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QSC PL380 PowerLight3 Amplifier

This analog amp offers a powerful 8,000-watt argument as to why QSC is a go-to name in live sound reinforcement.

by **David Rittenhouse**

QSC is a name that has been around for some time now. At one point or another, potentially everyone in the industry has been exposed to at least one or more of the company's products. Now that market penetration continues with the new QSC PowerLight3 series amplifiers — or, as QSC puts it, "the ultimate analog amplifier."

| FEATURES

The PowerLight3 upgrades the PowerLight2 series, adding and refining some appreciated functions. The new PL380 ($3,599) is QSC's flagship model, with an output of 8,000 watts (two channels driven at 2 ohms at 4,000 watts per channel). The PL380 is rated as a Class D switching power supply amp. This amp features QSC's reactive "back EMF," which recycles the unused energy back to the power supply to produce an AC efficiency of up to 85 percent, keeping AC power demand to a minimum.

The PL380's frequency response is rated from 20 Hz to 20 kHz ±0.2 dB. Maximum distortion is rated at 0.20 percent from 4 to 8 ohms, with noise rated at -104 dB. Input sensitivity is adjustable from three settings: 26 dB (5.27V), 32 dB (2.67V), and 1.2V (39.1dB) with input impedance set at >10k ohms. The Damping factor at 8 ohms is rated at 200. All of the standard input and output connectors are on the amp: XLR inputs with Neutrik and 5-way binding post outputs. The front panel of the PL380 is common with most other QSC amps, with attenuation knobs from each channel (the standard LED "Christmas Tree" of signal). The PL380 sits in only two rack spaces, and weighs in at a respectable 24 pounds.

The PL380 also supports remote control through QSC's QSControl BASIS networked audio platform and the DataPort at the rear of the amp. The PL30 is shipped with an 18A/30A Twist-Loc power cable to a Neutrik Power-Con at the amp. All of the common amplifier and load/power protection of short circuit, open circuit, thermal, RF and DC fault is also there, along with on/off muting and active in-rush limiting.

| IN USE

I had the opportunity to use the PL380 for several months. The first thing I did after opening the box was to change out the Twist-Loc power connector to a regular 20A Edison. This way, I could use the amp in any situation that might pop up (and they did pop up more frequently than even I would have wanted).

I found the PL380 very robust in the

FAST FACTS

APPLICATIONS
Live reinforcement, permanent installs

KEY FEATURES
8,000 watts (two channels driven at 2 ohms at 4,000 watts per channel); Class D; QSC reactive "Back EMF"; XLR inputs with Neutrik and 5-way binding post outputs

PRICE
$3,599

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➲ www.qscaudio.com

fact that it was lightweight, yet very powerful. I was able to run it as an extra sub amp, or as an extra amp for additional front fills on multiple shows. I loved the fact that QSC utilized the back panel connections to work with whatever could be thrown at them. Having both binding post and Neutrik outputs and parallel XLR inputs made things easier when adding it in to existing systems, like I did without the need of additional, sometimes flimsy, adapters.

The PL380 sounded great, clean, and quiet (when it needed to be). I used this amp on a large, last-minute Latin concert where I had to add two more EAW SB850 subs per side. The PL380 held up, and even sounded beefier and punchier than what I already had in my racks. With 2,500 watts per channel at 4 ohms, the PL380 exceeded my expectations. It was also good to find out that I could drive this amp hard for hours without it having any problems.

The next time out was on a simple corporate "talking heads" gig. I needed to add some front fills in, as the hotel ballroom was wider than I was expected. I knew I did not need an amp as powerful as the PL380, but it was what I had left in the shop. Needless to say, the PL380 sounded great and powered Community Veris 6s just fine. I even used it to power some EAW JF100s for a lobby plasma screen presentation at a corporate ballroom show, and sent it out once with a DJ and some full-range speakers just to see what it would do. It responded great. Yes, it was some serious overkill, but it proved its versatility. Since then, I have used the PL380 on almost every show as my total utilitarian amp — I'd just grab it and go!

At every show, the PL380 outperformed almost everything else I owned. The sonic quality was fantastic, from subs to high end to full range cabinets, with more power than you would need for anything in almost every arsenal. It ran cool and quiet and never thermaled, never shut down, and never left me hanging.

PRODUCTPOINTS

- Powerful
- Lightweight
- Great utility amp

- No DSP without additional gear

SCORE

Overall, a powerful improvement over the older series.

| SUMMARY

Today, there are more amplifier choices flooding you than you can wrap your head around or even have time to audition. QSC's PL380, however, stands out as a simply great product at a great price, offering the "Swiss Army Knife" of amps.

David Rittenhouse is the senior sales executive and A1 engineer at Event EQ in Baltimore, MD, and a regular contributor to **PAR**.

BENCH TEST
QSC PL380 Power Amplifier

BENCH MEASUREMENT DATA

Maximum Power (1 kHz, 1% THD) (See Notes)

Stereo 8-ohm loads	1.4 kW, 31.5 dBW
Stereo 4-ohm loads	2.3 kW, 33.6 dBW
Stereo 2-ohm loads	3.0 kW, 34.8 dBW
Bridged 4 ohm load	6.0 kW, 37.8 dBW

Dynamic Output Power

Stereo 8 ohm loads	1.8 kW, 32.6 dBW
Stereo 4 ohm loads	3.6 kW, 35.6 dBW
Stereo 2 ohm loads	6.0 kW, 37.8 dBW
Bridged 4 ohm loads	12.0 kW, 40.8 dBW

Dynamic Headroom

Stereo 8 ohm loads	1.1 dB
Stereo 4 ohm loads	1.9 dB
Stereo 4 ohm loads	3.0 dB

THD+N at near rated power (20 Hz - 20 kHz)

