Chapter 1

What the Heck Is HDTV?

In This Chapter

- Understanding the acronyms
- Going wide
- Avoiding the pitfalls

Since the transition to color TV in the 1950s and '60s, nothing — nothing!! — has had as much impact on the TV world as HDTV (high-definition TV) and digital TV. That's right, TV is going digital, following in the footsteps of, well, everything.

We're in the early days of this transition — a lot of TV programming is still all-analog, for example — and this stage of the game can be confusing. In this chapter, we alleviate HDTV anxiety by telling you what you need to know about HDTV, ATSC, DTV, and a bunch of other acronyms and tech terms. We also tell you *why* you'd want to know these terms and concepts — how great HDTV is, and what an improvement it is over today's analog TV (as you'll see when you tune in to HDTV). Finally, we guide you through the confusing back alleys of HDTV and digital TV — making sure you know what's HDTV and what's not.

Oh, Say, Can You ATSC?

A long time ago (over 50 years ago — longer than even Danny has been alive!), in a galaxy far, far . . . errr, actually right here in the U.S. . . . a group called the *NTSC* (National Television System Committee) put together a group of technical specifications and standards that define television as we know it today. Sure, there have been some changes in those 50 years (such as the addition of color), but today's analog TVs are built on this NTSC system.

Fifty years is a long time for any technology to dominate. Indeed, technologies and components used in television-transmission

systems, cameras, recording systems, and display systems (the TVs themselves) have long been capable of doing something more.

In the 1980s, the *ATSC* (Advanced Television System Committee) was formed to move TV forward. Many years later (1996), the ATSC's recommendations for a digital-television system were adopted by the FCC (Federal Communications Commission — the folks who set standards for TV broadcasts, regulate phone companies, and fine Howard Stern). ATSC standards use newer-than-1953 technology to give you TV like you've never had before:

- Widescreen images like those in the movies
- Greater detail — up to six times more detail
- Sharper images
- Smoother, more filmlike images with no video flicker
- All digital, with none of the "ghosts" and other image problems found in analog TV

Powerful Performance

HDTV (and digital TV, DTV, in general — there are some digital TV variants that are *not* high-definition, and we discuss them in this section) is all about giving you a bigger and better picture, better audio, and generally making your TV-watching experience more like a movie-watching experience. In fact, at its best, HDTV is so realistic that it's often described as "looking through a window" — as if you're really there, not just watching a program.

Video standards

There are three essential concepts to understand when you are comparing different video standards:

- **Resolution:** the number of individual picture elements that make up a TV image. The higher the resolution, the more detailed the image, and the sharper the image will appear.

  Resolution is defined by one of two factors:

  - *Lines* (the number of left-to-right lines the TV can display). CRT-based TVs (tube TVs) are rated this way.
  - *Pixels* (the number of pixels across the screen times the number up and down). Fixed-pixel displays (plasmas, LCDs, DLPs and the like) are rated this way.

- **Scan Type** comes in two forms:
  - *Interlaced scan: The*se TV images are created by lighting up every other row of horizontal lines on the screen in one instant, and then going back through and lighting up the remainder of the lines in the next instant. It happens so fast that your eye can't really tell it's happening.
  - *Progressive scan:* These systems light all the horizontal lines in the same instant, which can make the image seem "smoother" and more like film (or real life).
- **Aspect Ratio** (the *shape* of your TV picture):
  - Traditional TVs have a 4:3 *aspect ratio* (screen shape). This means that for every 4 units of measure across the screen, you have 3 units of screen height. For example, if the screen is 12 inches wide, it will be 9 inches high.
  - HDTVs have a 16:9 aspect ratio — which makes the screen relatively much wider for the same height, compared to a 4:3 TV. Most movies are widescreen (16:9, or even wider), so HDTVs can display most movies without the annoying "letterbox" black bars on the top and bottom of the screen. Figure 1-1 compares aspect ratios.

Figure 1-1: Going widescreen with a 16:9 aspect ratio.

We don't get bogged down in up-front technical explanations of these concepts. If you want to know all there is to know about such TV concepts as resolution, pixels, and interlacing, run (don't walk) to Chapter 21 right now. We'll still be here when you come back.

HDTV standards

There isn't a single "HDTV" standard out there. Instead, ATSC contains many different TV standards (with different resolutions, aspect ratios, and scan types) — 18, in fact. Some of these standards are truly HDTV; most are not. In the real world, you will deal with four standards when you try to watch TV content on your HDTV. The two primary HDTV standards are these:

- **720p:** This provides 720 lines of resolution with progressive scan (hence the *p*). By comparison, NTSC has less than 480 lines of resolution. 720p uses a 16:9, a widescreen aspect ratio.

- **1080i:** This variant (the highest resolution within the ATSC standard) uses interlaced scanning, but provides 1080 lines of resolution. 1080i is also widescreen, with a 16:9 aspect ratio.

There is actually a higher HDTV variant in the ATSC standard — 1080p, which is a progressive scan variant of 1080i. Only a few HDTV projectors (in the $40,000 and above price range) can handle this variant, and we know of *no* material that is broadcast or otherwise available as 1080p. So don't worry about it.

True HDTV performance requires at least 720p performance. If a TV program, movie, or other content is not at least 720p (either 720p or 1080i), it is *not* HDTV. If a TV can't display at least 720 lines of resolution, it is *not* HDTV-capable.

If a salesperson tries to tell you that an inexpensive plasma set, regular DVD, regular digital cable, or regular satellite TV "is" HDTV just because it's *digital,* it's not so.

