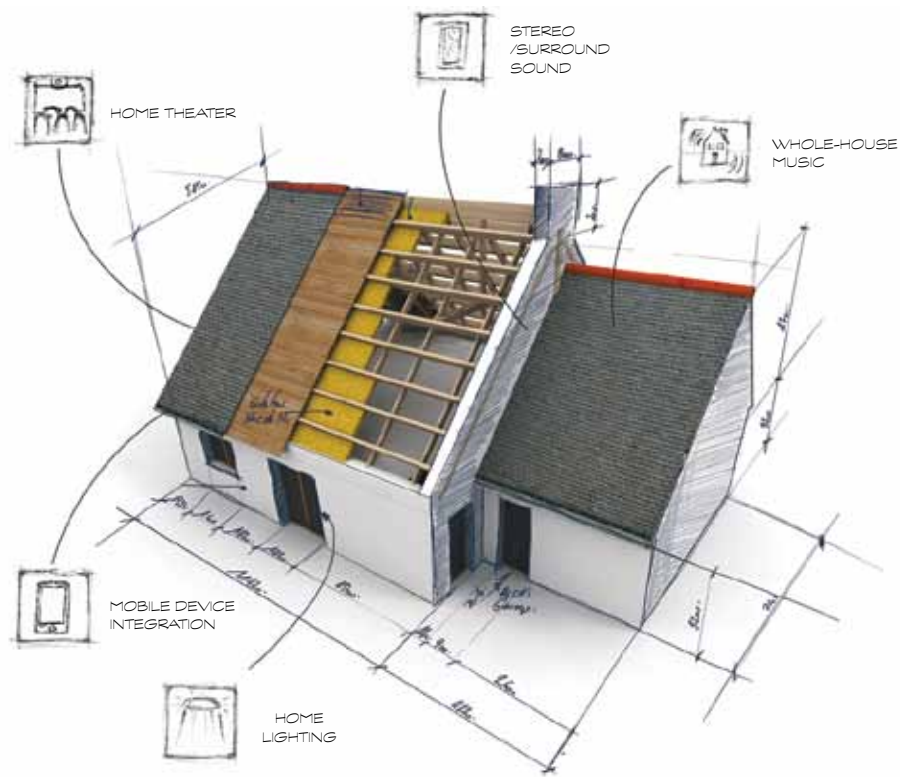


# HOME TECHNOLOGY PLANNING GUIDE



Make your home smarter. \_\_\_\_\_

# HOME TECHNOLOGY PLANNING GUIDE



HOME CONTROL



HOME LIGHTING



WIRING YOUR HOME (INFRASTRUCTURE)



NETWORKING



HOME THEATER



MOBILE DEVICE INTEGRATION



STEREO VS. SURROUND SOUND



WHOLE-HOUSE MUSIC



VIDEO & VIDEO DISTRIBUTION



## The Purpose of this Book

Accurate Technology Group understands you may have questions when it comes to building or remodeling your home.

Whether you are building a new home, remodeling your existing home or simply installing a home entertainment system, it's important to hire a Technology Contractor (A/V Design Specialist) who will get the job done properly. In many construction trades, most people (including electricians) are unfamiliar with the new products and technologies that are available for a low voltage system, or technologies outside their core expertise.

It is important to plan your home's technology infrastructure early and know enough to ask the right questions and make educated decisions. We're pleased to bring you this Planning Guide to help you do just that!

Come in to discuss your ideas. We look forward to meeting you!



“ Whether watching your favorite film, settling down with a good book, or preparing a meal, lighting control is the key to optimizing family time. ”



## Home Control

Taking control of your lifestyle and the various systems in your home is much easier and more affordable than ever.

Home control refers to technologies that can link and control all the equipment and systems in your home. Imagine having one controller that can:

- Automatically turn off all the TVs in the house when the kids are doing their homework.
- Alert you that the garage door is open and then let you close it from your iPhone.
- Manage your lights, window coverings and thermostats to reduce your energy bills.
- Monitor and arm your door locks, lights and security cameras anywhere you are.
- View your vacation home from your office, primary home or mobile device.

These are just a few examples of the today's control systems' capabilities, and there are many more possibilities available at a multitude of price points. We can adapt to your needs and design a system that delivers on your expectations and fits your budget. Design is the most critical step in having a system that functions flawlessly and delivers on your expectations.

The process of home automation works by making everything in the house that can be automatically controlled using technology do the jobs that we would normally do manually. It is much easier to install home automation in a house while it is still being

built, since you have the ability to put things inside the walls to save space. If your house is already finished, you can still have home automation done in a less-intrusive way through the use of wireless technology. Wired systems are generally more robust than wireless, but wireless technology has come a long way.





Home automation can perform tasks as simple as turning on the sprinklers at a certain time every day, or lowering the blinds as the sun sets through the windows of your home. One of the first decisions you should make when considering home automation products is, what systems in your home would you like to control? These systems are best understood when they are broken down into subsystems.



### Entertainment

This subsystem is usually the first one everyone wants to control, because each different component in an entertainment system comes with its own remote. Replacing all your remotes with one controller is the quickest way for everyone to begin to enjoy their home entertainment. Another big advantage is having the ability to move your music to any room in the home or having the movie you are watching follow you to another TV in a different part of the house.

### Climate

Climate subsystems can be managed according to the time of day, or they can detect open doors or windows and shut down the HVAC system until they are closed. Some systems even offer you your own weather station to tell you wind speed, inside and outside temperature, humidity at your location and much more. Programmable thermostats address comfort and efficiency by maintaining a schedule consistent with your family's presence in the home.

### Lighting and Shades

Controlling your lights allows you to create environments that optimize activities. Control systems can light your hallway for ease of access at night or turn on the landscape lighting as the sun sets. Shade systems can follow the sun as it rises or sets to optimize energy efficiency and maximize natural light. The possibilities for lighting-based control are endless.

