RSL SPEAKER SYSTEMS

Since 1970

# RSL Home Theater Guide

## Get A Great Home Theater Without Spending a Fortune!

# INTRODUCTION

Thank you for downloading this guide. Putting together a home theater system, whether it's for your den or a dedicated home theater can be a confusing and intimidating process. We often think that some manufacturers thrive on people's confusion in order to take advantage of them. There are so many choices, price ranges and opinions to deal with. Many people visit home theater boutique stores and leave under the impression that to get a great home theater, they'll have to take out a second mortgage or raid their kid's college savings. You can get a great home theater and save money in the process if you are armed with the knowledge we're about to share. Hopefully, after reading this guide, you'll feel a little taller, walk with a smile, and not be afraid to face the world of audio and video.

This guide is not a substitute for your owner's manuals. There are a wide variety of features, and although we touch on some of them, it would be difficult to fully explain how they work with all the different brands out there. Besides, just because a feature is included, it doesn't mean you have to use it.

After reading this guide you may be curious where we learned all this stuff. We've been audiophiles since the early 60's. We also owned the number one audio/video specialty retail chain in Southern California, where we manufactured our RSL Speaker Systems. We learned a lot about home theater and what retailers do and in this guide we bare our souls to you.

We should also mention who this guide is for. Have you ever experienced sound at a movie or concert that was memorable? If you wish to have this level of performance in your home, this guide is for you. It is not specifically designed for those wish to purchase an entire 'theater in a box' from a big box retailer. We're not criticizing that approach as we're sure that, in most cases, it will be an improvement over the sound that the TV produces by itself. This guide also doesn't address those who wish to use a soundbar with their TV. Again, this will result in an improvement over the sound from the TV, but will not provide a true home theater experience.

## Call us Toll-Free (800-905-5485) for Advice

Always feel free to call us for advice. An actual human will answer the phone. Many call us before buying a particular model to ask our opinion.

People often send us photos of their rooms to get our advice. We'll be happy to review your photos and call you at a convenient time. We can usually tell you what to expect from your room's acoustics, make recommendations on home theater components and discuss the placement of speakers; all at no obligation. Just email your photos to sales@rslspeakers.com and include a phone number along with the best times to call.

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## Retail Stores And What They Don’t Want You To Know

Have you ever visited a store that specializes in Home Theater? Sometimes referred to as boutiques, most of these stores focus primarily on high end equipment. If you've experienced a home theater demonstration, chances are you were presented with some very expensive choices. The implication was that if you didn't spend a large sum on a home theater, you wouldn’t achieve great results. Not true!

As a large audio/video retailer for many years, we'd like to share with you what we feel goes on in the mind of a typical home theater store owner. Because many of their customers want installation, the owner has to maintain one or more installation crews. Finding and keeping good installers is difficult and expensive. Take for example if there are 2 installation crews and each crew is capable of 40 hours per week. Therefore, there is only 80 hours of total billable installation time available. That is the maximum amount of installation income you can receive. An owner would not want to waste this time installing reasonably-priced equipment with lower profit dollars. He’d want each installation hour to be combined with the costliest, most profitable equipment possible. After all, in addition to an expensive installation crew, the owner often has to maintain an expensive retail location and demonstration facilities. Each potential customer that walks through the door costs money to get them there through advertising. Therefore, the profit from each person has to be maximized.

That's why they wouldn't dare recommend a reasonably priced A/V receiver if they think they could convince them to buy an expensive processor and power amplifier. We're not saying that these store owners are bad people, it's just that they have to do these things in order to survive. In their minds, they've rationalized over-magnifying the subtle differences that some of the ultra-expensive components have over more reasonably priced ones. With today’s improvements in technology, reasonably-priced components can deliver amazing performance.

## Online Stores

The main advantages to online stores are price and selection. Depending on where you live, it may be difficult to find a local dealer that stocks the products you are interested in. You can find just about anything on the web. In comparing prices with a retail location, be sure to take into consideration the shipping costs. The amount of help you receive before and after the sale can vary, just like with a retail store. This will be good to know in advance in case you have a question or problem. It is important to make sure that you are dealing with an authorized dealer of the brand you are considering. In some cases, if you do not purchase from an authorized dealer, you may not have a valid warranty for your product. Check their warranty return, and shipping policies as well as their ratings.


## Auction Sites

You can often find good deals on new and used components on auction sites such as eBay. As in the case of online stores, make sure that you are dealing with an authorized dealer of the brand you are considering. Many unauthorized dealers sell on eBay. It is our experience that the amount of help you may receive before and after the sale is limited. Check their return policies as well as their feedback.

## Warehouse Stores (Costco)

The following may sound like an advertisement for Costco, but we assure you it's not (we have no connection to Costco, although we are members). We've purchased several TVs there and it's been a great experience. If you are fortunate enough to have a Costco nearby, we recommend you check them out. They have a good selection of quality TVs at great prices. You can usually get better sales help, because Costco is able to retain good people. Their return policy is unsurpassed; you can return a TV for any reason. They also offer superb concierge phone service in case you have a question. Finally, their extended warranties are very reasonably priced.


## TELEVISIONS

When we were young, the TV we watched had snow, ghosts and was often fuzzy (and after we turned on the set, it got worse!). There was no such thing as high definition, or any definition for that matter. When I see a high definition picture on most sets, I'm still awestruck, not to mention what the new 4K sets can do. The HD picture on most major brands is really good as long as they are adjusted reasonably well.

For this guide, we'll go over the various types of TVs. Hopefully, that will help you to decide the type of TV that's right for you. However, it would be difficult to recommend specific models of TVs. That's because they are constantly being updated and changed. For this information, we suggest going online to look at reviews of the TVs in your price range. Many good websites including Sound & Vision offer reliable reviews.

However, do use a little caution here. In our experience we've found that some reviewers as well as retailers view a subtle improvement in picture quality as a reason to spend a lot more money for a particular model. Make sure the difference is meaningful before paying for that upgrade. Once you get your TV home, there won't be the other TVs in the store to compare it to and chances are the subtle differences you saw at the store may not really matter at home.

Some of the "big box" retailers don't adjust their TVs. They just hook them up the way they come out of the box which often isn't very good. Don't get fooled by this comparison.

In regard to screen size, the one general statement we can make is that bigger is better. The larger the screen, the more you'll feel you're in the middle of the action.

When getting a TV, check out the cost of the extended warranty. This can make a significant difference in your total cost. Also, check out the return policy and the easy of returning (usually more difficult if you buy it online).


## LCD Televisions

Currently, this is the most popular category of television . Because of this, prices on LCD flat panels have dropped tremendously. When LCD sets originally came out, there were two major gripes with them. First, was the limited contrast (the difference between the lightest and darkest images the set produced) and second was the way they handled motion, which could be choppy due to their limited refresh rates.

Both of these objections have been overcome. The contrast has improved dramatically, especially with improvements in backlighting. All LCD TVs need a source of backlighting. Older sets used fluorescent backlighting. Theoretically, the contrast of fluorescent backlighting is limited, because even when part of the scene is supposed to be black, some of the backlight still leaks through, because fluorescent lights are always on. Most LCD sets no longer use fluorescent backlighting. The newer sets use LEDs for backlighting. LEDs use less energy and have longer service life.

Two types of LED backlighting are used; edge lit and local dimming. Edge lit TVs have arrays of LEDs around the perimeter of the screen. TV manufacturers have done a great job evenly disbursing the light from the LEDs and the picture quality is excellent.

