



Powered Subwoofers, Down-firing vs. Front-firing comparison

There are many different choices for Powered Home Subwoofers including Down-Firing and Front-Firing that we feature at OSD. Our aim is to provide Subwoofer choices that work in a number of applications. Each subwoofer we offer has been designed and engineered with this primary goal in mind. Our second mandate was to build a subwoofer that was complementary to the many other products we offer both in price and performance, whether for Custom Home Theater, Whole House Distributed Audio or our newest category, Computer Audio Systems.



S10 Down-Firing Subwoofer

Features

- Large Down-Firing 10" reinforced woofer for excellent bass response
- Front-firing tuned 3" port designed for higher sound pressure from a smaller enclosure
- 120 Watts RMS
- Adjustable Gain Control and Variable Crossover Frequency (set between 50Hz and 250Hz)
- Includes switched or auto-sensing turn-on options with Power on LED indicator
- 2-Year Warranty

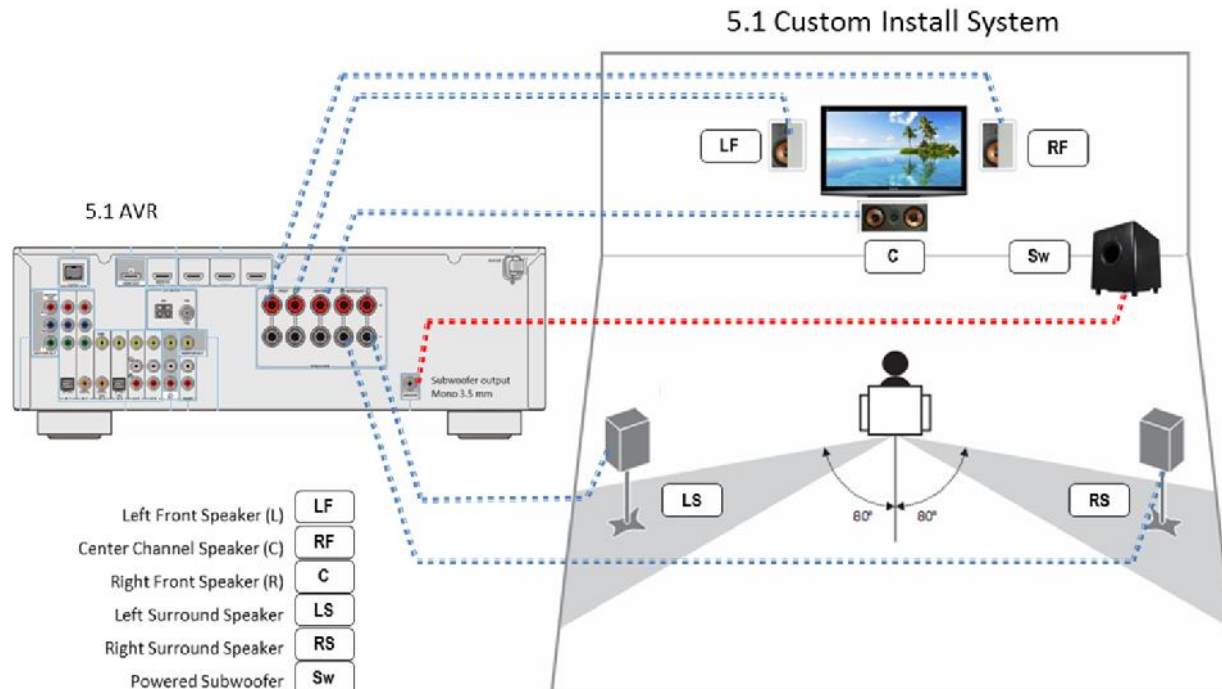




The Subwoofer, the .1 of the 5.1 Home Theater System...

Maximum Flexibility: Ideal for either Home Theater applications or adding to an existing audio system to create a sub-sat system.

Home Theater System: Easily connects to the line level Subwoofer output (variable) or LFE output (fixed) from the Audio/Video Receiver. With its unique down-firing design and front-firing port, the S-10 is an excellent choice for medium size Home Theater systems where space is a premium. In LFE mode, the variable crossover is set to 150Hz.



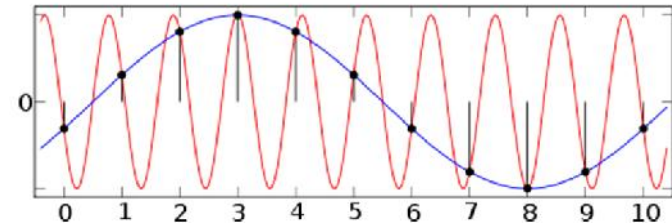
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Speaker placement...

