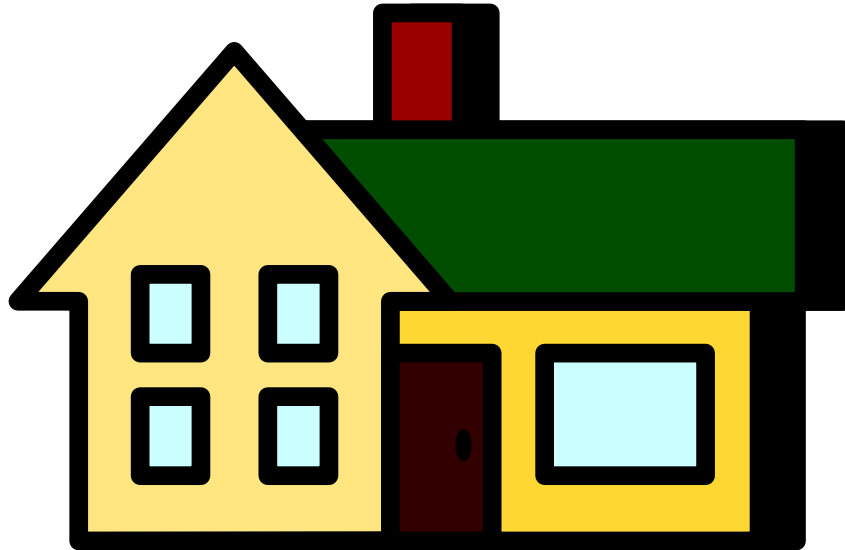


Decorate Your Home With Music



In-Wall Speaker Installation and Owner's Manual

OEM Systems Company, Inc.

\$5.00

Part Number 696

One Year Limited Warranty

If the speaker system proves to be defective in materials or workmanship, within one year from the date of the original customer's purchase, we will at our option, repair or replace the defective product. Abuse is NOT included in the warranty.

Limitation of Implied Warranties

Any implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

Exclusion of Certain Damages

Liability for any defective product is limited to repair or replacement of the product at our option. The factory shall not be liable for incidental or consequential damages of any kind or character because of product defects.

Some states do not allow limitation on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply.

This Warranty Does Not Cover

1. Damage caused by abuse, accident, misuse, negligence, improper operation or installation.
2. Products that have been altered or modified.
3. Any product whose serial number has been altered or removed.
4. Normal wear and maintenance.
5. Damages caused by shipping. All claims for shipping damages must be made with the carrier.

Warranty Service

Warranty service must be performed by an authorized service center, usually a dealer or its authorized agent.

All warranty repairs must be accompanied by the original bill of sale. No other document is acceptable or required.

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Congratulations and Thank You

for selecting Speaker and Accessory Products by OEM. They combine advanced technology with durability and will provide years of musical enjoyment. Your best choice for great sound in an uncluttered living space.

This manual is designed to make your speaker and accessory installation as easy as they are to listen to. You will find this installation to be simple, if you are the “D.I.Y.” kind of person.

Before you begin, we ask that you read this manual. We wish to share information with you pursuant to your achieving the highest level of sound quality with architecturally and aesthetically pleasing results.

We take into consideration Surround Sound issues for Home Theater industry standards, outdoor sound applications, multi-zone/source amplifiers and more. We also provide you with information on contacting outside services if you decide that any part of the installation process is beyond your comfort level.

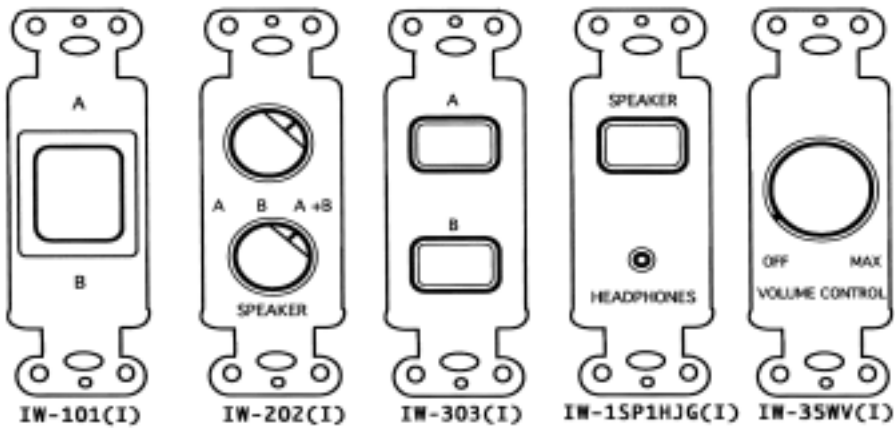
OEM manufactures a “**Wall to Wall**” compliment of equipment and accessories for Music & Sound Distribution Systems.

To maintain an elegant and uniform look in your home, with the highest degree of flexibility and performance while complementing the look of your existing/planned wall-mounted AC outlets, light switches, dimmers, etc., use OEM Products and Accessories.

For the best results in planning the design and installation of your sound distribution system *please* keep in mind that OEM Systems Company manufactures a full host of:

- ◆ In-Wall Speakers
- ◆ Decora® Style In-Wall **steel frame** “J” box mount volume controls, source switchers and jack plates which make installations neat and functional while maintaining a uniform appearance with your existing/planned wall-mounted AC outlets, light switches, dimmers, etc.
- ◆ On-Wall Indoor/Outdoor *weatherized* Speakers and Mounting Brackets
- ◆ In-Ceiling Speakers
- ◆ In-Wall AM/FM/Cassette Stereo Receivers
- ◆ In-Wall Subwoofer Speakers
- ◆ Home Theater *magnetically shielded* Center Channel Speakers
- ◆ Sound Scape™ SS-84-G outdoor stereo speaker
- ◆ Table Top Impedance Matching Switchers for stable & reliable use of more than two (2) pair of speakers (most amplifier/receivers have difficulty driving more than two (2) speaker pairs simultaneously)
- ◆ New Construction Rough-In Kits
- ◆ Drywall Speaker Locators

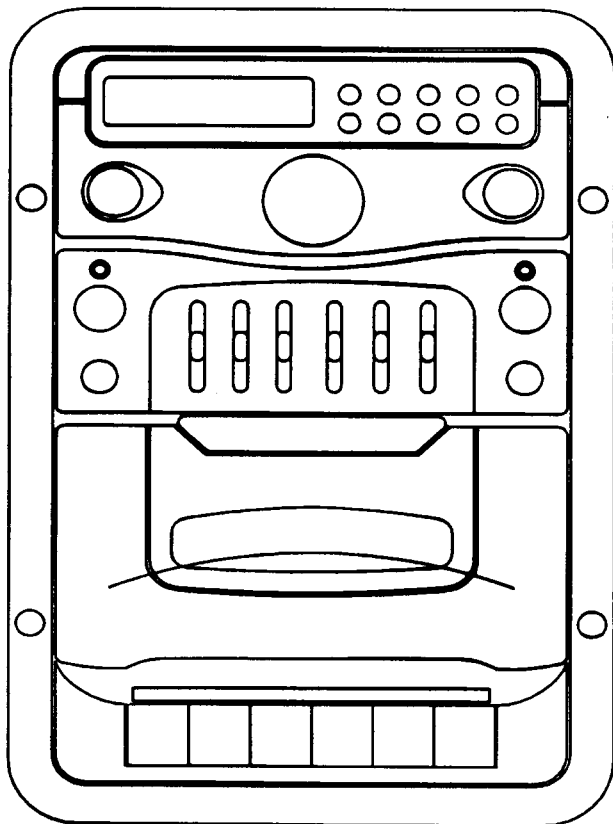
Decora® Style In-Wall Accessories



- ◆ In-Wall Source Switches
- ◆ In-Wall Speaker Selectors
- ◆ In-Wall Headphone/Speaker Switches
- ◆ In-Wall Autoformer Volume Controls
- ◆ In-Wall Banana Jacks
- ◆ In-Wall 5-way Binding Posts
- ◆ In-Wall RCA Jacks
- ◆ not all models shown

Our Heavy Duty Autoformer type volume controls (*limited lifetime warranty*) are conservatively rated at 35, 50, and 80 watts RMS per channel.

In-Wall AM/FM/Cassette (CD Ready) Stereo Receivers



IW-SYS2

- ◆ In-Wall Stereo Receiver (3 1/2" depth) mounts in standard 2" x 4" wall
- ◆ Digital AM/FM Tuner
- ◆ AUX (CD) Input
- ◆ 3 Band Graphic Equalizer
- ◆ Auto Reverse Cassette Deck
- ◆ Matching In-Wall CD Player

IW-SYS2 In-Wall AM/FM/Cassette (CD Ready) Receiver

On-Wall Cabinet Type Weatherized Speakers and Accessories

In addition to In-Wall products, OEM manufactures On-Wall products and accessories which will complement many systems where In-Wall products can not be used, such as concrete or masonry walls, sheetrock or plastered walls without sufficient depth and speakers mounted outdoors in patio and pool areas, etc.

These products include:

- ◆ Indoor/Outdoor weatherized & magnetically shielded ABS cabinet speakers, available in white or black finishes
- ◆ Universal Swivel Mounts



OEM models SE-620, SE-520, SE-420 & SE-320 available in white & black

Weather-Proof Cabinet Model Speakers

- ◆ Weather-Proof
- ◆ 2-way designs
- ◆ Polycarbonate woofers
- ◆ 1" dome tweeters
- ◆ 65 Hz - 20 kHz
- ◆ 10 - 100 watt power handling
- ◆ Available in white or black



Weather-Proof Mounting Brackets

- ◆ Dual 360 degree rotation heads enable versatile positioning on back & side walls & ceilings
- ◆ Safety cable for commercial applications
- ◆ Swivel brackets hold 10 lbs.
- ◆ Available in white or black



SE-520W with SE-DBLSVL-W Bracket

- ◆ Standardized machine screw mounting holes

In-Ceiling Speakers

OEM manufactures a number of round In-Ceiling speakers including the revolutionary new **Sound Flood**[®] *patent pending*. This great new product “screws” into standard recessed ceiling light fixtures (can’s). If you have recessed ceiling lighting in your home and prefer the elegance of a clean look, this product will provide great sound, while maintaining a livable, uniform and architecturally superior look.

Note: Round In-Ceiling speakers are considerably more elegant and easier to mount than square or rectangular products because square/rectangular products do not match the look of round light fixtures and they are difficult to mount *squarely*.



