

Tubes

Value

LS & HS

350 Watts

100 Watts

Specifications

WT100 and 350 AMPLIFIER

Owner's Manual

aria

The very essence of every note.

Design by Michael Elliott

WT100 and WT350 Power Amplifier

Owner's Manual

**Manufactured by Aria Ltd
914 South Santa Fe Avenue, PMB E
Vista, CA 92084**

User Guide

**Please read this manual before operating the amplifier,
and keep it for future reference.**

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The Very Essence of Every Note

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Introduction

Congratulations on the purchase of your Whole Tone amplifier from Aria Ltd! This amplifier is the culmination of 20 years of product development and should provide a lifetime of enjoyment.

Please read this manual carefully to assure that your amplifier is connected properly.

The Aria Whole Tone Power Amplifier Series

There are eight models in the WT Series. Refer to the unit's front panel to determine which model you have.

WT100LS: Low-sensitivity 100 watt per channel stereo amplifier.

WT100HS: High-sensitivity 100 watt per channel stereo amplifier.

WT100LS XL: Premium-build low-sensitivity 100 watt per channel stereo amplifier.

WT100HS XL: Premium-build high-sensitivity 100 watt per channel stereo amplifier.

WT350LS: Low-sensitivity 350 watt mono amplifier.

WT350HS: High-sensitivity 350 watt mono amplifier.

WT350LS XL: Premium-build low-sensitivity 350 watt mono amplifier.

WT350HS XL: Premium-build high-sensitivity 350 watt mono amplifier.

Features

All Whole Tone power amps have the following features. XL-build versions use additional premium-quality parts refer to “About the XL Amplifiers” for additional information about those models.

- Connects to single-ended (RCA) and balanced (XLR) pre-amps.
- High 470k ohm input impedance provides an easy match for all tube and solid-state preamplifiers.
- Tube front-end requires no biasing.
- Only two easy-to-get tubes needed.
- Gentle operation assures 8,000 to 15,000 hour tube life.
- Non-phase inverting.
- Completely unique supertransconductance circuit allows the tube to drive the output stage with no signal degradation.
- Rugged output stage is rated to drive 2 ohms and it adds no sonic coloration of its own: The amplifier sounds like the tube used.
- Dual sets of speaker terminals for Bi-wiring.
- Zero feedback for natural sound.
- All tube voltage supplies, including the filaments, are regulated.
- Extremely high-quality parts used, including Plitron toroidal transformer built to Aria specs, Audience Auricaps, custom-made PRP 0.1% precision metal film resistors, carbon-composition resistors (in select locations), Nichicon audio-grade capacitors, double-sided circuit boards, continuous-cast copper wiring and ceramic tube sockets.
- Standby mode increases tube life and provides “warmed-up sound” as soon as the amplifier is switched on.

Package Contents for the WT Amplifier



Take a minute to inspect the contents of the shipping crate. In it, you should find:

- The WT Amplifier
- XLR adaptors to be used in unused XLR inputs.
- A power cord.
- A set of five spiked points
- A 9/64th inch hex allen key for opening the amplifier
- Registration Card

About AC Mains Cords

I have provided a standard AC Mains cord with the amplifier. But high-end mains cords do sound better than standard cords. I wish I could find a great-sounding cord at a reasonable price to include, but I have been unable to find such a thing. Use the included cord to get your amplifier operating, but to get the best results, expect to use the amplifier with a good-quality cord.