The other type of LED backlighting is called ‘local dimming’. In this set, numerous LEDs are directly behind the LCD panel. The advantage to this is that when there are dark areas of the scene, the LEDs behind those areas can be completely turned off, which results in an increase in contrast. LED sets with local dimming general cost more and are designed to please the serious video buff.

As far as handling motion, the refresh rates of LCD sets have improved over the years. The normal refresh rate of the LCD TVs is 60 HZ (60 frames per second). To overcome the problem of jittery motion, many sets offer refresh rates of 120, 240, and some even 480 Hz. Although this can be great for programs like sports, a complaint is that it can make movies seem more like video (the soap opera effect). Fortunately, most sets allow you to turn this feature on and off.

## OLED Televisions

A newer technology is OLED (organic light emitting diode). OLED sets do not require any backlighting. As a result, contrast is reportedly amazing.

In addition, the colors are very vivid. The first OLED televisions are hitting the market now, but are very expensive. But like any new technology, there will be improvements in production that will bring the price down eventually.

## Plasma Televisions

Plasma sets are not as popular as LCD sets and are becoming fewer and far between every year. Compared with LCD sets, they have some advantages and disadvantages. They do offer a great picture with great contrast and are not susceptible to the jittery motion of some LCD sets.

Plasma sets do have some drawbacks. They consume more energy and are a lot heavier, which could be a factor when hauling them home from the dealer or hanging them on a wall. Most of the screens are glossy (many LCD screens have a matte finish). Glossy screens are susceptible to glare. If you have a plasma TV in a room with a window, you may find that the glare detracts from the picture. Lights can also cause a glare problem.

Earlier plasma televisions were susceptible to ‘burn-in’. When they reproduced a still image for a long length of time, part of this image would burn into the screen. Also, some plasma sets would suffer picture deterioration with age. Manufacturers of plasma sets have claimed to have solved this problem.

## Smart TVs

Smart TVs refers to sets that have built in applications and Internet access. They usually cost a little more. Smart applications can include Netflix and Amazon players as well as the ability to surf the Internet. Smart TVs require that you have an Internet service. If you don’t have a wired Internet connection to the TV, make sure the TV has a wireless adapter built-in if your home has Wi-Fi.

## 4K or Ultra HD TVs

The new 4K sets have approximately twice the resolution of High Definition TVs. Currently there is very little source material available in 4K. Netflix has started to offer 4K in its streaming service (because of all the data, this requires you have high speed Internet service. 4K larger screens can look spectacular. To appreciate the quality, you’d need a large set (probably at least a 70”). Since the introduction of

## 4K or Ultra HD TVs - Con't

4K TVs, there have been enhancements to improve color palette and contrast (eq. HDR and 10 bit color). These changes are occurring very rapidly and we suggest you do a little research online to familiarize yourself with the latest 4K TV enhancements to determine which are worth pursuing. It will also be important to make sure that your A/V receiver is also compatible with these enhancements.

## 3D Televisions

Watching 3D at home can be a lot of fun. However, the format doesn't seem to be getting a lot of support from manufacturers lately. There are 2 types of 3D televisions, those that use active shutter glasses and those that use passive glasses. Active shutter glasses are more costly and contain a battery that must be recharged or replaced. Although many of these glasses are lightweight, they are a little bulkier than the passive glasses. Some people complain that they can detect the flicker of the shutters. Others have reported occasional ghosting of images. Active glasses are used by most of the brands including Samsung, Sharp, Panasonic and Sony.

Passive glasses do not contain any electronics and do not need a battery. They are essentially the same glasses used in commercial theaters. They are relatively inexpensive, so it's easier to buy enough pairs for all of the viewers. The resolution is essentially half of 1080p. I have viewed sets with passive 3D glasses and I find the picture quality to be quite good and a little brighter than sets that use active glasses. However, with 4K Ultra HD TVs, passive 3D can be viewed in full 1080p. The main brand for passive 3D is LG.

If you have a 3D capable set,  you'll need a 3D capable Blu-Ray player and 3D Blu-Ray Discs.

## Front Projection Televisions

For the ultimate home theater, nothing matches the giant picture of a video projector. The progress that's been made in projectors is  mind-boggling. In 1998, we were considering building our own home theater. After checking out the projectors, the one to buy then was the Vidikron Vision One at $50,000! It used 3-9" CRT tubes needed to be replaced every few years at a cost of thousands. Also, a technician needed to come out every few months to adjust the set. As there was no high definition television then, the older projectors needed an outboard processor that would add lines to standard-definition DVDs so they would look good on the big screen. The one to buy then was a Farouja line quadrupler at about $25,000. Unfortunately, you could see the processor working, because of its limited computing power. I decided that rather than invest over $75.000 for the two pieces, I'd wait.

Today you can get an incredible-looking projector for approximately $1,000-$7,000 and most of these will play 3D movies. These projectors include a video processor on a chip that's far superior to the expensive outboard units of the past. And, they don't have CRTs that wear out and need constant adjustment.

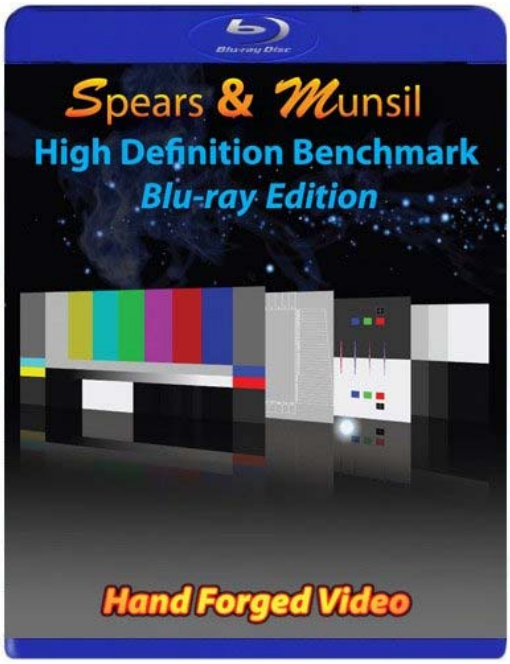
Today's projectors use DLP chips, LCDs and variations. Some of the popular brands are Sony, Epson, JVC, and BenQ. Most are 3D compatible. Projectors generally have bulbs that must be replaced periodically that a few hundred dollars. Some expensive projectors use LEDs and lasers, which have a much longer life. However, the price of these LED projectors will eventually come down.

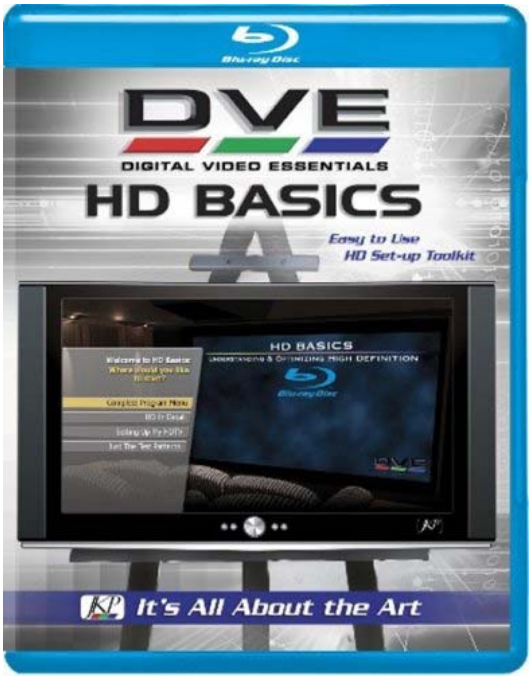
Video projectors generally require a dark room. If you cannot block the light from windows, you may be using your projector at night. You may then need a regular TV for watching during the day and a projector with a ceiling mounted, drop-down screen for viewing at night.  Some of the newer, more expensive screens can make daylight viewing possible. They can also greatly enhance contrast. So, in addition to the price of the projector, consider the cost of a good screen.

