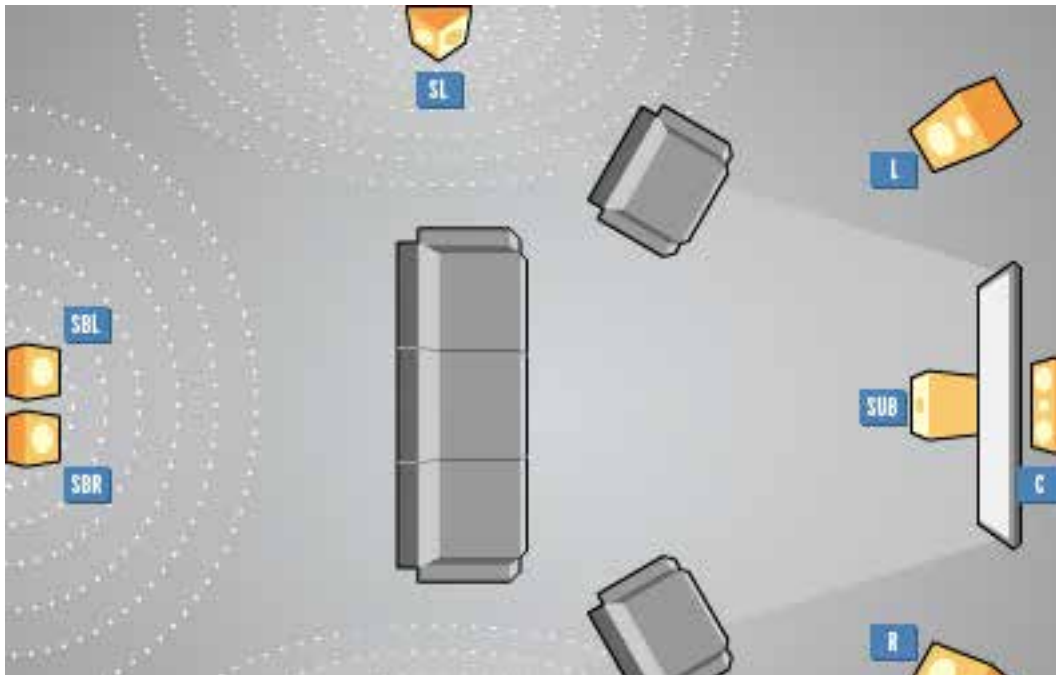


UNDERSTANDING HOME THEATER

Understand how to plan a home theater; choose the right home theater speakers, home theater receivers, home theater projectors *AND MORE*

- Getting started in front projection
- The most important home theater components
- How light works in a home theater
- What makes a great home theater
- Tips for installing a basement home theater
- Getting ready for professional home theater installation

Planning Your Home Theater: **THE ROOM COMES FIRST**



"It's the seating," says John Dahl, director of education for THX. "Most people do it backwards. They go to a store and buy an AV receiver [or something] first," he says, which is putting the egg before the chicken (not taking discussions of evolution theory into account, of course).

Dahl, who teaches integrators how to plan and execute top-notch home theaters, says that the room or location, and not the equipment, should always be the first thing anyone considers when planning a home theater.

Yes, great gear is, well, great, but performance of that gear depends significantly on the environment it's going to be operating in. That's why THX suggests you start with key issues, such as seating. Once you establish where you want to sit, how many seats you plan (or need) to have, then you can figure out what size display will work for your given seating distance and location. Walking into a dealer and asking for the biggest TV and loudest amplifier in the shop sounds like fun, but it's not always going to get you the best results.

Understanding your room before you've made your gear wishlist will also influence your choice of speakers and other equipment. Will any seats need to be close to surround speakers? If so, then



bipole speakers will work better than direct radiating, because bipoles create a more diffuse sound. What about bass? Your room's dimensions will create areas of resonances, called room modes, which accentuate or attenuate bass response. These are issues that can be dealt with before any holes are drilled or components plugged in.

