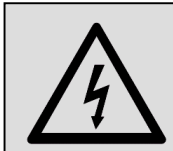
Specifications

- Input impedance: Greater than 1MΩ
- Output impedance: Less than 500Ω
- Frequency Response: 5Hz-100KHz ±0.1dB
- Maximum Output: 50V P-P , dBu
- Features: Two parallel cathode follower stages operating in class-A
- All tube: Based on N.O.S.*Sylvania* mil-spec subminiature triode vacuum tube
- Gain: 0dB (unity)
- True bypass: Automatically defaults to bypass when power is removed
- Power requirements: 12VDC @ 600mA - Centre positive 2.1mm barrel connector
- Dimensions: Width 2.4"; Length 4.5"
- Weight: 6oz (on Earth); 7oz (Neptune)
- Construction: Solid die-cast aluminum box
- Finish: Tough racing-green powder coat



Warning: High D.C. voltages of over 250 volts are present in the circuit: disconnect power before opening the unit. There are no user serviceable parts inside this pedal. Contact Effectrode regarding warranty or servicing issues.

Serial # GL-1A

GLASS-A

TRIODE BUFFER

effectrode® THERMIONIC

12 Broughton Crescent, Barlaston,
Staffs, England. ST12 9DB
www.effectrode.com

Introduction

The *Glass-A™* model GL-1A triode buffer is specially designed to do just one thing very, very well – buffer the output signal from a musical instrument fitted with high impedance pickups or piezo transducer to prevent 'loading' which dulls and degrades the instrument's tone.

High voltage tube circuitry coupled with audiophile passive components makes the *Glass-A* a sonic dream! Its frequency response is flat from 5Hz to over 100KHz with a shallow roll-off to maintain low phase distortion. The wide linear region of a tube operating at 300V means this buffer can handle signal levels of over 50V P-P and its parallel cathode follower circuitry ensures whisper quiet operation and superb line-drive capability. The *Glass-A* will effortlessly handle active 5-string bass guitars, NS Stick and even 'difficult' instruments with fast transients such as lutes, harpsichords and hammered dulcimers to reveal more detail and improve the depth and clarity and of these instruments.

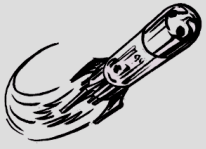
Thank you for trusting *Effectrode* to be your effects company. We wish you many years of musical enjoyment from this hand-built, all-tube pedal.

TRIODE CLASS-A

Phil Taylor — Designer

Tubes

The GL-1A signal path is based on a N.O.S. mil-spec *Sylvania* 6111 subminiature twin triode tube. Raytheon (meaning, "light of the Gods") developed subminiature tubes for military applications in the 1950s. The 6111 tube 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 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).

Where Not to Use a Buffer

There are situations where a buffer is of no benefit and can even be detrimental to tone. For instance if your guitar is fitted with active pickups or an onboard preamplifier. These devices already have buffer circuitry in them so placing another buffer after them is redundant — it won't have any effect.

This is the also case with some effect pedals — they already have excellent buffer circuitry built in. For example the Effectrode *Fire Bottle* pedal has a high impedance input and low impedance output. Placing a buffer before or after it will serve no purpose other than to introduce a small amount of noise into the signal chain. This introduced noise isn't severe with just one buffer, however can add up to become significant with many pedals/buffers in series. As a rule of thumb, keep the signal path as short as possible — use effect pedals and tone tools judiciously.

