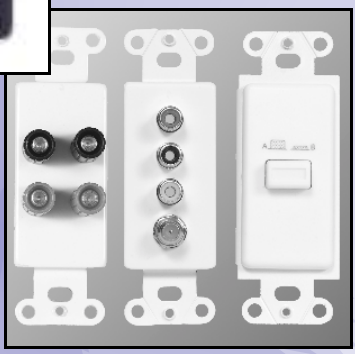

Pro-Wire®

Architectural Audio

System Design & Installation Guide

OEM SYSTEMS COMPANY, INC.

Installing loudspeakers in walls and ceilings is a straightforward and basically simple process.

We will help you design your system by sharing simple principles about sound, style and installation. The following dialog is intended to give you a fundamental understanding of speaker and volume control placement, mounting procedures and simple directions on how to wire your system for both new and existing construction.

Are you a “DIY” (Do It Yourself) type of person?

If you are not, please consider hiring a professional or “DIY” friend to install your system for you. However, before you decide, please let us suggest that you read through the installation instructions and dialog portions in this manual.

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Part I – Understanding Speakers and Determining Placement

Which speakers are right for you?

Rectangular speakers look and work great on walls and on vaulted ceilings. They feature a small "knock-out" on the baffle. This may be used to place an industry standard infrared receiver-repeater for carrying remote control commands to the stereo equipment center.

Round speakers are great on ceilings and are somewhat out of place on vertical surfaces. The **SC-622** and **SC-822** single point stereo speakers have been designed with stainless steel grilles and hardware to stand up well outdoors and in humid environments such as bathrooms, laundry rooms, outdoors in eaves, etc.

The CS-516 indoor-outdoor cabinet speakers are very versatile and attractive. Available in white and black, their cabinets are made of high-grade polypropylene composite with a powder coated aluminum grille and include brackets that enable the speakers to be pointed up and down or side to side. The brackets may be removed for bookshelf placement. These speakers are capable of weathering the storm and the heat. They are rated for a –50° F to +200° F temperature range and high humidity. They are covered by a 5-year unconditional corrosion guarantee.

Use on surfaces which cannot be penetrated or for areas where it is preferable that they not be penetrated. Concrete walls and ceilings are examples of surfaces which cannot be penetrated. Exterior walls are an excellent example of walls which may be penetrated, but it is sometimes preferable that they not be.

Cabinet style speakers are excellent for use under eaves for delivering music to outdoor activities. They are also very useful for placement on the ceiling or high on a wall, as they can be pointed downward or down and across to cover the listening position(s) with a full sound field.

The CS-516 has been designed to withstand harsh environments and is suitable for marine applications.

Keep the two colors in mind when deciding how to layout your system when using cabinet speakers. The black speakers are virtually invisible when placed high on dark colored ceilings. The white models will fare better than the black if in frequent exposure to the sun as white reflects heat and black absorbs it.

Where are you going to locate your speakers and volume controls?

There is flexibility in speaker placement. Factors governing speaker placement include:

- Listening position(s)
- Wall/ceiling construction
- Aesthetic considerations:
  - Location of furniture and objects located on walls and ceilings
  - Architectural concerns

Where your speakers and volume controls are placed may depend on whether your house is "new construction", with walls and ceilings that have yet to be drywalled, or "existing construction". Obviously new construction makes it much easier, BUT existing construction is very "do-able".

Determine a location for your stereo equipment center, (amplifier-receiver, CD player, etc.) In many households this equipment is located together with the video equipment in the room where your Home Theater - Surround Sound system is. It is from this point that all the wires driving your speakers will head-out to their respective locations.

Determine the range of activities which will occur in each room. This, together with room layout considerations, will help determine the best location to mount your speakers.

Keep in mind that walls are frequently used to hang items – pictures, art objects, mirrors, etc. Also, consider where window treatments will hang when placing in-wall speakers close to windows.

Ceiling speakers have to fight for space with far fewer constituents, primarily light fixtures and HVAC registers.

Your speakers should be located in either the ceiling or walls in such a manner that the individual left and right speakers are at relatively equal distances from the listener(s). Ideally, they should be approximately the same distance from each other as they are from the listener(s).

It is very simple. The gist is – place the speakers so an even sound dispersion is experienced by the listener(s) and so that the volume controls are located within easy reach.

The Home Office offers great examples of the process of choosing between in-wall or ceiling speakers. An office environment can be anywhere from very open, airy and uncluttered to just the opposite.

Let's say that in your home office, your desk is situated so that your back is close to a wall and you look across the room to a blank wall. Let's also say that you enjoy music when you work. This is a good scenario to place in-wall speakers in the wall facing you at ear level (when seated).

If your walls are covered with pictures, memorabilia, diplomas, etc. and your desk is situated so you look out through a window, then ceiling speakers are probably better for you.

You will want to place the volume control in a location you can reach while sitting at your desk taking and placing telephone calls.

The Dining Room is an example of a room where many people join together. The challenge here is positioning your speakers so that everyone at the table experiences the music at an equal volume level. You want to achieve the "perfect" background volume level so that everyone can hear the music without it interfering with anyone's ability to hear and participate in the banter.

The best location for speakers in a dining room is usually in the ceiling over the dining table. It is convenient to place the volume control in a location where the seated person who controls the volume can reach it with a minimum of hassle.

In the Garage, many times you will have a work bench – a place where you are stationed most times – this is the place for the volume control. In many cases, the best place for your speakers is at either side of your garage door pointing into the garage instead of another location pointing toward the outside. This assumes you have neighbors within earshot. If your preference is to have sound out in your driveway, then do the opposite.

Bathrooms have become very popular locations to have speakers. Most of us spend a fair amount of time in the bathroom in the morning getting ready for work and find it convenient to listen to the news while doing so. The best speakers for bathrooms are the SC-622 and SC-822 because of their single point stereo and moisture resistant design features. They have both left *and* right channel inputs so you can hear the whole picture from a single speaker. Their stainless steel grilles and screws will hold up to the frequent increases in moisture/humidity without rusting.

The Family Room is usually where the Home Theater System is located, unless you have a dedicated room. These speakers will serve to play the great sound effects of the movies you watch. They also will be the speakers you will listen to when you choose music over movies, video, TV, etc. Since the Home Theater System equipment directly controls the volume, the speaker wire-runs generally do not include wall mounted volume controls. Placement of the speakers will depend on room layout.

They should be located where an even sound dispersion will be experienced by the listener(s).

The Living Room is a great place for either in-wall or ceiling speakers because it is generally more formal with a concentration on style and design. As with the family room, the location of the speakers will vary depending on the room layout and listening preferences.