About the LS and HS Versions

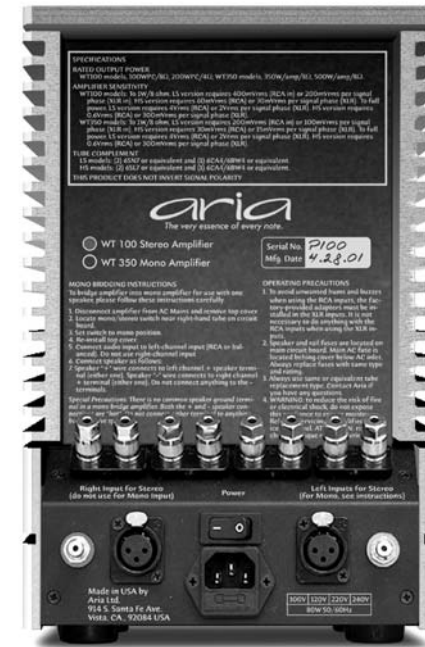
Both the 100 watt WT100 stereo amplifiers and the 350-watt WT350 mono amplifiers are available in two levels of sensitivity to best match your system needs.

The **LS** (low sensitivity) version uses a pair of 6SN7 octal-based triode tubes. It is ultra-linear and ultra-quiet. Because of its quietness, this version is ideal for high-sensitivity speakers. The high signal drive required by this amplifier makes it an ideal match with tube preamps, which normally can provide far greater output levels than solid-state preamps. If your preamp is not capable of putting out at least 4 volts rms (12 volts peak-to-peak, check with the manufacturer) you should use the HS version.

The **HS** (high-sensitivity) version is suited for systems with solid-state preamps. It only requires 1.2 volts (rms) of input drive to reach full output power. Suited for all speakers, the HS version uses dual octal-based 6SL7 triode tubes to provide normal sensitivity.

Note: It is not possible to change the sensitivity of the amplifier simply by changing the tube type. The high and low sensitivity versions are built with different values of anode and cathode resistors, required to match the tube type.

The WT100 Amplifier's Rear Panel



The WT100 series of amplifiers use premium-quality, brand-name connectors for high reliability and superb sonics. Both single-ended and balanced inputs are standard.

- The Right and Left Channel RCA Inputs are Cardas GRFA jacks except on the XL version of the amplifier, which uses WBT jacks.
- The Right and Left Channel Balanced Inputs are Neutrik XLRs.
- The Speaker Output Terminals are Cardas CCGR. There are two sets per channel to permit easy bi-wiring.
- The Main Power Switch is used to turn the amplifier completely off.

The WT350 Amplifier's Rear Panel



The WT350 series of amplifiers use premium-quality, brand-name connectors for high reliability and superb sonics. Both single-ended and balanced inputs are standard.

- The RCA Input is a Cardas GRFA jack except on the XL version of the amplifier, which uses a WBT jack.
- The Balanced Input are a Neutrik XLR.
- The Speaker Output Terminals are Cardas CCGR. There are two sets to permit easy bi-wiring.
- The Main Power Switch is used to turn the amplifier completely off.

Terminating Unused XLR Inputs

When using the RCA-type inputs, always insert the provided XLR Input Adaptors into the amplifier's XLR inputs as shown below.



By inserting the provided adaptors into unused XLR Inputs, you will block interference from entering the amplifiers and reduce background noise. It is not necessary to do anything with unused RCA inputs when you use the balanced XLR inputs, as they are internally terminated.

Connecting the WT100 Stereo to Your System

WT100 As a Stereo Amplifier

Connecting from Your Signal Source

The WT Series of amplifiers have both balanced (XLR) and single-ended (RCA-type) input connectors. We feel that balanced signal connections can offer better sound than single-ended connections. But the majority of signal sources only provide single-ended RCA-type outputs.

If your preamplifier or signal source (CD/DVD player, surround-sound processor, etc.) has **balanced outputs**, you should use them as the WT Series of amplifiers provide true-differential balanced input circuitry. Otherwise, use the RCA-type inputs.

