

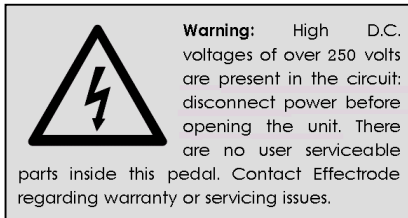
# Specifications

- Input Impedance: greater than 1M $\Omega$
- Output Impedance: less than 1K $\Omega$
- Controls: Shape, Depth, Speed and Volume
- Features: "Raysistor" and vacuum tube circuitry
- Expression Pedal: Roland EV-5 or EV-7.
- Turquoise LEDs: pulsate with modulation speed for visual song tempo matching.
- Pulse Shaping: Generates smooth "Bias" and deeper, choppy "Photocell" tremolo effects.
- Power Requirements: 12VDC @ 1Amp
- Dimensions: width 7.5" depth 4.8" height 1.3"
- Weight: 2lb (on Earth); 2.1lb (Saturn)
- Construction: solid die-cast aluminum box
- Finish: Olive-brown powder coat



RAYSISTOR TREMOLO-PANNER

## Owner's Manual



Serial #

DT-2B



12 Broughton Crescent, Barlaston,  
Staffs, England. ST12 9DB  
[www.effectrode.com](http://www.effectrode.com)

# Introduction

The *Delta-Trem™* reproduces the alluring, hypnotic tone and feel of a vintage vacuum tube amp tremolo—in S-T-E-R-E-O! It accomplishes this using vacuum tubes and an archaic, long-forgotten component known as a “Raysistor”. This circuitry creates a wonderfully warm and rich tremolo that blends well with clean and overdriven guitar. The pedal can operate as a mono tremolo into a single amp or true stereo, where the sound “ping-pongs” between two amps for a huge, spacious tone.

The *Delta-Trem's* versatile LFO (Low Frequency Oscillator) generates anything from a subtle shimmer to deep amplitude modulation (AM). It faithfully reproduces the smooth, buttery pulse of the early *Fender®* “Tweed” *Tremolux* amplifier, or the deeper throb of the neon/photocell tremolo of their later “Blackface” *Deluxe Reverb* amp. Further, advanced functions generate accented beats and rhythmic patterns, dither the pulse shapes so the tremolo throb shifts and changes on each cycle for a more randomised tremolo, and phase control of the two tremolos from 0°-180°.

Thank you for choosing to buy *Effectrode*. We wish you many years of musical enjoyment from this very special, hand-crafted, all-tube pedal.



*Phil Taylor — Designer*

# Tubes

The 12AU7 tubes in the *Delta-Trem* can be swapped with other 9-pin double triode tubes such as the 12AX7, 12A Y7, etc. These substitutions yield higher gain and mild overdrive for a “Leslie” style growl as well as tonal differences depending on the tube type, manufacturer, etc. *Sylvania* Mil-Spec NOS tubes are highly recommended.



To extend tube life, it is recommended that the unit be allowed to warm-up for at least one minute after being switched on. This is to allow the heater filament in the tube to heat the cathode, which is coated with a layer of barium and strontium oxide. This oxide layer gets torn off the cathode, a process known as cathode stripping, if the cathode has not reached its correct operating temperature. If operated well within their ratings, good quality signal tubes can last 100,000 hours or more: that's well over 11 years of continuous use. If you use your pedal for only 4 hours a day, they should last over 25 years. (We can't warranty tubes for this period, however experience shows that such lifetimes are probable).

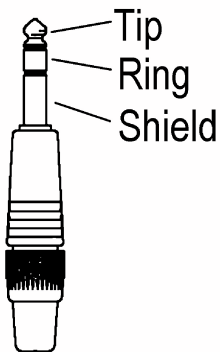
# Pots

This pedal is fitted with custom British made *Omeg* potentiometers. These are sealed units to prevent drying out or dust entering them, which means they never require periodic cleaning or lubrication. Additionally, a unique pot bushing system protects the pots from mechanical damage (i.e. being stepped on!)

The tremolo speed can also be set accurately using an external tap tempo controller such as the *Time Traveler™* pedal or any controller pedal that features a normally open momentary footswitch. Connection is made via the RCA phono socket on the rear panel of the *Delta-Trem*. **Note:** Adjusting the “Speed” knob overrides the tap tempo modulation rate settings.

**Bypass** footswitch allows selection between “effectified” (tube buffered tremolo) and “non-effectified” (true bypassed “dry”) signal.

**CV (Control Voltage)** input allows the speed of the tremolo to be controlled with an expression pedal, such as the Roland EV-5 or EV-7. Other expression pedals can be used if their potentiometer has a resistance in the range of 10K to 250K and are wired as shown below.