Cut -Away View of SL-5000 Sound Flood

- ◆ 2-Way, with 5” woofer & 1” dome tweeter
- ◆ “Screws” into standard flush mounted ceiling light “can” & wires to the stereo system
- ◆ grill is bright stainless steel to resemble the appearance of a reflector Flood Light bulb



Round In-Ceiling Speakers

- ◆ SC-500 5.25” 2-Way
- ◆ SC-NeC520 5.25” 2-Way with “eye-ball” tweeter
- ◆ SC-600 6.5” 2-Way
- ◆ SCB-622 dual voice coil woofer with discrete left & right tweeters - single unit stereo speaker

Home Theater – Surround Sound

A combination of the correct audio/video equipment, speakers and speaker placement will result in a Home Theater experience that will be truly entertaining. A full compliment of components which make up a Home Theater includes:

1. Multi-channel audio/video receiver with “surround sound” processing adhering to one or more of the following standards:
 - ◆ Dolby AC-3
 - ◆ Dolby Pro Logic
 - ◆ Lucas THX
 - ◆ Other types are available and may be acceptable
2. 4 to 6 speakers, including:
 - ◆ Left, center & right channel front position speakers (3 total)
 - ◆ Left & right channel rear position speakers (2 total)
 - ◆ Subwoofer (1 total)
3. Quality TV/Monitor
4. Quality VCR or Video Laser Disc player, Cable TV or Satellite feed

FRONT, LEFT & RIGHT CHANNEL SPEAKERS

Front channel speakers may be of differing variety. In-Wall speakers are our preference for great sound and a clean uncluttered space, although cabinet models i.e., book shelf or floor standing products work fine.

Center Channel Speakers

In today’s video scene, the center channel speaker carries 90% of the “dialog” or “spoken word” of the movies you will rent, purchase or access via cable TV or Satellite services.

The center channel speaker must be “magnetically shielded” if it is within a certain distance of your TV/ Monitor. Unshielded speakers and the magnetic field that they induce have an adverse effect on TV/ Monitor picture tubes which are within close proximity.

Generally the only speakers that are **shielded** are cabinet models specifically designed to be used in connection with Home Theater. The OEM model CS-540 is an excellent choice. It is specifically designed for Center Channel.



CS-540 shown atop of 27” TV monitor, with the supplied optional pedestal (not required), without pedestal, the **CS-540** mates neatly with the TV/Monitor



CS-540

- ◆ Shown with grill removed and supplied optional pedestal
- ◆ 2-Way, 3 driver design
- ◆ 2 - 5.50” polyolefin coated woofers
- ◆ 1” mylar ferro fluid cooled tweeter
- ◆ Pedestal included; its use is optional
- ◆ 50 watts nominal
- ◆ 100 watts maximum
- ◆ Horizontal or vertical use

Rear Channel Speakers

In-Wall or In-Ceiling speakers are the best choice for rear channel use for obvious reasons. They sound great, offer the highest sound value, can be easily placed where they will complete the surround sound field and they are completely out of the way.

Subwoofers OEM offer two models of In-Wall subwoofers, the C-8SW (shown with grill removed) and the SE-890C.

A subwoofer adds the deep, sustained bass frequencies that in addition to surround sound recreates an authentic sound field. Action and other movies of all types benefit by the addition of a subwoofer. In-Wall subwoofers can be located almost anywhere because of the omni-directional nature of bass sound propagation.



- ◆ C-8SW shown with grill removed
- ◆ 8” dual voice coil woofer
- ◆ Built in stereo cross-over for easy integration with satellite speakers
- ◆ Provides deep bass performance for life-like movie action sequences
- ◆ Easy to install and integrate with Home Theater Systems

SOUND SCAPE™ SS-84-G Outdoor Speaker

- ◆ Dual voice coil woofer with 4 piezo tweeters (2 per channel)
- ◆ 360° stereo horizontal dispersion from a single unit
- ◆ Rugged ABS enclosure resists long term exposure to moisture, ultraviolet light, heat & cold
- ◆ Stylish housing blends in with all types of landscaping
- ◆ 8 ohm impedance
- ◆ 100 watt power capacity
- ◆ Residential & commercial applications

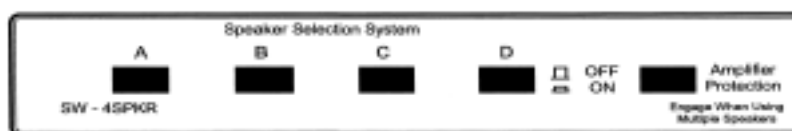


Impedance Matching Switchers

When you have a multi-room sound system, depending on the number of rooms and speakers you plan to have, in addition to in-room volume controls and on/off source switches, etc. an impedance matching switcher located in the “central area” along with the amplifier/receiver may be helpful and important.

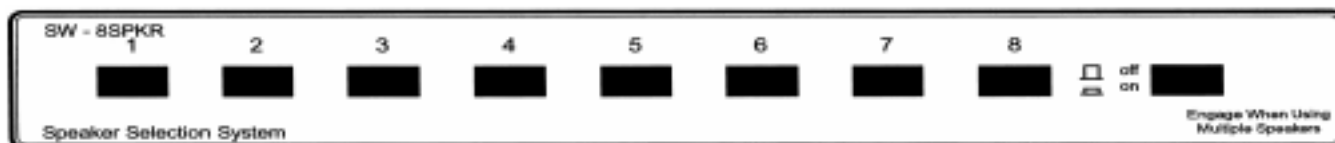
Many amplifier/receiver units have enough *watts* to run many pairs of speakers, but do not have the *current* delivering capability to deal with the drop in impedance which occurs when multiple speakers are wired “in parallel” to a single amplifier. Because this is common and because it is convenient to have on/off switching capability at the system center OEM has developed multiple products in this category, one of which will certainly fill your requirement.

SW-4SPKR



Impedance protection for up to four (4) pair of speakers.

SW-8SPKR



Impedance protection for up to eight (8) pair of speakers.

New product (photo not available at print time)

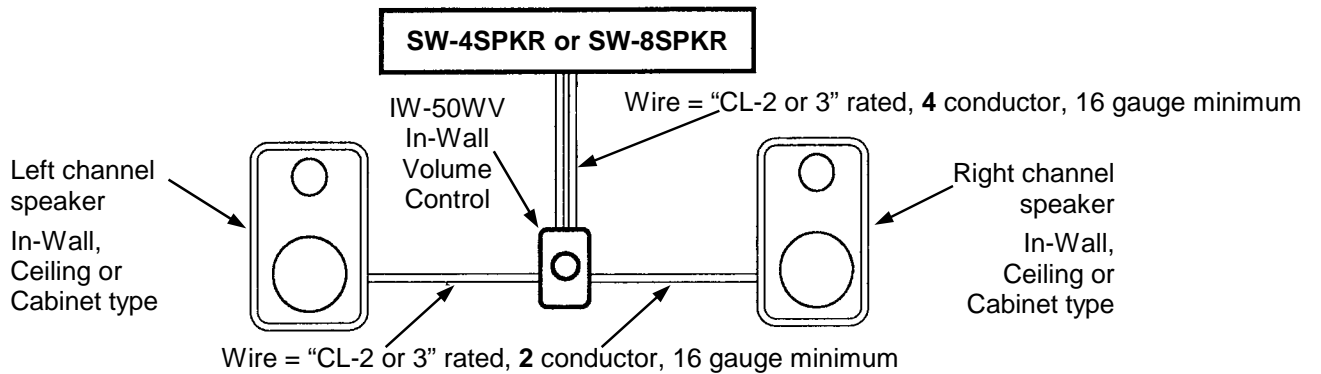
IW-SW4SPKR

An In-Wall impedance protected four (4) pair speaker switcher which fits in a standard “J” box. Two (2), or three (3) IW-SW4SPKR’s may be combined or “daisy-chained” in a two (2) or three (3) gang standard “J” box for impedance protected speaker switching of eight (8) or twelve (12) pair of speakers.

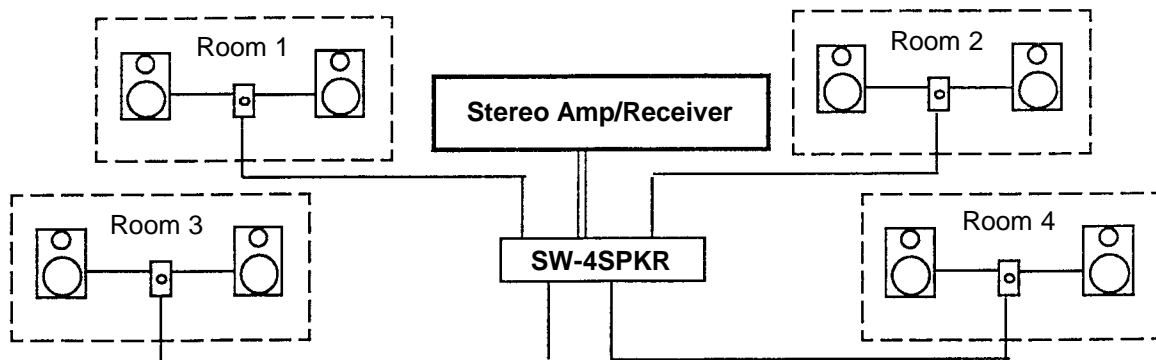
Consult your Dealer.

Layout for a Basic Multi-Room Audio System

Regardless of how many rooms or areas in your home in which you want distributed audio, you must begin by deciding how many "Stereo Pairs" of speakers you will be connecting to your system. Most likely your present stereo system is capable of driving multiple pairs of speakers **only** when an impedance matching speaker switching device is used such as the two (2) models discussed on the preceding page (SW-4SPKR which handles up to four (4) pair of speakers or the SW-8SPKR which handles up to eight (8) pair of speakers). Whichever switcher you choose, each room will "Home Run" wire back to the switcher as illustrated below:



Typical 4 Room Block Wiring Diagram



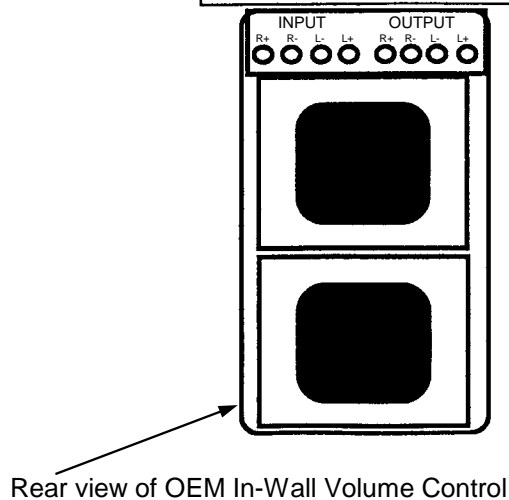
Volume Control Wiring Detail

To Input side of Volume Control

Connect the 4 conductor wire from the SW-4SPKR, pay attention that the Left & Right, Positive (+) & Negative (-) conductors are all in the correct positions.