In Bedrooms, if there is no seating, presumably the listening and TV watching will be done from the bed. In which case the speakers should be positioned so that an even sound field of left and right cover the bed. The volume control should be located within reach from the bed, such as next to the bed, above the nightstand.

Outdoors, All-Weather In-Walls (AW-700) may be installed on the exterior walls of your house if local building codes permit. Our In-Ground speakers are also a very attractive choice. We even have one that looks just like a rock (RS-82).

Round speakers may be flush mounted in eaves. The CS-516 indoor-outdoor cabinet speakers may be mounted virtually anywhere.

When your system includes outdoor speakers you may choose to locate the volume control inside, near a doorway or outside. If you choose to locate it outside, you will need to use outdoor volume control model AW-100WV **(figure 3b)**. These may be placed in either a flush or surface mounted J-box.

The AW-100WV includes a gray plastic cover plate that matches the color of popular gray plastic outdoor surface mount J-boxes.

Part II – Installation

Once you have determined the general locations of all the speakers, volume controls and the stereo equipment center, you are ready to begin the installation process.

We will start by defining the materials needed. Then we will describe both the new construction and the existing construction installation processes.

Materials

"J-boxes" & "Jack Plates"

A multi-gang J-box **(figures 1a & 1b)** with IWM-8BPG - eight (8) conductor jack plates **(figure 4a)** will be used to transition the wires from the stereo equipment center into the wall in a neat and organized manner. We call this the head-out because it is from here that the wire paths head-out on their way to the various rooms.

Basic aspects describing J-boxes include J-box size (1, 2, 3, or 4 gang etc. and depth) and material (plastic or metal). "Gang" refers to the number of switches, jack plates, etc. the J-box will accommodate. For example, if used for a light switch, a single gang would hold one, a 2 gang would hold two, and so on. Each gang will accommodate two pairs of speakers when IWM-8BPG jack plates are used **(figure 4a)**. So, for example, a 3 gang J-box will provide termination for six rooms or six pairs of speakers using three IWM-8BPG's **(figure 4b)**.

For the most part it is difficult to find readily available J-boxes larger than 4 gang. Pro-Wire makes a special 8 gang J-box called the HI-LO 8 **(figure 5)** that fits between 16" on-center studs. An 8 gang cover plate for it is available in white, ivory and almond colors.

In addition to the multi-gang J-box, you will need to accommodate the volume controls.

For new construction, a single gang J-box will be needed for each room with a volume control. Make sure these J-boxes are large enough to hold the volume controls **(figure 2a)**.

For existing construction, a single gang "old work" mounting ring will be needed for each room with a volume control **(figure 2b)**.

Wire

There are several manufacturers of quality speaker wire. There are various grades and gauges (sizes) of speaker wire.

Generally, the most practical wire for the money is generically referred to as 16/4. That means four 16 gauge insulated conductors in a single jacket or sheath **(figure 14)**.

Why 4 Conductor?

Each room generally has two speakers (left & right); each speaker has one (+) positive conductor and one (–) negative conductor for a total of two conductors per speaker. That is a total of four conductors per room, hence 4-conductor wire.

Today, building codes rate speaker wire or stipulate minimum quality. At the time this was printed a UL approved CL-2 or CL-3 rated wire was recommended. So ask for 16/4 CL-2 or CL-3 rated UL approved wire when you are ready to buy. Also, check if any locally applicable codes further govern wire for sound systems.

Some people opt for 14/4 or 14 gauge. 14 gauge is thicker, will carry higher wattages and technically does better over longer distances. We find 16 gauge to be well suited for nearly all applications. 14 gauge is more difficult to work with at the volume control because of the tight clearances that exist between the volume control and the inside of the J-box.

Speaker wire also comes in 2-conductor configurations.

For new construction you will only need the 4-conductor type.

For existing construction, 4-conductor and 2-conductor wires may both be used to simplify the wiring process.

New Construction

Pre-construction brackets and J-boxes

1. *Are you going to use PRE-CONSTRUCTION BRACKETS or are you going to cut the speaker mounting holes in the drywall after it is installed?*

Pre-construction brackets are somewhat similar to “Mud Rings” used by electricians to mark a spot where the drywall installers are to cut a hole.

Pre-construction brackets are position-able and designed to span up to 24" centers. The mounting hole cut-out can be placed at any point between studs, joists or trusses.

If you use pre-construction brackets, the installation of your speakers will be easier and much faster because the drywall installers will do the cutting for you.

There are several Pre-construction bracket models:

- RIR-5, 6, & 8 for the round speakers **(figure 6)**
- RIB-5, 7 & 8 for the rectangular speakers **(figure 7)**

2. Fasten the pre-construction brackets in their respective locations. After fastening the mounting straps to the studs or trusses, slide the mounting hole cut-out portion of the bracket into the desired position.

3. Choose a location in the wall close to the stereo equipment center (ideally within 6') to mount a multi-gang "J-box" **(figures 1a & 5)** for the head-out. Preferably, this location will be easily accessible and will not be visible once the equipment is in place.

4. *What Size "J-boxes"?*

Each "gang" when IWM-8BPG jack plates are used **(figure 4a)** will accommodate two pairs of speakers. So a 3 gang J-box will provide termination for six rooms or six pairs of speakers at the head-out point **(figure 4b)**.

Following the example of six rooms, obtain:

- One 3 gang J-box for the head-out termination *new construction nail-on type* **(figure 1a)**
- Six 22.5 cubic inch 3 5/8" deep single gang J-boxes for the volume controls *new construction nail-on type* **(figure 2a)**

5. Fasten the head-out J-box.

6. Fasten the volume control J-boxes in their respective locations, usually at light switch height.

Now you are ready to run the wire.

Running the Wire

The best time to run your speaker wire is after the electrical rough-in is complete and before the insulation and drywall go up.

1. From the multi-gang J-box head-out at the stereo equipment center, run the 16/4 to each volume control J-box location.

2. After you have made the run to the J-box, pull a 12-inch loop of the 16/4 into the J-box from behind. **Do not cut the wire.**

3. Continue running the 16/4 to the speaker which is located closest to the volume control. **Do not cut the wire.**

4. Coil up approximately 3 feet of slack of the 16/4 at the location of the closest speaker. **Do not cut the wire.**

5. Staple the coil of slack up between the studs or trusses in such a way that it will not interfere with the drywall or insulation.

6. Then, continue running the 16/4 to the location of the other speaker. Coil up approximately 3 feet of slack at the speaker location and **CUT the wire now**. Again, staple up the slack between the studs or trusses in such a way that it will not interfere with the drywall or insulation.

At this point you will NOT be installing any speakers or volume controls.

