

Switching to
Digital
TV



Everything
You Need
to **Know**

Switching to Digital TV: Everything You Need to Know

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Analog Versus Digital TV: What's the Difference?

The Least You Need to Know...

- Current television broadcasts use analog technology, which is prone to fading, snow, and ghosts.
- Digital TV reproduces crystal-clear picture and sound without fading or interference.
- Digital technology also enables TV stations to broadcast multiple channels with different programming.
- Unfortunately, older analog TVs can't receive digital transmissions.

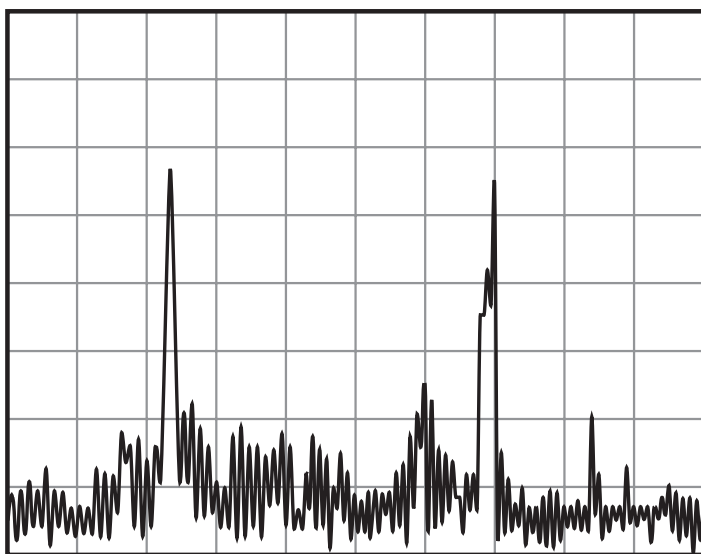
What's so special about digital TV? Why is the entire television broadcasting industry moving to digital?

The DTV transition is happening because digital is *better* television—better looking, better sounding, and with more channels of programming. If you've not yet experienced DTV, you're in for a big surprise!

How Traditional Analog Television Works

Before you can appreciate DTV, you have to understand how current analog television works. As you'll see, it's an imperfect system—albeit one that's worked well enough for close to half a century.

Analog television transmits programming in a continuous signal. This signal varies in amplitude, depending on the information contained in the picture. It's kind of how music was transcribed onto vinyl records; the television signal goes up and down depending on what's being broadcast.



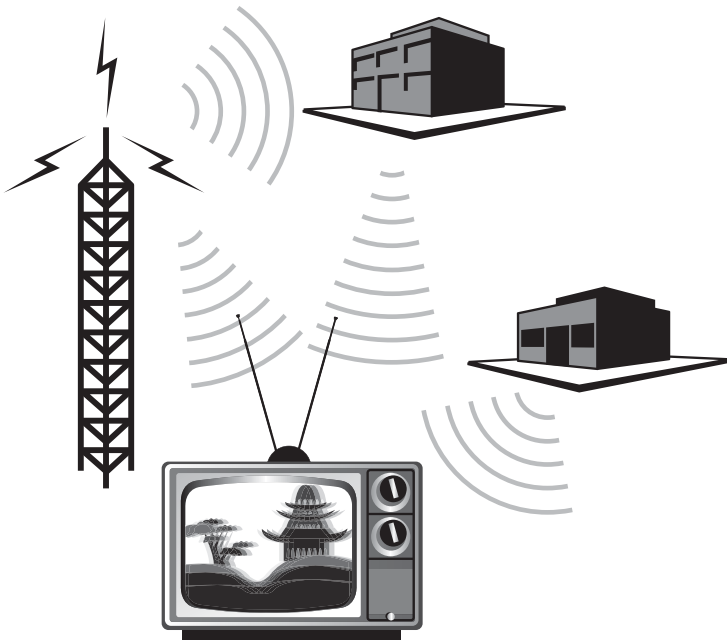
Analog television transmits in a continuous signal that varies in amplitude.

This analog signal is transmitted on a particular radio frequency, from the television station's transmitting antenna over the air to the receiving antenna connected to your TV set. Each television station is assigned a particular frequency that corresponds to its channel number. When you tune your TV to a given channel, you're actually choosing to receive transmissions on that particular frequency.