To Output side of Volume Control

Connect a 2 conductor wire to the Left Positive (+) & Negative (-) terminals and run it to the left channel speaker. Follow the same procedure for the Right channel speaker.



What You Need To Do The Job

A Design Plan

Questions for developing your plan:

1. How many zones or rooms will you be installing speakers?
2. Where will the speakers be placed?
3. Which type(s) of speakers will you be using?
 - a. In-Wall
 - b. On-Wall
 - c. In-Ceiling
 - d. Freestanding (bookshelf/floor standing)
4. How many total pairs of primary or *front* channel speakers will you be using?
5. Will you be installing rear or *surround* channel speakers for Home Theater use? If so, how many pair and which type (In-Wall, On-Wall, In-Ceiling or freestanding)?
6. Will you be installing a **center** channel speaker? If so, where and which type (In-Wall, On-Wall, In-Ceiling or freestanding)?
7. Will you be installing In-Wall volume, source switching or infrared repeater controls in some or all of the zone/rooms? If so, how many and where?
8. Will you be installing In-Wall Jack Plates? If so how many and where?

Give careful consideration to these issues as you will need to assemble the proper quantities of hardware and enough wire of the proper type(s) to complete the installation according to your plan.

If you are so inclined, consider drawing your plan out on paper marking the positions of the central equipment location showing the type and number of Jack Plates required (i.e., Banana Jacks, 5-way binding posts, "F" connectors for cable TV, etc.) and each of the separate zone/rooms showing the location of the respective In-Wall volume, source switching and infrared repeaters controls.

Measure the distance from the central equipment wall location (this is where the sound from the central equipment [amplifier/receiver, CD player, tape machine, TV/video sound, etc.] will interface with the sound distribution network) to each of the In-Wall volume, source switching and/or infrared controls *if you are including them in your design*. Next measure the distance from each of the In-Wall controls to each pair of their respective speakers.

You can save time and money by using 4-conductor wire on the wire runs from the equipment central location to each of the In-Wall control locations, *if you are using them*, and then 2-conductor wire to each location of the two (left & right) speakers which the individual In-Wall controls will command.

Note: To avoid any differences in volume levels between the individual zone/rooms' left & right speaker channels use an equal length of wire between the In-Wall controls, *if you are using them*, and the speakers. In any particular instance if one of the speakers is considerably closer to the In-Wall control than the other coil up the excess wire at some point near the speaker.

Note: If you are not using In-Wall controls, use 2-conductor wire for the wire runs from the central equipment location to the speaker pairs and **again** keep the wire lengths relatively equal for the left & right channels in each zone/room. This does not mean that *every* speaker in the network must have an equal wire length. It means that if for example, you have 2 zone/rooms each with one (1) pair of speakers and zone A's speakers are 75' & 100' away respectively and zone/room B's speakers are 30' & 50' respectively from the central equipment location or from the In-Wall control whichever the case may be, then make both wire runs for zone A 100' in length and both wire runs for zone B 50' in length.

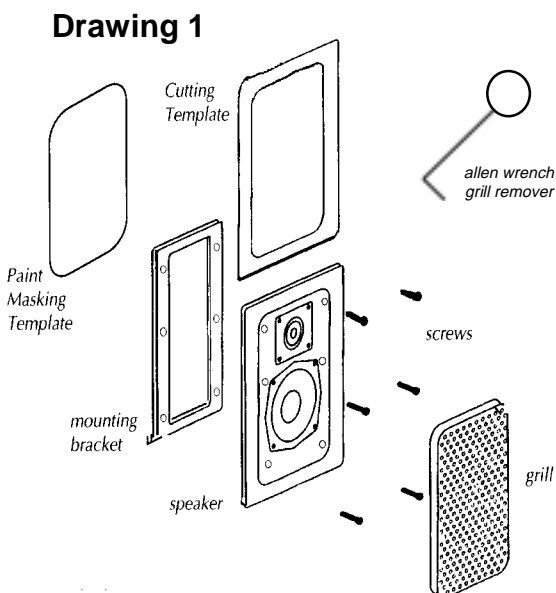
Uses & Locations of In-Wall Jack Plates

1. In the wall behind the central equipment location
 - a. Banana Jacks or 5-way binding post Jack Plates for sending the sound to the sound distribution network.
 - b. "F" connector Jack Plates for bringing cable TV, antenna, satellite feed to the central equipment's AM/FM, and video components.
 - c. Infrared transmitter/repeater Jack Plates for bringing remote control commands from the respective remote zone/rooms to the central equipment.
2. In the walls of the zone/rooms where speakers (*and separate TV sets*) will be located
 - a. In those cases where freestanding bookshelf or floor standing speakers will be used you should use Banana or 5-way binding post Jack Plates in the wall behind the intended location of each speaker and then run short wires from the Jack Plates *out of the wall* into the freestanding speaker input terminals.
 - b. If you plan a separate TV in any of the rooms you can use an "F" connector Jack Plate to neatly route the cable in the wall to the TV set(s).

Speaker System Parts Inventory (Drawing 1)

Before you get involved in the actual installation process, it is a good idea to check for possible shipping damage and identify parts and hardware:

- ◆ Two (2) loudspeaker systems with attached grills
- ◆ Two (2) metal brackets - rectangular with tapped screw holes
- ◆ Twelve (12) black metal screws (in their own little zip-lock bag)
- ◆ Another clear plastic bag with little rectangles of a black substance wrapped in white paper (explained later)
- ◆ Template(s) for cutting speaker hole(s)
- ◆ Speaker Grill "puller" tool (a small allen wrench type device with a finger loop)
- ◆ For new construction:
 - ◆ Drywall Locators which are discussed at the end of this guide are included.
 - ◆ Plastic "rough in" kits may be included. If they are not included, you may order them through your dealer.
 - ◆ Locators and rough-in kits are only used for installations in new construction, where walls are not yet covered.



If anything is missing after a thorough search of the box and packing materials, contact the dealer where you bought your speakers. Although In-Wall Systems are extremely well packed to withstand the rigors of shipping, you should still inspect them closely, especially if there is any damage to the outside cartons.

If you find anything wrong, contact your dealer or the shipper who delivered the speakers.

Note: Either a cardboard cutting template with cut-out, or simply a cut-out dimension guide, may be included. If only a paper dimension guide is found, use it to fashion a sturdy reusable cardboard cut-out template.

Tools for Installation in Existing Walls

It doesn't take a whole workshop to install your new speakers, just a few simple tools:

- ◆ pencil
- ◆ drill with a 1 inch flat bit
- ◆ rectangular utility knife or possibly a keyhole saw if your walls are "lath and plaster"
- ◆ length of stiff wire about 3 feet long (a straightened wire coat hanger works fine)
- ◆ Phillips head screw driver which will fit the black screws included with your speakers
- ◆ pair of wire stripper/cutters
- ◆ flashlight

Some of the following may also be needed, depending on the application:

- ◆ stud finder (very helpful in locating obstructions)
- ◆ drill bit just slightly larger than the diameter of the speaker wire
- ◆ plumb Bob or small weight on a string (a threaded hardware "nut" works fine)
- ◆ insulated staples for securing speaker wire
- ◆ masking tape or foam "double stick" tape
- ◆ paint and applicator for changing grill and outer frame finish
- ◆ bubble level

Speaker Wire

The amount of speaker wire you are going to need will of course vary with speaker and In-Wall control and Jack Plate placement (which we will cover next). But we are covering the subject of wire now because it is something you may have to go out and obtain along with whatever tools you don't already have. Wire is not included in this kit.

What Kind To Use

We recommend using multi-stranded Class 2 or Class 3 rated Plenum wire for amplifier to speaker connections. It is sold in pre-packaged rolls and in bulk displays at hardware, lighting, and home improvement stores. The outside covering (insulation) can be transparent, or any color, but make sure it is of sufficient thickness (gauge).

Selecting The Proper Gauge

Wire is measured in "gauges". Confusingly, the larger the gauge rating number, the thinner the wire. For example, 18 gauge is thinner than 14 gauge.

The gauge of wire you need is determined by the distance between your amplifier/receiver, In-Wall volume, source switching controls, the In-Wall speakers and misc. other Jack Plates. Use the following chart as a guide:

Length	Minimum Gauge
up to 50'	16
50' - 150'	14
over 150'	12

If in doubt, be safe and get a heavier gauge (thicker wire). Using too light (thin) a gauge wire over a long distance will compromise sound quality and will cause an apparent loss of power over long wire run distances.

How Much To Buy

Basically, more than you think you need. As we noted earlier, a discussion of lengths is premature until you have decided on exact placement of the speakers and amplifier, so you may want to skip this section and read the section below on “Where To Put Your Speakers”. But if you have a rough idea of the distance from your amplifier to the In-Wall controls and speakers, here are a few tips:

- ◆ Because of complicated paths which are often required to route wire, you will definitely need more than the amount derived from simple measurements.
- ◆ Even if one speaker is a lot closer to the amplifier than the other speaker, you should use the same length of wire for both paths. This ensures that both speakers will play at equal volume.
- ◆ Professional installers often use the “As The Crow Flies” rule of thumb, whatever the distance(s) in a straight line from the amplifier to each pair of speakers multiplied by five (5). This provides enough for the left and right speaker channel paths plus a healthy margin for unforeseen detours.

The store where you purchased your OEM products is an excellent source of help in determining the amount, type(s) and gauge(s) of wire to purchase and a drawing of your planned distribution system is indispensable here.

Remember, an electrician’s favorite adage, *“You can always cut off extra wire, but they don’t stretch worth a darn”*.

Amplifier Considerations

Virtually any receiver, power amplifier or integrated amplifier can be used with your In-Wall speakers. Don’t worry if your amplifier has a higher power rating than the input rating for these speakers. Amplifiers very seldom are called upon to deliver their full rated power. It is easier to “blow” your speakers with an under-powered amplifier than with a high-powered amplifier. When a low power amplifier is “cranked-up” it can produce high levels of distortion. Distortion is the enemy of speakers. See the section on “Taking Care of Your New Speakers”.