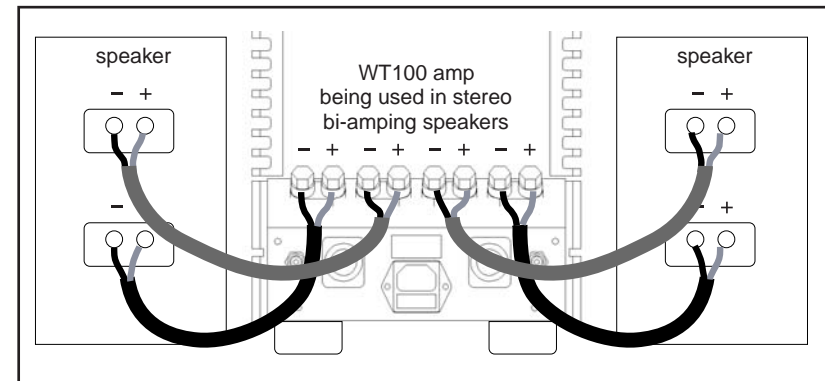
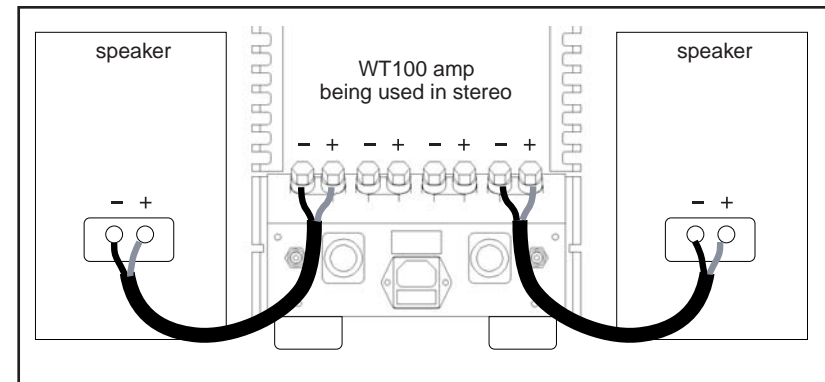
The amplifier has right and left channel inputs. Connect your signal source (preamplifier, CD/DVD player, surround-sound processor) to them. We recommend using high-grade audio interconnects for the best sound.

NOTE: If you are using the RCA-type inputs, see "Terminating Unused XLR Inputs", on page 7.

Connecting to Your Speakers

The amplifier has two sets of speaker output terminals per channel. If you are running only one speaker cable per channel, then use the speaker output terminals located nearest to the outside of the amplifier, above the RCA input terminals.

If you are bi-wiring your speakers (bi-wiring is where you use two sets of speaker cables per speaker), then you can use the second set of speaker output terminals for the second speaker cable.



WT100 As a Mono-Bridge Amplifier

The WT100 stereo amplifier can be configured as a 350-watt mono-bridge amplifier. Before doing so, an internal switch must be changed, and the connections to the amplifier will be different. Read the following sections carefully.

Changing the Amp to Mono

First, use the included hex driver to open the amplifier. See "Opening the Amplifier" for instructions on how to gain access to the inside of the amplifier.

There is a small toggle switch located on the main circuit board, located behind the right channel tube. Set this switch to the **“mono”** position. Close the amplifier when you are done.

⚡ Note: Risk of electrical shock! Unplug the amplifier before opening the amp. Never put your hand in any electrical device that is connected to power.



Setting the internal switch to mono converts the 100 watt per channel stereo amplifier into a 350-watt monophonic amplifier. As such, it will have tremendous speaker control with powerful dynamics.

Connecting from Your Signal Source

When the amplifier is set up as a mono amp, only the left-channel inputs are active. Connect your signal source (preamplifier, CD/DVD player, surround-sound processor) to the left inputs.

Note: If you are using the RCA-type inputs, see “Terminating Unused XLR Inputs”, on page 7.

