

Arx Piezo Preamp v3

User Manual

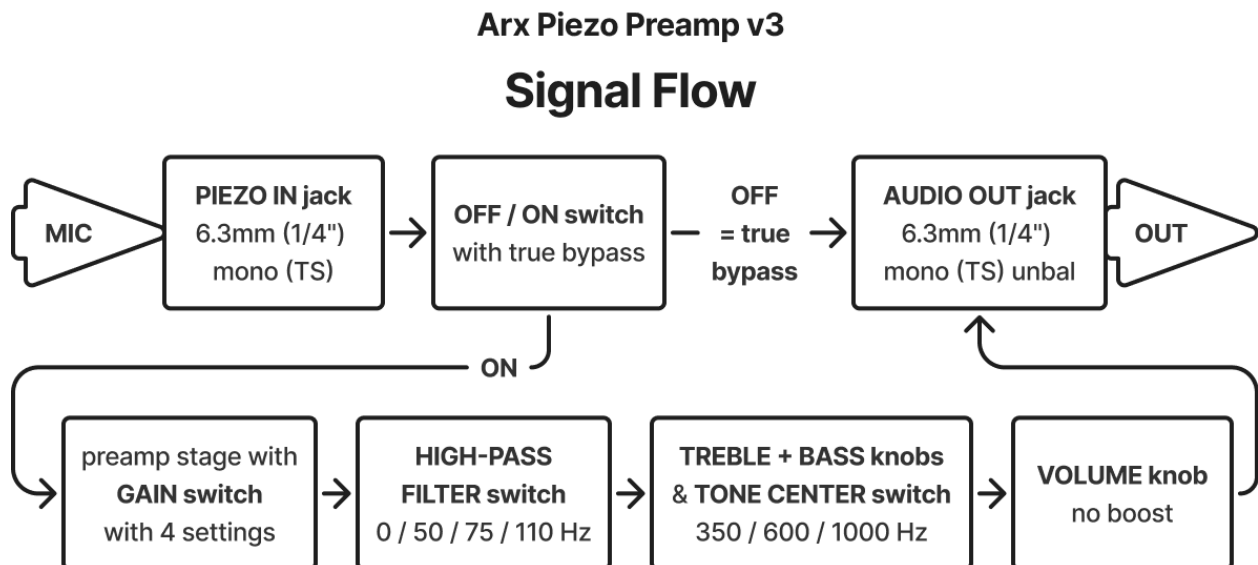
You are looking at a preamplifier designed specifically for contact (piezo) microphones and pickups, typically used with acoustic instruments. Using contact microphones without a specialized preamp can result in suboptimal sound quality, particularly lacking in bass. The Arx Piezo Preamp utilizes a technology known as "charge amplifier," which features low input impedance, offering lower noise compared to traditional high-impedance piezo preamps.

The input preamp stage strives to be as transparent, as "flat" as possible, preserving the original microphone output without alteration in the full audio frequency range of 20Hz to 20kHz. The pure sound of the microphone therefore depends on the quality of your microphone, its position on the body of the instrument, and the method of attachment to the body. It often requires a bit of experimentation.

The **preamp stage with Gain switch** is followed by a **High-Pass Filter** stage, then Baxandall **Bass / Treble tone control** stage for fine-tuning, and lastly the **Volume** knob. The preamp can thus be used for many different types of acoustic instruments.

I created this preamp as a way to learn audio PCB design. It is produced in a DIY way in small batches in the EU. Thank you for choosing it!

-- Arx
arx.wtf



Mounting the preamp

It is best to position the preamp as close to the piezo microphone / pickup as possible. Do not insert any other devices between the microphone and the preamp. The bottom side of the enclosure **features protruding flanges with mounting holes**. Use classic cable ties or velcro cable ties to mount the device to your instrument strap, utilizing these holes. Alternatively, mount the device on your pedalboard. The low-impedance input design should allow for a greater distance between the microphone and the preamp.

Using a 9V battery

This device can be powered by a standard rectangular **9V "pedal" battery** (aka **PP3**). Unscrew the bottom plate of the enclosure, attach the battery to the internal connector, insert the battery into the battery holder, and screw the bottom enclosure plate back on.

9V IN jack

Use **5.5/2.1mm DC plug, center-negative** ("standard pedal"). **Current draw is <10mA** (typically 2mA). Features MOSFET reverse polarity protection. When you insert the plug into the jack, it also cuts off the battery. Word of caution: such switches are known to fail from time to time, so if you plan to power the device using a 9V IN jack, consider removing the battery.

PIEZO IN jack

Mono 6.3mm (1/4") input jack for contact (piezo) microphones and pickups. Charge amplifier allows for the use of a low impedance input, improving noise immunity.

AUDIO OUT jack

Mono 6.3mm (1/4") unbalanced output audio jack. Low impedance. **A mono cable (TS) must be inserted so the device can be switched ON**. Do not use stereo cables (TRS) - the device will not turn on.

OFF/ON switch with true bypass

Switches the device between **true bypass** (OFF) and ON. **The device also requires a 6.3mm (1/4") mono cable to be inserted into the AUDIO OUT jack** to power on, preventing unnecessary battery drain if you forget to switch the device off.

LED MODE switch

- Left position: The main power-on **LED** ("eye of the frog") **will remain on** while the device is on.
- Right position: The LED will be in **battery indicator mode**. It will flash briefly when the device is turned on, then turn off to conserve battery. When the battery voltage drops below 7V, the LED will stay on to indicate the need to replace the battery.

GAIN switch

Sets the **gain of the input preamp stage**. The actual amount of gain depends on the capacitance of your piezo microphone(s) / pickup(s), which varies greatly between the microphones in the real world, therefore it is not possible to determine the gain exactly. Find the switch position that serves you best.

HIGH-PASS FILTER switch

Applies a gentle **6dB/oct high-pass filter at 0Hz (no filtering) - 50Hz - 75Hz - 110Hz**. This can be useful to suppress various unwanted thuds caused by handling of the instrument. This stage comes after the preamplifier stage, and before the tone control stage.

BASS and TREBLE control

These **cut or boost the bass and treble** in the range of **-10dB to +10dB**. Classic Baxandall tone control. The center frequency (between BASS and TREBLE controls) is selectable by the TONE CENTER switch, changing filter cutoffs.

TONE CENTER switch

Switches the center frequency (350Hz - 600Hz - 1000Hz) between BASS and TREBLE controls to allow for greater adaptability of the device to various instruments. For example, when the switch is on 350Hz, the BASS control will operate on frequencies below 350Hz and TREBLE control on frequencies above 350Hz.

VOLUME control

Sets the **final output audio volume** of the device, after all the stages. No boost.

Have fun!