You are simply running the wires while the walls are open. Not until after the drywall is installed, taped and textured will you actually install volume controls and speakers. *See* **Painting Your Speakers (page 19)**.

Existing Construction

Surveying for access

It is **absolutely necessary** in an existing construction installation that you **perform a "survey"** to determine access to all volume control locations from the head-out J-box and access from each volume control location to the respective speaker locations. This is because you will have to drill and cut holes through walls, below floors and above ceilings for the wire paths.

Access means not restricted by blocking or complicated with electrical, plumbing, ducting, etc.

First, choose the desired location for your stereo equipment center head-out. This is usually against a wall.

Ascertain that there is access from the head-out location either up to an attic or crawl space or down to a basement crawl space. Depending on the scope of the installation and various access aspects, you may want to, or have to, gain access to the volume control/speaker locations via both the upper attic and the lower crawl space areas. Check them both.

The major part of this is to go up into the attic space and down into the basement space. Once up and down into these areas, you will have to find the area above or below the desired head-out location. Look for wires, plumbing, ducting, etc., anything that will complicate or preclude access into the wall where the head-out J-box is to be located. **Remember where these potential obstructions are so you do not drill or cut into them at any time during the installation process.**

Insulation may impede your ability to see all of what you need to determine access. It is advisable that you **wear a respirator** so as not to breathe in insulation fibers that are hazardous to your health.

In most single story frame construction homes, there will be differing circumstances between the upper attic and lower crawl space areas.

In the **upper attic area**, you should have a fairly clear view of the ceiling joists or roof trusses to which the ceiling drywall is fastened. You should also have a reasonably good view of the top plates of the various walls throughout the structure. If the home has "blown-in" type insulation, you may have to brush it aside to see the top plates of the walls you are looking for. Likewise, if you have insulation "batting", you may have to lift it up in various areas to reveal the wall top plates. You should also have a clear view of any ducting.

As you navigate around the upper attic area, you must be very careful not to step or place any weight on what is the topside of the ceiling drywall. If you do, you may damage the ceiling and may possibly fall through it causing serious bodily harm.

As you make your way to the area above the desired head-out location, you will have to step on the topside of the ceiling joists, the topside of the lower member of the roof trusses, and/or the tops of the various walls.

The tops of walls are very strong and can support your full weight without any worry of collapse or flexure. The ceiling joists are quite strong and can

usually take your full weight although they may flex somewhat; the same goes for roof trusses although they can be prone to more flexure than joists.

It is the walls that hold the joists and trusses up, so when stepping on the joists or trusses, it is best to do so at a point close to a wall. It is possible to flex a joist or truss to the point where the fasteners holding the ceiling drywall to the bottom side of the member can "pop". If this happens you may have to perform cosmetic repair to the ceiling drywall where a small screw head size void or tear appears. As long as the point of the joist or truss you step upon is within 6' of a supporting wall, you should have no flexure problems whatsoever.

You should keep the foregoing in mind throughout the entire process of navigating the attic crawl space when locating volume control/speaker location access and when running wires to their respective destinations.

In the **lower crawl space area**, insulation "batting" will impede your ability to see all of what you need to see to determine access. Again, it is advisable that you **wear a respirator** so as not to breathe in insulation fibers as you disturb the insulation to gain visual access. Insulation fibers are hazardous to your health.

Presumably, in the lower crawl space area you will be navigating around on earth as opposed to construction framing in the attic area, so you will not have to use the same level of care when moving about.

In the attic area, the tops of the walls are relatively easy to see. This is not the case in the lower crawl space area. The reason for this is that there is a layer of sub flooring directly above the floor joists. The walls are fastened to the top of this sub flooring.

To find the walls from the basement, you will have to look for electrical wires and plumbing and determine a pattern from them as to where they transition from below the floor up into the various walls. Sometimes you may be able to find wall locations from nailing patterns where the wall was nailed to the floor. Usually, the nails used are longer than the combined thickness of the sole plate and the sub flooring and hence appear as a rough line of nail points piercing through the sub floor.

Cutting drywall for the "old work" J-box, volume control mounting rings and speakers

1. After determining that the wire head-out location you have chosen has access up and/or down to a crawl space, basement or attic, you will determine the exact location for the head-out J-box.

Use an "old work" J-box **(figure 1b)**. Each "gang" when IWM-8BPG

jack plates are used **(figure 4a)** will accommodate two pairs of speakers. So a three gang "old work" J-box will provide termination for six rooms or six pairs of speakers at the head-out point **(figure 4b)**. For the volume controls use "old work" single gang mounting rings **(figure 2b)**.

Following the example of six rooms, obtain:

- One 3 gang "old work" J-box for the head-out **(figure 1b)**
- Six "old work" single gang mounting rings **(figure 2b)** for the volume controls

2. Use a stud finder **(figure 15)** to locate the wall studs.

3. Cut a hole in the drywall the proper size to accept the "old work" J-box **(see section 5c Existing Construction)**.

4. Determine the approximate locations for volume controls and speakers in each room. Each time you evaluate locations for volume controls and speakers, you must determine access. From the attic and basement crawl spaces, look for wire, plumbing, ducting, etc. above and below these locations.

Be sure to ascertain the access between all wire paths (head-out to volume controls and volume controls to both respective speakers). It is quite possible that an obstruction could be present at some point between them such as a concrete wall, etc. If you do encounter a concrete wall as an obstacle, you should be able to core or drill it.

5. Once you determine access room by room from the head-out to the desired **APPROXIMATE** volume control and speaker locations, you must then determine their **EXACT** locations.

a. Use a stud finder **(figure 15)** to locate the exact locations of the studs, joists or trusses, whichever the case may be. You do not want to cut the hole in a location where the stud, truss, etc. intersects the hole. The hole you cut for the speakers must be a minimum of 1" away from the stud, joist or truss **(figure 8)**. This is to accommodate the flip-out cam nuts that secure the speaker to the drywall. If the mounting hole is any closer, the cam nuts will not be able to flip outward into position.

b. Then use the cut-out template supplied with your speakers to stencil the cut-out on the drywall with a pencil. Use a level **(figure 19)** to ensure template is not askew. Two thumbtacks per template can be used to hold it in place while you trace around it. If you use only one thumbtack the template will rotate, so use two.

c. To cut the hole you may use a drywall saw **(figure 16)** or a razor utility knife **(figure 18)**, whichever is more comfortable for you. It is usually easier and safer to use a drywall saw.

For round speakers drill one hole **(figure 9)** along the inside of the pencil tracing, preferably with a 1 inch "paddle bit" **(figure 17)**. Then carefully saw around the pencil tracing.