Role Reversal: There's a myth that a subwoofer can be placed anywhere in a room and instantly fill the room with complete sound. It's true that Subwoofers have Omni directional output; however, due to the inherent characteristics of the Low Frequency Sine Wave, there tends to be a number of dead spots. Dead spots are areas where the Subwoofer sounds non-existent. So placement can become critical to optimizing the performance of the Subwoofer. This is simply physics.

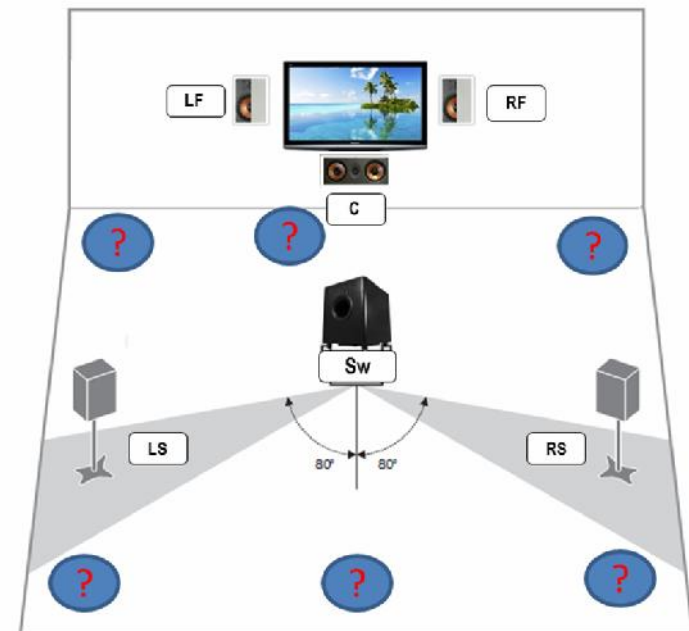
One way to find the optimum location for the Subwoofer is to place the subwoofer where the person will typically be sitting while viewing/listening to the Home Theater or audio system. Then, walk around to a couple of different potential locations for the Subwoofer and compare the sound quality of the Sub at each stop. Once you have determined the location that sounds the best, reverse the location of the sub (i.e., from the listening spot to where the sub will be located fulltime). We recommend that you involve your spouse/partner in this process. Female hearing is better, and your spouse will have an opinion on the subwoofer's final location.

Blue Graph represents typical Low Frequency Sound wave



Finding the best location...

