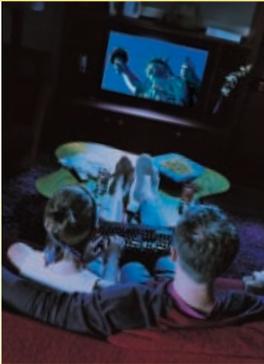




HDTV



A CONSUMER'S GUIDE TO THE WONDERFUL WORLD OF HDTV



www.CE.org/hdtv

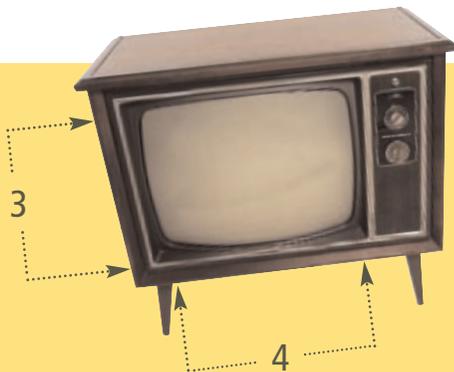
why you want HDTV



HIGH-DEFINITION TELEVISION

EXPERIENCE TELEVISION LIKE NEVER BEFORE. PICTURES SO SHARP AND CLEAR YOU'LL THINK THEY'RE REAL. SURROUND SOUND THAT PUTS YOU IN THE MIDDLE OF THE ACTION. SIMPLY PUT: THE HDTV EXPERIENCE IS AMAZING.

HIGH-DEFINITION TELEVISION (HDTV) DELIVERS PICTURE AND SOUND QUALITY THAT ARE A QUANTUM LEAP ABOVE YOUR CURRENT TV SET. IT'S JUST LIKE A MOVIE THEATER WAS PLACED IN YOUR LIVING ROOM! EVERY SHOW YOU WATCH—NO MATTER IF IT'S THE LOCAL NEWS OR A CHAMPIONSHIP SPORTS EVENT—TAKES ON A VIVID BRILLIANCE THAT SIMPLY HAS TO BE SEEN TO BE APPRECIATED.



NTSC



The Incredible **Picture...** The **Awesome Sound!**

The image seen on the best HDTV set has five times more detail than analog televisions. Now watching a big football game feels like you're 15 rows up on the 50-yard line as you see every inch of the field—even the scuffs on the quarterback's helmet. Not only is the picture more realistic—like looking through a sparkling clean picture window—HDTVs have wider, rectangular screens like movie theaters and deliver the same Dolby Digital surround sound that thrills audiences at the local Cineplex.

HDTV is revolutionizing television as CD players did for music. CDs eliminated scratches and hisses from records, while HDTVs eliminate ghosts, static, snow and poor-quality video. When you see an HDTV program, it's exactly the same as the one that left the TV station: colors are crisp, text is easier to read and the higher quality audio embedded into the signal supercharges the viewing experience.

HDTV is only one part of "digital television (DTV)," an umbrella term covering all of the digital formats for the standard approved by the Federal Communications Commission (FCC) in 1996. The official name is the Advanced Television Systems Committee (ATSC) standard. There are several different DTV

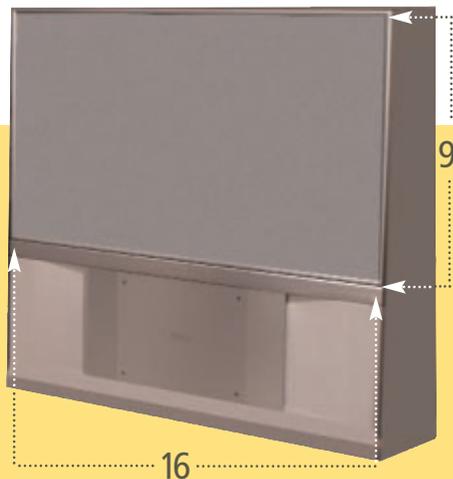
picture formats offering varying levels of quality; HDTV with its widescreen picture and Dolby Digital sound is the pinnacle.