For rectangular speakers drill two holes, one in the top right corner and the other in the bottom left corner. From the top hole, saw across the top pencil tracing to the left and then down the right pencil tracing. From the bottom hole, saw up along the left tracing and then right across the bottom tracing **(figure 9)**.

For the head-out "old work" J-box and the "old work" single gang mounting rings, use the same technique as for the rectangular speakers.

If you choose the razor knife, begin by scoring the drywall lightly using very little force. Slowly trace the pencil tracing with a fresh sharp blade. Apply only enough force to cut into the paper face of the drywall. After completing the entire trace with a precise shallow cut, repeat it over and over, deeper and deeper. As the cut gets deeper and well defined you may use more pressure. Continue this patiently until you cut all the way through the drywall. If you are not careful, you may slip and cut a score across the drywall that will require cosmetic repair.

6. Once you complete cutting the holes in the drywall for the head-out, volume controls and speakers, you will need to drill either the top plates or the sole plate/sub floor for the wire paths.

*Earlier in **Section 1 of Existing Construction** (surveying for access), you were advised to locate any wires, plumbing, ducting, etc. that could complicate or impact the wire paths. We also covered methods of finding walls from below the floor in the basement crawl space and from above the ceiling in the attic crawl space. Before you do any drilling whatsoever, you must be certain that you will not drill into any wires, plumbing, ducting, etc.*

OEM Systems Company, Inc. assumes absolutely no responsibility for accidental damage or bodily harm connected in any way with installations of these products.

PROCEED AT YOUR OWN RISK.

If you are certain no wires, plumbing, ducting, etc. are present you may proceed.

There are differing methods of drilling the top/sole plates. The two methods we will cover are referred to as the "45 degree method" and the "flexi-bit method".

The **"45 degree method"** is illustrated in **figures 10 & 11**. Use a long (12" or so) drill bit (twist drill type) about 1/8" in diameter and drill a hole up/down at a 45-degree angle **(figure 10)**. When the bit is visible coming in at the 45-degree angle above the ceiling or below the floor, you should be able to judge the approximate middle of the 2" x 4" plate. This method is most often used for finding sole plates or the bottoms of interior walls for access up from the basement crawl space area. This is because the sole plates are not visible from below the floor as the top plates are generally visible from above the ceiling.

The "45 degree method" may also be used as shown in **figure 10** to locate the top plates or tops of walls if access will be via the upper attic crawl space. However, because the top plates are generally visible from above and because it leaves a small hole (which is easily filled with a dab of spackle) the "45 degree method" is not as popular above as it is below.

Using the "45 degree method" on top plates is used mostly for volume control wire paths.

The "45 degree method" does not work for exterior walls however it is quite simple to determine the location of exterior walls.

The **"flexi-bit method"** is a popular way of drilling the top sole plates. This method uses an extra long bit to drill up through the top plates or down through the sole plates by gaining access to the inside of the wall via the speaker-mounting hole **(figure 12)**.

Special long drill bits generically referred to as **"flexi-bits"** are available in various lengths from 1 foot to 8 feet. These come in various bore sizes and with various "tip patterns". Professionals, while drilling with this method, are able to "feel" when the bit is about to fully pierce through the sole plate/sub floor or the top of the top top plate (there are two top plates). The professional feels this by the decrease in spin resistance to the drilling or boring of the wood. Once this is "felt", the drilling stops and is later continued once the pierce is found from above or below and it is confirmed that there is no wiring, plumbing, ducting, etc. in a path of damage. Professionals use "glow rods", plastic rods 1/8" or so in diameter that have fiber optic properties. The glow rod is pushed through small holes and then "lit" with a light source such as a flashlight. They

glow in the dark and are easy to see in a poorly lit attic or basement crawl space. You can use a coat hanger or other stiff wire to locate from above or below the pilot or exploratory hole you drilled from the living space. It will help if you spray paint the end of the wire a bright color.

Do not drill any hole larger than 1 1/4" in diameter. It is advisable that you drill multiple smaller holes rather than one large hole. Also, do not drill the holes too close together or too close to the edge of the top plate. Keep the holes in the middle of the 3 1/2" wide top plate. Keep multiple holes at least as far from one another as the diameter of the holes themselves and away from the edges of the top plate.

Running the wire

When all the holes are cut and drilled for the head-out J-box, speakers, volume controls and wire paths, you may run the wire. Use 4-conductor wire from the head-out J-box to each volume control and two 2-conductor wires from the volume controls, one to each speaker. To fish the wires through the walls, you can use an electrician's fish tape or a stiff wire of sufficient length.

Mounting Your Speakers

Once the mounting holes are present, either cut for you by the drywall installers or cut by you, mounting the speakers is very simple.

The round ceiling speakers and the SE-791D use cam nuts or "dog ears" for the mounting system. Position the dog ears so that they are flipped inward (counter-clockwise) toward the center of the speaker.

The rest of our in-walls use the clamp-ring mounting system. If they are not already attached, attach the clamp-ring to the speaker frame by placing the ring behind the plastic frame, smooth side up, so that the threaded holes in the ring match up with holes in the frame. Now insert the screws through the plastic frame and screw them into the metal ring, but just get them started.

Connect the speaker wires observing polarity (connecting the positive lead to the positive terminal and the negative to the negative).

For ceiling mounted speakers where insulation is present, it is a good idea to shield the back of the speaker from the tiny abrasive insulation fibers, which can find their way into the moving parts of speakers and cause problems. A very good way of doing this is to use 13 – 15 gallon plastic trash bags. Push the bag up into the hole and spread it out flat on the topside of the drywall between the drywall and the insulation (bags laid flat measure about 24" x 30").

Cam nut system: Push the speaker into the mounting hole and begin screwing the mounting screws in (clockwise). This will flip the cam nuts outward into position to clamp to the drywall and mount the speaker firmly **(figure 13)**. **Do not** tighten any one of the multiple cam nuts all the way in the beginning. Tighten each screw about 1/3 of the way then rotate to the next. This way you will visit each screw 3 times before you snug it into place. If you tighten any single screw all the way into place you have difficulty knowing how tight or how much further you have to go on the remaining screws and it is possible to damage the cam nut assembly if it is over-tightened.

When mounting SE-791D rectangular speakers, use the level to square them up perfectly before you put the final tightening twist to the cam nuts.

Clamp-ring system: Insert the bottom edge of the clamp-ring into the wall cavity so that the screws are touching the bottom of the opening. Now slide the top edge of the clamp-ring into the opening. Once the ring is inserted into the wall cavity, push the speaker frame into place against the wallboard. Next, pull the screws out so that the metal ring is pulled against the back side of the wallboard and tighten the first screw while still holding one of the other screws before continuing to tighten the rest.