NOTE

Television frequencies are measured in megahertz (MHz). Very High Frequency (VHF) channels 2 through 6 operate in the frequency range between 54 and 88MHz. VHF channels 7 through 13 operate in the frequency range between 174 and 216MHz. And Ultra High Frequency (UHF) channels 14 through 83 operate in the frequency range between 470 and 890MHz.

Unfortunately, this analog signal is far from perfect. It might not always exactly reproduce the original programming. It can easily deteriorate over long distances. And it can also suffer interference from other sources, producing ghost images, static, and “snow.”



Analog transmissions are subject to ghosts and other interference.

The result is that analog transmissions typically produce a lower-quality picture than the original. The picture isn't quite as sharp, the background is sometimes grainy, and the sound suffers from noise and a reduced frequency response.

But then you know all this—especially if you've ever tried to pull in a distant station from a TV attached to an antenna. The farther you are from the station, the worse the picture. And the results are equally poor if you live in a big city with lots of buildings that bounce the signal around. Ghosts and snow are commonplace.

In addition, analog television is inefficient. Each VHF or UHF channel takes up a lot of valuable bandwidth. The more efficient digital technology can fit four or more channels into a single analog channel. And that has many potential benefits.

How Digital Television Works

DTV is more advanced than the older analog technology. Unlike analog television, which uses a continuously variable signal, a digital broadcast converts the programming into a stream of binary on/off bits—sequences of 0s and 1s. This is the same way that computers store information in data files; each bit represents a small part of the picture, and all the bits combine to reproduce the original picture.



Digital television converts the picture into a stream of 0s and 1s.

The primary advantage of digital broadcasting is that these binary bits recombine to reproduce an exact copy of the original material. The picture and sound received from a digital transmission are always identical to the original source.

Even better, over-the-air digital signals don't weaken over distance, as analog signals do. As long as the signal can be received, the

picture is perfect, with no degradation or ghosting. Because digital signals are composed of binary bits, a 1 is always a 1, and a 0 is always a 0. There is no fuzziness or snow in the picture, no ghosts caused by interference.

In addition, digital is a more efficient technology. A digital transmission requires less bandwidth than does a similar analog broadcast; this lets local television stations broadcast two, three, or even four digital channels in the space of a single analog channel. This “multicasting” technology means you’ll receive more variety in programming from your local stations—all delivered with superior digital quality.

NOTE

It’s important to note that DTV is not the same as high-definition television. Whereas all HDTV is digital, not all digital broadcasts are high definition. Learn more in Chapter 3, “Digital Versus High Definition: What’s the Difference?”

How Digital TV Is Different

So a digital television signal is more like computer data than it is like a vinyl record. What does that mean in practical terms?

First, digital television can’t be received on older analog TV tuners. If you try to tune in the new digital channel 7 on your old TV, for example, you’ll find that there’s nothing there. Analog tuners simply aren’t equipped to receive digital signals. You’ll need either a newer TV with a digital tuner or a digital-to-analog converter box connected to your older TV to watch the new digital television broadcasts.

Second, your local TV station’s digital signal is likely broadcast on a different frequency than its analog signal. Although some stations will retain their old channel numbers, others will change channels. And even if the channel number remains the same, the underlying frequency that your tuner receives might differ.

And that channel number won’t be for a single channel anymore. With digital technology, most local stations will broadcast more than one *subchannel* of programming. Instead of receiving just a single channel 13, for example, you might be able to tune in channels 13.1, 13.2, and 13.3, each with its own individual programming. This will require you to learn new channel lineups and to punch a different (and slightly longer) number into your TV tuner.

In addition, some stations are switching to different transmitter towers for their digital programming. If your local station changes from a tower currently north of you to one that's more to your east, for example, you might need to reposition your antenna to receive transmissions from the new tower. This may be a minor inconvenience or it could signal major problems—especially if the new transmitting tower is considerably farther away from your house. In any case, be prepared to at least adjust the position of your antenna to receive the new digital signals.

