



Owner's Manual

Congratulations!

Before You Start

Your new architectural furniture is handmade from solid hardwood. Every tree is different, and no two pieces of hardwood are the same. We encourage you to consider the final color before installation. Your furniture is pre-sanded and a natural pre-stain sealant (made from 100% natural wax-free shellac) has been applied. If the natural color goes well with your décor, no additional steps are necessary. If you choose change the color, apply one or two light coats of water-based wood stain with a foam brush. Whether or not you choose to change the color, it's not recommended to apply varnish or polyurethane topcoat.

Your Room and Bass Response

Octave bands

0: Below 22Hz

1: 22Hz to 44Hz

2: 44Hz to 88Hz

3: 88Hz to 176Hz

"We hear the room." The lowest notes on a standard piano (A0, A#0 / Bb0, B0) and an electric bass guitar (B0, E1) are all in firmly Octave band 1. Most low octave sound waves are heard after they bounce off walls, ceilings and floors because these sound waves are physically **longer** than the dimensions of our rooms. We hear (and feel) how low frequency (LF) sources "energize" the bass response of our rooms.

Subwoofer Tethering Theory

In the home audio food chain, LF transducers are creating by far the highest levels of mechanical energy in our rooms. LF sources will "energize" a room more uniformly and powerfully when they are coupled to the studwork or a concrete slab foundation. When directly coupled to a room's structure and foundation, a subwoofer delivers deeper sound that is more "in-tune" with the room's physical properties and acoustics.

Subwoofer Tethering in Practice

Tethering subwoofers enhances bass performance.

Architectural furniture extends studwork into your room to enable tethering using a strap system. Tethering is a very

effective, economical, and non-destructive method to couple LF sources to studwork or a slab foundation. The result is more powerful, more tactile, and more accurate bass response from any subwoofer.

Subwoofer Placement Theory (3D Approach To Optimize Room Acoustics)

With a 3D approach to placement, using multiple LF sources can reduce or eliminate common problems with nulls (bass cancellation) and standing waves (bass doubling). Nearly all rooms sound better when there are multiple LF sources that are statistically independent. As Dr. Geddes explained, "...To get the best possible low frequency response one needs to use multiple subs placed about the room in such a way as to **maximize their independence from one another...**"¹ Deploy a statistically independent 3D approach to optimize room acoustics:

- 3D Rule: Each LF source is placed in a different geometry (considering length, width, and height).
- 3D Rule: LF source placements are NOT symmetrical. Placements are ASYMMETRICAL or LESS SYMMETRICAL.

¹ [Why Multiple Subs?](#) by Dr. Earl Geddes (30 October 2011). gedlee.com.

- 3D Rule: LF source placements are NOT correlated. Placements are UNCORRELATED or LESS CORRELATED.

Subwoofer Placement in Practice (How Many Subs)

Rectangular rooms have three dimensions. **In rectangular rooms, we recommend three statistically independent LF sources.** Four LF sources will sound better. After that, the law of diminishing returns applies. Progressively adding more than three or four LF sources will continue to statistically improve the room's response, but it might be hard to hear the difference, even if it can be measured. In non-rectangular rooms (e.g, if the listening room has only three walls and the fourth wall opens into a side room), it will be helpful to have a least four LF sources dispersed in both the main listening room and the side room.

Main Speakers in Practice

Mains are almost never statistically-independent from each other assuming they are set-up as a stereo pair. We recommend to count mains as one LF source in a sound system. Next, you can ask yourself two questions:

1. **Do my mains have a large woofer?** (e.g., 8" or larger, not a passive radiator, must have a high X_{max} , other attributes are also important, such as total Q)
2. **Do I have enough amplifier power for the woofer to reach X_{max} ?** (e.g., rule of thumb, 300 watts minimum)

If the answer to both questions is yes, then your mains could be functioning as a LF source.

If the answer is no to either question, then your mains are not likely an accurate LF source, but there are always exceptions and alternative technologies.

CALL OUT 1: The frequency response of main speakers should be close to flat from Octave bands 2 to 11 (44Hz to 20,000Hz) to be an accurate LF source. In other words, the amplitude (output volume, in dB) should be more or less equal, let's say, within 1-2dB, plus or minus, given equivalent input signals. Keep in mind that -3dB difference is half the volume and a -6dB difference is twice that!