### Security

Security and alarm systems normally address most of the safety issues in the home environment. Adding control of security lighting at night can prevent unwanted accidents such as falling down the stairs or add to the burglary deterrent by flashing exterior lights when motion is detected. You can also use security sensors to trigger climate and lighting scenes in case the alarm system is armed or disarmed. Imagine having your driveway light up as you pull onto your property, then your interior lights turn on and your security system deactivates as you enter the home.

### Home Data Network

Increasingly home automation systems are being designed to utilize the home data network to pass control information or stream digital media as mentioned above. This subsystem will play a larger role over time allowing the integration of entertainment, computing and appliances into a coordinated home network.

### Controllers

The most important piece of the home control and automation puzzle is how you and your family will operate all of these technologies. Controllers are the devices you will use and they can range from the traditional hand-held remote control, to keypad devices, all the way to touch-screen interfaces with customized designs. The more advanced the device becomes, the simpler the operation of your various subsystems.

The least expensive type of control device is a hand-held remote, and unlike the universal controllers you may already be familiar with, these programmable remotes allow you to do

much more than just learn the commands of the devices in your home. Many can control lighting as well as entertainment functions and additionally, they have the capability of executing scenes or macros.

Keypads are the second type of control system and these can be made to be portable like the handheld devices previously mentioned, but they can also be installed in a wall. They are available in many types and sizes, but the most common are three and six button systems. They are also available in a variety of colors to match your décor and can be engraved for instant recognition of the keys.

“ Replacing all remotes with one controller is the quickest way to enjoying your home entertainment. ”



The most comprehensive type of control device is a touch screen type of interface. Touch screens allow you to customize the look and feel for ease of recognition and use. While touch screens do require significantly more programming time, their ability to execute multiple strings of commands at the touch of a button makes them the most versatile choice for home automation systems. Touch screens can be mounted on a wall or placed on a tabletop. The last type of controller is your mobile device and these are extremely

attractive options because they give you control of your home from both inside and outside the premises.

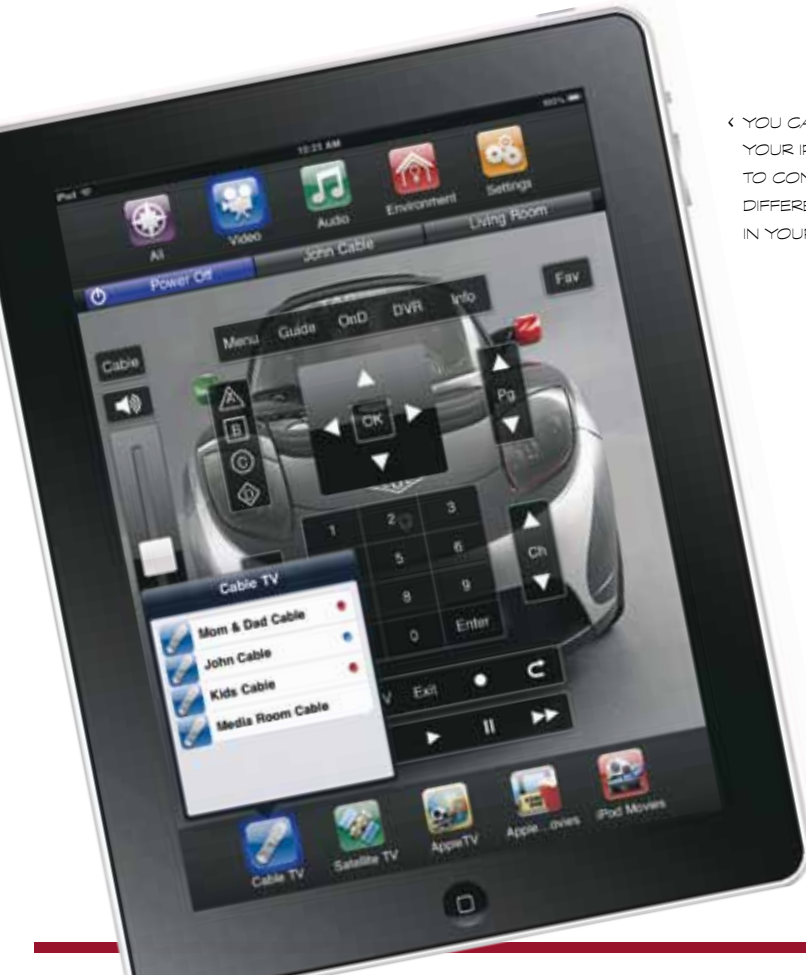
The implementation of control is only as good as the programmer, the wiring and the installation. For this reason, think long and hard about your budget and make this one of the earliest choices in the planning of your new home or remodeling project.



## Home Lighting

Residential lighting with lighting control is one of the most important things you can do for your home and your lifestyle. Lighting not only provides illumination, but can also be a key interior and exterior design element. Lighting systems enable us to conserve energy, perform tasks safely, and create an emotional connection to the environment for our families and guests. We want you to understand the benefits of whole-home automation and control with lighting systems, lighting design and use of natural light. This powerful combination can dramatically enhance your living environment.

◀ YOU CAN EVEN USE YOUR IPAD OR IPHONE TO CONTROL MANY DIFFERENT ACTIVITIES IN YOUR HOME.



### Lighting systems consist of three components:

1. **Light source** (lamp – incandescent, fluorescent, LED, halogen, etc.)
2. **Light fixture** (recessed, pendants, sconces, chandeliers, surface mounted, under-cabinet, etc.)
3. **Control systems** (dimmers, switches, timers, etc.) that transform spaces from only “on” or “off” to something that offers gradual lighting consistent with the human lifestyle.

Finding the right lighting to create a pleasing, yet functional décor can be a little overwhelming. For example, how do you know what type of light bulb—incandescent, LED or quartz halogen is best suited to your needs?

### Some questions you may want to ask are:

- Who will use the space and how will it be used?
- What is the size and shape of the room, and what exterior orientation does the room have?
- Is there an abundance of natural light available?

