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Going All Digital

12 Things You Need to Know — Part 1

By Gerhard Franz

Converting an analog cable system to digital TV may seem like a daunting task. From my experience working with a number of independent cable system operators, I have compiled a list of 12 things that can help make this transition a profitable investment. This list is by no means the complete guide or a textbook; rather, the intent is to make you aware of the major issues that you will encounter in upgrading your system to digital.

1. **Bandwidth**: The biggest difference between analog and digital is the use of bandwidth. In North America we use 6 MHz channels on a predefined frequency grid to transport video from the headend to the subscriber. In the analog world, one channel equals one program. So, depending on the bandwidth of your plant, 330 MHz, 450 MHz, etc. you were able to transport a certain number of programs. In digital, this relationship is no longer true. One 6MHz channel can carry anywhere from 2 - 8 digital programs and it is up to the operator to design the system accordingly.

2. **Transport Stream**: This is the basic vehicle in transporting digital video. It is a stream of bits with a standard format called MPEG. Simply put, the transport streams break down into packets of video data and header information that include the name of the program and related information identifying the data. One transport stream can contain multiple programs, or services, multiplexed together.

3. **Multiplexing**: Digital video data is transported using a time-domain multiplexing rather than the frequency domain multiplexing of the analog systems.

4. **Modulation**: Digital data needs to be transported over the same RF network as the analog data. To do this, the individual bits are represented by phases in the RF signal. The process of modifying an RF signal of a given frequency to carry the digital data is called modulation and the method described here is called QAM (quadrature amplitude modulation). 64 QAM means there are 64 unique states representing several bits of data, 256 QAM = 256 states, etc.

5. **Encoding**: The process of generating digital video data from analog sources is called encoding. The most widely used method, or codec, is MPEG-2. A more efficient codec is MPEG-4, meaning that fewer bits are required to capture a video image, resulting in a lower data rate per program and thus more programs per 6 MHz channel.

We will review #6-12 in Part 2 next month. ❑

About the Author

Dr. Gerhard Franz, CEO of Blankom USA, has over 25 years of global experience in the telecommunications, aerospace and electronics industries. He received his PhD in Electrical Engineering from the Technical University of Vienna, Austria, and his Executive MBA from Rutgers University. He is a senior member of the Institute of Electrical and Electronics Engineers (IEEE) and a member of the Society of Cable Telecommunications Engineers (SCTE). Dr. Franz is the author of several technical papers and business articles and holds two patents.