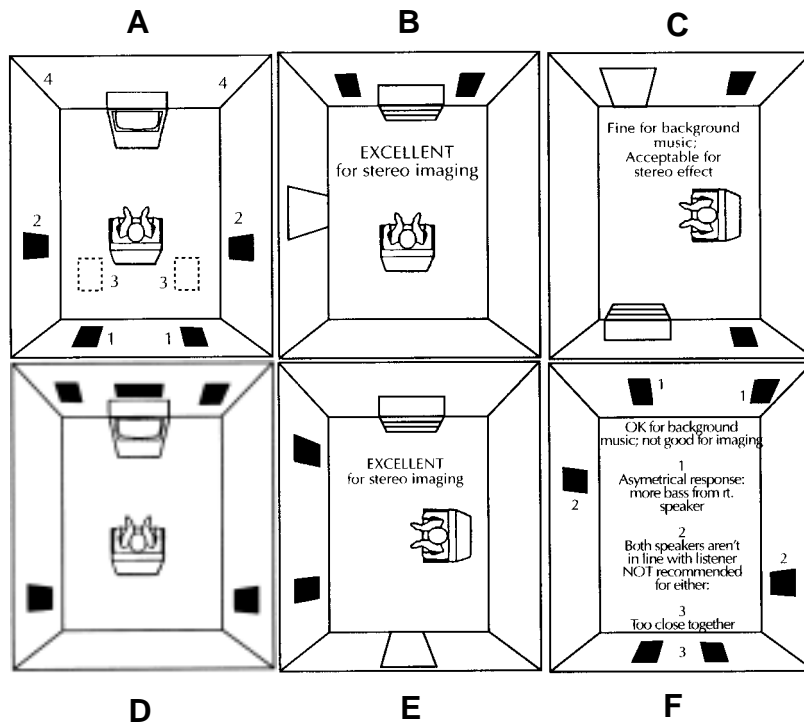
A more serious consideration is whether or not you intend to power more than one set of speakers with the same amplifier/receiver. If you intend to hook speakers to both the “A” and “B” amplifier/receiver output terminals and play both sets of speakers at the same time, you should read the section of this manual titled **“More on Amplifiers and Impedances”**, and review the sections “Impedance Matching Switchers” and “Multi-Room Amplifiers” in the introduction portion to avoid potential problems.

Where to Put Your Speakers

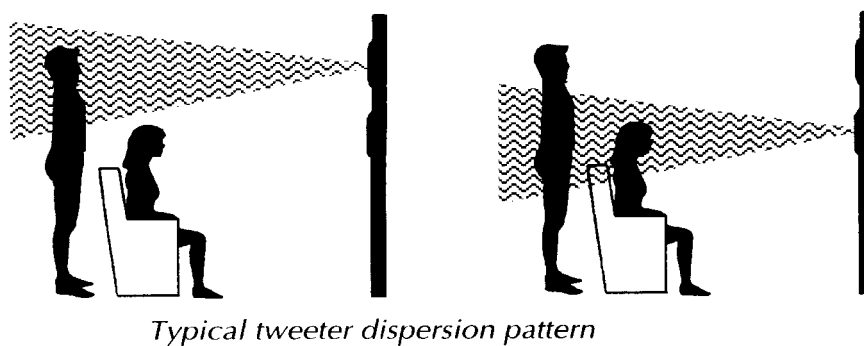
Placement can make all the difference in how your speaker system sounds - and how easy they are to install. There is one (1) "How" and three (3) "Wheres" to factor into your layout:

- ◆ How you intend to use your In-Wall speakers
- ◆ Where they will sound best (stereo imaging and acoustic considerations) taking into account your normal listening positions
- ◆ Where it is possible *structurally and otherwise* to install them (wall and ceiling surfaces)
- ◆ Where they can be installed that makes it easy to get wires to them without remodeling your entire house

Drawing 2



Drawing 3



Various Uses

In-Wall speakers can be used for background music, as a primary listening system or as built-in rear channel Surround Speakers in an Audio/Video Home Theater System as mentioned in the "Home Theater" section and "Center channel", "Rear channel" and "Subwoofer" sub-sections appearing in the "Introduction" portion of this guide.

Where to Put Your Speakers *continued*

Background Music (Drawing 2c, f)

If you only want low volume background music to float through a room, placement for best acoustics and imaging is not particularly critical. You can pretty well ignore all our diagrams and tips on imaging and other acoustical matters. Just put your speakers where it is convenient and non-obtrusive to room decor, but do not group the speakers too close together. You can even place the speakers in adjoining rooms, such as a living room which adjoins a formal dining room, or in a kitchen and breakfast nook, etc.

If you are going to place the speakers high up on a wall, flip the speaker upside-down when mounting so that the tweeter is on the bottom. This will provide better treble dispersion (see Drawing 3).

Surround Sound

In-Wall speakers make excellent surround speakers. They can be mounted at ear level in any of the positions shown in Drawing 2 including the ceiling, (Drawing 2a, pair 3).

Dolby® AC-3

Drawing 2d illustrates the recommended Dolby® Laboratories AC-3 five (5) speaker placement three (3) front (left, center & right) and two (2) rear (left & right). The AC-3 system is sometimes referred to as 5.1, because optimally the 5 discrete channels are augmented with a subwoofer which for the most part can be placed in any number of positions as its location is not critical.

Stereo Imaging

If your In-Wall speakers are going to be your primary listening source in a room, you need to consider some other factors to ensure proper imaging. The term “stereo imaging” refers to a speaker system’s ability to project music so that it sounds like the performers are in a three-dimensional space between the speakers. It is the whole point of “Stereo” instead of “Mono” (Drawing 2e).

Drawings 2b, c, e & f show some of the possible placements as well as some situations to avoid.

Other Acoustic Considerations

For best fidelity, there are several other factors to keep in mind before you begin the actual installation.

Vertical Placement (Drawing 3)

Treble frequencies are quite directional. While the dome tweeters in the speakers are designed to disperse high frequencies over a wide area, they will yield the best sound when positioned so that they are at listening position ear level.

Of course, if the speakers are being installed in an area where listeners usually stand up, such as the kitchen or a hallway, “ear-level” will be higher on the wall than for those rooms where listeners are often seated.

Corners and Reflections

When an In-Wall speaker is placed close to the corner of a room, bass frequencies are emphasized. This can be OK if both speakers are mounted near corners (while maintaining stereo imaging). Avoid placing just one speaker in a corner and another on a long flat wall, (Drawing 2f), speaker pair 1. Treble is emphasized when it reflects back from reflective surfaces such as large windows. Conversely, highs tend to be muffled by soft surfaces such as drapes, rugs, upholstered furniture, carpeted steps and even wallpaper.

In general, the best acoustic performance will result if both speakers face a similar type of surface and are placed in similar positions on the same type of wall.

Wall and Ceiling Surfaces

Now that we have covered where you *should* place your speakers, let's consider where you *can* place them.

In-Wall speakers require at least 3 ½" mounting depth (measured from the outer surface of the wall).

This means that they can be installed in any wallboard and 2" X 4" stud wall. In fact, the dense, rigid nature of wallboard or "sheetrock" (or lath & plaster in older homes) acts as a superb speaker baffle. You can also install the speakers in stud walls covered with thick wood paneling or in sheetrock or lath & plaster ceilings.

However you should avoid:

- ◆ Stud walls covered with thin paneling - the surface is not rigid enough and can cause annoying vibrations and buzzing, although in many cases reinforcing may be possible.
- ◆ T-bar "drop ceilings" with very thin fiberboard panels which can buzz and vibrate. If you suspect this will happen, reinforce the drop in panels with plywood or particle board.
- ◆ Any wall which can not provide the minimum depth of 3 ½" as clearance for the rear portion of the speaker. This includes brick and concrete walls where the sheetrock or paneling is attached to thin furring strips.
- ◆ Portions of walls where there are pipes, heating/air conditioning ducts, and especially AC wiring in the general vicinity. For example, if there is an outlet along the baseboard, there is often a live wire running part or all of the way up the wall at that point.

Speaker Wire Paths

The last consideration is the obstacle course that lies between the speakers' intended mounting positions and the desired mounting position/location of the central stereo system (amplifier/receiver).

Wires can be run through crawl spaces that lie above the ceiling or below the floor, through basements or second stories, or simply along the perimeter of the room. We cover each of these scenarios in detail in the "Running Connecting Wires" section of this manual.

In general, you should pay particular attention to the following areas:

- ◆ Avoid running speaker wires close to electrical wiring for any distance. If you must run speaker wire parallel to electrical wire be sure to maintain a distance between them of at least two (2) feet. It is, however, OK for speaker wires to cross paths with electrical wires at right angles or to go through the same hole together such as a joist or stud as long as they are separated before and after passing through the member together.
- ◆ Make sure that the entire path between speakers and amplifier is clear and not obstructed by a major floor or ceiling joist or masonry wall which you will not be able to drill through.
- ◆ Remember that the other end of the wires have to come out somewhere to connect with the amplifier. Confirm ahead of time that you can drill an outlet hole easily and in an unobtrusive spot.

Painting Your Speakers

If you like the native designer white finish of your In-Wall speakers, you can skip to the next step, "Cutting Holes For Your Speakers". But if you want your speakers to completely blend in with or accent a color scheme, now is the time to paint or cover the speakers' outer frames and perforated grills.

The speaker's outer surfaces are primed to accept ordinary latex wall paint or aerosol spray paint. Because the surface behind the perforated grill should remain black, you need to mask this area off before you begin painting.