Everyone can benefit from lighting control and it can be done wired or wireless, allowing you to set the ideal lighting scene for any activity. Whether it be watching your favorite film, settling down to relax with a good book or preparing a meal, lighting control is the key to optimizing family time and activities in your home. Lighting systems are also capable of multiple strings of commands called macros or scenes. These scenes enhance the way you and your family live and ensure greater enjoyment of all activities within the home.



### Orchestrate All the Lighting in Your Home – Some Examples:

- 8:30 a.m.** When you depart for work, reset lights and shades throughout your home to levels you prefer when you are away, with the press of just one button on a keypad near the door.
- 6:30 p.m.** As you approach your home on your return, use a visor control in your car to create a welcoming, secure lighting environment near entryways and throughout your home.
- 11:30 p.m.** Just before bed, turn off unneeded lighting room by room, or select a predetermined nighttime setting with softly lit pathways through hallways and stairs, from the convenience of your bedside table.
- 24 hours** If you are away for an extended period, automatically replay your home's normal lighting routine, as if you are still home, for added piece of mind.

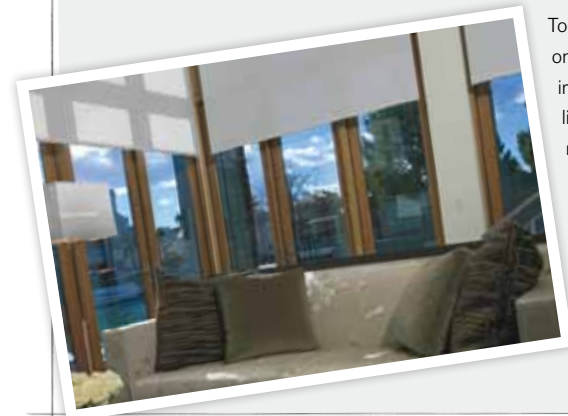
Today you can have a much greater impact on your electricity costs and minimize your impact on the environment with solid state lighting, aka LED lighting. LED lighting not only lasts longer and consumes less energy than standard incandescent or cold cathode fluorescent bulbs, but it can illuminate in colors and really set off your home and surrounding landscape.

### Shades and Natural Light

Installation of quiet electronic driven (QED) shades or drapery provides the potential for homeowners to maintain a level of natural light while simultaneously reducing unwanted glare, heat gain and ultraviolet rays, which can discolor furniture, art, and other objects in the home. In addition to maximizing the energy efficiency of your home and ensuring maximum light control, they can be programmed to follow the sun creating an effortless way to optimize your living environment.

One thing to keep in mind: The more varied and diverse your lighting fixtures and schemes, the more complex they are to run. Wherever you choose to implement light control, you can rest assured that the result will be far better than walking to the 10 wall switches by the front door and guessing which switch controls which light before you head off to retire for the evening!

PROGRAMMED LIGHTING >  
SCENES SIGNIFICANTLY REDUCE  
ENERGY CONSUMPTION AND  
IMPROVE OUR RESIDENTIAL  
ENVIRONMENT.





## Wiring Your Home (Infrastructure)

As technology in the 21st century keeps evolving, it is increasingly necessary to have your house wired properly. Structured wiring refers to running cables through the walls of your home that can carry all of the different signals required to integrate computer networks, home entertainment systems, cable or satellite TV, telephone, climate control and even home security systems, all operated by a central control or remotely through the Internet. What technology you want in your home will be strictly controlled by the wiring infrastructure you install. Get the wiring right and everything else is easy.

The following several paragraphs will help you to understand some of the need-to-knows when it comes to wiring your home.

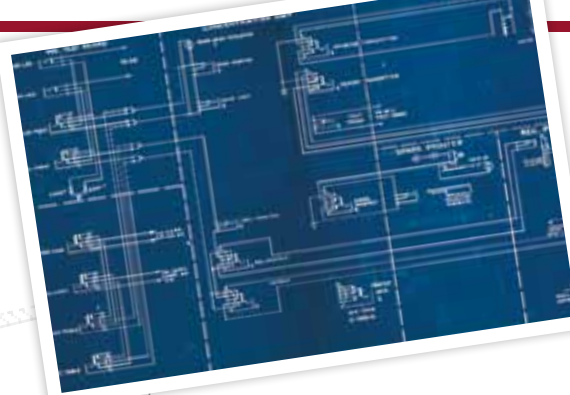
The first concern with our infrastructural wiring relates to electrical codes. The Canadian Electrical Code prescribes the following properties of the wire to be used in your walls:

- Reduce the spread of fire and smoke.
- Prevent shock.
- Comply with other requirements of the Canadian Electrical Code.

All wiring used behind walls, under floors or otherwise installed as a structural component of the building must be properly rated. Even speaker wires that go inside the walls have to be rated as either Class 2 or Class 3.

Next you need to decide on wire gauge and conductor count. How do you know what's right for the job? Well, let's look at the speaker wire, for instance.

The distance from the audio amplifier to the speaker location is a major factor in deciding which wire is right for the installation. Every foot of speaker wire adds more resistance, capacitance and inductance to the performance equation. Shorter runs of wire that are twisted and shielded a certain way yield better sound quality.



Some tips for maximizing the performance of your structured wiring system include:

- For less than 50 feet to the speakers or volume control, 16AWG (gauge) works fine.
- From 50 feet to 100 feet, use 14AWG.
- For 100 feet or more, use 12AWG.

Some additional good things to remember are:

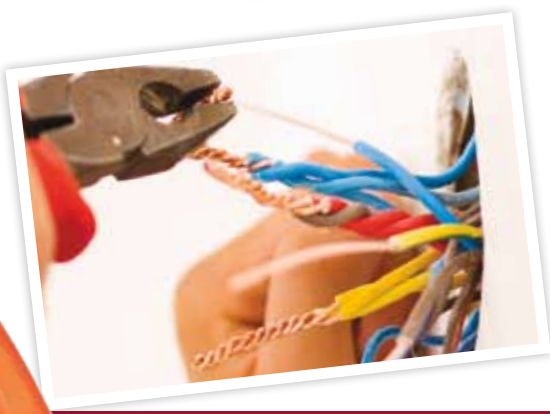
- For primary sound where dynamic range is at a premium, use more copper.
- If you are wiring main speakers, use heavier gauge.
- Don't underestimate the value of shielding for reducing noise.

