

L I N E A R   T U B E   A U D I O

Z10 ELECTROSTATIC AMPLIFIER

# USER GUIDE: Z10 Electrostatic Amplifier

**Linear Tube Audio**  
**301-448-1534**

**Takoma Park, MD, USA**  
**[hifi@lineartubeaudio.com](mailto:hifi@lineartubeaudio.com)**

**WARNING: For safety, the cover of this amplifier should be secured at all times.**

This amplifier contains extremely high voltages and the user should not attempt to service the amplifier. Furthermore, this amplifier generates radio-frequency energy that can interfere with communications equipment.

## **Introduction**

The Z10 Electrostatic Amplifier (Z10e) combines our ZOTL10 power amplifier with a Berning-designed preamplification stage and an electrostatic headphone circuit. The result is an integrated amp with a precision stepped attenuator, tube-coupled balanced inputs, and a reference-level headphone amplifier for standard headphones as well as electrostatics.

## **Limited Two-Year Warranty**

1. Your new product is covered by a limited two-year warranty against defects in material and workmanship. Any repairs required will be made at no charge within the first two years after purchase as a new unit. This warranty is transferable to new owners within the original warranty period.

2. Any units returned for warranty repair must be shipped prepaid after receiving return authorization\*. If possible, the unit should be shipped in its original packaging. If such is not possible, the unit should be well packed with particular attention paid to protection of all corners and avoidance of any looseness in the carton.

*\*Handling and shipping costs are the responsibility of customers outside the United States.*

3. This warranty does not apply to damage resulting from physical abuse or unauthorized alterations or repairs, or from tube rolling or adapter use, or from the use of third-party components, or damage to exterior finish after delivery.

4. The warranty is void if the serial number has been removed, altered, or defaced.

5. This warranty is void if improper voltage is applied to any input or output.

6. If Linear Tube Audio determines after receiving the unit that damage was misrepresented and has been caused by something not covered by the warranty, the customer must pay for any necessary repairs before the unit is returned to the customer.

7. Linear Tube Audio reserves the right to improve or change its products without obligation to modify previously manufactured units.

## **Service Note**

ZOTL amplifiers use a unique circuit and technicians familiar with other tube amplifiers may not know how to correctly work on LTA products. Please contact us before attempting any alteration or repair, whether you are concerned about the warranty or not.

## Specifications

Circuit Type:	Push-Pull Class AB
Speaker Output:	12W (4 Ohm), 10W (8 Ohm)
Headphone Output:	HI: 3W (32 Ohm) LO: 240mW (32 Ohm)
Electrostatic Headphone Output:	580V (Stax Pro Bias)
Input Sensitivity:	0.6V RMS for full output
Input Impedance:	47K
Output impedance:	1.2 Ohms
Preamp Output Impedance:	50 Ohms
Gain:	18dB (8 Ohm load)
Noise:	-94dB
Frequency Response:	+0, -0.5dB, 6Hz-60kHz (8 Ohm Load)
THD:	0.5%
Input Voltage	1 110/220 Selectable
Tube Complement:	(4x) 12AU7, (2x) 12AT7, (4x) EL84
Size:	W: 16" (40.6cm), H: 5.125: (13cm), D: 16" (40.6cm)
Shipping Weight:	20 lbs (amp) 10 lbs (PSU)

## **Quick Start**

Remove amplifier, power supply, and included cables from the box.

Attach the AC umbilical cable to the power supply and amplifier. Be sure to tighten the cable's locking connectors.

Hook up your sources and speakers and/or headphones.

Once your system is set up and everything is hooked up, turn on the power supply and then turn on your Z10e via the power button on the front panel.

There is a turn-on delay of several seconds to allow the unit to warm up.