Just as there is a wide variety of DTV picture formats, there are different types of digital televisions. The most affordable is capable of showing Standard Definition TV (SDTV). The next best category is Enhanced Definition TV (EDTV), capable of displaying a higher-quality 480 progressive image. An EDTV set has a digital tuner built-in, while an EDTV monitor requires a digital set-top box.

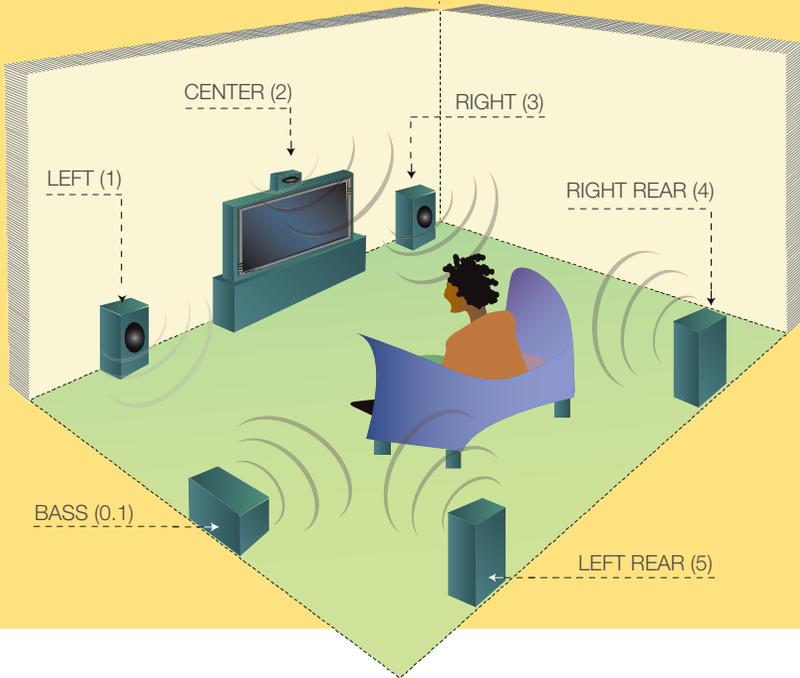
The highest picture quality models are HDTVs (720p, 1080i) with a widescreen 16:9 aspect ratio. This television lets you see uncropped widescreen movies without the black bars on top and bottom used for "letterbox" presentations (letterboxing is the method typically used to "fit" rectangular CinemaScope movies onto a square 4:3 screen). As with all DTV products today (SD, ED), HDTVs are available as HDTV sets with built-in tuners or HDTV monitors that require a digital receiver.



BETTER PICTURE
BETTER SOUND
DIGITAL



Six Channel (5.1) Dolby Digital Sound



How HDTV Differs from Analog TV

HDTV has higher resolution meaning sharper, clearer pictures: The image on a television is composed of small picture elements called pixels. The pixels in HDTV are closely packed together to provide a highly detailed picture. Current analog TVs display an image of 200,000 pixels. The minimum DTV signal shows 300,000 pixels and hits a maximum of two million for HDTV, the best of the 18 ATSC formats.

HDTV has a widescreen format: In addition to providing improved picture quality with more visible detail, HDTV is transmitted in a widescreen display commonly referred to as a 16:9

format, meaning that the picture is 16 units wide by 9 units high. A conventional analog display is 4 units wide by 3 units high, or 4:3. Thus the 16:9 display provides a wider image area that more closely matches the movie theater experience.

HDTV has better sound: Many HDTV programs also contain six-channel (5.1) Dolby Digital surround sound to provide an immersive audio experience to complement the improved picture quality on HDTV. This is particularly beneficial within a home theater system.