Connecting to Your Speakers

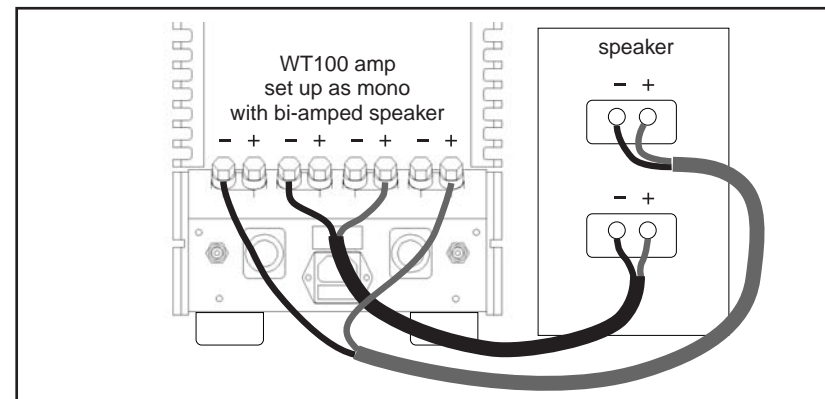
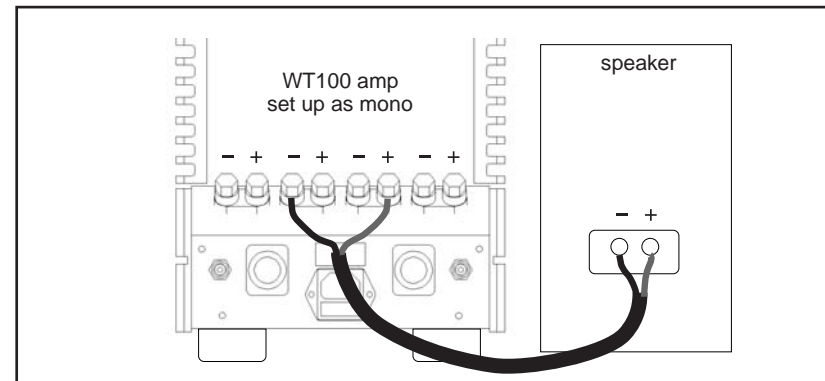
Make your connections as follows:

The speaker’s “+” wire connects to either of the amplifier’s **left channel “+” terminals**.

The speaker’s “-” wire connects to either of the amplifier’s **right channel “+” terminals**.

When set up as a mono bridge amp, you will not use any of the “-” speaker terminals.

⚡ SAFETY NOTE: Both speaker wires are live! Only connect bridge amps to passive (unpowered) speakers otherwise there is risk of damaging the amplifier.



Speaker connections when configured as a mono-bridge amp. Note that none of the amplifier’s four “-” speaker terminals are used.

Connecting the WT350 Mono to Your System

Connecting from Your Signal Source

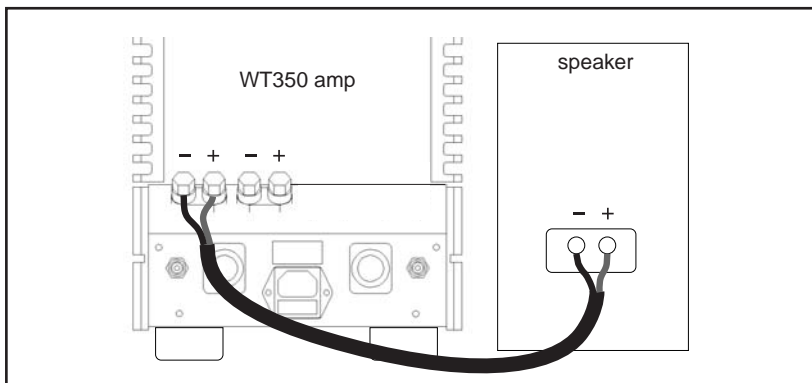
If your preamplifier or signal source (CD/DVD player, surround-sound processor, etc.) has **balanced outputs**, you should use them as the WT Series of amplifiers provide true-differential balanced input circuitry. Otherwise, use the RCA-type inputs.