All this, of course, is just the start. The final goal, as Dahl emphasizes, is to recreate as close as is reasonably possible, the theater experience as it was created in the studio. While there is no such thing as a THX-certified home theater, having your theater planned and executed by someone who understands the objectives is going to result in a space that will outperform a room that was gear focused, rather than experience focused—equipment and room need to work together. “We’re saving the world from bad sound and video,” says Dahl.

It may take longer and require more planning and thinking to design a theater this way, but it’s also a kind of insurance that when you invite friends over to share popcorn and the latest superhero movie, everyone in the room will be blown away. Work like this is not for the DIY set. It takes a professional who understands the parameters, internalizes the goals and knows how to use the tools, to produce a top-performing theater space. A professional also knows where to compromise and where to adjust to fit the homeowners’ or interior designer’s needs. “It doesn’t do anyone any service if we insist that there’s only one way. There’s a goal, but there are options too,” Dahl adds. “If you’re a good installer you have lots of options in your pocket.”

FRONT PROJECTION HOME THEATER:

The Basics Behind the Big Screens

Flat-panel displays get much of the attention today, but they can't compete with front-projection systems when your goal is to own a truly captivating home theater. Consider the phrase "home theater." As obvious as it may seem, home theater is all about creating a



Sony SXR projector

theater ... in your home. How many times have you gone to the movie theater to find everyone huddled around a 50-inch LCD? (If your answer was "greater than zero," you should find a new cinema.)

"If you walk into a room with a 120-inch screen and a gigantic football game playing on it, people say 'WOW!' You don't say 'WOW!' about a flat panel," says Gabriel Montemurro, senior system design engineer at Gramophone, a Maryland-based home theater and home automation shop. "There's nothing like a two-piece projector and screen system to give you that cinema feeling—that WOW factor."

Bigger is Better

The biggest thing a front-projection system has going for it is size. When looking for a canvas on which to showcase your favorite films, television shows, sporting events, and home movies, sheer screen size



JVC DILA projector

can go a long way toward turning an average Friday night into an event. Whereas flat-panel displays are typically measured in inches, front projection screens are measured more easily in feet. For example, a 124-inch (diagonal) screen, featuring a 16:9 HDTV aspect ratio, measures a whopping 9 feet wide. That's big.

Although front-projection systems offer much larger screen sizes, you don't necessarily pay more for the privilege. Inch for inch, a front projector and screen can often be much more cost-effective than a large flat panel TV.

How It Works

When you break it down, a front-projection system is really quite simple. As the name implies, the screen displays an image that's being projected from the front by a home theater projector.

With a front-projection system, both the projector and screen are critical components to the picture quality. All of the devices you'd want to connect to a traditional TV can also be connected to a projection system; doing so, however, does require a bit of planning to ensure that all of the video sources are properly switched and that a speaker system is handling the audio portion of the signal. The basic wiring of the system will differ little from what you already have.

Projector Choices

Like flat-panel displays, video projectors are available from a multitude of manufacturers and employ a variety of different display technologies. With flat panels, you typically have to choose between plasma (though there are few of those anymore) and LCD, the latter of which includes LED TVs. Not surprisingly, you also have choices when shopping for a front projector. These days, virtually every home theater projector offers native 1080p (high-definition) support, with HDMI and other input options. Where projectors tend to differ is by the technologies they use to create the images.

DLP (Digital Light Processing) and LCD represent the two most common types of front projectors, with the LCD (which sometimes goes by the term 3LCD) variant known as LCoS (Liquid Crystal on Silicon) standing as another popular option. LCoS is primarily used by Sony and JVC, who each have developed proprietary implementations of this technology, which they call SXRD and D-ILA, respectively.

When selecting a projector, light output, zoom, contrast and control options are all some of the features to investigate.

Screen Options

Apart from the projector, the other key ingredient in a front-projection system is the screen. The screen material can have a significant impact on the brightness, color saturation and viewing angle of a pro-

jection system. Additionally, there are many options for physically mounting the screen, like having it roll up into the ceiling when it's not in use.