### Control Systems

Many of these systems can be extremely sophisticated and require professional installation and proprietary wiring. Our most consistent recommendation is to use at least CAT5e wiring for the control system. You should always consider 14/4 and Dual CAT-5e for more sophisticated systems or in instances where you want to distribute telecommunications as well as IR (infrared) and speaker-level audio.

Remember to wire bathrooms, hallways and outdoor areas. There is no reason that whole-house audio/video should not extend to these often-overlooked areas. Even if you don't plan on installing equipment at every location right away, make sure you run the cables to that location. It will save you money and time in the long run.

**“ Even if you don't plan on installing equipment at every location right away, make sure you run the cables to that location. It will save you money and time in the long run. ”**



## Networking

We live in a technology-driven world these days and it is affecting how we do almost everything.

Satellite technology, the personal computer, the Internet, mobile devices and more have all led to the digitization of our content and have established a need for immediate access to information. We are convinced that it is more important than ever to have the right backbone installed in your home so everything talks the same language and works together effortlessly.

Most consumers, when creating a home network, will purchase simple routers and related solutions that are found in mainstream distribution outlets. These simple routers and switches are not designed to handle the workload they are asked to carry because they were primarily developed as inexpensive single-room solutions.

What does this mean? It means that if you are building a new home or remodeling your old one, you would be wise to consider building a high-performance network. The following article will try to clear up any confusion you might have when it comes to establishing a personal network in your home.

### What is a Network?

A network is a platform consisting of two or more computers that are linked in order to share resources (such as printers and drives), exchange files or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves or satellites. Computers residing on this network can be servers, desktops, laptops, mobile devices and other types of workstations.

The two basic types of networks are:

- Local Area Network (LAN)
- Wide Area Network (WAN)

### Local Area Network

A Local Area Network (LAN) is a network that is confined to a relatively small area. A Wide Area Network or WAN is used for a large geographic area such as the world. The LAN type of network is most often used in residential environments. In a typical LAN configuration, one computer is designated as the file server. It stores all of the software that controls the network, as well as the software that can be shared by the computers attached to the network.



Computers connected to the file server are called workstations. On many LANs, cables are used to connect the network interface cards in each computer; other LANs may be wireless. All wireless technologies require a transmitter and receiver system in order to communicate.

Remember that installing a good hardware infrastructure in your home during construction will always improve the strength, reliability and overall performance of your network, but if that is not possible, wireless, if done right, can be a good option.

### Residential Networks

Residential or LAN networks are generated through a subscription service; for example, Shaw, MTS, Bell or Rogers all provide data networks. These services will bring the World Wide Web into your home on a cable or telephone wire. Using a modem, you can decode that signal for use in a computer, laptop or mobile device.

There are other types of networks for bringing information into the home. Cell networks and the more affordable femtocell networks are becoming popular in larger homes, where too many access points would be required. These types of networks use cellular frequencies as communication paths.

A router will take a single source of data that has been received by a modem and distribute that data to multiple streams or devices. Routers can also wirelessly transmit that signal over a pre-specified distance utilizing a transmitter.

To answer the modern-day demands of a home network, we need a reliable and seamless network. One access point simply will not do. If the home is 2,000 square feet, one WAP (wireless access point) may cover the space; however, in larger homes or when more than

one WAP is required, there are significant issues to contend with: unreliable roaming, multiple network SSIDs, radio strength issues, conflicts with neighboring networks, port failure, just to mention a few. With consumer networking products, many assume it is "set-it-and-forget-it", but consumer products are not made to handle the constantly increasing workload that they are asked to carry.

In order to properly configure a network, we must first incorporate enterprise-grade wireless access points (WAPs), not off-the-shelf solutions. They should be strategically placed around the property to ensure seamless coverage. This collection of WAPs should be centrally managed by a wireless controller, which automatically analyzes, manages and optimizes the wireless environment in its entirety. When properly programmed and deployed, the wireless controller creates a robust, reliable and self-adjusting wireless environment.

This controller-based wireless network is perfectly suited for the IP-enabled automation systems, computers, AV equipment and other devices that are all working simultaneously via the home's wireless network. Additionally, they will offer the stable platform necessary to deliver exceptional system performance.



### Additional Networking Terminology

**Protocol** – The language devices use to talk to each other.

**IP** – Internet Protocol, the language of the Internet and home networks.

**TCP** – Transmission Control Protocol, like signing a receipt for data delivery – guaranteed delivery.

**UDP** – User Datagram Protocol; example: streaming media. No acknowledgment on receipt of data.

**HTTP** – Hypertext Transfer Protocol, used to make displayable Web page requests and download Web pages over TCP/IP.

**FTP** – File Transfer Protocol, used to transfer files between computers on the Internet or within a network over TCP/IP.

**LAN** – Local Area Network (i.e. the home's network).

**WAN** – Wide Area Network (i.e. the Internet groups of networks connected together over long distances).

**Subnet** – Portion of a network that has been segmented off through software or hardware.

**IP address** – Identifier for a computer or device on a TCP/IP network (Example: 192.168.0.12).

**Ethernet** – Communications protocol allowing multiple devices to share a common transport mechanism.

**Modem** – Modulator/Demodulator, device used to convert one form of a signal to another.

**Router** – Moves data packets between different subnets.

**Switch** – Makes point-to-point connections between MAC (Media Access Control) addresses on a LAN; MAC address = hardware address of a device on a network.

**DHCP** – Dynamic Host Configuration Protocol. DHCP Server (usually in the router) used to automatically assign devices on the network IP addresses.

