AEF-8LFT 8" In-Ceiling / Wall Frameless Subwoofer

INSTALLATION GUIDE

	Overall	Cut-Out (Diameter x Depth)
AEF-8LFT	9-7/8" diameter	8-5/8" x 3-7/8"

Congratulations! You have purchased a high quality subwoofer. When matched to comparable electronic equipment, expect years of high fidelity sound. We are constantly striving to provide the very best value in quality audio products.

The following manual is designed to give you, the installer or owner, basic information as to the speaker's installation and operation. It is beyond the scope of this manual to go into all the details that must be taken into consideration in a sophisticated high fidelity system. When installing the wiring and speakers it is important to adhere to all local codes and regulations. Consulting a professional can help to maximize your system's performance.

If you have any questions regarding this speaker which are not answered by this manual, contact your local dealer for assistance. For the most current information please visit www.angstromloudspeakers.com.

SHIPPING DAMAGE

Each speaker is thoroughly tested before it leaves the factory. However, in shipment, accidents may occur. Please inspect your speakers carefully when you receive them to ensure there is no damage. If there is, please notify your supplier immediately. If you received your speakers by public transportation, report the damage at once to the shipping company.

GENERAL DESCRIPTION

The SE-80SWf subwoofer is a passive speaker that utilizes a specially-designed shallow cone made from polypropylene. It uses a linear long-throw motor to achieve high efficiency and high output in a compact design that fits in walls utilizing standard "2x4" construction. The term "passive" means that it does not contain its own amplifier. It must be driven from a dedicated amplifier or connected in parallel with a primary listening speaker using a passive crossover, (not supplied). The woofer is optimized for maximum output and low frequency extension in our frameless mounting system. The AEF-8LFT is designed to be used individually or in multiples depending on room size and listening needs. For aesthetic compatibility, the subwoofer is shipped with the same round and square micro-perforated grilles that are used on our frameless in-wall/ceiling speakers.

GETTING STARTED

The remaining portion of this manual is split into two sections. The first section provides basic step-by-step installation instructions. The second section provides an overview of some important elements of subwoofer placement, connection, amplification, configuration, and painting. We recommend that you familiarize yourself with both these sections before you begin the installation.

If you will be painting your grilles then leave them in their plastic bags until needed to protect them from dust and oil contamination.

INSTALLATION

MINIMUM TOOLS REQUIRED

#2 Phillips Head Screw Driver or Drill-Driver w/#2 Phillips bit
Wire Cutter / Stripper

Other Possible Tools

Tape Measure, Pencil, Ladder, Drywall Saw, Stud-Finder, Flashlight, Tape, etc.

PROCEDURE

If pre-construction brackets were used, skip to step 5

1. Determine subwoofer location and check for obstructions
2. Mark and cut hole for subwoofer
3. Check speaker fit
4. Run Wire
5. Prepare the cavity for the subwoofer
6. Prepare wire for connection and connect it to the sub
7. Insert subwoofer into hole and tighten toggles
8. Install grille, test and adjust system

1. If the subwoofer locations have not yet been established then do so now. The SUBWOOFER TIPS & TECHNIQUES section of this manual provides information useful for optimizing the placement.

   Assess the ceiling or wall area for possible concealed obstructions such as wiring, plumbing, heating ducts, etc. For the ceiling, this is best done through an attic crawl space if available. Absence of a crawl space will require greater study of observable clues and may possibly require the use of inspection holes and inspection tools (camera, mirror, flashlight, etc.). Use a "stud finder" to locate the positions of the joists or studs.

   The cardboard speaker template can be used as a visual aid for aesthetically optimizing the placement. Use a push-tack or tape to temporarily hold it into place.

   We recommend that the edge of the speaker holes be at least ¾" (19mm) away from joists or studs where there is a seam in the sheetrock to ensure, that the integrity of the sheetrock is maintained.

