WISDOM

Owner's Manual

S55i
RTL® Subwoofer

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DOCUMENT CONVENTIONS

This document contains general safety, installation and operation instructions for the Wisdom Audio S55i Subwoofer. It is important to read this document before attempting to use this product. Pay particular attention to:

WARNING: Calls attention to a procedure, practice, condition or the like that, if not correctly performed or adhered to, could result in injury or death.

CAUTION: Calls attention to a procedure, practice, condition or the like that, if not correctly performed or adhered to, could result in damage to or destruction of part of or the entire product.

Note: Calls attention to information that aids in the installation or operation of the product.

Introduction

Congratulations on purchasing your Wisdom Audio in-wall subwoofer. The S55i's Regenerative Transmission Line™ technology delivers tremendous bass performance in terms of depth, dynamics, and distortion resulting in articulate bass that integrates seamlessly with high-resolution main speakers such as Wisdom Audio's Insight Series.

This manual focuses on the S55i subwoofer itself. In order to fully understand the system, we recommend you also review the manual for the SC-2/3 System Controller, or SW-1 subwoofer amplifier, or MiniDSP-1 subwoofer processor, without one of which this subwoofer will not perform correctly.

While we expect your local Wisdom Audio dealer to take care of the setup and calibration of the system, we still recommend that you at least briefly review this and the other manuals to understand the system's full capabilities.

Overview

Your Wisdom Audio S55i subwoofer uses a modern implementation of an old idea for high quality, low distortion bass reproduction. While the roots of the Regenerative Transmission Line™ go back to the 1950's, it is the combination of modern computer modeling and the vastly more powerful motors of contemporary driver design that make the RTL™ so special.

There is a class of bass enclosures that has been around since the 1950's, which can be described generically as "low frequency tapped waveguides" or "tapped pipes". It was an idea that was a bit ahead of its time then, since fully optimizing its use required both powerful drivers and computer modeling. But, if you are into such things, check out US Patent 2,765,864 (filed in 1955), and an AES paper published in 1959, *"Analysis of a Low Frequency Loudspeaker System"*.

We have utilized sophisticated modeling software in order to fully optimize our enclosures, and have developed drivers that are specifically optimized for this application. We call our unique implementation of this relatively old idea a "Re-generative Transmission Line™" subwoofer, or "RTL" sub for short.

All dynamic drivers develop energy on both sides of the diaphragm, with the rear energy being 180° out of phase with the front energy. If you allow the driver to operate in free space (no enclosure), the front and rear energies largely cancel each other out — especially at low frequencies.

Overview *(continued)*

In our Regenerative Transmission Line™ subwoofer, the energy from the back side of the driver is sent along a long, folded path in such a way that its lowest frequencies arrive back at the front side of the driver in phase, effectively summing to an increase of 6 dB in output. Thus, the energy from both sides of the woofer cone is used in a productive way, resulting in a substantial reduction in distortion and an effective surface area double compared to what you would otherwise expect. As an example, the effective radiating surface area of the four 3″x5″ woofers in the S55i is equivalent to *an* 8″ woofer in more conventional enclosures, yet fits in a 3.5″ deep stud bay.

The results are quite stunning. Low frequencies are strikingly dynamic and responsive, and integrate quite seamlessly with the fast and detailed Sage Series planar magnetic hybrids. As an example, the S55i has an output in excess of 115 dB at 30 Hz.

Unpacking the S55i

Please exercise caution when unpacking your S55i.

CAUTION:

As shipped, a protective steel construction shield is held in place magnetically to seal the S55i from various construction debris, paint, etc. The grille is in a separate cardboard sleeve in the shipping box. Please locate and save the grille for later use, leaving the construction shield in place until you are ready to play the S55i.

The S55i is fully assembled on delivery. The front surface has a smooth, resin-coated paper finish that can be taped and spackled, and then painted to match the adjacent drywall (gypsum board).

The end of the speaker that contains the grille assembly also includes the “pig- tail” for connecting the speaker to the system, as well as some “feet” to support the S55i slightly above the sole plate, to allow room for the wiring and the base- board of the finished wall. (Rooms with unusually tall baseboards may require the S55i to be mounted somewhat higher still.)

The grille itself is held in place magnetically. Removing the grille exposes the black service panel, which only needs to be removed in the unlikely case that one or more drivers needed to be replaced after installation in the wall.