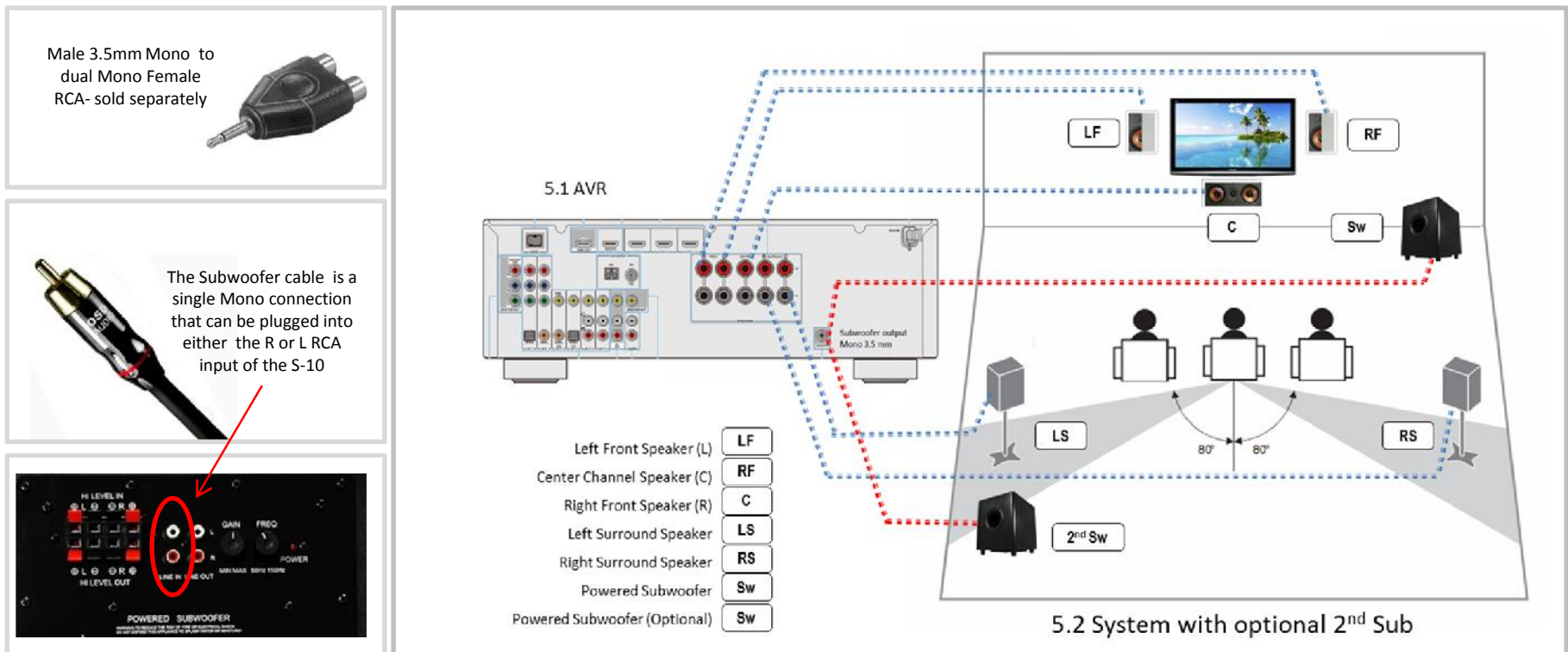
5.1 Custom Install System





The dead spots, there is a solution...

Double your pleasure: There maybe an issue with these dead spots with your home theater setup, especially if you have multiple seating options either side to side, or side to side with front and back. These dead spots may change the listening experience for the different seating positions. The latest solution to this problem involves adding a second subwoofer to fill in the dead spots. Typical 5.1 or 7.1 Audio Video Receivers can split the LFE output with a simple adaptor/splitter. The receiver featured in the diagram utilizes the 3.5mm mono connection. The adaptor creates a dual mono connections allowing Two Powered Subwoofers to be connected. In most cases dual 10 inch woofers work better than a single 12 inch or two 12inch subs would sound better than a single 15 inch because of the sine wave coverage from the two subs. Note, AVR manufacturers are starting to market 7.2 Receivers with Dual LFE outputs.





Down (or Floor) Firing Subwoofers... Bass Reflex type (vented enclosure)

These subwoofers are the most affordable we offer. They feature either a 10" (S10) or 12 inch (S12) driver. The speaker is mounted at the bottom of the cabinet firing down into the floor. This actually fills the room with the consistent amount of bass. They often integrate better with music coming out of the other speakers. This design works best firing into hard wood floors or hard surface. If you have carpets, you may want to cut a piece of wood and place directly under the subwoofer's feet. The bass distribution of this design is typically more equal and precise than front-firing subwoofers. The tuned port allows the cabinet to be a little smaller and utilize less power (thus more affordable) than other designs. We would not recommend it be up against a wall or pushed back into a corner. There is also a separate gain and variable crossover control knob (50Hz to 250Hz) for additional application flexibility.

S10...



Amplifier Plate, Back panel featuring gain and variable frequency controls





Front Firing Subwoofers... Bass Reflex type (vented enclosure)

We also feature two Front Firing Subwoofers. With these we can now offer the perfect compliment to our down firing series subwoofers allowing us to offer a solution to almost any application. The Front firing subs tend to cost more money but also provide a lower frequency range (5 Hz to 180 Hz) than the Down Firing series (50 Hz to 250 Hz). This demands more output power while utilizing upgraded components including a longer throw 10 or 12 inch woofer. We also designed the cabinet to have both a Front Firing woofer and dual front firing ports. This allows the woofer to be built into a custom cabinet if needed. Otherwise the design also allows placement either close to a wall or even tucked back into a corner. We would also recommend using the Front firing subs along with either 6.5 or 8.0' two way satellite speakers versus the down firing which would match better with the 4 or 5.25 inch 2 way speakers.

Dual 2" front firing ports



Includes protective grill





Not all 10" subs are created equal...



Frequency Range... **PS-10: 5 Hz to 180 Hz**

Notice, over sized surround needed for longer cone excursion which produces lower frequencies which needs more power...

4 times more to produce an Octave lower

Example: Frequency Response: 50 Hz, 25 Hz would be an Octave lower so it would take 4 times the power to move the same amount of air at the lower frequency 25 Hz vs. 50 Hz.

PS-10 Down Firing Sub



S10: 50 Hz to 250 Hz



Other factors... Frequency Response

Another thing to consider in making your choice, Picking the best match for the speakers you plan to use with the respective Subwoofer design. The PS Front Firing Subs have a lower rated Frequency Response 5 Hz to 180 Hz and would match better with an 8" or 6.5" speaker that also features a lower response as well. Conversely the Down Firing Subwoofers have a broader/Higher Frequency Response that matches better with the 5.25" and 4" speakers which need more help in the bottom end.



AP840: 8" two way Indoor/Outdoor

Frequency response:
30 Hz to 22Hz

Or...



IW680: 6.5" two way In-Wall

Frequency Response:
38 Hz to 22Hz

With the PS-10

5 Hz to 180 Hz



Front Firing



AP490: 4" two way Indoor/Outdoor

Frequency response:
60 Hz to 22Hz

Or...