The WT350 has only one channel, thus only one set of inputs. Connect your signal source (preamplifier, CD/DVD player, surround-sound processor) to them. We recommend using high-grade audio interconnects for the best sound.

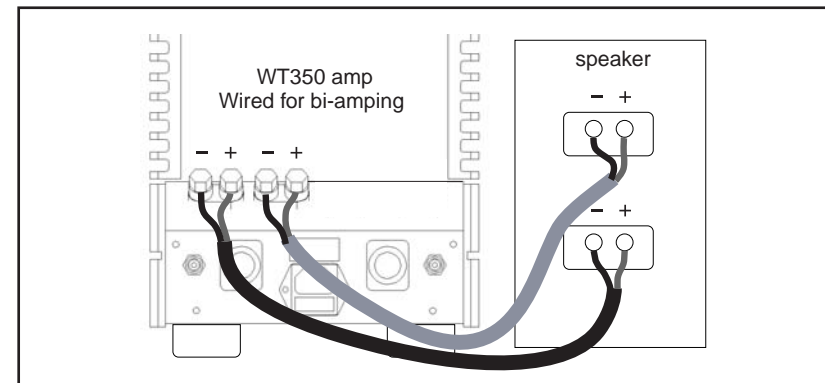
NOTE: If you are using the RCA-type inputs, see "Terminating Unused XLR Inputs", on page 7.

Connecting to Your Speakers

The amplifier has two sets of speaker output terminals. If you are running only one speaker cable, then use the speaker output terminals located nearest to the outside of the amplifier, above the RCA input terminal.



If you are bi-wiring your speakers (bi-wiring is where you use two sets of speaker cables per speaker), then you can use the second set of speaker output terminals for the second speaker cable.



⚡ SAFETY NOTE: Like all bridge amplifiers, the WT350 does not have a common speaker signal. Both the "-" and "+" speaker connections are electrically live. If you connect this product to anything other than a passive (unpowered) speaker there is a chance the amplifier will be damaged.

Turning On the Amplifier

Double-check to make sure everything has been wired correctly. This is especially important when setting up the WT100 as a mono amp due to the unusual way the wires need to be connected.

Once you are certain that everything is fine, you can connect the amplifier to your wall AC outlet with the provided cord, though we do recommend using a high-end audio AC Mains cord.

Turn on the power switch on the rear of the amplifier and the front panel lamp should light red.

Press the switch bar under the “Aria” logo on the front panel and the amplifier will begin its warm-up cycle. The first “click” you hear will be the sound of the tube’s high voltage power supply turning on. The front panel lamp will pulse violet.

About 15 seconds later, the amplifier will click again, indicating that the warmed-up tube circuitry has been connected to the output stage. The front panel lamp will change to blue, indicating that the amplifier is ready for use.

Pressing the switch bar again will place the amplifier back into standby mode, shutting off high voltage to the tubes. However, both the output stage and the tubes will be kept warm, which both prolongs tube life and assures that the amplifier will sound its best as soon as goes through the 15-second warmup cycle.

Amplifier Loudness

It might seem that the WT amplifiers don’t play as loudly as your previous amplifier. You may find that you have to turn up the preamp’s volume control to get good levels. This will be very noticeable if you ordered the LS (low sensitivity) version. This is not a problem: the WT Series of amplifiers want a lot of signal drive. Especially the LS amps — that’s why I recommend using a tube preamp to drive them: transistor preamps usually can’t put out enough volts to drive them to full power.

Amplifier **sensitivity** should not be confused with amplifier **power**. One company might make a 100 watt amplifier that puts out full power with only 0.1 volt of input signal. And someone else might make one that needs a volt to put out the same power. Which is the more power amplifier? Neither -- they are both 100 watt amps. But on the first amp you’d barely have your volume control open before the amp was playing as loudly as it could, where on the second amp you might

need to turn the control to 12 o’ clock to get it playing as loudly.

