Television: An Information Appliance

In the fall of 1938, IBEW International Representative S. J. Cristiano was on hand at the Kolorama Laboratories in Irvington, N.J., to witness one of the first practical demonstrations of the household appliance we know today as television. He compared this budding technology to watching theatrical movies at home and noted that the major advantage of television is that the viewer can see events as they are happening.

When Brother Cristiano asked Kolorama officials why the television was not yet available to the public, he was informed that television standards, transmission frequencies, bandwidths, definition, field frequencies and economic factors were standing in the way. The total costs of establishing enough television stations and hooking them up nationwide through a co-axial cable system would be greater than any return possible from the investment. In short, TV was thought to be economically impossible. But the next year the National Broadcasting Company (NBC) featured a live telecast of President Franklin Delano Roosevelt opening the 1939 World's Fair in New York City and a culture was born.

Since that time, television has become a way of life for almost all North American households. As we near a new century, the emergence of digital television (DTV) and high-definition television (HDTV) are bringing a whole new level of clarity and redefining the term "picture-perfect" at the same time that television and the Internet are converging. Although DTV and HDTV are two different technologies within the broadcast industry, "digital" will be used in this article to explain the expanding television technology in the broadcast industry.

Digital TV Comes of Age

The U.S. broadcast industry currently utilizes analog signals, but the move is on to convert all stations simultaneously to digital signals and high-definition pictures. The National Association of Broadcasters reports that 66 television stations, reaching nearly 50 percent of all U.S. households, are now delivering free, over-the-air digital signals. It is estimated that by the end of 1999, network stations in the top 30 markets will be delivering digital signals reaching over 60 percent of all television households. By 2006, broadcasters must relinquish extra spectrum and broadcast only digital.

Digital will not afford U.S. broadcasters the option to expand the size of their signal. Rather, they will have to squeeze more picture detail in the same bandwidth they used for analog television. Analog signals cannot be compressed as well as a digital signals.

Television images are made up of small rectangular dots called pixels (Picture Element), which is the smallest resolvable rectangular area of an image. The more pixels in a given area, the better the picture on the screen.

The old National Television Standards Committee (NTSC) format uses rectangular pixels that are slightly taller than they are wide. The new HDTV format is composed of square pixels, just like those on computer monitors. This will remove some of the image distortion seen on older televisions. Digital pixels are also smaller. In the area taken up by a single pixel on a standard NTSC TV, digital televisions will have four and a half pixels.

Digital TV broadcasts are streams of bits that can contain any data broadcasters may wish to add to their signal. While most of the data will be video and audio, some of the signal will contain other forms of data. This could include a network connection that sends pictures, sounds, multimedia games and illustrated articles. Viewers will still be able to passively watch TV, but digital television will also allow viewers to customize a program as interactive television takes center stage.

HDTV—High Definition Televison

The original impetus for HDTV came from wide-screen movies. Soon after wide-screen was introduced, movie producers discovered that individuals seated in the first few rows enjoyed a level of participation in the action not possible with conventional movies. Evidently, having the screen occupy a great field of view (especially peripherally) significantly increases the sense of "being there." Interest began to build in developing a HDTV system for commercial broadcasting. Such a system offers a higher-resolution picture, a wider picture and enhanced digital audio that will allow for a realistic surround sound.

Interactive Television

There's a waiting market for a convergent media experience. Two recent surveys revealed that nearly 40 million viewers are surfing the Internet while a television is on in the same room. It is estimated that 72.6 million Americans—35 percent of the population—are already online and that 50 percent have a personal computer.

In the 1980s, interactive television was tested in a few select markets. Subscribers to their services could shop online, play games with people in other parts of town, and utilize a host of services courtesy of interactive television. The only problem was that these experiments used an external network connection that ran up the price of the service. Digital TV imbeds interactivity inside the broadcast.

You will be able to pay a bill, access banking information, shop for groceries and make an appointment with your doctor or dentist all at the touch of your fingertips. Such is the technology of interactive television. In addition to the computer, the telephone is also being configured into the interactive technology mix. So-called "third-generation" cellular telephones combine the digital quality of a computer image married with wireless telephone technology. The result is a "telephony" that lets one see and identify the caller among its capabilities.

A major Internet Service Provider (ISP) is taking steps to offer an integrated television system via satellite. The plan will allow viewers of TV shows access to the ISP service. The Internet access will be through a traditional dial-up modem, while the TV signal will be beamed by satellite.

Corporate communications giants like AT&T are positioning themselves to take advantage of the burgeoning technology in an effort to provide accelerated deployment of local telephone service and advanced telephone and video services for its customers. AT&T is the world's premier provider of voice and data communications, with more than 80 million customers. Other corporate giants are embracing the Internet/television convergence.

IBEW and the Digital Future

When Brother Cristiano recorded his thoughts for the *IBEW Journal*, he no doubt envisioned that the Brotherhood would play a huge role in the development of this exciting technology. The December 1948 *IBEW Journal* detailed the number of members who work behind the scenes on studio and remote camera crews; operating the cameras' switching gears; repairing the intricate devices and equipment in the studio; picking up the sound via the "mike booms" and monitoring the master controls.

As digital TV ushers in the era of information-based technology, we can expect to see expanded opportunities for the electrical industry. This will call for a new and different training to meet the demands of the latest technology. IBEW President J.J. Barry recently lauded the National Joint Apprentice Training Committee (NJATC) for developing and registering apprenticeship standards for the voice, data, and video industry. The new three-year, Telecommunications Installer/Technician Program will equip IBEW members to work with a wide array of low-voltage, information-based devices that characterize this era of converging digital technologies.

We can also expect a strong increase in communication capabilities. Despite the growing popularity of the Internet, computer technology remains out of the reach of many working families. Putting the power of the Internet into the television set will open the technology to an even bigger audience. The potential use of telecommunications for unions in organizing, public relations, member communications and the like are limitless.

STANDARDS COMPARISON TABLE

	NTSC	NDTV (ATSC)*
Sound	2 Channels (Stereo)	5.1 Channels (Surround)
Aspect Ratio	4 x 3	16 x 9
Max. Resolution	720 x 486	1920 x 1080

**The Advanced Television Systems Committee (ATSC) was established to set voluntary technical standards for advanced television systems, including digital high-definition television (HDTV).*