Once you have mounted your speakers, gently press the grille into the recess. The grilles are held by “friction fit”. Grille retention gum is provided in case this friction is insufficient. Put four pieces of the black gum in the edge of the black baffle area of the plastic frame and seat the grille into the gum.

Painting Your Speakers

Your speakers come with a stark white finish. It will stand as a finish on its own or will serve nicely as a primer base to put the desired paint finish on the frames and grilles without any additional preparation.

If you plan to paint your speakers you will have to determine when and how you will paint them, before or after they are mounted in the wall. **YOU MUST NOT** apply any paint to the areas behind the speaker grilles. Your speakers come with paint guards that mask the vulnerable parts.

Painting speakers is a little tricky so heed the following advice:

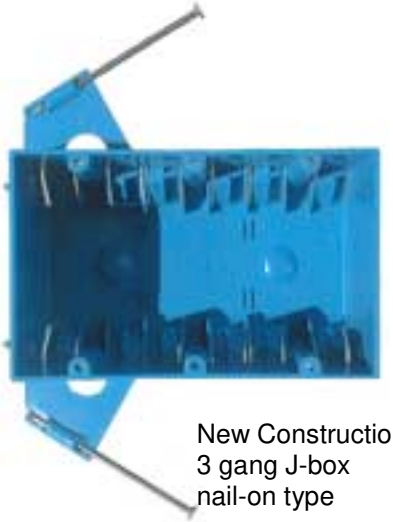
- Whether you are painting your speakers in the wall or out of the wall, **paint the grilles and the frames separately**. Remove the grilles, mask the portion of the speaker that is under the grille and paint the frame. Let it dry completely before attaching the grille.

- Be careful not to get too much paint in the recesses of the frame where the grille attaches. If these recesses become clogged with paint, the grilles will not attach properly.

- Be careful that you do not clog the grille perforations when painting the grilles. Also be careful not to get too much paint on the edges of the grille, which fit to the frame. Make certain that the grille paint is completely dry before attaching the grille to the frame.

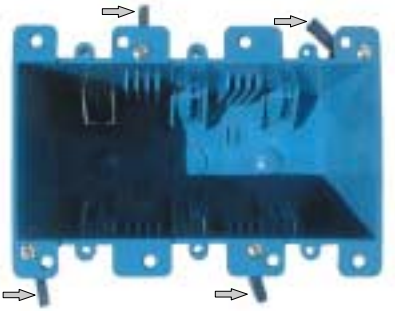
- Use multiple *thin* coats of *thin* paint for best results.

Figure 1a



New Construction
3 gang J-box
nail-on type

Figure 1b



"Old Work"
3 gang J-box
⇨ fastens with cam nuts ⇦

Figure 2a

New Construction 22.5 cubic inch
single gang J-box nail-on type

Figure 2b

"Old Work"
single gang
mounting ring

⇨ fastens with cam nuts ⇦

Figure 3a

IW-100WV
Volume Control

Figure 3b

AW-100WV
Outdoor Volume Control

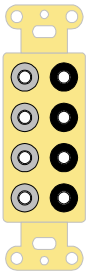
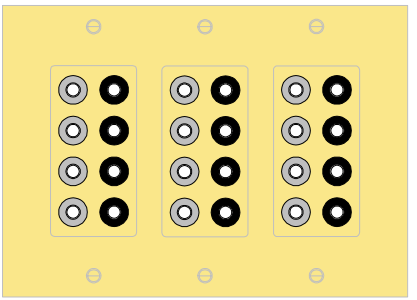
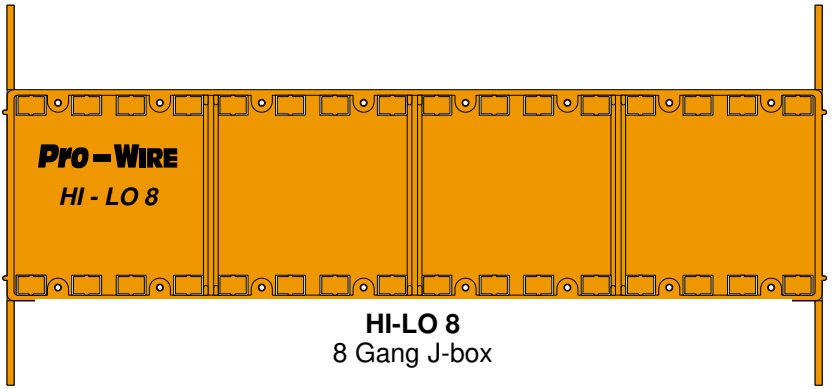
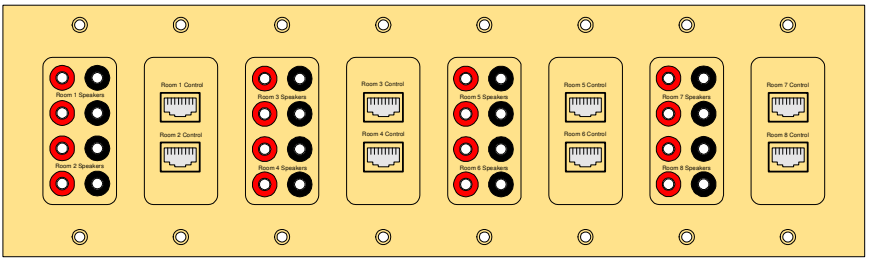
Figure 4a	Figure 4b
	
IWM-8BPG Provides termination for 2 pairs of speakers Available in White, Ivory & Almond *terminals color coded* *red & black*	**Example** 3 **IWM-8BPG**'s shown in 3 gang J-box with 3 gang cover plate This method gives your system a professional look to match the rest of the wall plates in your home

Figure 5

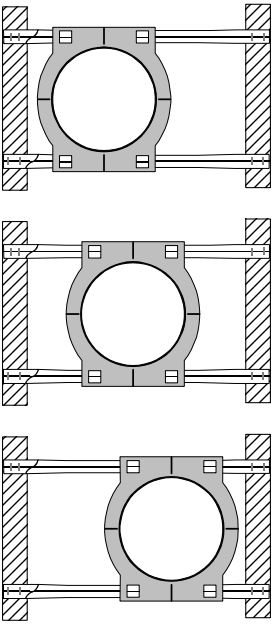


HI-LO 8
8 Gang J-box



CVRPLT-8
8 Gang cover plate
Available in White, Ivory & Almond
Configuration example for 8 room speaker system with cat 5 control jacks