IW530: 5.25" two way In-Wall

Frequency Response:
68 Hz to 22Hz

With the S-10

50 Hz to 250Hz



Down Firing

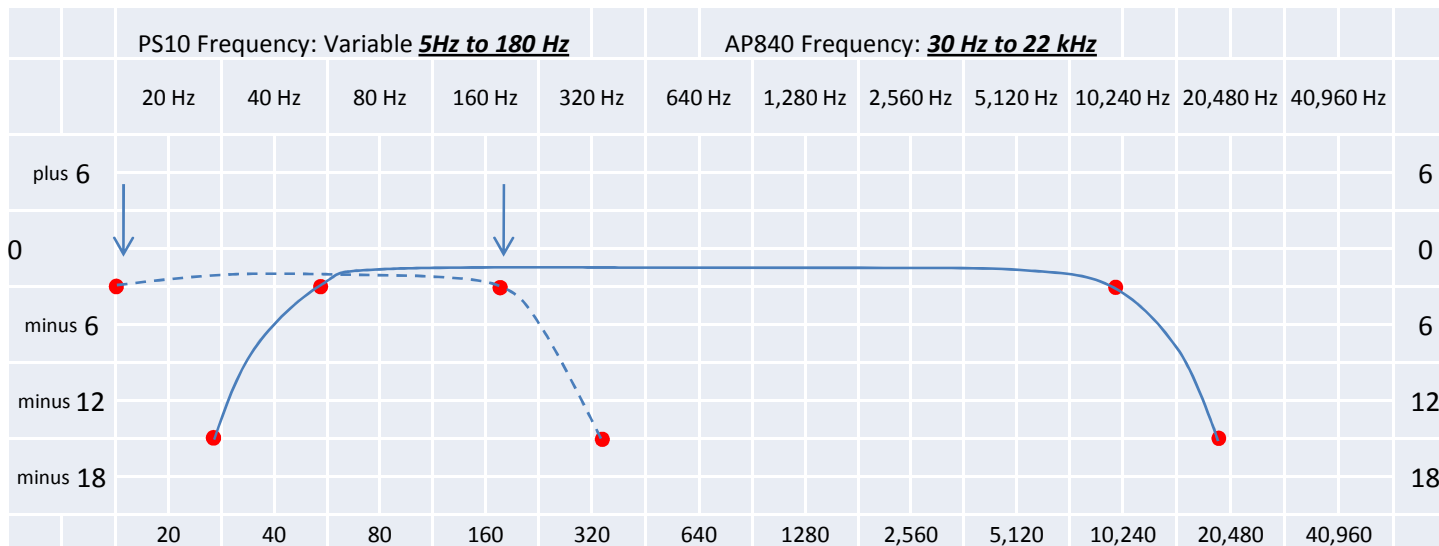


Charting the Frequency Response... Speakers to Subwoofer

PS-10



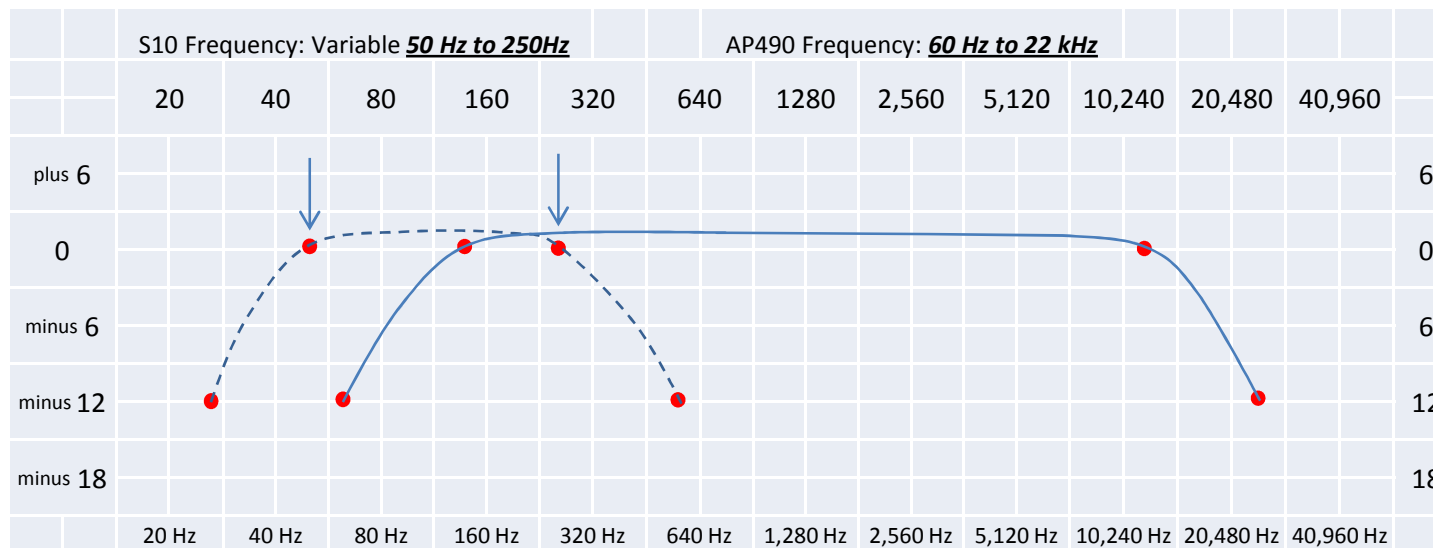
AP840



S-10



AP490





Utilizing CAE technology for both our Electronic and Speaker designs...

Computer Aided Engineering has greatly reduced both development and overall cost as well as shortened the timeline to market...

CAE (Computer Aided Engineering)

The competitive market of today, requires a quality product with reliability and durability. As a rapid response in terms of study and implementation of products. The term CAE means a set of techniques that allow the assessment of aspects of a product generally designed by CAD