**WiFi** – Wireless Fidelity 802.11x.

**WLAN** – Wireless Local Area Networking.

**SSID** – Service Set Identifier, it is the name of the WLAN and must be entered on all devices.

**WEP/WPA** – Wired Equivalent Privacy/WiFi Protected Access; Encrypts data transmissions on wireless network.

**802.11b** – 11 MB wireless protocol 2.4 GHz.

**802.11g** – 54 MB wireless protocol 2.4 GHz.

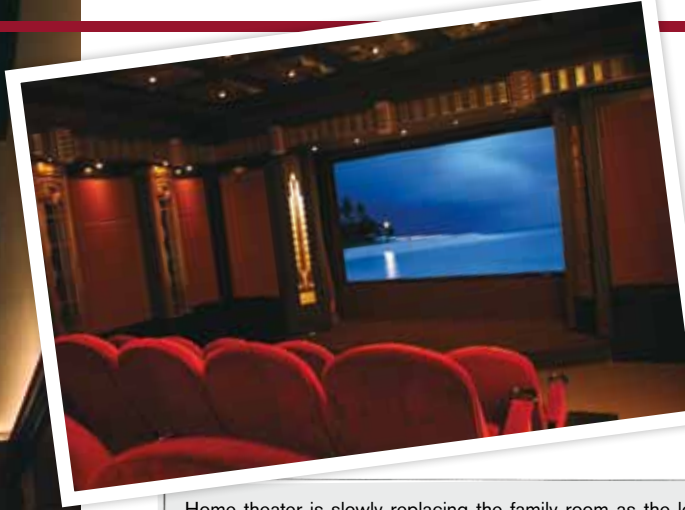
**802.11a** – 54 MB wireless protocol 5 GHz, many wireless products DO NOT work with 802.11a.

**802.11n** – Next-gen WiFi, more range, faster speed.

**AP** – Access Point, needed to distribute your signal (also called WAP Wireless Access Point).

**Wireless Router** – Router with built-in Wireless Access Point.

## Home Theater



Home theater is slowly replacing the family room as the location in the home where everyone gathers. There are numerous things that go into the design and construction of a home theater room. It is not as simple as picking a few ingredients and having an installer assemble them.

- What are the good brands to consider?
- What kind of costs can I expect?
- How big a screen can I use in the room?
- What is the optimum distance to the screen and where is the best seating position?
- What products will yield the best sound in the space?
- Should I use one subwoofer or more, and where should they be placed?

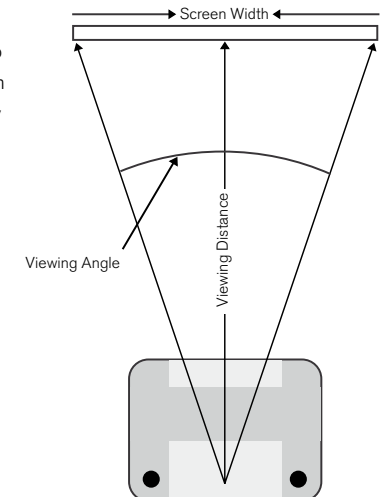
As you can see, even some of the basic choices aren't really so basic. Let's break down what you need to consider and why.

### The Room

The first place to start is the room you intend to house the home theater in. The size of the room will determine the size and type of video display device (plasma TV, LCD TV, LED TV, rear or front projector) that would be best to use.

Additional room items to consider are:

- How much ambient light is present?
- What type of wall construction do you have (drywall, glass, etc.)?
- Will you be placing your home theater system components in a cabinet or closet?
- Will you be installing your speakers in the wall or ceiling?



Diagonal Screen Size 16:9 Aspect Ratio	SMPTE (Society of Motion Picture & Television Engineers) Recommended Distance for watching HDTV	THX Recommended Distance from Seating to Screen for Movies
40"	5.4'	4.5'
46"	6.3'	5.2'
52"	7.1'	5.8'
55"	7.5'	6.2'
60"	8.2'	6.7'
65"	8.8'	7.3'
92"	12.5'	10.3'
108"	14.7'	12.1'
114"	15.5'	12.8'

### The Video Display

This is the first component to consider, as it is the core of every home theater. After all, the idea of home theater is to bring the giant movie theater experience home, and generally, nothing does a more realistic job of that than a good front projection TV. The other options mentioned earlier (i.e. LCD, plasma) will also do well, but there are very few choices available above a 70 inch screen size in these types of televisions. Additionally, factors such as room light, control, seating position and viewing angle all play a role in the type and size of display.

### Audio System

The most essential element of the movie theater experience is sound. The way sound is implemented in a home theater system is critical to the overall experience and possibly even more so than the picture. The impact and excitement of a movie or sporting event is delivered through the audio system! When choosing the audio system, there are several different components you need to consider. Let's start with the electronics.

### Receivers

The A/V (audio video) receiver is the basis of the audio system. It provides the amplification and the features that will drive the sound. Receivers are made up of three components; a) an amplifier for powering the loudspeakers, b) a preamplifier for processing the sound, and c) a tuner for picking up radio stations (optional). A/V receivers or separate components need to be matched to the room and the speakers in order to optimize audio performance. Surround sound processors have the ability to make the room larger or smaller. Your mind knows when you are in a small jazz club or when you are in a large concert hall, and the processing capability of your electronics delays sounds to each speaker in order to recreate these kinds of environments in your room.

### Loudspeakers

The next components to consider for your home theater system are the loudspeakers. You will need at least five to seven speakers. The center channel speaker placed above or below the screen will deliver the dialogue/voices. The left and right front speakers will be placed on either

side and will create the width of the scene on the screen, and the left and right rear speakers will create the depth of the environment. When utilizing seven speakers, two more speakers are placed on the side walls. The last speaker(s) you will need is called the subwoofer. Its job is to recreate the deep bass sounds that deliver impact and help you feel the home theater experience. In many systems you can get away with one subwoofer, but THX recommends four.

### Source Components

It is important to consider that your picture and sound will only be as good as the signal or information you give to them. HDTV will require a service provider such as Shaw HD or MTS HD, etc. Additionally, you can obtain a DVR (Digital Video Recorder) for recording your favorite shows. Other source components include DVD, CD player, Blu-Ray player, turntable and even HD radio.