## Television  Video Processors

TVs and projectors include some form of video processor, whose  purpose is to make standard definition TV programs and DVD movies look better on high definition sets. To simplify, a TV picture is divided into scan lines. The more lines, the better the picture. A program in high definition has more scan lines than a standard definition program.

When the processor sees the limited number of lines of a standard definition picture it uses computing power to add additional lines. Although it may sound like a gimmick, it really does enhance the picture. Not only do TVs and projectors have video processors, but most audio/video receivers, DVD and blu-ray players also have them. If you prefer the processor in your TV, it is important to turn the other processors in your system off. You can do this in their settings menu.



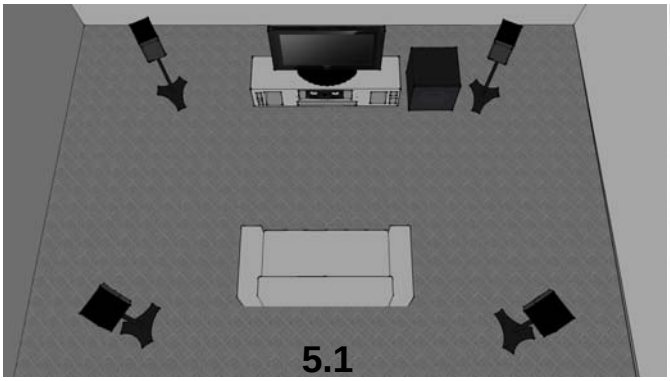

## TV Calibration

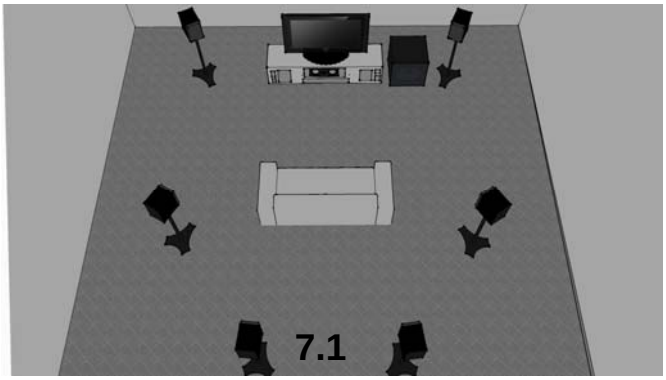
Some TVs and projectors do not have a great picture right out of the box. Some times it's a good idea to calibrate the numerous adjustments available in your set. There are two main ways to do this: do it yourself or have a professional do it. Today's sets generally stay in calibration for a long time. It's not a bad idea to have a professional come out for the initial setup. A qualified professional will have the equipment and experience to get the most out of your TV.

If you choose to do it yourself, you can purchase a calibration blu-ray disc for a reasonable price. There are several excellent ones available including one from Spears & Munsil. Or you can just adjust the picture to what you find pleasing. Some sets actually have a guided setup process built-in.

# WHAT KIND Of SYSTEM: 5.1, 7.1, ATMOS, ETC.?

Our industry is continually coming up with creative ways for you to spend more money on your home theater speaker system. First, there was 5.1. This consisted of a left, center, right, 2 speakers for the surrounds, and a subwoofer. Then came 7.1, which added 2 additional speakers for the rear. After that, 7.2 added an additional subwoofer. And they're still at it. Recently, they've introduced Dolby Atmos, Auro 3D and DTS:X, which incorporates even more speakers.




In this section, we'll discuss whether a 5.1 or 7.1 system is best for you.

Many speakers don't image well, which makes it more desirable to have a 7.1 system to help place the sound elements better. With RSL speakers it's different. Because of their imaging, you're able to get an immersive experience with just a 5.1 system. A 7.1 RSL system helps to pinpoint the sound slightly better and is more suitable for larger rooms. For most people, a good 5.1 system will provide thrilling movie and musical performances.

Adding a second subwoofer normally shouldn't be necessary. However, it can be considered under the following circumstances:

1. Your room is extremely large.
2. If your room has very uneven bass response, carefully placing two subwoofers can often fill in the gaps for a more even bass distribution.
3. More intense bass output. For some people enough bass is never enough. Two subwoofers can increase the bass up to 6db, which is huge.

Some have asked about height and width speakers. We would only recommend considering additional speakers if you plan on building a Dolby Atmos, Auro 3D or DTS:X system. You'll find more info on these in the pages that follow.

The bottom line for most situations is that we recommend a 5.1 system. Many current AVRs are designed for 7.1 systems. If you use it with a 5.1 system, you will have an extra 2 channels left over to drive speakers in another room or RSL Outisider II outdoors speakers. In general, manufacturers offer 5.1 receivers as their lower-priced models with less features and performance. Whenever possible, we recommend getting a 7.1 or 7.2 receiver, even if you only hook it up to a 5.1 speaker system.

