - faster capacitor charging - quicker turn-on time for Q5.

With the standard values of R16 - R18 the total resistances are:

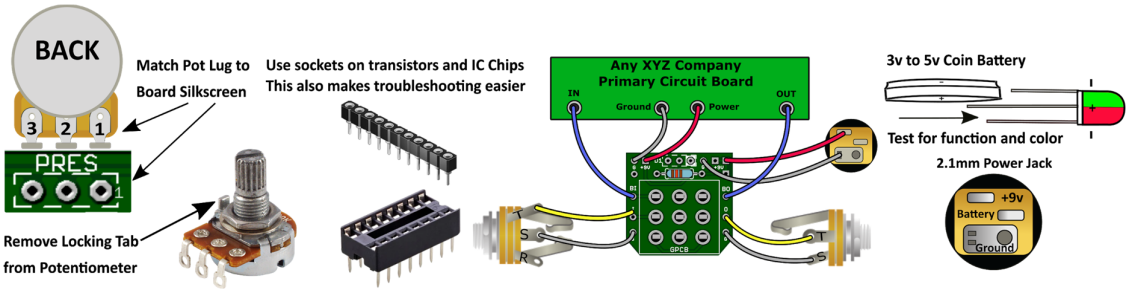
- **SW1 Up 40kΩ (R16 + R17 // R18)**
- **SW1 Middle 160kΩ (R16 + R17)**
- **SW1 Down 10kΩ (R16)**

To set a fast release time you would be looking at a total resistance value of 10k to about 60k, which would mean the 160kΩ would be too large. With R16 at 10kΩ and both R17 and R18 at 56kΩ you would get 38kΩ, 66kΩ and 10kΩ on the switch settings - if you find the 10kΩ setting to be to fast you could increase R16 by 5kΩ - 10kΩ (I'll leave you to do the maths for the other settings). Alternatively you could replace SW1, R17 and R18 with a 100kΩ pot and set the release time manually.



Some people say that compressors sound a bit dull (lack high frequencies), To compensate for this we set C12 to a small value which reduces bass frequencies giving an apparent treble boost.

For bass guitar I would suggest a"socket and see" approach using values up to 100nF.



[Soldering Tutorial on Youtube]

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