Computer-aided engineering (often referred to as CAE) is the use of information technology to support engineers in tasks such as analysis, simulation, design, manufacture, planning, diagnosis, and repair.

Among the CAE areas covered include:

1. Stress analysis on components and assemblies using FEA (Finite Element Analysis);
2. Thermal and fluid flow analysis Computational fluid dynamics (CFD);
3. Kinematics;
4. Mechanical event simulation (MES).
5. Analysis tools for process simulation for operations such as casting, molding, and die press forming
6. Optimization of the product or process.





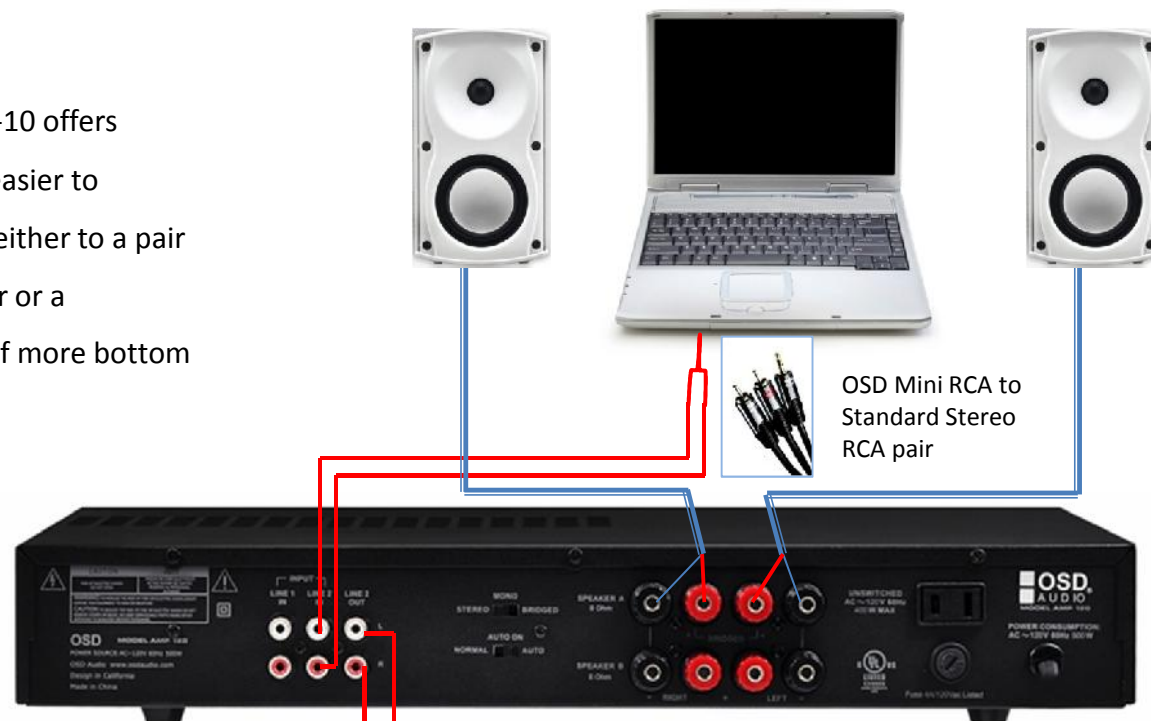
Another Application, the Sub-Sat system...

Subwoofer-Satellite system: The S-10 offers different connection options making it easier to interface with an existing audio system either to a pair of speakers connected to your computer or a complete two-channel system in need of more bottom end.

