

Little Devil

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Description

The Little Devil has no equal among portable, DC powered, small amps. It features full pre and power amp sections. A wide range tone control lets you dial in the tone you want. With its chimey cleans, two distinct flavors (smooth and gritty) of fat, growly, overdrive, and a raunchy distortion when cranked up, the Little Devil is suitable for a wide range of genres. By simply turning the switch, the Little Devil becomes an effects pedal letting you take the sound you love to higher power levels. Connect the Little Devil to your favorite speakers or amp and experience the sonic richness that Little Devil has to offer.

Connectors:

INPUT Jack, OUTPUT Jack, AC Adaptor Jack (DC 9V)

Power Supply:

DC 9V: Dry Battery 9V type or a 9V, regulated, AC Adaptor

Controls:

GAIN, TONE, VOLUME, PEDAL OUTPUT VOL., OFF-AMP-PEDAL switch

Amp output:

~0.75W into 8Ω load. Amp can drive speakers from 4Ω -16Ω.

Parts Checklist

Resistors

	value	Color code
R1	51	Green/Brown/Black
R2	100k	Brown/Black/Yellow
R3	51k	Green/Brown/Orange
R4	1M	Brown/Black/Green
R5	10M	Brown/Black/Blue
R6	2.7k	Red/Purple/Red
R7	51k	Green/Brown/Orange
R8	2.2M	Red/Red/Green
R9	10M	Brown/Black/Blue
R10	2.2k	Red/Red/Red
R11	680	Blue/Gray/Brown
R12	2.7k	Red/Purple/Red
R13	10k	Brown/Black/Orange
R14	5.1k	Green/Brown/Red
R15	10	Brown/Black/Black
R16	100	Brown/Black/Brown
R20	6.8k	Blue/Gray/Red

Capacitors

Part	Value (F)	
C1	1000u	
C2	470u	
C3	47u	
C4	22n	223
C5	22n	223
C6	10p	100
C7	22n	223
C8	10n	103
C9	22n	223
C10	47n	473
C11	22n	223
C12	4.7n	472
C13	3.3u	
C14	47u	
C15	47n	473
C16	220u	

ICs

Part	Value
IC1	CD4007
IC2	LM386

Note that **CD4007** is a CMOS IC and can be destroyed by electrostatic discharge.

Potentiometers

Part	Value
MASTER	A100k
PREAMPVOL	A100k
SBOUTVOL	A100k
TONE	B100k

Jacks

Part	Value
POWER	2.1mm DC Jack
INPUT	¼" Stereo Jack
OUT	¼" Mono Jack

LED

3mm blue LED

Switches

Part	Value
S1	Rotary Switch
SW1	3PDT Foot Switch

Other Hardware

4 knobs with a red cap
1 knob with a silver top
Leaf Spring
9V Battery Snap
PCB

Assembly

Soldering

Little Devil is designed such that all components are soldered to the PCB.

The Following are general soldering recommendations:

- Use a soldering iron with temperature control.
- Do not spend more than 3 seconds while soldering each leg of a transistor, a resistor, a capacitor, an IC, or a diode.
- Use an ESD safe soldering iron with temperature control when soldering CMOS ICs and MOSFETs.
- Use a heat sink when soldering active components.
- Inspect all solder joints for completeness and cold solder.
- Ensure that components under potentiometers are fully inserted into the PCB.
- Ensure that 3PDT switch, rotary switch, DC jack, input jack, and output jack are fully inserted into the PCB and that they vertical (i.e. at the right angle with the PCB).

