ARBE-III

Universal Battery Eliminator

Manufactured by

Antique Radios Inc.
PO Box 6352
Jackson MI 49204
USA

Owners Manual and Warranty

ARBE-III Instruction Manual

Introduction

ARBE-III is a solid state, fully regulated, universal power supply designed specifically for use of pre 1930's battery operated radios. Three electronically isolated power sources are provided in one self contained unit. The high current "A" supply is continuously adjustable from 1.25 VDC to 6.5 VDC. The "B" and "C" supplies provide eight different fixed voltages for maximum flexibility. The electrical isolation of each supply provides the user with the ability to power most early battery operated radios. The ratings of each supply are conservative and when used as intended, the ARBE-III should provide years of trouble free service.

A Supply

This section of the ARBE-III is used to provide the filament voltage for the early vacuum tubes. The "A" supply is fully adjustable from 1.25 VDC to 6.5 VDC. (this will meet the requirements for all of the pre 1930's battery operated radios). The standard "O1A" vacuum tube will draw approximately ¼ of an ampere of current. The ARBE-III is therefore capable of supplying the power requirements for up to 12 such vacuum tubes.

The ARBE-III is factory set for 6.2 VDC. Using the special adjustment tool provided, it is easily adjusted for any voltage between 1.25 and 6.5 VDC. A DC voltmeter with at least 3% accuracy should be used to when making adjustments to the "A" supply. Make all adjustments **before** you connect your radio. The adjustment hole is located above the barrier strip and is labeled "ADJUST".

The voltage regulator used for the "A" supply is capable of supplying in excess of 3.0 amperes if the operating temperature of the heat sink is maintained below 70 ºC (158 ºF). The ARBE-III is thermally protected making it practically indestructible. However, we do not recommend operating the ARBE-III above 3.0 amperes for extended periods of time. It should also be noted that as the output voltage is reduced, the available current is necessarily reduced also. For example, at 4 volts, the available current is reduced to approximately 2.5 amperes. If you try to draw more current than the ARBE-III is capable of delivering, it will go into thermal overload and the regulator will shut off. As noted, you can not damage the regulator by overloading it because of the thermal protection. A direct short on the output will simply cause the regulator to shut down.

B Supply

The "B" supply of the ARBE-III is designed to provide 5 different regulated DC voltages (22, 45, 67, 90 and 135 volts). The **total** "B" current available is 60 ma. This means that any combination of voltages used together should not exceed 60 ma. Each voltage can provide up to 30 ma at less than 5 mv ripple. The high voltage is derived from a separate winding on the power transformer. The high voltage is rectified, filtered, and regulated with a three terminal regulator which is set for 135 volts. The remaining "B" voltages are derived by the use of a zener diode voltage network. The "B" voltages are approximately within 5% of the stated voltage. The high voltage regulator is protected against overload conditions (short circuits). If **any** of the "B" supply outputs are accidentally shorted out, no damage will occur to the ARBE-III. A short circuit condition will cause excessive heat build up because it's an abnormal condition.

C supply

The "C" supply of the ARBE-III is designed to provide 3 different regulated voltages (-4.5, -9, and -22 volts). Each voltage can provide up to 20 ma at less than 1 mv ripple. The voltages are derived from a 3rd winding on the power transformer. The voltage is rectified, filtered, and derived by the use of a zener diode voltage network. The "C" voltages are approximately within 5% of the stated voltage.

Use of the ARBE-III

You should become familiar with the circuitry of your radio **before** attempting to connect it to the ARBE-III. Incorrect connections and or wrong "A" supply voltage settings can instantly destroy a set of tubes. A schematic diagram is a useful tool when attempting to hook up your radio for the first time. **Antique Radios Inc** is a potential source for many old radio schematics. Additionally, numerous wiring diagrams are available on our website. www.arbeiii.com These will show how to make the electrical connections for many of the early battery operated radios from the 1920's. As a minimum, you need to know the following information:

1.) Filament voltage and current requirements of the tubes in your radio.
2.) B supply voltage requirements.
3.) C supply voltage requirements if applicable.
4.) Common reference point of the supply voltages.

The most critical supply voltage is the "A" supply. An incorrect voltage can destroy a complete set of tubes instantly. A tube manual will show the correct voltage levels for many commonly used vacuum tubes. A partial listing of tube voltages and current requirements are included on the following page.

Voltage and Current requirements for commonly used vacuum tubes

Tube Type	Voltage	Current	Typical Voltage Used*
01A	5.0 VDC	0.25 AMP	6.3 VDC
UX201A	5.0 VDC	0.25 AMP	6.3 VDC
UV301A	5.0 VDC	0.25 AMP	6.3 VDC
UV201 or UX201	**5.0 VDC**	**1.00 AMP**	**6.3 VDC****
UX99	3.0 VDC	0.06 AMP	4.5 VDC
UX199	3.0 VDC	0.06 AMP	4.5 VDC
UV99	3.0 VDC	0.06 AMP	4.5 VDC
UV199	3.0 VDC	0.06 AMP	4.5 VDC
1A4	2.0 VDC	0.06 AMP	2.0 VDC
1A6	2.0 VDC	0.06 AMP	2.0 VDC

* These voltages which were normally used to power the radios using the above tubes. Typically these radios had rheostats which were used to lower the voltage to the appropriate level. Six volt storage batteries where popular power sources for radios using 01A type series tubes. Many of the RCA Radiola sets used 4 ½ volt dry cells which were not rechargeable.

