

SONY



**The Sony Guide to
Home Theater**

Contents

What is Home Theater?	Page 3
Why Sony?	Page 4
What You'll Need: Sources, Sight & Sound.....	Page 6
Home Theater Sources	
DVD Players.....	Page 7
About Progressive Scan.....	Page 9
Super Audio CD Playback.....	Page 10
Digital Satellite Receivers.....	Page 11
About High Definition.....	Page 12
High Definition TV Receivers.....	Page 13
Personal Video Recorders.....	Page 14
Network Media Receiver.....	Page 15
VHS Hi-Fi VCRs.....	Page 16
Home Theater Sight	
A New World of Choices.....	Page 17
Choosing an Aspect Ratio.....	Page 17
Choosing a Screen Size.....	Page 18
Choosing a Screen Type.....	Page 19
Features to Look For.....	Page 25
Home Theater Sound	
About Surround Sound.....	Page 28
Surround Sound Formats.....	Page 29
A/V Receivers.....	Page 30
Speaker Consistency.....	Page 33
Types of Speakers.....	Page 34
Bringing it All Back Home	
Before You Buy.....	Page 35
How to Buy.....	Page 36
Where to Put It All.....	Page 38
Finishing Touches.....	Page 39
Home Theater Connections	
Audio Connections.....	Page 40
Video Connections.....	Page 42
Home Theater Glossary.....	Page 45
A Final Word.....	Page 51

What is Home Theater?

Think of what makes movies in a theater so compelling. Consider the giant screen, teeming with brilliantly detailed, vivid color pictures. Think of the sound, sometimes booming with explosions, sometimes delicately whispering and always immersing you in a full 360-degree experience. At the movies, these elements can come together with astonishing emotional force.

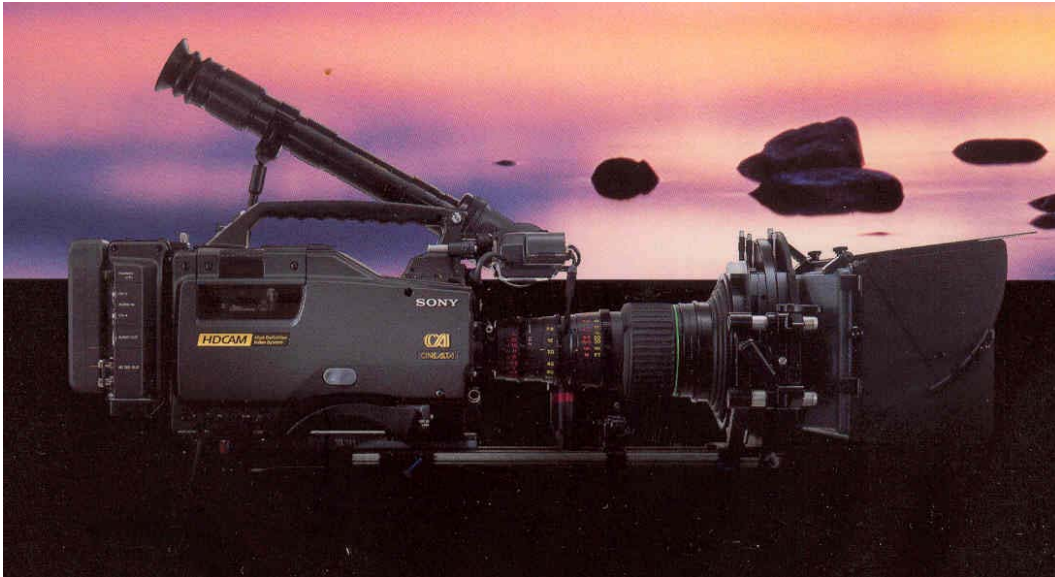
Home theater is the technology that brings this experience into your room. And there's never been a better time to make your move. Compared to the systems of just a few years ago, today's home theaters enjoy far greater realism, drama and impact. Today you can benefit from recent breakthroughs in electronics such as progressive scan DVD players, flat-panel televisions and Dolby Digital® surround sound. What's more, packaged systems make assembling a home theater easier than you ever thought possible.

So if you've been on the outside of home theater, now is the time to jump in. And if your home theater is a few years old, now is the time to upgrade.



Why Sony?

No company is better prepared to provide your home theater than Sony. We co-invented many of the essentials of home theater, including Compact Disc and DVD. Our award-winning FD Trinitron® WEGA® television is the gold standard in picture quality. Our Plasma WEGA™ and Grand WEGA™ televisions have won rave reviews. And Sony leads the industry in both A/V receivers and packaged home theater systems.



The Sony CineAlta camera has been used to capture major Hollywood action adventure movies, comedies, dramas, indie films and a full range of episodic television, commercials and music videos.

But that's only half the story. Our knowledge of the technology extends well beyond your living room. After all, Sony Pictures Entertainment is one of Hollywood's leading movie companies. Sony's CineAlta™ cameras are at the cutting edge of digital movie making. Sony microphones, mixing consoles and digital audio recorders are acclaimed by studio professionals. The Sony Dynamic Digital Sound® (SDDS®) system is a fixture in movie theaters from coast to coast. And you can find Sony products in the broadcast, cable and satellite TV studios where programming is created, edited and distributed.



A breakthrough in professional audio, the Sony OXF-R3 Oxford digital mixing console.

In all the world, no other company has this intensity of home theater focus—or this breadth of home theater expertise. Only Sony.

What You'll Need: Sources, Sight & Sound

Home theater combines three essential elements into one powerful experience. These elements are Sources, Sight and Sound.

SOURCES. A good DVD player is the essential source for today's home theaters. In one easy purchase, a DVD player offers studio-quality pictures, CD-quality sound and access to the over ten thousand movies available on DVD!



SIGHT. Home theater requires a big screen, at least 27 inches diagonal. Thanks to the "high scanning," "High Definition monitor" or "High Definition upgradeable" televisions, bigger is also better.

SOUND. To reproduce the full impact of surround sound, home theaters use at least a 5.1-channel speaker system connected to an A/V receiver that incorporates a Dolby Digital decoder.



Home Theater Sources

DVD Players

The essential home theater source component, a DVD player is also one of the best entertainment values today. It delivers digital picture quality that until recently you would only have seen in a TV broadcast studio. You'll hear digital-quality surround sound. You'll enjoy over ten thousand titles including movies, concert videos, children's programs and more. Of course, compared to videotape, DVDs are more compact, more durable and offer much faster access to individual movie scenes. And DVDs never need rewinding.



DVD MOVIES. Thousands of titles are available for sale or rent, each one carrying the promise of spectacular pictures and superlative sound.

Features to look for:

- **Progressive scan.** This feature effectively doubles the picture quality. To get the benefit of progressive scan, you'll want to connect your DVD player to a "high scanning," "High Definition monitor" or "High Definition upgradeable" television. If you own or you're thinking of buying one of these televisions, then a progressive scanning DVD player is a must.
- **3-2 reverse conversion** is a technology employed in the better progressive scan DVD players. It retains the integrity of the movie's original film frames. You'll see a clearer picture, especially on scenes with movement.



- **Component video outputs.** These Y/P_B/P_R outputs are a must for progressive scan DVD—and they're highly desirable for all other players. They do the best job of preserving the picture quality.



Component video outputs (Y/P_B/P_R) are the best way to convey the full quality of the signal from the DVD player to the television.

- **MegaStorage® DVD changer capability.** This lets you load any mix of up to 300 CDs and DVDs for pushbutton access to all your music and movies. No more rummaging through the shelves. No more fumbling with jewel boxes.
- **Super Audio CD playback.** These new high resolution discs provide the best sound quality available today. And multi-channel Super Audio CDs are the perfect complement to multi-channel home theater speaker systems.
- **DVD-R/RW, CD MP3 playback.** It's best to get a DVD player that can handle all the different types of discs you'll want to play.
- **Digital audio outputs.** To enjoy surround sound, you'll want to connect the optical or coaxial digital audio output of the DVD player to your A/V receiver.

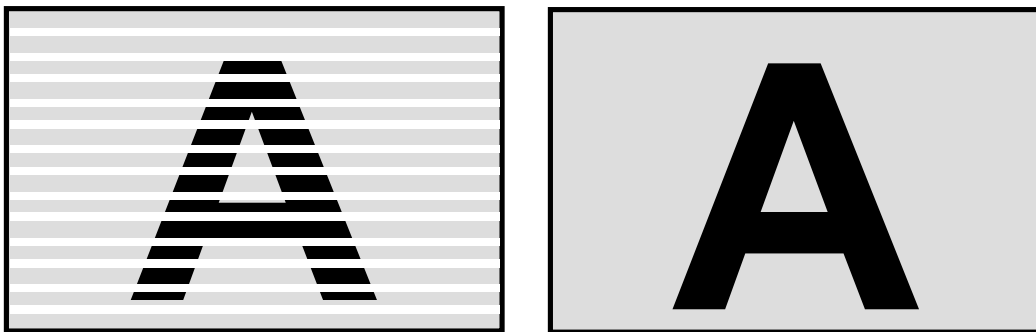


Digital audio outputs feed the digital bit stream to your A/V receiver for decoding.

About Progressive Scan

In video, what appears to be a continuously moving image is actually a series of discrete still pictures, called frames. Each frame lasts 1/30 second each contains 480 scanning lines that appear on the screen. Because of limitations in the early days of television, these 480 lines were divided into two "fields," each of which lasts 1/60 second.

The first field displays the odd-numbered scanning lines. The second field comes back and displays the even-numbered scanning lines. This is "interlace" scanning and it displays only 240 scanning lines at any one time. This system of 480-line interlaced display is abbreviated "480i."



Interlace scanning (left) divides the frame into two "fields." The first field presents the odd-numbered scanning lines (1, 3, 5, etc.). The second field presents the even-numbered lines. Progressive scanning (right) creates the picture by illuminating each line from top to bottom until all scanning lines in the frame are completed. Progressive images have twice the vertical resolution, so they're noticeably clearer and sharper. And horizontal scanning lines are far less conspicuous.