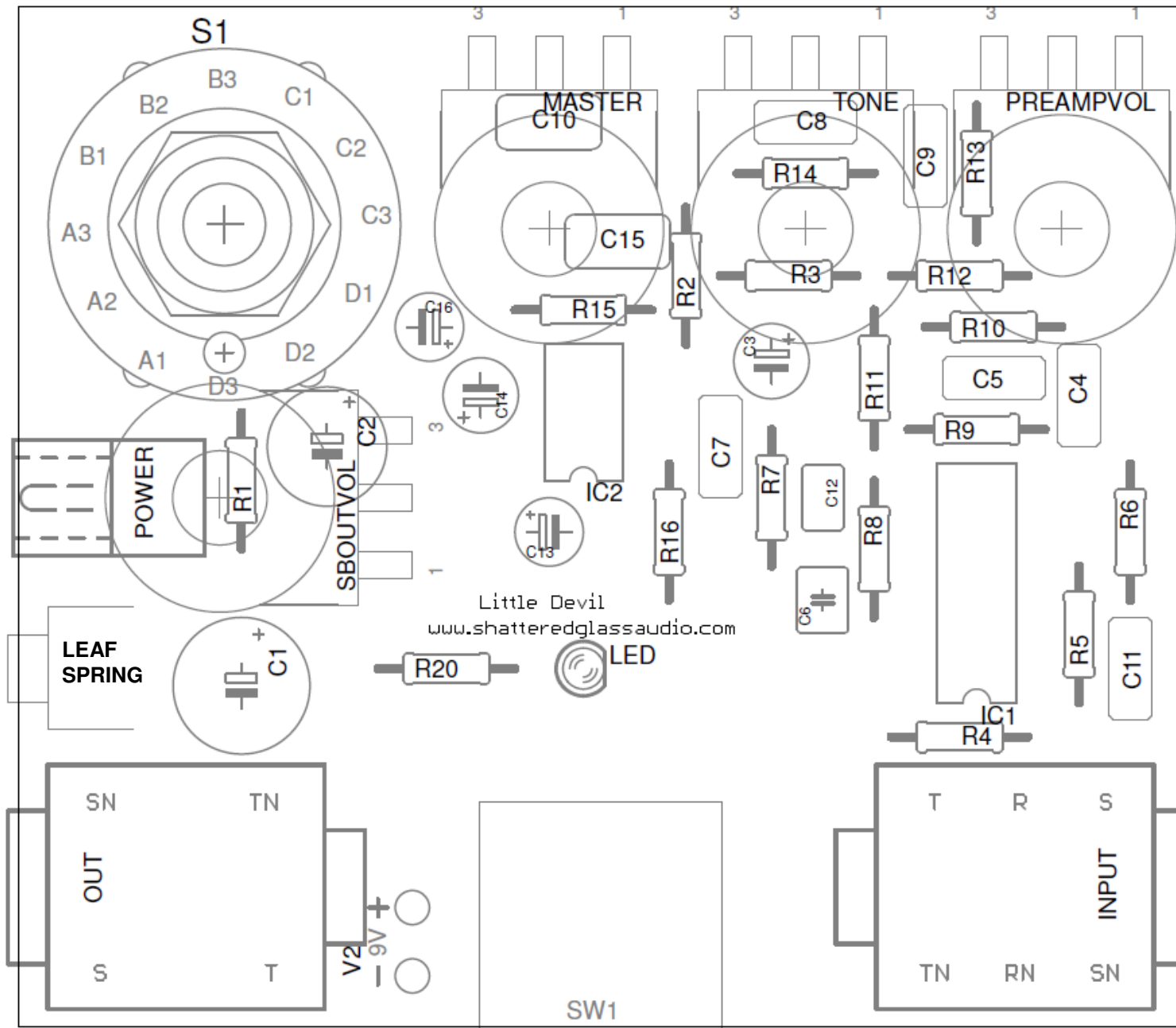
The following are general instructions on the order of soldering components to the PCB. NB your kit may not contain all components listed below. This does not mean that your kit is incomplete.

Solder components in the following order:

1. **Sockets** (if you are using them) for ICs. Sockets are not supplied with the kit. You can purchase sockets from many online stores and they are also available at Radio Shack.
2. **Diodes** – Make sure you orientate diodes such that the diode orientation matches orientation on the PCB.
3. **Resistors**
4. **ICs** – If you are not using IC sockets, solder ICs to the PCB. Make sure that the IC is orientated such that notch on the IC matches the notch on the PCB layout.

CMOS ICs, such as CD4007, can easily be damaged with electrostatic discharge. To solder CMOS ICs use only an ESD safe soldering iron. The regular soldering iron is not ESD safe and can easily destroy a CMOS IC.