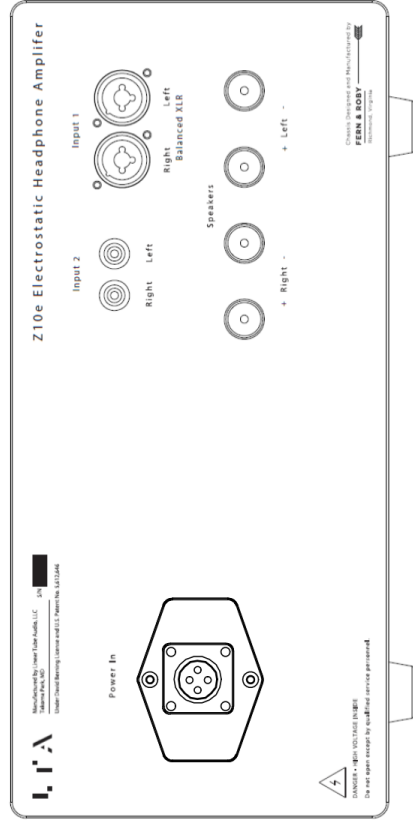
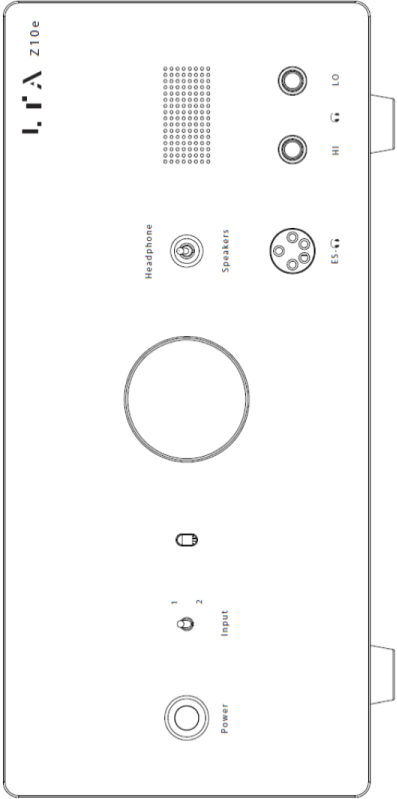
It is usually best to turn your components on starting from the beginning of the signal path and ending at the amplifier, and to turn your system off in reverse order.

## **Operation**

The unit is designed to be powered on indefinitely without harm. The front panel power button powers down the amplifier but the power supply remains on in a nearly idle state. To turn the amp completely off, use the power switch next to the IEC connector.

The unit is air cooled and should be placed somewhere with adequate ventilation.

Please allow at least fifteen (15) seconds between power cycles.



The front of the Z10e has the power button, input selector switch, IR sensor, volume knob, headphone/speaker switch, 5-pin electrostatic headphone jack, LED display, and two 1/4" headphone jacks.

The back of the Z10e features the 4-pin AC umbilical connector, two pairs of RCA inputs, one pair of XLR inputs, and four binding posts.

## **Inputs**

There are three inputs: two RCA and one XLR. The XLR provides a tube-coupled balanced input. The preamplification stage converts the balanced input into a single-ended signal that suffers no voltage loss.

## **Outputs**

The speaker outputs use binding posts that allow you to use banana plugs, spades, or bare wire.

There are two headphone outputs: one "HI" and one "LO". These refer to the output power, not the impedance. Use the HI output for full-sized headphones that need more power and the LO output for more sensitive headphones. Each uses a 1/4" jack. There is a switch to use either the headphone outputs or the speaker outputs. Always lower the volume before switching between the two.

The electrostatic headphone output puts out 580V, which is the standard voltage for electrostatic headphones currently made by Stax, Audeze, MrSpeakers, and others that use the 5-pin connector. If using older Stax headphones, the voltage is appropriate for "Pro-bias" models.

The Z10e also features an additional preamp-level Sub Out which is step-attenuated. This is a unity gain op-amp coupled, stereo RCA preamplifier output meant to be used with low-pass filtered, active

subwoofer RCA inputs. **WARNING: Always power down the connected subwoofer(s) before powering off the Z10e. Failure to do so may result in damage to connected devices.**

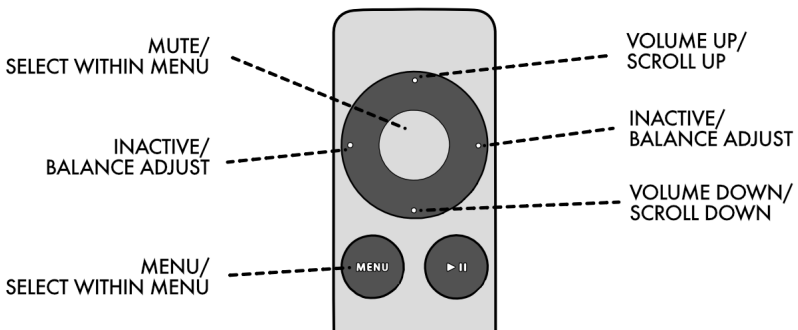
## User Interface and Controls

The front panel features a power switch, input switch, volume knob, headphone outputs, and display. The remote control is able to adjust volume, mute, and access a menu with more configurable options.