"People often think that a projection system is more obtrusive, when in fact it can be less obtrusive than a large flat-screen TV," says Mike Holmes of JVC USA's Consumer Display Division. "With high-quality drop-down screens available, a projection system virtually disappears when not in use because you don't have that giant, black rectangle dominating the room."

While it's certainly a popular option to construct a dedicated screening room around a front-projection system, it's by no means your only option. The combination of high-output projectors, retractable screens, and proper lighting control allows you to integrate a front-projection system into virtually any space in your home.

"Video entertainment has expanded beyond traditional movies, thus creating a demand for a room more flexible than a dedicated theater," says Digital Projection International's Michael Bridwell. "The room must now be optimized for Friday movie night, Saturday morning video games and Saturday afternoon football."

By using the design know-how of a seasoned custom electronics professional, you can have that home theater you've always dreamed about, without having to sacrifice your family room. The equipment will stay out of sight, revealing itself only when you're ready to watch something on that big, immersive 120-inch screen.



Digital Projector DLP projector



Epson LCD projector

WHAT GOES INTO A Home Theater System



Denon home theater receiver

Most big electronics stores offer systems generally referred to as home-theater-in-a-box. Those are fine as starter systems or for apartments, but for someone who's serious about their home theater experience, a customized system and room is what's called for.

We've already discussed the importance of the projector and screen in a high-performance home theater. Here are some of the other critical components of your new media room:

Receiver (or amplifier and processor):

The audio portion of your home theater will be handled by a surround-sound receiver or a pro-amp and amplifier combination. A receiver or pre-amp is the device where all your main interconnects (the HDMI, optical and other cables) will go. It also handles the audio and video processing by taking the signals from your source components and translating the digital surround sound signals into analog signals for the amplifier.

Look for. *lots of input options, network capability, video upscaling and audio calibration tools.*

Media Servers:

Equipped with huge storage capacities, ranging from 1 to several terabytes, a media server can hold on its internal hard drive hundreds if not thousands of movies and put them right at your fingertips. By using the server's built-in interface, which can be displayed directly on the screen of the home theater, a touchpanel or even as an app on your tablet or smartphone, you can search for movies by genre, title, date and other criteria. Some servers are so smart they can categorize the movies for you. If you already own a collection of discs (both CDs and Blu-rays) these can be downloaded into and stored on the server. You can also download movies from the Internet or buy a preconfigured collection of flicks from the manufacturer (some but not all offer this service). It's a slick setup that's easy enough for all ages and levels of tech savvy to operate.

Look for. *Storage capacity, ability to integrate with a control system, multi-zone capability.*



Top: Oppo BDP-103 Blu-ray player
Middle: Kaleidescape-Cinema-One
Bottom: Integra dtr305

Media Streamers

The newest way to bring content to a home theater, media streamers are fast, flexible, chockfull of choice, and fun. Oh, and they're also super affordable. At a fraction of the cost of most media servers, media streamers have become a favorite source of content among home theater enthusiasts. With a unit connected to the Internet, you'll be able to access popular online movie sites like Netflix, VuDu and Hulu, and stream your selection directly to the screen or projector of your home theater. The downside: The streaming speed and image quality will hinge on the strength of the Internet connection. If the Internet is down, so will be your home theater. For this reason, it's wise to complement a streamer with a server and/or Blu-ray disc player.

Look for. *Form factor: USB port, favorite streaming services*

Blu-ray Disc Player

Despite the popularity of streaming, Blu-ray Disc players do still hold value in a home theater. They're an affordable component that lets you enjoy your existing collection of Blu-ray discs (also 3D versions) by just popping them into the player. Plus, they can play standard DVDs and CDs. Some players also have streaming and storage capabilities.

Look for. *3D Capability, video upscaling, Wi-Fi and Ethernet.*

MAXIMIZING LIGHT in a Home Theater

We talk a lot about projectors for home theaters—how bright they are or what kind of contrast ratio they offer, but the projector is just the device that delivers the light. There are other factors that help ultimately determine the picture experience, including the screen, ambient lighting and room characteristics. Here are some basic guidelines for dealing with light in your theater or media room.