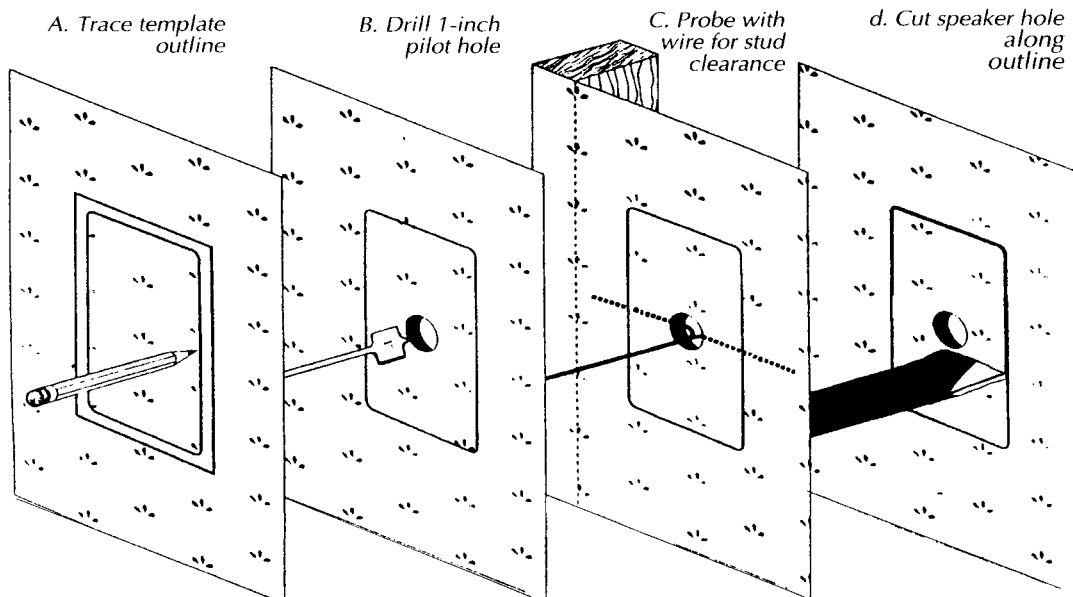
1. First the speaker grills must be removed. To do this use the included grill puller tool. Place your index finger through the loop and insert the short straight end through one of the grill perforations near the grill's corner and gently pull the grill off.
2. If a paint masking template was provided with your speakers (rectangular white cardboard that fits inside the frame) use it to mask the inner area.
3. If no masking template was provided, carefully mask off the black baffle and speakers.
4. Paint the outer speaker frame and grill **separately**. A roller with a short or medium nap will work much better than a brush.
5. After the paint has thoroughly dried, remove the cardboard masking plate or masking tape.

There is no need to replace the grills at this time since you will need access to the inner speaker surface during installation.

Cutting Holes For Your Speakers (Drawing 4)

Wall board is an easy surface in which to make a relatively neat hole. Actually, the hole does not even have to be that neat since the speaker's outer frame will cover it. Just make sure you do not make it any larger than the template. In the following steps, you are going to locate a section of wall between two studs, mark the outer boundaries of the hole, drill a small hole in the center to confirm your location and then cut the main hole.

Drawing 4



Cutting Holes For Your Speakers *continued*

1. First you must determine the location of your wall studs so that the speaker can be approximately centered between them. There are several ways to do this:
 - ◆ Tap on the wall and listen to the resulting “THUMP”. When it is deeper, you are close to a stud.
 - ◆ Use a stud-finder, a simple little magnetic device which works by locating the vertical lines of nails holding the sheetrock to the studs. Electronic models that sense the density of studs are also available and recommended.
 - ◆ Identify studs by the position of electrical outlets or switches along a wall. There will be a stud either directly to the left or right of an electrical fixture. This gives you a point of measurement, since studs are usually 16” “on-center” apart.
2. When you are reasonably sure of where the 2” X 4” wall studs are (and are **totally** sure that there is no electrical wiring, ducting, plumbing, etc. in the area you plan to cut, position one of the cardboard mounting templates and draw around the inside outline with a pencil. If you do not trust your eye, use a level to make certain that the finished hole will be straight and level. Repeat these steps for each speaker.
3. Drill a 1” hole in the center of the pencil drawn outline.
4. Obtain a length of stiff wire such as an unwound, straightened coat hanger. Bend it so that the last 12” is at a right angle to the rest.
5. Insert the 12” end into the 1” hole to probe left and right to confirm that a stud on either side is not too close.
 - ◆ If there is a stud on one side or the other in too close proximity, simply reposition the cardboard template a few inches in the opposite direction and redraw the pencil outline, keeping the 1” hole within the inner boundaries of the template.
6. If there are no obstructions, cut the hole along the pencil outline. If the surface is sheetrock, simply cut it increasingly deeper with a utility knife until it gives way and then pull the cutout portion out by grasping it through the 1” drill hole.
 - ◆ If you are dealing with lath and plaster or thick paneling, you need to use a key-hole saw or equivalent instead of the utility knife, cut slowly so as to minimize chipping.
7. Temporarily place the speaker into the cut-out to ensure that it fits properly. It is OK if the hole is slightly large, since it will be covered by the speaker’s outside frame. Actual installation will happen later, after you have routed the speaker wires.
8. Repeat appropriate steps for all remaining speakers.
9. Now it is time to drill the hole on the **other** end at the point where the wires from the speakers will exit to the amplifier/receiver.
 - ◆ Use the same 1” drill bit, or utility knife as before.

For an elegant, organized and highly functional **finish** to your sound distribution system you should utilize “J” boxes and OEM Jack Plates to terminate the wires feeding the sound distribution network at the wall behind, or near the central equipment location creating an **In-Wall input “J” box** “**patch-panel**”.

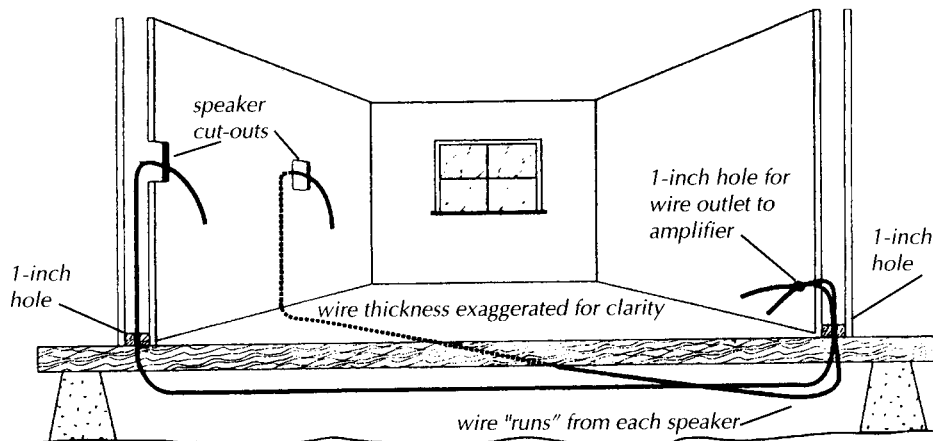
From here use short well terminated cabling (preferably terminated on both ends of each cable with banana, spade or pin type connectors, or a combination of same) from the amplifier/receiver, impedance matching switcher or multi-room amplifier to the In-Wall input “J” box” “patch-panel”.

Running Connecting Wires

Now that you know where the wires have to run, it is time to actually route them. As mentioned before, there are three possibilities:

- 1. Down, Across & Back Up (Drawing 5)** If you have a crawl space under your house or a relatively unfinished basement, your job is broken into three parts: 1) down from the amplifier to the crawl space; 2) across the crawl space to the wall(s); 3) up the wall(s) to the speaker locations.
- 2. Up & Over (Drawing 6)** If you have an attic or overhead crawl space: 1) up from the amplifier into the crawl space; 2) across the crawl space to the wall(s); 3) down the wall(s) to the speaker locations.
- 3. Overland (Drawing 7)** If the speakers and amplifier are in the same room and it is carpeted, you can route the wires along the baseboard. This method usually results in just two very short lengths of wire possibly being visible. Use whichever method or combination which is most applicable, but read over each as further described ahead before undertaking it.

Drawing 5



Down, Across & Back Up (Basement or lower crawl space) (Drawing 5)

If you have an unfinished basement or crawl space under your home, you can avoid having to run wires in the room. Working from underneath is sometimes trickier since there are often more pipes, ducts, electrical and cable lines already in place.

1. Make sure you have the following:
 - ◆ flash light
 - ◆ tape measure
 - ◆ cordless drill, or regular model with long extension cord
 - ◆ a very long roll of approved speaker wire
 - ◆ wire stripper/cutters
 - ◆ length of stiff wire such as a straightened coat hanger at least 3' long
 - ◆ tape (any type will do)
 - ◆ It is very convenient to have an additional person to help you "upstairs" or top side. This person's job will be to grab the wires as you push them up from below.

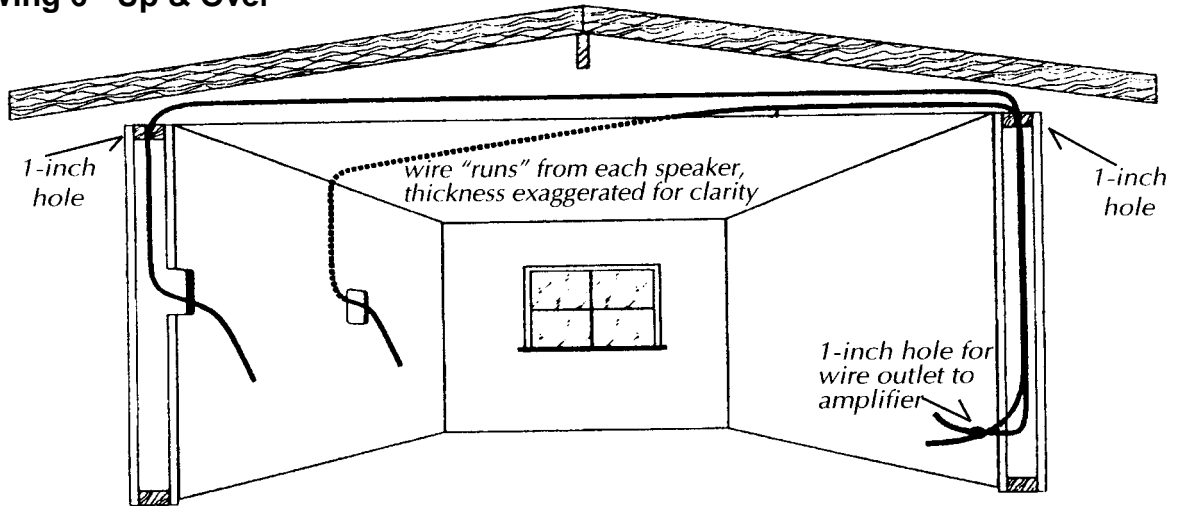
Running Connecting Wires *continued*

2. Enter the basement or crawl space and proceed to the spot directly below where one of the In-Wall speakers will be.
3. After carefully measuring to make sure you are in the right place, drill a hole up through the flooring and the horizontal 2" x 4" "plate" directly below the speakers' intended wall location.
- 4a If you do not encounter in wall insulation, which is usually present on outside walls, have your assistant lower the plumb bob or weighted string down the inside of the wall and drop it through the hole which you drilled up from the basement; a flashlight and a mirror may increase the ease of this.
- 4b If you run into insulation, tape the end of the speaker wire headed for the speaker above to the stiff wire (straight for this procedure), then push the stiff wire up through the insulation to your partner above.
5. Making sure that the end does not get pulled back down through the hole, reel out wire while moving across the basement / crawl space until you reach a location below the amplifier/receiver.
6. Extend at least ten (10) extra feet of cable and cut the end off the reel.
7. Grab your coil/roll of cable and move over to the hole that has been drilled below the other speaker. Again, have your assistant drop a plumb bob or weight and string down until you can reach it. Tape the cable to it and let him or her pull it up, extending at least eight (8) feet of wire up through this hole. Or use the stiff wire method if the wall has insulation or obstructions in it.
8. Making sure the end does not get pulled back down through the hole, reel out cable until you reach the space under the amplifier/receiver.
9. Extend at least ten (10) extra feet of cable and cut the end off the roll. You have now run wires from both speakers to a point directly below where the amplifier/receiver will be.
10. Drill a 1" hole up through the flooring and the horizontal 2" x 4" "plate" directly below the amplifier/receiver outlet hole.
11. Because of the small diameter of the hole, the plumb bob / string method may not work on the amplifier/receiver end. If so, tape the two (2) cable ends (which come from the speakers) to a stiff wire and push them up through the hole. Since there is only a 1" hole upstairs in the wall, you will probably need to wiggle the wire around until your helper can locate it and snag the wires taped to the end. They may also need to use a length of stiff wire with a little hook bent into the end to grab the cables through the small hole.
12. Have your helper pull the cable up until most of the slack has been taken up down in the crawl space or basement. If you want, you can secure the cable runs to the floor joists or beams using insulated staples.