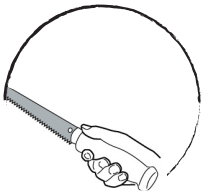
   NOTE: Infinite baffle subwoofers should not share the same internal wall space as other infinite baffle speakers. While it is ok for two subwoofers to share the same cavity, other speakers should be isolated with blocking or a large region of dense acoustic material. The same applies to confined ceiling-spaces. The exception is large attic spaces where the volume of air is large and there will be no cross-coupling between speakers.

   It is also recommended that you avoid mounting subwoofers immediately adjacent to in-ceiling lighting. This will help to reduce unwanted vibrations.

INSTALLATION

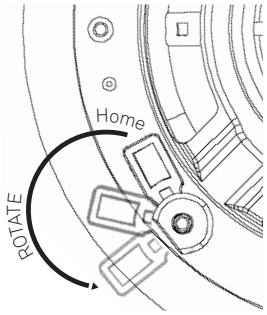
2. Once the speaker locations are established, draw the speaker cut-out with either the plastic compass that is provided or remove the outer ring from the cardboard template and draw a circle around this inner cardboard disk. Instructions for using the template are printed on the speaker template. Note: The hole diameters for the various speakers are marked on the compass. **The SE-80SWf has mounting dimensions of 8-5/8" (219mm) diameter and 3-7/8" (98mm) depth.**

   Using the proper tool, cut the appropriate sized hole in the wall. On drywall, clean cuts can be made with a drywall saw. Cut the hole to the inside of the drawn circle.



3. As the drawing below shows, the speakers utilize Toggle Clamps which, after tightening, hold the speakers in place. Ensure that the toggle clamps are rotated into their "Home" position so they will clear the edge of the cut-out. Note: The speakers are shipped with the toggles in their Home position.

   Verify that the subwoofer fits properly into the cut-out. If the hole should have been cut a little too large the flange on the speaker should cover this. Remove the speaker from the hole.



4. If the speaker cable has not yet been run, do so now that you have access to the ceiling or wall's interior. Note: It is outside the scope of this manual to detail this portion of the installation.

5. To aid in speaker performance, a fibrous material, such as fiberglass or other non-flammable acoustic material, may be placed behind the speaker. If the wall or ceiling space has blown or loose insulation, it is important to prevent the insulation from entering the back of the speaker. This can be accomplished by placing a sufficiently large batt of fiberglass insulation or similar structured material behind the speaker. For in-ceiling installations where blown insulation is present, a fabric barrier such as our Insu-Flate® ISF-147 can be placed behind the speaker. The ISF-147 is an acoustically transparent fabric cover specifically designed to protect the back of the speaker and prevent debris from interfering with its proper operation.

   For in-wall installations where the walls are 4" (100mm) deep, if insulation is present then it will be necessary to clear all the insulation from behind the subwoofer's magnet.

   Placing a rigid enclosure behind the speakers can be done but the enclosure should be large enough not to degrade the performance of the speaker. Rigid enclosures of less than 0.75 cuft (21 liters) should be stuffed with acoustic insulation such as fiberglass.

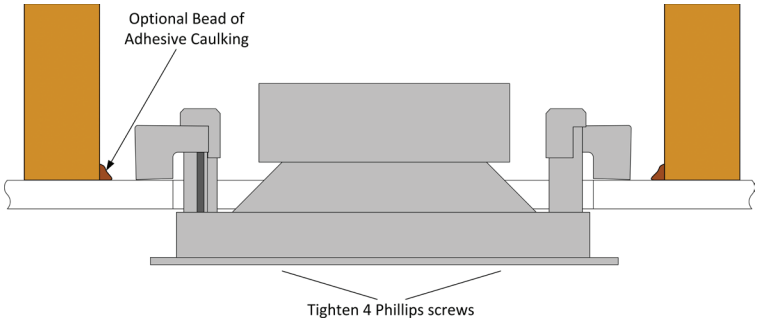
   Where building codes require a fire-rated back box, please contact us or your dealer for assistance in selecting a suitable enclosure.

