### Broadcasters' Information About DTV Captions

If you are a broadcaster, the DTV systems you put in place will provide virtually everything you need. We suggest the addition of a caption transcoder that can accept or recover Line 21 captions and insert them as DTV captions. The only additional piece you may need is a caption transcoder that can accept or recover Line 21 captions and insert them as DTV captions in your DTV signal. Transcoders are available from several different manufacturers of caption encoding equipment. VITAC will be pleased to provide you with the list of manufacturers.

VITAC strongly recommends that you set up a DTV caption decoder and monitor so that you know the captions are fine leaving your transmitter. We are prepared to monitor the technology to ensure a smooth captioning transition for your programs. Our engineers are available to consult with you at no charge when you are installing or testing DTV equipment.

### What to do about DTV Captions?

Analog TV uses Line 21, a portion of the video signal, to carry caption data, but Digital TV has no equivalent part of the signal to carry captions. In a digital TV signal, captions are just another data set that must be delivered to consumers' TV sets along with video and audio.

The standard that was developed by the TV and captioning industries, working together, to deliver closed captions in DTV is called EIA-708. (EIA is the Electronic Industries Association, a national industry group that has written many standards.)

EIA-708 provides a way for caption data to be transmitted in a timely manner with a television signal. It also specifies how captions can be displayed. It offers many improvements over analog TV captioning, including:

- · Captions in many languages simultaneously
- · Captions have easier to read viewer selectable fonts
- · Consumer control over the size of the captions as well as background and foreground colors
- · Support of complete universal character sets

With EIA-708, captions can be transmitted that will work on DTV receivers – both Standard Definition (SD) and High Definition (HD), and on all analog receivers with a converter box. V equipment.



# History of DTV Captioning

When Line 21 closed captioning was introduced in 1980, it was based on the video and computer technologies of the mid-1970's. Due to the expense of computer memory, PBS developed a system for displaying closed captions. This system was limited in that it could use only 64 predetermined screen locations to begin a new caption. The font display had to be monospaced, always with 32 characters per row. The character set was also very limited, and did not include all the characters needed for French for Spanish captioning (both of which languages are used regularly in North American broadcasts).

Some of the technical specifications of Line 21 were addressed when the FCC issued its first rulemaking requiring decoders to be built into every TV set. When Congress passed the TV Decoder Circuitry Act of 1990, the Electronic Industries Association (EIA) created the Television Data Systems Subcommittee (TDSS, also known as the R-4.3) to address the lack of standards for Line 21, to ensure that new decoders would all work the same way and that captioners could create captions that would appear in a consistent manner on every TV set. During its deliberations, the TDSS decided to enhance the Line 21 system by adding a few new characters and assigning codes that would allow the center of the screen to be used for the first time, and to allow roll-up captions, for the first time enabling real-time captions to be placed somewhere other than the bottom of the screen.

The EIA took the work of the TDSS and approved it as a standard, naming it EIA-608. The FCC adopted all the recommendations of the EIA, and all TV receivers (13 inches or larger) built from July 1993 forward were required to meet the EIA-608 standard, and captioning software was developed to comply with EIA-608.

With that effort behind it, the TDSS assigned itself the task of looking ahead to DTV. In the course of its work, the TDSS commissioned Dr. Carl Jensema, a deaf man who is vice president of the Institute for Disabilities Research and Training (IDRT), to research the desires of deaf consumers. The most frequently requested improvement was the ability to change the size of the caption display either to make captions larger or smaller. There was no way to accommodate this desire in EIA-608.

It was at this time that DTV was developed. The TDSS created a Working Group that still exists today to debate and create a new standard for enhanced captioning features. This standard, which VITAC helped to write, is called EIA-708, and the current version EIA-708-B. EIA-708-B covers two important areas. First, it defines how caption data is to be encoded and transmitted. Secondly, it monitors the display protocol, determining how captions appear on a DTV screen.

Because some consumers will want to receive DTV signals but display them on their old NTSC (analog) TV sets, DTV can deliver Line 21 caption data in a 708 format. This data has all the same features and limitations of 608 data, including the speed at which it is delivered to the consumer's equipment.

Most of the first consumer DTV receivers were, in fact, set-top boxes that received a DTV signal and converted it to NTSC. This converted signal must have captions in 608 format on Line 21, assuming that the program has been captioned.

