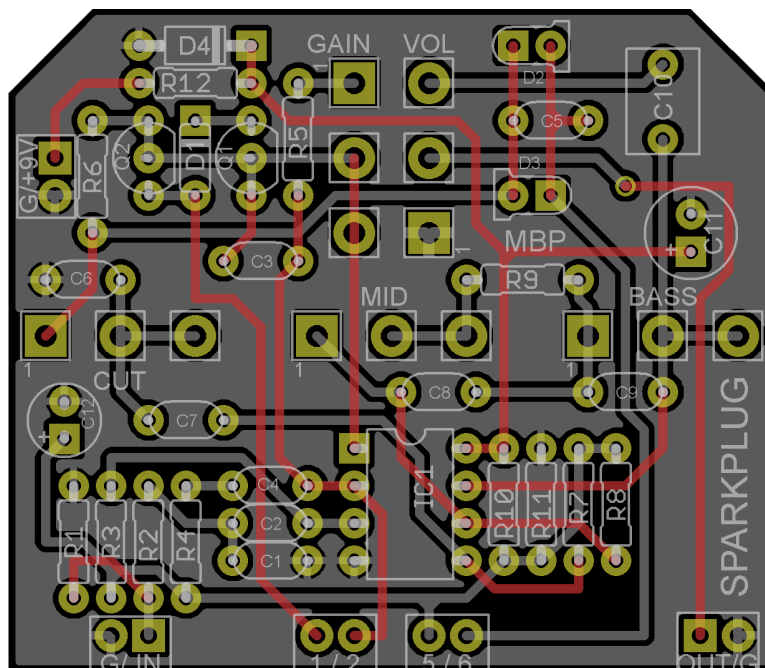
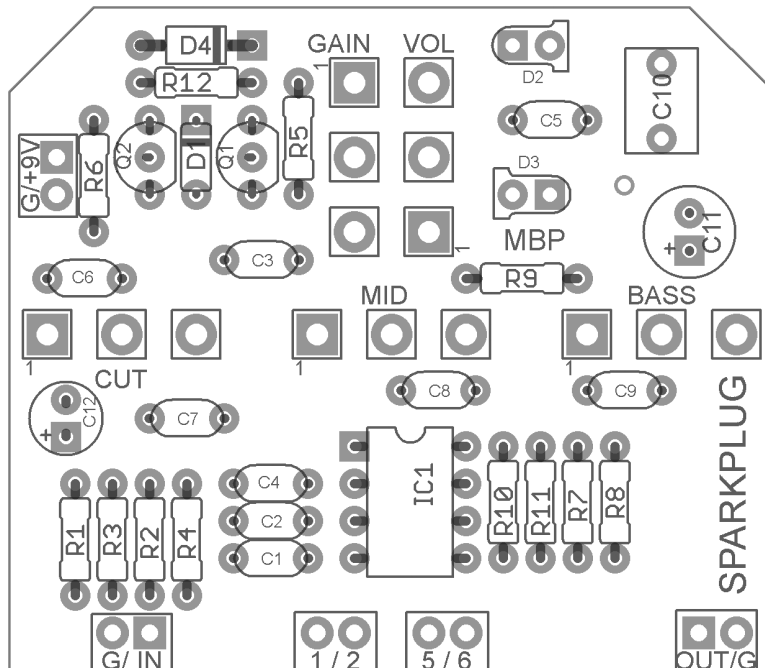