   One other preparation that can be done, but is not required, is to run a bead of adhesive caulking at the interface of the drywall and the studs or joists on either side of the subwoofer opening. For new construction, the drywall can be bonded to the studs or joists at the time of construction. The adhesive caulking helps to ensure the most robust installation for the best possible bass.

6. Once the speaker cable has been run and the cavity prepared, pull the end of the cable out of the speaker cut-out, strip back a section of the jacket as needed, and then expose ½" (13mm) of each conductor.

   Connect the wire conductors to the terminals on the back of the subwoofer by depressing each spring terminal, inserting the wire into the hole, and releasing the terminal. Use care to observe the proper polarity (+ & -). Speakers wired out of phase will exhibit an apparent loss of bass response. The red terminal is positive (+) and black negative (–).

7. Insert the speaker into the hole and tighten the four toggle screws. As you start to turn each screw the toggle clamps will rotate outward to engage the ceiling or wall material as shown. CAUTION: DO NOT OVER-TIGHTEN THE CLAMPS. Too much torque may damage the toggle, causing the speaker not to seat securely. A snug fit is all that is necessary to assure proper performance. If using a drill with a clutch, the lowest clutch setting that will turn the screw is usually enough torque.



8. Attach the grille of your choice and adjust the system controls to optimize the bass performance.

   Should you need to remove the grille, pull the grille forward at its edge. This can usually be done with one's fingers but using a thin tool at the edge can aid in lifting the grille forward. Initially there will be significant resistance because the grilles are magnetically attached with numerous powerful neodymium magnets.

SUBWOOFER TIPS & TECHNIQUES

SPEAKER PLACEMENT

Placement of in-ceiling or in-wall subwoofers should be carefully considered. Ideally, they should be located where they will provide the best possible sound and meet one's aesthetic requirements. It is beyond the scope of this publication to discuss all of the various aspects of subwoofer placement. However, this section contains information to guide you in making good choices. Please contact a professional for assistance if you are uncomfortable with the planning or installation process.

The AEF-8LFT is optimized for use in small to mid-size home theaters and distributed audio systems where the room size is approximately 3000 cubic feet (85m^3) or less. In most cases we recommend two woofers for small home theater systems and 4 woofers for larger and/or loud applications.

For distributed audio systems, a single woofer may be sufficient for smaller rooms and where the volume will not be loud. For mid-size rooms 2 woofers is a better option. For higher volume levels, 4 woofers should be used.

At the most fundamental level, the task of a subwoofer is to energize the room with low frequency sound. It is most efficient at doing this when located at a room's corners, (where three surfaces meet). Therefore one of the best places for subwoofers is within 36 inches of a corner. **(Options A, D & G)** in the placement drawing. Avoid placing them immediately adjacent to openings such as hallways and entries to other rooms. Also, avoid placing them in a wall space or confined ceiling space that is shared with another infinite baffle speaker. It is ok if two subwoofers share the same wall or confined ceiling space.

