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OPERATING INSTRUCTIONS: QSC Power Amplifier 8.0

778

This amplifier delivers 300 watts per channel of low distortion audio power. Intended for professional applications, many features have been incorporated to improve your control. To ensure clean, reliable operation and to get the most out of the numerous features, we suggest that you read the following instructions before operating the amp.

SPEAKER HOOK UPS AND OUTPUT POWER

This amp is rated to drive loads of four ohms or higher per channel. Please refer to the following table to determine what speakers and power levels may be used, assuming standard parallel connections. The table is per channel:

Total load	16 ohms	8 ohms	4 ohms	2 ohms- AVOID
Power delivered	90 watts	175 watts	300 watts	OVERLOADED
Speakers (cab- inets*)	1/16 ohm	2/16 ohm	4/16 ohm	8/16 ohm
		1/8 ohm	2/8 ohm	4/8 ohm
			1/4 ohm	2/4 ohm

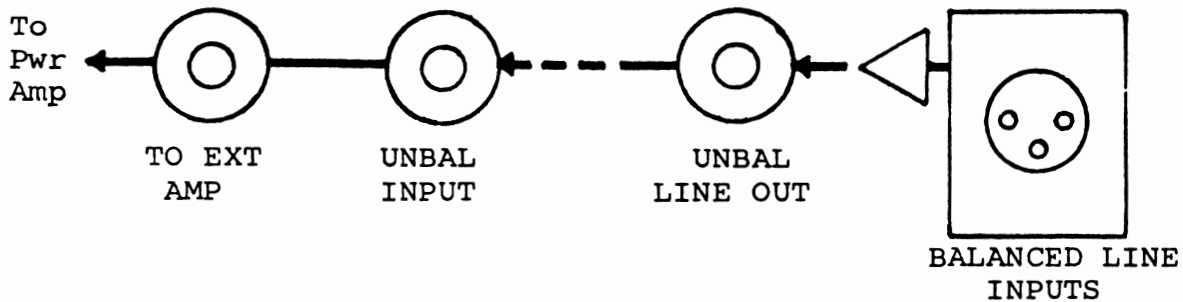
\*When total cabinet impedance is the given value.

While the two channels can be used completely independently of each other, you will achieve the most efficient loading when multiple speakers are split evenly between the channels. For recommendations in special case operation see the sections headed BI-AMPING and MONO OPERATION.

CAUTION: Never connect both channels to the same speaker (except in bridged-mono operation), as they will "fight" each other and possibly damage the amp. See MONO OPERATION.

INPUT SIGNALS AND HOOK-UPS

Each channel accepts balanced and unbalanced inputs as shown below. The arrows indicate signal flow for each jack.



1/4" JACK.  
Same signal as  
UNBAL INPUT.  
Used to connect  
additional amps.

1/4" JACK.  
Accepts unbalanced  
input signal, or  
return signal from  
UNBAL LINE OUT. If  
not used, BALANCED  
LINE INPUT flows  
through.

1/4" JACK.  
Used to patch  
to external  
effects or  
electronic  
crossover.

XLR CONNECTOR.  
Accepts 3-pin balanced  
or unbalanced inputs.  
Signal flows through the  
active converter, and  
feeds UNBAL LINE OUT.  
Unity gain, +20dB max.

QSC conforms to the practice of providing low impedance outputs and high impedance inputs for best results under all conditions. Low impedance outputs are necessary to avoid cable losses, and high impedance inputs are desirable to avoid signal loading losses. Balanced lines incorporate an extra wire to cancel long-distance cable hum, and should be used where equipment is plugged into different AC outlets.

Note that, in effect, the Balanced-to-Unbalanced circuit can be used separately from the amplifier, and may be patched as desired.

### GAIN CONTROL

The Gain determines how much signal it takes for full power output. Calibrations are shown as input volts required, and dB of voltage gain, at each setting. The Gain control should normally be all the way up, except for certain cases:

1. MATCHING SENSITIVITY TO OTHER POWER AMPS. Input levels may be reduced slightly to match with lower gain amps. A gain of 26 dB is a fairly common value.
2. COMPENSATING FOR SPEAKERS OR PLACEMENTS. Give the speaker needing the most power maximum Gain, and reduce the Gain to the other units. Remember, every 3 dB increase in Gain will double the power level.
3. STANDBY OPERATION. To eliminate unwanted noise, especially when powering up or shutting down the system, reduce the Gain to minimum.
4. FOR BI-AMPING. Please see that section.