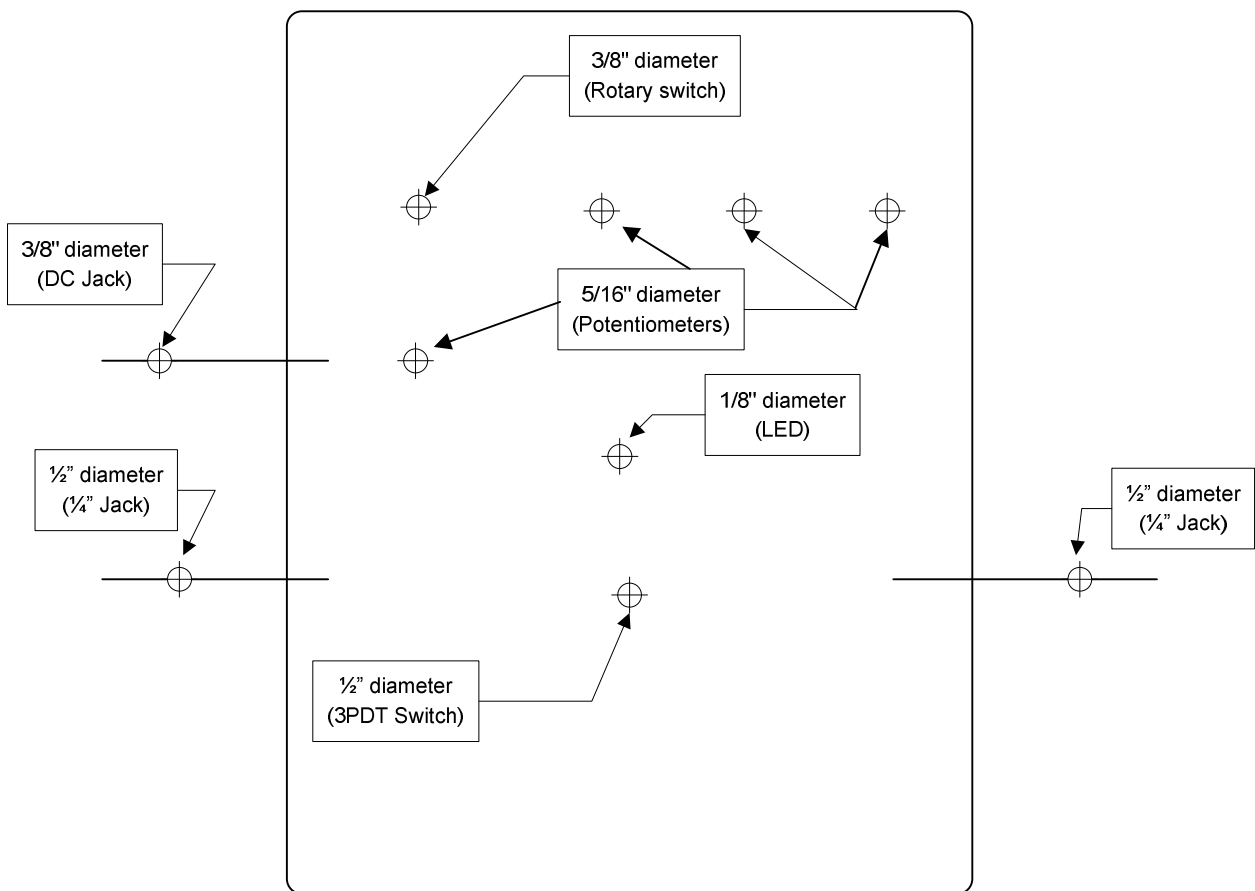
5. **Transistors** – Make sure to orientate transistors such that the flat part of the transistor body lines up with the flat side on the PCB. Transistors can be damaged by prolonged exposure to heat. In addition to keeping your soldering iron not overly hot and not spending more than 3 seconds on soldering each leg of a transistor, we recommend that you use a heat sink clipped to a leg of the transistor you are soldering. **MOSFETs can easily be damaged with electrostatic discharge. To solder MOSFETs use only an ESD safe soldering iron.** The regular soldering iron is not ESD safe and can easily destroy a MOSFET.
6. **Ceramic Capacitors**
7. **Film Capacitors**
8. **Leaf Spring**
9. **PCB mounted DC jack**
10. **Input and Output Jacks**
11. **Electrolytic Capacitors** – Electrolytic capacitors are polarized and need to be properly orientated on the PCB. Make sure that the positive lead of the capacitor is inserted into the whole with a small plus sign next to it.
12. **Battery Snap** – The red lead of the battery snap goes into the hole marked “+”, whereas the black lead of the battery snap goes into the hole marked “-“ on the PCB
13. **Potentiometers** – Before mounting potentiometers make sure you snap off the tab on the side of each potentiometer. To be able to mount potentiometers onto the PCB you may need to straighten and adjust legs of a potentiometer. Mount each potentiometer such that it matches the outline on the PCB.
14. **Rotary Switch** – To be able to insert the rotary switch into the PCB you might need to straighten and adjust the pins on the bottom of the rotary switch.
15. **3PDT Foot Switch** – The 3PDT Foot Switch should be inserted into the PCB such that the longer side of solder lugs is parallel to the longer side of the board (i.e. length of the board)
16. **LED** – When inserting the LED into the PCB make sure that the flat side of the LED matches the flat side on the figure below. Lift the LED up from the PCB until the top of the collar on the LED lines up or is slightly below the top of the body of the potentiometers. Top of the collar of the LED should be at most $\frac{3}{4}$ ”-13/16” above the PCB.