### Control Systems

Each component in a home theater system comes with its own remote, leading to a collection that can number half a dozen or more. One solution is to opt for a sophisticated but easy-to-use universal remote that can control most of the functions of each of your components.

“ **The impact and excitement of a movie or sporting event is delivered through the audio system!** ”





## Seating

You have a fancy home theater system; now you need some comfortable furniture that will make you want to spend your time with your home theater. Your furniture can be of the traditional sofa and chair variety, or you can opt for specialized home theater furniture that includes features such as built-in cup holders and extra-overstuffed padding.

“... the idea of home theater is to bring the giant movie theater experience home, and generally, nothing does a more realistic job of that than a good front projection TV.”

## Room Treatments

These are panels or objects that compensate for the amount of glass, floors, wood and other materials used in the room construction. These will all have an effect on the video, sound and control of the experience. You don't want the room to be too "live" or too "dead."

## Final Take

There are a myriad of things to consider when planning your home theater and your budget. Remember: Your goal is to do it right, so you may want to consider what aspects of the room and system are most important to you in order to maximize the result.



< HOME THEATERS HAVE BEGUN REPLACING THE FAMILY ROOM AS A GATHERING PLACE



## Mobile Device Implementation

The iPod and iPhone revolutionized the music industry and the cellular telephone industry. There are now over 200 million of these in existence. Most of us use the iPhone for picking up e-mail and phone calls. Others use the iPhone to listen to music through their car stereos or headphones. More-experienced iPhone users have even downloaded and explored a few of the over 150,000 applications available online.

The iPhone adds a new dimension of technology integration to your lifestyle by providing control beyond the confines of the house.

There's virtually no amenity in an integrated home that you can't control from an iPhone or iPod touch, including:

- Streaming your music and movies around the house with an Apple TV system.
- Have your system sense your iPhone, iPad or iTouch as it moves from room to room and have your content follow you.
- Viewing your security cameras to monitor your children, or see who is at the front door.
- Adjusting lighting control systems and motorized window shades.
- Controlling HVAC systems.

From outside the home, you can do even more cool things like:

- Modify the temperature before you get home.
- Check that all exterior doors are locked.
- Activate the security system and turn on the outside lights.
- Monitor exterior security cameras.
- DVR the big game or your favorite TV shows.

These are just a few of the options available, but we have to start somewhere, so let's talk about one of the most popular activities people will do with their mobile devices: MUSIC!

Putting your music and related content on some form of storage device is common today. Computer audio, the iPhone and the iPod have revolutionized how we interact with and manage our music. Most people have never experienced what digital music can sound like through a good stereo or theater system.

The key to achieving the best sound from our iPod or iPhone is to maximize how the music landed on our computers to begin with. If you are putting your legacy CD collection on your computer, be sure to set up iTunes to rip in Apple Lossless. This will capture much more of the music on those discs than the default setting of 128kbs. Setting your computer to rip in lossless is as simple as clicking on the advanced tab in the preferences menu. Lossless will take up more space on your hard drive, but the difference in sound quality is well worth it.

The next step after we have transferred these higher performance files to our computer is to connect our iPod to one of those new docking stations that have come on the market. Connecting the docking station to a stereo input with a simple audio cable allows you to enjoy your iPod music in ways that rival and even surpass a really good set of earphones.

Using a device like an Apple TV will add control and distribution to your iPod or iPhone. Connect the two devices, program that input on your home theater receiver to look for PCM audio; set it to play it back in two-channel or a music

surround mode and prepare to be amazed! Connecting the Apple TV's video outputs to your home theater gear provides complete control of your entire music collection from the iPod, in the palm of your hand.

A third way to enjoy your iPod on your system is to connect to a new type of device that is called a USB DAC (Digital to Analog Converter). This is a device that pulls the digital music directly off your hard drive via a USB cable, then decodes the music into two-channel audio and passes it on to your stereo system. Companies such as Signal Path, Ayre, Audio Research, Sumiko and Wavelength all provide these kinds of components. The sound will astound you if your stereo system is up to the task. There is nothing like sitting in front of your system with instant access to every single CD you have ever owned.

Digitally stored music is the future of music as we know it. The first step is obviously just a good stereo system, but whatever method you decide on, enjoy the music, and be sure to have a good back-up system in place for all of your music files and more.



## Stereo vs. Surround Sound

The advent of home theater has put multi-channel sound (a.k.a. surround sound) into our lives forever, and while that was an elevating experience for movies, it couldn't quite replace the warmth and finesse of a good stereo when it came to reproducing music. There was something emotionally uplifting about putting on your favorite, record or CD! Certainly, surround sound is extremely cool, but listening to music the way most of it was recorded, in two channels, takes us beyond the physical sounds or words and brings us closer to that emotional connection to our past, present and future.

Can you remember what songs you and your friends were listening to in high school? Can you remember what song was playing when you got married or had your first child? We all can! Just like photographs, we mark special moments in our life by the music of the times or the songs we liked. Why is all of this important? The answer is simple: Dedicating the space and budget necessary to create a high-quality two-channel experience in your home is an investment that will give you years of enjoyment.

We suggest finding speakers that perform to your taste and are right for your room. The speakers are arguably the most critical element in a stereo and since each person hears differently, it is a good idea to start by finding speakers that you love. Here's a tip: Speakers that sound good with music will also sound good with theater, but the opposite is rarely

true. Theater speakers can deliver the dynamics and impact of music, but often fall short when it comes to warmth and finesse. The room too has a significant impact on the sound of the speaker and will influence how that speaker will sound. If there is a lot of glass in the room, you probably want to temper your desire for metal dome tweeters, as the resulting sound could potentially be "bright and shrilly-sounding".