# AUDIO/VIDEO RECEIVERS (AVRs)

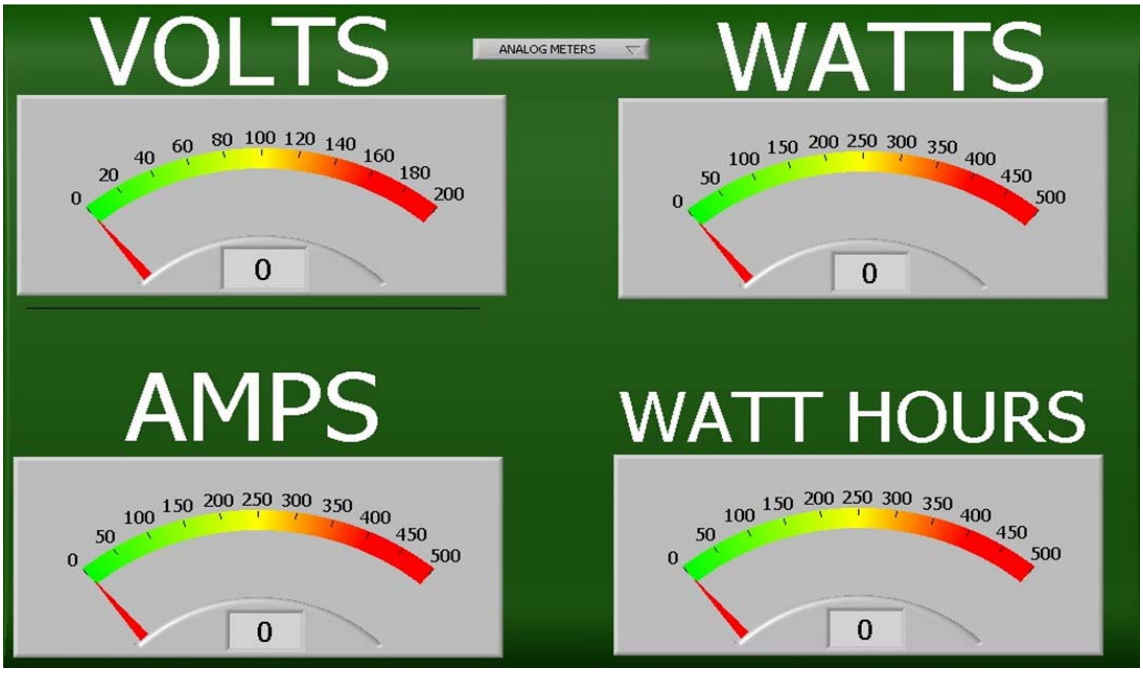

In this guide we refer to Audio/Video receivers as AVRs and A/V receivers. It is easy to be overwhelmed when trying to choose one. This is due to the dizzying array of features that many brands offer. It seems that manufacturers are battling it out to see who can incorporate the most features. There are so many logos on the front panels of AVRs, such as Dolby$^{tm}$, DTS$^{tm}$, THX$^{tm}$, Audyssey$^{tm}$, Atmos$^{tm}$, Auro$^{tm}$ 3D , etc. you wonder how they have any room for controls. However, the question is: Which features are really necessary?

Currently, the brands of receivers that are most popular with our customers are Denon, Yamaha, and Marantz (Denon and Marantz are under the same owners). These AVRs, sound great and are generally easier to setup then some of the other brands. Most of these receivers incorporate good room correction circuitry, which can be very important if your room has less than ideal room acoustics. We'll talk more about this later.

We'll briefly discuss some of the main features that are offered in many AVRs. It's a good idea to have a list of those that are important to you when shopping for one.

In general, we advise our customers to be conservative when budgeting for an AVR. In a home theater, the items you'll keep the longest are your speakers. Well made speakers (such as RSLs-shameless plug) can last for decades. The next item will be your TV. TVs can last for many years. The item you'll probably own the least amount of time will be the AVR. It's not that they'll fail prematurely. It's that the features change so often that people feel the need to upgrade periodically. So, we recommend that you don't over-budget for an AVR. You can achieve breathtaking sound with our speakers by getting an AVR in the $500-$1,000 price range. You can also look for either a last year's model or a factory-refurbished AVR to save money. Regardless of whether you plan on having a 5.1 or 7.1 system, we always suggest getting 7.1 or 7.2 receiver. The 5.1 AVRs from most manufacturers are usually the bottom of the line models that are stripped of features and offer less performance. You can always call us for advice. We can give you our opinion about what you may be considering or make suggestions.

# Power (Watts per Channel)




Every receiver lists its power in watts per channel. In general, more is better. We recommend that your receiver offers at least 60 watts RMS per channel. But you need to be careful here. While many receivers boast over 60 watts per channel, it may actually be far from the case. The question to ask is: "how many channels driven?" If the specs say only 2 speakers driven, then you'll be getting drastically less when all 5 or 7 speakers are playing. What you want is a receiver rated at over 80 watts per channel with 2 channels driven. That way, you'll have enough left in the tank to run 5 or 7 channels. So make sure you look carefully at the specs. And if the specs only specify 2 channels driven, Google and some magazine reviews can usually help you find the honest rating. If you see a receiver rated in peak watts, do not believe that specification. Rating in peak watts is a dishonest specification, which makes amplifiers appear to be more powerful. Only go by RMS watts.

In a home theater system, the part of the sound that needs the most power is the bass. Since the bass is handled by the subwoofer and its built-in amplifier, much less power is required from the AVR.

By the way, when a receiver runs out of power it can be bad news. If you crank the volume up and your receiver can't handle it, it will distort. This distortion can actually damage your speakers.

In extreme cases, too much power can also be bad. If you have some super-powered receiver and you crank the volume way up, you could damage your speakers. However, having extra power on tap for momentary peaks is a good thing. For our systems, stick to receivers with 60 - 150 watts per channel, all channels driven. Just remember, its generally better to err on the side of more power than less.

## Equalization And Automatic Room Setup

Most receivers come with some kind of room correction / auto calibration circuitry. Its an important feature because it'll measure the distances to all the speakers and adjust the volumes accordingly for each; a task you would otherwise have to do yourself. A microphone is supplied which picks up test tones played by the receiver. The receiver then analyzes how your speakers and room affect the test tones and then adjusts various settings to optimize the system in your room.


But even more importantly, this circuitry will help compensate for bad room acoustics; hence the term room correction. All rooms have unique sonic characteristics and few are perfect. Acoustics play a very important role in the sound of your home theater system. Rooms with carpeting, lots of stuffed furniture and window treatments, such as drapes, usually sound better than rooms with bare walls and hard floors, where sound bounces around. Unless absorbed, sound waves continue to bounce from one hard surface to another. An extreme example is most gymnasiums.

In the past, the only way to fix bad acoustics was to install carpet and thick drapery, or cover your walls with sound treatment (usually not much of a complement to your home decor). Audyssey is a brand of room correction circuitry that turns the arduous task of overcoming bad room acoustics into an art form. We've found that among all the brands of room correction circuitry, Audyssey is among the most effective. We have personally witnessed Audyssey transform a room with terrible acoustics and harsh sound into a room with good sound quality. It was quite impressive. Several brands of receivers, include some level of Audyssey; which brings us to our next point.

Audyssey circuitry comes in different levels. The top 3 versions of Audyssey from low to high are: Multi EQ, Multi EQ XT, and Multi EQ XT 32. If your room is less than acoustically ideal, then we highly recommend picking up a receiver with one of these versions. Yes it will cost more, but it will be well worth it. Look at it like this; the worse your room is acoustically, the better you want your Audyssey room correction to be. We don't recommend receivers containing Audyssey's entry-level 2EQ.

Another good room correction can be found in Yamaha's receivers. It's called YPAO and we have also found it to be very effective.

The quality of different brands and models of room correction can vary. Once you set it up, we recommend comparing the sound with it switched on and off to see which you like the best. If you'd like specific recommendations on which receiver to get with room correction, feel free to contact us.

## Video Features

Your AVR is the heart of your home theater system. All of your audio and video components connect to it. Modern video components will connect through the HDMI inputs. The HDMI connection will carry both the video and the audio, making separate cables for each unnecessary. Since HDMI was introduced, it has been upgraded several times. HDMI 1.4 or later is necessary for 3D TVs. Current AVRs also offer HDCP 2.2, which allows copy-protected 4K Ultra HD material to be played.

For switching to your different sources, make sure the AVR has at least 4 HDMI inputs (for switching your Blu-Ray player, cable box, video game, etc). It is also advisable to look for an AVR with 2 HDMI outputs. This will allow you to feed both a TV and a projector in case you have both of these.

In addition to switching A/V sources, AVRs offer video processing options, among them upscaling that adds lines of resolution to standard definition video and HD to 4K. Many AVRs also offer controls that let you adjust the video picture. It is our opinion that the upscaling circuitry and the video controls should be a function of your TV or projector and that those in the AVR are usually unnecessary and should be bypassed in order to avoid conflicts. Make sure that any AVR you are considering offers the ability to completely pass the video through it unprocessed in any way. If your TV has some of the latest picture enhancements, such as HDR, make sure your AVR can pass these through.