The DTV Standard

On December 24, 1996, the U.S. FCC adopted the major elements of the ATSC DTV standard, mandating its use for digital terrestrial television broadcasts in the U.S. Within the DTV standard are 18 different picture formats. The FCC did not mandate use of the specific HDTV and SDTV formats contained in the ATSC standard, but these have been uniformly adopted on a voluntary basis by broadcasters and receiver manufacturers. All digital receivers (set-top boxes) and HDTV sets receive them all. A DTV receiver, which looks like a VCR or a cable or satellite receiver, gathers and translates the digital signal for the DTV monitor.

In 1997 the FCC adopted companion DTV rules, assigning an additional 6 MHz channel to approximately 1,600 full-power broadcasters in the U.S. to permit them to offer digital terrestrial broadcasts in parallel with their existing analog services during a transition period, while consumers made the conversion to digital receivers or set-top boxes. In accordance with the FCC plan, digital television service was launched in the U.S. November 1, 1998.

The two most commonly used signals by local broadcast stations are EDTV and HDTV. With the current analog system, TV images are created by interlace scanning, which uses two fields of alternating horizontal scanning lines to form a full picture. This picture is referred to as "480 interlace," or 480i. With many DTVs, the number

of scanning lines are more than doubled to 1,080 (1080i). This is HDTV and delivers a more detailed image that practically jumps off the TV screen.

HDTV also may be broadcast and displayed as a "progressive image" (720p), like a computer monitor. Here, a full frame fills the screen from top to bottom, eliminating lines altogether so the picture has a more film-like feel. EDTV quality is referred to as 480p for its 480 progressive lines of resolution.

In the new digital era, broadcasters can offer free, over-the-air television of higher resolution and better picture quality than is possible under the current system. If broadcasters so choose, they can deliver HDTV with theater-quality pictures and CD-quality sound. Or a broadcaster can offer several different TV programs at the same time (called "multicasting"), but in a lower resolution – SDTV. Even with fewer than 480 lines of resolution, the picture and sound quality of SDTV still is better than analog TV. The target date for completion of the analog-to-DTV transition is 2006, or 85 percent household penetration, whichever occurs later.

A bounty of beautiful shows

Broadcasters are offering an ever-increasing array of high-definition programming. . . you will be knocked out when you see them. When you get your new HDTV home, you'll have an amazing palette of digital entertainment from which to choose—right in your living room. No matter if you love soap operas, prime-time favorites from network TV and premium cable networks, Hollywood blockbusters or almost every sport you can imagine, you'll likely find sparkling HDTV versions available today.

To find out what programs are airing in HDTV in your town, check out Titan TV (www.titantv.com), a free online program guide from Decisionmark in conjunction with CEA. The National Association of

Broadcasters' (NAB) website also is a good source for the latest list of DTV broadcast stations in your area (<http://www.nab.org>).

Your new HDTV also is a great companion for the many affordable progressive scan output DVD players widely available on the market. While these players don't provide a high-definition image, connect one to your HDTV and you'll see a beautiful, seamless picture that exceeds even the quality of a standard DVD player.

With thousands of DVD titles available and all the new DTV programming on-air, there's no shortage of digital entertainment for your new HDTV.

What is HDTV *and why is it so important?*

HDTV is an entirely new system that will ultimately replace today's existing analog "NTSC" television system. The term "HDTV" refers to a television system that can transmit, receive and display high-quality digital images.

Once the DTV standard was set in 1996, the Federal government subsequently mandated a nationwide transition for the nation's 1,600-plus television stations to move from analog to digital transmission. In order to facilitate this, the FCC allocated an

additional channel to all broadcast TV stations. This second channel is dedicated for digital broadcasts and upon completion of the transition (the year 2006 or 85 percent household penetration, whichever occurs later), the original analog channel must be returned to the government. The FCC will eventually auction the analog channel spectrum.