In the early days of television, when 12-inch diagonal screens were commonly used in living rooms, showing only 240 lines was not a practical concern. But in today's environment of 61-inch diagonal projection systems, the illusion of a continuous picture on the screen begins to fall apart. Depending on how close to the screen you sit, individual scanning lines become visible and the compromise in vertical resolution becomes an annoyance. That's why most of today's finest DVD players and big screen televisions have the ability to present a progressive scanning image. Instead of getting 240 lines, you get 480 lines every 1/60 second. This 480-line progressive scanning is abbreviated "480p," and it delivers twice the vertical resolution of conventional video!

Connect a DVD player with progressive scan output to a "high scanning," "High Definition monitor" or "High Definition upgradeable" television and the results are phenomenal. You'll see images that are noticeably smoother and more film-like. It's less like television, more like movies in a theater!

Super Audio CD Playback

A music source, Super Audio CD belongs in any discussion of Home Theater thanks to multi-channel sound capability. You haven't enjoyed the ultimate in home audio reproduction until you've heard a multi-channel Super Audio CD reproduced over a multi-channel speaker system. Thanks to Sony's Direct Stream Digital™ recording technology, the sound is an obvious improvement over Compact Disc and other digital audio systems. And thanks to multi-channel sound, it doesn't just appear as if the musicians are playing in your living room. It sounds as if you're transported from your living room into the original performance space.



Over 600 Super Audio CD titles range from landmark jazz and classical recordings of the analog era to the latest in rock and pop. The Super Audio CD catalog includes labels as diverse as Universal, AudioQuest, Chesky Records, Columbia, Delos, DMP, Epic, Legacy, Sony Classical, Telarc, EMI and Virgin Records, to name just a few.



Over 600 titles of stereo and multi-channel Super Audio CD represent a passion for beautiful music, beautifully reproduced.

As you'd expect, you can find Super Audio CD playback in dedicated audio players. But you can also find the capability in many DVD-Video players and selected home theater packaged systems.

Digital Satellite Receivers

With over 200 channels of entertainment, the DIRECTV® service brings an incredibly rich array of programming options into your home. Subscribe to the service and you'll be able to choose from pay-per-view movies and events, college and professional sports packages, plus a long list of cable favorites. And in many cities, you can even enjoy your local TV channels, brought to you by satellite! The DIRECTV service provides digital picture quality, plus CD-quality digital sound including Dolby Digital surround sound on selected channels. And the DIRECTV service even delivers selected channels in the glory of High Definition TV!



Features to look for:

- **Support for DIRECTV local-to-local and multi-satellite programming.** The new receivers get the full benefit of the expanded DIRECTV channel lineup.
- **Dolby Digital optical passthrough.** To enjoy surround sound, you'll want to connect the optical digital audio output of the DIRECTV receiver to your A/V receiver.
- **High Definition reception.** If you own or you're thinking of buying a "high scanning," "High Definition monitor" or "High Definition upgradeable" television, you should give serious consideration to a High Definition DIRECTV receiver. With the right subscription, you'll have access to unforgettable pictures on HBO and Showtime, in addition to sports and other programming on HDNet.
- **Powerful on-screen guide.** With over 200 channels to choose from, you'll want a receiver that makes choosing entertainment easy.
- **One button record.** Make sure your DIRECTV receiver works seamlessly with your videocassette recorder or personal video recorder. The infrared "blaster" supplied with many satellite receivers can automatically switch your recorder on, put it into the record mode and turn it off when the recording is done!

About High Definition Television

High Definition TV will dazzle you with up to six times the picture detail of conventional TV. HDTV means a widescreen 16:9 picture with cinematic sweep and grandeur. It also means Dolby Digital sound, including surround sound for movies and TV dramas. Best of all, High Definition television is not a promise for the future. It's here today. The DIRECTV satellite service carries three HDTV feeds (HBO, Showtime and HDNet) to a national audience. Some cable TV services are beginning to offer High Definition feeds. And HDTV is becoming more and more available in over-the-air TV broadcasting.

In May 2003, the National Association of Broadcasters (NAB) reported that 885 television stations in 189 cities are broadcasting digital signals that can be received in 97% of American homes. More than 78% of homes are in markets with five or more digital television broadcasters. And many of these digital broadcasts are in High Definition.

An April 2003 NAB listing of shows broadcast in High Definition includes 8 Simple Rules for Dating My Teenage Daughter, Alias, American Dreams, Crossing Jordan, Becker, CSI: Crime Scene Investigation, CSI: Miami, The Drew Carey Show, Everybody Loves Raymond, Frasier, Hack, JAG, The King of Queens, NYPD Blue, The Practice, Reba, Robbery Homicide Division, Smallville, The Tonight Show with Jay Leno and Without a Trace, plus 40 other network TV shows.

This doesn't even count HDTV sports and special events, which have included NCAA football, the Rose Parade, the Super Bowl, the U.S. Masters Golf Tournament, the U.S. Open Tennis Championships, and the 2002 Winter Olympics. In addition, ABC has announced that it will transmit the NBA finals and the Stanley Cup, as well as the 2003-2004 season of Monday Night Football in HDTV.

For many viewers, one stumbling block on the road to HDTV has been the relative lack of local HDTV broadcasts over cable TV. But recent agreements between representatives of the consumer electronics industry and the cable television industry have done much to clear the way to widespread distribution of local HDTV broadcasts over cable.

The U.S. recommendations for Digital Television (DTV) broadcasting actually encompass 18 different television formats. High Definition TVs and HDTV set top boxes (usually called "HDTV receivers") are designed to tune all 18 formats. Six of these are designated as "High Definition," while the others are called "Standard Definition." All but a few formats can deliver a visibly better picture than conventional television. Broadcasters have been encouraged, but not required to use their DTV spectrum for High Definition.

Active Scanning Lines	Horizontal Pixels	Aspect Ratio	Picture Rate (frames per second) P = progressive i = interlace	Definition
1080	1920	16:9	30i, 30P, 24P	High Definition
720	1280	16:9	60P, 30P, 24P	High Definition
480	704	16:9 or 4:3	60P, 30i, 30P, 24P	Standard Definition
480	640	4:3	60P, 30i, 30P, 24P	Standard Definition

Of the eighteen DTV broadcast formats, only the top six are designated High Definition. The Federal government has encouraged, but not required broadcasters to use their DTV spectrum for High Definition broadcasting.

High Definition TV (HDTV) Receivers

To receive over-the-air High Definition broadcasts, you can choose a television with a built-in HD receiver. But most customers are currently buying "high scanning," "High Definition monitor" or "High Definition upgradeable" televisions, which can connect to an outboard HDTV receiver, purchased separately.



HDTV receiver features to look for:

- **1080i, 720p and 480p outputs** to serve the widest range of High Definition monitor televisions.
- **480i outputs** to serve conventional televisions.
- **DIRECTV reception.** Many receivers that will tune free, over-the-air HDTV also function for the subscription DIRECTV service. So you can get complete HDTV reception from a single set-top box.
- **DVI-HDTV interface** enables superb, uncompressed digital-to-digital connection from the set-top box to the television. Your High Definition signal is carried with full picture quality. The connection is also secured by HDCP technology to protect the signal from piracy.



The DVI-HDTV interface carries High Definition in full digital quality.

- **Component video outputs** enable high-quality analog connection to a television. The separate components of the video signal can be Y/P_b/P_r or R/G/B.



The D-sub 15-pin interface supports component video R/G/B signals.

- **Dolby Digital optical passthrough.** To enjoy surround sound, you'll want to connect the optical digital audio output of the HDTV receiver to your A/V receiver.

Personal Video Recorders

A new generation of devices can record up to 80 hours of television onto a built-in hard disk drive. This does so much more than the conventional VCR. You can pause live TV when you need to take a break, then resume watching exactly where you left off. So you're always free to take a phone call or take a trip to the kitchen. You can "rewind" live TV and repeat a line of dialog that you might have missed. And you can have the recorder capture up to 80 hours of TV shows, ready for viewing whenever you choose! You can even rate TV shows as good or bad, and the recorder will "learn" your preferences. The recorder can then automatically analyze the schedule of upcoming shows and suggest programs with the actors, genres and subject matter you've liked in the past. It's like having your own, personal TV critic on hand, ready to make the most of every minute you spend viewing!



Features to look for:

- **TiVo™ service.** This subscription service brings you electronic program guides. The recorder can also "learn" your preferences and record shows similar to the ones you like—a great way to discover new favorites.

- **Simultaneous record and playback.** Here's another trick that hard disk recorders can do that VCRs can't. This feature lets you record a current show onto the unit's hard drive, even while you're watching another show that you've previously recorded!
- **Season Pass** automatically records every episode of your favorite show every time it airs—even if the network changes the schedule.
- **Wish List** records upcoming shows with your favorite actor, actress, director or keyword.
- **Auto VCR Transfer** saves programs onto VHS tapes.

Network Media Receiver

Today's personal computers are increasingly important repositories of audio and video entertainment. The ability to download, store and play music is rapidly being joined by the ability to digitally record television shows onto the PC hard drive. Sony's own Giga Pocket™ personal video recorder brings exactly this TV recording function to selected Sony VAIO® PCs. In many homes, entertainment from the PC can be distributed throughout the home via Ethernet cable or 802.11a wireless network. What's been missing is a device to convert this entertainment from the IP language of networking to the audio/video outputs required for a home theater system.



About the size of a paperback book, the PCNA-MR10 RoomLink™ media receiver delivers home entertainment content from a compatible PC to your home theater system!