The next step is to choose the right amplification. This will usually be in the form of an integrated amp or a separate power amp and pre-amp combination. You will need to consider several strategic factors: Will it match well sonically with my loudspeaker? Does it have the power and speed to adequately drive my loudspeakers? Does it image (recreate



◀ NOT YOUR FATHER'S IPOD DOCK!  
SLEEK AND HIGH PERFORMANCE

the position of the instruments on the stage) well enough for the speakers to mentally disappear. Tube amplifiers are growing again as a category, because they tend to provide a certain emotional connection that is not generally associated with solid state designs. Try to incorporate separate components.

The third step will be to determine what sources of music you and your family will be listening to. You may have CDs, SACDs, HD Radio, XM, digital media and more. There are affordable and high-performance choices available for all these formats. Maybe you remember records? Turntable sales were up 37 percent in 2009. Also in 2009, record sales jumped a whopping 33 percent to 2.5 million copies. 2008 boasted

1.8 million copies sold and 990,000 vinyl albums were sold in 2007. Records are coming back, and why? Because many music experts believe they sound better.

There are even more things to be considered, such as the cables and interconnects you will need, stands for the speakers (if necessary), furniture to house the electronics, and possibly even room treatments or control technology. The really fabulous news is, once you have ventured down this road, you will feel like a kid again! You will want to listen to YOUR music again and you may even want to buy some new music again! Stereo/two-channel audio systems are infectious and will impact how you spend your time at home.



◀ DESIGNATING AT LEAST ONE ROOM IN THE HOUSE FOR HIGH PERFORMANCE AUDIO, IS AN INVESTMENT WELL WORTH MAKING.



## Whole-House Music

Whole-house music systems, also known as multi-zone audio systems, were one of the earliest requests from consumers in regards to “cool things they would like to have in their home.” The dream was to own a whole-house audio system that effortlessly piped music throughout your home, where all the components “talk” harmoniously to one another. Today that dream is possible, and there are many different ways to distribute music throughout your home, including wired and wireless solutions with powered and non-powered options.

### Definition

Whole-house music refers to moving music from one location to multiple locations around the house. These locations are usually referred to as zones. Multi-zone means multiple rooms, and multi-source means the ability to listen to different things in different rooms simultaneously.

### System Types

#### Type 1: Multi-Zone/Systems Using a Receiver

The simplest possible approach to multi-room sound is adding a second pair of speakers to an existing home stereo system. You or someone you hire will run speaker wire in the walls and either connect them in a second room at a wall plate or at the speakers themselves. Some problems with this approach include the following: 1) can't control the volume of the rooms independently, 2) can't control the volume from the second room, and 3) can't control the sources such as CD functions, etc.

#### Type 2: Advanced Multi-Zone/Multi-Source Control Systems

These types of systems allow you to listen to different sources (i.e., CD, iPod, AM/FM/HD Radio, etc.) at the same time in different rooms, and are available in many configurations from four to 32 or more zones.

#### Type 3: Whole-House Networking

If you were smart enough—or lucky enough—to have your house wired, you probably have a wire in your walls called CAT-5e (Category Five-Enhanced) or CAT-6 (higher speed and voltage standard wire), both of which are capable of distributing audio signals—though they should not be used simultaneously for a computer network—as well as audio signal distribution.

#### Type 4: Dedicated Computer Audio Network

As previously mentioned, you can use your computer to distribute audio over your CAT-5e or CAT-6 network in the form of AAC, mp3



digital audio files or Internet radio. The first step is to move all of your music and related content over to the digital world. This will make it accessible, eliminate the need to store and organize it, and make your whole-house music system more accessible.

#### Type 5: Wireless Music Distribution

As wireless technology has improved, so have the options for wireless distribution of music. The most common wireless technology is Wi-Fi (Wireless Fidelity) and you should try to stay with wireless N, if at all possible. Wireless G may exhibit glitches or imperfections in the transmission of the music, because it has limited speed and bandwidth.

- **Wireless Music Adapter**—These devices send a Wi-Fi signal to another adapter connected to your multi-zone home theater receiver, enabling you to listen to music in a remote zone that uses your computer or NAS as a source on your A/V receiver.

#### Conclusion

Now that you know the various types of systems available, you can better decide what will fit your lifestyle, budget and construction parameters. The only other consideration needs to be: How do you want to control your whole-house music system? Do you want to use volume potentiometers or LPADs to access your systems? Do you want keypads or touch-screens?

Music everywhere will make one of life's little pleasures more convenient and enjoyable!

“ **Music everywhere will make one of life's little pleasures more convenient and enjoyable.** ”



## Video & Video Distribution

Video is usually considered the most important choice when shopping for electronics, and for good reason. Home entertainment is cited as the third most time-consuming activity in the average home, following sleep and work!

The types of TVs most commonly purchased by consumers are LCD (Liquid Crystal Display), Plasma Displays, Rear Projection Televisions and Front Projection Televisions. Let's look at the advantages and disadvantages of each.

LCD is the most popular and is available in two variations. The first variation is fluorescent (CCFL) and the second is LED (light emitting diode). Both of these technologies refer to the way the display is lit up from behind or "backlit." Fluorescent backlighting uses a fluorescent light on the back of the panel and is energy-efficient and low-cost. LED utilizes solid state LED bulbs on the back of the display panel and is more energy efficient, as well as more durable (20,000 hour longer life-spans = approx. 10 years)! Be careful to avoid edge-lit LED panels, as they tend to exhibit hot spots in the picture and are usually lower performers.

A plasma display utilizes a chemical reaction that excites a phosphor or pixel element. Plasma is generally considered to be better

for black level, smooth motion and three-dimensionality. The primary reason for this is that these types of television have the ability to turn each pixel element on and off. The backlight in an LCD television must remain on all the time.

A rear-projection display is a projection TV housed in a cabinet. There are many types of backlight technology incorporated into these televisions, but the most common are LED (light-emitting diode), LCD (liquid crystal display), DLP (digital light processing) and CRT (cathode ray tube). CRT is the oldest of these technologies and LED is most recent. The benefit to this type of display technology is that by keeping external light from affecting the projector, we can get a very bright image on a very large screen.

