

PROJECT NAME

QUANTUM

BASED ON

Ibanez MT-10 Mostortion

EFFECT TYPE

Overdrive / Distortion

BUILD DIFFICULTY

■■■■■ Easy

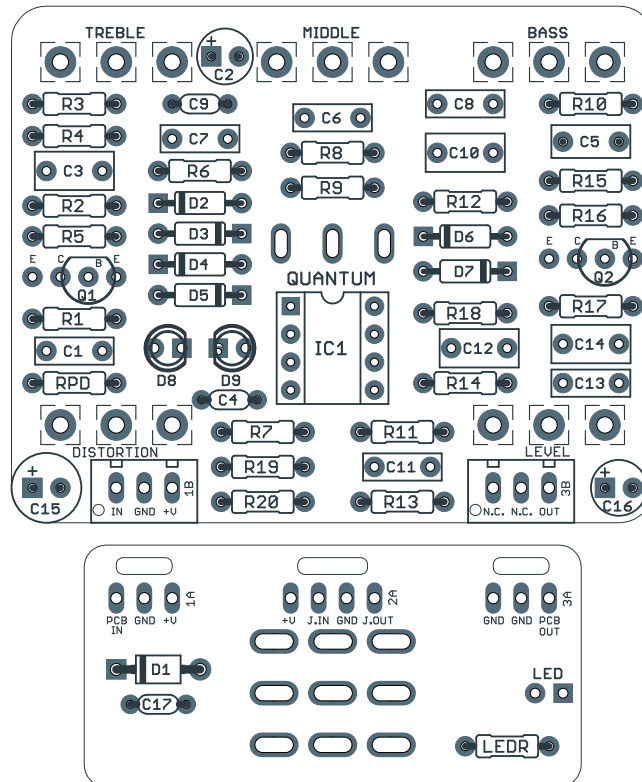
DOCUMENT VERSION

1.0.0 (2018-12-15)



PROJECT SUMMARY

A reproduction of a rare and very expensive low-to-mid-gain overdrive with 3-band EQ that is popular in the Nashville scene.



Actual size is 2.3" x 1.86" (main board) and 2.3" x 0.86" (bypass board).

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INTRODUCTION

The Quantum Amp Overdrive project is a clone of the Ibanez MT-10 Mostortion MOS-FET Distortion, a fairly obscure pedal in the Ibanez “10 series” released in 1990 and discontinued in 1993.

It’s unique in that it’s the only Ibanez pedal with a 3-band tonestack, which was uncommon up until the 2010’s when you started to see amp-like pedals from companies like Wampler. Before then, the Marshall Shredmaster and Guv’nor (Drivemaster) were two well-known examples, but there aren’t many others.

The Quantum is faithful to the original MT-10, but with one added modification: a switch that lets you go between different clipping diodes. The original has a high clipping threshold using two stacked diodes in each direction, but with the clipping switch you can also select one 1N914 in each direction for a lower threshold (as in a Tube Screamer) or LEDs for a higher threshold.

USAGE

The Quantum has the following controls:

- **Treble, Middle** and **Bass** form a passive 3-band tone control for flexible tone shaping.
- **Distortion** controls the amount of gain in the op-amp clipping stage.
- **Level** controls the overall output of the effect.
- **Clipping** (toggle switch) selects the clipping diodes which changes the character of the drive tone.

PARTS LIST

This parts list is also available in a spreadsheet format which can be imported directly into Mouser for easy parts ordering. Mouser doesn't carry all the parts—most notably potentiometers—so the second tab lists all the non-Mouser parts as well as sources for each.

