

Step Into The Spotlight With The

Guitar Distortion Pedal

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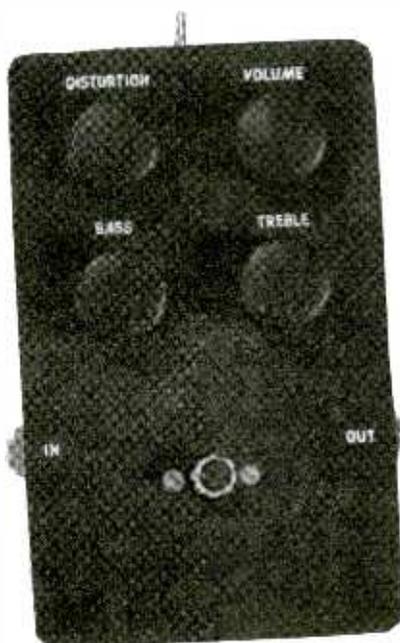
Many musicians use special effects of one type or another to augment their musical performance. Perhaps the most popular performance enhancer for guitarists is distortion. Musicians have been injecting distortion in their musical compositions for decades. In fact, it's a good bet that every new multi-effects processor to reach the market will include several memory programs dedicated to distortion effects. Your special-effects setup needn't be all that elaborate.

In this article, we'll describe how to build a musical-distortion generator—dubbed the *Guitar Distortion Pedal*—that features individual bass and treble controls. On top of that, this inexpensive and easy-to-build project can be assembled from “off-the-rack” components that can be picked up at your favorite electronics distributor.

Circuit Description. A functional block diagram of the Guitar Distortion Pedal, which is comprised of a variable-gain preamplifier and an active tone-control circuit, is shown in Fig. 1. Each of the unit's two stages are built around half of an LF353 dual JFET-input, op-amp.

A schematic diagram of the Guitar Distortion Pedal is shown in Fig. 2. The audio source is fed to the circuit through jack J1. From the jack, the source signal is fed through C1 (which is used to strip away any DC level that might be riding the input signal) and R1, and then applied to the inverting input of op-amp IC1-a. The voltage gain of IC1-a is determined by resistors

This inexpensive and easy-to-build, musical, special-effects project lets you add new dimensions to all your future guitar performances



R1, R2, and potentiometer R3, which controls the amount of distortion produced. That way, the gain can be made variable over the range of 1 to 51 to produce a great variety of distortion settings. Diodes D1 and D2 help to limit the gain to improve sustain.

Capacitor C2 provides a frequency-response rolloff at the upper end of the guitar's audio spectrum to limit noise. The two most frequent problems encountered with electric guitars are noise and hum, especially in low-priced

models. The hum is an inherent problem in single-coil pickups. Some high-quality pickups are designed to eliminate interference hum. Obviously, noise/hum limiters are incorporated into only high-priced or custom guitars. However, if your guitar exhibits a high level of noise and hum, the value of capacitor C2 (82 pF) can be increased to 150 pF or more. But, be aware that doing so will result in a signal with the highs partially rejected at higher distortion settings.

From the output of IC1-a, the signal is fed to an active tone-control circuit, comprised of R4-R10 and C3-C5. Potentiometers R5 and R9 set the bass and treble levels, respectively. The output level is set by R14. The final signal is coupled to output jack J2 via C6 and R11. The electrolytic capacitor blocks any DC offset appearing at the output of IC1-b. Switch S2 connects the audio input directly to the output, thereby bypassing the distortion circuit so that normal, clean audio can be heard.

Op-amps are normally powered

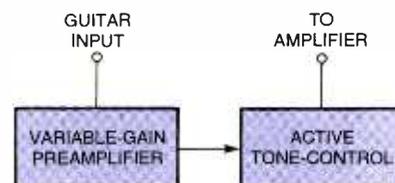


Fig. 1. This functional block diagram of the Guitar Distortion Pedal reveals that it is comprised of pair of sub-assemblies—a variable-gain preamplifier and an active tone-control circuit—each built around half of an LF353 dual JFET-input, op-amp.