You need to be aware of one final difference. Even though digital signals are clearer than analog signals, they aren't always perfect. Whereas an older analog signal might fade and get noisy as you move farther away from the transmitting tower, a digital signal won't fade. It will stay perfect until that point where it's too weak to continue. At that point, the picture and sound will simply disappear, often without warning. DTV is an all-or-nothing proposition—either you get a great picture or you don't get any picture at all!

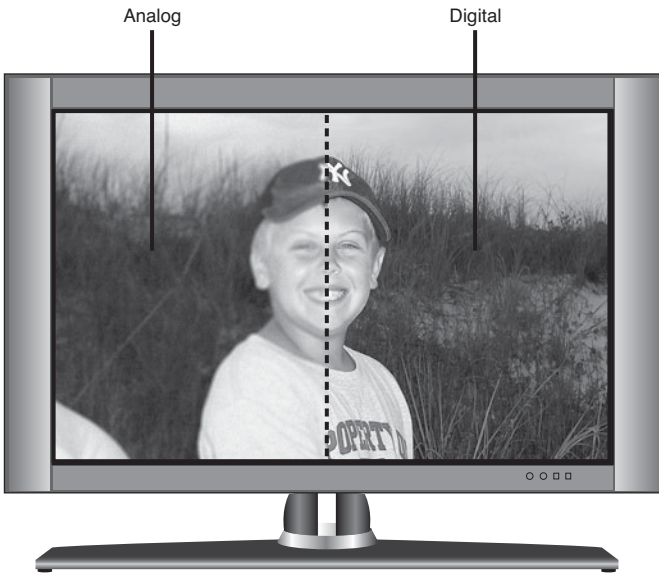
Why Digital TV Is Better

Of course, all these differences between analog and digital television would be irrelevant if there weren't something in it for you, the viewer. Fortunately for all of us, DTV is superior television—which should make the transition easier to live with.

Digital TV Means Better Picture and Sound

The biggest improvement offered by DTV is better picture and sound. Quite simply, a digital picture is a superior picture.

The difference between an analog and digital television picture is every bit as noticeable as the difference between VHS videotapes and DVDs, or between vinyl records and compact discs. In all instances, the newer digital technologies (DVDs and CDs) look and sound superior to their analog counterparts (videotapes and vinyl records). It's the same when you move from analog to digital TV; the difference in picture and sound quality is quite obvious.



Digital TV has a sharper picture than analog TV.

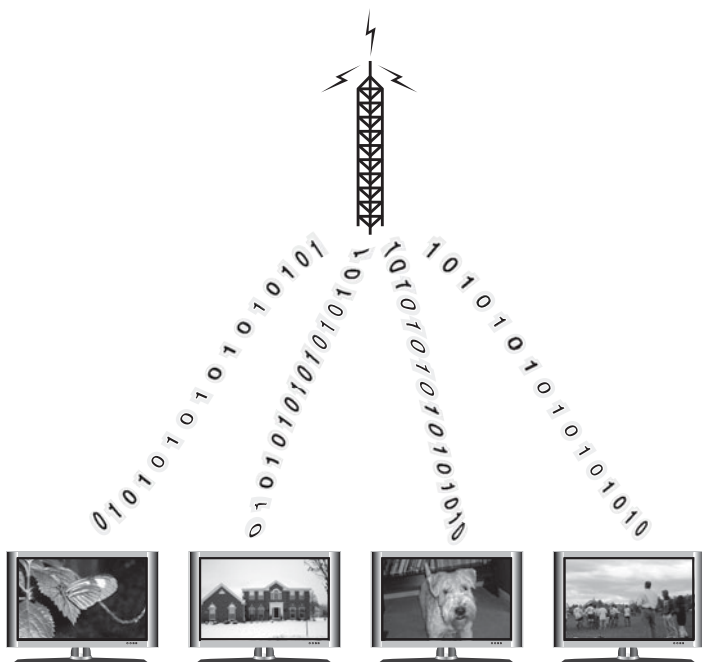
So say goodbye to fuzzy and grainy pictures, snow in the background, and ghost images. A digital signal doesn't fade or get noisy; it's crystal clear from start to finish. And there are no ghosts; a digital tuner is incapable of receiving the multiple signals that produce ghost images on analog TVs.