Another placement option is to install the subwoofers a distance ¼ of the

SUBWOOFER TIPS & TECHNIQUES

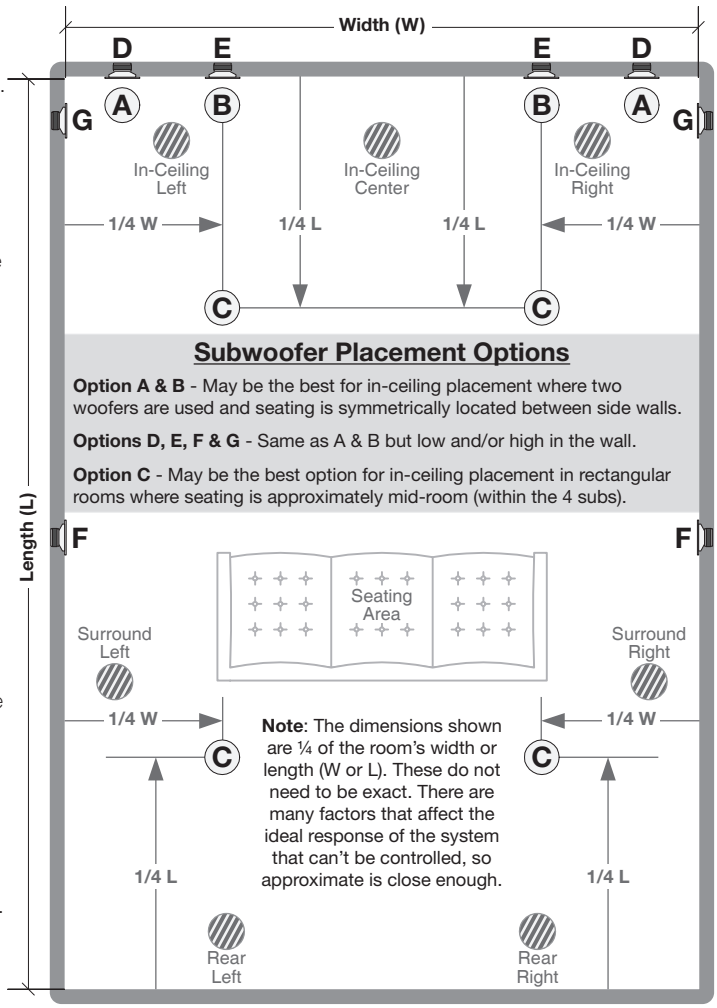
room width from the corners. **(Options B, C, & E)** This works well when there are symmetrically parallel walls of similar composition to the left and right of the subwoofers. The placement of the subwoofers can be in the ceiling or the walls. Though the subwoofers will be less efficient at transferring energy to the room at these locations (compared to corners), the bass will likely be more uniform at different listening positions across the width of the room. This arrangement is likely the best option when Auto Room Calibration systems are not employed.

If the listening room is rectangular in shape, then four woofers can be arranged in a central rectangular pattern in the ceiling. **(Option C)** Of the suggested locations, this location is the least efficient at transferring energy to the room. However, the advantage is that it can help to provide more uniformity in the bass reproduction within the boundaries of the subwoofers. This option is likely best for mid-room seating where there are multiple rows and where Auto Room Calibration systems are not employed.

Option F is also a consideration because the woofers are close to the seating area, but it lacks the advantages of corner loading and ¼ wavelength spacing.

A few more notes on placement: Mirroring the placement of **Options A, B D, E, & G** at the back of the room is a way to increase the system output. It is also reasonable to place subwoofers behind furniture. The effect on the output should be small as long as there is sufficient space (>1in, 25mm) to allow the subwoofer to radiate its energy and the furniture is not so large as to trap the energy. With that said, a china cabinet is probably not the best piece of furniture to place in front of a subwoofer.

Finally, if the application is a modern home theater, then run the Auto Room Calibration system on your AV receiver. See the EQUALIZATION section on this page.



PASSIVE CONNECTION

These subwoofers should ideally be driven by a dedicated amplifier but they have enough sensitivity (efficiency) to be used passively in a "passive sub-sat" arrangement when a passive crossover is employed. The term passive means that the subwoofer is connected in parallel with the main set of listening speakers, (referred to as satellites), hence the term "passive sub-sat." In a "passive sub-sat" arrangement two subwoofers are required, (one for each audio channel). Optimizing a passive sub-sat system requires greater skill and knowledge than an active system and it is recommended that a qualified expert be employed for this type of application.

In an active sub-sat system (not passive) the subwoofer is driven by a separate amplifier, independent of the amplifier that drives the main satellite speakers. Home theater receivers almost always utilize an active sub-sat configuration.