AMP-120, Power Amplifier

AP-490, Indoor/Outdoor Speakers

S10, Powered Subwoofer



OSD Mini RCA to Standard Stereo RCA pair

Option #1) Signal Level, connect the Sub via a standard Stereo RCA right and left interconnect. The Subwoofer eliminates the High frequencies above the crossover setting. Note, you would use a dedicated single mono sub cable if using with a receiver that features only a single RCA mono output. The receiver in that case would be combining the right and left channel internally.



OSD Stereo RCA cable

S10 Back plate

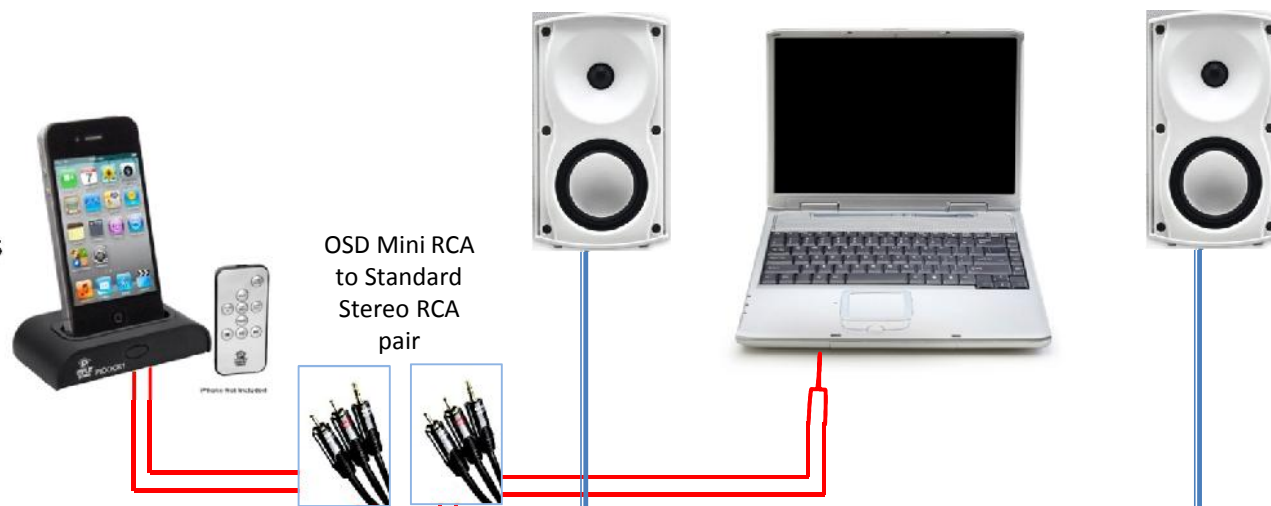


S10: 120 watt 10" Down Firing Subwoofer

Need more info? Click User's Guide under Product Details



Sub-Sat system: Speaker Level connection, adding a second source that also utilizes the Subwoofer...



AMP-120, Power Amplifier

AP-490, Indoor/Outdoor Speakers

S10, Powered Subwoofer

Option #2) Speaker Level, connecting the Subwoofer from the Speaker Level output (speaker B) of the AMP-120. In this setup you can utilize the subwoofer for both Sources (both input 1 & 2). There are also many instances where the Amplifier does not have a RCA signal level output.



S10 Back plate



S10: 120 watt 10" Down Firing Subwoofer

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LFE, Low Frequency Effects...

