

OPERATING INSTRUCTIONS

1. Make sure that you have complied with the INSTALLATION and CONNECTION INSTRUCTIONS prior to attempting operation.
2. The preamplifier should be on and initially muted and/or at minimum gain.
3. Turn the D115 power switch "On." You will note a short delay of approximately 1/2 second before the power relay clicks in and the "On" (and fuse out) indicator lamp reaches full brilliance. This "soft start" protection is provided to minimize the power surge of charging the D115 capacitors, to prolong component life and minimize the momentary "light dimming" encountered when switching on audio power amplifiers. The duration of this turn-on delay will vary with line voltage.
4. After about 10-30 seconds the "screen" lamp will also light, indicating that the high voltage regulators have reached operating temperature.
5. The D115 will now operate satisfactorily. However, a full stabilization time of 15 to 30 minutes is recommended for best sonic performance.

NOTE: It is important to note here that ARC does not recommend operation of the unit 24-hours a day. (As is the custom of some audiophiles to achieve maximum sonic performance.) While this is probably good procedure for solid-state equipment, ARC does NOT recommend this for vacuum tube equipment. Vacuum tube life is shortened significantly by this procedure.

6. Input level controls. The input level controls may be used to "balance" the levels between amplifiers of different input sensitivity when using the D115 in a bi-amplified system.

If used alone in a single amplifier system, the input level controls should be adjusted to provide a normal listening level when the gain control on the pre-amplifier control unit is in the range of 10 to 2 o'clock. This adjustment will provide optimum control by your preamplifier, as well as providing best signal-to-noise ratio therefrom.

ADJUSTMENT PROCEDURE AND DISCUSSION

The D115 utilizes very high quality, commercial and computer grade components and this, together with conservative operation of all components and tubes, will provide long service life, if installed and operated within the parameters outlined in this manual.

The output tubes, for example, are operated with electronically regulated "bias" as well as electronically regulated "screen" voltage. With these voltages regulated the variation in output tube idle current for varying line voltage becomes normally unimportant.

The output tubes are set at the factory for an "idle" cathode current of 65mA. (.065 amperes) each at a power line voltage of 120. Reducing the line voltage to 105 causes this current to drop to 62/63mA. Increasing the line voltage to 130 causes this current to increase to 67/68mA. This amount of change is not important sonically nor will it materially affect tube life.

After vacuum tube failure and replacement, it is important to readjust the amplifier for optimum performance and tube life.

CAUTION: The following internal procedures should not be attempted by the owner unless he is technically qualified. There are high voltages and currents within this unit which can be lethal under certain conditions. All internal adjustments should be accomplished by a qualified individual. It is necessary to remove the top cage from the D115 for the following adjustments. Unit should be off for cage removal.

There are three (3) parameters which may be adjusted (in the following sequence) in the D115. These adjustments are internal, requiring removal of the cage. Use the plastic alignment tool provided.

1. OUTPUT TUBE IDLE CURRENT ("BIAS")
2. DC BALANCE
3. AC BALANCE

1. OUTPUT TUBE IDLE CURRENT ("BIAS")

The output stages of the D115 are partially cathode-coupled "push-pull Class AB₁," utilizing our tightly-coupled output transformers which provide low distortion and sonic accuracy.

As shipped from the factory, the output "bias" adjustments are set for a nominal 65mA. per tube with a stable power line voltage of 120. (Export models are adjusted for each country's requirements.) Under these conditions the tubes are each dissipating approximately 28 watts of their 48 watt rating (42 watt plate, 6 watt screen). This point of operation provides "enriched" Class AB₁, and will satisfy most critical listeners.

Although the main "B+" voltage to the output tubes will vary with line voltage, the "bias" voltage and the "screen" voltage are electronically regulated. Because of this the change in operating point of the output stage does not vary significantly with reasonable changes in line voltage. It is therefore not normally necessary to readjust "bias" except when changing power output tubes.

Make sure that ventilation requirements are met as described under INSTALLATION to prolong tube and other component life.

1A. "BIAS" ADJUSTMENT PROCEDURE

For best results operate and adjust the D115 at 120VAC line voltage, or at the line voltage that is typical in the final installation. Adjustment should be made under zero-signal conditions after at least 15-20 minutes of uninterrupted stabilization time. There may be a very slight interaction between the 8 output tube bias adjustments, so recheck the first tube current after adjusting the other 7, etc., until you are certain that all are correct and stabilized.

A digital voltmeter capable of accurate measurements in the range of .05 to .1 Volt DC is required to accomplish this adjustment (must have 3 1/2 digit display.) Use the plastic alignment tool provided to make the adjustments.

There is a 1 ohm 5% wirewound resistor in the cathode circuit of each output tube, and these connections (test points referred to schematically and on the circuit board as TPs) are provided at either end of these resistors so that a voltage measurement can be conveniently made across each resistor. These test points are identified and accessible from the top side of the printed wiring board.

Because the resistor is 1 ohm, you can conveniently "direct" read the total cathode current in each tube. A .065 Volt reading indicates 65mA. (Be certain that you do NOT attempt to read current.)

<u>TUBE</u>	<u>TEST POINTS</u>	<u>ADJUSTMENT</u>
V8	TP8, TP5	RV8
V10	TP10, TP5	RV10
V12	TP12, TP7	RV12
V14	TP14, TP7	RV14
V9	TP9, TP6	RV9
V11	TP11, TP6	RV11
V13	TP13, TP16	RV13
V15	TP15, TP16	RV15

It is important that all 8 output tubes be reasonably matched (within 5%) for highest performance operation. (Matched sets are available from Audio Research.) It is also important, both for long life free from arcing effects as well as sonically, that these tubes be of a low "gas" nature. Tubes provided by Audio Research will meet these parameters.

2. DC BALANCE

The D115 uses an improved version of our patented cross-coupled input/driver circuit that automatically tracks normal minor tube drift. Therefore, the accuracy of DC balance required for best performance is not super-critical. However, it is necessary to check and reset DC balance if input tubes V2 or V3 are changed.

A battery-operated digital voltmeter having a 10 megohm or higher input impedance and 3 1/2 digit resolution or better is needed for this adjustment.

Set each adjustment for +75V DC within 0.1V of equal voltages for the two test points of each channel. Allow at least 20-30 minutes warmup stabilization for best results, plus 10-20 hours "burn-in" for the new tubes.

The sonic or measured degradation is minimal with up to 2 volts of DC unbalance, but it is best to set the balance with 0.1V to allow for tube aging.

	<u>TUBE</u>	<u>TEST POINT</u>	<u>ADJUSTMENT</u>	<u>SET TO</u>
Channel 1	V2	TP1 TP3	RV1 RV3	+75V DC) +75V DC) 0.1V Matched
Channel 2	V3	TP2 TP4	RV2 RV4	+75V DC) +75V DC) 0.1V Matched

If proper voltages cannot be achieved, replace the tube indicated above.

3. AC BALANCE

Normally the AC balance does not require readjustment. If tubes are changed, however, you may want to recheck its setting. This adjustment should not be attempted unless low distortion measuring equipment is available.

First, make sure the output tubes are properly biased and that the DC balances are correct.

Using the plastic alignment tool provided, set RV5 and RV6 for minimum second harmonic distortion at 10 watts of 1kHz output into a 16 ohm load, typically less than .005%. As an approximation, the adjustments can be made for minimum 1kHz total harmonic distortion and noise, typically less than .02%.

A properly adjusted unit will achieve AC balance at about midrotation $\pm 30^\circ$ of RV5 and RV6. If lowest distortion requires adjusting beyond this range, it may indicate a weak or unbalanced tube at V2 or V3 or possibly other tubes.