The final display type is front projection TV. These are the closest to theater-style imaging and the primary benefit is that they can be custom sized as large as you want. These





screens can be sized beginning at around 80 inches and go to sizes of 200 inches or more. You can't do that with any of the other types mentioned previously. Front-projection utilizes any of the aforementioned backlight technologies (LED, LCD, DLP, CRT, etc.) projected onto various types of screen materials. The disadvantage to a front-projection system is that you should have complete control of any natural light entering the room, otherwise your picture will begin to wash out and lose brightness.

Consider the activities, the room and the lighting conditions before deciding what particular TV display technology you will put in each location.

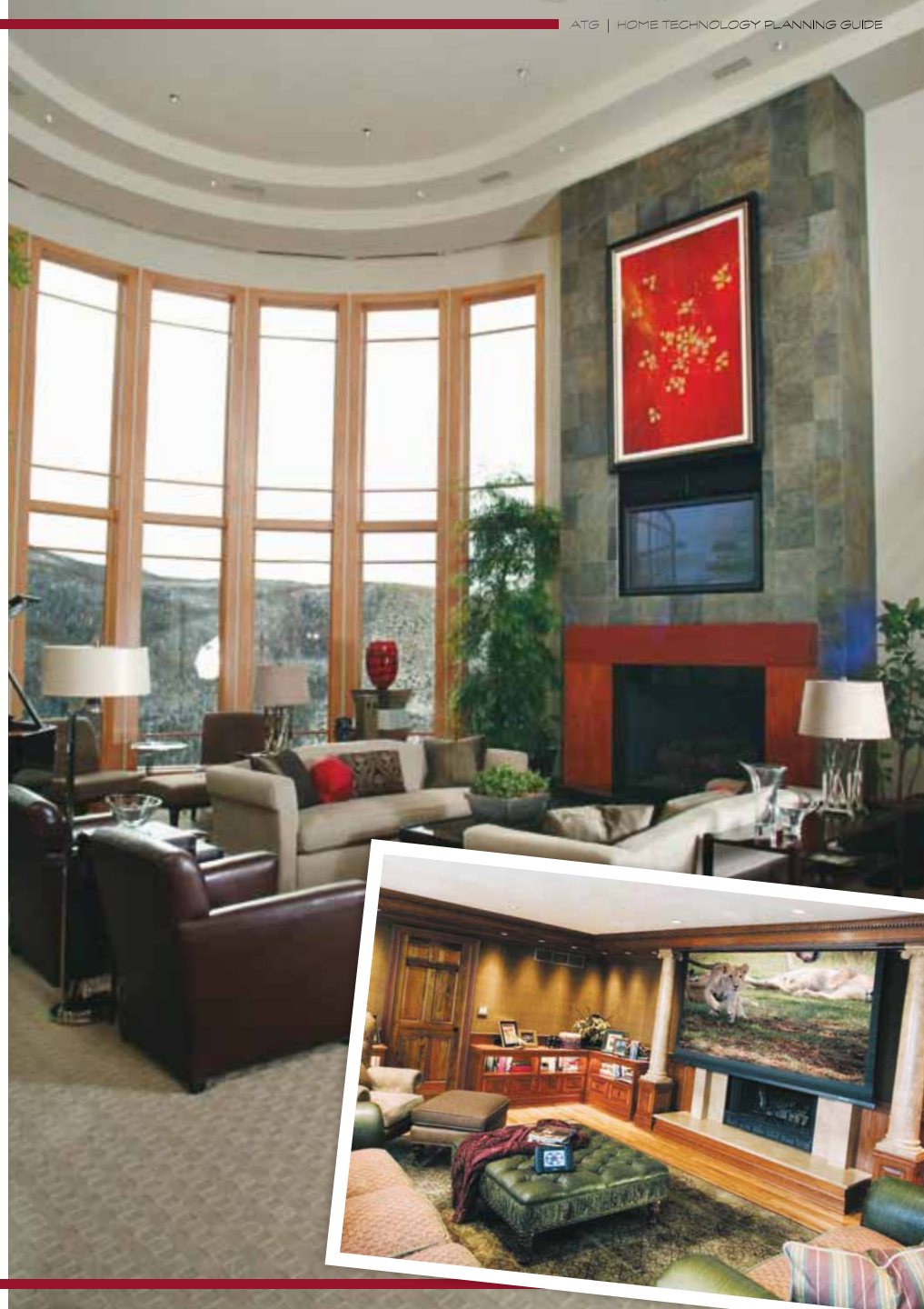
Once you have chosen the TVs, now you have to get a picture to each of them. Distributed video is a system where all kinds of video (and audio) signals from A/V source components (i.e., Blu-Ray players, DVD players, DVRs, etc.) are sent to multiple TV locations around the home. Video distribution is all about getting a strong, clear signal to all of your TVs. This involves three general functions:

- Gathering the signals.
- Combining, conditioning and amplifying the signals.
- Distributing the signals to their destinations.

There are three variations of video distribution common to most installations:

- Analog RF (Radio Frequency) distribution refers to sending signals including satellite, cable, DVD, DVR, Blu-Ray and other available sources to various rooms and areas throughout the house on a standard coaxial cable. The cable most recommended for this type of distribution is a good quality, quad-shielded RG-6u wire.
  - There are two parts to maintaining the integrity of RF signals; the first part is keeping your signals from leaking out of the cable. The second part is keeping outside signals from leaking into the cable.
  - Analog Component utilizes three separate video connections to pass luminance (black and white picture components) and color information on separate wires. This type of distribution is still analog, but can carry full high-definition resolution and is much better than RF.
  - The third variation is digital and is most often sent on HDMI cables. HDMI stands for High Definition Multimedia Interface and is capable of carrying all audio and video signals on the same wire. There are two primary issues regarding signal distribution with HDMI. The first is that HDMI components must handshake (recognize each other) for the signal to pass. The second is that wire runs of over 75 feet usually degrade picture performance.

The job of your systems integrator is to get the picture you want to see, on the right size screen, distributed in the best way possible.





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