CALL OUT 2: In the real world, large woofers do need powerful amps to reach X_{max} . This is why most powered subwoofers have...you guessed it...high power amps matched with large woofers.

Recommended Main Speaker and Subwoofer Mix

Use two powered subwoofers if the main speakers are an accurate LF source. Otherwise, use three or more powered subwoofers. At least one LF source should be close to flat down to 22Hz to accurately reproduce the lowest notes on a standard piano and an electric bass guitar. Normally, it requires a very large woofer and a very powerful amplifier.

Subwoofer Height

Elevating subwoofers enhances bass performance. By aligning with the room's surfaces and energizing different geometries, the room's bass response is deeper and more even as problems with nulls and standing waves are reduced or eliminated without any DSP.

The reason to elevate a subwoofer is to make it statistically independent from LF sources close to the floor, such as your main speakers.

Recommended Subwoofer Height

No height "sounds" better. To keep things simple, we recommend the following:

- Divide the room in the three heights: floor, shoulder-height, and ceiling-height
- Place one LF source in each height

Consider first and foremost your room's aesthetics and décor and **safety** when elevating subwoofers. For example, think twice before you decide to place a subwoofer over a doorway.

Recommended Placement of Three Subwoofers

One Floor Sub. Two Elevated Subs. A favorite placement option for most rooms is one subwoofer tethered to the floor and two subwoofers elevated, for example:

- First sub elevated to ceiling-height and dead center on the left or right wall.
- Second sub elevated to shoulder-height on the opposite side of the room and in a corner.
- Third sub on the floor and dead center along the front wall or rear wall.
 - If the second sub close to the rear wall, then the third sub is centered on the front wall. Or vice versa.

Two Floor Subs. One Elevated. If you want two subwoofers tethered to the floor and one subwoofer elevated:

- First sub as close as possible to any wall and dead center.
- Second sub as close as possible to the opposite wall and dead center.
- Third sub anywhere else you like in terms of aesthetics, ideally in a corner and as far away as possible from the other two subs.
- Pick any sub to elevate to shoulder-height or ceiling-height, based on the room's aesthetics.

Powerful, Tactile, Accurate Bass Response in Your Room

By this point in the conversation, we assume you have at least one powered subwoofer and you have purchased SubLuv architectural furniture to tether and, optionally, elevate, your subwoofer. If not, please contact steven@16wurkz.com with your questions or suggestions.

Solo (On-Floor) Installation Instructions

Physical Compatibility

- Solo works with small and large subwoofers weighing up to 220 pounds (100 kg) with feet spaced closer than 23 1/4" apart. Included tether straps support subwoofers up to 32" tall.
- Use Solo alone or stacked for your heaviest subwoofers and line arrays to distribute their full weight directly to your floor joists.
- When stacked, two Solos support up to 600 pounds (275 kg), for example, a line array of three 200 pound subs.

Design Compatibility

- Solo is compatible with almost all powered subwoofer designs, including: ported, sealed, side-firing, downward-firing, wired, and wireless.

Orientation

- Follow any instructions provided by the sub manufacturer.

Installation Time

- Est. 20 minutes

Recommended Number of Installers

- One person

Installation Kit Contents

- Hardwood Rails 1" x 1" (2)
- Hardwood Beams, Grooved (2)
- GRK Bronze Fasteners - Low Profile Cabinet™ Screw #8-gauge (8)
- Stud finder nail (2)
- Straps, Black (2)
- T15 Torx Key Wrench, Red (1)
- T15 Bit, Black (1)
- 24" measuring tape, White (1)

Recommended Tools

- Hammer
- Power Drill
- Stud Finder Device (Optional)

Solo Installation Steps

1. If possible, determine if the floor joists run length-wise or width-wise. Often this will be easy to see in the basement or crawlspace.
2. **Find the first floor joist.** Joists are studs in your floor. Use a stud finder device (optional, not included). Or, measure out from the wall using the 24" measuring tape (included). There should be a joist either 16" or 19" out from the wall, approximately. The distance from the adjoining wall is less important, about 8" normally works well. Lightly tap the stud finder nail (included) through the floor to a depth of about 1" to confirm you hit a stud, do not skip this step. Do not remove the nail. You will remove the nail in a later step.