Tip: wiper (pin2)  
Ring: +5V (pin 3)  
Shield: GND (pin 1)

The tremolo speed can also be controlled using an external VCO (Voltage Controlled Oscillator).

**VOLTAGE RANGE MUST  
BE IN THE RANGE OF 0  
TO 5 VOLTS.**

## Controls

**Bias/Optical/Flyback** 3-position toggle switch on the rear panel selects the tremolo pulse shape. “Bias” replicates the smooth, shimmering swirl of the early *Fender®* “Tweed” 5E9 *Tremolux* guitar amps; “Optical” has the deeper throb of the neon/photocell tremolo in *Fender’s* later “Blackface” *Deluxe Reverb* amplifier models; and “Flyback” generates intense tremolo effects by means of a rising/ falling sawtooth oscillator.

**Shape** knob alters the pulse shape of the tremolo (selected with the “Bias/Optical/Flyback” switch). Pulse shaping is continuously variable, transitioning seamlessly from one shape to another as the knob is rotated.

**Depth** knob controls the intensity (amplitude modulation) of the tremolo. Turn the knob counter-clockwise for a subtle shimmer, and clockwise for deep Louisiana swamp blues. **Tone Tip!** Rotating the “Depth” knob fully counter-clockwise will cancel the tremolo effect so that the *Delta-Trem* works as a tube boost/buffer/splitter.

**Speed** knob sets the tremolo modulation rate. Rotating this knob clockwise increases the rate. The “Raysistor” circuitry can generate deep and choppy amplitude modulation at higher speeds, like a neon/photocell tremolo, or be smooth and syrupy tremolo at lower speeds, like a “Bias” tremolo.

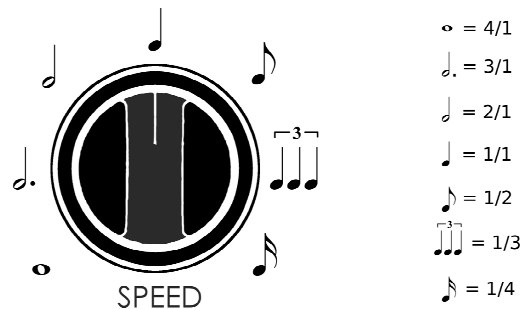
**Volume** knob sets the output level of the “Left” tremolo. In the centre 12 o’clock position gain is roughly unity. Turning this knob fully clockwise yields a substantial +6dB of gain boost, which can push the input of a tube amp into overdrive. **Tone Tip!** The volume level of the “Right” output is adjusted using an internal trimpot. To access the trim-pot, disconnect the power to the pedal, unscrew the six screws securing the base-plate and remove it. Adjust the trim-pot with a small watchmaker’s screwdriver or specialised trimming tool.

**Mono/Stereo** 2-position switch allows the *Delta-Trem* to work as a panner/splitter for mono sources, such as guitar, or as a true stereo tremolo for stereo keyboards. When the switch is “up” the input is mono (TS) and when “down” it’s stereo (TRS). **Tone Tip!** Use the “Left” output when using the *Delta-Trem* as a basic mono-in->mono-out tremolo.

The “Shape”, “Depth” and “Speed” knobs have secondary functions when the “Tap/Sync” footswitch is pressed and held down. When the internal jumper **Link** is removed, the three knobs operate as “Shape”, “Depth” and “Speed” knobs for the “Right” tremolo. With the link in place the “Right” tremolo output settings are the same as those of the “Left” output. However the secondary functions of the “Shape”, “Depth” and “Speed” knobs change to become “Rhythm” (accented tremolo beats), “Dither” (pulse dithering) and “Phase” (variable from 0°-180°) controls for the “Right” output.

Rotating the “Shape” (“Rhythm”) knob clockwise generates ever more complex accented rhythmic patterns: 1/1, 1/2 (march time), 3/4 (waltz), 4/4 (rock/pop), 5/4, 6/8, etc. until the *Delta-Trem* begins to sound more like a sequencer than a tremolo. And rotating the “Depth” knob (“Dither”) clockwise introduces a fluid randomness into each successive tremolo throb, so the pulse intensity ebbs and flows.

**Tap/Sync** footswitch sets the tremolo speed. Use the “Speed” knob to dial-in the tempo divide/multiply factor—at 12 o’clock the divide multiply/factor is one-to-one (quarter notes). Rotating clockwise multiplies the tempo, and rotating counterclockwise divides the tempo (as shown in the diagram below). Then tap along to the beat on the “Tap/Sync” footswitch—two or more successive presses (taps) set the tremolo speed (tempo) according to the foot tapping rate.



A single press of the footswitch resets the tremolo to the beginning of its cycle, allowing resynchronisation with the beat when playing in a live situation.