Unpacking the S55i *(Continued)*

The Regenerative Transmission Line™ opening occupies less than half the space covered by the grille. You can see the serial number of your S55i by removing the grille and looking into the RTL opening; it will be on the back, inside surface of the S55i enclosure.

Subwoofer Placement

Subwoofers offer somewhat greater flexibility in placement, since the frequencies they reproduce are not readily localizable by the human ear. This is due to the fact that the wavelengths they reproduce are more than ten feet (3 meters) long, but our ears are located only about 6-7 inches (17 cm) apart. Thus these extremely long waves do not contribute meaningfully to the imaging that the main speakers create.

However, this fact does not mean that the placement of the subwoofers has no effect on the sound quality in the room. Far from it. The subwoofers are the *most* likely to suffer from the response irregularities introduced by the room itself, operating as they do below approximately 80 Hz in most systems.

Recent research into the behavior of rooms as a function of speaker placement has concluded that — if you have the freedom to do so — there are significant advantages to placing several smaller subwoofers around the room, rather than relying on a single large woofer. Moreover, the optimum placement is usually centered on each of the four walls, or deep in the corners of the room. If you have the luxury of doing so, this simple placement strategy can reduce the size of the room's response irregularities from 20 decibels down to perhaps as little as 6-8 decibels—a tremendous improvement.

Reducing the room's inherent problems to this degree provides a huge advantage. It allows the SC-2/3 System Controllers to put its considerable abilities to work on *perfecting* your system's response, rather than on trying to perform major corrective surgery.

Room Treatment

Rectangular rooms have six reflecting surfaces (four walls, ceiling and floor) that reflect sound to the listener, after various delays introduced by the indirect routes the sound take on their way to the listener. These first reflections are particularly damaging to sound quality. Looking at the simplest case of stereo reproduction, you have a minimum of *twelve* first reflection points in your room that deserve some attention.

Unfortunately, it is often difficult to do much about the ceiling and floor reflections, even though they are arguably the most destructive. (The minimization of these reflections is one of the strongest arguments for the tall, line source loud- speakers that Wisdom Audio builds.) This leaves you with eight "first reflections" that you should consider minimizing somehow. These points are easily found by having an assistant slide a small mirror along the four walls of the room, while you sit at the listening position. Any place on the wall where you can see a reflection of *any* speaker is a first reflection point. Concentrate on the first reflections for the Left and Right speakers first.

If you can, arrange to apply either absorption or diffusion at these eight points (don't forget the wall behind you). Absorption can be as simple as heavy, insulated drapes; diffusion can be provided by a well-stocked bookcase with books of varied sizes. Alternatively, you can buy purpose-designed room treatments (some sources listed under References, below).

The important things to remember are these: a good room should have a balance of absorption and diffusion; and if you are going to treat only a few areas of the room, the first reflection points are the most important ones to treat.

Professional Acoustic Design

Does this all sound too complicated? For good reason: it *is* complicated.

The difference between the average listening room and one that is professionally designed and implemented is huge. A great listening room will disappear to an astonishing degree, letting the experiences captured in your recordings speak to you directly. A well-designed room is also quieter and more comfortable. It can easily become a favorite retreat for peace and rejuvenation.

If you decide to investigate the possibility of improving your room with the help of a professional, it is important to find someone who focuses on residential spaces. Most acousticians are trained to deal with large spaces — airports, auditoriums, lobbies in commercial buildings, etc. The problems seen in "small" rooms (residential spaces) are quite different, and outside the experience of most acousticians. Find someone who specializes in and has a great deal of experience designing home studios, home theaters, and the like. Your Wisdom Audio dealer may be such a person; failing that, he/she can help you find such a professional.

References

Books on Acoustics:
The Master Handbook of Acoustics, F. Alton Everest, TAB Books
Sound Reproduction: The Acoustics and Psychoacoustics of Loudspeakers and Rooms by Dr. Floyd Toole, Focal Press

Installing the S55i in a Wall

Your dealer has extensive knowledge of wall construction, and will customize these installation instructions to suit the needs of your particular situation. These notes simply provide an overview of the process.