Theater by Avista

Screen Selection

The material you aim your projector at plays a big role in the image, but choosing a screen isn't always simple. There isn't one screen that will work for every situation. The truth is that screens will behave differently in different circumstances, so you have to carefully consider what your room needs and what you want out of it when selecting a screen.

Eric Haas, technical specialist at Current Concepts in Coopersburg, PA, says he recommends screens on a case-by-case basis. "We take into account the screen gain, the light output of the projector and the ambient light in the room," he says.

For rooms with a lot of ambient light, he's installed screens with a light rejection surface (also called angular rejection), which can work very well, but there may be situations where even that doesn't solve all problems. For instance, light rejecting screens are designed to turn away light at very specific angles while accepting light that comes from the direction of the projector. In one home, he found that light coming in through a window in the back of the room was hitting the screen at just the right angle so that the screen essentially treated it as if the light was coming from the projector, while light from other parts of the room didn't create a problem.

There isn't an all-around best screen—one that works perfectly in all situations—but some basic guidelines can help you get the one that will work best, most of the time, in your room. "We were founded on the principle that there is a perfect screen for every application," says Dave McFarland of Stewart Filmscreen. Finding that screen is a matter of evaluating the room's variables, the pro-

jector and your expectations (and budget). However, to make selection easier for people, Stewart recently launched a new brand of screens called Cima, which includes two materials: Neve, a white material with a wide viewing cone appropriate for light-controlled rooms; and Tiburon, a gray screen meant to boost black level in rooms with more ambient light.

David Rogers of Elite Screens agrees that screens which selectively reject light can work very well in “light infested” rooms because the screen’s reflective under layer only returns light coming from the direction of the projector. The downside is those screens may have a narrow viewing cone.

Sometimes, Haas says, a very high-gain screen can be a good option in an ambient light situation, but not all high-gain screens are good at rejecting ambient light or reproducing strong contrast. A



Theater by Future Home

high-gain screen can also help boost the performance of a dimmer, less-expensive projector, but there may be other sacrifices, such as bright spots.

Stewart suggests that users should also be aware of lens ratio when selecting a screen, because it can impact uniformity and hot spotting. The company recommends that screen gain should never be greater than the lens ratio.

One of the first things you should consider when selecting a screen is the shape and size of the room. A wide room will require a screen that allows for a wide viewing cone. Some screens will focus their reflected images in a narrow cone toward viewers directly in front, while others cast a wider image. When looking at screen specs, look for the half gain number. The larger the number, the larger the viewing cone before the brightness drops by half from peak brightness. The shape of your room and spacing of your seats can determine what screen works best in your room. Because projection screens in dedicated home theaters tend to be big, often filling up most of the wall, this doesn’t tend to be an issue in a lot of rooms (but it is a big deal for flat-panel TVs). Some high-focus the image in a narrower angle.

When looking at light rejecting screens, it’s important to know that most screens only reject light from one plane. Screen Innovations’ Black Diamond material, says SI director of sales Blake Vackar, is the only one that rejects light from both the horizontal and vertical planes. This means that light from side windows and a white ceiling are both turned away from the picture, reducing light scatter by 75 percent. It does this by incorporating eight optical layers over a highly reflective surface. The curious part about the Black Diamond (particularly the 4k .8 material) is the screen material is black, but when you shine a projector on it, you get vibrant colors, real whites and deep blacks. That screen does have a fairly narrow viewing cone of 45 degrees to half gain, so this makes it appropriate for a dedicated theater with seating all grouped in the ideal viewing area. For a wider room, SI

offers a 1.4 gain dark gray screen with a wider viewing angle and most of the contrast benefit of the black screen.

Vackar notes that a wider viewing cone can be important for media rooms, especially for video gaming, because gamers may be situated all around a room. Black Diamond screens come in a Zero Edge format that looks better in multi-purpose rooms.

