D79B ADJUSTMENT PROCEDURE AND DISCUSSION

The D79B utilizes very high quality, commercial grade components and this, together with conservative operation of all components and tubes, should provide long service life.

After long service, or after vacuum tube failure and replacement, or in a location with consistently low line voltage, it may be desirable to readjust the amplifier for optimum performance.

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. Refer all internal adjustments to a qualified individual.

There are three parameters which may be adjusted (in the following sequence) in the D79B. The DC and AC balance adjustments are internal, requiring removal of the rear cover.

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

1. OUTPUT TUBE IDLE CURRENT ("BIAS")

The output stages of the D79B are partially cathode coupled "push-pull parallel Class AB_1," 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 55mA cathode current per tube with a stable power line of 120 Volts. Under these conditions the tubes are dissipating approximately 33 Watts of their 48 Watt rating (42 Watt plate, 6 Watt screen). This point of operation provides "enriched" Class AB_1, and will satisfy most critical listeners.

Make sure adequate ventilation is provided to prolong tube life.

1A. "BIAS" ADJUSTMENT PROCEDURE

For best results operate and adjust the D79B at 120VAC line voltage, or at the line voltage that is typical in the final installation. Adjustments should be made under zero-signal conditions after at least 15-20 minutes of uninterrupted stabilization time. There may be a slight interaction between the 4 output tube bias adjustments, so recheck the first tube current after adjusting the other three.

Select the desired tubes (V15, V16, V17, V18) with the Bias/Operate switches and adjust at the corresponding control at the lower edge of the front panel for identical readings between the 2 tubes on each channel, within about 1/16" of meter deflection. Use the plastic alignment tool supplied with the D79B. Each reading should be within ±1/4" of the top of the green band on the meter scales. This adjustment usually corresponds to lowest 1kHz total distortion (typically less than 0.1% at 75 Watts) into 16 ohms. It may be trimmed for lowest measured distortion after completing the DC and AC balance adjustments. If identical cathode currents or low distortion cannot be achieved, change to a new matched pair of output tubes (matched within 5%).

CAUTION: Always return the "Bias/Operate" switches to "Operate" after completing the adjustments, before applying input signals to the unit. This will minimize meter "pinning" during large signal operation.

2. DC BALANCE

Because of the nature of the push-pull, direct-coupled input circuit the bias of the driver stage following is determined by the DC balance of the input stage. Best sonic operation occurs when these DC input plate voltages are the same within 0.1Volt DC or better. The actual voltage is not critical at about 108 to 112VDC. It is the balance that is important within each channel.

The balance adjustments are located on the rear vertical circuit board as follows, viewed from the rear of the unit:

V6 6FQ7	R18	R17	V2 E83CC	V1 E83CC	R18	R17	V5 6FQ7
(AC) RV8						(AC) RV7	
(DC) RV4						(DC) RV3	
(DC) RV6						(DC) RV5	
Channel 2 (right)						Channel 1 (left)	

Channel 1 DC Adjustment RV3 (upper) affects the voltage on R18, and
RV5 (lower) affects the voltage on R17.

Channel 2 DC Adjustment RV4 (upper) affects the voltage on R18, and
RV6 (lower) affects the voltage on R17

2A. DC BALANCE ADJUSTMENT PROCEDURE

A battery-operated digital voltmeter having a 10 megohm or higher input impedance and 3½ digit resolution or better is best for these adjustments.

Allow at least one hour of uninterrupted stabilization time before final adjustment.

Using the plastic alignment tool supplied with the unit:
Adjust RV3 for about 110VDC to ground on top of R18 (Channel 1).
Adjust RV5 for about 110VDC to ground on top of R17 (Channel 1).

There is some interaction between these adjustments because of the nature of the circuit. Make final trim adjustment for as close as possible to 0 VDC difference between the voltages at the top of R18 and R17, with the DVM connected between these points.

Repeat the above for Channel 2 using RV4 and RV6.

It is not required that the left channel voltages be exactly equal to the right channel voltages. It is important that each channel's two voltages match and that they are nominally 108-112VDC. If balance cannot be achieved, replace V1 or V2 and allow at least one hour for restabilization.

For optimum performance it may be necessary to trim this adjustment after several hundred hours of operation.

3. AC BALANCE

Normally the AC balance does not require readjustment unless the output or driver tubes are changed. This adjustment should not be attempted unless the previous adjustments are checked first.

Using the plastic alignment tool supplied with the unit, adjust RV8 and RV7 for minimum 2nd harmonic distortion at about 1 Watt, 1kHz output into a 16 ohm load, typically less than .002%. As an approximation, the adjustments can be made for minimum 1kHz total harmonic distortion and noise, typically less than .02%.