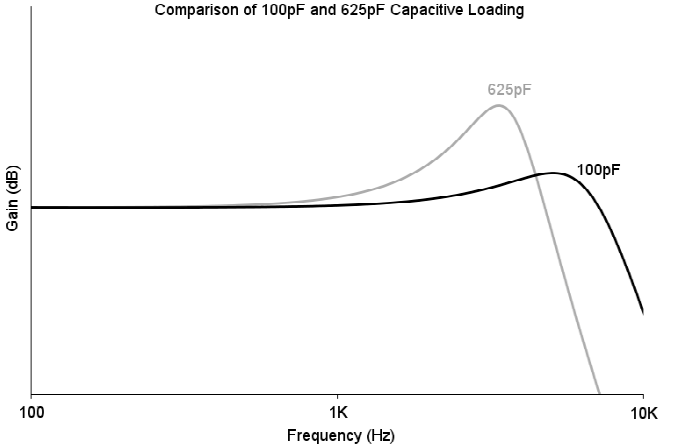
Finally, buffer placement is as much an art as a science. Fuzz boxes are proof of this! Placing a buffer before fuzz can really screw up their tone. Generally fuzzes like to 'see' a naked guitar pickup. This is because the pickup interacts with the fuzz to form part of the circuit. The character and how the fuzz pedal reacts will change depending on playing dynamics and where the guitar controls are set. A buffer can destroy this beautiful relationship

What is a Buffer?

Technically a buffer is a unity gain (0dB) amplifier circuit with a high input impedance and low output impedance. In practice buffer pedals are used to prevent high frequency 'roll-off' and preserve the brightness of a guitar when connecting it to long cables or effects pedals with lower impedance input stages.

Where to Use a Buffer

Ideally a passive guitar pickup should 'see' a 1MΩ resistive load with a capacitance of just a few tens of picofarads in parallel with it. This load is the input impedance of a typical vintage *Fender* tube amp. If you're using a good quality instrument cable (such as *Evidence Audio* or *Death Valley Cable Company*) of less than 15' between your guitar and tube amp then you almost certainly do not require a buffer — there will be no significant degradation of tone. However, if the load resistance connected to your guitar pickup is lower than this or the capacitance creeps up into the hundreds of picofarads range then attenuation of higher frequencies will occur. Subjectively this causes loss of brightness or 'sparkle' making the guitar tone dull and lifeless. The graph on the next page compares the effects of 100ρF and 625ρF capacitive loads on a typical single coil pickup.



Guitar cable capacitance can present itself as an adverse load if the cable is very long or poor quality. This is especially a problem with cheaper cables with plastic molded jack plugs, which often exhibit high capacitance. This becomes an even greater problem with longer cables. Even the highest quality cable and connector has some degree of capacitance, however placing a buffer between the guitar and cable will negate its effect to restore brightness significantly improving clarity and definition.

As well as cable loading there are effect pedals that present an adverse load to your guitar. Examples include the *Binson Echorec*, which – although a beautiful sounding delay machine – has a very low input impedance of 47KΩ. Another vintage effect with low input impedance is the *Uni-Vibe* at 68KΩ.

There are also some older effect pedals that keep their input circuitry connected, even when the bypass switch is pressed, and using several of these pedals in series will result in a cumulative lowering of input impedance. With these kinds of effect pedals, again placing the buffer before them will prevent loading and revitalise tone.

Another problem with certain effect pedals is that they have poor output drive capability or to put it another way they have a high impedance output buffer stage. Even when the pedal is engaged the buffer circuitry cannot adequately drive the load that cables or other pedals present. An example of this is a passive volume pedal, with an output impedance of several hundred KΩ. A buffer should be used after these types of pedals to prevent tone loss.

A buffer can also help with certain effects that are prone to self-oscillation. These include some wahs, fuzzes and the Effectrode *Phaseomatic*. If these pedals see a high input impedance or open circuit they begin to 'chirp' or squeal uncontrollably generating sounds independently of the guitar input signal. In some cases this might be desirable, for instance if you're trying to create 1950s sci-fi effects with the *Phaseomatic*, however if you're in a live situation you, your audience and especially your sound engineer won't appreciate hearing a wah pedal squealing uncontrollably. Placing a buffer before these problem pedals will ensure they always see a low impedance and prevent self-oscillation.