Another option for battling extreme light situa-

tions is to use two projectors in a system such as Elite Screen's AirFlex5D system which stacks two projectors into one housing and uses a processor to keep them in sync. Such a system can deliver double the light output of a single projector, but can cost less than buying an ultra-bright projector.

The screen company Draper features a useful screen selector tool on the company's web site. Most other screen companies offer similar tools, but if they don't, any home theater dealer/installer will be able to walk you through identifying the same variables to help you decide.

Wall Color

Commercial theaters are painted dark colors for good reason—because you want to focus on the screen and not the walls. But no matter how dedicated a movie viewer you are, you probably don't want your home to look like a commercial cave. "You're always dealing with compromise" says Haas, when creating a home theater or media room space. One of those compromises may be on room color.

First let's talk about sheen. Semi-gloss paint can be easier to clean, but it's also reflective—it will reflect the projector's light, making the room brighter, and can even reflect back on the screen itself. Haas says matte or flat sheens are best, especially in dark, earthy tones, but eggshell is acceptable too. Any sheen more than eggshell will be too reflective, even on the trim paint.

In addition to the wall color, anything of color in the room has the potential to be picked up by the screen. Painting the front wall, where the screen goes, a flat, light-absorbing dark gray will help reduce any light that's bouncing around the room from bouncing back at the viewer and helps define the picture.

For wall color, dark, non-primary tones are best, but most people don't want to paint their favorite rooms dark brown just to make the picture look its best. A proper projector calibration can compen-



Theater by Cinemar Solutions



Theater by Innerspace Electronics

sate for many of the problems wall color may introduce.

What about the ceiling color? You usually don't want to use ceiling paint—the common white paint found at all home improvement stores. Ideally, a flat black or gray ceiling would be best. Many theaters use dark acoustic panels (wrapped in fabric) on the ceiling to both deal with first sound reflections from the front speakers and also absorb excess light. Vacker notes that the Black Diamond screens, because they reject light from both the horizontal and vertical planes, are able to reject light from a white ceiling. “It removes the room color from the equation,” he says.

Light rejecting screens can also make up for some of the reflections coming off colored walls because they treat light reflected off walls the same way as they treat ambient light. Plus, their narrow viewing cone keeps less light from hitting the walls.

If you really want to add some bright colors to the room without impacting the picture, try using accessories such as wall accents, throw pillows or a rug with an attractive pattern. The important thing is to make it a room your family will want to be in.

Light Control in Home Theaters

A room's got to have light, right? Determining how much light and where to put it where it will cause the least harm is a common problem in media rooms.

The most important thing is to keep light off is the screen, then determine how much light you really need in order to use the room the way you want to. In a dedicated theater, eliminating all ambient light is pretty easy—just turn the lights off and enjoy the movie—but in a multipurpose media room, which may contain a wet bar, a pool table, and other non-screen elements, other lights are going to come into play.

Haas suggests that lights be kept as far away from the screen as possible, and not directed at the screen. For instance, lights that focus their output down on the user, rather than radiate out into the room, will allow for socializing without washing out the picture.

A smart lighting control system can be very useful in a home theater. You can start by creating separate lighting zones, so the area crucial to the screen can be dark, but other areas (such as a bar area) can have light. Wireless dimming products, like Lutron's Maestro systems, make it easy to turn down the lights while you're already seated in your viewing chair.

Recessed spot lighting can be useful for illuminating specific areas of a room (such as over a game table or bar) without casting much light out into the rest of the room or toward the screen.

With all this talk about getting the light away from the screen, it almost seems counter-intuitive to attach lights to a screen. But that's exactly what SI can do with its Black Diamond Zero Edge. The Ambiance LED option puts LED lights around the perimeter of the back of the screen with 256 color options. Vackar says that the lighting improves perceived contrast and does not impact the screen image at all, and looks really cool.

Ultimately the goal isn't to create a space that fits some industry specs for home theater. The goal is to create a space you and your family will enjoy, in which both the décor and the electronics work together. Sometimes that means a compromise or two, but the results are worth it.



