

S C I E N C E

A M P L I F I C A T I O N

SHIV

USER MANUAL V.1

Intro

Thank you for purchasing the Science Shiv guitar amplifier! This manual goes over the different features of the amplifier, maintenance, tube, and warranty information as well as some general tube amp info.

Front Panel

Input jack: 1/4" for your guitar cable.

Voice toggle switch: A 3-way switch that changes the voicing of the amplifier to accommodate different guitars, speakers, and playing styles.

- Position 1: Tonally balanced – great for a wide range of guitars and speakers.
- Position 2: Adds midrange frequencies and bite with a slight gain boost for a more aggressive sound.
- Position 3: Adds bass and low-midrange frequencies for a thicker, warmer tone. Can aid thin sounding pickups and speakers, or add thickness to single coil pickups.

Path toggle switch: Routes your guitar signal through the Normal or Overdrive circuitry.

Gain I (Normal): When turned clockwise, the gain control takes the Normal path from clean to classic sustaining power tube saturation.

Tip: For maximum clean headroom, set the Loudness control (see below) fully-clockwise, and turn up Gain I to desired level of 'cleanliness' with your particular guitar (usually below 12 o'clock).

Gain II (Overdrive): Voiced for more overdrive than the Normal path, this gain control goes from crunch tones to modern high-gain.

Level (Overdrive): Controls the overall volume of the Overdrive path, so it may be balanced with volume of the Normal path.

Tip: Experimenting with the balance of Gain II and the Level control can produce different overdriven textures. With Gain II set higher than the Level control, the sound will tend towards preamp distortion. If the Level is set above Gain II, then overdrive will tend towards output tube distortion, both which have different textures when overdriven. By adjusting the two controls you can get different levels of preamp and output tube overdrive to suit your particular style.

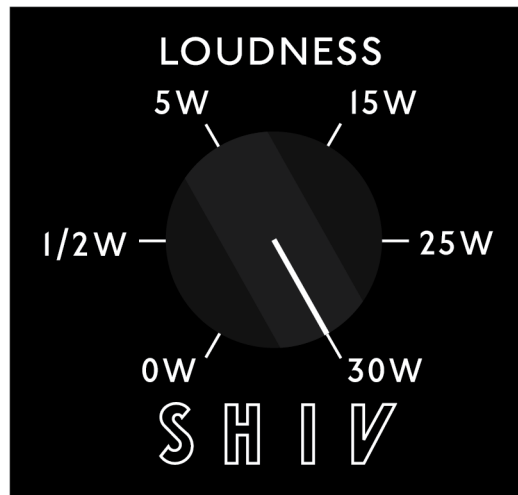
High EQ: Adds treble frequencies when turned clock-wise.

Low EQ: Adds bass frequencies when turned clock-wise.

Absence: Reduces high frequencies to smooth-out the tone when turned clock-wise. This control is located in the output circuitry, and allows fine control of overdrive and harmonics generated there. Note that this control has more effect with overdriven tones where more harmonics are present.

Loudness: The Loudness control is different from traditional master volumes in that it lowers the internal voltages inside the amplifier to reduce power, which keeps power amp overdrive intact at low volumes. This gives an effect similar to an attenuator that comes between the amplifier and speakers, but actually increases tube life (unlike attenuators) when set below fully clockwise, and requires no extra equipment.

The diagram below shows the clean output power at various settings:



Note: You may notice a slight lag in response or spurious noises when turning the Loudness control quickly. This is normal, and is the amp 'readjusting' to the new voltage conditions. You may also notice that the physical 'feel' of the Loudness control is different when turned. This is also normal, and because the circuit necessitates a special high voltage potentiometer which has a slightly different torque when rotated.

On/Off switch: Turns the amplifier on and off.

Standby/Play switch: With the amplifier ON, Standby mode mutes the sound allows the tubes to heat up before applying high voltage in Play mode. Leave in this mode for 30 seconds to a 1 minute before switching into Play mode. Standby can also be used to mute the amplifier while leaving the tubes warm short breaks. For long breaks it is best to turn the amplifier completely off.

To turn off the amplifier, follow the same turn-on procedure in reverse – allowing the amp to idle in Standby mode for about 30 seconds before powering off. While it is perfectly okay to turn the amp off immediately, idling in standby before powering off lets the filter capacitors

inside the amp fully discharge. If turned off immediately, there will still be some sound as the filter caps continue to discharge.

Rear Panel

120 VAC power input: Plug in the included standard IEC power cord here. For use with 120 VAC (USA) only unless otherwise specified.

WARNING!: Use with grounded power outlet only! Discard power cord immediately if ground pin is damaged/broken. The ground connection is for your safety in case of a fault!

Footswitch jack: Plug included 1-button footswitch here. Plugging in the footswitch over-rides the front panel Path switch.