Figure 6



RIR Pre-Construction Brackets

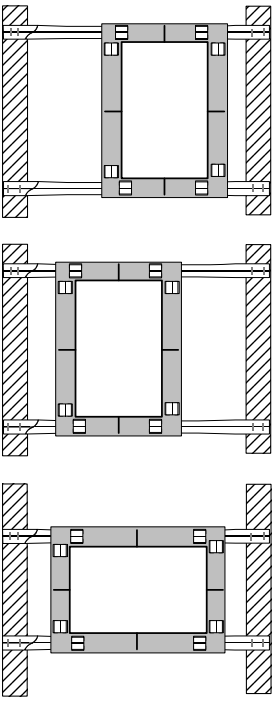
Shown aligned left

Brackets may be positioned at any point between trusses / joists

Shown aligned centered

Shown aligned right

Figure 7



RIB Pre-Construction Brackets

Shown aligned right

Brackets may be positioned at any point between trusses / joists

Shown aligned left

Shown aligned centered horizontal

Figure 8

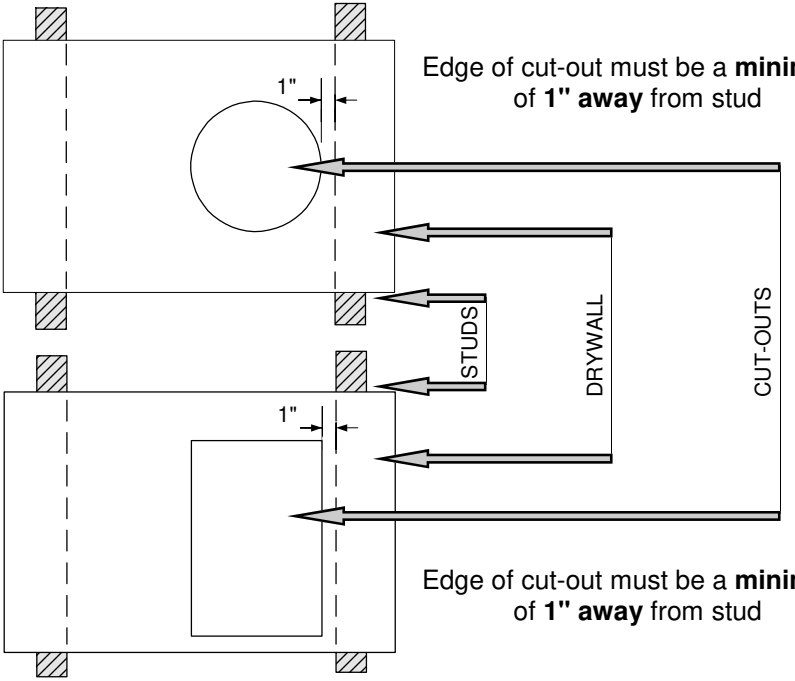


Figure 9

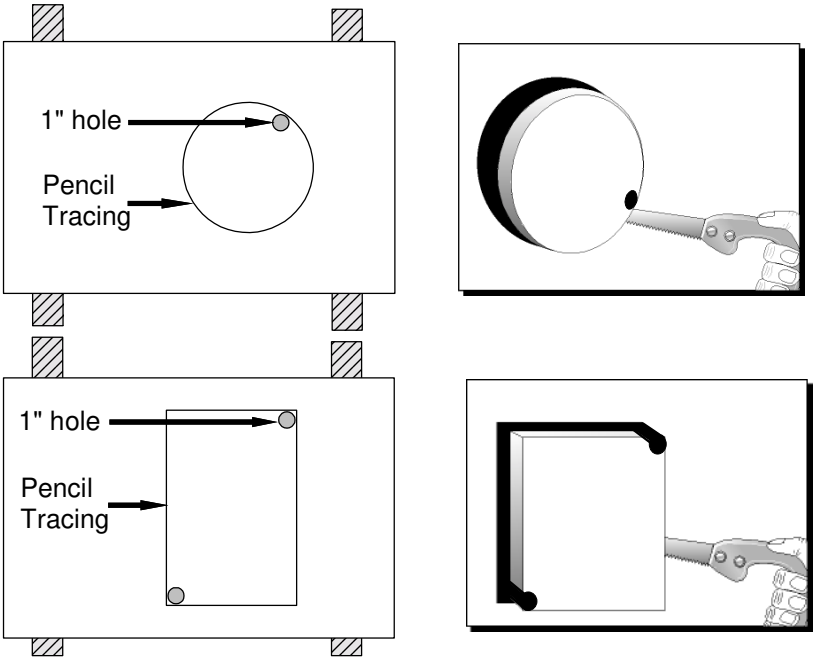


Figure 10 (also see figure 11)