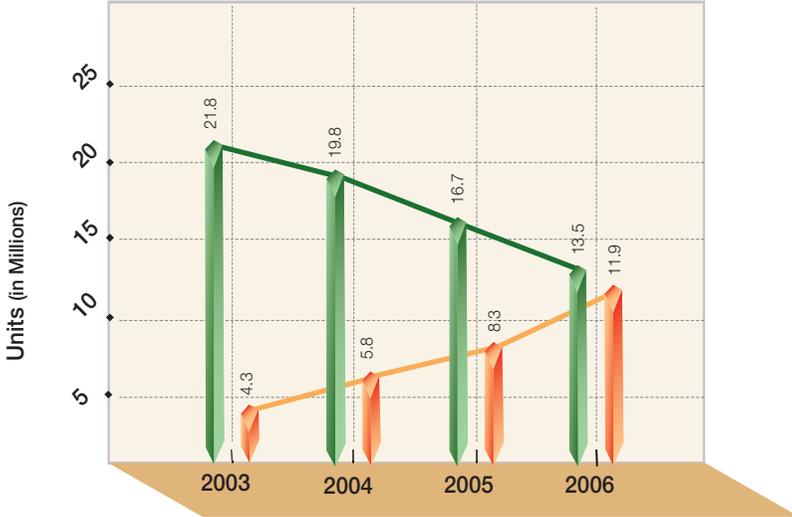
The World of Television *Goes Digital*

Analog vs. Digital Sales Projections

2003 – 2006

UNITS

 Digital  Analog



HDTV's great picture, the increasing amount of programming combined with the falling prices of HDTVs, is providing consumers with a great incentive to go digital.

U.S. DOLLARS

 Digital  Analog



What makes HDTV better than today's television?

HDTV offers incredibly detailed, life-like picture quality with up to five times the sharpness of today's television along with digital surround sound capability and a widescreen format.

Is my current TV obsolete?

No, analog televisions will continue to receive analog broadcasts at least through 2006, and probably longer. After that, consumers will be able to connect an inexpensive receiver to their existing TV to decode TV broadcast signals, just not in high-definition. Of course, current televisions will continue to work with cable, satellite, VCRs, DVD players, camcorders, video game consoles and other devices for many years.

What can I watch in HDTV?

The great news for consumers is that Hollywood is creating more and more digital programming at the highest levels of resolution and sound quality.

What is the difference between "digital cable," "digital satellite" and "HDTV?"

Just because a program arrives through a digital cable or digital satellite doesn't mean it is in high-definition. Much of today's programming — even that received from a digital satellite, digital cable or even a digital channel broadcast over-the-air — is delivered in SDTV. You'll get a better picture than you get with the analog broadcasts TV has used for years, because a digital picture will be free from the "ghosts" and "snow" that can plague analog transmissions. At a minimum, over-the-air SDTV offers a picture 640 pixels wide by 480 pixels high, totaling 307,200 pixels — about 50 percent more than today's analog TV. A standard definition picture will be good, but not nearly as sharp and crisp as high-definition, which can go up to two million pixels.

2-PART SOLUTION: Monitor + Receiver



MONITOR



TERRESTRIAL



SATELLITE



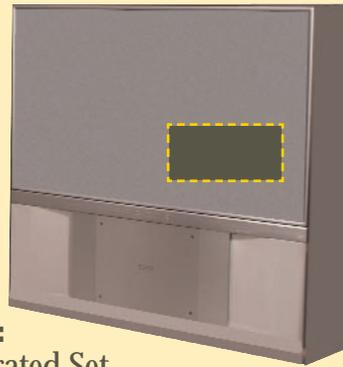
CABLE

RECEIVER
(SET-TOP BOX)



SIGNAL DELIVERY

how to receive HDTV



MONITOR WITH
INTEGRATED RECEIVER



SIGNAL DELIVERY

1-PART SOLUTION: Integrated Set

How Do I Receive HDTV?