## Surround Modes

Over the years surround sound formats have evolved. First, there was Dolby™ Pro Logic. This circuitry would take the 2 channels of audio from the VCR and synthesize additional surround sound channels. Although this isn't the same as five separate channels, its surround effect can be convincing at times and can be currently used for 2 channel stereo sources.

After that, Dolby™ Digital and DTS™ surround were introduced. These offered 5 discrete channels along with an LFE (low frequency effects) bass channel for the subwoofer. These systems employed compression to fit all the audio on a DVD. Although some have criticized the audio quality because it was compressed, we've experienced some excellent sounding movies and concerts that use both formats. These systems are currently used on most non-Blu-Ray DVDs. Between the two, we feel that DTS sounds slightly better.

The latest surround formats are Dolby™True HD and DTS™ HD Master Audio. These are found on Blu-Ray discs. They are uncompressed and can easily fit on a Blu-ray disc because of its large data capacity. You'll need an HDMI connection to enjoy these formats. If you have a 7.1 system and the movie you are playing has only a 5.1 sound track, the AVR can provide sound to all 7 speakers.

In addition to these formats, most AVRs have processors that are designed to take two channels of stereo audio and change them into synthetic ambient modes such as concert halls, stadiums and night clubs. We don't care for most of them as they seem to sound artificial.

You may not be up for reading your AVR's owners manual from cover to cover (you're not alone; most of us feel that way). However, one section we recommend is the one that describes the surround modes and how to use them. This will allow you to get best sound from your system.




## Dolby Atmos, Auro 3D, and DTS:X

Recently, some new surround formats have been introduced. Dolby Atmos, Auro 3D, and DTS:X all employ additional speakers in addition to the standard 5.1 and 7.1 speakers. Some of these speakers are overhead. The goal of all of these systems is to provide more exact placement of the sound elements of movies and music.

So far, we've experienced Atmos and an Auro 3D. We have not yet heard DTS:X So, we'd like to share our initial impressions of Atmos and Auro 3D, which are subject to change as the formats mature.

We found that both systems have strengths and weaknesses. So we thought we'd put together our list of pros and cons for each system to help you decide which is right for you, if any.

**DOLBY ATMOS**

Dolby Atmos is a new home theater speaker configuration that "transports you from an ordinary moment into an extraordinary experience with breathtaking, moving audio that flows all around you" according to Dolby. Basically you're taking an existing surround system and either adding speakers in the ceiling, or on top of the front and rear channels. The ceiling setup has two options: 2 speakers above and in front of the listening position or two speakers above in front and two speakers above and behind the listening position, totaling 4. If in-ceilings aren't an option, you can use reflecting speakers. You can place one reflecting speaker on top of your front left and right channels, totaling 2. Or you can place one on top of each of your front and rear channels, totaling 4.


**Atmos Pros:**

1. We found that with 2, or better yet, 4 in-ceiling speakers you will indeed increase your audio dimensionality and create a more immersive experience. Airplanes, bullets, rain, etc really will come from above you. You'll also notice more accurate sound placement than a standard surround system. Adding Atmos via in-ceilings is definitely a step towards the ultimate goal of realism.

2. Cost. Receivers aren't cheap, especially when you get to 9 channels and above. Fortunately, you can get a 5.1.2 Atmos system (2 in-ceiling speakers) by using some reasonably priced 7.2 Atmos receivers. If you want to have 4 in-ceiling speakers, then you'll need a 9 channel receiver.

3. Space. Atmos is spatially efficient. Considering the fact that you're installing speakers into the ceiling, an Atmos system is not very intrusive in your room. For some people, putting 5 speakers in a family room is a tough enough sell. Now if you want to add more, at least they're less intrusive.

**Atmos Cons:**

1. Compatibility. Atmos is not compatible with every room. Actually, to achieve the desired results, you really need a fairly specific room with a flat ceiling no lower than 9 to 10 feet. Unfortunately, if you have vaulted ceilings, you may be out of luck. For those of you who can't install into your ceilings, you're faced with a less desirable alternative, which brings us to point #2.

2. Reflecting speakers. We're not big fans of this approach. That's not to say it can't work. We just feel the results are inconsistent and less fulfilling than with the in-ceiling speakers. We found that the reflecting speakers don't achieve the desired dispersion, commonly leaving you with a narrow sweet spot. So, although one seat may sound great, its just too bad for anyone not sitting in it. Also, we didn't experience the same level of definition as we did with the in-ceilings. Firing sound directly at you is definitely more optimal than bouncing it off of another surface.

3. Lack of source material. Right now there's only a few movies actually recorded in Atmos, but it’s getting better all the time.


**AURO 3D**

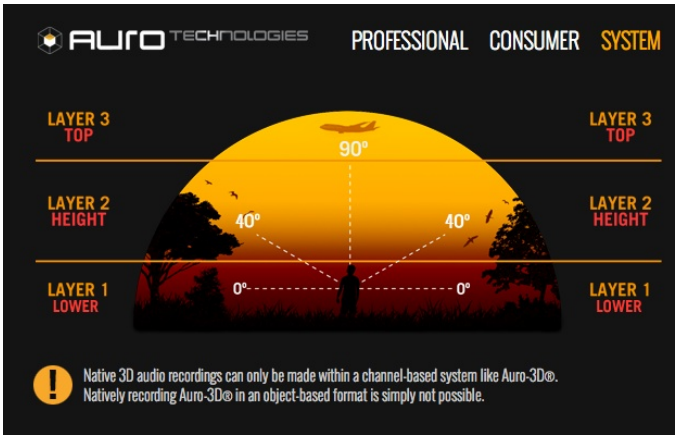
Auro-3D is on its way to the U.S. and is taking a different approach to achieve a similar goal. Auro looks at sound in layers and adds a second layer of sound on top of your standard 5 or 7 channel system. Its kind of like stacking one surround system on top of another. They achieve this with four bookshelf speakers, front and rear left and rights, mounted on the wall above your current surround system and angled down at approx 30 degrees.

**Aura Pros:**

1. Sound. Our sole experience came from Auro's room at the Venetian in Las Vegas. The demo took place over a 9.1 system (5.1 surround + 4 height speakers) with a high-quality demo disc. The experience was exhilarating. The demo disc actually included a/b comparisons with Auro on and off. Wow, what a difference! It was the closest simulation of reality that we've ever experienced. A pipe organ in a cathedral was 100% convincing, as was a symphony orchestra. A recording of a London street corner left you struggling to believe you weren't there. A jetliner passing overhead made you want to hit the deck. It was convincing. We felt this was a substantial leap towards ultimate realism.

2. Compatibility. Auro is compatible with a larger variety of rooms. Since you're basically just adding bookshelf speakers to the wall directly above your left and right channels, you don't need to worry about vaulted ceilings or cutting holes. The only potential for a problem is a room with a really low ceiling. You may not get enough separation between high and low speakers. We don't yet know what the spatial requirements are.

3. Sweet spot. Auro, from what we could tell, has a much wider sweet spot. We don't feel that a narrow sweet spot is a huge problem with Atmos (with in-ceilings) but we have heard the issue mentioned on several occasions.




**Auro Cons:**

1. Cost. To enjoy Auro 3D, you'll need a minimum of 9 channels. Your choices are to either buy a 9.2 receiver, or add a stereo amp to an Auro capable 7.2 receiver. Then, you'll need 4 more speakers.