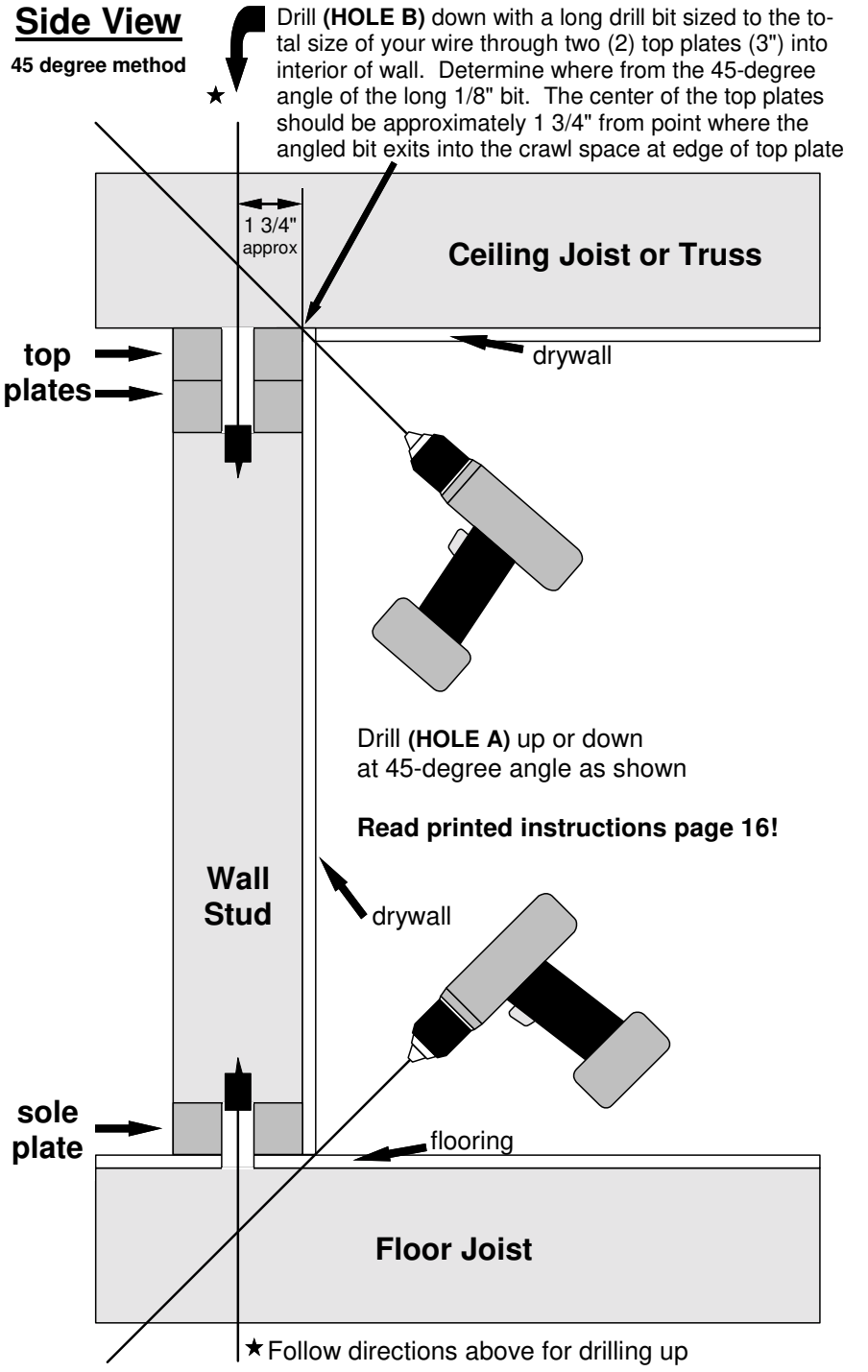


Figure 11 (also see figure 10)

Top View

(looking down from attic crawl space at wall top plate)

45 degree method

Read printed instructions page 16!

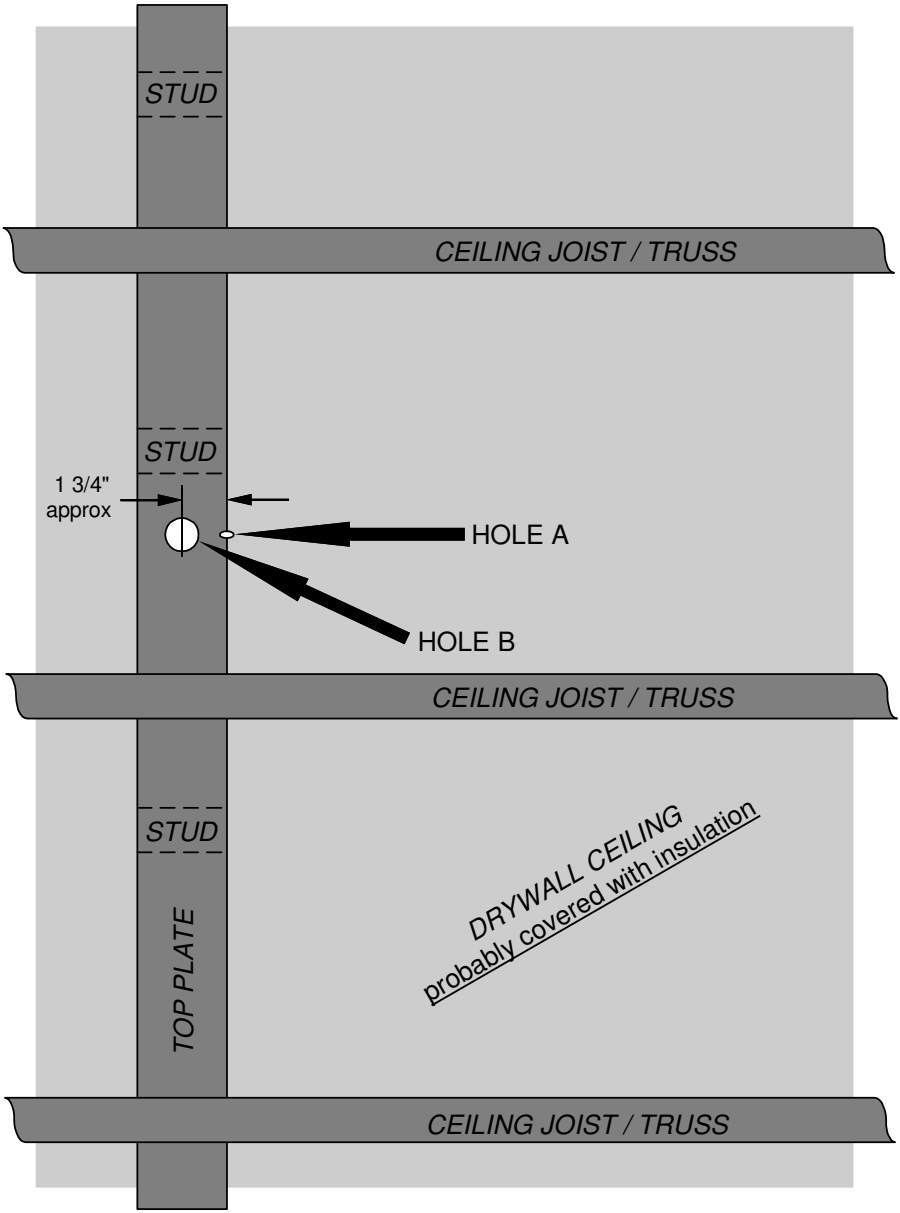


Figure 12

Flexi-bit Method

Method may be used to drill up or down provided you have an adequately long flexi-bit.

Read printed instructions page 16!

