

A Look at the Development of the Digital Cable Network Interface Standard

By David Broberg, © March 11, 2001

In the past, one of the things that made it impossible to build a digital television that would be compatible with digital cable services across the United States was the lack of consistent standards for the cable plant. Some digital plants use 64 QAM signals, while others used 256 QAM. In addition, signal levels and many other system parameters varied from one cable plant to the next. With thousands of separate cable plants and dozens of different operators, the approach was not always consistent. This was no problem with the use of leased set-top boxes that were fully under the control of the cable operator since they were specifically matched to a given system. With the demand for retail availability of the set-top boxes, came the requirement that a single receiver must be able to work on any system. The challenge was to capture all the variables across all the systems into a single standard that if followed, allows full interoperability. The process over the past two years to standardize the variety of signal parameters has been fraught with techno-politics and competing interests, but has finally been realized in the SCTE DVS/313 Digital Cable Network Interface Standard.

As part of the CableLabs® OpenCable™ project, the first attempt at consolidating all the variables of the digital cable systems across the country into a single specification was released in October 1999 as the "OCI-N" specification. This standard was the result of many meetings and long hours of discussions among the cable operators deploying digital systems in North America. While most of the primary signals were common among all, cable operators often made different choices for operating levels, frequencies or other parameters. There are also other network differences between the two incumbent system suppliers (Scientific Atlanta and General Instrument - now Motorola) that had to be reconciled. Much of the hard work was done within this OpenCable process to create a specification that would capture all the parameters used between all the variations of the two dominant systems. One objective of this process was to obtain a specification that would not obsolete any of the already deployed millions of digital set-top boxes, while at the same time capture all the possible variations so a new box could be built that was compatible anywhere. In the end the specification ended up as mostly a superset of the two primary systems approaches, but also included some compromises and some new requirements that would be necessary to support the retail availability of navigation devices (set-top boxes).

Once the OpenCable specification was made public, the consumer electronics industry, through the Consumer Electronics Association (CEA), objected to the FCC on several of the chosen parameters. The CEA argued that some of these parameters would burden the compatible receivers with unnecessary cost and complexity, suggesting that making some changes on the

plant might allow for simpler or lower cost receivers. The FCC didn't care much for the lack of consensus and demanded that a joint technical agreement be voluntarily negotiated between the two industries right away, or they would risk FCC regulatory action to settle the dispute, which would likely be painful for both sides.

Over the course of several months, delegates from both CEA and CableLabs met on a weekly basis to hammer out what finally became the "Joint Technical Agreement." This document included the conclusions and compromises of the joint process over all the disputed parameters, but was not intended to be a comprehensive specification. This document was submitted to the FCC in late February 2000 as the conclusion of the dispute over certain technical parameters defined by the OpenCable Network Interface Specification (OCI-N).

The changes reflected in the agreement were folded back into a new release of the OpenCable specification, which was submitted in March 2000 to the SCTE Digital Video Subcommittee (DVS) for standardization as DVS/313. Through the open industry standards process, there were eventually two separate ballots on the standard, both of which passed with more than an 80% margin. The hard part turned out to be the reconciliation of the 169 separate comments that were received over both ballots.

A series of drafting group meetings was held from June 2000 through early March 2001 to reconcile these comments. By March all of the comments from the second ballot were either withdrawn by their authors or addressed by minor editorial changes to the document so no further re-ballot was necessary. By the time this story reaches print, a new version, number 4 – of DVS/313 should be published and on its way with a recommendation for final approval as an American National Standards Institute (ANSI) standard. The resulting standard collectively defines all the signal characteristics of the network interface between digital cable television plants and consumer equipment used to access multi-channel television programming. Next month we will examine some of the specific requirements of this specification and what has changed since the original OpenCable version.