Theater by Smart Homes of Texas

9 OVERLOOKED HOME THEATER FEATURES

Many home theater enthusiasts, especially Do-It-Yourselfers, tend to fuss all about the big picture and sound-in-the-round speaker approach, while neglecting many important details.

Sometimes installers are guilty of the same thing (though usually it's the client's taste or budget that's to blame). A home theater is more than a room and more than a collection of electronics all tethered together. When done right, a home theater is a total experience.

To get to that sublime home cinema experience, you need to pay attention to all the details

The truth is that few rooms are perfect for a home theater before the gear arrives, and many still aren't perfect after the gear's been installed and connected. In fact, perfection is rarely achievable, but there are a number of features that any home theater enthusiast overlooks at their own peril.

1. Lights. Most of the time the lights in your home theater are going to be turned off. That doesn't mean that the lights aren't important. Placement and control of lights can impact how your theater looks and how convenient it is to enjoy. If you like to watch TV or movies with a little bit of light on, then controlling where the light is directed, how it's reflected and even its color and intensity will all have an impact on picture quality. Lighting control—whether via a remote or an app, allows you to adjust the lights without having to get out of your seat. A lighting system that's integrated with the theater controls can make these adjustments for you, based on how it was programmed.

2. Reflective Surfaces. Many people don't realize how reflective the surfaces or accessories in their home theaters are until they've turned off the room lights and started to watch a bright movie scene. Every shiny or light-colored surface in a room can reflect the screen's light back into the room in unwanted ways. Be careful of glass surfaces (such as on art or poster frames—look for non-glare glass) and light colored walls and trim. Yes, something as simple as white trim can brighten up a whole room when the lights are turned off and the screen image is bright.

3. Seats. Sofas are fine for living rooms, especially when you plan to talk to the people sitting next to you, but in a home theater, the seating should direct your attention only to the screen. The best theater seats not only include all the built-in accessories (recline buttons, heat, snack table, cup holders...) but also are designed to properly support your body from your head to your feet so you won't feel fatigued or fidgety during the length of the movie.



4. Accessories. A home theater is not an ordinary family room. Go a little crazy. Get that fancy marquee you saw online, the fiber-optic star ceiling, the vintage popcorn maker, the life-size replica of Spock. Whatever makes it fun and adds to the movie experience is fair game.

5. Control. One of the most frustrating things of any complex home theater or media room is how complex it is. If you have to pick up more than one remote to operate your room, then you're doing it wrong. Basic single-room control systems or universal remotes can take the frustration out and leave the movie enjoyment in.

6. Acoustics. The way a home theater sounds is dependent on a lot more than just the speakers and amplifiers you bought. Sound comes in waves, and like the ocean, those waves keep moving, bouncing around and off things until they've worn themselves out, and are dispersed or are absorbed by a something else (such as an island). Without addressing the acoustic reflective, dispersive and absorptive properties of your room (including the walls, ceiling, floor and furniture/accessories) your home theater is only half done.

7. Bass and/or LFE. Subwoofers aren't simply the bass speaker (bass can come from all your speakers) and all bass isn't the same thing as LFE (low frequency effect). Those issues get mixed up

a lot. Bass, subwoofer use and LFE can be confusing, but proper implementation can mean the difference between a ho-hum home theater and a system everyone you know is jealous of.

8. Calibration. Just because the speakers are plugged in and the projector is pointed in the right direction, the job isn't done. Both the video and audio needs to be calibrated. This ensures both that the products are properly set up to perform well, and that they perform well in the unique space that is your room. Your screen, source components, throw-distance and wall color will all impact the picture, so don't assume that the settings that work in one person's room are going to work in your room. The same goes for audio.

Most receivers or surround processors come with auto room calibration features. These are safe to start with, but take a trust-but-verify approach by checking the settings manually with a sound meter and your own test tones. There are many good smartphone apps for this.