Solo Installation Steps (continued)

3. **Find the second floor joist.** Measure from the first stud finder nail. There should be a joist either 16" or 19.2" from first stud finder nail, approximately. It's important that both stud finder nails are same distance from the adjoining wall, about 8" normally works well. Lightly tap the other stud finder nail (included) through floor to a depth of about 1" to confirm you hit a joist, do not skip this step. **Do not remove the nail.**
4. Each hardwood rail (included) has two holes. On the bottom of the rail, the hole is very small. On the top of the rail the hole is much larger. Start with one hardwood rail. With very small holes on the bottom of the rail facing downward, position the rail over a stud so that a stud finder nail pokes up through the hole.
5. **Use the measuring tape for this step.** Make sure the hardwood rail is straight by measuring the distance from each hole to the wall. Example, if your stud finder nail is 16" from the first wall then the other hole on the rail should also be 16" from the first wall.

Solo Installation Steps (continued)

6. Screw a long fastener (included) into the other hole on the rail. This will be easier with a drill or hex wrench using the black T-15 bit (included). **Do not tighten.**
7. Remove the stud finder nail that is poking up through the rail. Screw a long fastener into this hole. **Do not fully tighten with a power drill.** Hand tighten both fasteners with a hex wrench and T15 c the red T15 Torx Key Wrench (included).
8. Repeat the previous three steps for the second hardwood rail. **Use the measuring tape to be sure the distance between the rails is the same.**
9. Optional step: Remove the feet on your subwoofer so the cabinet will rest directly on the hardwood beams.

Solo Installation Steps (continued)

10. **Do not use fasteners or nails for this step.** Each hardwood beam has two grooves running lengthwise. Place the hardwood beams across the rails with the grooves facing up. Slide the hardwood beams back and forth on the rails until the beams are centered. The position of the beams also should match up with your measurements of the bottom of your sub, or with the feet measurements if these were not removed. If your sub has spikes, the large groove in the hardwood beams is designed to accept the spikes. Take your time. Use the measuring tape and small adjustments to get the beams lying right where you want them on top of the rails.
11. Use the short fasteners (included) to attach the hardwood beams to the rails. Using the small groove, position the small fasteners in the groove above each rail and screw them down. **Do not fully tighten with a power drill.** Hand tighten both fasteners with a hex wrench and T15 bit or the red T15 Torx Key Wrench (included).

Solo Installation Steps (continued)

12. Gently place your subwoofer on the beams.
13. Locate the clasp on one of the black straps. Turn the clasp so that the mouth is opening upward toward the ceiling when you press the tab. Keeping the clasp in this position, grab the strap. Place it under the sub, underneath the hardwood beams and feed it up and over the sub. Feed it into the mouth of the clasp. Repeat for the second black strap.
14. Make one final check that the sub is positioned correctly on the hardwood beams. Grab the tail of one black strap and pull down HARD. Repeat for the second black strap.
15. Connect the subwoofer to the rest of the sound system. Enjoy the music!

Encore (On-Wall) Installation Instructions

Compatibility

- Encore can elevate subwoofers weighing up to 150 pounds (70 kg) with no restrictions on physical size.

Design Compatibility

- Encore is compatible with almost all powered subwoofer designs, including: ported, sealed, side-firing, downward-firing, wired, and wireless.

Orientation

- Encore makes it possible to experiment with orientation. For example, if your subwoofer has one woofer you can orient the woofer to fire in any direction you choose as long as the black straps do not touch the woofer.