Now Sony meets this need with the PCNA-MR10 RoomLink™ media receiver. The receiver has an Ethernet port on one side, and audio/video outputs on the other. It can deliver music, digital still pictures, video and live television from compatible VAIO PCs with VAIO Media™ software installed. Using the RoomLink receiver remote control, you can browse menus on your television screen, giving you access to the entertainment on your PC!

If your network provides no Ethernet cable near the home theater system, the receiver can be connected to a Sony PCWA-DE50 for 802.11a wireless LAN connection to a compatible wireless LAN access point.

VHS Hi-Fi VCRs

Even in the age of DVDs and personal video recorders, the old VCR still has a role to play. Some movies are not yet released on DVD and some rental stores still have more VHS cassettes than DVDs. You may own a shelf full of VHS movies that you still want to play. VHS tapes are also easy to record and exchange with friends and family. And VHS Hi-Fi tapes often contain Dolby Stereo sound tracks, suitable for Dolby® Pro Logic® processing at home. This produces surround sound that's satisfying and dynamic.

Features to look for:

- **VHS Hi-Fi.** An absolute must for high fidelity stereo sound.
- **VCR Plus+ Gold™** system automatically "maps" your local channel line-up. Programming the VCR becomes as easy as dialing a telephone number, thanks to the PlusCode® numbers you'll find in many newspaper TV listings and *TV Guide®* magazine.



- **Four Heads.** Two heads for SP speed and two for EP optimize playback picture quality. They also enable better freeze frame, frame advance and picture search special effects.
- **Built-in DVD player.** A combination VHS/DVD player can save space and prevent remote control clutter.

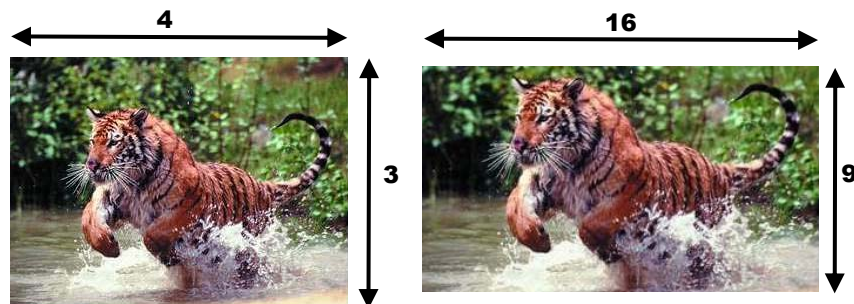
Home Theater Sight

A New World of Choices

If you haven't shopped for a television recently, you're in for a surprise. You now have a new range of choices that extends beyond conventional Cathode Ray Tubes (CRTs) to include Liquid Crystal Display (LCD) direct view television, LCD rear projection, LCD front projection and plasma flat screen television! You also have a choice of the squarish screen with its 4:3 aspect ratio or sleek, widescreen television with the new 16:9 aspect ratio. This section will step you through your choices. At the end, we'll point out some features worth looking for.

Choosing an Aspect Ratio

"Aspect ratio" is the proportion of screen width to screen height. Until recently, all television had an aspect ratio of 4:3, meaning that the screens were all nearly square, 1.33 times as wide as they are high. Many movies and an increasing number of television programs are presented in a more horizontal, widescreen format. DVD titles and High Definition TV broadcasting also support widescreen programming. That's why many modern televisions offer a widescreen design with a 16:9 aspect ratio some 1.78 times as wide as it is high.



Conventional television uses the somewhat square 4:3 aspect ratio (left). Many of the latest televisions offer the widescreen 16:9 aspect ratio (right).

Choosing the right aspect ratio depends on your budget and your viewing habits.

- **If you watch mostly television**, especially news and sports, you're better off with the conventional 4:3 aspect ratio (all other things being equal).
- **If you watch mostly movies**, especially from DVD, you're better off with the widescreen 16:9 aspect ratio (all other things being equal).

Choosing a Screen Size

The guidelines for choosing a TV screen size are not set in stone. Much will depend on the amount of space you have for a television, the size of your room and particularly the viewing distance. But the "right" screen size also depends on your preference. If most of what you watch is movies on DVD and if you want to be immersed in the full cinematic experience, you may be better off with a larger screen than the one recommended here.

With these qualifications in mind, we present screen size calculators for three classes of television.

For conventional televisions with 4:3 aspect ratio and "480i" scanning	
Viewing Distance	Recommended Sony TV Screen Size
6'	24" diagonal
7'	27" diagonal
8'	32" diagonal
9'	36" diagonal
10'	40" diagonal
11'	43" diagonal
13'	53" diagonal
15'	61" diagonal

For "high definition monitor" televisions with 4:3 aspect ratio and 1080i or 480p scanning	
Viewing Distance	Recommended Sony TV Screen Size
7'	32" diagonal
7' 6"	36" diagonal
8'	40" diagonal
9'	43" diagonal
11'	53" diagonal
13'	61" diagonal

For "high definition monitor" televisions with widescreen 16:9 aspect ratio and 1080i or 480p scanning	
Viewing Distance	Recommended Sony TV Screen Size
5'	32" diagonal widescreen
5' 6"	34" diagonal widescreen
7'	42" diagonal widescreen
8' 6"	51" diagonal widescreen
9' 6"	57" diagonal widescreen
11'	65" diagonal widescreen

Choosing a Screen Type

As we've mentioned, the range of available television screens has never been greater. If you're into the technology, it's an incredible feast. If you're a little uncertain, the sheer selection can be daunting. Here's a quick guide to what's what, and how to choose.



- **Cathode Ray Tube (CRT) direct view.**

WHAT IT IS. The conventional television. You're looking at the front of a large glass envelope, the inside of which is coated with phosphors. The picture is formed by an electron beam, the "cathode ray" that makes the phosphors glow.

BENEFITS. Despite the new competition, the CRT continues to be the most popular type of television. It's not hard to see why. The age of the flat CRT, ushered in by Sony's own FD Trinitron® picture tube, means that today's best CRTs are more accurate than ever. Not only do CRTs offer the lowest cost for each screen size, they also offer longevity and the best picture quality. With CRTs, the blacks are blacker and the contrast is greater. You also get the widest viewing angle, and the bright picture stands up well to ambient room light. And CRTs are not saddled with altitude limits, so you can watch them anywhere.

LIMITATIONS. CRT televisions are the heaviest. A 32-inch CRT television can weigh over 200 pounds and is typically over 20 inches deep. Direct-view CRTs are also limited in screen size. Few CRTs are larger than 36 inches diagonal. Sony's largest is 40 inches diagonal. Speakers need to be magnetically shielded, so as not to interfere with the CRT electron guns.



- **Liquid Crystal Display (LCD) direct view.**

WHAT IT IS. Liquid-crystal display technology first appeared in the early 1970's. LCD is used in front projectors, rear-projection TVs, and flat-panel displays. Like a laptop computer screen, a flat panel direct view LCD consists of a panel of viscous liquid sandwiched in plastic. The liquid is driven by a network of transistors that control individual pixels. When a transistor delivers an electrical charge, the crystals 'untwist' to an exact degree to filter light generated by a lamp behind the screen.

BENEFITS. LCDs are far thinner, lighter and sleeker than CRTs, making them favorites of interior decorators. LCDs also need no convergence. They're immune from "burn-in," so there's never any harm from videogames left on too long, DVDs in pause or station logos on the corner of the screen. LCDs also need no magnetic shielding from your loudspeakers. And there are no altitude limits. So they're ideal from sea level to Denver!

LIMITATIONS. Currently LCD televisions cost more and they are somewhat limited in viewing angle and contrast ratio. LCDs are generally limited to screen sizes of 30 inches and less, although larger sizes are soon to appear in the marketplace.



■ Plasma Display Panel.

WHAT IT IS. Another flat panel technology, this contains chambers of plasma gas for each pixel. The plasma pixels are made to glow by a network of electrodes. Plasma is the king of the "wow factor" technologies—giant-screen televisions currently up to 63 inches diagonal, yet svelte enough to mount on the wall, in an armoire or on a tabletop stand. Even large plasma TVs can be as thin as 5-1/4 inches. The picture is only part of the beauty.

BENEFITS. Because the screen brightness comes from the plasma itself, these panels have a wide viewing angle. Plasma models have wide 16:9 aspect ratio screens and a high enough pixel count to achieve HDTV-level resolution. Unlike LCDs, plasma panels are broadly available in larger screen sizes. Plasma panels also need no convergence. And they need no magnetic shielding from your loudspeakers.

LIMITATIONS. Although today's plasma panels offer excellent picture quality, their black levels and contrast still cannot match CRTs. Unlike LCDs, plasma can be affected by image retention and "burn in." Care needs to be taken when selecting aspect ratio and using videogames to avoid the possibility of image retention. Plasma panels can generate an acoustic buzz when used at high altitudes (altitude more than 6,200 feet above sea level or air pressure less than 800 hPa). This is caused by the difference between the pressure inside the panel and the pressure outside.



▪ **CRT rear projection.**

WHAT IT IS. The most popular choice for giant screens. These are single piece, self-contained televisions. They typically use three small CRTs—one each for red, green and blue. The resulting light is projected through a lens and mirror system behind the screen.

BENEFITS. As in direct view, rear projection CRTs offer superior performance and moderate cost. With the clever packaging of today's rear projection systems, CRT rear projectors are not much larger than rear projection systems using LCDs. And there are no altitude limits.

LIMITATIONS. Can't quite match the viewing angle of direct-view CRT. Requires periodic convergence adjustment to ensure CRTs remain in alignment and provide a clear, sharp picture. To make convergence easy, Sony's Flash Focus™ system performs this alignment in seconds. CRT rear projection can be affected by image retention and "burn in." Care needs to be taken when selecting aspect ratio and using videogames to avoid the possibility of image retention due to uneven aging of the CRTs. And your speakers need to be magnetically shielded, so as not to interfere with the CRT electron guns.