AMPLIFICATION

Depending on the system requirements, the AEF-8LFT subwoofer will perform well with amplifiers rated from 50 to 150 Watts RMS at 4 ohms. (Note: The AEF-8LFT is a 4 ohm subwoofer, the power rating of the amplifier should be considered at 4 ohms and not at 8 ohms unless the subs are connected in series.) Though the subwoofer is rated for 150W, please be aware that damage can be done by amplifiers of even moderate power if the subwoofer and/or amplifier are continuously overdriven for long periods of time. If you should hear distortion at high listening levels then the volume should be reduced.

For most installations it is recommended that a dedicated subwoofer amplifier (such as our Model 500) be used to drive the subwoofer(s). The AEF-8LFT subwoofers can also be driven by an ordinary stereo amplifier. However, conventional stereo amplifiers almost always lack subsonic filters* that are incorporated within dedicated subwoofer amplifiers (like the Model 500). When using a conventional stereo amplifier greater care must be exercised to ensure the woofers are not overdriven with subsonic program material.

*Subsonic filters are used to reduce the excursion of the woofer below frequencies which the woofer can effectively operate and that would overdrive the woofer at high listening levels.

Since the AEF-8LFT was designed to operate down to 30Hz, a subsonic filter should be applied around 35Hz to ensure the best possible performance and highest output capability. If your amplifier lacks a subsonic filter then in many cases a passive filter can be added at the input. Please contact us or your dealer for information on suitable filters.

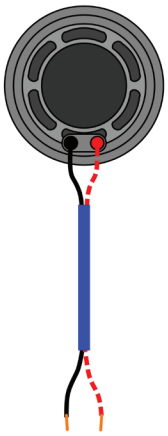
EQUALIZATION

It is common now for home theater receivers to include digital signal processing that performs Automatic Room Calibration. These systems perform a number of different measurements and adjustments, including equalization. Within a limited seating area, these can be very effective at improving the overall system performance and the quality of the bass. However, not all algorithms work well and in some cases their success depends of the expertise of the person setting up the system and their ability to reconfigure the settings. If you utilize the Auto Room Calibration system on your receiver and you discover that it sounds worse afterwards, then we recommend that you restore the factory default settings and consult an expert to work out the issues.

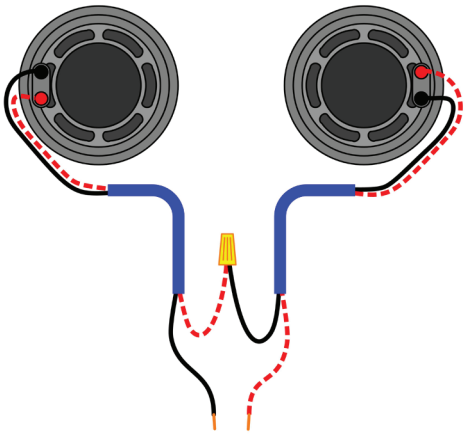
Note: Equalization can not be used to correct every location in the room simultaneously. If you optimize the bass for the middle or any other location in the room then it will not be accurate at many other locations. That is the nature of the environment.

CROSSOVER

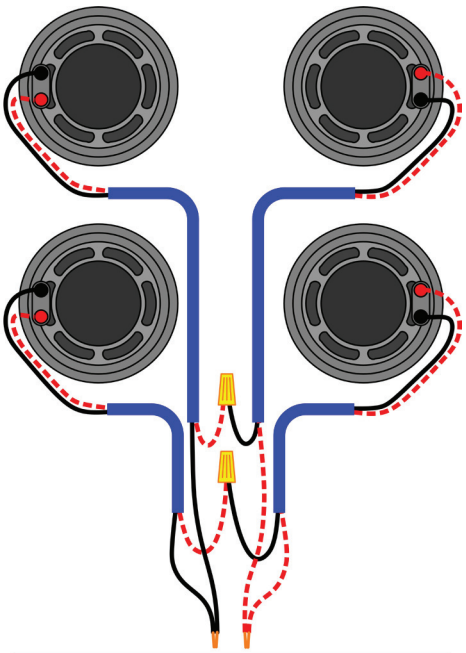
Since this is a subwoofer, it has a limited range of frequencies which it designed to reproduce. The function of the crossover is to direct the various frequencies to their proper destinations. Frequencies that are suitable for the subwoofer are directed to the sub and other higher frequencies are directed to the main speakers (satellites). If this subwoofer is part of a