Compatible DTV standards

720p and 1080i are the two HDTV standards, but you'll also find a lot of digital TV material will be broadcast at lower resolutions that don't quite make the grade as HDTV. You can still watch this programming on your HDTV — in fact, most HDTVs will make this programming look better than it does on a regular TV — but remember: That stuff *is not* really HDTV.

- **480p (EDTV):** This *enhanced-definition* TV standard provides higher-than-NTSC resolution, with progressive scan (NTSC is interlaced). EDTV can be (and often is) 16:9 widescreen, but it is not required to be widescreen.
- **480i (SDTV):** This is interlaced, non-widescreen (4:3), standard-definition TV, equivalent to NTSC analog broadcasts.

Remember these different terms — HDTV, EDTV, and SDTV — when shopping. They will often be in the product descriptions; you need to know exactly what you are buying.

Audio standards

The ATSC standard includes big improvements in the audio part of television — what you hear as part of any movie, video, or TV show. That's because ATSC includes Dolby Digital surround sound capability in the overall standard for digital TV.

Dolby Digital (which we discuss in greater detail in Chapter 18) doesn't *always* mean surround sound. Some Dolby Digital soundtracks are stereo (two channels) or even mono (one channel). ATSC supports surround sound if a program's producer and broadcaster want to include it.

The NTSC broadcast standard supports only stereo audio (two channels) and not surround sound. Luckily, most DVDs (and some satellite and digital cable TV channels) include Dolby Digital soundtracks that can provide true surround sound. You can also use a home-theater receiver that supports systems like Dolby Pro Logic II (see Chapter 18) to create surround sound from these sources.

Dolby Digital, and surround sound in general, provides an audio soundtrack for TV shows and movies that — wait for it! — *surrounds* you and provides audio that matches the action on-screen. For example, surround sound might use speakers mounted in the rear of the room to reproduce ambient noises of the setting around the action, or give a 3D sense of space to those creepy footfalls of the bad guy sneaking up behind the protagonist.

Dolby Digital provides six channels (confusingly called *5.1)* of audio. Here's what they do:

- A center channel carries the dialogue being spoken by characters on your HDTV screen.
- Two main front channels handle left and right sound cues (and the soundtrack music) in stereo.
- Two surround channels (mounted in the rear of the room, as described earlier) provide a sense of 3D space.
- A Low-Frequency Effects (LFE) channel conveys deep bass sounds (such as exhausts rumbling and bombs exploding). The LFE channel is the ".1" in the 5.1 naming scheme for Dolby Digital. It doesn't get a whole number because it contains only low-frequency sounds, not the full range of human hearing.

Figure 1-2 shows a typical Dolby Digital surround-sound layout.

We talk about surround sound in much more detail — including details on what sort of equipment you need to hear it properly in your HDTV viewing room — in Chapter 19.

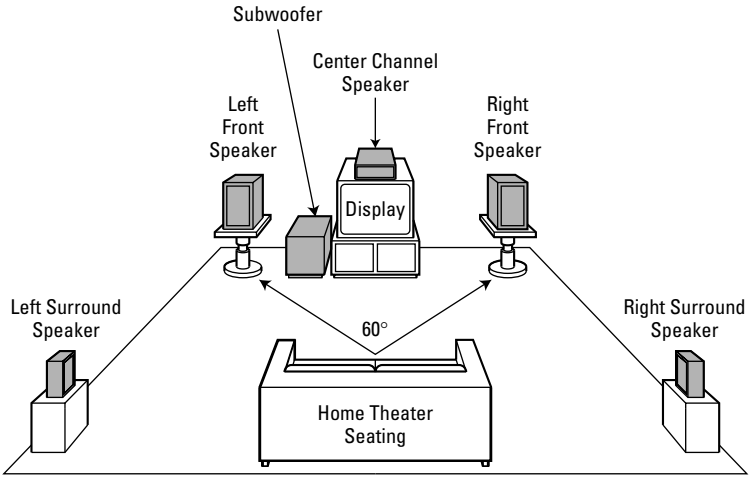

Figure 1-2: Doing the surround-sound thing.

Perplexing Pitfalls

HDTV isn't the easiest thing in the world to get figured out — we've been dealing with it for years and still run into advertising and marketing mumbo-jumbo that make us say, "Huh???" The whole purpose of *HDTV For Dummies* is to help you wade through the marketing manure and to get you up to speed on HDTV. So without further ado, here's a list of HDTV danger zones:

- **Digital confusion:** The biggest (and most prevalent) myth we see in the HDTV world is the notion that any kind of digital TV signal (such as digital cable, digital satellite, or DVD) is HDTV. This simply isn't true — a TV signal must be 720p resolution or higher to be considered high-definition.
- **EDTV confusion:** EDTVs are TVs (typically plasma flat-panel models) that cost a lot and can display progressive-scan images — but don't meet the minimum requirement of 720p, so they don't display true HDTV signals. There's nothing wrong with EDTVs, just don't be fooled into thinking you're getting an HDTV when you're not.
- **Image scaling:** We're starting to see some new marketing being applied to an old concept — *image scalers* that can convert video signals from one resolution to another.

These devices are now being marketed as "HDTV upscalers" (yeah right), with a promise that they make any TV signal into HDTV. Don't believe it. Image scalers *can* improve SDTV and NTSC images with an HDTV, but they don't make those images *into* HDTV images.

- **The DTV tuner:** As HDTV (and DTV in general) becomes more prevalent, *DTV tuners* will become common. These tuners (discussed in Chapter 8) let older TVs "watch" DTV broadcasts. DTV tuners do *not* turn older analog TVs into HDTVs. They just convert DTV signals to NTSC for display on an analog TV.