SPARKPLUG

fx type: Overdrive

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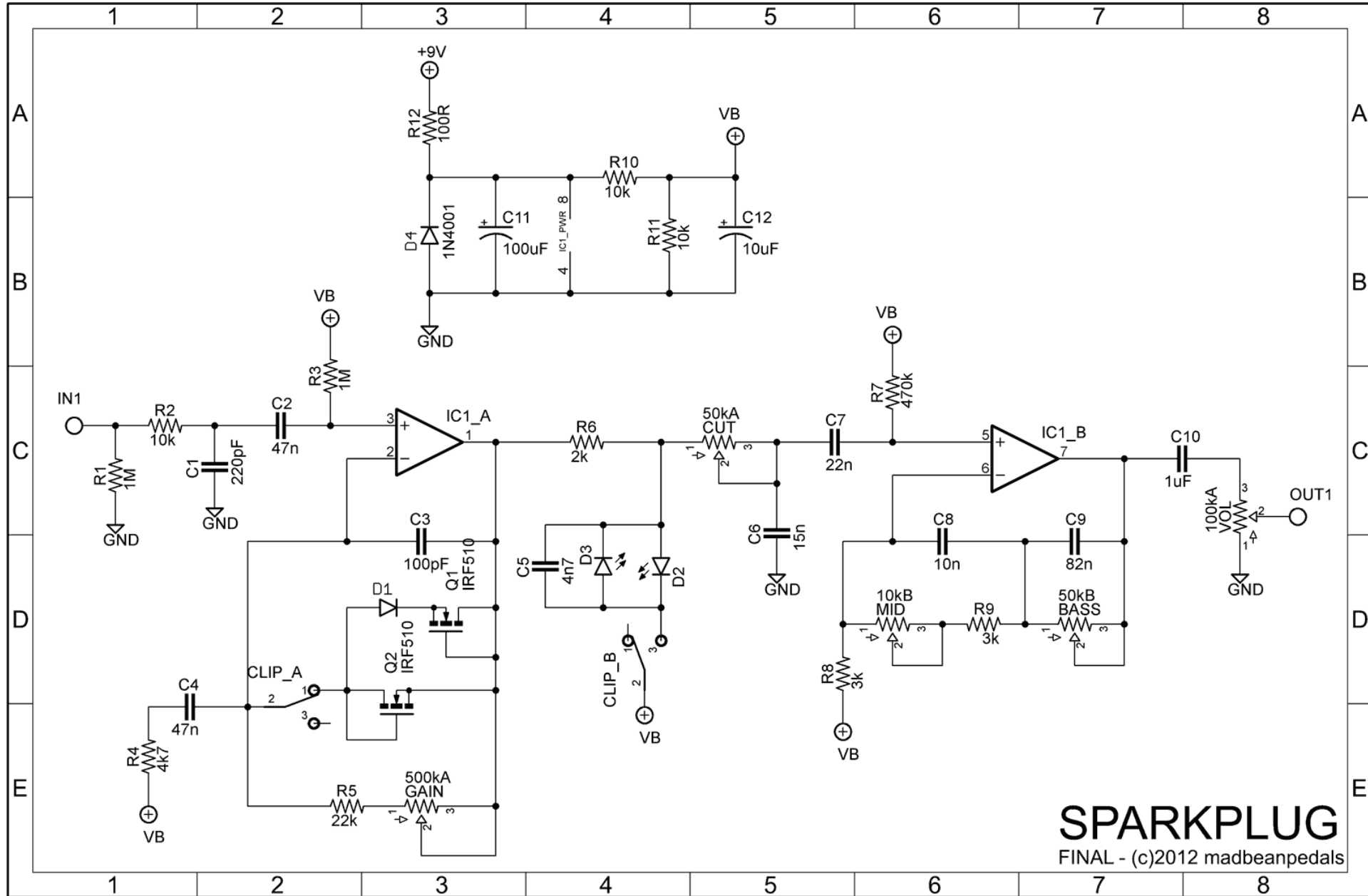
2.05" W x 1.775" H



Sparkplug PCBs purchased from [madbeanpedals](http://madbeanpedals.com) (or etched from the included PCB artwork) may be used for small quantities of commercial pedal building (bulk discounting on PCBs is not offered). You may not, however, offer these PCBs for commercial resale (re-distribution) or as part of a "kit". Selling and trading through DIY forums is, as always, completely legit.

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Schematic



B.O.M.