The only way to increase amplifier sensitivity (in a zero-feed-back design) is to use more tubes, or higher-gain tubes. I feel that the key to sonic purity is *simplicity*, so I only use one tube per channel—the signal path could not be any simpler; and the type of tubes I have chosen to put in the WT series of amplifiers offer superb sound quality and plenty of voltage gain when matched with the right kind of preamp. See “About the LS and HS Versions” on page 4 for more information about preamp matching.

About the XL Amplifiers

All Whole Tone Series amplifiers are designed to provide exceptional sound quality. As mentioned previously, construction is robust, using double-sided circuit boards. Precision PRP metal-film resistors custom-built to Aria specifications (the most transparent metal-film resistor ever made), and the best-sounding capacitors on the market. Cardas RCA inputs and speaker terminals are standard, and output stage energy reserve is provided by four Nichicon Gold Tune main capacitors.

But for music lovers whose interest in sound quality is high, a higher level of build quality is used in the XL version. The very best parts are used, and the improvement in sound is apparent even to the casual listener. Resistors in critical locations are by Caddock and Mills, Black Gate powdered graphite capacitors are used in all essential power supply locations, Nichicon Super Through main capacitors are used, and WBT jacks are used for the RCA inputs. The wiring is upgraded to Van den Hul “The Wind” and a choke input filter is used for the tube high voltage supply.

Each of these parts contributes to weightier, more coherent bass, quieter background, see-through transparency, and warmer, more natural sound.

Parts like this are rarely used in products sold through retail channels because normal retail markup renders them prohibitively expensive. But as you can hear, their performance more than justifies the extra cost.

Break-in Period

The WT Series of amplifiers are very sensitive instruments and, like real musical instruments, will not sound their best until they have played music for a while. During the initial “break-in” period, the amplifier will sound somewhat bright and a bit edgy. This is normal for all high-end electronic components.

During the break-in period, which will last at least 100, and as much as 300 hours, you will here dramatic improvements in the areas of bass coherence and warmth.

You can speed to break-in process by playing music through the amplifier as much as possible.

Internal Adjustments

There are no user-adjustable internal adjustments other than the mono-stereo switch, used to convert a WT100 amplifier from stereo to mono-bridge. The tubes do not require biasing. There are two other internal adjustments, DC Offset (“DCO”) and BIAS which should normally never need to be changed. They are located on the biasing card and control the output stage. Only a technician who possesses the *WT AMP Service Manual* should attempt such adjustments. (Please note that WT Amplifiers whose serial numbers begin with “1WT” have incorrectly-labeled DCO and BIAS controls — the labels were inadvertently reversed.)

Tubes and Tube Replacement

Tube Life

Good-quality tubes will provide 8,000 to 15,000 hours of operation before performance begins to degrade (usually indicated by a reduction of volume or a general “softening” of the sound quality).

I wish I could provide rare tubes with all Aria amps, but the very best tubes are extremely hard to find. Rather than hold up production and delay shipping, I use more easily-found tubes.

While they may not be the best tubes available, they get the amp running.

I strongly suggest that you start seeking premium-quality tubes—it’s worth the trouble: the amplifier is so neutral-sounding, it will sound like whatever tubes you put in it, and you will be amazed at the variety of sounds you can get from the amp when you try it with different tubes.

The tubes do not need to be matched although you must run the same brand and type of tube in both channels. No biasing is required.

About Tubes for the LS WT Amplifiers

Equivalent tubes that will work in the LS version of the WT amps are: 6SN7, 6SN7GT, 6SN7GTA, 6SN7GTB, 6SN7WGT, 6SN7WGTA, ECC32, 5692, 6180, CV1986, and CV1988.

The LS version of the WT100 and WT350 amplifier ships with a pair of Sovtek 6SN7 triode tubes. I use these tubes because they are currently in production, and sound very, very detailed and transparent. They are, however, a bit analytical-sounding — not the richest or most emotional-involving sounding tube available.