2. Space. Adding 4 bookshelf speakers to your walls could be a really tough sell if your theater is also your family room.

3. Lack of source material. The selection is very limited and because of this, we're not sure whether or not Auro will be successful.

**DTS:X**

This new format from DTS allows you maximum flexibility as to how many additional speakers you need and where you can place your them. Then, the AVR automatically determines how to distribute the sound. As this format is new, we have yet to hear a demonstration, so we can't honestly give an opinion. However, the idea itself sounds like it has potential. Many of the newest AVRs come with DTS:X or allow you to download a firmware update. Source material is currently very limited, so we'll have to watch this format and update our opinion on it.

## Volume Processing

If you've watched  a movie in a home theater, you may have had the following experience: During a quiet scene with some dialog, you turn up the volume to hear it better. Then, all of sudden, the scene changes to a loud one and you're almost blown out of your chair. Then you scramble to find the volume control and turn it down. Hopefully, you didn't wake the kids or bother your neighbor. Quite often, the volume of movies at home seems to vary greatly.

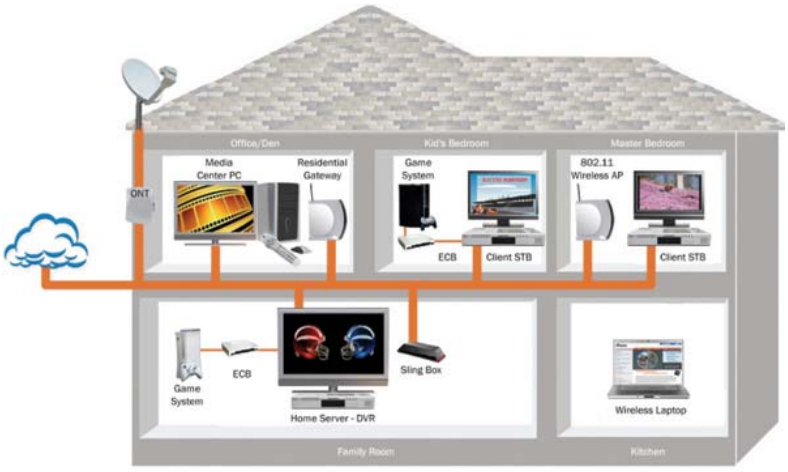
Many current AVRs offer volume processing from various companies like Dolby™, Audyssey™, and THX™. As much as we strive to have as little processing as possible in our sound, this can be an useful feature when you don't wish to disturb those in other rooms. This feature compresses the dynamic range so that more of the sound is at the same volume. Soundwise, this is a compromise. So, if you use this feature, remember to turn it off when you're finished watching the movie.

## THX™

THX™ is a licensing organization. THX™ is a series of specifications for equipment and the way it is set up for both movie theaters and home theaters. If the theater owner or the equipment manufacturer meets these specifications and pays THX™ a licensing fee, they will receive THX™ certification.

We don't feel that THX certification is necessary to achieve the best audio or video performance. Some companies feel that putting the THX logo on their equipment will gain them more sales, due to the familiarity when people see a movie with the THX logo on the screen.

If your AVR offers THX processing, be certain to do some listening with it both on and off. Decide for yourself what sounds best to you.




## Smartphone, Bluetooth, and Network Connectivity

Most AVRs can play music from your smartphone, computer, iPod or other music device through Bluetooth or your home network. Some include WiFi that can connect your AVR to your home network. Besides retrieving music, photos, and video from other devices, this can also be handy in allowing your receiver to upgrade its firmware over the Internet. Most AVRs provide a USB jack that can accept an iPod, MP3 player, or memory stick with songs or photos on it. Some AVR's have circuits that can enhance compressed music such as MP3s. Some receivers offer Apple AirPlay, which receives music wirelessly from your iPhone, iPad or computer. Many AVRs will let you listen to Internet music services such as Pandora or Spotify. Some receivers can be the heart of a whole house music system that can stream music to matching speakers in other rooms. Most of today's receivers can also decode high resolution music files with quality that's superior to CDs.

## HD Radio

All AVRs, have FM tuners. HD Radio is a new format for AM and FM stations. HD radio uses digital compression similar to MP3s to make AM sound much better. For FM, HD Radio allows a radio station to put multiple broadcasts on the same frequency. You'll be able to choose different programs from the same radio station. In order to receive HD broadcasts, you need an HD Radio capable receiver.

## Second Zone

Many AVRs can power another set of speakers in a second zone, either in another room or outside. If you have a 7 channel AVR and you are running a 5.1 system, you'll have 2 extra amplifiers that you can use for second zone speakers. If you have a 7.1 system, you will be using up all of your AVR's amplifiers and you will need an additional stereo amplifier to power the speakers in the second one.


## Remote Control

Some remote controls are laid out quite well. They're backlit and easy to manipulate in a dark home theater. Others are more difficult to use. If you're unhappy with your AVR's remote you may wish to consider purchasing a universal remote. Many AVR's remotes also have the ability to control other components in your system.

## Read The Manual Before You Buy

This is very important. Quite often, manufacturers put a lot of effort into the features of their AVRs and little effort in making their owners manuals understandable. This can cause stress and leave you feeling inadequate. It's their fault, not yours!

Owners manuals are available from manufacturer's websites for virtually all current AVRs. Before buying an AVR, download the manual first. See if you can understand it. If not, consider a different brand.

While we're on this topic, let's talk about on-screen setup menus. These should be easy to navigate and understand. You should be able to change the speaker's level volumes or crossover frequencies without much hassle.

## You Don't Need to Use Every Feature

By now some you may be saying, "stop! enough already. Too many features. I'm confused." Don't worry. Just because the manufacturer crams all these features into their AVR doesn't mean that you have to use them all.

## Can I use an older AVR?

Absolutely. In our society, we're always pressured to own the latest and greatest. Despite all the hype you may have read in magazines and have heard from audio/video salespeople, an older AVR can work well in your home theater system. Yes, there may be a few limitations, but you can usually work around them.

# BLU-RAY PLAYERS

Choosing a Blu-ray player is a lot easier than choosing an AVR or TV. Stick with a major brand and you pretty much can't go wrong. The difference in video quality among them is minimal. As far as audio quality goes they are all good. However, some of the costlier brands incorporate higher end audio DACs (digital audio converters), which can make a difference if the rest of your system is up to that level.

A word of caution: Many who buy higher end Blu-ray players don't get the audio performance they paid for. This is because they connect the Blu-ray player to the AVR using only an HDMI cable. When connected this way, the sound processing is done by the circuitry in the AVR and not the Blu-ray player, eliminating the audio differences between inexpensive and costly players. To get the full benefit, the Blu-ray player must feed the AVR through the analog inputs (which some AVRs do not include). However, because most AVRs have excellent audio processing, even lower cost Blu-ray players can sound excellent when connected to an HDMI input. All current Blu-ray players should be compatible with Atmos and DTS:X.


## Loading times

Some of players are agonizingly slow. Be sure to check magazine reviews of Blu-Ray players, which often include loading times.

## 3D Capability

Most current Blu-ray players are 3D compatible. If you have a 3D TV, but your AVR is not 3D compatible (it requires HDMI 1.4 inputs) look for a Blu-ray player with 2 HDMI outputs. One HDMI output will connect directly to your 3D TV. The other will transfer audio to your AVR.