Resistors		Caps		Diodes	
R1	1M	C1	220pF	D1	BAT41
R2	10k	C2	47n	D2, D3	LED
R3	1M	C3	100pF	D4	1N4001
R4	4k7	C4	47n	Transistors	
R5	22k	C5	4n7	Q1, Q2	IRF510
R6	2k	C6	15n	IC	
R7	470k	C7	22n	IC1	see notes
R8	3k	C8	10n	Switch	
R9	3k	C9	82n	CLIP	DPDT (On/On)
R10	10k	C10	1uF	Pots	
R11	10k	C11	100uF	BASS	50k
R12	100R	C12	10uF	CUT	50k
				MID	10k
				GAIN	500k
				VOL	100k

Overview

The **Sparkplug** is modeled after the many great overdrives designed by Dave Barber of Barber Electronics such as the LTD, the Direct Drive and their many variations. While each of these overdrives is unique, they all feature some common design elements such as soft and/or hard clipping, no input or output buffers, and a number of internal trim pots for tone control. The **Sparkplug** is molded along these lines without being a direct clone of any particular design. Internal controls have been moved outward for on-the-go tone changes and the clipping choices offer a nice range of classic overdrive suitable for most players.

Controls:

Vol: Passive volume control

Gain: The amount of overdrive from light to heavy

Bass, Mid: Active tone controls

Cut: Passive tone cut from full treble to treble roll-off

There is no particular IC required for the **Sparkplug**, and experimentation is encouraged (use a socket). Of the ones I tested, I particularly liked the JRC4558, JRC4580D and TLC2272. Other types to try: NE5532, OPA2604, and TL072. Barber also likes to stack op-amps on top of each other. Check this out: <http://www.barberelectronics.com/parallelpamps.htm>

About the tone controls: The three controls, Cut, Mid, and Bass offer a nice range of tonal variety but keep in mind that these are not going to produce radically different sounds like the traditional TMB type. Rather, they should be used to find the “sweet spot” for the particular guitar and amp you are using, or for complimenting pedal stacking such as additional overdrive or boost.

About the clipping switch: This switch lets you choose between soft clipping via mosfets in the feedback path of the gain stage or hard clipping via LEDs. The mosfets have less gain, more pronounced mid-range and are very warm sounding. The LEDs have more presence, gain and bite.

Notes

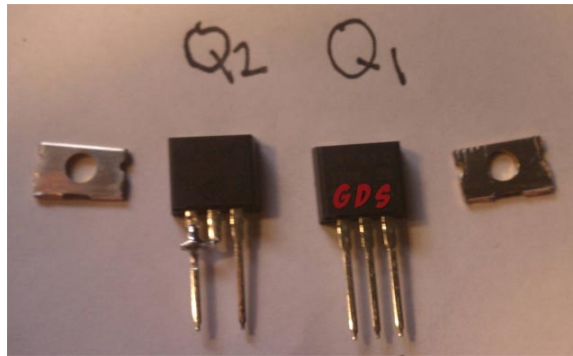
C10 should be a 1uF poly film cap.

For D2, D3, you can use either 3mm or 5mm, diffused or water clear. I tried both 3mm red diffused and 5mm water clear and they both sounded great!

Important:

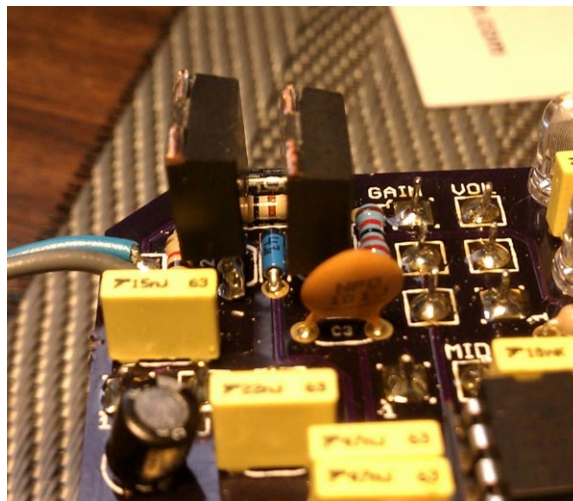
The use of the IRF510 mosfets for the soft clipping was a choice made AFTER I sent the boards for manufacturing. I intended to use a different type of mosfet, but later realized that there was not enough variation between the two clipping choices (and I had them connected incorrectly anyway as it turns out). This prompted more experimentation and the IRFs ended up being the best choice by far. However, this means you will need to make a small modification to use these transistors on the PCB, since the trace connections are not correct. Fortunately, it is an easy fix.