Note that the Regenerative Transmission Line opening that vents the low frequencies into the room may be placed either up near the ceiling, or down near the floor. In most rooms, these are largely equivalent positions in terms of acoustics. The difference will usually be aesthetic rather than performance-based.

The front board of the S55i is 5/8″ thick, and presents a smooth, paintable finish surface similar to dry wall. It can be butted up against the 5/8" dry wall, taped, and spackled, and painted like any other section of wall. It will also readily accept skim-coating if the construction calls for plaster walls.

The process of installing the S55i in a standard stud wall is quite straightforward.

1) **Open the 2 x 4 stud bay to be used**
   - **a)** The existing dry wall (if any) should be cut back so it covers about half of the 2 x 4 on each side of the bay. The flange of the front board of the S55i will cover the other half.
   - **b)** Obviously, there cannot be any plumbing or wiring in this area of the stud bay, nor firebreaks. The S55i will use a bit more than half of the available space in a standard eight foot 2 x 4 stud bay.

2) **Stand the S55i in front of the bay in which it will reside; make the electrical connections**
   - a) There are two methods commonly used for making these connections.
   - b) If you have access to the adjacent stud bay, drill a hole through the 2 x 4 stud between where the S55i's feet will be when it is in place, and feed the pigtail through the hole. You can then make the connection in the adjacent stud bay, where you will have plenty of room to work. You can even put the connections inside a J-box for future serviceability if you so desire.

   - a) Alternatively, sometimes it works out easier to bring the connecting wire through the top plate or sole plate of the same stud bay in which the S55i is located. If so, the connection can be made in the space between the feet at the end of the S55i with the pigtail. If the signal is coming through the attic and the top plate, the S55i will need to be "upside down" with its feet at the top of the bay. This places the grille high on the wall, which may be preferred aesthetically (since it can be mistaken as a surround speaker).

Installing the S55i in a Wall *(Continued)*

b) The preferred method for making the electrical connection is to solder the wires together and then insulate the connection with shrink tubing. If this is impractical, use appropriately-sized wire nuts and wrap the wire nut connections in black electrical tape to prevent any chance of the connection vibrating loose.

3) Stand the S55i in the stud bay, dress the wires so that they cannot rattle, and screw the front board to the studs with drywall screws

a) The S55i has predrilled, countersunk screw holes so standard #8 dry wall screws will sit with their heads below the surface, so they can be tapes and spackled without any trace. A total of twelve (12) dry wall screws are used.

b) The S55i should be supported or suspended in a manner that does not subject it to twisting or torsional forces that would stress the enclosure. The enclosure should never be forced against an irregular surface. If the studs are curved or warped in an installation, the installer must insert shims between the S55 front panel and the stud surfaces to avoid such stresses, as would be the case for any in-wall loudspeaker.

4) Tape and spackle the seams

a) Note that there is a slight recess around the front edge of the S55i to facilitate taping and spackling, yielding a smooth result.

5) After everything has been painted, slice the paint along the edge of the galvanized steel construction shield.

a) Remove and discard the shield.
It is there simply to protect the inside of the S55i, and particularly the woofers themselves, from being splattered with paint or contaminated with construction debris. Once that purpose has been served, it needs to be removed. A sharp utility knife can be used to break any paint that may have adhered the cover to the face of the subwoofer.

6) Remove the grille from its protective sleeve and position so it lays flat against the rubber magnet and wraps around its edges.

a) When properly positioned, the grille will be fully supported by the rubber magnet and cannot buzz or rattle.

Making the S55i Connections

As with any system, you should make changes to the connections only when the power is turned off to avoid any chance of inadvertently causing a problem (such as a short-circuit).

We recommend using heavy-gauge speaker wire, the gauge will vary dependent on your speaker run length. Please consult an authorized dealer to determine what gauge would be best for your application.

For the purposes of this manual, we will assume that you have already connected the SC-2/3 System Controller as per the instructions found in its manual. As such, you should have signal coming from your source component(s) to a preamp/processor that provides bass management (to create the subwoofer channel(s), and then on to the SC-2/3; following the SC-2/3, the signal for the sub-woofer is sent to a high quality amplifier such as the Wisdom Audio SA Series, or SW-1 amplifier.

A "pigtail" connection is provided at one end of the S55i. Since the S55i fills a standard 2 x 4 stud bay, the simplest thing is to drill a hole in one of the 2 x 4 studs and thread the pigtail through to the adjacent bay, where you have ample room to make connections and run the wires.

