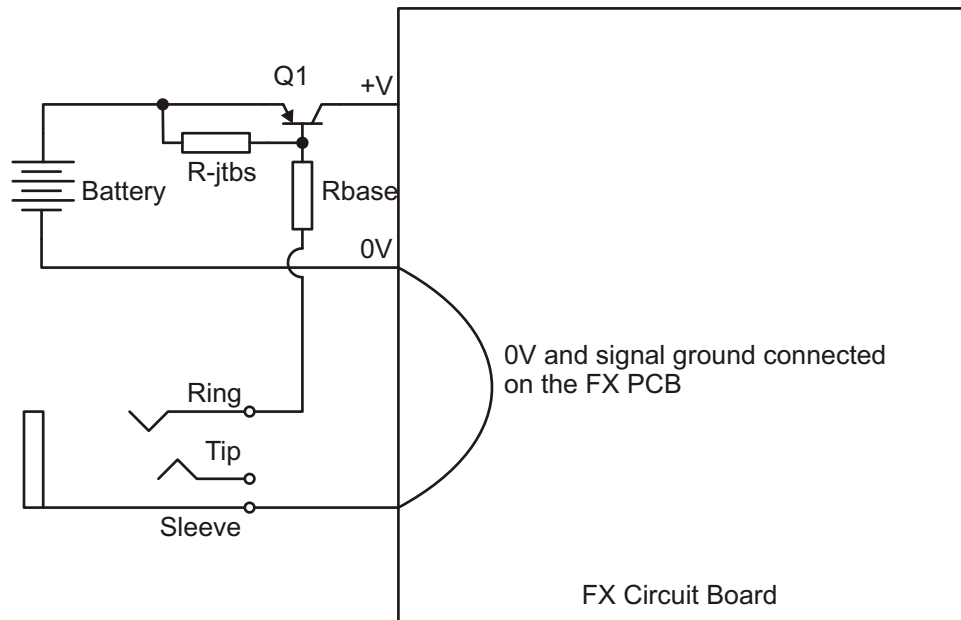


# Power Switching Without Mono-Plug Tears



Power supply is always connected to the FX through wires and Q1. Q1 is turned on and off to switch power to the effect. Q1 is turned on by inserting a mono plug into the stereo jack. The mono plug connects Rbase to 0V through the signal ground wire, and this pulls enough current to turn on Q1. That lets the power supply voltage through to the FX circuit board.

Q1 needs to be PNP and rated for enough voltage and current to switch the board's power. For most pedals, a 2N3906 or similar general purpose PNP will work fine.

Rbase is calculated to let enough current through Q1 base to make the voltage across it "small". The 2N3906 is specified to have a voltage across it of less than 0.4V with a collector current of 50ma and a base current of 5ma. In practice, they're much better on average. But assume you're going to need 5ma through Rbase. The voltage across Rbase is the battery voltage minus the base emitter voltage, so the resistor is the battery voltage minus about 0.7V divided by 0.005A. For a 9V supply, you can use Rbase of about 1.4 to 1.8K and be fine. That's just the "worst case" from the datasheet. The typical Vcesat charts in the datasheet show a Vce of less than 0.1V at 50ma for 5ma of base current. In my experience, the voltage across Q1 is less than 50mV in most cases.

R-jtbs is there to be sure that Q1 turns fully off. This isn't a horrible problem, but using 10K to 1M there makes sure Q1 is fully off. "Jtbs" stands for "just to be sure".

Why go to this trouble? It has to do with grounding issues and where the currents go. If you did the more common trick of just attaching the battery (-) lead to the ring terminal, 100% of the effect power flows into the effect on the same wire that carries the signal ground. So any current used in the effect causes a slight voltage wiggle on that wire, which the pedal amplifies. In many cases you can hear the result, sometimes from LEDs causing clicks or from oscillation and noise in high gain distortions.