

# Specifications

- Input impedance: Greater than 10M $\Omega$
- Output impedance: Less than 10K $\Omega$
- Controls: Body (notch/lowpass) and Level
- Features: Phase inverter switch (0° or 180°)
- All-Tube pre-amp: Class-A design for acoustic instruments fitted with piezo pickups or mic.
- Tube notch filter: smooth notch response to minimize phase-delay distortion
- True bypass: With 'anti-pop' or 'thump' foot-switching circuitry
- Power requirements: 12VDC @ 400mA - Centre positive 2.1mm barrel connector
- Dimensions: Width 4.75"; Depth 3.75"
- Weight: 12oz (Earth); 2.2oz (Io)
- Construction: Solid die-cast aluminum box
- Finish: Light-tan powder-coat finish



**Caution!** The Acoustode utilizes vacuum tubes. Voltages as high as 300V are present in the circuit. Effectrode assumes no responsibility for possible injury from electric shock while servicing this pedal or operating it without the back-panel. There are no user serviceable parts inside this pedal. Contact Effectrode regarding warranty or servicing.

Serial #

**GT-1A**

# ACOUSTODE

## VACUUM TUBE PREAMPLIFIER

### Owner's Manual



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## Introduction

Thank you for purchasing the *Acoustodeä* vacuum tube pre-amp. This tough little black box is an audiophile pre-amp, pickup booster and buffer in a compact and easy-to-use pedal format. It's specially designed to add warmth, clarity and richness to enhance the tone of acoustic guitar piezo pickups and microphones. The unmatched transparency and definition of this pre-amp make it ideal for use with NS Stick, upright or electric bass, mandolin, fiddle, electric piano; in fact any recorded instrument signal will benefit from being enriched with this pre-amp.

The *Acoustode* is equally at home on tour or in the studio where can be used breathe life and add warmth to the sterile, clinical sound of digital recordings or sound cards. Audiophile grade components and silver solder are used throughout the circuit with precision metal-film resistors for low-noise and stability, polyester coupling capacitors for their ability to resolve fine signal detail and ground-plane layout. The result is a top-class pre-amp pedal that exhibits a level of purity and natural tone not found in solid-state germanium or silicon designs.

Thank you for trusting Effectrode to be your effects company. We wish you many years of musical enjoyment from this hand-built, all-tube pedal.



*Phil Taylor — Effects Scientist*

## Tubes

The *Acoustode* model GT-1A signal path is based on a NOS mil-spec 6111 subminiature triode tube. Raytheon (meaning, “light of the Gods”) developed subminiature tubes for military applications in the 1950s. The 6111 is manufactured to meet stringent Mil-E-1 specification for reliability and designed for long service life under conditions of severe shock, vibration (20,000G!), high temperature and high altitude.



Subminiature tubes represent the pinnacle of tube technology and offer more consistent musical performance than early germanium transistors.

To maximize tube life, we recommend that you let the GT-1A warm-up for at least one minute after being switched on. This allows 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. 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).

This creates time delays between the different frequency components within the signal so they are no longer aligned - the result is to alter the overall shape of the signal. The effects of amplitude on the frequency components in audio signals are well documented; taking the acoustic guitar as an example, harshness or bite occurs by increasing 2KHz level, boominess at 120 - 200Hz, presence at 4 - 6KHz, etc. However, adjusting the relative phase of the frequency components produces more subtle changes to the sound quality. Presently, these audible effects are poorly understood and the few scientific studies written on the subject deal with the effects of phase distortion in transducer (loudspeaker/headphone) reproduction. Even in this specialized case, there is no industry consensus on the topic and it has received only cursory attention in the realms of recording practice and product design. Some pro-audio manufacturers realize the importance of utilizing well designed coupling and matching transformers in signal amplifiers and DI boxes to minimize phase distortion that happens during low frequency roll-off. The human ear is even more sensitive in the upper mid-frequency range, raising the argument that it is critical to make an effort to maintain phase-alignment at these frequencies. The *Acoustode* pre-amp was specifically designed to address this issue.

## Controls

**Level** knob controls the level of the Acoustode's gain stage, which is based on a hi-fidelity, class-A triode tube amplifier. Rotating it clockwise adds transparent, flat, gain ranging from  $-\infty$ dB (no signal) to 12dB. Acoustic guitarists, bassists, NS and Chapman Stick players can add some subtle volume lift (9 to 12dB) and warmth for soloing. This Acoustode™ can also be utilized to add clarity and definition to many instruments and other audio sources during recording. Studio engineers can take advantage of the warm and natural boost capability to augment the recording levels of many types of instruments and microphones.

**Body** knob can be used to decrease 'boominess' of acoustic instruments so they sit better in the mix or manage feedback in live situations by reducing the level of the offending frequencies. The all-tube filter circuitry is sweeter sounding and less aggressive than typical notch filters as it allows 'dry' and filtered signals to be mixed together. When clockwise the full body of the instrument's frequency response is retained. Rotating the knob anti-clockwise removes frequencies centred between 120 — 200Hz. By their nature, filters introduce phase delay distortion to the signal, so should be used as sparingly as possible. For example, a sharp notch filter necessarily has to change phase across the null point with a trade-off of notch depth for phase error (see 'Theory of Operation' section in this manual for further information).

**Phase** toggle switch inverts the phase of the output signal from  $0^\circ$  to  $180^\circ$  to reverse its polarity. Inverting the phase can help reduce feedback when sound from the monitors or PA system coincide with the instrument amp to cause a feedback hot-spot (node) where the performer is situated on stage.

**Footswitch** allows selection between effectified and direct signal. Silent true bypass switching ensures there are no 'pops' or 'thump' when engaging the effect and that there is absolutely no loss of tone from your guitar to your amp when the effect is disengaged. Additionally, the tube signal path in this pedal is built to demanding audiophile specification to ensure hi-fidelity and signal integrity at all times - the benefit that the tone of your acoustic instrument always remains pure and intact.

## Theory of Operation

For best results the *Acoustode* pre-amp should be connected directly after the instrument's pickup. This ensures the pickup 'sees' a high quality tube buffer and is not subject to tone-killing capacitive loads or clinical/brittle sound of solid-state amplifier stages.

The *Acoustode* is a tool for enhancing and restoring the tonal balance of acoustic instruments without adversely affecting the fundamental timbre or character. The unique tube mixer circuit that allows notch-filtered signal to be blended continuously with the 'dry' signal, making it possible to reduce phase delay distortion artifacts to a minimum. By their nature all types of notch filter circuit topology introduce frequency dependent phase-shifts centered at the notch frequency as shown below.