### LEVEL READOUT

The three-tier Level display is calibrated in watts, at 4 ohms, (white) and dB below clipping (ochre). To estimate power at impedances other than 4 ohms, refer to chart earlier to ascertain maximum power and the use the dB scale to correlate the lower level powers. \*

## TDI READOUT

The True Distortion Indicator monitors actual distortion in the signal, rather than indicating when the amp "should" be distorting. It will begin to trigger any time the amp exceeds .1% distortion. Slight flashes will be hard to hear; prolonged or bright display indicates audible distortion.

CAUTION: If the TDI triggers before the Level display reaches full power, you may have a shorted speaker wire, too low of a speaker impedance (too many speakers), or problems in the amplifier. See AMPLIFIER AND SPEAKER PROTECTION.

## POWERLIMIT

The PowerLimit circuit monitors the speaker power, and can be pre-set to limit the power to desired values. Control settings are shown in watts at 4 ohms (white) and dB below clipping (ochre). As with the Level Indicators discussed earlier, wattage correlations to different impedances can be made.

1. TO ELIMINATE DISTORTION. Increase the PowerLimit setting until peaks no longer flash the TDI lamp. The PowerLimit lamp should now be flashing on the peaks, showing operation of the circuit. If operated into 4 ohms, this will occur on about the 300watt/0dB power level and the amp will be delivering its full rated-power without clipping.
2. TO PROTECT DRIVERS. If using a 4 ohm load, set the control for the total desired power. If using an 8 ohm load, you will get about half the power indicated on the control, so double the setting.
3. TO PROTECT EARS. If you are required to observe loudness limits, you may increase the PowerLimit setting until peak levels are held down to the desired maximum. Since softer levels are not affected by the PowerLimit, your sound will be compressed into a more limited range of volume, which may be better suited to "background" sound sources.

If you feel that the PowerLimit is "holding back" too much on the peaks, experiment with decreasing (higher numbers) the PowerLimit, decreasing (lower numbers) the Gain so you don't peak so much, or doubling the power handling components to permit desired levels without limiting (and clipping). Note- if you drive the PowerLimit heavily into compression, you may observe a certain amount of "fluttering" during transients, as well as possible distortion from preceding units.

## FAN COOLING

The built-in fan assures adequate cooling under most conditions. Be sure the vents are not blocked, and prevent heat build-up around the amp, especially in racks. To periodically remove dust: unplug the AC cord, remove the top cover, and blow or brush away any dust build-up. The electronic components are not in the air stream and will not be subject to dirt build up.

## AMPLIFIER AND SPEAKER PROTECTION

A number of protective circuits are included as insurance against expensive troubles. All inputs and outputs are protected against short circuits, over-driving, and open circuit conditions; the speakers are also protected from amplifier faults.

1. **SHORT CIRCUITS.** The amplifier current limit is set high enough to fully drive four ohm speakers, with moderate amounts of current fold-back to reduce the stress during short circuit. Open circuit operation presents no problems.
2. **SOFT-FAIL.** Ordinarily, when a power transistor shorts out, the entire amp either shuts down (if its fully protected) or the entire amp is ruined, and speakers may be damaged. In both cases, it is certain that the performance will be stopped. In order to provide continued operation, QSC fuses each transistor, so if one fails, the amp can still "limp along". Loss of power and TDI display will result. By advancing the PowerLimit control until the TDI is reduced, blowing out the remaining power transistors can be avoided.
3. **OVERHEATING.** Each channel has a separate thermal cut-out which lifts the load during overheating. You will observe loss of Level Readout until the thermostat resets. Check for adequate ventilation, speaker shorts, blocked fan, etc.
4. **SPEAKER FUSES.** The PowerLimit circuit is the primary protection against driver burnout, but a properly selected speaker fuse will give back-up protection, even against amplifier faults. The amp is shipped with full-power fuses (15A). You should consult the manufacturers of your drivers for proper fuse values. QSC provides the following estimated ratings, but we do not assume any liability if your drivers fail anyway. All values are per 8 ohm driver.

