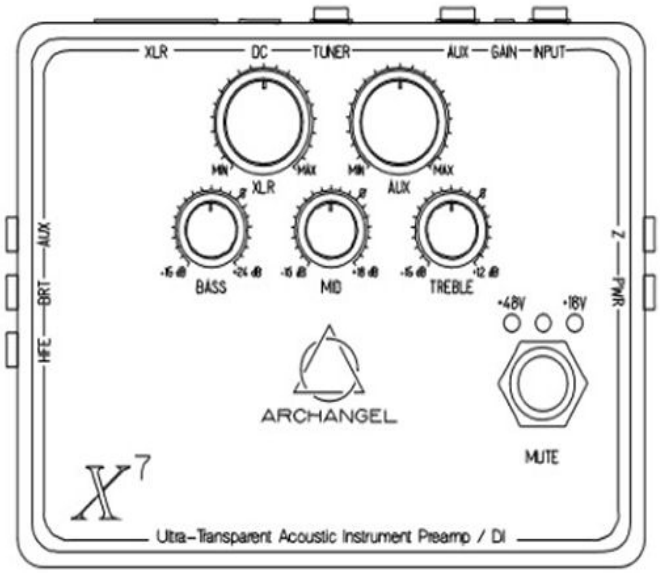
X7



Users Manual

The X7 has several new features and settings
Making it among the most flexible and advanced acoustic processors available.

Please take a few moments to read through this guide before the first use
to get the highest level of performance possible, customized for your signature tone and playing style.

Warnings!

- Always keep, read, and follow these instructions.
- Do not use this device near water.
- Clean only with damp or dry cloth.
- Protect cords from being walked on or pinched particularly at plugs, and the point where they exit from the device.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this device during lightning storms, and remove batteries when unused for long periods of time.
- Refer all servicing to factory authorized service personnel.
- The device shall not be exposed to dripping or splashing and that no objects filled with liquids, shall be placed on or near the device.
- Prolonged listening at high volume levels may cause irreparable hearing loss and/or damage. Always be sure to practice “safe listening.”

WARNING: To reduce the risk of fire or electric shock do not expose this device to rain or moisture.

Input

The X7 has a 1/4” high impedance unbalanced input for instruments. The X7 can accept input from piezo pickups, magnetic pickups, even active electronics like the Sunrise™ active magnetics, or the Taylor™ Expression System™, It even works with 18V active bass guitar preamps and iOS and mobile devices.

The gain and impedance may need setting to match your input source, which is detailed later.

The X7 really shines when used with SBT (multiple soundboard transducers) like Elevation™ premium transducer sets or JJB™ Prestige 330s. Using those transducers with the X7 reveals tone exactly like a large diaphragm condenser mic, without the feedback that plagues most piezo systems.

The input jack when unplugged, disconnects the batteries from the power supply to extend battery life. It does not remove phantom power however, to prevent audio spikes into the PA when unplugging the input jack. Likewise when the x7 is powered by phantom power, the jack stays hot when the cable is unplugged.

Tip: *Engage the mute switch when disconnecting the input jack when using phantom power and the XLR out. It minimizes any noise or popping through the XLR line when swapping instruments or unplugging.*

Tuner / Mute

The tuner out is activated with the mute switch. The tuner out is completely isolated from the audio path unless it is active. For accurate tuning with less false triggering, the tuner out is processed with a sub-sonic and a separate low frequency filter.

The x7 lights up with red LEDs to indicate muted status. The mute switch is a pro 3PDT heavy duty switch. It may be stiff until it is broken in. Press the switch very hard to toggle it the first few times.

Aux Direct Output

The Aux out is a high definition unbalanced and isolated direct out. It also has it's own dedicated volume control. The Aux out is designed for ultra-high quality recording and for stage monitoring. The Aux output is select-able as pre or post eq for a transparent isolated direct output. The Aux output is a low impedance line out at 4.7kΩ . It is still a high enough impedance to drive most pedals and processors.

Tip: *When recording, run the XLR and the Aux output to separate channels and apply compression to just one channel for parallel compression. This is a trick used in pro studios to add punch and sustain, without losing the brilliance or attack of the notes. This technique also works great when using reverb and other effects to keep your transparent tone intact. You will also find that the Aux and XLR outs are perfectly phase correct, so you may have to flip the phase of the Aux output at the mixer when using with some pedals that reverse the phase of the signal.*

XLR Balanced Output

The XLR output is a true balanced output so the signal is twice as hot as similar half balanced devices. True balanced also means that any induced line noise is canceled out. The XLR output has it's own dedicated volume control, and is processed by the Isometric Equalizer.

For the lowest noise possible, we recommend starting with the X7 volume at maximum and the gain reduced at the mixer and bring the faders to a strong level when zeroed and use minimal mixer equalization settings.

Mute the channel at the mixer when turning on or off phantom power on the mixer and when switching to phantom power or battery power on the X7 to avoid pops and spikes in the audio signal.

