A. Setting bias

Always set the bias

- after replacing any output or driver transistor.
- after replacing any diode or resistor in the driver/output circuitry.
- if the amplifier seems to run too hot at idle.
- if the amplifier exhibits crossover distortion.

The bias network sets the quiescent base current in the NPN and PNP driver transistors, which in turn sets the quiescent current in the output transistors. The driver transistors should both be slightly "on" at idle so that the transitions of the signal voltage between positive and negative are smooth and free of gaps or glitches. Too much bias current will cause the amplifier to run hotter than it should, especially at idle, while too little will cause noticeable crossover distortion, especially at low signal levels.

The amplifier circuitry must be cool, or at least within a couple degrees of ambient air temperature, and the top cover must be removed. If the driver and output transistors are significantly warmer than the ambient air, leave the amplifier off and let it cool before proceeding.

Before turning the amplifier on to set bias on one or both channels, familiarize yourself with the locations of the trimpots (R131 and R231 for 2RU models; R171 for 3RU models) and the voltage measuring points so you can work quickly but thoroughly. If the amplifier warms up before you finish setting the bias, you will need to shut the amplifier off and let it cool down before you resume.

To set bias on the RMX4050HD and RMX5050, first remove the screws holding the channel module/heatsink assembly to the chassis. Lift the assembly up from the chassis standoffs and set it down inside the chassis resting on the heat sinks. Do not disconnect any wires. This gives you equal access to both channels' adjustments and measurement points.

Tools and resources you will need:

- all flat screwdriver (non-conductive) for adjusting trimpots
- DC voltmeter
- AC power

Procedure

1. Turn the amplifier's gain controls all the way down. No test signal is needed.
2. Plug the amplifier into an appropriate AC source. Turn the amplifier on.
3. Channel 1: Locate resistor R146 and trimpot R131 (except RMX4050HD & RMX5050: resistor R199 & trimpot R171 on the upper module). While measuring the DC voltage across the resistor, adjust the trimpot listed in Table 1 for 2RU model or Table 2 for 3RU models.
4. Channel 2: Locate resistor R246 and trimpot R231 (except RMX4050HD & RMX5050: resistor R199 & trimpot R171 on the lower module). While measuring the DC voltage across the resistor, adjust the trimpot listed in Table 1 for 2RU model or Table 2 for 3RU models.

After setting the bias, calibrate the positive and negative current limiting; instructions for the procedure follow in below.

B. Setting positive and negative current limits

All models except the RMX4050HD and RMX5050 have adjustable positive and negative current limiting thresholds. Current limiting in the RMX4050HD and RMX5050 is not adjustable.

Tools and resources you will need

- Oscilloscope & Digital multimeter
- 2-ohm resistive load (rated for at least 1200 watts)
- Shorting connector for amplifier output
- Variable AC transformer (e.g., Variac, Powerstat, etc.) rated for 25A (120V) or 12A (230V). Make sure the AC supply is appropriate for the amplifier.
- 1 kHz audio sine wave generator
- Clamp-on digital current meter (e.g., Fluke 30 Clamp Meter)
- Small flat screwdriver (non-conductive) for adjusting trimpots

Procedure

1. Set the audio sine generator to 1 kHz at 1 volt RMS and connect it to Channel 1's input. Connect a 2-ohm load and the oscilloscope probe across Channel 1's output.
2. Turn up Channel 1's gain control partway. On the oscilloscope you should see the amplitude of the sine wave increase accordingly.
3. Turn the gain control back down and apply a short circuit across the output terminals of Channel 1. Clamp a current probe either onto one of the brown wires running to the AC switch or onto the gray output wire from channel 1's module.
4. Turn the gain control all the way up. Adjust trimpots R139 and R140 equally until the current measured falls within the range shown in Table 1.
5. Turn the gain control all the way down and remove the short circuit so the channel drives the 2-ohm load. Turn the gain control back up until the output clips. The voltage at which the signal starts to clip should fall within the range shown in Table 1. If the clipping is asymmetrical, that is, the signal clips on either the positive or negative side first, adjust R139 to make it symmetrical.
6. Turn the gain control down. If the amp has begun to warm up shut it off and let it cool a few minutes before proceeding with Channel 2.
7. Repeat steps 1 through 5 for Channel 2. Use trimpots R239 and R240 to adjust the current limiting in step 4.
8. Turn both channels' gain controls all the way down. Clamp the ammeter onto one of the amp's AC wires and check the amp's idle current. If the amplifier is still at about room temperature, the idle current should match the value shown in Table 1.
9.

Table 1: Bias and current limit adjustments for 2RU RMX models

Calibrations	Adjust	RMX850	RMX1450	RMX1850HD	RMX2450
Channel 1 bias: DC voltage across R146	R131	0.16 V	0.14 V	0.07 V	0.07 V
Channel 2 bias: DC voltage across R246	R231	0.16 V	0.14 V	0.07 V	0.07 V
Output current into shorted load	Channel 1: R139 & R140 Channel 2: R239 & R240	4-4.5 A	4-5 A	7.5-8.5 A	8.5-9 A
AC current when driving shorted load	Channel 1: R139 & R140 Channel 2: R239 & R240	3.75-4.5 A	4.5-5.5 A	4.5-5.5 A	5.5-6.5 A
Clipping voltage into 2 ohms (RMS)	Channel 1: Adjust R139 for symmetry Channel 2: Adjust R239 for symmetry	26-29 V	33.5-37.5 V	42-44 V	44-49 V
Clipping voltage into 2 ohms (peak)	Channel 1: Adjust R139 for symmetry Channel 2: Adjust R239 for symmetry	36.8-41 V	47.4-53 V	59.3-62.2 V	62.2-69.3 V
Idle AC demand* (at ambient temperature; higher when hot)		0.4 A +/-10%	0.4 A +/-10%	0.6 A +/-10%	0.6 A +/-10%

**Figures shown are for 120V amplifiers; multiply current by 0.5 for 230V or 1.2 for 100V.*

Table 2: Bias and current limit adjustments for 3RU RMX models

Calibrations	Adjust	RMX4050HD	RMX5050
Channel 1 bias: DC voltage across R199 of upper module	R171 of upper module	97 mV	90 mV
Channel 2 bias: DC voltage across R199 of lower module	R171 of lower module	97 mV	90 mV
Output current into shorted load per channel	Fixed; not adjustable	4.6-5 A	4-5 A
AC current when driving shorted load per channel	Fixed; not adjustable	3-3.3 A	3-3.5 A
Clipping voltage into 2 ohms (RMS)		57-63 V	63-71 V
Clipping voltage into 2 ohms (peak)		80-89 V	89-100 V
Idle AC demand* (at ambient temperature; higher when hot)		0.6 A +/-10%	0.6 A +/-10%

**Figures shown are for 120V amplifiers; multiply current by 0.5 for 230V or 1.2 for 100V.*

Contact information

If you need any further information regarding this service procedure, please contact QSC Technical Services at the addresses or numbers below.

Telephone: 1-800-772-2834 (within USA only)
+1 (714) 957-7150

Fax: +1 714-754-6173

Skype: qscaudio

E-mail: tech_support@qscaudio.com

Web Site: www.qscaudio.com (product info/support)
www.qscparts.com (on-line accessory and replacement component sales)

Postal and parcel address: **QSC Audio Products, LLC.**
Technical Services Group
1665 MacArthur Blvd.
Costa Mesa, CA 92626 USA