▪ **LCD rear projection.**

WHAT IT IS. These systems shine a high-intensity light through a single LCD panel or three individual LCD panels for Red, Green and Blue. The resulting light is projected through a series of lenses and reflected off a mirror behind the screen.

BENEFITS. Systems that use three LCD panels—one each for red, green and blue—can achieve superlative picture quality. LCD rear projection can deliver slightly better color than typical DLP™ models because the three LCD panels can be individually adjusted. LCD rear projection features compact size and light weight. Easy bulb replacement by the user brings the television back to like-new brightness levels. The LCD panels are fixed in place and therefore need no convergence adjustment. LCDs are immune from "burn-in," so there's never any harm from videogames left on too long, DVDs in pause or station logos on the corner of the screen. LCDs also need no magnetic shielding from your loudspeakers. And there are no altitude limits.

LIMITATIONS. Black levels and contrast still cannot match today's best CRTs. Can't quite match the viewing angle of direct-view CRT.



▪ **LCD front projection.**

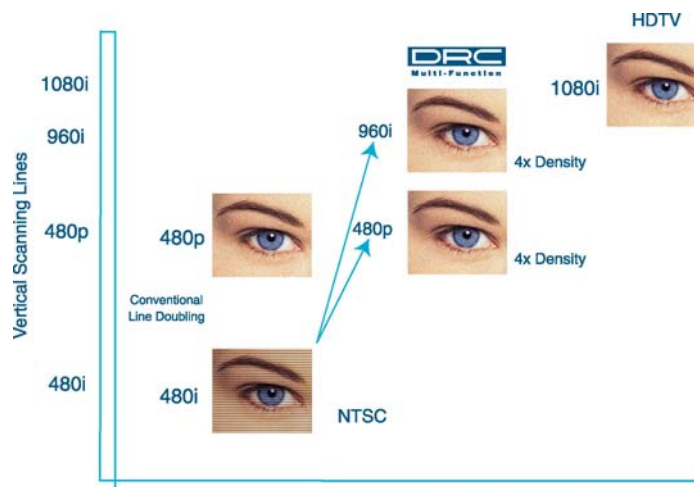
WHAT IT IS. These are small, portable projectors that project an image onto a separate component screen or a white wall. They work by shining a high-intensity light through a single miniature LCD panel or three individual panels for Red, Green and Blue. The resulting light is projected through a lens system onto the screen.

BENEFITS. If you want the biggest possible picture, LCD front projection is the definite way to go. You can project images as large as 25 feet diagonal. If you want the least impact on your home décor, that's another good reason to go this route. In portable use, you can place the projector on a coffee table. For permanent installation, the projector can be suspended from the ceiling. So it's out of the way during daily life. There's more. LCDs need no convergence and are immune from "burn-in." They need no magnetic shielding from your loudspeakers. There are no altitude limits. And the brightness comes from a light bulb that is replaceable.

LIMITATIONS. Ambient light needs to be controlled to get the brightest picture, especially when projecting at the biggest screen sizes.

Features to Look For

- **High scanning/HD monitor/HD upgradeable television.** These televisions accept the full 1080 interlaced scanning lines (1080i) from an external High Definition receiver or High Definition DIRECTV receiver. They also accept the 480 progressive scanning lines (480p) from progressive output DVD players. In both cases, the picture is vastly more detailed than conventional television, which uses 480 interlaced scanning lines (480i). The difference is dramatic, especially in the larger screen sizes. In big 480i screens, the scanning lines are so large that they can become visible, undermining the sense of reality. In high scanning televisions, the scanning lines blend seamlessly together into a more realistic, more emotionally compelling image.
- **Digital Reality Creation™ circuitry.** High scanning televisions generally boost conventional 480i sources to higher line rates, such as 960i or 480p. Even though the picture resolution does not change, you get a more seamless, more satisfying image on the big screen. A big step up from a line doubler, Sony's family of Digital Reality Creation™ circuits does an even better job. By replacing analog picture patterns with their High Definition digital equivalents, DRC doubles the number of scanning lines and doubles the number of pixels on each line. You get pictures with four times the original picture density—approaching the quality of High Definition!



Sony's Digital Reality Creation circuit not only doubles the scanning lines of conventional 480i sources, it also increases the picture density to nearly that of High Definition sources.

- **CineMotion™ 3-2 reverse conversion** is a technology employed in Sony high scanning televisions. It overcomes the problems that can sometimes occur when movie film, which is shot at 24 frames per second, is displayed on progressive scanning televisions, which operate at 60 frames per second. In order to display 60 frames, some televisions take scanning lines from two adjacent movie frames and force-fit them into one television frame. This makes a hash out of any object that's moving on the screen. Vertical edges that should be smooth take on a disturbing,

zipper-like texture. And this unwanted artifact happens frequently, occurring on two out of every five video frames! To make matters worse, the problem is not limited to those times when you're watching movies. Most prime-time dramas, music videos and commercials are also shot at 24 frames per second. That's why CineMotion 3-2 reverse pull-down is so important. It analyzes the picture, identifying the difference between footage shot on interlaced video and footage shot on film. For film footage, the system actually retains the integrity of the original film frames. You'll see a clearer, more stable picture, especially on scenes with movement.

- **DVI-HDTV interface** enables superb, uncompressed digital-to-digital connection from the set-top box to the television. Your High Definition signal is carried with full picture quality. The connection is also secured by HDCP technology to protect the signal from piracy.



- **FD Trinitron® picture tube.** This award-winning CRT sparked the new wave of flat tubes. But the FD Trinitron color system continues to stand apart, winning the praise of magazine reviewers, the admiration of professionals and the unwavering loyalty of customers.



Sony's FD Trinitron picture tube is set apart by outstanding clarity and detail, pinpoint corner-to-corner focusing, minimal glare and accurate image reproduction. These come from Sony's Fine Pitch Aperture Grille, a High Focus Electron Gun, a Flat Glass Panel and Sony's High-Precision Deflection Yoke.

- **Super Fine Pitch™ CRT.** An improvement in the FD Trinitron picture tube. Behind the screen, we've reduced the spacing or "pitch" of the Aperture Grill by 65%. You get higher resolution, greater precision and a television that takes full advantage of High Definition source material.
- **Component video inputs** enable high-quality analog connection from a DVD player or satellite receiver. The separate components of the video signal can be Y/P_b/P_r or R/G/B.
- **HDTV reception.** Some televisions offer a complete HDTV receiver built in. So you have access to free, over-the-air digital TV broadcasts that are already available to 97% of American homes.
- **MID™ circuitry.** If you're a fan of picture-in-picture, wait until you've tried Sony's Twin View™ picture-and-picture! Powered by the MID circuit, this feature displays two pictures side-by-side. Then you can zoom each picture up or down in size, depending on what's going on and what's important. You can even display a High Definition source side-by-side with Standard Definition on the same screen.
- **WEGA Engine™ circuitry.** This is the secret behind XBR® Plasma WEGA™ and XBR LCD WEGA™ television. It performs the all-important "scaling" that helps determine the picture quality of fixed pixel displays. Unlike conventional circuitry, the WEGA Engine system maintains the picture in the digital domain from the first stage to the last. In this way, Sony achieves a picture that's less like watching television -- and more like a window on the world. Refinements include Direct Digital Circuitry, the DRC™ Multi-Function system and MID™ X circuitry.
- **Memory Stick® media playback.** A growing number of Sony televisions includes a Memory Stick media slot. The latest televisions will display JPEG images (DCF format).* Simply slide the Memory Stick media out of a Sony Cyber-shot® camera or Handycam® camcorder and into the television's Memory Stick slot!
- **3D Comb filter.** To maximize the picture detail of conventional TV broadcasts, televisions need to separate the luminance (Y) from the chrominance (C). The 3D comb filter analyzes the picture over three dimensions: vertical, horizontal and time, to get superb detail and high color purity under the widest range of picture conditions.

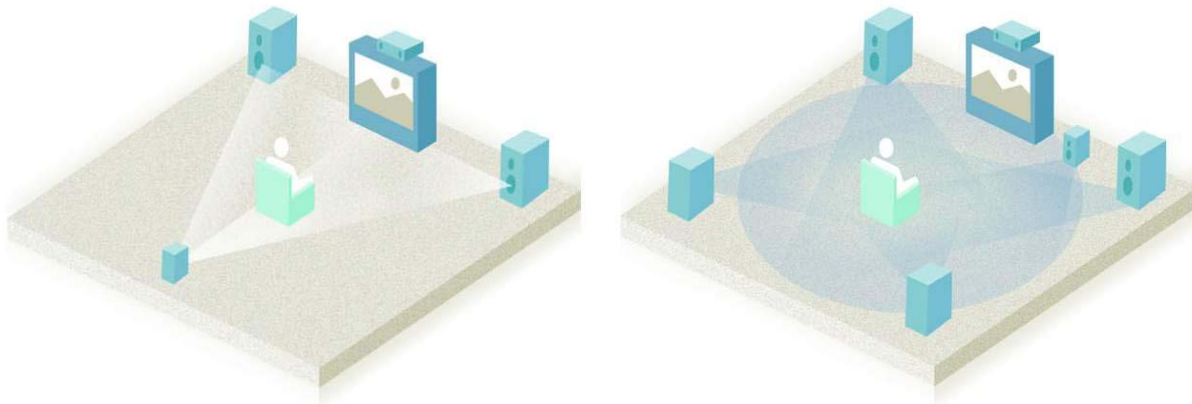
Home Theater Sound

About Surround Sound

Surround sound began in the movies, with the urge to convey a more convincing, more complete audio-visual experience. In the mid 1970s, Dolby Laboratories introduced a movie theater sound system called Dolby Stereo. During the production of movie sound tracks, this system encoded or "matrixed" the Left, Center, Right and Surround channels onto just two channels of the film distribution print. Dolby Stereo gained acceptance in movie theaters. And the movie studios were quick to take advantage. Today, thousands of movies include Dolby Stereo sound tracks.