Alternatively, the incoming signal can be routed directly into the small space provided by the "feet" of the S55i, and the connection to the pigtail can be make just prior to installing the S55i in the wall.

Connect the outputs of your Wisdom Audio SA-series amplifier to the subwoofer, taking care to get the polarity correct. Connect the positive (+) terminals on the SA-Series amplifier to the red wire in the pigtail; likewise, connect the negative (–) terminals on the amplifier to the black wire in the pigtail.

We recommend using wire nuts and then wrapping the resulting connection in electrical tape to preclude any chance of the wire nut working loose over time.

North American Warranty

Standard Warranty
When purchased from and installed by an authorized Wisdom Audio dealer, Wisdom Audio loudspeakers are warranted to be free from defects in material and workmanship under normal use for a period of ten years from the original date of purchase.

Important
Wisdom Audio loudspeakers are designed for installation and operation in environmentally controlled conditions, such as are found in normal residential environments. When used in harsh conditions such as outdoors or in marine applications, the warranty is three years from the original date of purchase.

During the warranty period, any Wisdom Audio products exhibiting defects in materials and/or workmanship will be repaired or replaced, at our option, without charge for either parts or labor, at our factory. The warranty will not apply to any Wisdom Audio products that has been misused, abused, altered, or installed and calibrated by anyone other than an authorized Wisdom Audio dealer.

Any Wisdom Audio product not performing satisfactorily may be returned to the factory for evaluation. Return authorization must first be obtained by either calling or writing the factory prior to shipping the component. The factory will pay for return shipping charges only in the event that the component is found to be defective as mentioned above. There are other stipulations that may apply to shipping charges.

There is no other express warranty on Wisdom Audio products. Neither this warranty nor any other warranty, express or implied, including any implied warranties of merchantability or fitness, shall extend beyond the warranty period. No responsibility is assumed for any incidental or consequential damages. Some states do not allow limitations on how long an implied warranty S55i and other states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. This warranty is applicable in the United States and Canada only. Outside of the U.S. and Canada, please contact your local, authorized Wisdom Audio distributor for warranty and service information.

Obtaining Service

We take great pride in our dealers. Experience, dedication, and integrity make these professionals ideally suited to assist with our customers' service needs.

If your Wisdom Audio loudspeaker must be serviced, please contact your dealer. Your dealer will then decide whether the problem can be remedied locally, or whether to contact Wisdom Audio for further service information or parts, or to obtain a Return Authorization. The Wisdom Audio Service Department works closely with your dealer to solve your service needs expediently.

IMPORTANT: Return authorization must be obtained from Wisdom Audio's Service Department BEFORE a unit is shipped for service.

It is extremely important that information about a problem be explicit and complete. A specific, comprehensive description of the problem helps your dealer and the Wisdom Audio Service Department locate and repair the difficulty as quickly as possible.

A copy of the original bill of sale will serve to verify warranty status. Please include it with the unit when it is brought in for warranty service.

WARNING: All returned units must be packaged in their original packaging, and the proper return authorization numbers must be marked on the outer carton for identification. Shipping the unit in improper packaging may void the warranty, as Wisdom Audio cannot be responsible for the resulting shipping damage.

Your dealer can order a new set of shipping materials for you if you need to ship your loudspeaker and no longer have the original materials. There will be a charge for this service. We strongly recommend saving all packing materials in case you need to ship your unit some day.

If the packaging to protect the unit is, in our opinion or that of our dealer, inadequate to protect the unit, we reserve the right to repackage it for return shipment at the owner's expense. Neither Wisdom Audio nor your dealer can be responsible for shipping damage due to improper (that is, non-original) packaging.

Specifications

All specifications are subject to change at any time, in order to improve the product.