You've done it! Skip to the section, titled "Hooking Up Your Speakers".

Running Connecting Wires *continued*

Drawing 6 - Up & Over

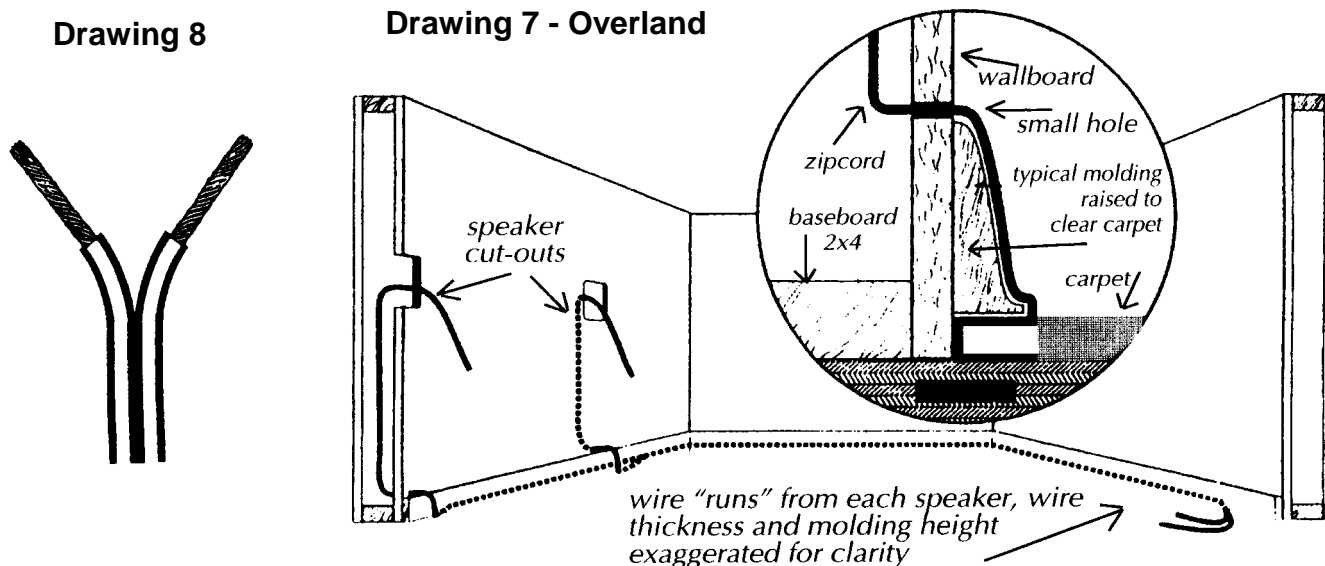


Up & Over (Attic Crawl Space) Drawing 6

1. You are about to ascend into your attic. You will need the following:
 - ◆ flash light
 - ◆ tape measure
 - ◆ cordless drill, or regular model with long extension cord
 - ◆ a very long roll of approved speaker wire
 - ◆ wire stripper/cutters
 - ◆ length of stiff wire such as a straightened coat hanger at least 3' long
 - ◆ tape (any type will do)
 - ◆ It is very convenient to have an additional person to help you "downstairs" or below. This person's job will be to grab the wires as you push them down from above.
2. Crawl up into the attic with all the above mentioned equipment and proceed to a spot that is directly over one of the speaker cut-out holes.
3. After carefully measuring to make sure you are in the right place, drill a 1" hole down through the horizontal 2" x 4" plate into the "stud bay" directly above the respective speaker cut-out.
4. Time to use that roll of cable. Push the wire end down through one of the holes you just drilled until it extends at least 8 feet. If there is in wall insulation obstructing gravity's natural pulling down of the wire, tape the end of the wire to the stiff straight coat hanger and push the stiff wire down through the insulation until it can be located at the speaker cut-out.
5. Making sure the end does not get pulled back up through the hole, reel out cable while moving across the attic/crawl space until you reach the location above your amplifier.
6. Extend at least ten (10) more feet of cable and cut it.
7. Grab your coil/roll of wire and move over to the hole that has been drilled above the other speaker. Extend at least eight (8) feet of wire down through this hole.
8. Again, making sure that the end does not get pulled back up through the hole, reel out cable until you reach the space above the amplifier/receiver.
9. Extend at least ten (10) more feet of cable and cut it. You now have cables running from both speakers. Time to get them down the wall to where the amplifier/receiver will be.

Running Connecting Wires *continued*

10. Drill a 1" hole through the horizontal 2" X 4" directly above the amplifier wall outlet.
11. Now you are going to guide the cables down to where they will emerge from the wall. Since this hole is not very large, just stuffing them down and grabbing them will not work. Instead, it is time for the plumb bob or string-with-weight (or wire if there is insulation to contend with). Tape the two cable ends (which come from the speakers) to the plumb bob string just above the weight and lower the whole thing down through the 1" hole above the amplifier/receiver. You will probably have to "feed out" the attached cable to get the weight to descend.
12. Continue "paying out" both cables until they and the weight hit bottom. Tie the free end of the plumb bob string to something so that it does not fall down the hole.
13. Exit the crawl space and stretch for a moment.
14. Go over to the 1" amplifier/receiver wire hole and look for the extended plumb bob / weighted string and the attached cables. If they are not visible, fish around for them with your stiff wire and pull them through the hole. Then rescue the plumb bob from the attic.
15. At the speaker holes, things are much easier. You can just reach through and grab the cables. Pull their entire free length out the speaker cut-out holes. You have done it! Skip to the next section entitled "Hooking Up Your Speakers".



Overland (Drawing 7)

If for a variety of reasons, it is impossible to route cables above or below, you can still achieve a relatively invisible job, assuming your amplifier/receiver can be located in the same room. Usually the only visible cable will be a 1" - 2" segment on the baseboard below each speaker.

1. On the wallboard directly below each speaker cut-out hole, measure up 2" from the floor and mark the spot with a pencil dot.
2. Drill a small hole just large enough to admit a speaker cable.
3. Insert one end of your speaker wire through the small drilled hole and use a stiff hooked wire to fish out the speaker cable from above. Repeat for both speakers.
4. When a room is carpeted, the baseboard moldings are elevated slightly to clear the carpet and pad. This creates a hollow space between the bottom of the molding and the floor which can be used to conceal your speaker cable along the perimeter of the room. Use a screwdriver, putty knife or similar flat-blunt device to stuff the cable under the molding taking care not to damage or pierce the insulation until you reach the spot where your amplifier/receiver will be.

Running Connecting Wires *continued*

Overland continued

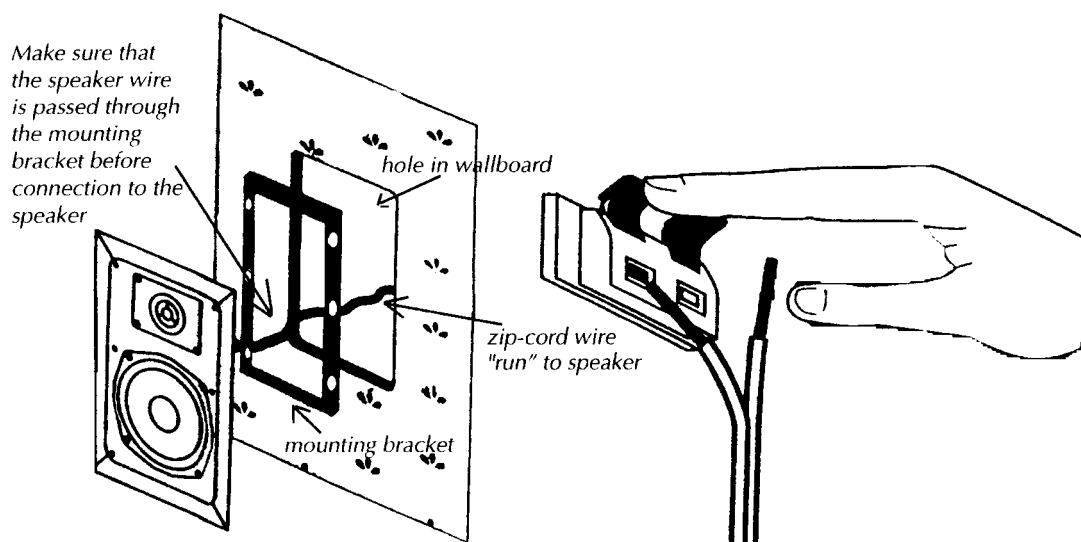
5. To secure the cable so that it does not get pulled out during vacuuming, add insulated staples at the points where the cable enters and exits the baseboard.

Note: If your baseboards are taller than normal, you can drill the hole behind the baseboard and avoid the short length of visible cable. You may have to chisel a shallow channel in the back of the baseboard for clearance.