The benefits of Dolby Stereo were confined to the movie theater as long as television and home video were limited to just one channel of audio. But the launch of high fidelity stereo VCRs and stereo TV broadcasting in the early 1980s changed all that. Suddenly, you could rent a VHS Hi-Fi movie that contained the full Dolby Stereo encoded sound track! And you could watch movies on broadcast TV that transmitted that Dolby Stereo sound track into your home.

It was now possible to enjoy movie theater surround sound in the comfort of your own home. High fidelity companies transformed their AM/FM receivers into "A/V" receivers, including first Dolby Surround and then the more refined Dolby Pro Logic decoding circuitry.



Dolby Pro Logic decoding (left) results in four channels: Left, Center, Right and a common Surround channel. Even when there are two Surround speakers, they are being driven with just one Surround signal. The Dolby Digital system (right) offers digital sound quality, better separation among the channels, a Low Frequency Effects (LFE) channel for the subwoofer and a separate signals for Surround-Left and Surround-Right.

The next wave of home theater sound innovation came with the launch of digital distribution formats, including DVD, digital cable, DIRECTV digital satellite broadcasting and free, over-the-air digital television broadcasting. These digital media opened the door to digital surround sound. Dolby Laboratories answered with the Dolby Digital system. Compared to Dolby Pro Logic decoding, the Dolby Digital system has crucial advantages:

- **Digital sound quality.** The movie sound tracks now approach the sound quality of Compact Disc. You'll hear full frequency response, low noise and exceptional clarity.
- **Discrete channels.** Where the Dolby Pro Logic decoder must pull the four channels out of two stereo signals, the Dolby Digital system keeps every channel separate, or "discrete."
- **More channels.** Where the Dolby Pro Logic system has a single Surround channel, the Dolby Digital system delivers a separate channel to the Surround-Left and Surround-Right speakers. All told, there are 5.1 separate channels. That's five full-range channels (Left, Center, Right, Surround-Left and Surround-Right), plus a Low Frequency Effects channel to drive the subwoofer.
- **Low-Frequency Effects (LFE) channel.** The human ear can't detect where low-frequency bass is coming from. This "omnidirectional" quality of bass means that a single subwoofer can provide bass for an entire surround sound system. The subwoofer bass will blend with the full-range speakers for a dynamic, high-impact soundstage. The LFE channel is often called the "0.1" channel because the subwoofer handles roughly one-tenth the frequency range of the full-range channels.
- **Scalability.** While the Dolby Digital system is often called a 5.1-channel system, it can also support fewer channels, all the way down to mono, for movies and TV shows produced before the 1970s.

Surround Sound Formats

Since the acceptance of Dolby Digital encoding, the number of surround sound formats has continued to grow. But don't worry. Modern A/V receivers are good at automatically detecting the surround sound format and automatically applying the best available decoding.

- **Dolby Digital® surround sound.** This is the surround sound system used on most DVDs, on DIRECTV satellite broadcasts and on free, over-the-air High Definition TV broadcasts. You need a receiver with Dolby Digital decoding.
- **Dolby Digital EX 6.1-channel sound.** The new encoding format includes a matrix "Surround Back" channel.
- **Dolby Pro Logic surround sound.** This decoding is important because it works with the Dolby Stereo signals encoded into literally thousands of movies and a large

proportion of analog stereo TV broadcasts. If you watch television or enjoy VHS Hi-Fi movies, you'll use Dolby Pro Logic surround sound.

- **Dolby Pro Logic II-movie and Pro Logic II-music.** These new decoding systems derive 5.1 channels instead of the conventional 4 channels of Dolby Pro Logic surround sound. These are decode-only systems. By design, there is no Pro Logic II-movie or Pro Logic II-music encoding for source material.
- **dts® 5.1-channel surround sound.** Another digital surround sound format, used as an option for DVD movie sound tracks and for music disks.
- **dts 96/24.** The DVD-Video standard offers the possibility of a dts 5.1-channel signal encoded at a 48 kHz sampling rate. However, dts has created a way to extend the sampling rate to 96 kHz while retaining full backwards compatibility. Older decoders can handle the new discs (although without the benefit of the 96 kHz sampling rate). Newer decoders can deliver the extended frequency response and heightened realism of the 96 kHz signal.
- **dts ES discrete 6.1 and dts ES matrix 6.1.** These systems add a Surround Back channel. In the "discrete" case, it's a completely separate channel. In the "matrix" case, it's specially encoded into the other surround channels, then regenerated by the receiver.
- **dts Neo6:cinema and dts Neo6:music.** These decoding systems derive six channels from two-channel material. These are decode-only systems. By design, there is no Neo6:cinema or Neo6:music encoding for source material.

A/V Receivers

In many respects, the A/V receiver is the brains of your home theater system. It's where you connect and select all your entertainment sources. It's where the surround sound signals are decoded into their separate speaker channels, and where those channels are amplified to drive the full range speakers. (Subwoofers typically have their own amplifiers built in.)



Features to look for:

- **Surround sound decoding.** All modern A/V receivers will decode Dolby Digital and Dolby Pro Logic signals. You should also look for dts decoding. If you're a home theater enthusiast, you may also want the full laundry list of decoding systems.
- **32-bit decoding.** While many decoders operate with 24 bits of precision, some go the extra step to 32 bit decoding. This is on par with professional movie theater decoders. It delivers higher precision and lower noise.
- **Digital Cinema Sound™ processing** is a Sony system that accommodates the differences between your home theater setup and an actual movie theater. Digital Cinema Sound processing recreates the actual, measured acoustics of three Hollywood dubbing stages. These are reference-class movie theaters where directors go to adjust and approve their final sound tracks. Thanks to the Digital Cinema Sound modes, you'll hear exactly what the director intended!



The acoustics of this Hollywood dubbing stage are incorporated in Sony's Digital Cinema Sound circuitry. Note the swivel chairs and sound mixing console in the foreground. This is not just a movie theater. It's a reference-class movie theater where directors go to adjust and approve their movie sound tracks!

- **Surround sound for music.** Selected Sony Digital Cinema Sound™ circuits also recreate the acoustic space of two legendary concert venues: the Vienna Musikvereinsaal and the Amsterdam Concertgebouw. So you experience music with the acoustics of a real concert hall.

- **Inputs and outputs.** As the nerve center of your entire A/V system, your receiver needs a good complement of inputs and outputs. Make sure that the type of inputs and outputs matches your other equipment, especially your DVD player, DIRECTV receiver and television. In particular, if you have a High Definition monitor television, look for component video (Y/P_B/P_R) inputs and outputs that can support 480p and 1080i signals. You'll also want optical or coaxial digital inputs for connecting your DVD player.
- **Power amplifiers.** Make sure the receiver has the number of power amplifiers you need to decode the surround sound you want. Today's receivers offer up to 7 channels of amplification for 7.1-channel surround sound!



Sony's Digital Cinema Sound circuitry also reproduces the acoustics of two renowned concert halls, the Amsterdam Concertgebouw and the Vienna Musikvereinsaal, shown here.

Speaker Consistency

When buying home theater speakers, you'll want to consider the space you have for speaker placement and the types of speakers available today. But the most important consideration is the consistency of sound from one speaker to the next.

To appreciate the importance of consistent sound, consider a mis-matched stereo system with a big, bass-heavy speaker on the left and a small speaker on the right. Every time the music emphasizes the bass notes, the stereo image will appear to "wander" toward the left! When the bass becomes quiet, the image will wander to the right. Instead of getting a true stereo image, you get an ever-shifting blur of sound. This problem is bad enough in two-channel stereo. In multi-channel home theater systems, this problem is multiplied.

For consistent sound, it's important to buy all your full-range speakers (Left, Center, Right, Surround-Left and Surround-Right) not simply from the same manufacturer—but from the same series in the manufacturer's lineup! You want to make sure that all five full-range speakers use the same design for the high-frequency driver (the "tweeter") and the same approach to cabinet design, crossover design and all the other technical details that go into determining sound quality.



Matched speakers from a single manufacturer are essential for achieving a surround sound effect that's stable, consistent and ultimately convincing.

The only speaker that's free of this requirement for consistency is the subwoofer. Most subwoofers can be adjusted for level and "crossover frequency" to blend successfully with most full-range speakers.

Types of Speakers

A full 5.1-channel home theater system includes five full-range speakers: Left, Center, Right, Surround-Left and Surround-Right; plus a Subwoofer for the "0.1" channel. You've got a range of choices for each.

- **Front speakers.** You can choose from large, floor-standing speakers, smaller "bookshelf" speakers or tiny "satellite" speakers. Your choice will probably be dictated by your budget, the amount of space you have and the locations you have for speaker placement. Most speakers for A/V use are "magnetically shielded." This will prevent fields from the speakers' magnets from interfering with the picture of CRT televisions.
- **Center speakers.** The Center channel is important because it carries the dialog. The Center speaker creates the illusion that the dialog is coming directly from the actors on the screen. Center speakers are usually sleek designs for horizontal placement immediately above or below the television. Choose your Center speaker from the same brand and series as the Left and Right. Most Center speakers are magnetically shielded to prevent interference with the TV picture.
- **Surround speakers.** For highly motivated home theater enthusiasts, these could be large, floor standing speakers. But because most of the movie sound track information is concentrated in the front, smaller "satellite" speakers work very well.
- **Subwoofer.** Most subwoofers are "active," which means they are driven by their own, internal power amplifier. Because the human ear can't detect the direction from which deep bass is coming, the subwoofer can be placed almost anywhere, including under a table or in a corner of the room.
- **Matched speaker sets.** Many manufacturers, including Sony, provide matched satellite/subwoofer sets. These provide identical or nearly identical speakers for the five full-range channels, plus a cosmetically and sonically matching subwoofer. The satellite speakers are often designed to be hung on a wall or to sit on a cabinet or shelf.