Note: When connected to LFE output from AVR set crossover control to 150Hz

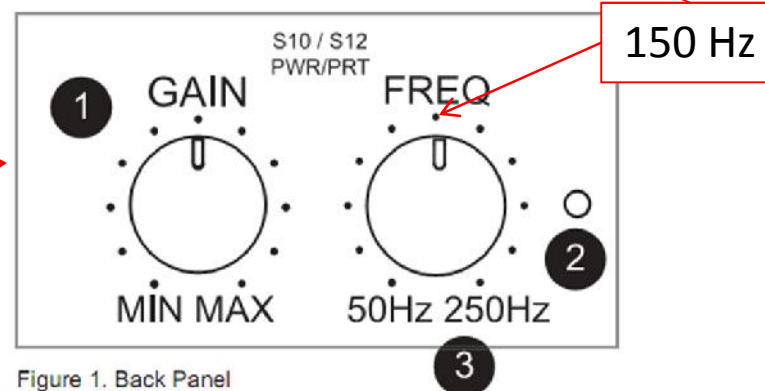
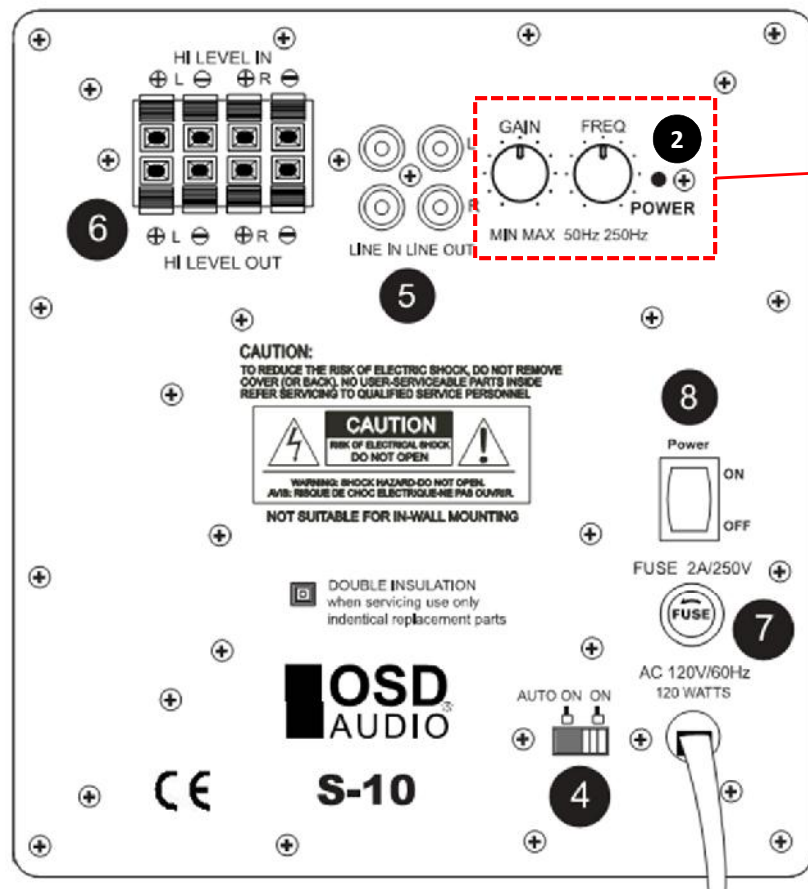


Figure 1. Back Panel

BACK PANEL CONTROLS (Figure 1)

- 1. Volume Control**
Adjusts output volume.
- 2. Power/Protect LED indicator**
Illuminates green indicating the unit is turned on while switch 2 is in "Normal" position, or when receiving signal in "Auto-On" mode. Illuminates red during standby/protect mode.
- 3. Variable Crossover**
Sets crossover frequency between 50Hz and 250Hz. For stereo music or home theater, set the frequency to a level that sounds pleasing to your ear and the overall reproduction of your audio. If using LFE signal, set crossover to 150Hz.

BACK PANEL CONTROLS (Figures 2-3)

4. Autosensing

Sets the power-on/off option of the S10/12. Set it to on for manual control using switch 8. Set switch to Auto-On for automatic power-on when signal is present; after 10 minutes with no signal, unit will enter standby mode. For Auto-On the power switch is left in "ON" position.

5. Line Level Input

Connect to the line level, subwoofer, or LFE output of your receiver, pre-amp, or power amp. **Do not use** if Speaker Level Inputs are connected. For single mono input: plug into either R or L terminal, or use a y-adaptor. *

6. Speaker Level Input

Use when line level outputs are unavailable from your receiver, pre-amp or power amp. Your existing stereo speakers can share these terminals, allowing you to add bass to any stereo or home theater system. Always maintain speaker polarity by connecting positive (+) and negative (-) terminals on this unit with corresponding terminals on your existing speakers and source. **Do not use** if Line Level Inputs are connected.

7. Main Power Inlet & Fuse Holder

Accepts IEC type line cord. A fuse located in the integrated holder provides safety from fault conditions: replace fuse with one of same type and rating only.

8. Power Switch

Turns unit on and off in Normal power mode. Leave set to "ON" when using Auto-On power mode.