The IRF510 are larger in size and come in a TO-220 type packaging like the 12 or 15v regulators you may have used before. They have a tab on the top side of each which is connected to the Drain pin. You need to GENTLY clip these tabs off first.

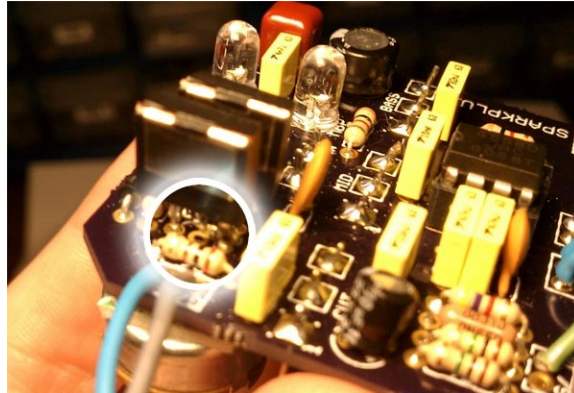


For Q1, this is all you need to do. For Q2, we need to connect the Drain and Gate together to enable the soft body clipping (since the pads on the board are not connected in the right way). Gently bend the middle pin over to the left, solder and clip off the excess.

Now solder Q1 and Q2 on the board, facing the same way as indicated by the drawings on the PCB.



Be sure there is a gap between the pin you bent and soldered and the pad directly below it on the PCB. It is important that these do not touch, otherwise the clipping will not work correctly.



Note the gap: the pin does not touch the middle pad of the transistor on the PCB.

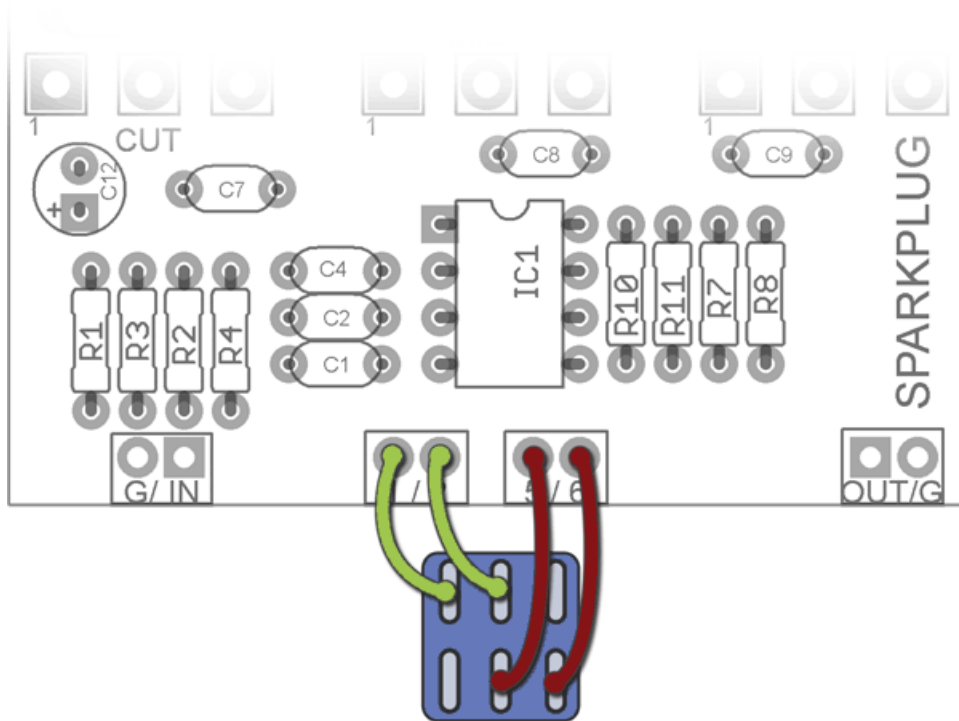
That's it!

