Specifications

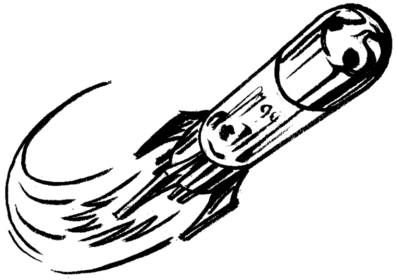
- Input impedance: Greater than 1MOhm
- Output impedance: Less than 1KOhm
- Controls: Tone and Boost
- Features: Variable resonance switch
- All tube: Based on NOS mil-spec subminiature triode vacuum tube operating in class-A
- Gain: Continuously variable from 0dB (unity buffer) to a huge 30dB
- True bypass: With 'anti-pop' or 'thump' foot-switching circuitry
- Power requirements: 12VDC @ 350mA - Centre positive 2.1mm barrel connector
- Dimensions: Width 4.75"; Depth 3.75"
- Weight: 12oz (on Earth); 2oz (the Moon)
- Construction: Solid die-cast aluminum box
- Finish: Tough Ferrari-red 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 # **FB-1A**

Fire Bottle

MAGNETIC PICKUP BOOSTER



effectrode audiophile pedals

12 Broughton Crescent, Barlaston,
Staffs, UK. ST12 9DB
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Introduction

Thank you for purchasing the *Fire Bottle™* model FB-1A. This unique booster pedal features an all-tube signal path, modified 'Harvard' style tone control and selectable input impedance specially designed to enhance the tone of magnetic guitar pickups. The FB-1A can improve clarity for a bigger, bolder tone or fatten up the sound of a single coil pickup to give it the characteristic warmth of a humbucker pickup. Gain is continuously variable from 0dB (unity) to a huge 30dB allowing the *Fire Bottle* to operate as an audiophile unity gain buffer, clean boost or push a tube amp into overdrive.

The FB-1A is designed for flexibility, simplicity and outstanding sound quality. 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 an outstanding booster pedal that exhibits a level of purity and natural tone not found in solid-state germanium or silicon designs.

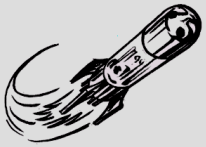
Thank you for trusting *Effectrode* to be your effects company. We wish you many years of musical enjoyment from this hand-built, all-tube pedal.

Phil Taylor — Designer

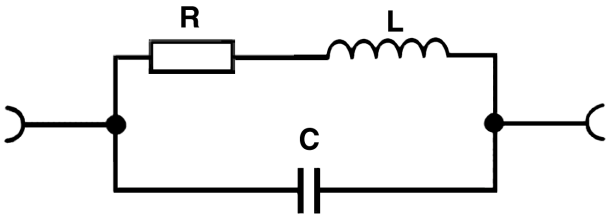
TRIODE CLASS-A

Tubes

The FB-1A signal path is based on a NOS mil-spec 6112 subminiature twin triode tube. Raytheon (meaning, "light of the Gods") developed subminiature tubes for military applications in the 1950s. The 6112 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).



The figure above shows the equivalent circuit for a magnetic guitar pickup. The resonant frequency of the pickup is determined by the inductance L (in most stock pickups, between 1 and 10 Henries) and the capacitance C. C is the winding capacitance of the pickup coil (approximately 80 - 200pF) plus the cable capacitance (about 500 - 1000pF). Capacitance varies between different cable manufacturers and lengths, altering the resonant frequency and hence, the tone of a given pickup.

AUTOMATIC TRUE BYPASS MANUFACTURED IN THE U.K. SILENT SWITCHING™

All *Effectrode* pedals feature our innovative **Silent-Switching™** true bypass system, where an active audio circuit minimises the 'pop' or 'thump' when the effect is engaged. Additionally, as a failsafe, the circuitry will always default to bypass if power is Interrupted to the pedal ensuring that you can continue to perform. Signals are switched using a precision audio relay with gold-plated contacts for superior tone and performance over multi-pole footswitches, which were not originally designed for constant use or audio signals. The relay also shortens the signal path so that signal is not routed through any internal wiring thus preventing noise contamination.