Drilling the Enclosure

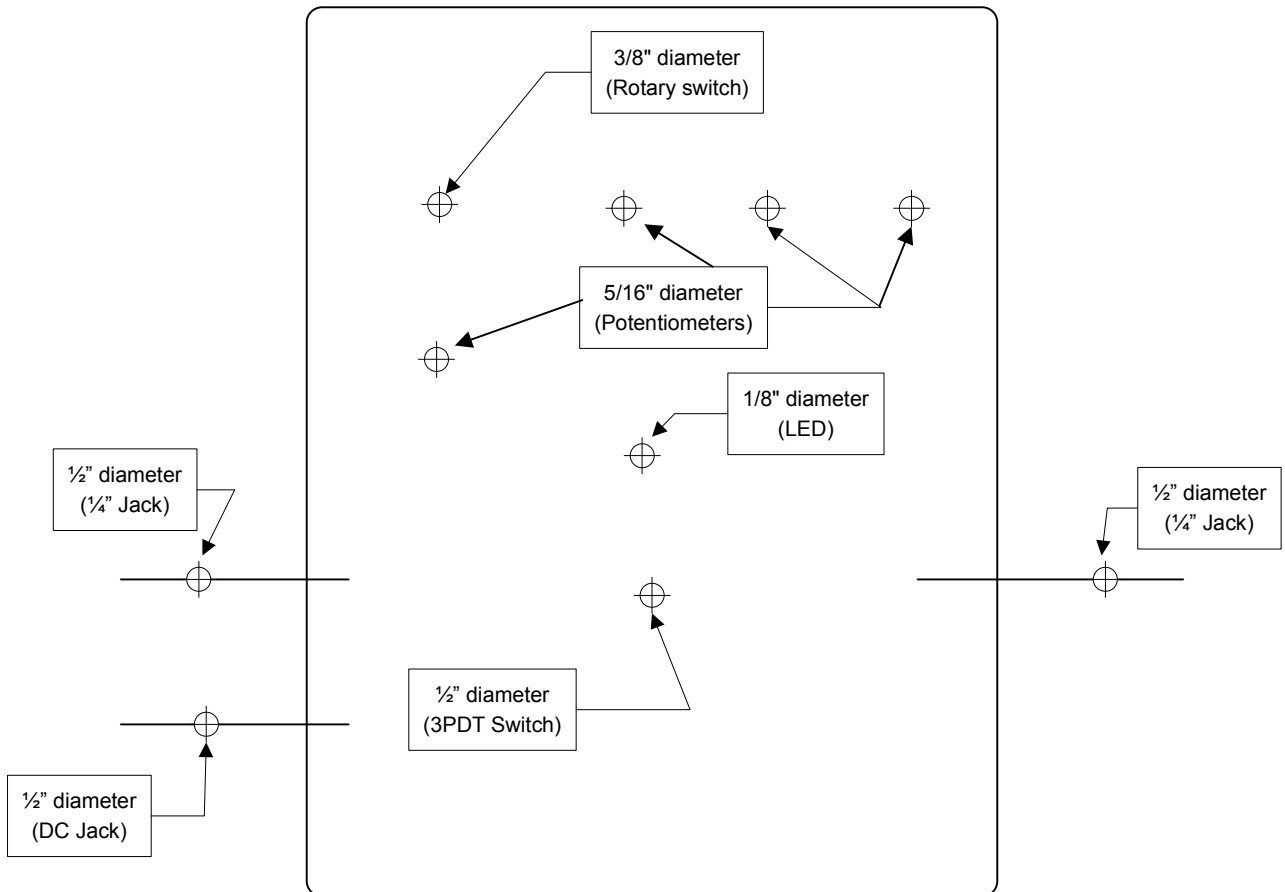
Little Devil PCB is designed with the Hammond 1590BB type enclosure in mind. It is possible to fit the Little Devil in a larger enclosure with some modifications, though. Drill template below is for the Hammond 1590BB enclosure. When printing the drill template, for your version of the kit, make sure to set printing options to no scaling, otherwise template may not match the enclosure.