BTW: The IRF510 is available at Smallbear. You can also usually find them at RadioShack (for twice the price).

Last thing: You can use 16mm, short-pin PCB mounted pots for this build. Some of the pots will block the spots where the wires go on the bottom of the PCB. For this reason, you should solder your wires before soldering on PCB mounted pots.

Wiring

Wiring



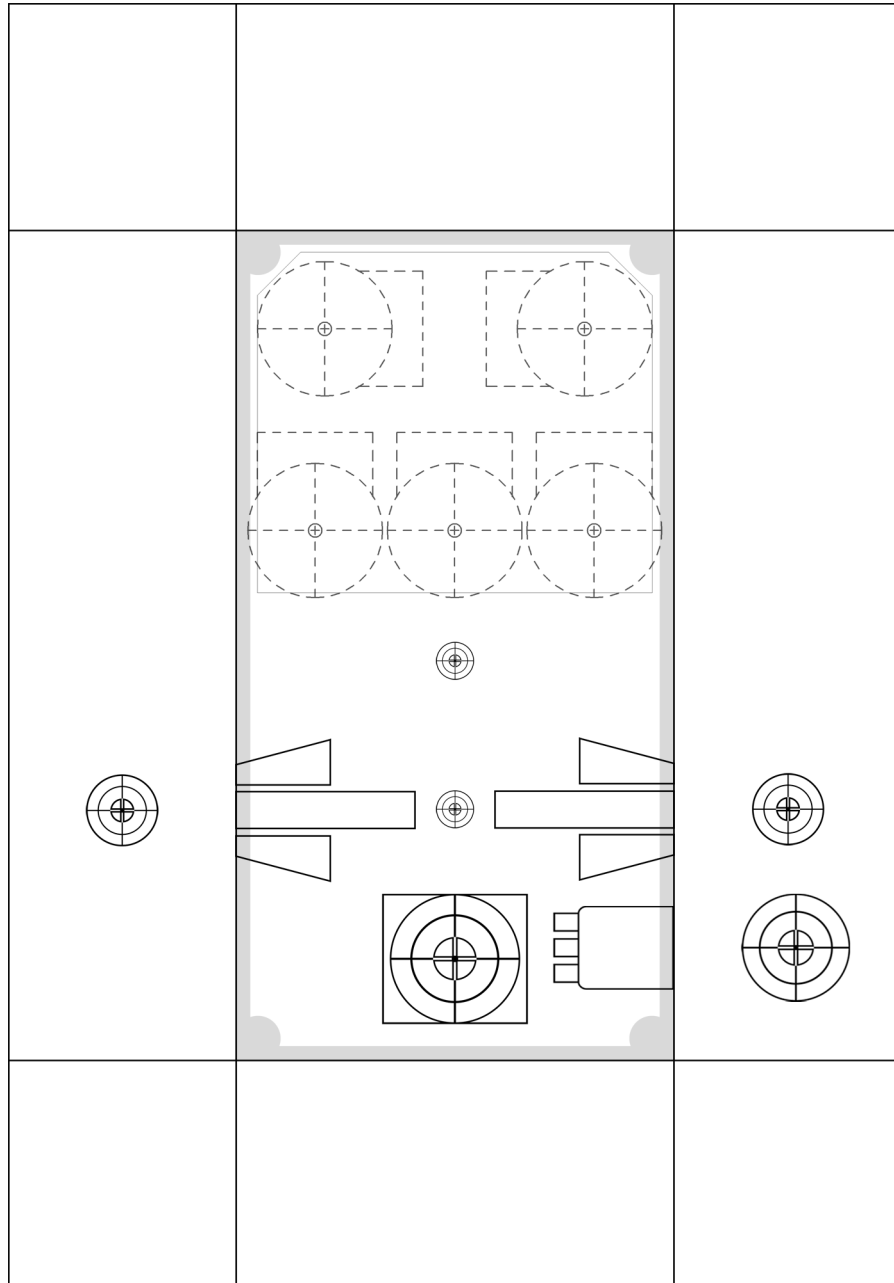
The On/On DPDT switch should be wired as follows:

Please refer to the Standard Wiring diagram for basic connections:

http://www.madbeanpedals.com/tutorials/downloads/StandardWiring_MBP.pdf

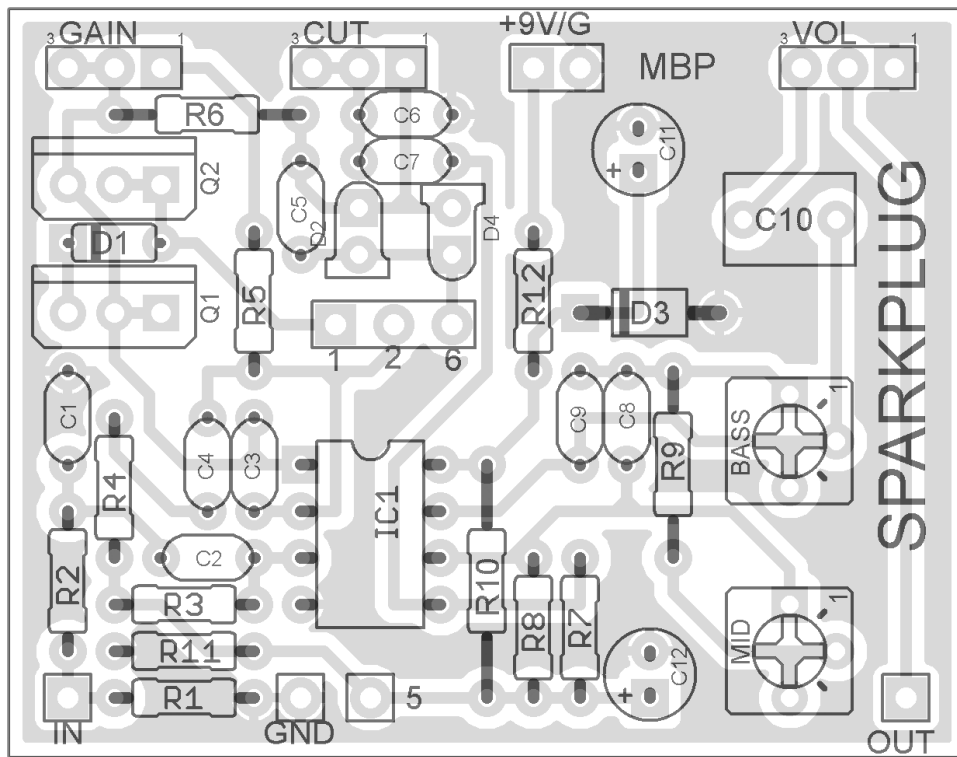
Drill Guide

1590B Enclosure
4.64" W x 6.69" H

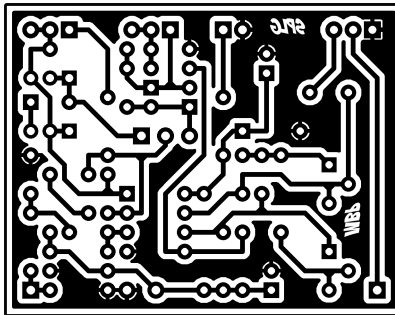


This template is approximate. Please check carefully before committing to drilling!

Single Sided Layout



2.08" w x 1.63" H (inc. borders)



You do not need to go through the fix for Q1 and Q2 mentioned earlier: this has been corrected for the single-sided layout. However, you do need to clip the tabs off the top.

To save space, the Bass and Mid pots were made trimmers, so you can use them this way or wire them to pots like the manufactured PCB.