[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
R1	1k	Metal film resistor, 1/4W	
R2	510k	Metal film resistor, 1/4W	
R3	9k1	Metal film resistor, 1/4W	
R4	22k	Metal film resistor, 1/4W	
R5	10k	Metal film resistor, 1/4W	
R6	220R	Metal film resistor, 1/4W	
R7	1M	Metal film resistor, 1/4W	
R8	2k7	Metal film resistor, 1/4W	
R9	47k	Metal film resistor, 1/4W	
R10	10k	Metal film resistor, 1/4W	
R11	1M	Metal film resistor, 1/4W	
R12	10k	Metal film resistor, 1/4W	
R13	47k	Metal film resistor, 1/4W	
R14	1k	Metal film resistor, 1/4W	
R15	510k	Metal film resistor, 1/4W	
R16	10k	Metal film resistor, 1/4W	
R17	470R	Metal film resistor, 1/4W	
R18	100k	Metal film resistor, 1/4W	
R19	10k	Metal film resistor, 1/4W	
R20	10k	Metal film resistor, 1/4W	
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor. Can be as low as 1M.
LEDR	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	22n	Film capacitor, 7.2 x 2.5mm	
C2	10uF	Electrolytic capacitor, 5mm	
C3	1uF	Film capacitor, 7.2 x 3.5mm	
C4	47pF	MLCC capacitor, NP0/COG	Original value is 51pF, but this is the nearest commonly-available value.
C5	220n	Film capacitor, 7.2 x 2.5mm	
C6	68n	Film capacitor, 7.2 x 2.5mm	
C7	33n	Film capacitor, 7.2 x 2.5mm	
C8	15n	Film capacitor, 7.2 x 2.5mm	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C9	330pF	MLCC capacitor, NP0/C0G	
C10	1uF	Film capacitor, 7.2 x 3.5mm	
C11	1n	Film capacitor, 7.2 x 2.5mm	
C12	1uF	Film capacitor, 7.2 x 3.5mm	
C13	100n	Film capacitor, 7.2 x 2.5mm	
C14	1uF	Film capacitor, 7.2 x 3.5mm	
C15	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C16	47uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C17	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	1N914	Fast-switching diode, DO-35	
D3	1N914	Fast-switching diode, DO-35	
D4	1N914	Fast-switching diode, DO-35	
D5	1N914	Fast-switching diode, DO-35	
D6	1N914	Fast-switching diode, DO-35	
D7	1N914	Fast-switching diode, DO-35	
D8	3mm	LED, 3mm, red diffused	
D9	3mm	LED, 3mm, red diffused	
Q1	2N5088	BJT transistor, NPN, TO-92	Original uses 2SC1815.
Q2	2N5088	BJT transistor, NPN, TO-92	Original uses 2SC1815.
IC1	CA3260E	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
TREBLE	250kA	16mm right-angle PCB mount pot	
BASS	250kA	16mm right-angle PCB mount pot	
MID	50kA	16mm right-angle PCB mount pot	
DIST	500kA	16mm right-angle PCB mount pot	
LEVEL	100kB	16mm right-angle PCB mount pot	
CLIP	SPDT cntr off	Toggle switch, SPDT on-off-on	
LED	5mm	LED, 5mm, red diffused	
IN	1/4" stereo	1/4" phone jack, closed frame	Switchcraft 112BX or equivalent.
OUT	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X or equivalent.
DC	2.1mm	DC jack, 2.1mm panel mount	Mouser 163-4302-E or equivalent.
BATT	Battery snap	9V battery snap	Optional. Use the soft plastic type—the hard-shell type will not fit.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

BUILD NOTES

Clipping switch

The clipping switch allows you select between different sets of diodes.

The left position of the toggle switch is the stock MT-10 clipping arrangement, which has two silicon diodes in each direction. The right position of the toggle is one diodes in each direction, as in the Tube Screamer—a lower clipping threshold with a more compressed sound. The center position leaves only the LEDs for a more dynamic and transparent tone.

If you look at the schematic, you'll see that the LEDs, D8 and D9, are always connected. However, in either the up or down switch positions, the lower-threshold diodes are connected and so the LEDs have no effect—there's no signal remaining for them to clip.