Though I don't stock them, the Sylvania JAN VT-231, sounds a bit thick but it is so scarily rich and full that it will raise goose-bumps on your arms; while the RCA "Red Base" 5692 provides a warmer and rounder sound than the Sovtek, and is every bit as detailed.

About Tubes for the HS WT Amplifiers

The HS version of the WT100 and WT350 ships with a pair of GE "silver-plate" 6SL7GT triode tubes. I was lucky enough to get a bunch of these excellent-sounding tubes. You might be able to do better, but these are quite good. Of course, there are other tube types that will work well, too. Equivalent tubes that will work in the HS WT amps are: 6SL7, 6SL7GT, 6SL7WGT, ECC35, 5691, 6113, 6188, CV1984, CV1985

Sources of Tubes:

See www.ariaaudio.com/tubes.html



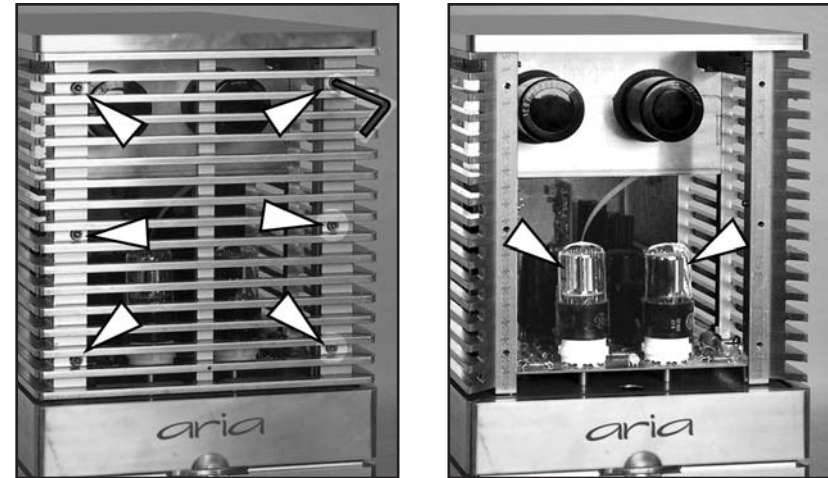
Note: Do not try to use high-sensitivity type tubes in an LS amp or vice-versa. The high and low sensitivity versions are built with different values of anode and cathode resistors, required to match the tube type. Soldering skills are required. Contact Michael Elliott at Aria Ltd for information on changing amplifier sensitivity.

Opening the Amplifier

To access the tubes, the front grille must be removed. Use the provided hex allen key and remove six bolts, as shown.



Note: Risk of electrical shock! Unplug the amplifier before opening the amp. Never put your hand in any electrical device that is connected to power.



After removing the front grille, the tubes may be changed. This only needs to be done after about 8,000 to 15,000 hours of use, or if you want to install premium tubes. No biasing is required. Use care when replacing tubes as they are fragile. Make sure that they are oriented correctly before inserting them in their sockets. Do not operate the amplifier with the grille removed.

Spiking the Amplifier

The rubber feet on the bottom of the amplifier are designed to prevent marring of furniture or other soft surfaces. But using spikes will improve the sound because they decouple the amplifier from vibrations in the surface upon which it is resting.

On carpeting, spikes are actually better than the rubber feet, because their sharp points will work their way through the nap of the carpet and spike the amplifier directly to the flooring. When the amp is later moved, there will be no visible depressions.

Simply unscrew the rubber feet and screw the spikes into the threaded holes.