Figure below is the **drilling template for version 1** of the kit.



Drilling Template for version 1 of the kit.

Figure below is the **drilling template for version 2** of the kit.



Drilling Template for version 2 of the kit.

After you have printed the template attach it to the enclosure. When attaching the template to the enclosure make sure that the top edge of the template is aligned with the top edge of the enclosure. Mark the holes with a center punch. Remove the template. Drill the holes.

Putting it together

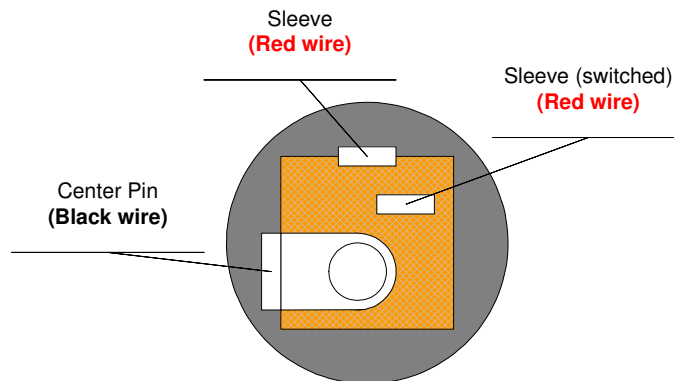
After all components are soldered, the enclosure is drilled, and the faceplate/artwork is attached you are ready to assemble the Little Devil.

Before inserting the PCB with components soldered to it, unscrew all nuts and remove all washers from potentiometers, 1/4" jacks, and the rotary switch. Unscrew the top nut and remove the locking washer and the white washer from the 3PDT switch. Unscrew the bottom nut on

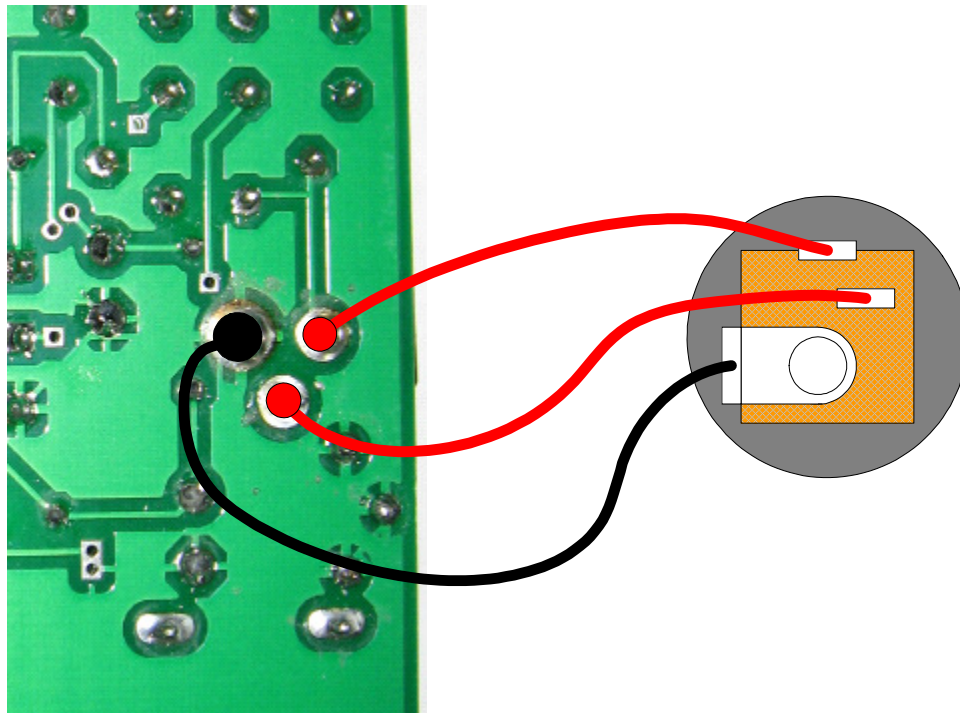
the 3PDT switch until it is about $\frac{1}{2}$ " - $\frac{3}{4}$ " above the PCB. Insert the PCB into enclosure making sure that potentiometers shafts, LED, and 3PDT switch shaft go into appropriate holes. First, screw in nuts and washers of the $\frac{1}{4}$ " jacks starting with the jack on the side of the spring leaf. Tighten the nuts of the $\frac{1}{4}$ " jacks with your fingers until you cannot turn the nuts any more. Do not use tools to tighten the nuts on $\frac{1}{4}$ " jacks. Over tightening the nuts on the $\frac{1}{4}$ " jacks will cause the PCB to bend. Next, screw on washers and nuts for the potentiometers, making sure that nuts are screwed on tightly. With your finger unscrew the nut that is on the shaft of the 3PDT switch, inside the enclosure, until it touches the roof of the enclosure. Now, screw on nut and washers for the 3PDT switch.