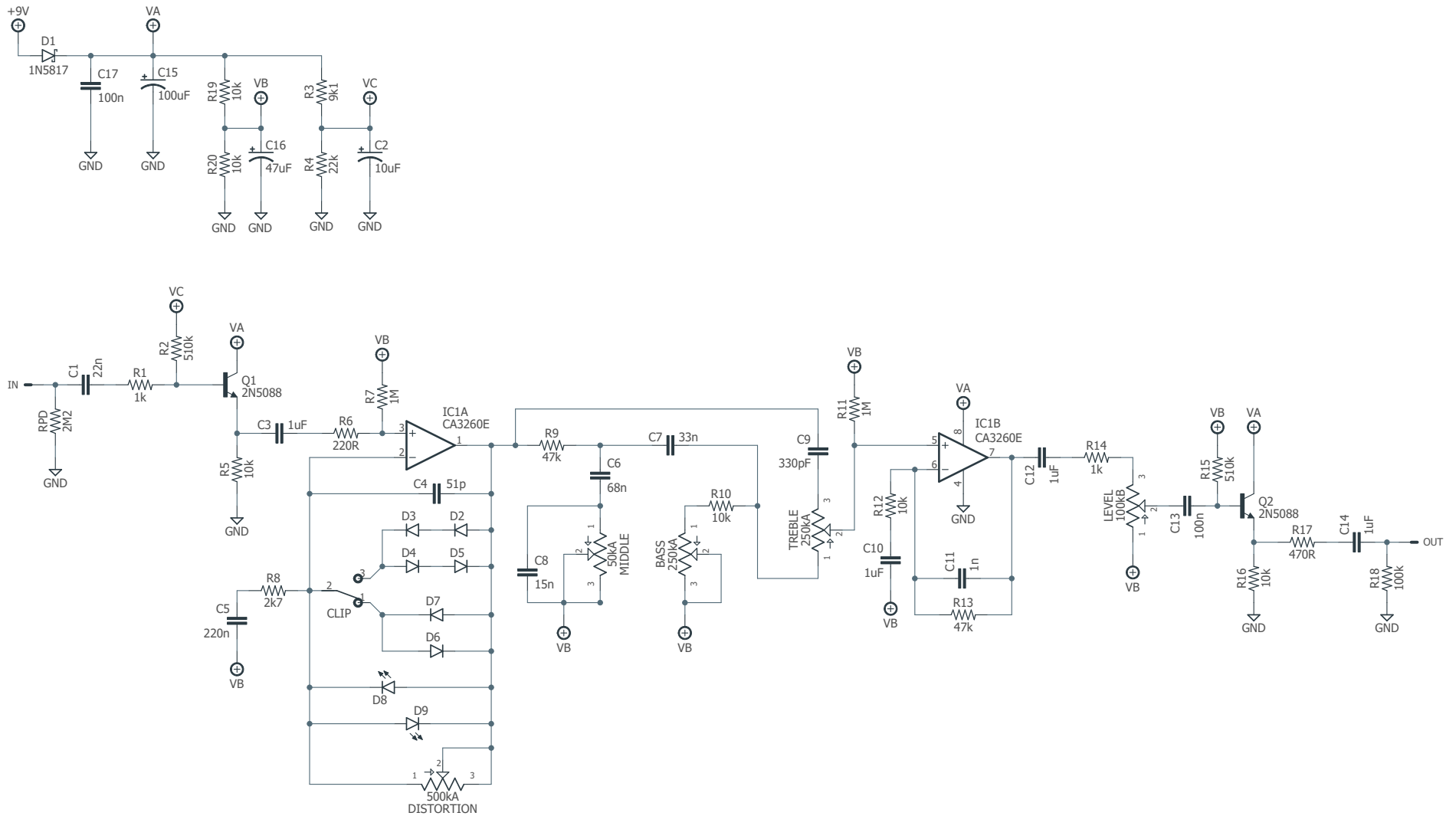
Feel free to experiment, For example, you could jumper D7 for asymmetrical clipping. Or, you could omit the two clipping LEDs for a diode-lift mode in the center position.

IC selection

The CA3260 MOSFET IC used in the design was discontinued for awhile and has only recently become available again, although it is still not easy to find. This IC is the only MOSFET component in the pedal, and there are no other substitute op-amps that have both MOSFET inputs and CMOS outputs, so you'll need that exact part if you want it to be a direct clone.

That said, the CA3260 isn't the only thing unique about this circuit. It's still worth building even if you can't find one. It won't be a true MOSFET distortion, but it will still have its own character whether you use the CA3260 or a JRC4558 or anything else. You may even find you like one of those better.