Wall mount brackets are a great solution for positioning satellite speakers.

Bringing it All Back Home

We've completed our tour of Sources, Sight and Sound. Now is the time to put it all together. This section will review the practical considerations for buying and installing a home theater system.

Before You Buy

- **STEP 1. Determine what building blocks you already have.** Decide whether you have a television, A/V receiver or DVD player that you want to keep.
- **STEP 2. Determine your viewing distance.** If you're buying a new television, this will help you in selecting a screen size. Consult the charts on page 18 for more information. Where possible, check out the television you're planning to buy, connected to a good DVD player, when seen from the actual viewing distance in your room.
- **STEP 3. Determine your level of interest.** At Sony, we realize that not everyone shares an equal passion for home theater equipment.

If you're nervous about buying the right products and making the right connections when you get them home, you're probably best served by an all-in-one product like Sony's DVD Dream™ systems. All the equipment will match. And all of the cables and speaker connections are color-coded. It's like having a Sony expert standing next to you when you set your system up!

If you're only somewhat interested in equipment, Sony's Home-Theater-in-a-Box systems are a good place to start. The speakers will match—and will work well with the receiver. There's also an easy set-up guide to help you get started.

If you're after the highest possible performance or if you'll want to upgrade individual pieces in the future, separate components are your best bet.



The rear of a Sony DVD Dream System, showing color-coded cables and color-coded speaker terminals.

How to Buy

If you've done your homework (see "Before You Buy," above), buying home theater is easy. Just consider four typical scenarios.



Your current
television

+



a Sony DVD
Dream system

- **SCENARIO A.** Let's say you have only a television and you simply want to add home theater. You can just purchase a Sony DVD Dream™ system and you'll be done! The system contains an A/V receiver and DVD player housed together in one, sleek component, plus a matched set of speakers, complete with subwoofer. Depending on the DVD Dream system model, you may also want to add speaker stands and/or wall-mount brackets.



Your current
television and
DVD Player

+



a Sony Home-
Theater-in-a-Box
System

- **SCENARIO B.** Let's suppose you have both a television and a good DVD player that you want to keep. You can step up to home theater with the purchase of a Sony Home-Theater-in-a-Box system. This will include an A/V receiver and a 5.1-channel speaker system, complete with subwoofer.

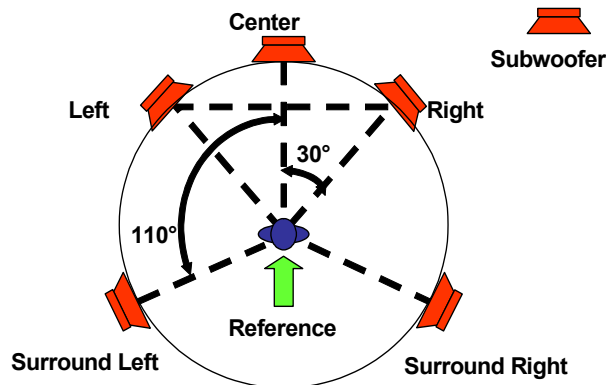
- **SCENARIO C.** Assume that you're starting from a blank sheet of paper. You won't be using any existing components. If you choose, you can build a completely customized system with exactly the television, DVD player, A/V receiver and speakers that fit your specific needs!
- **SCENARIO D.** Maybe you're passionate about having equipment of the highest quality. Maybe you hate the idea of having a room where A/V equipment is a prominent visual feature. Or maybe both points of view are represented in your home! Whatever the case, you may best be served by custom installation. Custom installers can give you the maximum in home theater enjoyment with the minimum of visible equipment. A good installer is a master at hiding equipment and when the time comes to enjoy, revealing it on motorized lifts. An installer can work hand-in-hand with your architect, your decorator and your general contractor. An installer can integrate your home entertainment system with automatic window shades and automatic room lighting. And a good installer can even create whole-house entertainment systems or integrate the home theater system with your PC network. If you're intrigued by the idea of custom installation, you can find out more at www.sonyavdesigner.com.



A custom installer authorized by Sony Consumer Integrated Systems can elicit the best performance from the best equipment, like the Sony VPH-G90U high definition projector. A legend among video professionals and enthusiasts, the G90U has 9-inch electromagnetic focus CRTs and 2500 H x 2000 V resolution. It also costs more than the average automobile.

Where to Put It All

- **Speakers.** Absolutely correct speaker placement would have you sitting in the middle of a circle. The television would be directly in front of you, with the Center channel speaker directly above or below. The Left and Right speakers would be 30 degrees to either side. Ideally, you'd have a perfect equilateral triangle with the Left speaker, Right speaker and your listening position at each point of the triangle. The Surround-Left and Surround-Right speakers would be to the sides and behind you, at the same distance as the other speakers. Finally, the subwoofer could go in any convenient place.



Perfect speaker placement. Don't worry if you can't achieve perfection at home. The better A/V receivers can apply selective time delay to compensate for inconsistent speaker placement.

In reality, the surround speakers can go alongside you or behind you. And since it's hard to place every speaker at an equal distance from your listening position, the better A/V receivers have speaker distance compensation circuits that will add time delay to correct for imperfections in speaker placement.

Floor-standing speakers need no further hardware, but most satellite speakers are designed to sit on a shelf, mount on floor stands or attach to the wall with mounting brackets. Be sure to check if these are included with your speakers.

- **Source components.** These can go on bookshelves, but it's best to have a purpose-designed equipment rack, available in most furniture stores and electronics stores.
- **Television.** Most rear-projection televisions are designed to sit directly on the floor. But the larger CRT direct-view televisions are best placed onto TV stands. A stand from the TV manufacturer is a good choice because it raises the middle of the screen where it belongs—at eye level. The stand will also match the cosmetics of your television, will support your TV's weight and will provide room for your source components—solving many installation issues at once.



A television stand can solve many issues at once. It elevates the television to the correct height and it provides shelves for the source components.

Finishing Touches

While not essential for home theater, two add-on purchases can make your system much more enjoyable. A "universal" remote control can replace all your separate remotes—an especially good move if you've built your system from individual components. Finally, wireless headphones will let you enjoy full-volume entertainment at night, after others in your house have gone to sleep. It's like having your cake and eating it, too.



A universal remote control (left) can simplify system operation. Wireless headphones (right) enable you to enjoy the system after others have gone to bed.

Home Theater Connections

Connecting a home theater is easier than you may have imagined. Separate components from reputable manufacturers come with clear directions and easy-to-follow diagrams. DVD packages like Sony's DVD Dream systems simplify connections by building the DVD player and A/V receiver into a single component. These Sony systems go even further with color-coded speaker cables and color-coded speaker terminals.

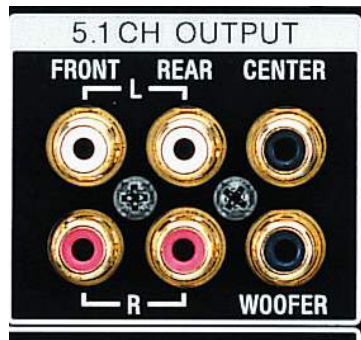
This section will review some of the most common home theater connections, and help guide you in choosing connections when your equipment offers more than one way to do the job.

Audio Connections

- **Line-Level Analog Audio.** These are the most common audio connections in a home theater system, hooking up most of your source components to your A/V receiver. The physical connector is called either an "RCA" or "pin" plug. In stereo, the Right and Left are usually color-coded so you don't mix them up. Right plugs and jacks are coded in Red. Left plugs and jacks are coded in white. In some cases, 5.1-channel connections are used, for example in taking the output of a multi-channel Super Audio CD player to an A/V receiver.



Line-level analog audio jacks are generally color-coded red for Right and white for Left. The plugs on the cables share the same color code.



5.1-channel analog audio jacks enable a Super Audio CD player to deliver multi-channel sound to an A/V receiver.

- **Optical and Coaxial Digital Audio.** Digital audio connections generally do a better job of maintaining the sound quality of digital source components, including DIRECTV satellite receivers, HDTV receivers and DVD players. While some music lovers prefer coaxial digital connections, optical connections are immune from electromagnetic interference.



Digital audio outputs feed a digital bit stream to your A/V receiver.

- **Speaker Connections.** Some A/V receivers can put out 100 watts or more to drive each speaker. Dedicated speaker wires are used to make this connection. Speaker wire is typically "lamp cord," consisting of two multi-stranded copper conductors running side by side. Spring-loaded or screw-type speaker terminals hold the conductors in position. For the best sound, observe the "polarity" by connecting the "red," "hot" or "plus" terminal on the A/V receiver to the corresponding terminal on each speaker. Speaker cables are usually coded to help you in this process. The "hot" side of the speaker cable will be red, have a stripe or have ridges on the insulation, so you won't need to trace the polarity down the entire length of the cable. In speaker wire, lower gauges offer thicker conductors for better sound, especially over long wire lengths.



These screw-type speaker terminals on the back of an A/V receiver make for extremely reliable, secure connections.

Video Connections

- **Radio Frequency (RF) connections.** This is the only way to connect a rooftop antenna, cable TV service or satellite TV antenna feed. You also need an RF connection to carry the antenna or cable signal from your VCR to the television. While you can watch VCR tapes as "Channel 3" or "Channel 4" on your television, this use of the RF connection can degrade color, detail and sound quality. You'll get better picture and sound when you watch tapes using the composite video and line-level audio connections. RF connection uses a coaxial cable with screw-on "F-type" plugs.



RF connections like this are only appropriate for rooftop antenna feeds, cable TV service and satellite antenna feeds. Avoid them for other source component connections.