Assembling the Enclosure Mounted DC jack (version 2 of the kit only)

The following section applies only to version 2 of the kit, only. Strip and tin both ends of each wire. Solder one end of each wire to the DC jack according to the figure below.



Insert and securely fasten DC power jack. Solder the wires from the jack to the bottom side of the PCB (i.e. the side opposite the side where other components are soldered) according to the figure below.



You will be soldering the wires to the pads where the PCB mounted DC jack would have been soldered. It is neither necessary nor advisable to fill the whole hole with the solder. Lay the wire as flat as possible on the PCB such that the tinned tip lies across the pad it will be soldered to. Make sure that the bare wire, or the tinned tip, is not touching any other pads or exposed traces. You may find it useful to tape, insulated, parts of the wire to the PCB using a piece of the electrical tape, or some other kind of tape, to keep the wire from moving while soldering.

Finishing up

What follows applies to both versions of the kit. Close the enclosure. Put bumpers on the bottom of the enclosure. Install knobs with the red top on potentiometers. Install the knob with the silver top on the rotary switch, and you are done.

Operation

Little Devil is designed to operate on 9V by using either a 9V battery or a regulated, center-negative, 9V power supply, such as BOSS PSA-120.

Little Devil can be operated either as an amplifier or as an effects pedal. The knob with the silver top in the picture below is used to select the mode of operation and to turn the Little Devil off. In addition to the mode selection switch there are four other controls GAIN, TONE, VOLUME, and PEDAL OUTPUT VOL.



Selection Switch

To operate the Little Devil as an amp set the selection switch to point to “AMP” and connect your speakers to the “OUT” jack.

To operate the Little Devil as an effects pedal set the selection switch to point to “PEDAL” and connect your amp to the “OUT” jack.

To turn the Little Devil off set the selection switch to point to “OFF”. When running on battery, the Little Devil can also be turned off by unplugging the guitar cord.

GAIN

GAIN acts as a preamp volume. It controls the gain of the preamp section of the Little Devil.

TONE

TONE controls frequency shaping.

VOLUME

VOLUME acts as a master volume. It controls the overall volume of Little Devil's power section.

PEDAL OUTPUT VOL.

PEDAL OUTPUT VOL. is active only in the PEDAL mode. It controls the output level of the Little Devil.

Precautions

Location

Using the unit in the following locations can result in a malfunction:

- In direct sunlight
- In rain
- Location of extreme temperature or humidity
- Excessively dusty or dirty locations
- Locations of excessive vibrations
- Close to magnetic fields

Power supply

Be sure to unplug the power supply when the unit is not in use. Remove battery in order to prevent it from leaking when the unit is not in use for extended periods.

Interference with other electronic devices

Radios and television sets placed nearby this unit may experience reception interference.

Handling

To avoid breakage, do not apply excessive force to the switches, potentiometers, or controls.

Keeping foreign matter out of your equipment

Never set any container with liquid in it near this equipment. If liquid gets into the equipment, it could cause a breakdown, fire, or electric shock. Be careful not to let metal objects into the equipment.