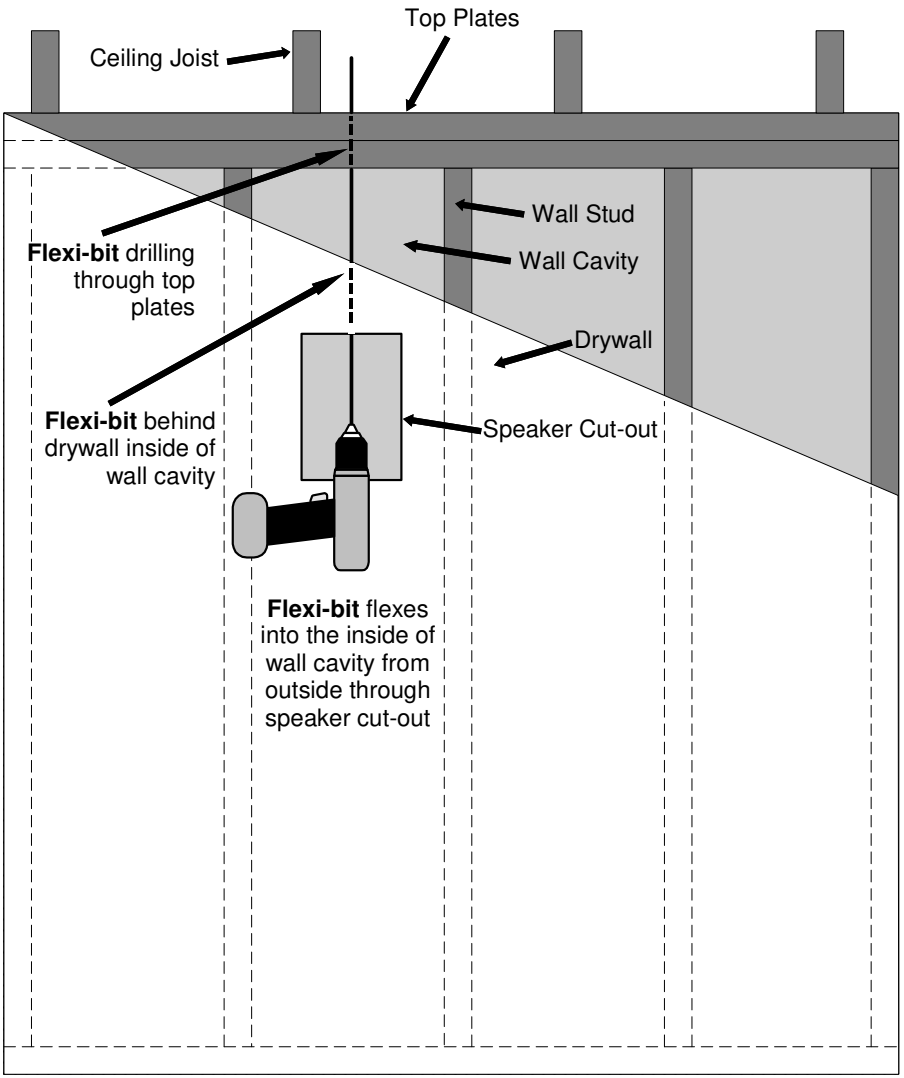
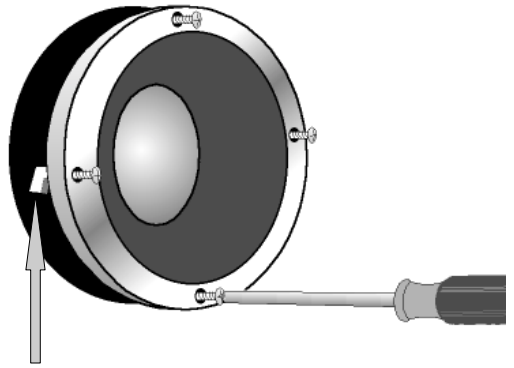


Figure 13

Mounting Speakers

Read printed instructions page 17!



Cam Nuts "Dog Ears"

Tighten each screw a little at a time
Do not overtighten!

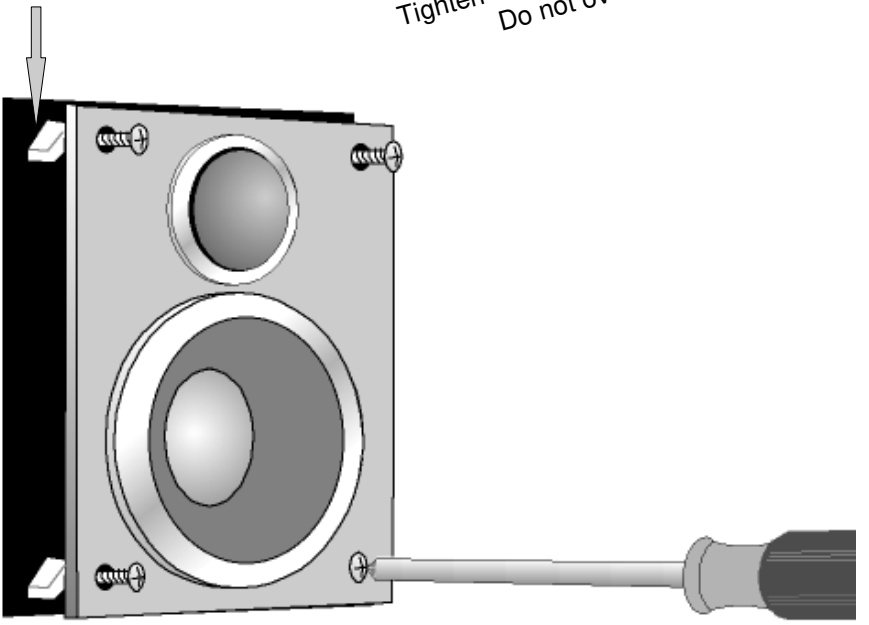


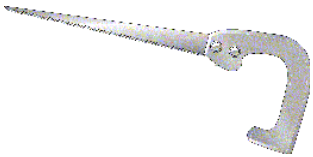
Figure 14

16/4 Speaker Wire
Rated CL-2 or CL-3
UL Approved
Check local codes applicable to low voltage wire

Figure 15

Stud Finder
Simple model shown here
More elaborate electronic models available at moderate cost

Figure 16



Keyhole or Drywall saw

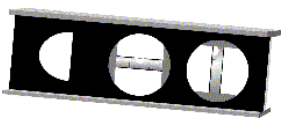
Figure 17

Paddle Bit or Speed Bore

Figure 18

Utility or Razor Knife

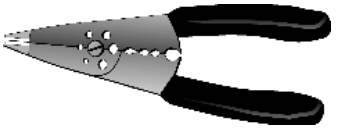
Figure 19



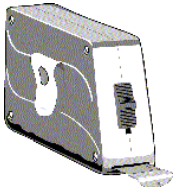
Level

Figure 20

Other Useful & Necessary Tools

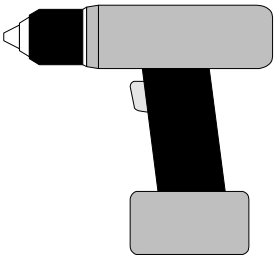


Wire Stripper

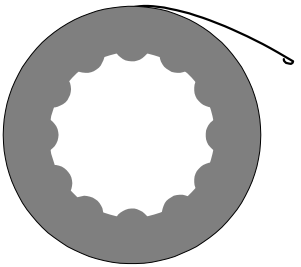


Tape Measure

Phillips Screw Driver



Electric Drill
preferably cordless



Electrician's Fish Tape

Call 775 355-0405 for technical assistance with installation or wiring.

www.oemsystems.com

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