Lifetime Transferable Warranty Terms

Aria Ltd., except as otherwise provided herein, warrants the original purchaser and all subsequent owners of this audio component against any defects in the material, manufacturing and workmanship or if it fails to perform in accordance with published specifications from the date of delivery to the first purchaser **and may be transferred to succeeding purchasers. Proof of ownership transfer is required which will be fulfilled simply by sending a copy of an endorsed bill of sale to Aria Ltd.**

This warranty applies to parts, labor and return shipping. This warranty is limited to the repair or replacement of the component (at the sole option of Aria Ltd.) and does not cover any consequential, special or incidental damages. This warranty does not cover damage caused by modification, alteration, repair or service by anyone other than Aria Ltd. Nor does it cover loss, misuse or improper maintenance of the component. Proof of purchase is required.

Note: Tubes warrantied for two years.

This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state. The warranties contained herein are in lieu of and exclude all other warranties, express or implied, by operation of law or otherwise, including warranties of merchantability or fitness for particular use. **THE MAXIMUM LIMIT OF LIABILITY FOR LOSSES OR DAMAGE FROM ANY CAUSE, WHATSOEVER, SHALL BE THE PRICE PAID FOR THE COMPONENT.** Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above limitations or exclusions may not apply to you.

Specifications

WT100 Amp Specifications

Output Power

8 ohms: 100W
4 ohms: 200W

Input Sensitivity

RCA inputs to 1W/8 ohm: 400mVrms (LS); 60mVrms (HS)
XLR inputs to 1W/8 ohm: 200mVrms per signal phase (LS), 30mVrms per signal phase (HS)
RCA inputs to rated power: 4Vrms (LS); 0.6Vrms (HS)
XLR inputs to rated power: 2Vrms per signal phase (LS); 300mVrms per signal phase (HS)

WT350 Amp Specifications

Output Power

8 ohms: 350W
4 ohms: 500W

Input Sensitivity

RCA inputs to 1W/8 ohm: 200mVrms (LS); 30mVrms (HS)
XLR inputs to 1W/8 ohm: 200mVrms per signal phase (LS), 15mVrms per signal phase (HS)
RCA inputs to rated power: 4Vrms (LS); 0.6Vrms (HS)
XLR inputs to rated power: 2Vrms per signal phase (LS); 300mVrms per signal phase (HS)

WT100 and WT350 Specifications

Amplifier Polarity

Noninverting

XLR Wiring

Per IEC 268, AES14.1992: Pin 1 - Ground, Pin 2 - HOT (+), Pin 3 - COLD (-)

Frequency Response

1Hz to 120kHz (LS); 1Hz to 30kHz (HS)

Signal-to-Noise

Reference to 1W: 96dB (LS); 90dB (HS)

Aria WT and WT XL Amplifiers

Residual Hum and Noise
nuVrms (LS), nuVrms (HS)

Damping Factor
Ref 8 ohm: 44

Maximum Output Current
100A

DC Offset
Less than 100mV, typical. Note: this amplifier does not use a high-gain servo. Some woofer movement is expected, but it will be far below normal signal levels.

Power Requirements
Standby: less than 50W, Operate 80W

Fuses
Rail Fuses (located on main circuit board): 6-amp fast type (four places); Speaker Fuses (located on main circuit board): 6-amp fast type (two places); AM Mains Fuse: (located inside AC Inlet receptacle on rear) 10-amp slow type. All fuses are 5mm x 20mm size.

Available Voltages
The WT100 and WT350 can be ordered to operate in 100VAC, 120VAC, 220VAC and 240VAC environments. Detachable IEC Mains receptacle accepts all power cords. Unless other arrangements have been made, units destined for sale in 120V countries will be shipped with standard-grade AC Mains cord. Units destined for other countries will not be shipped with a Mains cord. All Aria products are built to meet or exceed UL/CSA safety standards.

Dimensions (W x L x H)
Amplifier Only: 8" x 17" x 13", 20cm x 43cm x 33cm
Shipping Crate: 14" x 23" x 19", 35cm x 58cm x 48cm

Weight
Amplifier Only: 50lbs, 23kg
Shipping Weight: 63lbs, 29kg

The logo for Aria, featuring the word "aria" in a lowercase, elegant, cursive script font.

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