## Analog outputs

Analog outputs allow you to hook your Blu-ray player's audio into an older AVR. This allows you to use the built-in Dolby True HD and DTS HD Master Audio decoders of the Blu-ray player and then transfer the audio to your AVR. If you do this, make sure your AVR has the proper analog inputs.

## Updating by the Internet and Wi-Fi

Most Blu-Ray players can connect to your home network and the Internet. Some have built-in a Wi-Fi adapter if you can't use a wired connection. Blu-ray players occasionally need to update their firmware through the Internet. Hollywood is very concerned about the copy protection on their discs and changes it often. When this happens, the player needs to be updated in order to play the latest discs.

## Netflix And Other Sources

In addition to playing discs, Blu-ray players often include the ability to play Netflix instant downloads, Amazon movies, YouTube, and the ability to go to other websites for content. Depending on your Internet speed, the video quality can be surprisingly good.

# SPEAKERS

## Speakers Are A Long Term Investment

Of all of the technology-based items that you may own, you will probably own your speakers the longest. Think about how about how often you upgrade your mobile phone. With all sorts of new features thrust upon us, AVRs are also upgraded relatively often these days. When it comes to speakers, we get phone calls and emails daily from customers who've had their RSL speakers for over 30 years. So, when you decide how much to budget for speakers, consider their usable life. You may find that getting really great speakers will have a lower cost per year than any other item in your home theater.

Of all the components in a home theater, speakers will have the biggest effect on sound quality. Current technology offers phenomenal sound with today's movies and sound tracks. Great speakers can involve you in the movie or music and give you that tingling sensation your used to experiencing at the best movie theaters and concerts.

# 5 Ways to Save Big on High-End Speakers & Subs

1. **If you buy from a retail store; make sure you negotiate**

Speakers are the most profitable component of a home theater system - by far. Retailers can sell speakers for double what they buy them for. So start your offer low and see what they come back with. Some large retail chains may have prices set by corporate and cannot discount - but boutique shops almost always can. Remember, it's always better to try negotiating than to just assume that you can't.

**2. Buy factory-direct.**

When you want the best deal, go straight to the source. Buying directly from the manufacturer bypasses middlemen, distributors, and retailers and can save you the most money.

Unfortunately, the vast majority of high-end speaker brands don't sell direct to the public. However, there are a few brands like us that do.  While there are some very good factory-direct brands, there are also plenty of cheap knock-offs. Check the expert and customer reviews of the brand you're considering to make sure that what you're considering is high quality.

**3. Double-check prices online.**

Before you shell out a bunch of money for speakers, it's always a good idea to double check prices online. Many brands will list MSRP on their website. But if they don't, check sites like Amazon.com and eBay.com. With eBay, you may be able to find slightly used high-end speakers that work perfectly and you can save a lot. Good speakers are designed to last for decades so you don't have to worry too much about how many hours of use they have.

**4. Check with the experts.**

Publications like Sound & Vision Magazine and HomeTheaterReview.com evaluate speakers thoroughly. Price, build quality, and performance are carefully weighed to determine a speaker's overall value. In Sound & Vision Magazine, the best value products receive their "Top Picks"  award and are listed in the “Top Picks” section of their website. Buying speakers that the experts rave about is one of the best ways to make sure you're getting the most bang for the buck.

**5. Consider going vintage.**

As we mentioned before, eBay.com can be a very useful resource - especially for vintage speakers. Older high-end speakers can still sound great and can save you a lot.

## Confused About Speakers? Our Difference Could Be The Answer.

There are many good speakers on the market today and it's easy to be confused. If you wish to consider RSL Speakers, here's a little info about us: Since 1970, our goal has been to provide the sound normally associated with expensive high-end speakers at low factory-direct prices. In addition, our patented Compression Guide Technology allows our speakers to deliver better clarity and resolution than comparably priced, conventional speakers. Our website explains more about Compression Guide Technology and its benefits, Buying direct saves you dealer's and middleman's profit, which translates into substantial savings. Our satisfaction guarantee takes all the risk out of putting our speakers to the ultimate test; in your home (we even cover shipping both ways). Here's a link to the review in Sound & Vision Magazine: http://www.soundandvision.com/content/rsl-51-theater-speaker-system

Regardless of the brands of speakers you're considering, here are some suggestions:

- Consider the size of your room and make sure the speakers are appropriate for the space.
- Consider how the speakers will match your audio/video receiver.
- Read the magazine reviews as well as customer reviews for the speakers you're considering. Sound & Vision has a "Top Picks" section, which is a good starting point.
- Make sure the speakers have a return privilege. This is very important, because it's important to know how they will sound in your home. Will you have to for pay return shipping or a restocking charge?

**1980**

**6600H**

## Size Used To Matter

Over the years we have made hundreds of models of all sizes, many of them large. It used to be true that if you wanted big sound, you needed big speakers. This is no longer true.

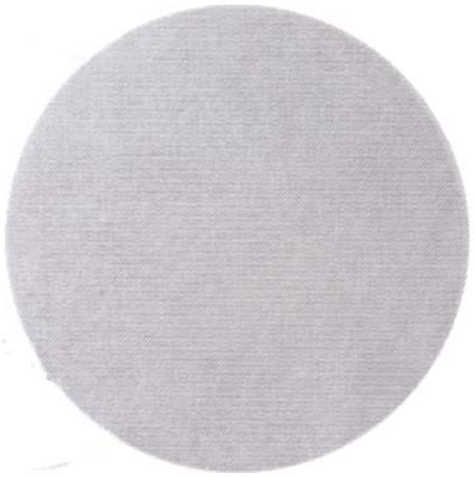
**2015**

CG4

In many of today's systems,  the deep bass tones are handled by the subwoofer, while the rest of the sound is handled by smaller (satellite) speakers. For good sound, the satellite speakers are required to blend seamlessly with the subwoofer. The satellite speakers must have enough bass response so that there is no gap where the subwoofer leaves off. They must also be able to handle enough power to play at loud volumes without distortion. In addition to all of these requirements, the satellite speakers must be able to properly image the sound. While it may seem logical that a larger speaker cabinet will yield a larger sound image, the opposite is often true, where a smaller cabinet can produce a larger image. An additional advantage is that smaller cabinets are easier to place and will intrude less in the room.  In RSL's case, our small speakers  can deliver a great home theater experience, even in very large rooms. We chose the small size, because it allows our speakers to deliver a large sound image.

With a separate subwoofer, there is a lot of flexibility where it can be placed. With a high quality speaker system, you should not be able to detect that a separate subwoofer is operating. You should be given the impression that all of the bass is originating from your satellite speakers.

## Should You Put Speakers In The Wall Or Ceiling?



Some people prefer to use in-wall or in-ceiling speakers in their home theater rather than conventional boxed speakers.  If you wish to do so, we recommend using in-wall or in-ceiling speakers for your rear and/or surround channels. You can use in-wall or in-ceiling speakers for your right, left, or center channels, but boxed speakers will give you better imaging. We also do not recommend using an in-wall subwoofer.

Generally, rectangular speakers are used for walls and round speakers are used for ceilings, although either can be used for both. Most round speakers do not sound as good as rectangular speakers, because the tweeter is located in front of the woofer. This design causes cancellation between the woofer and tweeter and results in an uneven frequency response (our RSL C34E round speaker uses a lateral alignment, which avoids this problem). Also, our C34Es are used extensively for Dolby Atmos.