- **Number of required amplifier channels:** 1
- **Frequency response**: 30Hz – 80 Hz ± 2dB relative to the target curve
- **Impedance**: 8Ω
- **Sensitivity:** 90 dB/2.83V/1m
- **Power handling, peak:** 370w
- **Maximum SPL:** 115dB / 30 Hz /1m
- **Dimensions:** see appropriate dimensions drawings on next page
- **Shipping weight, each:** 43 lbs. (20 kg)

For more information, see your Wisdom Audio dealer, or contact:

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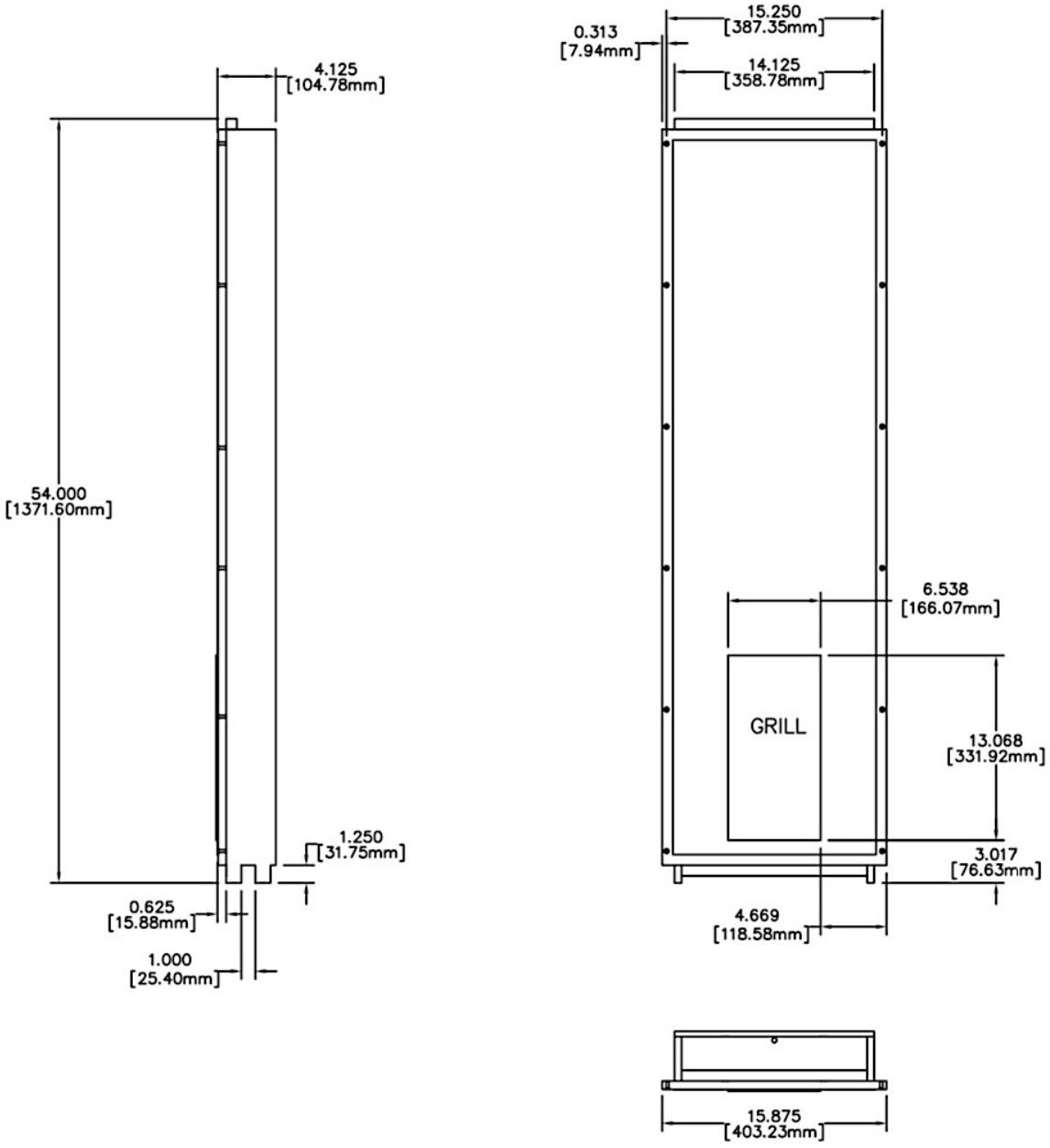
Ph: 775.887.8850

Accessories

Extension Port "f/c" Kit
The S55i's port can be extended up to 30" (76 cm) for mounting under the floor, in the ceiling or venting the sub from an adjacent room. For more information and pricing please consult your approved Wisdom Audio dealer.

S55i Dimensions



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