9. Noise.

Have you ever been in a completely silent place? Probably not. Even if you plug your ears up from all outside noise you'll still hear your heart beating and your stomach churning over your breakfast burrito. Your home theater is unlikely to be silent either. Your projector, receiver, Blu-ray player, HVAC system, media servers... all make noise. However you shouldn't have to sit back and just accept it. Try to design your theater from the start so that noise-emitting products are in cabinets or in a separate room. If the noise is coming from outside your theater room, try improving the insulation, and seal up any air gaps, especially around doors.

Some projectors are particularly noisy when their auto iris is functioning. The best thing you can do in that situation is to mount the projector as far away from your ears as possible. At normal view/listening levels, low ambient noise may not be very noticeable, but when a quiet scene comes onscreen, it's very disturbing to hear the whir of your projector above the whispering of the actors.



BASEMENT HOME THEATERS

Issues & Opportunities

Basements can be ideal places for your home theater project, but they can present unique problems.

For people who live in a part of the country where basements are prevalent, below-ground rooms are still the dominant place to put a dedicated home theater. A basement is a perfect location for a theater or media room for lots of reasons. The sidewalls aren't usually shared with other rooms; if there are windows, they're small ones; they're generally not an open design, so acoustics are easier to control; and their out-of-the-way nature makes them great places for temporary escape.

That said, basements also include challenges that other rooms don't have.

The first thing to consider in a basement is moisture. "We look around for spots where there may have been leaks," says Dave Wexler of The Little Guys in Chicago, IL. He notes that newer homes usually don't have moisture issues, because new developments manage water better than older ones did.

If you've had moisture issues in the past, sump pumps, French drains, dehumidifiers and moisture blocking paints can all be used. A contractor will need to solve any potentially serious problems early on in the project.

Plumbing, exposed conduits, heating and air conditioning ducts all can get in the way of your of your audio and video gear. Often a heating duct crosses a ceiling area in exactly the place you need a projector. A professional integrator will know whether the projector placement can be altered or if the duct needs to be moved.

Ceiling height can be a problem in many basements, especially where ceiling mounted projectors and tiered seating is in the plan. A low ceiling can make it a challenge to put seats on risers, especially with a third tier, without getting the guests' heads too close to the ceiling or in the way of the projector's light.

Depending on what you want for your display, the basement entryway can be a challenge. If your stairs are narrow and have a low ceiling, it might be tough to get an 80- or 90-inch flat-panel TV down there. Even harder will be a big—100 inches or larger—rigid projection screen. Rolled up fabric projection screens can easily be carried down any stairs.

What about windows? While basements don't normally have a lot of windows, if there are any, they need to be able to be covered so no light comes in to wash out the picture.

Insulation is also a concern—both for containing heat (if you live in a cold part of the country) or to keep the audio in. "Given the opportunity, we use Acoustiblok," says Wexler. Acoustiblok is a viscoelastic polymer material that's applied to wall studs. It's excellent for soundproofing, but it can be expensive.

Because a basement will have very different temperature characteristics than the rest of the house, it's important to make sure it operates as a separate HVAC zone in the house.

Todd Anthony Puma of The Source Home Theater, New York, N.Y., says lighting is key in any theater, especially a basement. "The placement of lights is critical," says Puma, so the lighting is directed to where people need it and not onto the screen. "A lot of people want to do recessed lighting, but I recommend sconces. Recessed lighting can rattle [from bass frequencies] or leak light," he says. Puma also recommend LED path lighting around seats and stairs to prevent accidents in the dark.

Puma adds that remote controlled lighting makes a huge difference in people's enjoyment of a theater. First, there's the WOW factor of watching lights automatically fade to black while the picture and sound come on, but beyond that, remote controlled lighting allows you to activate different lighting scenes depending on the how the room is being used at the time—a music listening scene may set the sconces to partial illumination, while the movie scene turns them off entirely—and you won't have to get out of your chair to change them.

Another issue that Wexler sees with basements is fluctuating power. "Voltage stabilization is critical," he says, and recommends products from companies like Furman and Panamax to maintain a home theater's performance level. You don't want to see your picture go dim every time the air conditioning kicks in.