SCHEMATIC



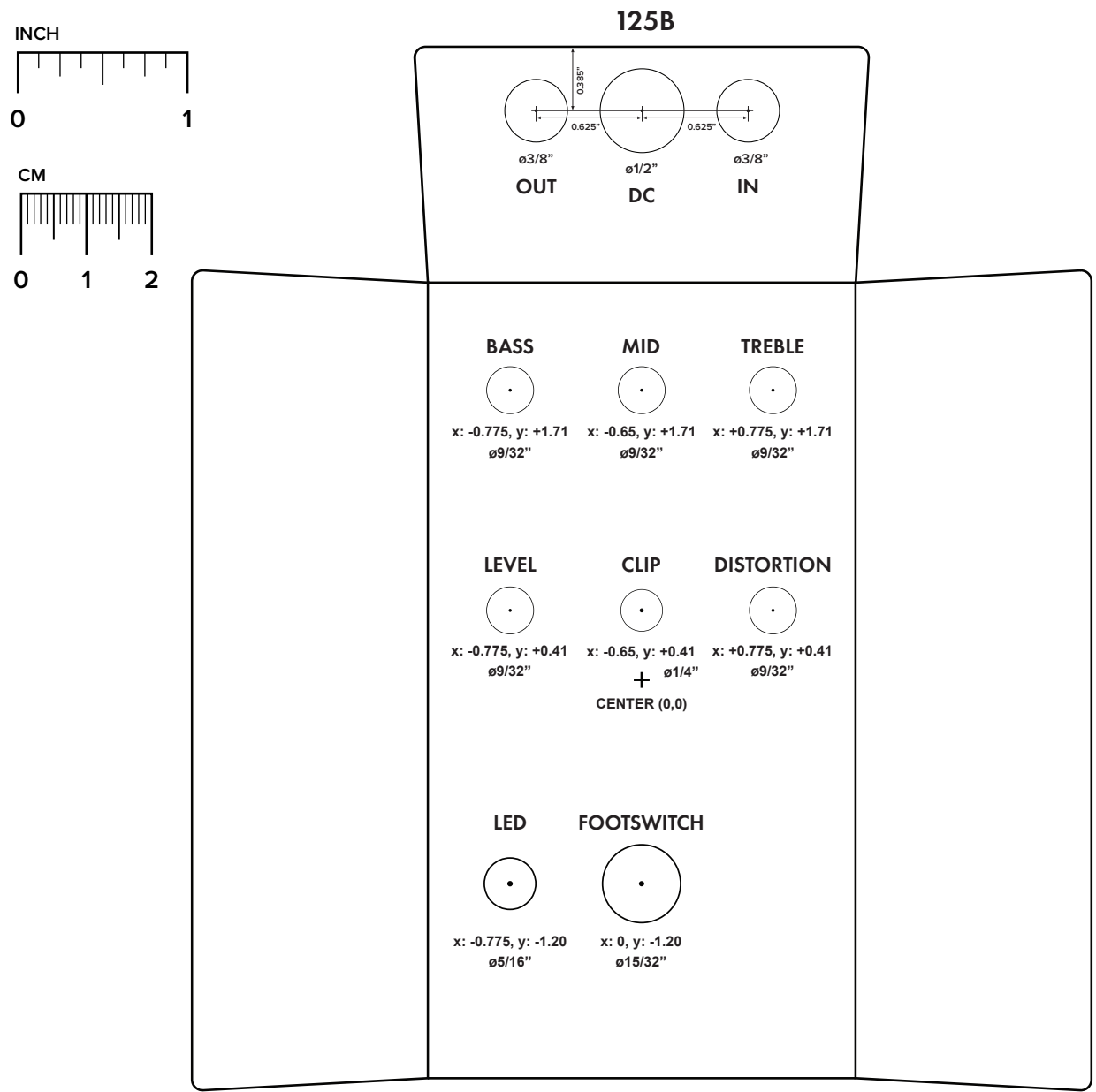
DRILL TEMPLATE

Cut out this drill template, fold the edges and tape it to the enclosure. Before drilling, it's recommended to first use a center punch for each of the holes to help guide the drill bit.

Ensure that this template is printed at 100% or "Actual Size". You can double-check this by measuring the scale on the printed page.