Installation Time

- Est. 30-40 minutes

Recommended Number of Installers

- Three people, Shoulder-height installations
- Six people, Ceiling-height installations with step ladders

Installation Kit Contents

- Hardwood Arms (2)
- Black Dowel Rod (1)
- Quarter-Round Crossbars (2)
- 1/2" Hardwood Button Plugs (2)
- GRK Bronze Fasteners - Low Profile Cabinet™ Screw #8-gauge (6)
- Stud finder nails (2)
- Orange Level (1)
- Straps, Black (2)
- T15 Torx Key Wrench, Red (1)
- T15 Bit, Black (1)
- 24" measuring tape, White (1)

Recommended Tools

- Hammer
- Power Drill
- Stud Finder Device (Optional)
- Three Step Ladders (For ceiling height installations)

Encore Installation Steps

1. Determine the height based on your room's aesthetics and décor and safety.
2. **Find the first stud.** Use a stud finder device (optional, not included). Or, measure from the corner of your room using the 24" measuring tape (included). There should be a stud either 16" or 24" out from the corner, approximately. Lightly tap the stud finder nail (included) through the wall about 3/4" to confirm you hit a stud, do not skip this step.
3. **Find the second stud.** Measure from the first stud finder nail. There should be another stud either 16" or 24" from first nail, approximately. Again, always lightly tap the stud-finder nail (included) through wall about 3/4" to confirm you hit a stud.

Encore Installation Steps (continued)

4. **Finalize the height.** The stud finder nails are roughly the middle of where your hardwood arms will be. If this is the correct height for your installation, continue. If not, repeat the previous steps at the desired height.
5. **Remove the stud finder nails.** Each hardwood arm (included) has three holes. One hole has a silver insert. Start with one hardwood arm. Place a fastener (included) through the hole with the silver insert. Screw the fastener into a hole you made with the stud finder nail. This will be easier with a drill or hex wrench using the black T-15 bit (included). **Do not tighten.** The arm needs to be able to rotate for the next step.

Encore Installation Steps (continued)

- 6. Make the arms level.** One person insert the black dowel rod (included) through the eyehole and place the orange level (included) on top of the black dowel rod. A second person can then insert the other end of the black dowel rod through the eyehole on the other hardwood arm and adjust the height of the arm until the black dowel rod is level. A third person can then place a fastener through the hole with the silver insert on the other hardwood arm. Focus on keeping the black dowel rod level. Make sure that the fastener on the other arm is going into a stud. Use the hole you made in step three as a point of reference as to where the stud is located. Screw the fastener into the stud. This will be easier with a drill or hex wrench using the black T-15 bit (included). **Do not tighten.**

Encore Installation Steps (continued)

7. Place a fastener through the remaining four holes. These holes do not have a silver insert. **Make sure that all fasteners are going into a stud. Do not tighten.** If any fasteners are not going into studs, then remove all fasteners and start again. Do not reuse the holes. Instead, go an inch or so higher or lower.
8. **Go back to the very first fastener and hand tighten.** We recommend to hand tighten fasteners with a hex wrench and the T15 bit or the red T15 Torx Key Wrench (included). **Hand tighten the remaining five fasteners.**
9. Assign two people to be subwoofer holders. Disconnect all wires and cables from the subwoofer.
10. Assign a third person to be the adjuster. The adjuster will adjust the straps and cross bars.
11. If you are elevating to ceiling-height, use three step ladders and ask three people to be ladder holders. Safety first.
12. When ready, the subwoofer holders should hold the subwoofer steady, close to the hardwood arms.

Encore Installation Steps (continued)

13. The adjuster locates the clasp on one of the black straps. Turn the clasp so that the mouth is opening downward toward the floor when you press the tab. Keeping the clasp in this position, grab the strap. Place it over the top of the sub and feed it down between the black dowel rod and the wall. That is, the tip of the strap should be fed downwards behind then black dowel rod. Keep feeding it until you can grab it from behind the sub. Feed it into the mouth of the clasp.
14. Repeat for the second black strap.
15. The adjuster will then slide a crossbar behind the sub so the holders can rest the sub gently on the cross bar **while not letting go of the sub.**
16. Repeat for the second crossbar. **The holders should not let go of the sub.**
17. **Again, the holders should not let go of the sub.** The adjuster can now tighten the black straps until the sub is secure, straight, and balanced. Use the orange level.

Encore Installation Steps (continued)

18. After adjusting is complete, now let go of the sub. If the sub is resting fully on both hardwood arms, the crossbars can be safely removed or left in place.
19. Optional, place the button plugs into the topmost hole on both hardwood arms.
20. Connect the subwoofer to the rest of the sound system.
Enjoy the music!

Support

Please email steven@16wurkz.com