There are several components required to watch a program in HD. Generally, it's simple and just like receiving traditional TV:

- The program must be transmitted in high-definition. Viewers can receive HDTV signals through one of three ways: over-the-air broadcast, cable, or direct broadcast satellite.
- At the consumer's home, the signal must first go from the antenna, dish, or cable through a receiver. Again, HDTV Sets have receivers built in (often referred to as "integrated sets");
- others require a separate set-top receiver. Cable and satellite subscribers currently need a special HDTV set-top box.
- The program must be viewed on an HDTV Set or Monitor. In addition to a receiver (integrated or via a set-top box), a consumer needs a standalone monitor or integrated set capable of displaying high-definition images.

How do I know what to buy?

Start by doing your homework just as you would for any long-lasting household purchase. This primer is a good start. CEA also collects HDTV retailer listings and posts this information on its website – www.cea.org/hdtvguide. These retailer listings are part of a larger print and online resource titled the "HDTV Guide."

Additionally, CEA is working with other industries involved in the transition to promote HDTV and properly educate retail sales personnel so that once you set foot in a consumer electronics store, you'll be guided to the best HDTV purchase for your

needs. One partnership CEA has established with Decisionmark is the Titan TV Retail Zone. This program lets retailers enter the address of their customers and quickly determine which local, off-air TV stations are broadcasting in digital, and which programs are available in HDTV. The RetailZone even helps retailers recommend the optimal antenna required to receive DTV at consumers' homes by incorporating CEA's off-air antenna color coding scheme (<http://www.antennaweb.org>).

Digital TV Shopping Guide

Before you walk into a consumer electronics store, it's important to know some key phrases that describe the advanced TV you'll be buying. The good news? There are hundreds of HDTV products available today, and prices are more affordable than ever.

Digital Television

Television Type	Resolution	Aspect Ratio	Audio	Rating
High Definition Television	Vertical Resolution from 720p to 1080i	Widescreen (16:9)	Receives and reproduces and/or outputs Dolby Digital 5.1	Best
Enhanced Definition Television	Minimum vertical resolution of 480p	Widescreen (16:9) or traditional (4:3)	Receives and reproduces and/or outputs Dolby Digital 5.1	Better
Standard Definition Television	Less than 480p	Widescreen (16:9) or traditional (4:3)	Receives and reproduces and/or outputs useable audio	Good

Over-the-Air Broadcast

At this stage in the analog-to-HDTV transition, consumers need the right equipment for their specific programming wishes and the area in which they live. Currently, the predominant way to watch your local stations' HDTV channel is with an over-the-air antenna. Most cable and satellite providers do not yet carry your local digital channels (check with your cable or satellite provider). This is changing every day as more cable companies join the HDTV bandwagon. Until then, over-the-air HDTV reception is a free and spectacular viewing experience!

If you want over-the-air reception, you will need an antenna. The type of antenna required – rooftop or indoors – depends on your location, the distance from the station's transmitters and the local terrain. In many instances a rooftop antenna will be more effective, but you might have a set of old rabbit ears that work just fine. It varies from household to household. To find out what antenna works for your home, use the CEA antenna selector map program located at www.antennaweb.org. This easy-to-use online tool lets you enter your zip code to see a map plotting your home's proximity to the various HDTV stations in your area. The site also tells you whether you will need a multi-directional or a uni-directional antenna. Again, CEA also has created a color-coded labeling system on antennas to further aid consumers when they shop.

Satellite

To receive HDTV via satellite, you will need a specific receiver, as well as a special satellite dish. Both are readily available from local electronics retailers. DIRECTV and Dish Network are actively promoting their HDTV services. See your dealer or their websites for more details.

Cable

The consumer electronics and cable industries have agreed upon a national standard for HDTV over cable systems that will allow consumers to buy DTVs that connect to digital cable without a set-top box and enjoy easy access to HDTV services offered by cable operators. This "plug-and-play" agreement ensures that "Digital Cable Ready" TVs (DCRs) soon will be available at your local consumer electronics retail store and will allow the millions of cable households in the country to seamlessly transition to HDTV by simply plugging their new DCR HDTV into their cable jack and turning on the set. HDTV service and programming may vary from region to region, so call your cable provider to inquire about HDTV service in your particular area.