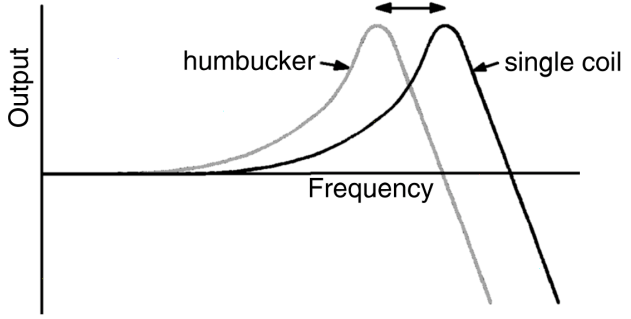
Controls

Boost knob controls the level of the *Fire Bottle's* tube gain stage, which is electrically identical to the vintage Fender™ amp input stages. Rotating it clockwise adds gain ranging from 0dB (unity tube buffer) to a substantial 30dB. Electric guitar players can utilise the *Fire Bottle* as a tool to add "punch" to solos or push a tube amp into creamy overdrive. Additionally, acoustic guitarists, bassists, NS and Chapman Stick players can add some subtle volume lift (3 to 6dB) and warmth for soloing. This audiophile quality boost pedal can add clarity and definition to many instruments and other audio sources. Studio engineers can take advantage of the warm and natural boost capability to augment the recording levels of various instruments and microphones.

Tone knob can be used to tailor the character and body of the signal. The tone control is based on the classic 1940s *Fender™* 'Harvard' tube amp tone circuit which controls the critical frequencies for electric guitar and is a very usable control. Additionally an internal trimpot allows further adjustment of filter 'Q' to balance high and low frequencies so that the FB-1A integrates into practically any amp/guitar rig.

Vari-Z toggle switch alters the input characteristics of the tube gain stage. The *Fire Bottle* should be placed first in the signal chain to allow the input circuitry to interact with the guitar magnetic pickup.

The **Vari-Z** switch is designed especially to work with single coil pickups of the type installed in Stratocaster™ or Telecaster™ guitars. With the switch in the 'centre' position the resonant peak is unaffected. In the 'down' position the resonant peak drops down about 2KHz giving single coil pickups a warmer tone similar to a vintage humbucker. In the 'up' position the resonant peak drops even further down (around 4KHz) creating a much fuller and fatter sound.



Footswitch allows selection between effectified (compressed) and non-effectified (dry) 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 your guitar tone always remains pure and intact.

Theory of Operation

The *Fire Bottle* is a tool that can be used to tailor the resonant frequency, gain and tone of a magnetic pickup to alter the fundamental timbre or character of an electric guitar. The resonant frequency determines how fat or thin the sound is - a lower frequency sounds fatter and a higher frequency sounds thinner. The resonant peak determines the character of the sound. A higher peak sounds more 'edgy' and a lower peak sounds smoother. For example, Stratocaster™ single coil pickups have a bright sound because of their high resonant frequency with a high peak. Les Paul™ humbucker pickups have a mellower, warmer tone because the resonant frequency is lower with a more damped peak because of the increases coil resistance.

The resonant frequency of most magnetic pickups in conjunction with a typical guitar cable lies between 2 to 5KHz. The human ear is most sensitive to frequencies in this region. Subjectively, boosting frequencies in the 2KHz region sound warm and mellow; at 3KHz have more presence and at 5KHz more brittle and thin. The height of the peak also alters the quality of the sound - a high peak produces a "lively" sound, whereas a low peak produces a weaker sound. The resonant peak amplitudes of most magnetic pickups range between 0 to 12 dB, being dependent on the composition of the magnetic material in the coil, external resistive load and metal case shield.