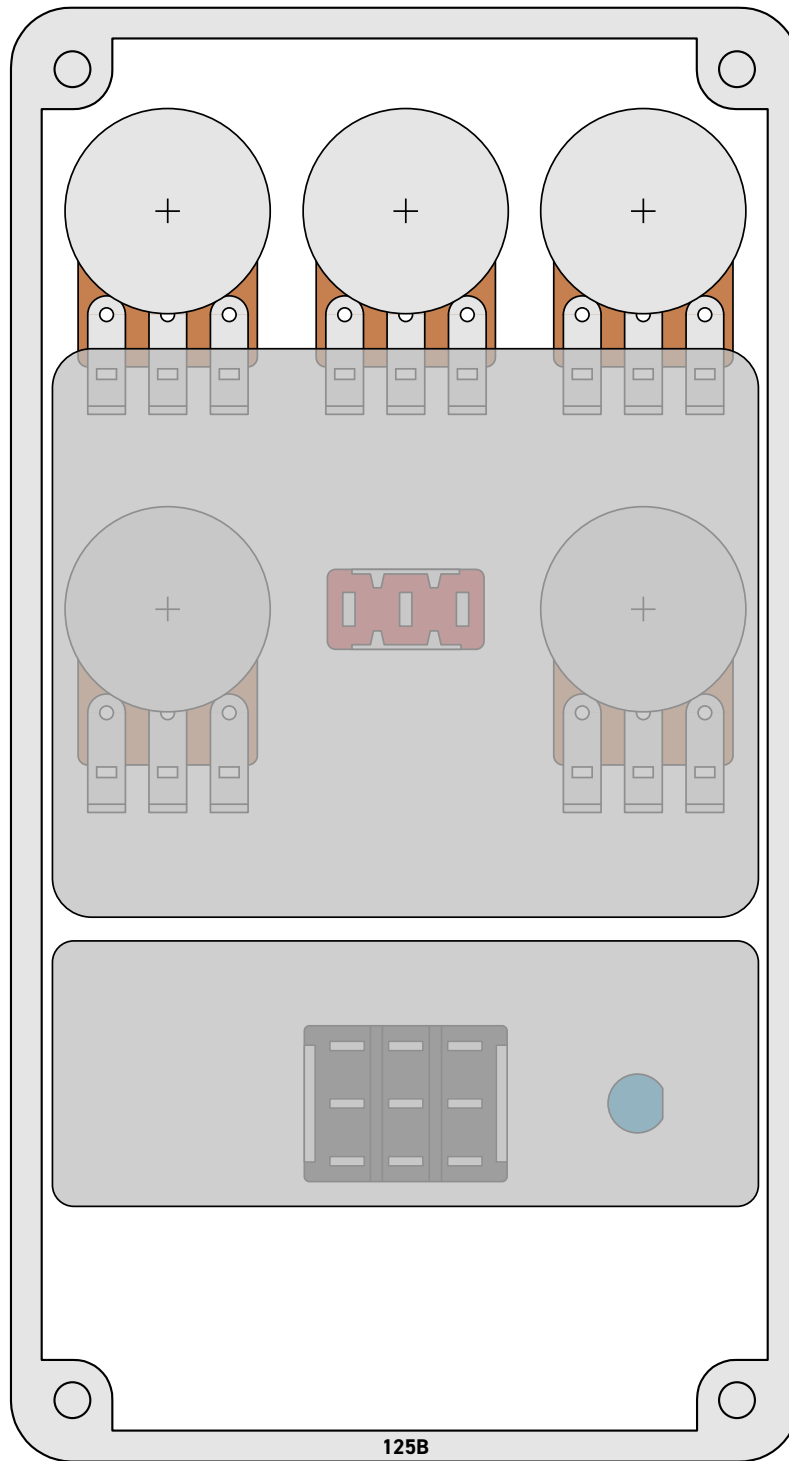
Top jack layout requires the use of closed-frame jacks like the [Switchcraft 111X](#). Open-frame jacks will not fit in layouts with 5 or more knobs due to the placement of the DC jack.

LED hole drill size assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.