While a traditional rectangular room may be ideal for a dedicated theater, more families are designing their basement spaces as multipurpose rooms—often with open designs that aren't ideal for theaters. For this reason, Wexler says speaker positioning is sometimes an issue. "We use a lot of in-ceiling speakers for surround or rear channels," he says, "because sometimes walls aren't where you'd like them."

Whatever your basement, there's a solution that can turn that empty space into an impressive entertainment area.

What to Expect During Your **HOME THEATER PROJECT**

By now you've probably shopped around for a home theater professional. You may have even selected all the equipment and features you'll enjoy in your home theater system. Now comes one of the hardest parts of the process: waiting.

It can be months from the time you write that big check for your home theater equipment to the time you finally get to turn it on. So how do you cope with the wait? How do you temper that burning anticipation? You could crash the home theaters of family and friends. They'll return the



favor once your own home theater is done. Besides, you'll probably want to show it off. And by visiting others, you may get more ideas for your own home entertainment haven.

Here are some common issues and decisions you'll likely face during your home theater project:

1. It helps to understand the process of constructing and installing a home theater. First, your home theater will be prewired for all of the equipment. In a new construction or addition, this usually occurs when the builder has completed the framing and before the walls are "closed" with drywall, sheetrock or any other material. With wood or steel structures, the vertical wall supports known as studs will still be visible.

2. Whoever installs or "pulls" the wire should test each cable to make sure it works properly. Receptacles for in-wall speakers, multimedia jacks and power outlets will be installed during this time.

3. Don't expect your audio/video equipment to be installed until the construction or renovations are complete and the areas are free of dust and debris that can harm sensitive electronics.

4. A good custom electronics contractor will use this time to build your system in racks at its own facility, test each of the components and program any controllers so the entire system works properly

when installed in your home. Ask if you can see your system assembled in your contractor's facility first. Any lingering questions or concerns you have can be addressed at that time. Late changes may still be possible as well.

5. Once all the construction work is done, the "trim out" phase begins. This is when all the electronics are put into place. In new homes, this may occur while you are moving in.

6. After the electronics have been installed, the company should test all the components to be sure they are working properly, tune the audio system to ensure it sounds its best and calibrate the video monitor. If you have a costly video projector or monitor, ask about certified professional calibration.

7. The electronics company should show you how to operate the system and any controls, and it should be available to answer your questions. The company may provide a basic package of commands to get you started, and it's a good idea to schedule a visit to add more extensive controls once you've had some time to use your home theater system.

8. The "completion" of your home theater and any payment due at that time should include the initial training on using the system as well as a follow-up visit to add extra control options and iron out any wrinkles. It's a great idea to specify this in your contract.

9. Communication is key. The construction company should let other contractors know when the wire, the plumbing and the heating need to be installed. The electronics company must let others know where any speakers, screens and other items will be located, as well as coordinate with custom cabinetmakers if audio and video components are to be housed in their creations. The interior designer and electronics pro need to communicate about decor issues and placement of speakers and other electronics. And so on. You should encourage this communication and make it clear that you expect it.

10. Respect is appreciated. Show each of your contractors that you respect their opinions and hard work, especially if one is being asked to alter a design for the need of another. If you don't respect their talent and hard work, then seek other contractors to finish the job.

11. Call a meeting. Still having communication issues and battles among your contractors? Call everyone to a meeting, put the issues on the table and don't allow anyone to leave until the problems are resolved. Encourage embattled parties to see and articulate opposing points of view. Before you know it, they may be referring clients to one another.

If you're interested in learning more about home automation, indoors or out, check out these useful resource sites:

Find an Installer:

Locate a professional in your area who can set you up with your dream system.

<http://residential.findinstallers.com/findinstallers/installers>

Electronic House Learning Center:

Helpful articles on a variety of home tech topics.

http://www.electronichouse.com/topic/tag/Learning_Center/

Electronic House Coolest Homes:

Inside looks at the best integrated homes and media rooms and home theaters offered for your inspiration.

<http://www.electronichouse.com/coolhomes>