Digital sound is also superior to analog sound. The bandwidth is wider, the frequency response is better, and the noise is lower. In fact, there's enough bandwidth for stations to offer much of their programming in Dolby Digital surround sound—something that's just not possible with analog broadcasts.

Digital TV Means More Channels

Because digital broadcasting is more efficient than analog broadcasting, there's room for local stations to offer more programming channels over the same bandwidth. The result is something called *multicasting*—offering multiple subchannels in the space of a single channel.

Each available subchannel can carry a complete high-definition program, a standard-definition program (in digital format), or specific data streams. Therefore, broadcasters can offer a variety of special data services over their digital channels, in addition to their normal programming.



DTV enables multicasting of multiple subchannels.

For example, a station might offer HDTV programming on one subchannel, a standard-definition version of that programming on a second subchannel, completely different programming on a third subchannel, and a local news or weather feed on a fourth subchannel. That's a lot more programming than the current single channel you're used to!

NOTE

Broadcasters don't have unlimited digital bandwidth, which means they have to pick and choose how many subchannels they offer—and what kinds of programming go on each subchannel. For example, don't expect multiple HDTV subchannels; you'll typically find one subchannel with high-definition programming, while the other subchannels offer standard-definition programming.

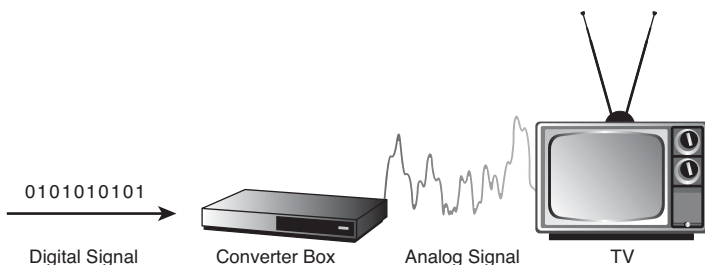
What You Need to Watch Digital TV

It's simple. To receive DTV broadcasts, you need a TV tuner capable of receiving digital signals.

Most older TVs, unfortunately, do not have digital tuners. Tuners in older sets can only receive current analog broadcasts, on traditional channels 2 to 68.

TVs sold in the past year or so, however, have to include digital tuners. This type of tuner is completely ready for the new digital broadcasts; all you have to do is punch in the right channel numbers for the digital program you want to watch.

If you have an older TV with an analog tuner, you can also receive digital transmissions by using a digital-to-analog converter box. This piece of equipment contains its own digital tuner to receive digital signals; the digital signals are then converted to analog signals and fed to your TV's analog tuner. You connect the input of the converter box to your antenna and the output to the input of your television set. You then turn your TV to channel 3 or 4 (depending on the box) and leave it there. You change channels using the tuner in the converter box.



Use a digital-to-analog converter box to receive digital signals on an older TV.

NOTE Learn more about using a converter box in Chapter 6, "Connecting a Digital Converter Box."

What Can You Watch in Digital?

Of course, one of the big questions concerning DTV is what programming is available—or will be available. After all, why purchase a digital TV if there's nothing much to watch?

The good news is, come February 2009, nearly every program on every channel will be broadcast in crystal-clear digital format. That's right, after February 17, all full-power television stations are required by law to broadcast all their programming in digital (and, of course, to cease analog transmissions). So when the digital TV transition occurs, any program you might want to watch will be digital.

Before the transition date, stations are encouraged but not necessarily required to begin digital transmission. In reality, most larger television stations in most major cities are already broadcasting a full slate of digital programming. So, for example, if you live in a city such as Chicago or Minneapolis or even Des Moines, you should be able to receive digital signals from all the local stations affiliated with the major broadcast networks.

Therefore, all your favorite programs, from *CSI* to *Lost* to *American Idol*, should be able to be received by any TV that has a built-in digital tuner. Just switch to the digital channel number (as specified by the local station) and you should be able to tune in all major programs.

So, there are already plenty of programs to watch in digital—with lots more coming by February!

NOTE If you receive your programming via cable or satellite, everything you watch is already all digital—including both local and network programs.

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