The impedance of the XLR output is ultra low at 47 Ω (94Ω Balanced) It is easy to get +4db signals from the XLR balanced output. Be careful to not clip the mixer's inputs from sending a line level signal into a microphone input, which causes distortion, and could damage the mixer or at the least annoy the soundman and thoroughly scare everyone in the room

Gain Control

The gain control is on the back panel beside the input jack. The gain control is a tiny brass adjustment screw. Using the included jewelers screwdriver, turn the screw clockwise to increase the gain and counter-clockwise to reduce it. At the lowest setting the gain is 0dB for unity gain. At the highest setting the gain is 21dB for 11x amplification.

The gain control is centered when shipped. It must be reduced for single piezo elements mounted directly to the soundboard (like found in many ukeleles and mandolins), and for active electronics or heavy percussive playing styles. I may need to be increased for small disc piezos or for thin film piezo types.

To test the gain settings for acoustic instruments with piezo pickups, tap the bridge or soundboard with your palm using a fair amount of force. For electric instruments and magnetic pickups, play the loudest passages you will process with the X7. Decrease the gain if there is popping or clipping coming from your X7.

Ipods, keyboards, and similar line inputs may need their master volume level reduced before processing the signal with the X7.

⚠ **Note:** *The gain control has 15 complete revolutions in it's travel from minimum to maximum!*

Mod Switches

The X7 continues one of our most popular features from previous generations. The Mod Switches allow you to re-wire the X7 circuit and change and personalize several essential design parameters to suit your personal playing style and tone.

There are four Mod Switches for the X7 which are located on the enclosure sides.

The HFE switch tunes the midrange knob to eliminate resonance and feedback with the switch pushed in (more detail in the EQ section below). The switch out tunes the midrange filter to a more typical midrange frequency of 1.5 kHz for when feedback elimination is not desired.

The Z switch selects the input impedance between 11 Meg Ω when the switch is out or 1 Meg Ω when th switch is pressed in. The input impedance makes very little difference in tone. 1 Meg Ω is the recommended setting for most applications.

The Bright switch lowers the tuning frequency of the treble filter. The switch pushed In is the bright setting and out is the sweet setting.

The Aux switch assigns the Aux out path. The Aux out is pre eq when the switch is pressed in, or post eq when out.

Powering Up

There is a power source selection switch on the side of your X7 for selecting +48v Phantom, or +18v DC/ Battery power. Phantom powering means you wont need to buy batteries at all, or at least much less often than with similar products. And the X7 now includes a DC jack for 18v regulated adapters having center pin negative polarity.

The X7 uses two 9v batteries. Duracells are included, and recommended for use with all Archangel preamps. The batteries are accessed by removing the bottom plate which is secured with 4 thumbscrews cleverly disguised as the rubber feet on the bottom of the enclosure. Battery life is estimated by our friends at Duracell to be 450 hours or longer. This varies with your gain and eq settings. Unlike most preamps that are only 9V DC battery powered and considered dead at 8 volts, the X7 is 18 volts on battery power and will play well even with the batteries drained down to below 9 volts on the power rails. If you consider your performance to be mission critical however, install fresh batteries whenever you change your strings.

The X7 can easily be powered with standard 48v DC phantom power supply. The X7 only draws 1.7mA of current at the maximum settings. If the phantom power supply from the mixer is substantially below 48 volts, or the current supply is below the international standard of 10mA, please use the battery setting.

Note: The voltage and current of the phantom power supplied by the mixer can be seriously affected from using very long cable runs, improper cables or termination, too many phantom powered devices connected at once, shorted cables and connectors, and home brew XLR to 1/4 adapters. Mixers equipped with phantom power may have a different voltage rating from the standard 48v. Read the owners manual of any product connected to the X7 carefully before use.

Harmonic Feedback Elimination (HFE)

The Isometric Equalizer's midrange filter is actually two filters in one. The tuning is selectable with our Mod Switches.

The first tuning is a conventional midrange filter tuned to 1.5kHz, which is the frequency range that competes with vocals. The second tuning is our remarkable HFE setting. It is tuned at 237Hz, which captures the second harmonic of the 95Hz to 110Hz fundamental that will often feedback when acoustic guitars are amplified, especially when using piezo soundboard transducer pickupss.

Acoustic instrument tops have several frequency modes that resonate differently. The fundamental is the primary resonant frequency of the top. When we analyzed the typical acoustic guitar feedback, we found that the fundamental frequency and the second harmonic were both excited at the same time at or near the low G#. The harmonics that cause feedback, resonate primarily at or near 106Hz and 212Hz, with the second harmonic being a little louder than the fundamental from the reinforcement of the octaves and fifths in the top's resonance nodes, upper bouts, the instrument's back, and the air column.

We tuned the feedback elimination at 237Hz and it kills the second harmonic's resonance, but still leaves the lower fundamental note perfectly intact. This stops the feedback but leaves the bass response strong and powerful. And the frequencies that are cut are in the typically much louder G string frequency range, and not the low E and A strings.

The HFE setting also works great for reducing the wolf note on violins and the air prime fundamental resonance of mandolins. The Isometric Equalizer allows for fast and simple complete feedback elimination, and the bass response is still tight, loud, and very low.

Features and specifications in this manual are subject to change without notice.

Current product information is available online at:

www.archangelelectronics.com