



a negative clipping adjustment and a positive trim corresponds to a positive clipping adjustment.

7. Remove the short from the channel.
8. Observe even clipping on both channels. If an unbalanced adjustment is made, uneven clipping will be observed. Repeat step 6 to achieve the proper current limit setting.
9. Repeat this current limit procedure on the next channel for the amplifier under calibration.

E.) Frequency Response

1. Select an 8 ohm load on channel 1 & channel 2.
2. Note the output level -10dB below full power.
3. Note the exact 2KHz level and compare it to the 20Hz and 20KHz output (20Hz - 20KHz , +/- 0.15dB). The output level should not be above or below the 0.15dB margin at these frequencies.

F.) Thermal Response

1. Set the oscillator frequency to 2KHz and apply a short to the output of both channels and block the fan intake. The AC line current draw should be 4.5 - 5.5 amps a.c. initially and increases to about 7.0 - 7.5A at thermal shutdown (one channel will normally shutdown earlier than the other).

Do not allow the test to continue if the AC current rises above 9A. See the Troubleshooting, Protection / Limiting Circuit Problems section in this manual if this happens.

2. When thermal shutdown occurs, wait a couple of minutes and verify an AC idle current of 1.0 - 1.5A ac. Recheck the bias setting if the current is excessive. Remove blockage from fan intake.
3. Allow the amplifier to cool and recover from the thermal cycle. The amplifier must be able to recover into a 2 ohm load. Return the output load to 8 ohms.

G.) Output Noise

1. Set the amplifier gain control to 0dB, with a 2kHz 1.00Vrms input signal. Note the output level.
2. With the input signal level off, measure the residual noise level. The signal level must be less than 100dB down from the full output noted. This is a wideband measurement (no filtering).

H.) General Inspection

This completes the electronic test procedure. Inspect the amplifier for mechanical defects. Inspect the solder connections. Reassemble the amplifier and verify the amplifier's operation before returning the product to service.

MPX Series

Troubleshooting

Please refer to the MPX schematics for the component identification numbers in this troubleshooting guide. This section can be used in principal to troubleshoot all models in the MPX amplifier line. Notice that reference is primarily given to channel 1. For channel two, cross-reference parts as necessary by using the schematics and the physical layout of the board.

**WARNING**

There are no user serviceable components inside this product. Opening this product or attempting servicing may expose the user to electrical shock. Refer servicing to qualified service personnel.

LEDs Not Lighting (Front Panel):

When the lights are out on a channel, this could mean that an internal fuse is blown within the amplifier. Replace this fuse with the appropriate fuse only. Be sure the AC cord is unplugged from the wall!

When a fuse is blown, then this may be an indication that excessive current draw is the real problem within the channel. The fuse blew to protect the amplifier from further damage.

After the fuse is replaced, be sure to use a variac to power the amplifier up slowly. Otherwise, the fuse may just blow again. See below for troubleshooting AC power supply problems.

AC Power Supply Problems:

The problems that develop from power supply related problems can be best observed in terms of their failure classifications. They are as follows:

❑ Shorted Fault Condition

1. *High Current Draw.* The amplifier draws excessive current when a small amount of AC supply voltage is first applied. This symptom means there is a short in the power stages of the circuit. It is possible to lift the fuse for each channel to isolate the problem to one channel. Look for:

- a. A shorted main bridge rectifier(s).
- b. Both supply clamping diodes (D512 & D513 on the MPX300 and MPX600, D907 & D908 on the MPX1200) shorted.
- c. Either polarity of the driver transistors (Q501, Q502 on the MPX300 and MPX600, and Q933, Q934 on the MPX1200) shorted.
- d. Either polarity of the main output power transistors shorted.
- e. A shorted power supply capacitor.

2. *Moderate Current Draw.* Current draw is not as rapid as before. The amplifier draws high current when the AC supply voltage is near 120VAC, but the current increases gradually as the supply voltage is increased. This symptom indicates that the driver/output circuits are turning on because of incorrect biasing. Look for:

- a. A driver (Q501, Q502 on the MPX300 and MPX600, and Q933, Q934 on the MPX1200) or main output power transistor short(s).
- b. A shorted single-supply clamping diode (D512 & D513 on the MPX300 and MPX600, D907 & D908 on the MPX1200).
- c. Open bias diodes (D505 & D506 on the MPX300 and MPX600, D903 & D904 on the MPX1200) or resistive bias components (VR501 & VR601 on the MPX300 and MPX600, and VR901 on the MPX1200).