- **Composite video connections.** The most common way of hooking up home video source components, the composite connection combines black-and-white information (luminance) and color information (chrominance) into a single signal that's a "composite" of the two. Composite video connection of source equipment enables far higher resolution and far better color than RF connection. In home theater equipment, the physical connector is the same "RCA" or "pin" plug as used for line-level audio. To avoid confusion, the video connectors are typically color-coded yellow. Because composite video requires a separate connection for sound, manufacturers often supply cables with three sets of plugs on each end: Video (yellow), Right Audio (red) and Left Audio (white).



Composite video connections have the potential to deliver far higher picture quality than RF, unencumbered by sound.

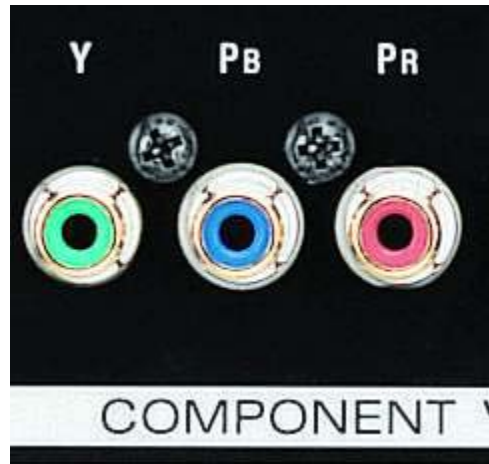
- **S-Video connections.** S-Video connections can deliver somewhat higher quality than composite video, because they offer separate conductors for a black-and-white signal (luminance) and a color signal (chrominance). The physical connector is a 4-pin Mini-DIN plug.



S-Video connections can be better than composite video because they provide separate signal paths for the black-and-white and color signals.

- **Y/P_B/P_R component video connections.** These connections are a must for progressive scan DVD—and they're highly desirable for other equipment. They divide the video signal into three component parts: black-and-white luminance (Y), blue color difference (P_B) and red color difference (P_R). This enables beautifully rich, clear, accurate color, especially important for today's better video sources. In home

theater equipment, the physical connectors are the same "RCA" or "pin" plugs as used for line-level audio, typically coded green (Y), blue (P_B) and red (P_R).



Component video connections (Y/P_B/P_R) are the best way to convey the full quality of the signal from the DVD player to the television.

- **R/G/B component video connection.** Another way of connecting a component video signal of exquisite quality is separate connections for the three primary colors of video: Red, Green and Blue, abbreviated R/G/B. This is most often used for connecting a PC or an LCD front projector. The physical cable usually has a D-sub 15-pin connector that includes a pair of thumbscrews for secure mating.



The D-sub 15-pin interface supports component video R/G/B signals.

- **DVI-HDTV digital video connection.** Digital Visual Interface (DVI) HDTV enables spectacular, uncompressed digital-to-digital transport of a video signal from an HDTV receiver to a "high scanning," "High Definition monitor" or "High Definition upgradeable" television. The connection is also secured by HDCP technology to protect the signal from piracy. The physical connector includes a pair of thumbscrews for secure mating.



The DVI-HDTV interface carries High Definition in full digital quality.

Home Theater Glossary

1080i. High definition signal with 1080 scanning lines and interlaced ("i") scanning. This contains up to six times the detail of conventional TV pictures.

16:9 Aspect ratio screen. This is 33% wider than the standard 4:3 aspect ratio screen. It's closer to the proportions of widescreen movies and perfect for Digital TV broadcasting, anamorphic DVD-Video titles and other state-of-the-art 16:9 programming sources.

2-Tuner Picture-in-Picture. Simultaneously displays two shows, with both TV pictures generated by internal tuners.

32-Bit surround sound decoding. Far more accurate, for higher fidelity than the conventional, 24-bit decoding.

3D digital comb filter. A circuit that processes composite video signals, stripping the color signal (chrominance) apart from the black-and-white signal (luminance). To maintain picture quality, this filter compares each horizontal scanning line with the lines above and below—and with the corresponding lines on the previous and subsequent video frames. You get higher horizontal resolution, higher vertical resolution and reduced video noise.

4:3 Aspect Ratio. The proportions of a conventional television screen. The 4:3 aspect ratio is squarish compared to the widescreen, 16:9 aspect ratio.

480i. The conventional, Standard Definition television signal. This contains 480 active scanning lines (of a total 525 lines) displayed at 30 frames per second. Interlaced ("i") scanning divides each frame into two fields of 240 lines. Each field lasts for 1/60 second.

480p. Enhanced definition TV signal with 480 active scanning lines, progressive ("p") scanning and a rate of 60 frames per second. Used in both digital television broadcasting and progressive scan DVD players.

5.1-Channel Inputs. For receivers, enables you to connect a multi-channel source, such as a Super Audio Compact Disc player. So you can enjoy high-resolution surround sound for music that's a giant step closer to the original performance. The inputs allow for flexibility now and in the future.

6.1-Channel Inputs. Accommodate the latest sources with 6.1-channel surround sound. The sixth channel drives a Surround-Back speaker.

720p. High Definition TV signal with 720 active scanning lines and progressive ("p") scanning. Used in digital television broadcasting.

A/V inputs. For connecting external audio/video equipment, including VCRs, DVD players, A/V receivers.

Anamorphic. A type of lens that "squeezes" a 16:9 widescreen picture into a standard 4:3 image. For proper playback, the image needs to be "unsqueezed" by display on a 16:9 screen or by letterbox presentation (with black bars at the top and bottom) of a 4:3 screen.

Artifact. An unwanted distortion of the video signal, visible on the screen.

Aspect ratio. The proportion of TV screen width to height. Conventional television has an aspect ratio of 4:3. Modern, widescreen television has an aspect ratio of 16:9.

ATSC. Stands for the Advanced Television Standards Committee. An advisory group that produced the table of 18 recommended transmission formats for Digital Television (DTV) broadcasting in the United States.

Cathode Ray Tube (CRT). The most common television display technology, the CRT is a sealed glass envelope in which the inside front surface is coated by phosphors. The phosphors glow when excited by an electron beam—the "cathode ray." CRTs are used for both direct-view and projection television.

CD-R/RW audio playback. Plays audio discs from your CD-R/RW burner.

Center channel. A speaker channel in surround sound systems. The Center channel is crucially important because it creates the illusion that the dialog is coming from the actors on the screen.

Chrominance. The color component of a video signal, abbreviated C. Chrominance is combined with the black-and-white signal (luminance) in composite video connections, but kept apart in S-Video and component connections. For higher quality, the single chrominance signal can also be divided into B-Y and R-Y components in Y/P_B/P_R component connections, or into the primary colors of Red, Green and Blue for R/G/B component connections.

CineMotion reverse 3-2 pull-down. A Sony feature that preserves the integrity of movie film frames for spectacular, consistent fine detail in 480-line progressive scanning (480p). In televisions, it works with all film-originated content, including broadcast TV, cable TV, satellite TV and DVD.

Coaxial digital output. A method of connecting high-quality digital audio from a source component to an A/V receiver.

Component Video connections (Y/P_B/P_R). Component video is the best method for connecting analog video signals. Y/P_B/P_R is ideal for DVD players and compatible satellite receivers. Uses separate connections for luminance (Y), blue color difference (P_B) and red color difference (P_R).

Component Video connections (R/G/B). Component video is the best method for connecting analog video signals. R/G/B is ideal for HDTV receivers and computer signals. Uses separate connections for Red (R), Green (G) and Blue (B).

Composite Video connections. Composite video is the standard method of connecting video equipment, but it is far from the best method. Composite video puts color information (chrominance) together with black-and-white information (luminance) on the

same wire. Picture quality is lost whenever chrominance and luminance are stripped apart for display on a television.

Digital Cinema Sound system. A group of Sony developments that represents a total re-thinking of home theater sound. Produces the sound that movie directors intended by recreating the precise acoustics of three post-production dubbing stages in Hollywood.

Digital Concert Hall. To enable multi-channel music reproduction from conventional, stereo sources, Sony engineers have captured the sound of two revered performance spaces: Amsterdam's Concertgebouw and Vienna's Musikvereinsaal. Sony's top receivers offer DSP modes that reproduce both halls.

Digital Reality Creation™ circuitry. A Sony breakthrough in big-screen television. This uses digital mapping to convert a conventional TV image into its high definition equivalent. The system creates four times as much data for a more solid, more convincing picture. And some versions of the system enable you to choose between interlaced and progressive display modes.

Digital Signal Processing (DSP). Circuits that shape and enhance a signal when it's still in the digital domain. Audio DSP circuits can perform surround sound decoding, create acoustic environments, adjust the bass and treble with incredible precision and even adjust the volume.

Digital Television (DTV). The US system for over-the-air broadcasting gives stations 18 options in signal format, six of which are designated as true High Definition.

Dolby Digital decoder. Enables multi-channel digital surround sound that is dynamic, spacious and realistic. Generates 5.1 discrete channels of sound for Left, Right, Center, Surround-Left, Surround-Right and Low Frequency Effects (LFE) for a Subwoofer.

Dolby Digital passthrough. This is a digital output from a DVD player, satellite receiver or HDTV receiver to an A/V receiver with built-in Dolby Digital decoder.

Dolby Digital EX 6.1-channel sound. The new encoding format includes a matrix "Surround Back" channel.

Dolby Pro Logic decoder. The classic system that decodes and amplifies the surround channels already encoded in most movie videocassettes and laserdiscs, many TV dramas and sports broadcasts.

Dolby Pro Logic II-movie and Pro Logic II-music. Decode-only systems that derive 5.1 channels instead of the conventional 4 channels of Dolby Pro Logic surround sound.

dts (Digital Theater System) decoder. Enables multi-channel digital surround sound that is dynamic, spacious and realistic. Generates 5.1 discrete channels of sound for Left, Right, Center, Surround-Left, Surround-Right and Low Frequency Effects (LFE) for a Subwoofer.

dts 96/24. Sound track encoding system that can deliver the extended frequency response of 96 kHz sampling and the heightened realism of 24-bit quantization.

dts ES discrete 6.1 and dts ES matrix 6.1. Decoding systems that add a Surround Back channel. In the "discrete" case, it's a completely separate channel. In the "matrix"

case, it's specially encoded into the other surround channels, then regenerated by the receiver.

dts Neo6:cinema and dts Neo6:music. Decode-only systems that derive six channels from two-channel material.