The best television sets currently available are HDTVs with 16:9 widescreen aspect ratios capable of displaying either 720p, 1080i or higher resolutions. HDTV sets also have built-in digital receivers/decoders and deliver Dolby Digital sound. HDTV sets are available as either direct view (familiar tube TVs), rear or front projection models.



There are also HDTV monitors that offer the same high picture and sound quality as HDTV sets, but require separate receiver boxes to decode digital signals. HDTV monitors are available in either direct view, rear or front projection versions.



HDTV tuners are the key to the exciting new digital kingdom. You must have one – either inside or connected as a set-top box – in order to see DTV programs. HDTV tuners decode all ATSC formats and send 480p, 720p or 1080i signals to an HDTV monitor. It also outputs Dolby Digital audio. They are often called set-top boxes, receivers or digital decoders.



Like the highest quality HDTV, Enhanced Definition Television (EDTV) is an all-in-one unit—a display with a built-in decoder in either direct view or rear projection design. In this case, you'll see at least a 480p image, rather than 720p or 1080i. The screen can either be square-shaped (4:3 aspect ratio) or widescreen (16:9). It receives, reproduces and outputs Dolby Digital sound.



An EDTV monitor has the same display parameters as an EDTV, but does not have a built-in decoder. Occasionally, this type of TV is referred to as a multimedia monitor.



The Enhanced Definition TV tuner receives all digital signals, but outputs them to a TV at 480p resolution, rather than 720p or 1080i.



Standard Definition TV (SDTV) sets deliver a digital picture that's better than your current analog TV, but less than the 480p of EDTVs. It has a built-in decoder, but no aspect ratio is specified by CEA.



The Standard Definition TV tuner is the one most owners of current analog TVs are expected to purchase in the years ahead. This tuner receives all digital formats and outputs an analog (NTSC) signal. However, it does handle Dolby Digital audio.

FEDERAL COMMUNICATIONS COMMISSION (FCC)

– The FCC, under the leadership of Chairman Michael Powell, has taken a strong and active role in the HDTV transition. Although its website deals primarily with policy rules and regulations, it also has Consumer Alerts and Fact Sheets. (www.fcc.gov)

ADVANCED TELEVISION SYSTEMS COMMITTEE (ATSC)

– The Advanced Television Systems Committee is an international, non-profit organization developing voluntary standards for digital television. The ATSC member organizations represent the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite and semiconductor industries. (www.atsc.org)

NATIONAL ASSOCIATION OF BROADCASTERS (NAB)

– The National Association of Broadcasters is a full-service trade association that promotes and protects free, over-the-air local radio and television stations' interests in Washington and around the world. (www.nab.org)

NATIONAL CABLE AND TELECOMMUNICATIONS

ASSOCIATION (NCTA) – The National Cable and Telecommunications Association, formerly the National Cable Television Association, is the principal trade association of the cable television industry in the United States. (www.ncta.com)

SATELLITE BROADCASTING COMMUNICATIONS ASSOCIATION

(SBCA) – The SBCA is the national trade organization representing all segments of the satellite consumer services industry. (www.sbca.org)

additional
HDTV
resources

A SPECIAL CEA WEBSITE – has a wealth of information on the analog-to-digital television transition. Most of this information is stored on the HDTV Web page, but additional resources, such as policy filings, press releases and publications, may be found through the CE.org search engine. (www.ce.org/hdtv)

HDTV GUIDE – Intended as a resource tool for the industry, the *HDTV Guide* also contains useful information for consumers, such as a detailed listing of HDTV products available with manufacturers' suggested retail prices.

HDTV UPDATE E-NEWS – CEA produces this e-mail newsletter at least once a quarter in order to highlight the latest developments in HDTV programming, policy and related issues. The E-News archive is available online at www.ce.org/hdtv.



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