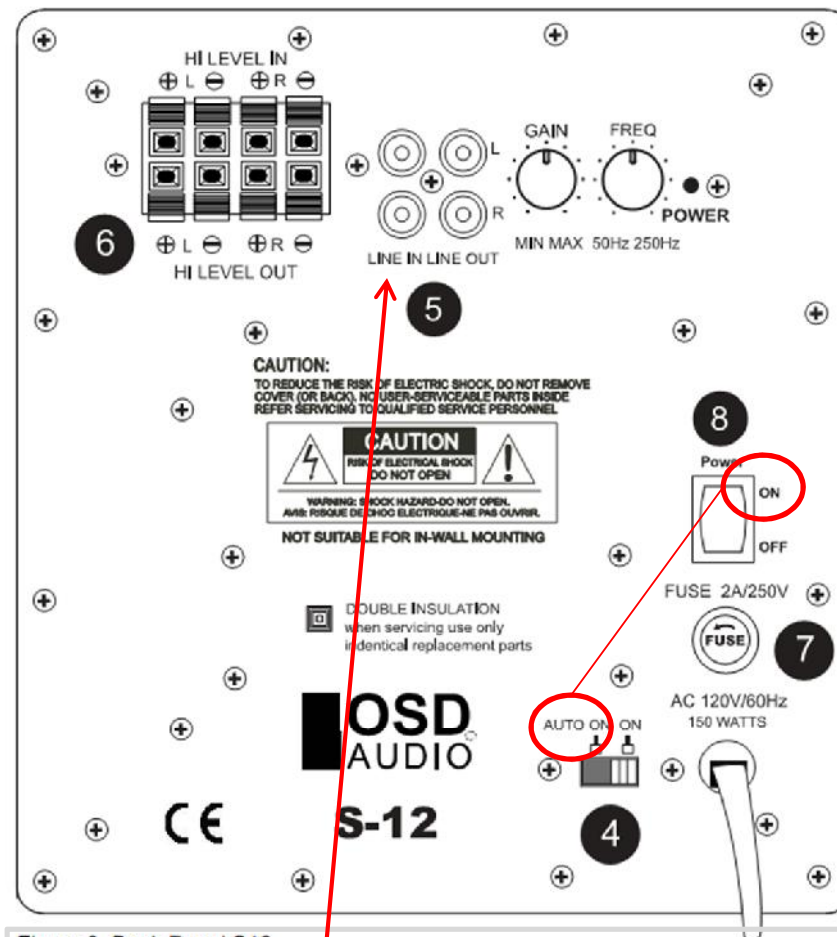
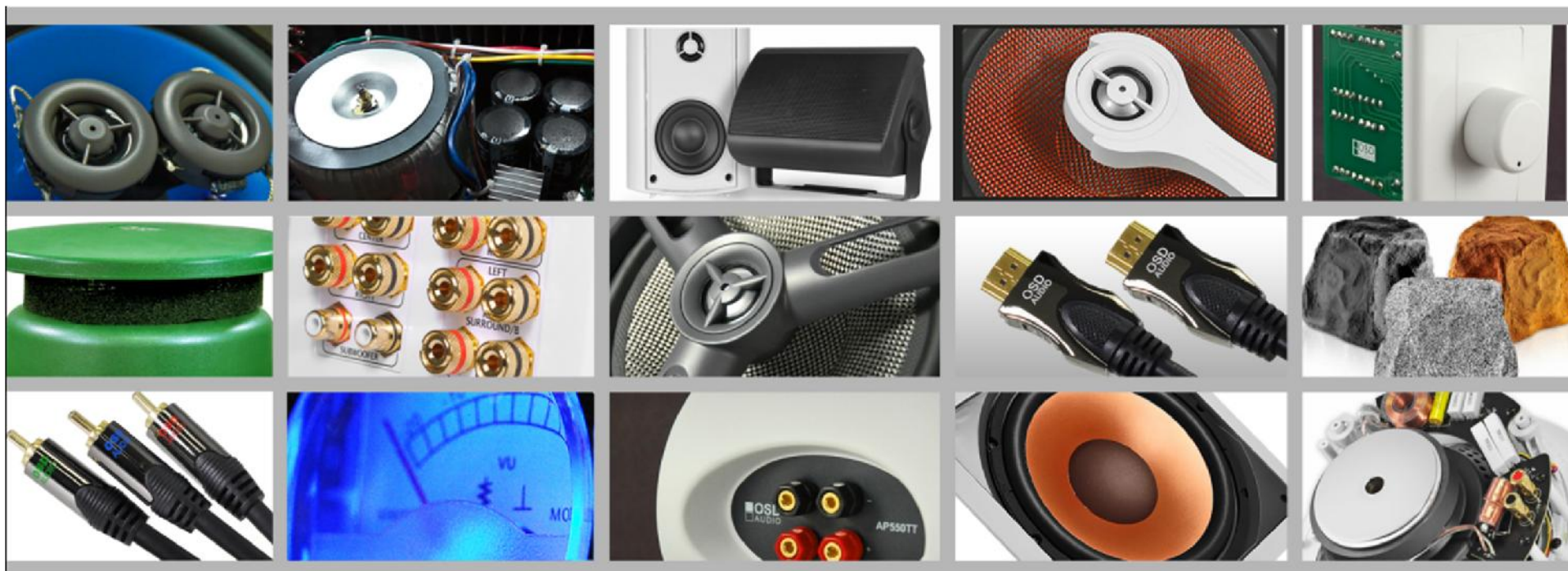


Figure 3. Back Panel S12

*The Subwoofer cable is a single Mono connection that can be plugged into either the R or L RCA input of the S-10

OSD Gold Series Subwoofer Cables
available 6 to 100 feet





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