Stereo 8 ohm loads
<0.02% @ 1.0 kW, 20 Hz – 2 kHz
< 0.6% @ 1.0 kW, 20 kHz
Stereo 4 ohm loads
<0.05% @ 1.5 kW, 20 Hz – 2 kHz
< 1.0% @ 1.5 kW, 20 kHz

THD+N at 10W output (20 Hz - 20 kHz)

Stereo 8 ohm loads	< 0.08%
Stereo 4 ohm loads	< 0.1%

Damping Factor, 50 Hz re 8 ohm **206**

Output Impedance magnitude at:

50Hz	38.8 milliohm
1 kHz	57.4 milliohm
5 kHz	196.7 milliohm
10 kHz	393.9 milliohm
20 kHz	867.9 milliohm
Input Impedance	14.7 kilohm

Frequency Response, 4-ohm load
20 Hz - 20 kHz +/- 0.0 dB
- 3 dB at < 10 Hz, 58 kHz

Voltage Gain, 8-ohm load, vs. gain setting

26 dB	21.2X, 26.5 dB
32 dB	41.8X, 32.4 dB
1.2V	92.1X, 39.3 dB

Sensitivity for 0 dBW, 8-ohm load

26 dB	133 mv, -15.3 dBu
32 dB	67.7 mv, -21.2 dBu
1.2V	30.7 mv, -28.0 dBu

Sensitivity for rated output, 1.5 kW, 8-ohm

26 dB	5.17 V, 16.5 dBu
32 dB	3.62 V, 13.4 dBu
1.2V	1.12 V, 3.2 dBu

Output noise, 32 dB gain setting, Ch1/Ch2 (essentially gain setting Independent)
Wideband
110/200 mV | -28.2/-23.0 dBW
A - Wtd
816/852 uV | -70.8/-70.4 dBW

Signal to noise ratio re: 1.5 kW into 8 ohm, 32 dB gain setting

A - Wtd	102.4 dB

Channel Separation, 20 Hz - 20 kHz

Ch 1 > 2 , Ch 2 > 1	> 50 dB

Power draw @ idle **153 W, 0.58 PF, 2.2A**

Notes: *Unless otherwise noted or implied, all measurements are made with 8-ohm loads from the balanced XLR inputs, stereo mode with the volume set to maximum and gain set for 32 dB. Both channels driven for all distortion and power measurements. Measurements made on one channel are made on channel two.*

Power output measurements were limited by the regulation and resultant voltage drop under power of my AC supply.

BENCH MEASUREMENT COMMENTARY

The QSC PL380 is one brute of an amplifier! This most powerful of the PL series utilizes both a switchmode power supply and a Class D switching power amplifier circuit. This one definitely exceeded the regulation capacity of my external AC supply fed from a sub-panel outside of my lab. My load resistors could take it for the relatively short time of the distortion vs. power tests.

Class D amplifiers in general have an out of band high frequency response that is a function of load impedance value due to their necessary LC output filters. The PL380 has this relatively controlled. This is shown in **Fig. 1** for frequencies greater than 10 kHz and loads of open circuit, 8, & 4 ohm. Low frequency response was very extended. This is plotted in **Fig. 2** along with the response of the two low-cut filter positions of 30 & 50 Hz.

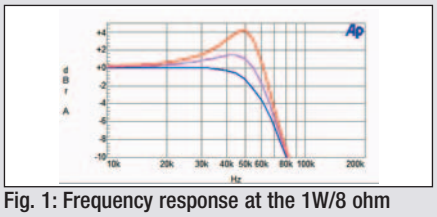

Fig. 1: Frequency response at the 1W/8 ohm level as a function

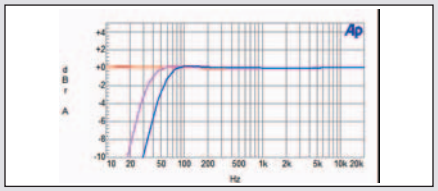

Fig. 2: Frequency response of the Low and High cut filters. Red = Flat, Magenta = 30 Hz low cut, Blue = 50 Hz low cut

THD+N for a 1 kHz test signal and for 8, 4, and 2 ohm loading in the stereo mode are shown in **Fig. 3**. Distortion is reasonably low and noise dominated up to about 10W and then begins to rise with 8-ohm loading. The lower impedance loads cause more distortion above the 10W level which is not surprising. As mentioned above, my AC supply couldn't hold the voltage up enough under this VERY high amperage load to make the rated power at the lower loads. But still, 3 kW per channel ain't bad! No doubt the amp would meet it's ratings with a maintained 120V AC line input.

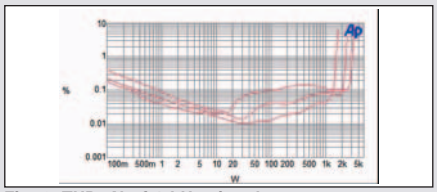

Fig. 3: THD+N of 1 kHz signal vs. power output for 8, 4, & 2 ohm loading, bottom to top at 100W

Plotting THD+N as a function of frequency and power for 4 ohm loading, distortion is low up to about 2 kHz, where it begins to rise and gets to pretty high values above 10 kHz at the 1.5 kW and higher levels. The 1 & 10W levels are noise dominated.

The damping factor vs. frequency shows an unusual, in my experience, increase in DF below about 50 Hz.

In terms of Channel separation, unusual is the more or less flat nature of the separation vs. frequency. Much more usual is a characteristic that rises with frequency due to capacitive coupling in the signal circuitry.

— Bascom King