** The UX201 was an early version of the UX201A series. These tubes were very inefficient and were subsequently replaced with the UX201A or UX301A type tubes. As the above table indicates, the UX201 tube draws substantially more current the UX201A series (4 times). A simple set using UX201's can draw as much as 5 amperes of current. Whereas the same set using UX201A's would only draw 1.25 amperes of current. It should be noted that the use of these tubes can cause the rheostats in your radio to overheat. This could cause potential damage to your radio.

In most cases, a schematic will show the required voltages and the common reference point for the various voltages. A typical common reference point is the (A-) connection on the filament supply. In this case, the (B-) and the (C+) would be connected to the (A-) (common reference). Since the ARBE-III has the A, B, and C supplies isolated from each other, an external jumper must be connected from (A-) to (B-) to (C+). **It should be noted that not all radios were wired the same.** Some required (B-) and (C+) be connected to the (A+). **A typical common jumper connection would be A+ to B- and A- to C+.** Other sets made these connections inside of the radio. As noted it is important to know what your particular radio requires!!

Typically the older battery operated radios required an external "earth" ground connection for best results. The ARBE-III is pith a three wire power plug. Electrically, the aluminum front panel of the ARBE-III is grounded if you use the power plug as intended. For safety

reasons it is important to plug the ARBE-III into a 3 wire AC line or outlet. In addition, the (B-) terminal of the ARBE-III is capacitively coupled to the aluminum front panel. This provides an RF by-pass for your radio and effectively provides the ground your radio may require.

Cautions when using the ARBE-III

The ARBE-III has been designed to provide many years of trouble free operation if used as intended. Short circuit protection is provided on each separate supply (A, B, C). However, the short circuit protection is not intended to provide the protection function if one supply is connected directly across another supply.
Example: the "A" supply connected across the "C" supply.
You would have a similar reaction if you connected a 12 volt car battery across a 6 volt car battery!!

Connecting any of the supplies across each other could void the 5 year warranty!!

You should always keep in mind that **any** electrical device is potentially dangerous. The ARBE-III has been designed with safety in mind, however the following precautions should be observed:

1) High voltage is present on the "B" supply terminals when the on/off switch is in the on position and the front panel red neon bulb is illuminated.
2) Under normal operating conditions, the heat sink on the aluminum front panel will run hot (to the touch), but not hot enough to burn anyone. If the ARBE-III is allowed to remain in a shorted state for an extended period of time, the heat sink could become hot enough to cause a minor burn.
3) For electrical safety, the aluminum front panel and heat sink are grounded though a 3 wire power cord. **Do not try to defeat the ground.**
4) The ARBE-III is assembled with tamperproof screws. This is for safety reasons. Inside the ARBE-III, 120 VAC is exposed and is potentially lethal. Do not attempt to repair it yourself. If you have any problem with the ARBE-III, send it back to Antique Radios Inc for repair.
5) Always turn the ARBE-III off when not in use.
6) Always double check your connections before you turn the power on your radio. You can verify proper filament voltage by using just "one" tube the first time you attempt operation. A few extra minutes could save you a valuable set of tubes.
7) **If you are uncertain about the proper connections, GET HELP FIRST!! Technical assistance is available from Antique Radios Inc.**

The following actions can void your warranty

The ARBE-III is warranted by Antique Radios Inc. for a period of five year from the date of purchase. This product will be repaired (or replaced) by Antique Radios Inc. if we determine that the product was used as intended and the failure was due to defective workmanship or components. The customer is intended to pay the shipping charges. This warranty is void if any of the following have occurred:

1.) Removal of the tamperproof screws.
2.) Connection of the individual supplies across each other or to any other power source or battery.
3.) Connection of any of the individual supplies to 120 VAC.

Limited 5 Year Warranty

Antique Radios Inc. warrants to the original purchaser of this Universal Battery Eliminator that, should it prove defective by reason of improper workmanship and/or material: (a) for 5 years from the date of original purchase at retail, Warrantor will repair or replace, at Warrantors option, any defective component without charge for the part. Parts used for replacement are warranted for the remainder of the original warranty period. (b) for 5 years from the date of original purchase at retail, Warrantor will provide the labor for a warranty repair without charge when the Consumer delivers the product to Antique Radios, Inc. at PO Box 6352, Jackson, MI. 49204.

1.) To Obtain Warranty Service, Consumer must deliver the product to Antique Radios, Inc. at the above address. All Shipping expenses are the purchaser's responsibility. Proof of purchase is required when requesting warranty service. Purchaser must provide the sales slip or other document which establishes proof of purchase.
2.) This Warranty Does NOT Cover, defects caused by: modification, alteration, repair or service of the product by anyone other than Antique Radios, Inc., and its authorized representatives; physical abuse or misuse of, the product or operation thereof in manner contrary to the instructions; or shipment of the product for service. Consult the operating instructions included with the product for information regarding use of operation.
3.) Any express warranty not provided herein, and any remedy for breach of contract which but for this provision might arise by implication or operation of law, is herby excluded and disclaimed. The implied warranties of merchantability of the fitness for any particular purchase are expressly limited to a term of 30 days. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.
4.) Under no circumstances shall Antique Radios Inc. be liable to purchaser or to any other person, or for any incidental or consequential damages, whether arising out of breach of warranty, breach of contract or otherwise. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.
5.) This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.