3. *AC Current Drift.* Indicated as a current drifting problem. Once the amplifier has established operating capability, it gets unreasonably hot. Look for:



- a. Misadjusted bias circuit.
- b. Oscillation causing current drain. This might be caused by a defective feedback component.
- c. One or both of the pull-up resistors (R517 & R518 on the MPX300 and MPX600, R955 & R927 on the MPX1200) is open.

A slow pulsing of 2-5 amp current draw indicates a break in the bias circuit (often an open bias diode or a break in the circuit between the bias diodes).

If the high voltage power supplies are severely unbalanced, the fault may be caused by either an AC feedback defect, or a DC component failure. First, remove the primary audio opamp and remeasure the power supplies. If the supplies are balanced with the opamp removed, the fault is in the feedback loop. Check the following components:

- d. The opamp (U503 on the MPX300 and MPX600, U901 on the MPX1200).
- e. The FET switches (Q503& Q504 on the MPX600, Q901 - Q904 & Q917 - Q920 on the MPX1200).

If the DC supplies remain offset with the opamp removed, inspect the +/-15VDC supplies.

If either of these low voltage power supplies is at, or very near, 0 volts, a 15V zener, regulator, or a 15V filter capacitor, on the op amp rail is shorted.

If both of the +/-15VDC supplies are above 3-4 volts of the opamp rail voltage, check the opamp second stage output voltage and the driver transistor base voltages. For example; if the output of the opamp is +1VDC, or greater, and the base of the driver is between 0 and 0.5VDC, check the components in the bias circuit (or the opposite polarity components if the opamp output voltage is close to -1VDC).

If the +/- high voltage supplies are both near 0 volts, the power supply transformer or its connections may be defective. Inspect the AC voltage at the transformer secondary connections.

If the proper AC voltage is present on the secondary connections (these are given in your power supply wiring diagrams), inspect the supply fuse. If the AC voltage is still not present, the transformer wiring, or a power supply connector may be defective.

❑ Open Fault Condition

1. Uneven voltage rails:

- a. Open emitter resistor (R501& R502 on the MPX300 and MPX600, R937 & R938 on the MPX1200).
- b. Open FET Switches (Q503& Q504 on the MPX600, Q901 - Q904 & Q917 - Q920 on the MPX1200).

2. Low power supply voltages:

- a. Open bridge rectifier (BR501, BR601).
- b. Open filter capacitors (C511, C512, C611, C612).

Signal Amplification Problems:

❑ Unstable Output Power

Do not confuse instability with 120Hz (100Hz for exports) noise in the signal, which evenly spreads the trace vertically. To find this signal, sync the oscilloscope to the AC line and reduce the scope sweep rate to 10mS range, to look for 60 -120Hz (50 - 100Hz) hum

frequencies. Distinguish between instability, "ringing" which is momentary instability after a transition, "step" distortion, and crossover distortion (both often show ringing).

- a. Check feedback components located at the second stage of your op amp.
- b. Verify ground *continuity* between input audio ground, power ground and chassis ground.

☐ High Frequency Oscillation

If the amplifier exhibits a severe oscillation, this is often affected by a change in the output impedance. If this is the case:

- a. Check capacitors (C518, C519, C520, C523 on the MPX300 and MPX600, C914, C915, C916, C951, on the MPX1200).
- b. Substitute the IC and check the IC socket for contamination (U503 on the MPX300 and MPX600, U901 on the MPX1200).

☐ Excessive Crossover Spike, or Oscillation at Zero Crossing

If the distortion is present with no output no-load, verify that the feedback components are good. Also, look for:

- a. Shorted bias diodes (D505 & D506 on the MPX300 and MPX600, D903 & D904 on the MPX1200).
- b. A defective trimpot (VR501 & VR601 on the MPX300 and MPX600, VR901 on the MPX1200).
- c. Open pull-up resistors (R517 & R518 on the MPX300 and MPX600, R927 & R955 on the MPX1200) on the output devices .

☐ Lack of Power

- a. Short circuit current limits (VR502, VR503 & VR602, VR603 on the MPX300 and MPX600, and VR902 & VR903 on the MPX1200) that are set too low.
- b. Several open output transistors (Base-Emitter or Emitter-Collector).
(NOTE: Check the driver transistor gain). To test for this, check the voltage dropped across the output transistor emitter resistors with an input signal and an output load. Any resistor that has a significantly different voltage drop indicates a defect in the associated output transistor or the emitter resistor.
- c. Fets, or the associated drive SMT boards are not biasing.

☐ No Signal Throughput

- a. A defective op amp. It is not practical to test the IC, but it is possible to check for signal presence at the input and output terminals of the IC.
- b. A damaged or defective resistor network at the first stage differential op amp circuit.
- c. A defective input connector or input wiring multi-conductor cable.
- d. Muting / relay circuit is not disengaging.