SINGLE SUBWOOFER
This solution will yield a 4-ohm load.
Connect to the outputs of the amplifier.



SERIES WIRED SUBWOOFERS
This solution will yield an 8-ohm load.
Connect to the outputs of the amplifier.



SERIES-PARALLEL WIRED SUBWOOFERS
This solution will yield a 4-ohm load.
Connect to the outputs of the amplifier.

home theater and driven actively with a separate amplifier then the crossover function will be handled by the AV receiver. **For most installations, whether the AEF-8LFT is part of a distributed audio system or a home theater, we recommend a crossover frequency of 80Hz ±20Hz.**

WIRING

To achieve maximum performance from your new subwoofer(s) we strongly suggest the use of good quality CL-2 or CL-3 rated audio cable. We recommend that the cable be at least 16 gauge or larger for runs of over 50 feet (15m) and that the cable meet your local codes and regulations. Allow about 2½ feet (0.8m) of free cable at the speaker cut-out and sufficient length at the other end to reach the electronics. Having to add extra cable later can be tedious and time consuming.

Avoid bundling speaker cables parallel to electrical cables for extended lengths. Though the impedance is low and the likelihood of interference low, this may help reduce hum and RF interference. When securing the cable, use care not to staple or nail the electrical conductors. Doing so could result in a short that might damage the electronics.

When connecting your speakers, make sure proper polarity (phasing) is maintained. Simply put, this means being sure the same wire which is hooked to the positive terminal of the amplifier has its other end hooked to the positive terminal of the speaker. It is important to check this on all speakers. If the connections on one of the speakers are reversed, (out of phase) the quality of the bass will be impaired.

If you have multiple subwoofers we recommend that each one be wired with its own dedicated speaker cable. This ensures the greatest flexibility for connection and amplification.

Multiple woofers can be wired in series, parallel, or series/parallel configurations. Please refer to the illustrations showing the various wiring configurations on this page.

PAINTING THE GRILLES

If you will be painting your grilles then leave them in their plastic bags until needed to protect them from dust and oil contamination.

The grilles can be painted using multiple light coats of spray paint. Do not paint the grilles with a brush or roller. Custom color spray paints are available in different sheens to match most surfaces. Contact us or your dealer for information. Certain types of paint will require thinning to avoid clogging the grille's perforations. **It is not necessary or recommended to remove the scrim cloth from the back of the grille prior to painting. It can't be reapplied once removed.**

Follow the directions that are supplied with your paint. In addition to the paint supplier's instructions we suggest the following techniques be employed to ensure the best possible finish.

» Ensure the work area is protected from overspray and that it is clean and clear of dust before beginning. A light mist of paint can be applied to the protected work surface and allowed to dry before painting the grilles. This can help to keep loose dust particles from becoming airborne while painting.

» Apply the paint to the front and edges of the grilles from several directions by either turning the grilles or moving around the grilles while painting. This will provide more uniform coverage.

» Begin spraying to one side of the grille and then move the steady spray over the grille as you work your way around it. This helps to ensure that you have a steady smooth spray that is free from large spatter that sometimes occurs when the spray is first initiated. Stop the spray in the same way, by moving the spray away from the grille.

» Use a few light coats and allow sufficient time for the paint to dry before handling.

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