Hooking Up Your Speakers (*Drawing 9*)

The main thing to remember when hooking up speakers is that the two conductors which make up each individual speaker wire are not interchangeable. One will be used as the **positive (+)** conductor and other for the **negative (-)** conductor. These correspond to the **Red (+)** and the **Black (-)** connectors on your In-Wall speakers and also to the speaker terminals on your amplifier/re-

Drawing 9



Identifying positive (+) and negative (-)

You need to be able to discriminate between the two conductors in the individual speaker cables. If your wire has transparent insulation, generally one conductor is copper colored and the other is silver colored. Use the **copper** side for **positive (+)** and the **silver** side for **negative (-)**.

If you have used wire which has opaque insulation, there are still differentiating markings. Examine the wire closely for:

- ◆ ribs or grooves on one conductor's insulation
- ◆ a stripe or stripes
- ◆ a single strand of thread intertwined with the stranded wire in one of the conductors, inside the insulation

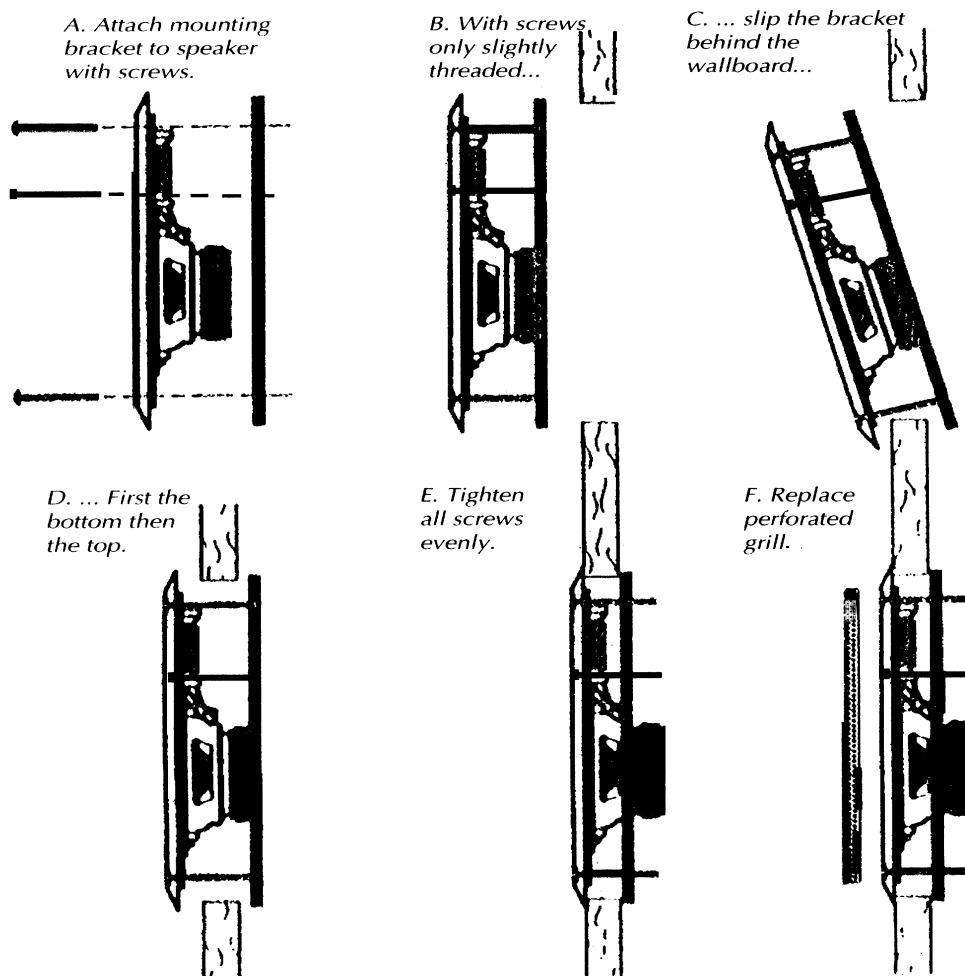
Denote any of these as the **positive(+)** conductor

Hooking Up Your Speakers *continued*

At The Speaker End

1. Cut off excess wire, leaving about 2' extending through the speaker cut-out hole.
2. Pull the conductors apart so they are separated for the first two inches from their ends.
3. Using wire strippers, remove ½ inch of insulation from each conductor. (*Drawing 8*).
4. Twist the strands in each conductor into tight spirals.
5. Important: Route the speaker wire through the speaker frame as shown in (*Drawing 9*).
6. Attach the speaker wires to the **red (+) & black (-)** speaker terminals. Press down on the protruding levers while inserting the respective **(+) & (-)** conductors into their appropriate holes. **Note:** If you have a soldering device, “tin” the ends (coat them with solder) to prevent fraying which may occur over time.
 - ◆ Connect the **positive (+)** conductor to the **red** speaker terminal and the **negative (-)** conductor to the **black** speaker terminal.
 - ◆ Make sure that no stray strands of wire have become detached to touch any other strands, wires or terminals than the intended terminal.
7. Repeat steps 1 through 6 for all other speakers.

Drawing 10



Hooking Up Your Speakers *continued*

At The Amplifier End

1. Cut off excess wire, leaving enough to comfortably reach from the hole in the wall to the stereo system. If there is a possibility that you are going to move the amplifier to another area in the room, consider leaving some excess wire coiled up. If you have used sufficiently heavy gauge (thick) wire, this extra length will not negatively affect speaker or sound performance and will facilitate rearranging later.
2. Pull the conductors on both speaker wires apart so they are separated for the first two inches.
3. Using wire strippers remove ½ inch of insulation from each conductor (Drawing 9).
4. Twist the strands of each conductor into a tight spiral. Again, if possible, “tin” the ends.
5. Attach the speaker wires to the **red** and **black** speaker terminals on the amplifier/receiver.
 - ◆ Connect the **positive (+)** conductors to the **red** terminal and the **negative (-)** conductor to the **black** speaker terminal.
 - ◆ Make sure that no stray strands of wire have become detached to touch any other strands, wires or terminals than the intended terminal.

Final Assembly *(Drawing 10)*

1. If you have not already done so during painting, remove the perforated grills from all the speakers, using the speaker grill removal tool to pull the grills off the speaker frames.
2. Attach the black mounting brackets to the respective speakers using the black screws provided. Tighten the screws only a few turns each - only enough to loosely hold the mounting brackets in place.
3. Slide the bottom of the bracket inside the speaker cut-out holes, followed by the top so that the wallboard is between the bracket and the speaker.
4. Center the speaker in the cut-out hole and tighten the screws until the mounting bracket is drawn up snugly from behind, clamping the speaker in place. Tighten each screw equally so as not to tweak or twist the speaker frame.
5. Replace the speaker grill by gently pressing it into place.
6. Repeat steps 1 through 5 for all the remaining speakers.

In most installations, the grills will fit tightly without vibration. If any audible vibration takes place, or if the speakers are ceiling mounted, you finally get to use the contents of the mysterious packet with papers. They are pre-cut lengths of special damping/adhesive material.

Remove the perforated grill(s), unwrap four of the dampening strips and affix them to the four corners of the inner speaker baffle surface. Then replace the grill.

A Short Test Drive

It is a good idea to test everything out at this point. Also, although we have paid close detail to speaker polarity, we have not concerned ourselves with which wires went to left and right speakers.

1. Turn on your stereo system. Make sure that the volume control is turned down and that the balance control is set to “center”.
2. Activate a sound source such as FM, a tape or CD.
3. Gently turn up the volume. You should hear sound from each speaker. (If you do not, please refer to the trouble shooting guide commencing on the next page).
4. Now rotate the balance control on the amplifier/receiver all the way to the left. Sound should only come from the (intended) left speaker. If sound is coming from the (intended) right speaker, please skip to step 6b.
5. Rotate the balance control all the way to the right. Sound should only come from the right speaker.
- 6a If this is the case, your installation is a success. We suggest you read the later section titled “Taking Care of Your New In-Wall Speakers” (for further operating tips).
- 6b If sound comes from the right speaker when the amplifier/receiver’s balance control is turned to the left, you will need to change the connections on the back of the amplifier/receiver.
 - ◆ **First Turn Off The Amplifier!**
 - ◆ Then swap the wires attached to the left and right speaker terminals.

A Quick Trouble Shooting Guide

Before returning your In-Wall speakers for service, it is a good idea to check the following simple remedies first.

No Sound From Either Speaker

1. Incorrect sound source (FM, CD, etc.) selected on amplifier/receiver.
2. Mute button activated on amplifier/receiver.
3. Incorrect speaker output selected - many amplifier/receiver have an "A" and "B" speaker switch. Make sure the "connected" pair has been "selected".

No Sound From One Speaker

1. Faulty connection at either the speaker or amplifier/receiver - double check these connections.
2. Balance control turned to the full left or right position - place it to the "center" position.
3. Bad connecting cable between the sound source (FM, CD, etc.) and the amplifier/receiver; try a different cable.
4. Defective speaker - contact your dealer. To verify a defective speaker - switch the speaker leads from the amplifier/receiver - if the same speaker does not work, the speaker or the speaker wire running to speaker is defective. If the other speaker now does not function the problem is either in the wiring or the amplifier/receiver or the associated components.

Intermittent Sound From One Speaker or Speakers Play Initially But Then Shut Off

Short circuit at either the amplifier or speaker connectors is activating the amplifier/receiver protection circuitry - double check connections. Make sure no stray strands of wire from one conductor are touching another.

Both Speakers Play But Sound is Mixed With Hum

1. It could be a faulty patch cord. If so, there will also be a hum from your main speaker system as well as your In-Wall speakers.
2. Assuming you did not have hum in your system before, one or both of the speaker wires has been run too close to internal household wiring. Re-route it so that it is at least two feet away from any and all AC wiring when running parallel.

Both Speakers Play But Sound is "Muffled and/or Strained"

1. Amplifier may shut off if volume is raised too far.
2. Too thin a gauge of wire has been run too far a distance between the amplifier/receiver and the speakers. Make sure that you have followed our suggestions as to wire gauge vs. overall distance.

When The Volume is Turned Up to a High Level The Treble Cuts Out

The "Poly Switch" circuit breaker is activated. It is a special protection circuit which electronically disconnects the tweeter if it starts getting too hot. Turn down your amplifier/receiver volume and make sure to read the section of this manual entitled: "Taking Care of Your New In-Wall Speakers". This circuit breaker is not present in all models. Check carton or spec sheet to confirm whether or not your speakers have this feature.

Installing In-Wall Speakers During New Construction *(Drawing 11)*

Needless to say, installing In-Wall speakers when a house is being built is far easier than doing it later.

Dry Wall Locators have been included to let the Dry Wall Installers know where to cut speaker openings.