Speaker Jacks and Impedance Selector

*Note: Speakers must be rated for at **least** the full rated clean output power of the amplifier (30W). Under overdrive conditions, the power of the Shiv can be up to 45W, therefore it is preferable to use speakers whose combine power rating exceeds the clean power rating. This topic is up for debate as some speaker manufacturers rate their speakers with this knowledge in mind (i.e. four 25W rated speakers may be OK for a 100W amp).*

Using one speaker cabinet: With the amp OFF, match the impedance selector with the speaker cabinet's impedance. Always verify a speaker cabinets impedance before using with the amplifier. An impedance mismatch can potentially damage the amplifier.

Using two speaker cabinets: When using with two speaker cabinets, both must be the same impedance (i.e. two 8 ohm cabs), and the impedance selector should be set for half each cab's impedance. For example:

- When using two 8 ohm cabs: Set the impedance selector should be set to 4 ohms.
- When using two 16 ohm cabs: Set the impedance selector should be set to 8 ohms.
- Using two 4 ohms cabs: This configuration is not supported because there is not 2 ohm tap on the Shiv's output transformer.

Footswitch

Switches between the Normal and Overdrive Paths. Plugging in the footswitch over-rides the front panel Path switch.

Tube life and troubleshooting

Output tubes (V4, V5, V6, and V7 – See tube chart on pg. 9) generally produce a good strong sound for 6 months to a year when played regularly, then they may become dull sounding, and/or the amplifier may begin to lose some power. Output tubes may last much longer depending on how hard the amp is played and how high the Loudness control is set.

Sometimes output tubes they die gracefully, sometimes abruptly causing a fuse to blow, which in turn protects the amplifier from further damage. Output tubes may also become microphonic (see below) like preamp tubes. Occasionally it's possible to see which power tube(s) is damaged. If necessary, remove the output tubes to inspect them (remove power cord, allow tubes to cool, then grab by the base, and gently pulling up in a slight circular motion if necessary). Here are things to look for:

- Shiny silver area on top of tube has turned white, indicating the tube has lost vacuum.
- Burned spot on the large gray structure inside the tube indicating the tube has over-dissipated (usually due to “runaway” bias).

Sometimes an output tube or preamp tube will become “microphonic” when something becomes physically loose inside the tube's glass envelope. In turn, this noise inside gets amplified and can be heard through the speaker. The noise can be anything from static, to high-pitched ringing, to intermittent sputtering noises. This is usually exacerbated by vibration from the speaker cabinet. If you think a tube may be microphonic, try isolating the amplifier from the speaker cabinet.

Tip: With the amplifier on and the rear panel removed, you may be able to identify a microphonic tube by gently tapping on each tube with a pencil's eraser (for example, since anything hard may potentially crack a hot tube) to see if the sound becomes worse or changes. All tubes will amplify the sound a little, especially preamp tubes. For example, if you hear an intermittent ringing sound and tap each tube to find V1 is causing the ringing to start and stop, you can be sure it's the problematic tube!

In general preamp tubes, V1, V2, and V3 (see tube chart on pg. 9) can last many years, and usually become microphonic before wearing out or failing.

Changing preamp tubes

V1, V2, and V3 (see tube chart on pg. 9)

For V1, gently push down and twist the aluminum shield to remove. To remove tubes, gently pull upward using a very slight circular motion if necessary. When re-inserting a preamp tube, mind the pin/socket orientation as they are “keyed” to insure proper installation.

Changing output tubes

V4, V5, V6, and V7 (see tube chart on pg. 9)

CAUTION! Tubes can become extremely hot during normal operation. Make sure the amplifier is OFF, and always allow tubes to cool before handling to prevent burns.

To change output tubes back on the top of wire tube-retainers, and gently pull up on the tubes with a very slight circular motion if necessary. Insert the new tubes, minding the “key” on the bottom of the tube.

In general, it's best to change all four output tubes at once (V4, V5, V6, and V7 – See tube chart on pg. 9), and preferable to buy a "matched quad" from a reputable dealer. However, because of the dual-cathode bias system, it is possible to replace only one pair of output tubes at a time with a "matched pair." If a tube prematurely fails, or only a pair is available (on tour a music store, for example) this may be the best option.

Note: V4 and V5 are one pair and V6 and V7 are the other pair.

The Shiv's cathode biased output section requires no adjustment when changing tubes, and most EL84s will work within safe bias range without worry. On rare occasions a tube set will be so far out of spec that the amp's bias will be too “cold” or too “hot.” The Shiv comes equipped with Ruby branded and tested JJ EL84 output tubes from Doug's tubes (<http://www.dougstubes.com/>) rated for “average distortion.” Using these same tubes will insure optimal bias and performance.