OPERATING INSTRUCTIONS

1. As the amplifier is "warming up" (you have already determined that the AC line voltage is within the green arc operating range), switch the "bias operate" switches to each of the output tubes and notice the meter deflection. In approixmately 15 minutes the output tubes (V15, 17, V18, 16) should be stabilized and the meters should read approximately at the junction of the red and green arcs.

This point (the red and green junction) has been calibrated to indicate when the "cathode" currents of V15, 17, 16, 18 are at approximately 65 ma. This is the "nominal" minimum distortion operating point for an average matched pair of 6550 tubes in this circuit.

Operating the tubes at up to $\pm$1/4" of this calibration point will not appreciably effect either tube life or performance, so these bias adjustments do not require constant "fiddling" to achieve satisfactory operation.

2. Once the unit has "warmed up" to a stabilized operation condition the bias/operate switches should be returned to the "operate" positions.

CAUTION: Never operate the amplifier except with the "bias/operate" switches in the "operate" position.

3. At this point the amplifier is ready for use (and you have previously fully connected it into the system).

Play a record. Turn the preamplifier volume control to 12 to 1 o'clock, a good setting for your normal listening habit (the input level controls on the amplifier are fully counter-clockwise at this point), and advance the amplifier input level controls until you have achieved your normal listening level.

Enjoy!

ADJUSTMENT PROCEDURE AND DISCUSSION

The D79C utilizes very high quality, commercial grade components and this, together with conservative operation of all components and tubes, should provide long service life.

After long service, or after vacuum tube failure and replacement, or in a location with consistently low line voltage, it may be desirable to readjust the amplifier for optimum performance.

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. Refer all internal adjustments to a qualified individual.

There are three (3) parameters which may be adjusted (in the following sequence) in the D79C. The DC and AC balance adjustments are internal, requiring removel of the rear cover.

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

1. OUTPUT TUBE IDLE CURRENT ("BIAS")

The output stages of the D79C are partially cathode coupled "push-pull parallel Class AB_1," 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 cathode current per tube with a stable power line of 120 Volts. This point of operation provides "enriched" Class AB_1, and will satisfy most critical listeners.

Make sure adequate ventilation is provided to prolong tube life.

1A. "BIAS" ADJUSTMENT PROCEDURE

For best results operate and adjust the D79C at 120VAC line voltage, or at the line voltage that is typical in the final installation. Adjustments should be made under zero-signal conditions after at least 15-20 minutes of uninterrupted stabilization time. There may be a slight interaction between the 4 output tube bias adjustments, so recheck the first tube current after adjusting the other three, etc., until you are certain that all are correct and stabilized.
Select the desired tubes (V15, V16, V17, V18) with the Bias/Operate switches and adjust at the corresponding control at the lower edge of the front panel for identical readings between the 2 tubes on each channel, within about 1/16" of meter deflection. Use the plastic alignment tool supplied with the D79C. Each reading should be within $\pm$1/4" of the top of the green band on the meter scales. This adjustment usually corresponds to lowest 1kHz total distortion (typically less than 0.1% at 75 Watts) into 16 ohms. If identical cathode currents or low distortion cannot be achieved, change to a new matched pair of output tubes (matched within 5%).

CAUTION: Always return the "Bias/Operate" switches to "Operate" after completing the adjustments, before applying input signals to the unit. This will minimize meter "pinning" during large signal operation.

2. DC BALANCE AND ADJUSTMENT PROCEDURE

Because the direct and cross-coupled circuit is "servo" controlled, it is not normally necessary to readjust these parameters, even when changing tubes. Of course, a component failure within the servo circuit itself will cause readjustment to be required.

A batter-operated digital voltmeter having a 10 megohm or higher input impedance and 3½ digit resolution or better is best for these adjustments.

Allow at least one hour of uninterrupted stabilization time before final adjustment.

Check for a nominal +110 Volts at Pins 1 and 6 of V3 and V4 to the circuit "common." The actual voltage is not critical within the range of +105 to +115. The balance is critical. This is, if pin 1 has 106.7, for example, then pin 6 should also have 106.7. It is not necessary that the other channel have the same voltage, only that each channel balance is precise.

Adjustment of the individual servos is accomplished by the following:

V3	Test Point 1	RV3
V3	Test Point 3	RV5
V4	Test Point 2	RV4
V4	Test Point 4	RV6

These adjustments are very sensitive and require only the smallest of control movement.

3. AC BALANCE

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

First, determine that the output tubes are properly biased, and that the DC servoed voltages on the input circuit are correct as outlined in Step 2.

Using the plastic alignment tool supplied with the unit, adjust RV8 and RV7 for minimum 2nd harmonic distortion at about 1 Watt, 1kHz output into a 16 ohm load, typically less than .002%. As an approximation, the adjustments can be made for mimimum 1kHz total harmonic distortion and noise, typically less than .02%.