

ProSeries Subwoofers Application Using Three Subwoofers

One of the increasingly common applications in car audio is the use of three subwoofers in an installation. There are many vehicles that are too narrow to easily fit four subwoofers across the rear deck, but are wide enough to fit two or three subs (more subs are better, right?). The new ProSeries subwoofers are available in two different impedances, and can be installed in threesomes in one of two ways, depending on the amplifier powering them. This tech sheet describes the installation and wiring of three ProSeries subwoofers.

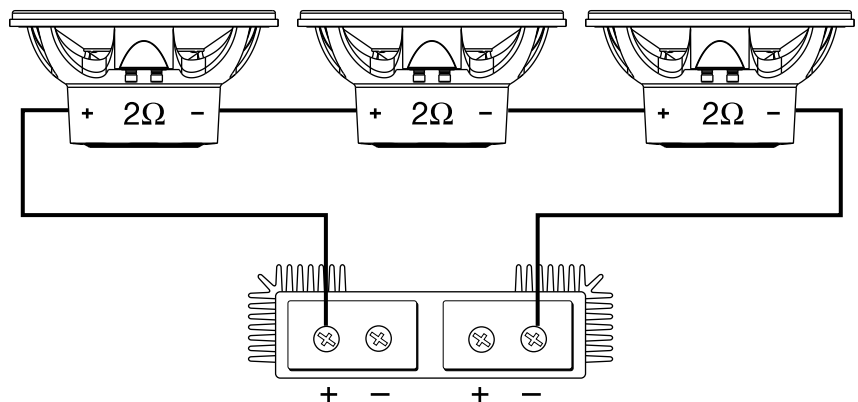
What Amplifier is Powering the Subwoofers?

Once you have decided on using three subwoofers, you must determine what amplifier is being used to power them before picking a subwoofer impedance and a wiring scheme. It's important to know how low an impedance the amplifier is capable of handling. Most amplifier companies publish output power at a variety of impedances. Usually, an amplifier will deliver more power if it is driving a lower impedance load. However, if an amplifier drives too low of an impedance, it may exhibit undesirable traits. It is imperative that the amplifier be used within its safe operating range to keep it from shutting down or becoming unstable. We will explore two typical scenarios to demonstrate the two basic wiring diagrams.

Example One—2-Channel Bridged Amplifier

In this example we have a 2-channel amplifier that is rated at 100 watts per channel into a 4Ω load. It is also rated at 200 watts per channel each channel driven into a 2-ohm load. It is not rated at a 1-ohm load per channel as this amp becomes unstable at this low an impedance. This amplifier is also capable of being operated in bridged-mono mode into a 4Ω load. In this mode, each channel of the amplifier effectively "sees" a 2-ohm load because the two channels share the total speaker load. This load is at the very limit of the safe operating range of this amplifier.

An ideal three-subwoofer system for an amplifier like this is three ProSeries 2-ohm subwoofers wired in series. The total load presented to the amplifier is 6 ohms, and each amplifier channel effectively "sees" a 3-ohm load. The amplifier will deliver much more power this way than at its 4-ohm rating, but will still be capable of safe operation into this load without exhibiting unstable characteristics.



Bridged 2-Channel Amplifier

Total speaker load: 6 ohms
Total load per channel: 3 ohms

Note: Check with the amplifier manufacturer for specific wiring connections for bridged mono mode.

Example Two—Dedicated Mono-block Amplifier

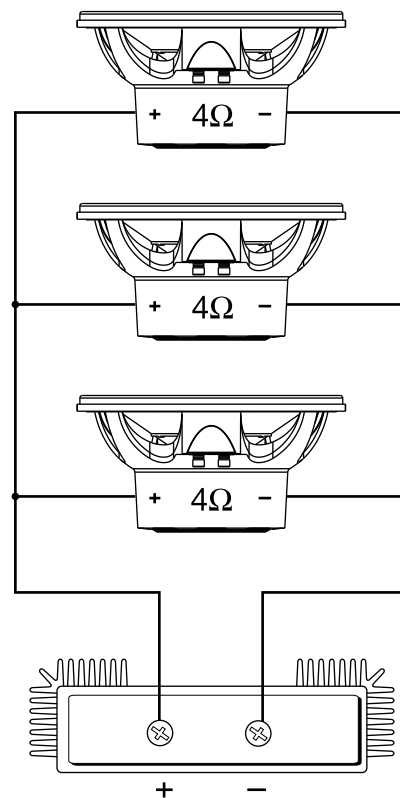
Lately, there are an increasing number of large mono-block amplifiers that are capable of driving very low impedance loads. Many of these are class D amplifiers, and are very stable even at low impedances. In this example, the amplifier is rated at 250 watts into a 4-ohm load, 500 watts into a 2-ohm load, and 1000 watts into a 1-ohm load. It is not rated below a 1-ohm total impedance.

This application calls for three 4-ohm ProSeries subs wired in parallel. The total impedance of the subwoofer load is 1.3 ohms, which is within the safe operating range of this amplifier, and is a load into which the amplifier is capable of delivering a tremendous amount of power.

It is important to verify whether or not your amplifier is capable of driving this low impedance load. While many of the newer class D amps are rated as "1-ohm stable," some mono amplifiers are not capable of driving this load and will be safer if operated at the higher impedance given in example #1. Either way, you must verify the safe operating range of your amplifier before deciding on a wiring scheme.

Wiring Summary

As you can see, the selection of which impedance subwoofers to use, and the choice of a wiring plan for the subwoofers is very dependent on the amplifier used to power them. You must verify the safe operating characteristics of the amplifier first. In general however, two-channel amplifiers that are stable between 2 and 4 ohms per channel will work well when bridged to three ProSeries 2-ohm subwoofers wired in series. Dedicated mono-block amplifiers that are stable at load impedances below 2 ohms will usually work well when powering three ProSeries 4-ohm subwoofers wired in parallel.



Dedicated Mono Amplifier
Total speaker load: 1.3 ohms

Installation Tips

The ProSeries subwoofers are optimized for high performance in very small sealed enclosures. To obtain the levels of performance and output that these subs are capable of, it is important that the enclosures be solidly constructed, and that they are close to our recommendations for sealed internal enclosure volumes which are listed in the chart below. We manufacture all of our subwoofers to exacting tolerances so that all ProSeries subwoofers are precise clones of one another. Because of this all three subwoofers can technically share one large enclosure. However, an enclosure sized to fit all three subwoofers would have relatively large panels and it becomes even more important that the enclosure be very solidly built and braced to avoid enclosure panels from resonating. Often times it is simpler to build a separate chamber for each subwoofer. This way, the dividers between chambers act as braces to strengthen the enclosure.

Specification:	12.5LF (4Ω)	10.5LF (4Ω)	8.5LF (4Ω)
Recommended Enclosure Volume (internal)	1.0ft ³ (28 liters)	0.5ft ³ (14 liters)	0.3ft ³ (8.5 liters)
Recommended Amplifier Power	50–1200 watts	50–1100 watts	50–750 watts
Nominal Size	12-inch (300mm)	10-inch (250mm)	8-inch (200mm)
Mounting Cutout Diameter	11" (280mm)	9 ¹ / ₈ " (232mm)	7 ³ / ₁₆ " (183mm)
Mounting Depth	5 ⁵ / ₈ " (143mm)	4 ³ / ₄ " (121mm)	4 ¹ / ₁₆ " (104mm)

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