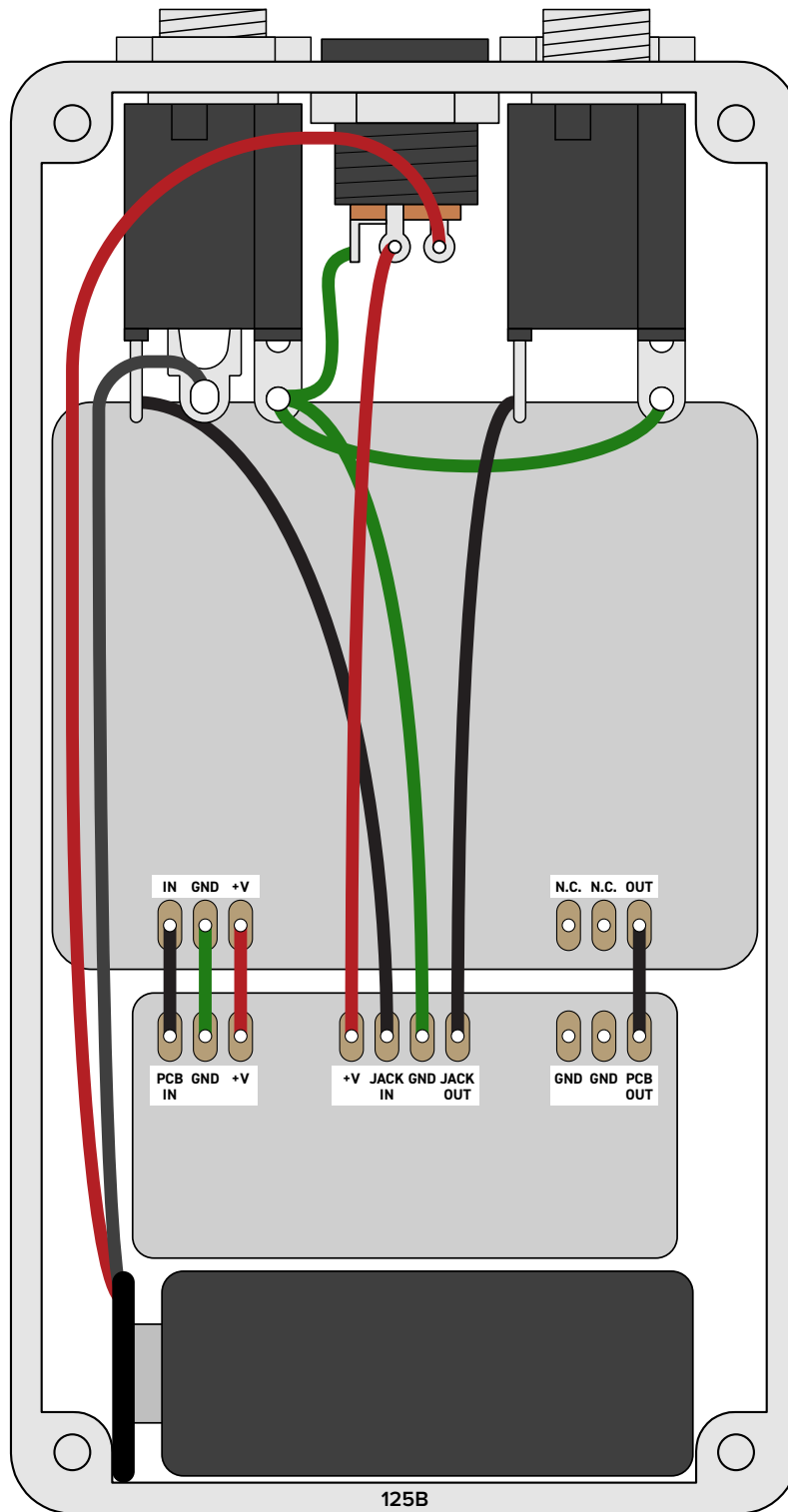


ENCLOSURE LAYOUT

Enclosure is shown without jacks. See next page for jack layout and wiring.



WIRING DIAGRAM



*Shown with optional 9V battery. If battery is omitted, both jacks can be mono rather than one being stereo.
Leave the far-right lug of the DC jack unconnected.*

LICENSE & USAGE

No direct support is offered for these projects beyond the provided documentation. It's assumed that you have at least some experience building pedals before starting one of these. Replacements and refunds cannot be offered unless it can be shown that the circuit or documentation are in error.

All of these circuits have been tested in good faith in their base configurations. However, not all the modifications or variations have necessarily been tested. These are offered only as suggestions based on the experience and opinions of others.

Projects may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though a link back is always greatly appreciated. The only usage restrictions are that **(1) you cannot resell the PCB as part of a kit without prior arrangement, and (2) you cannot "goop" the circuit, scratch off the screenprint, or otherwise obfuscate the circuit to disguise its source.** (In other words: you don't have to go out of your way to advertise the fact that you use these PCBs, but please don't go out of your way to hide it. The guitar effects industry needs more transparency, not less!)

DOCUMENT REVISIONS

1.0.0 (2018-12-15)

Initial release.