DTV receiver. See HDTV receiver.

DVD-Video. Immensely popular video playback system, for which over 10,000 titles have already been published. Some say that DVD stands for "Digital Versatile Disc." Some say "Digital Video Disc." In fact, the format's inventors could not agree. Officially, DVD doesn't stand for anything.

DVD-R/RW capability. For added versatility, some DVD players can accommodate DVD-R/RW discs (video format) and DVD-RW discs (VR format).

DVI-HDTV. An interface that enables spectacular, uncompressed digital-to-digital transport of a video signal from an HDTV receiver to a "high scanning," "High Definition monitor" or "High Definition upgradeable" television. The connection is also secured by HDCP technology to protect the signal from piracy.

FD Trinitron® picture tube. Sony's visually flat picture tube. Uses a Flat Glass Panel, high-focus electron gun, High Precision deflection yoke and a Fine-Pitch Aperture Grille.

Frequency response. In audio, the ability of a system to convey music from the deepest bass frequencies to the highest treble. In video, the ability of a system to convey high resolution, which corresponds to high video frequencies.

HD component video connection. Component video (Y/P_B/P_R) connectors that can carry High Definition video sources and DVD 480p progressive scan output.

HDTV receiver. Receives and displays free, over-the-air High Definition television. Capable of images with up to six times the detail of conventional television.

HDTV DIRECTV receiver. Receives and displays subscription High Definition television from the DIRECTV satellites. Some models can also receive free, over-the-air High Definition television. Capable of images with up to six times the detail of conventional television.

High Definition. A new type of free, over-the-air TV broadcasting with up to six times the picture detail (resolution) of conventional, Standard Definition broadcasting. The National Association of Broadcasters reports that 885 television stations are broadcasting a digital TV signal and that 60 network TV series are being broadcast in High Definition.

Home Theater. Media and home electronics that deliver the movie theater experience at home. Minimum requirements are a DVD player, a television with a screen of 27 inches diagonal or more and an audio system that features Dolby Digital decoding and 5.1-channel surround sound speakers.

Interlaced Scanning. The opposite of Progressive Scanning. The technology behind the conventional television signal, which shows half of a frame's scanning lines in each 1/60 second. First the odd numbered lines are displayed, then the even-numbered lines.

Letterbox. One technique for accommodating widescreen programming on a standard 4:3 screen. Letterboxing presents the widescreen picture with black bars across the top and bottom. Cinema purists love letterboxing because it preserves the director's original vision. Others are disturbed by a picture that does not fill their 4:3 screen.

Liquid Crystal Display (LCD). A television display type that uses a viscous liquid and a mesh of transistors to turn pixels on and off. LCDs are used in both direct-view and projection television. In both cases, LCDs require a light to generate brightness.

Local channels. DIRECTV broadcasting that beams the signals of CBS, NBC, ABC and Fox local affiliate stations, plus a PBS national feed into many cities. No need for cable or a local TV antenna.

Low Frequency Effects (LFE) channel. The "0.1" bass channel of surround sound systems, commonly fed to a subwoofer.

Luminance. The black-and-white component of a video signal, abbreviated Y. Luminance is combined with the color signal (chrominance) in composite video connections, but kept apart in S-Video and component connections.

Memory Stick® media playback. A Sony feature that enables you to display JPEG images (DCF format).^{*} Simply slide the Memory Stick media out of a Sony Cyber-shot® camera or Handycam® camcorder and into the television's Memory Stick slot!

MID™ circuitry. Sony processing that enables advanced Twin View™ picture-and-picture, including simultaneous display of SD and HD-originated pictures.

Multi-Channel Super Audio CD playback. The benefits of surround sound come to music. Super Audio CD supports up to 5.1 channels of full-quality sound.

Noise. Random, unwanted interference with the signal to which you're trying to watch or listen. In audio, noise takes the form of hiss or static. In video, noise is picture "snow," random flecks or specks of unwanted color.

NTSC. The U.S. standard for color TV broadcasting, adopted in the 1950s. NTSC is now used to refer to other aspects of conventional broadcasting, including the frame rate of 29.97 interlaced frames per second and the television raster of 525 gross scanning lines per frame and 480 active scanning lines. NTSC officially stands for National Television Standards Committee, although frustrated engineers will tell you it stands for "Never The Same Color."

One Button Record. This feature of DIRECTV receivers lets you record a show from the program guide at the touch of a button. Uses the receiver's timer and an infrared "blaster" to automatically start and stop your VCR.

Optical digital output. A method of connecting high-quality digital audio from a source component to an A/V receiver. Optical outputs use a fiber optic transceiver to convert pulses of electrical voltage into flashes of laser light. At the far end, the light is converted back into voltage pulses.

Pan & Scan. One technique for accommodating widescreen programming on a standard 4:3 screen. The system selects out a 4:3 portion of the larger picture and presents only that portion. To follow the action in the larger picture, a technician must sometimes shift

the point of view left or right, "panning" the frame. Cinema purists hate Pan & Scan because it disrupts the director's original vision. Others appreciate a picture that fills their 4:3 screen.

Personal Video Recorder (PVR). System that records video onto a hard drive. PVRs offer many new opportunities, including the ability to hold 80 hours of programs, the ability to pause live TV and the ability to automatically suggest TV shows you might like and record them for you.

Plasma. A flat panel television display type in which plasma gas pixels glow when excited by electrodes.

Progressive Scanning. The opposite of Interlaced scanning. Shows each scanning line in sequence, for a more seamless, more film-like image.

Projection. A television display system that projects the image as light onto a screen. Front projectors are located out among the audience and project on a reflective, white screen. Rear projectors are self-contained boxes that project onto a translucent screen.

Resolution. A measure of video signal detail for source material, transmission channels, recorders and displays. Resolution can be measured in pixels or in "lines of resolution."

RF connector. Accommodates a local TV broadcast antenna or cable.

Satellite Speaker. A compact speaker that reproduces all of an audio signal except for the deepest octaves of bass. Many home theater speaker systems use satellite speakers for the full-range channels and subwoofers to handle the bass.

Stereo Broadcast Reception. Decodes MTS stereo TV broadcasts. Can include dbx® noise reduction for better sound.

Subwoofer. A specialized loudspeaker that handles only bass frequencies (typically 200 Hz and below). The subwoofer is ideally suited to reproducing the "0.1" Low Frequency Effects channel of modern surround sound systems. Most subwoofers are also "active," meaning that they include their own power amplifier.

Super Audio CD playback. High-resolution audio that enables you to rediscover your love of music. The highest quality sound source available today, Super Audio CD supports both stereo and multi-channel music reproduction.

Super Fine Pitch™ CRT. Refinement of the Sony FD Trinitron CRT that enables even higher resolution.

S-Video connection. Enables you to connect video equipment to your A/V receiver at high signal quality. S-Video keeps the black-and-white signal (luminance) apart from the color signal (chrominance) to maintain picture quality.

Universal remote control. Simplifies operation by also controlling many brands of TVs, VCRs, DVD players and A/V receivers. (May not be compatible with all brands and models.)

VCRPlus+ Gold technology. A VCR feature that makes channel programming and timer setting easy.

WEGA Engine™ circuitry. Sony scaling circuitry that helps deliver the superlative performance of XBR® LCD WEGA™ and XBR Plasma WEGA™ televisions.

Widescreen. Programming and video systems that incorporate an aspect ratio wider than the conventional 4:3 television screen. In video, widescreen means 16:9, which equals a ratio of picture width to height of 1.778:1. Movies can use several widescreen formats, including a ratio of 2.35:1.

A Final Word

Home theater is an exciting, dynamic field with new concepts and new products coming out all the time. For further information on the latest developments, be sure to set a bookmark on your web browser at www.sony.com/he.

SONY®

Sony Electronics Inc.
1 Sony Drive, Park Ridge, NJ 07656
www.sony.com

The Sony Guide to Home Theater, version 2.0; May 8, 2003

© 2003 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Television pictures are simulated. Features and specifications are subject to change without notice. Non-metric weights and measures are approximate. Sony, CineAlta, Cyber-shot, Digital Cinema Sound, Digital Reality Creation, Direct Stream Digital, DRC, DVD Dream, Flash Focus, Giga Pocket, Grand WEGA, Handycam, LCD WEGA, MegaStorage, Memory Stick, MID, Plasma WEGA, RoomLink, SDDS, Sony Dynamic Digital Sound, Super Fine Pitch, Trinitron, VAIO, VAIO Media, WEGA, WEGA Engine and XBR are trademarks of Sony. Dolby, Dolby Digital and Pro Logic are trademarks of Dolby Laboratories Licensing Corporation. dts is a trademark of Digital Theater Systems Corporation. DIRECTV is a registered trademark of DIRECTV Inc., a unit of Hughes Electronics Corporation. VCR Plus+, VCR Plus+ Gold, C3, ALLSET and PlusCode are trademarks of Gemstar Development Corporation. TV Guide is a registered trademark of New America Publications, Inc. TiVo is a trademark of TiVo, Inc. dbx is a registered trademark of Carillon Electronics Corp. DLP is a trademark of Texas Instruments, Inc.

* Playback on these televisions requires Memory Stick media with images stored in the DCF file format. All Sony digital still cameras and camcorders that store images on a Memory Stick media are compatible except models DSC-D700 and DSC-D770, DCR-TRV900, and DSR-PD100A. If the image file is re-named or manipulated, the DCF file format must be restored before playback is possible. Before they can be viewed, images captured on all other digital still cameras and camcorders will need to be formatted on a PC to the DCF file format, using third party software not supplied with the television.