## What About Bi-pole and Di-pole surround Speakers?

Bi-Pole and di-pole surround speakers have additional speakers to disperse the sound in different directions. The thinking behind this is to create a more diffuse soundfield. We do not agree with this approach. We want all of the elements of a movie or concert to sound exactly in their correct place in your room. Speakers that image well can precisely locate all of the elements around you. If you have a high quality 5.1 system with no speakers on the sides, you'll still sense that there is no gap between the front and rear speakers. Because some speakers can't accomplish this, manufacturers feel the need to employ additional speakers to spread the sound, but the imaging winds up being imprecise.


## The Importance Of Choosing The Right Subwoofer

Subwoofers come in all price ranges and there are tremendous differences among them. The biggest problem with the typical low-cost subwoofer is that while it may appear to produce a significant amount of bass, it does so at the cost of accuracy. Manufacturers have long known how to make inexpensive parts produce what appears to be a lot of output at low frequencies. This kind of boomy bass is very undesirable in a quality home theater system. During its normal operation, a variety of bass tones are fed to the subwoofer. In music, for example, it's important that all the characteristics of the bass instrument are reproduced properly. A bass drum should sound very different from a string bass, etc.

With ‘cheap’ subwoofers, regardless of the sound fed to it, the same one-note bass always emerges. This can be very fatiguing to listen to. In addition, an inferior subwoofer will not blend well with the rest of the speakers and will mask their clarity. You’re always reminded that there’s a separate subwoofer present.

Subwoofers reproduce a very limited part of the audio range, typically 20 – 100 Hz. This range of sound requires the most power. The source of this power comes from the amplifier built in to the subwoofer and not your AVR. Bargain subwoofers often overrate their amplifiers in peak watts, which is not as honest as an RMS wattage rating. So we suggest caution before buying any subwoofer whose amplifier is rated in peak watts.

## Wireless Subwoofer Control

A great feature to look for in a subwoofer is wireless remote control, such as found on the RSL Speedwoofer 10. The bass that’s present in movies and music will vary tremendously. The best place to adjust the bass is at your listening position. If your subwoofer doesn’t have remote control, you may find yourself constantly getting up and walking to the  subwoofer to adjust the volume. These interruptions can diminish your listening and viewing enjoyment. In addition, the amount of bass you hear at the subwoofer will be different than from your listening position, which may require you to get up again to readjust.

## Wireless Connectivity

Sometimes it’s not possible to run an RCA cable from your AVR to the subwoofer. In this case, there are several wireless solutions available that can work quite well. Some subwoofers, such as our Speedwoofer 10S have a wireless receiver built in. To connect this speaker wirelessly, all that’s needed is the small optional transmitter that connects to the back of your AVR. All wireless devices have some delay called latency. It’s important to look for one with low latency (under 30 ms).

## Speakers: Summing It Up

The most important part of choosing speakers is hearing them. Where should you hear them? While the obvious answer may be at a local retailer, you won’t get an accurate idea of how the speakers sound in your home by listening to them in a demonstration room. There are many things that can be manipulated in a demo room, including room acoustics, positioning of the speakers and the choice of demonstration material. How the speakers will sound in a store will be different than in your home.

We’ve spoken about this earlier in this guide. So again, make sure you have a chance to evaluate the speakers in your home and if they don’t work out, you can get your full purchase price back.

Speakers need a ‘break-in’ period in order for them to sound as they were designed to. So, before you critically listen to them, play them for 30-40 hours at a moderate volume.

**Soundcast™ Wireless Speaker Transmitter and Receiver**

## WIRELESS SURROUND SOLUTIONS

You may find yourself in a situation where it is inconvenient or impossible to run wires to your surround and rear speakers. Fortunately, with the latest advances in wireless technology, solutions are at hand. As an example, Soundcast™ (offers a product that contains both a small transmitter and receiver. Currently, it sells for around $200. The transmitter connects to the rear and/or surround outputs of your AVR. The receiver plugs into an AC outlet in back of your room. It has a built-in amplifier that connects to your speakers. We have found the sound quality to be quite good. The are other brands and the selection of wireless speaker devices is constantly increasing.

## SPEAKER WIRE

For best sound, use quality speaker wire. Speaker wire is available in all price ranges. However, after extensive testing we have determined that the best value in performance is around a dollar per foot. Once you exceed that amount, you'll pay a lot for a small gain. We recommend two-conductor wire with high quality copper. You'll also want to make sure that there is a means of determining polarity (identifying the positive and negative strands).

All wire has resistance. The thicker the wire, the less resistance it has. The less resistance, the better your speakers will sound. The thickness of the wire should be determined by the length of the wire you are using. For longer lengths, heavier wire should be used. See our table below:

| Length of Speaker Wire (each speaker) | Recommended Minimum Thickness |
|---|---|
| Up to 15 feet | 16 AWG |
| 15 to 30 feet | 14 AWG |
| Over 30 feet | 12 AWG |

## CONNECTION CABLES

Before the days of HDMI cables, hooking up an audio/video system was a nightmare. There were numerous connections for both the audio and the video. And each of these connections presented a golden opportunity for an audio/video salesperson to sell you a set of high-priced cables. With analog audio and video signals, a good set of cables will prevent signal loss. Although you may have some analog connections, most of yours will be through HDMI, which thankfully handles both the audio and video in one connection.

All HDMI signals are in digital form. What it boils down to is that the signal either goes through perfectly or it doesn't at all. Purchase decent, but relatively inexpensive HDMI cables. Do not let anyone talk you into super-duper, whiz-bang, high-buck HDMI cables. You will gain absolutely nothing but bragging rights with the uniformed. However, for long runs (over 20 feet), more expensive HDMI cables are usually required.

The same goes for fiber optic cables if you need to connect your Blu-ray or DVD player to an AVR that doesn't use an HDMI connection. Don't overspend.

In most home theater systems, the only analog RCA cable will be the one that connects the AVR to the subwoofer. The band of frequencies that are fed to the subwoofer is limited, normally in the 20-200 Hz. range. It is for this reason, that despite the hype regarding subwoofer cables, you do not need to purchase an expensive one. Just choose one that is constructed to last. Sometimes it may actually be cheaper to purchase a stereo pair of RCA cables than a single one. If that's the case, just hook up only one of them and the second one will serve as a spare, should the first one ever fail.

## CHOOSE THE RIGHT INSTALLER

While an expert home theater installer may be a good way to go, sometimes all you need is to run wires through the walls for speakers. In this case, consider an electrician. They are just as qualified to run wires as a home theater installer. Although they may not be able to provide audio/video advice, they may be able to save you a bunch of money. You can always call or email us first to discuss equipment layout and speaker positioning, then have the electrician place the wires. We're always happy to help.

## Thank you for reading this guide. We hope it has been helpful.

As we mentioned at the beginning of this guide, If you are considering setting up your home theater, please don't hesitate to call us and ask for advice.

Feel free to send us digital photos of your room from different angles. We'll review them and call you at a convenient time. We can make recommendations on home theater components and discuss the placement of speakers; all at no obligation. Email your photos to sales@rslspeakers.com and include a phone number along with the best times to call.

Our business is primarily word of mouth from satisfied customers. When you purchase your speakers, we'll be there for help and service.

**We would appreciate knowing what you thought about this guide and any suggestions you may have. Please let us know by emailing us at** sales@rslspeakers.com **.**

RSL SPEAKERS

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