## Headphone/Speaker Output

The headphone/speaker switch on the front panel does not affect the electrostatic output. This means that if you have electrostatic headphones plugged in, they will always be playing music. We advise you to unplug electrostatic headphones before listening to speakers.

## Remote Control



**Up and Down Buttons:** These normally function as Volume Up and Volume Down. In Menu mode, they function to move up and down in the menu as displayed on the operator display.



**Left and Right Buttons:** In normal operation these are not active. They can be configured in the “L-R Remote Arrows” Menu to function as the Balance control. In the Menu mode, they act as selectors.

**Center Button:** This normally functions as a Mute function. When the unit is muted, there are two Xs on the display. When in Menu Mode, the Center button functions as a Select button.

**Menu Button:** When in normal operation, selects the Menu Mode. In the menu, this functions as a Select button.

**Play/Pause Button:** This is only used to pair a new Apple remote to the unit, which is done by holding the button down for 30 seconds.

## **Menu**

The menu is accessed via the Menu button on the remote control. Scroll with the up and down buttons to see menu options. Pause on an option to see the entire title scroll by.

**Balance:** Use the right and left remote buttons to adjust the balance. The front panel displays the balance setting as you adjust - two bars in the center indicate that the balance is at 0 (both channels are equal). When the desired balance level is selected, press the center button to save the setting. A message will appear on the display to indicate which setting the balance has been set to. The balance setting is saved across all inputs and will be utilized upon power up to the last saved setting. The maximum balance setting is 16 levels difference.

**Brightness:** The front panel display can be set to 16 levels of brightness. The brightness levels are saved and recalled upon power on.

**Display Timeout:** The volume display and input LEDs can be set to turn off after 10 seconds. They will reappear if a button on the remote control is pressed or the volume knob or front panel switch is changed. There are 3 settings:

OFF - The volume display and input LEDs remain on.

VOL - The volume display turns off but the input LEDs remain on.  
ALL - The volume display and input LEDs turn off.

**L-R Remote Arrows:** There are two functions that can be selected for the Left-Right Arrow buttons as follows:

Off – the remote Left-Right arrow buttons are deactivated.

BAL – the remote Left-Right arrow buttons will control the balance.

**Reset to Default:** The amplifier controls are set to Balance = 0, Display Timeout = Off, Home Theater Mode = None, and Display Brightness = 1, and Remote Left-Right Arrow buttons set to Not Active.

## **Tubes**

The Z10e is supplied with selected vintage tubes. The tubes operate at low current, which allows them to have an extended life.

Changing tubes:

EL84: The power tubes are self-biasing and do not need to be matched for gain.

12AT7: The 12AT7s should be a matched pair.

12AU7: These are used in the preamp section (the smaller circuit board) and in the power amp section. In both cases, the 12AU7s should be matched pairs and each individual tube should have both of its triode sections matched as well.

The sockets are tight, so gently rock the tube pins until you are able to remove the tubes. We use high-quality ceramic tube sockets with gold pins which are designed in such a way that the white ceramic part may shift slightly. This is an intentional design; the tube socket is very secure.

Before changing tubes, turn off the amplifier and wait at least 10 minutes to allow the stored power to discharge. Avoid touching any of the components on the circuit board, especially the vertical circuit boards.

**Note on using 7062 tubes:**

The 7062 is often used as a replacement for the 12AT7. This is usually not a problem, but they do require slightly more heater current than a standard 12AT7, which in turn requires slightly less current than a standard 12AU7. If you want to use 7062 tubes in the power amp section, you'll need to replace both the 12AT7s and the 12AU7s with 7062s in order to ensure that all tubes receive adequate heater current. You can use 7062s in the preamp section without changing any of the other tubes.

**Fuses**

There are two 5x20mm 4A Slow Blow fuses in the IEC inlet of the Power Supply.

**For more information and FAQs, please visit  
[www.lineartubeaudio.com](http://www.lineartubeaudio.com) or contact us at  
[hifi@lineartubeaudio.com](mailto:hifi@lineartubeaudio.com).**