DRIVER POWER	FUSE VALUE (fast-blow)
10 watts	1
30 watts	1.5
50	2
100	3
200	4

If the fuse blows, there will be no Level readout. Carry lots of spares. If the fuse blows repeatedly without driver damage, you may wish to experiment with the next higher value.

## BI-AMPING

Most of the features on the A 8.0 are especially useful for bi-amping. The calibrated Gain controls make it easy to balance the high and low sensitivities; the PowerLimit and speaker fuses protect delicate high frequency drivers. A rear mounted crossover module is available. It feeds the highs to Channel 1 and the lows to Channel 2. The crossover frequency is adjustable from 400 Hz. to 2400 Hz. A separate page is included with this device.

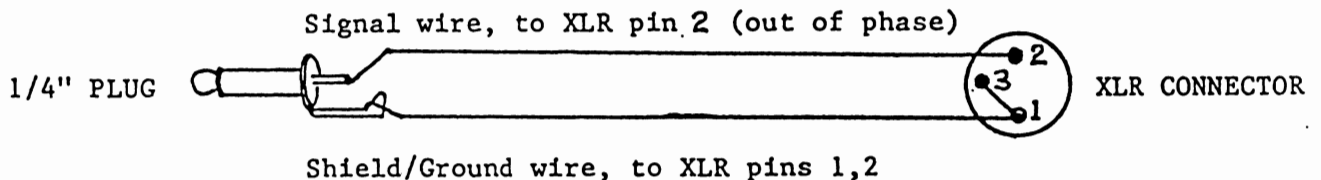
## MONO OPERATION

Even if you have no use for stereo reproduction, you will find several advantages in having two channels for mono operation. The easiest way to run such set-ups is to patch from the EXT. AMP jack of channel 1 to the UNBAL. INPUT of channel 2. Assuming that you have an even number of speakers, divide them equally between the two channels. DO NOT plug channel 1 and 2 SPKR. OUTS into the same speaker box, as they will "fight" each other, distort, and possibly damage the amp. If you have only one speaker, you will have to use just one of the channels. Observe the usual 4-ohm minimum impedance per channel. Set both Gain controls to the same levels, unless you want to run some of the speakers at different levels for better coverage.

## BRIDGED MONO OPERATION

For special situations requiring 600 watts into a single 8 ohm load, or 350 watts into a single 16 ohm load, it is possible to "strap" both channels in series. In this mode, the A 8.0 will drive a 70 volt balanced line for distributed sound systems. The idea is based on reversing the phase of one channel, so that both channels operate in "push-pull". When a single load is connected between both channels, it tricks the amp into seeing a single 8 ohm load as two 4 ohm loads, and thus it delivers the full 600 watts.

HOOK-UP: Connect input signal to channel 1 as usual. Construct a special patch cord for channel 2, as shown below.



Connect the 1/4" plug to channel 1 EXT. AMP jack, and connect the XLR plug to channel 2 BALANCED LINE INPUT. The final step is to set all controls, especially the Gain controls, to identical levels on both channels so the load is equally shared. For best matching, put both Gains on maximum. To verify the matching, feed a test tone into channel 1 and briefly test each channel with a speaker to establish the exact same level in each. After this has been verified, the actual 8 to 16 ohm load may be connected. Wire the "hot" lead to the red binding post of channel 1; wire the "ground" lead to the red binding post of channel 2.

CAUTION: Both leads to the speakers are now "hot", so be sure that there are no conflicting grounds at the speaker cabinets or in the cabling. Be especially careful that the load impedance is 8 ohms or higher (NO 2 OR 4 OHM LOADS). If the amp is overloaded or shorted, the protection circuits will not be as effective as usual, and instant damage is possible. Do not plug in speakers with the amp turned on. Make sure no one tampers with your control settings. This hook-up is best used in permanent installations where hook-ups and settings will not be disturbed.