In cases where grossly out of spec output tubes are used, cold-biased tubes may sound weak or thin, while hot-biased tubes may cause “red-plating.” Red-plating is when the large grey metal structure inside the tube over-heats and begins to glow red (like a hot coal). Continued use of a tube(s) that are red-plating will lead to imminent failure of the output tubes, a blown fuse, and possibly further damaged to the amplifier.

Tip: Buy “burned-in” tubes when possible for maximum stability and minimal bias drift.

Fuses

WARNING: Only check/change fuses with amplifier unplugged from the wall socket!

Fuses are user-replaceable, and if a fuse needs replacement, always replace with the correct "T" type and rating. The "T" stands for "Time delay" also known as "Slow Blow." Also be sure to use the correct amperage rating (Ex. 1A = 1 Amp). These fuses are the 3AG type and are commonly available. The correct fuse values are located on the back panel of the amplifier.

If a fuse blows, it's a good thing! Fuses are put in place for safety and to protect the most expensive parts of the amplifier. Fuses can blow for various reasons, however the most common is a output tube failure. To check if a fuse is blown, push and twist counter-clockwise

to remove the fuse holder and see if the small wire inside the glass is broken. There may also be a burnt area the inside of the glass.

If you replace a fuse, and it blows again, there is likely a more serious problem. Please contact us before changing the fuse again at info@scienceamps.com so we can further assist you with the trouble-shooting.

Safety

- Always use a 3-prong cable into a grounded outlet. This makes sure the amplifier is always grounded and safe in the rare occurrence the chassis should become "live" (electrified).
- Tubes become very hot during normal operation. Allow them to cool before handling to prevent burns.
- Never change tubes with the amplifier ON.
- Always make sure the amp's vents are open, allowing heat to escape and air to flow freely.
- Keep the amp away from moisture, and never put any beverages on top of the amplifier, no matter how convenient it may seem!
- Only change fuses with the amp unplugged from the wall!
- There are potentially lethal voltages present inside the amplifier. Do not open the amplifier chassis unless authorized and are a qualified technician.

Limited Lifetime Warranty

Science Amplifiers are warranted to be free from defects in workmanship for the lifetime of the original owner. Electronic components such as capacitors, resistors, transformers, jacks, and potentiometers are warranted for 5 years (not including tubes, see below). Any part determined defective by Science Amplification within the 5 year period shall be repaired or replaced by Science Amplification without charge for parts and labor provided the unit is returned and transportation costs prepaid. Science Amplification will pay return shipping costs to the original owner. Any unauthorized repair, modification, or tampering voids this warranty.

The warranty excludes:

- Normal wear and tear: worn out tubes, jacks, cosmetic damage, etc.
- Misuse and abuse: operating the amp without a speaker connected (although the amp has some built-in protection against this), operating the amp into the wrong speaker load, improper tube installation, using the wrong value fuses, maladjustment of bias controls, etc.
- Accidental damage: Dropping the amp, spilling liquid inside, etc.
- Acts of "God": Natural disasters and other non-preventable/foreseeable events that damage the amplifier.
- Tubes, unless within manufacture's warranty period of 90 days (replacements offered at manufacturer's discretion).
- Any damage caused by authorized or unauthorized repair or modification that is not performed by Science Amplification.

Speakers carry Eminence's 7-year manufacturer's warranty. The terms can be found here: <http://www.parts-express.com/docs/warranty/eminence-manufacturer-warranty.pdf>

If you think you have a speaker problem, please contact us first.

For warranty service, please email info@scienceamps.com for return authorization. Amplifiers must be sent back in the original packaging or equivalent packaging. The cost of return shipping to Science Amplification is to be prepaid by the owner. Science Amplification is not responsible for damage caused in return shipping. Science Amplification will pay for the return shipping after the warranty work is completed.

In general, we will be able to fix your amp for free, and help with tube changes, etc. if needed. We will also be happy to modify the amp in any way possible until the amp is perfect for you. Non-warranty repair is also available – please inquire for shop rates.

Don't hesitate to contact us!

Care and Maintenance

If plexiglass panels need cleaning, use only a soft clean, and dry 100% cotton cloth to wipe off smudges with just a little pressure to avoid scratching. If needed dampen the cloth with a little water, or use Novus brand plastic polish. Avoid harsh alcohol-based cleaning products as they may cause the acrylic to “bloom.” Also avoid the ubiquitous “microfiber” cloths, which can

leave lint and/or tiny scratches the plexiglass in some cases since they vary so greatly in quality.

Periodically check the 4 mounting screws on the bottom to make sure they are tight. These screws secure the chassis to the head cabinet, and also insure contact to the aluminum RF shielding plate inside the cabinet.

If possible, move the amplifier when the tubes have had the chance to cool down for a couple minutes. Because the tubes get very hot, the elements inside become more vulnerable to physical damage until the tubes have cooled. In general, try to move the amp off stage last.

Tube Chart

Birds-eye view of the Shiv's tube layout. Only replace tubes with specified types listed below:

