Questions abound as more consumers than ever shop for high-definition TVs

by Jonathan Sidener

Market researchers expect that more digital TVs than analog will be sold this year, and the weeks leading up to Christmas and the Super Bowl are the peak of the TV shopping season. That means there are more people than ever trying to figure out the complicated transition from analog to digital TV, a world filled with acronyms, engineering numbers and new accessories.

HDTV 101 - Shopping for an HDTV requires research, but the installation of a new flat-panel TV can be turned over to the pros. Best Buy installers Benjamin Berkey, right, and Jordan Taylor hoist a 40-inch LCD in a San Diego home. CNS Photo by John Gibbins. -- Wait. First you were talking about HDTV, then digital TV. Are they the same?Digital TV and HDTV are related, but different. Let's start with digital TV. In the past, TV signals were transmitted as a series of squiggly radio waves. With digital TV, the signal is encoded as a series of zeros and ones. It's a different technology that requires digital hardware to decode the signal.

For a number of reasons that have nothing to do with picture quality, Congress has mandated that TV stations switch from analog to digital signals by Feb. 17, 2009. To receive the digital signals, consumers will need either a digital TV, a converter box or a digital cable or satellite subscription.

HDTV is a category of digital TVs capable of displaying a high number of details known as pixels -- picture elements. Pixels are scanned onto the screen as horizontal lines, and so a TV's resolution is measured by its number of horizontal lines.HDTVs, by definition, are those capable of displaying between 720 and 1,080 horizontal lines of information. This is a significant improvement in the amount of detail in the images over standard definition TV, which has as many as 480 lines.

-- OK. But what about plasma? Plasma is one form of digital TV. Some are HDTV, and some aren't. Some digital TVs -- primarily less-expensive plasma and LCD flat screens -- display fewer than 720 lines. These are considered enhanced-definition TV, or EDTV.

-- So is 1,080 better than 720? And what's the 1080p that all the ads talk about?This part gets more complicated. HDTV is more than the number of lines on a screen. It also takes into account how those lines are scanned onto the screen.

Traditional TV uses a little trick to display images. The picture tube first scans all the odd-numbered lines onto the screen and then goes back and scans the even lines. The practice, called interlacing, is barely perceptible. Digital TVs are capable of scanning the lines consecutively. This method, called a progressive scan, creates a smoother image.

By definition, HDTV images are a minimum of 720 lines progressively scanned (720p), or 1,080 interlaced lines (1080i). Many HDTV enthusiasts consider 720p to be a better image than 1080i.

A new version of HDTV, 1080p, is technically superior to either of the original display formats. But there's

currently no TV content produced in 1080p. The emerging technologies of Blu-Ray and HD-DVD offer movies in 1080p, but only for people who buy the new high-definition movie players.

-- Do I need cable or satellite TV to get HDTV? What about DVD?There are three ways to get HDTV: cable, satellite or antenna. For cable and satellite, you'll probably need additional hardware. Digital cable ready HDTVs can work without a set-top box, using a decoder "CableCard" that fits into a slot in the TV. The cards, provided by cable companies, typically cost less than high-definition set-top receivers, also rented from cable companies.

CableCards have advantages and disadvantages. Video may look better because the signal is decoded in the TV, eliminating any degradation that occurs between a set-top box and the TV. But the cards aren't capable of two-way communication with a cable operator, so they can't provide services such as pay-per-view.

A third option is to get free over-the-air signals, using an antenna. As of March 1, all TVs 25 inches or larger were required to include an HDTV tuner and be capable of receiving free signals if connected to an antenna. Hills can make over-the-air reception difficult, so this won't be a viable alternative for everyone.

A significant number of HDTV owners never connect to an HDTV source, and only use their digital display for improved DVD viewing. DVDs aren't high-definition, but can be progressively scanned on an HDTV. They'll look better displayed at 480p on a digital TV than at 480i on an analog TV.

-- I keep hearing about DLP. What's that?There are four types of HDTVs: direct view, rear projection, front projection and flat panel. Direct view is the digital version of the good old CRT picture tube. These are the least-expensive type of HDTV. They have extremely high-quality pictures. On the downside, they're bulky, heavy and are only available in sizes up to 34 inches.

Projection TVs, front and rear, are the second-least expensive versions of the new TVs, although front projectors are most often used in custom home theaters that can easily cost tens of thousands of dollars for the whole setup. Rear-projection TVs use lenses and mirrors to display a large image from behind a screen. CRT projectors are used in the least-expensive projection TVs. They're big, heavy and can't produce very bright images.

Other projector technologies are called microdisplays. They use various tiny electronic devices to control bright light sources. DLP from Texas Instruments is one of these microdisplay technologies. It uses more than 1 million microscopic mirrors to control the pixels.

Other technologies include LCD and liquid crystal on silicon to control the projected image.

Flat panels -- plasma and LCD -- are the thinnest and lightest of the HDTVs. Plasma is generally the most expensive of the new TVs, but prices have dropped and it remains the top-selling big-screen HDTV. LCDs are the most popular choice for HDTVs smaller than 32 inches, but larger models can be more expensive than plasma. In flat-panel TVs between 37 and 42 inches, plasma and LCD are competitive in price and picture quality.

-- Some TVs have HDMI. Is that important?High-Definition Multimedia Interface is a digital technology to connect the TV to devices such as cable set-top boxes, game systems and DVD players. Older systems such as component video use analog cables to move the signal from the set-top box to the TV. The digital HDMI signal is never converted to analog, so it's capable of producing a better image.

As more systems such as the Sony PlayStation 3, Blu-Ray and HD-DVD HD movie players include HDMI outputs, an HDMI connection on the TV will become more important. For most people, it won't be of immediate use with most gadgets in the entertainment center, including older HDTV cable boxes.

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