During new installation, keep the following in mind:

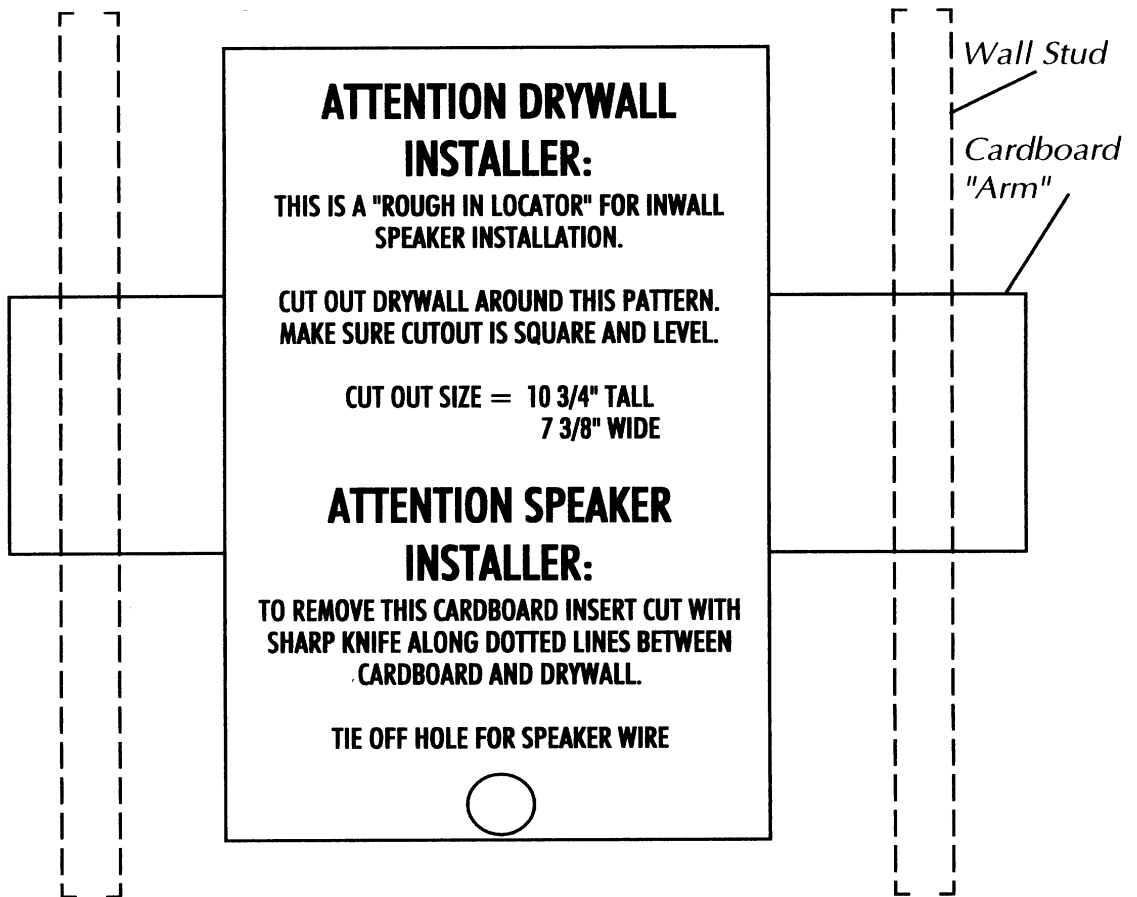
- ◆ The cardboard “drywall locator” kits included with your speakers are designed to facilitate the installation process for “new construction” and they serve as environmentally friendly protective packing material.
- ◆ Select the location for your speakers, keeping in mind your typical listening position when the room is finished. Be sure that the wall location for the speakers will not be obstructed by electrical wiring, plumbing or heating/air conditioning vents/ducts.
- ◆ Unfold the cardboard “arms” from each side of the “drywall locator”. These arms should be stapled or nailed to the wall studs, as indicated in *(Drawing 11)* below. Use a level to be certain that the kit will be “square” to the wall. The kit will show the drywall installer exactly where to cut the drywall for the speaker. The kit must be square and level to insure that the final speaker installation will look proper in the finished wall.
- ◆ Use a bubble level to verify that the Dry Wall Locators are straight, square and level.
- ◆ The card-board arms will not interfere with wallboard added later.
- ◆ A hole has been provided at the bottom of the kit to “tie off” the wiring for the speaker. The wire should be stapled to a stud near the kit to provide “strain relief” so that the wire does not pull **out** of the locator kit during construction.
- ◆ If possible, run speaker wires after AC wiring is in place to avoid induced hum caused by close parallel proximity.
- ◆ Secure speaker wire in place along the run with insulated staples only and be careful not to pierce the insulation. Allow a bit of slack for expansion of building materials.
- ◆ Needless to say, the actual speakers should not be installed until the wallboard is in place. Leave some extra wire coiled up and stapled to the one of the studs behind each of the Dry Wall Locators.
- ◆ When it comes time to put up the dry wall, make sure the speaker cut-out holes closely follow the sides of the Dry Wall Locators.
- ◆ After the wallboard is put up, install the speaker as detailed in this manual.

Installing In-Wall Speakers During New Construction

Drawing 11

NOTE;
CARDBOARD
"ARM" MAY BE
ADJUSTED BY
SLIDING IT
THROUGH THE
CARDBOARD
"LOCATOR KIT"
FROM SIDE TO
SIDE FOR
PROPER
SPEAKER
PLACEMENT.

STAPLE
SPEAKER WIRE
TO STUD
BEFORE "TIEING
OFF" AT
LOCATOR KIT!



Taking Care of Your New OEM Speakers

Taking Care of Your New In-Wall Speakers

In-Wall speakers are designed to last the life of your home - if you follow a few simple rules.

The main “killers” of any loudspeaker system are:

1. Too little power at high volume levels
2. Too much power at high volume levels, too much bass & treble added
3. Transient thumps

Not Enough Power

It is a surprising fact, that far more speakers are damaged by too little power than by too much! When an amplifier runs out of power (pushed beyond its limits) while trying to recreate musical peaks, it causes a form of high frequency distortion called ***clipping***. In moderate amounts, clipping simply makes the music sound terrible. In greater quantities over a period of time, it can damage or destroy the drivers (the individual woofer & tweeter components that comprise the overall loudspeaker) in *any* loudspeaker system. If you like your music loud, consider getting an amplifier with at least 60 - 125 continuous watts per channel.

Too Much Power

There is nothing wrong with driving your speakers with as much as 150 watts per channel - the extra power helps them achieve quick musical transients found in digital recordings. However, you must remember to restrain yourself and not get too heavy-handed with the bass, treble and volume controls (or remote activation of these functions). If the music begins to sound distorted or you hear a “clacking” sound during bass notes, back off! And naturally, if the internal protection circuits are intermittently shutting off the tweeter, you are exceeding its safe power input level. **Note:** At high volume levels, bass & treble settings should be in the “flat” position; in other words straight up, with no increase.

Transients

Loud deep ***Thumps*** caused when you turn your stereo on or off, or when the tone arm is dropped too hard on a record, or when switching between inputs (i.e. switching from FM to CD) can seriously damage any loudspeaker including your In-Wall models. It is always a good practice to turn the volume down (or press the Mute button if your unit has one) when changing records or selecting another source (such as changing from tuner to CD player, etc.). Also remember to turn your system off before disconnecting any hook-up cables. When they are pulled out, a huge burst of low frequency hum often occurs if the system is still on.

Cleaning

Your speakers are covered with a durable finish which can be cleaned with soap and water or spray cleaners. Avoid the use of ammonia based cleaning products, however, if you have painted the grills and frames, follow the paint manufacturer’s cleaning instructions.

More On Amplifiers and Impedance

Not all amplifier/receivers can safely operate two sets of speakers at once. If you intend to use your In-Wall speakers at the same time as your main speakers - or if you intend to hook up two pairs of In-Wall speakers and play both at the same time, it is important to consider both the impedance of the speakers and the capabilities of the amplifier you are using.

Taking Care of Your New OEM Speakers

More On Amplifiers and Impedance continued

First, consult the owner's manual that came with the amplifier/receiver. It should tell you the minimum speaker impedances that the unit is capable of driving. On some models, the manual will recommend that only two (2) pairs of 8-ohm speakers or one (1) pair of 4-ohm impedance speakers be used. A few extremely robust amplifier/receivers and power amplifiers may even allow two (2) pairs of 4-ohm speakers.

If you cannot readily determine this information, consult the dealer where you purchased the amplifier/receiver, or call the manufacturer.

Next, determine the impedance of your other speakers. It is often printed on the back panel of the cabinet near the connection terminals, or consult the speaker owner's manual.

The In-Wall speakers are rated at 8-ohms impedance. In general, this means that most amplifier/receivers will allow you to simultaneously operate one (1) pair of In-Wall speakers and one (1) additional pair of 8-ohm rated impedance speakers, be they cabinet type or In-Wall type.

If your other speakers are rated at 4-ohms, some amplifiers may experience difficulty driving both pair at once and shut off intermittently when the volume is too high.

In this case you should only operate one (1) pair of speakers at a time - or keep the volume very low.

Parallel Operation

Two (2) pair of 8-ohm speakers connected in parallel create a 4-ohm load. This means that some amplifier/receivers can be used to drive as many as four (4) pair of In-Wall speakers at the same time (or three (3) pair of In-Wall types and one (1) pair of cabinet type speakers).

Outside Help

If you do not feel that you are up to undertaking installation - or if you start and for some reason cannot finish, you have several alternatives to consider for outside help.

- 1. Freelance telephone installers** With the deregulation of the telephone industry, a whole new industry has sprung up. These people are experts at stringing wires unobtrusively and have the tools to do the job quickly and easily. They usually charge between \$10 and \$15 per hour. Many advertise through small community newspapers and on bulletin boards in public places and super markets, etc.
- 2. Phone installation services** Larger companies which specialize in installation may be found in the Yellow Pages under the following listings: Telephone Equipment & Systems-Wiring & Installation or Telephone & Television Cable Contractors. These firms charge more than the free-lance installers but may be easier to locate and contact.
- 3. Custom stereo installation contractors** Although they prefer to specialize in complete "turnkey" system installs, many stereo installation companies are also willing to do hourly work. Unfortunately, they are buried in the listings with regular stereo dealers (under Stereophonic & High Fidelity Equipment Dealers), so you may have to make several phone calls to find one.
- 4. Electrical contractors** As a last and expensive resort, you can always use a true electrical contractor. They are listed in the Yellow Pages under Electrical Contractors.