For consumers with full DTV receivers and screens, the captions they get can be either 608 captions replicated in 708 format, or they can be captions originally created using the 708 display specification.

The 708 format was designed to allow use of the entire Unicode set, which includes virtually every character in every alphabet in the world, plus the complete range of symbols, thus making 708 useful for subtitling or captioning almost every program, regardless of subject matter. Second, the decoder manufacturers can design any set they wish, so consumers can have a choice in product selection. The fonts can be proportionally spaced, so they are more readable. The third enhancement, resizing is a feature sometimes called a caption "volume control," because the consumer can make the display larger or smaller. The font colors can also be changed. Conceivably, the consumer can also relocate the caption if they feel it's blocking something they want to see.





Today, DTV captions are identical to captions created for analog TV (Line 21), because the analog captioning system is the "lowest common denominator" of captioning. Any caption created for analog decoders will work in a DTV environment, but the opposite is not true. If VITAC creates captions for DTV, those same probably will not work on an analog decoder. That would mean VITAC would have to create two sets of captions for each program.

VITAC currently creates captions using EIA-608 standards and upconverts them to EIA-708 for DTV usage. VITAC is prepared to create EIA-708 captions when necessary. VITAC's captioning deliverables are compatible with all known upconversion systems.

For more on the technical requirements of DTV captioning, VITAC recommends reading the DTV Access Brief prepared by the National Center on Accessible Media in cooperation with the Corporation for Public Broadcasting.

http://www.broadcastpapers.com/data/NCAMDTVCaptions01.htm



### **DTV Captioning Regulations**

The Decoder Circuitry Act of 1990, allowed Congress to recognize that new technologies might someday be developed, and the Act required the FCC to update its rules for decoders as new technologies appeared. Current FCC rules (Part 15 of the FCC Code, Section 15.122, entitled "Closed caption decoder requirements for digital television receivers and converter boxes") require caption decoders in all DTV receivers and tuners, with or without screens (meaning set-top boxes are also included) built after July 1, 2002.

#### The rules read as follows:

"Digital television receivers and tuners must be capable of decoding closed captioning information that is delivered pursuant to the industry standard EIA-708-B, "Digital Television (DTV) Closed Captioning," Electronics (sic) Industries Association (1999).... Digital television manufacturers may wish to view EIA-708-B in its entirety. Copies of EIA-708-B may be obtained from: Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704, http://www.global.ihs.com".

This section is important not only to TV manufacturers, but also to TV networks and program producers. In its separate ruling mandating the provision of closed captioning services, the Commission states the following definition of "pre-rule programming:"

"Video programming first published or exhibited for display on television receivers equipped for display of digital transmissions or formatted for such transmission and exhibition prior to the date on which such television receivers must, by Commission rule, be equipped with built-in decoder circuitry designed to display closed-captioned digital television transmissions."

In other words, the same rules that mandate captioning of NTSC programming now apply to DTV programming. Only those programs first published specifically for DTV transmissions prior to July 1, 2002, can be considered "pre-rule programming," and receive the limited exemptions available for such programming. Currently, according to the FCC rules, "30% of the programming distributor's pre-rule nonexempt video programming being distributed and exhibited on each channel during each calendar quarter must be provided with closed captioning," and "As of January 1, 2008, and thereafter, 75% of the programming distributor's pre-rule nonexempt video programming being distributed on each channel during each calendar quarter must be provided with closed captioning."



## **DTV Captioning FAQ**

### How is VITAC remaining current with DTV captioning?

We remain in constant communication with the vendors of DTV encoding equipment, and we are prepared to convert our systems to process native DTV closed captioning (i.e. so-called "708 captions"). Otherwise, we will continue to produce 608 captions and work with equipment vendors to ensure that these captions are properly upconverted for DTV.

### What do broadcasters need to know about DTV captioning?

Continue to follow the standards debates in regards to encoding of captions onto video. We encourage you to set up the ability to monitor your DTV captioning transmissions just as you now monitor Line 21 captions. We have had reports that DTV captions are only working intermittently so far. VITAC is continuing to work with clients as always by accepting the analog copies of your programs and delivering caption data files back for encoding.

#### What do consumers need to know about DTV captioning?

VITAC is committed to ensuring that consumers will always receive the best quality captioning possible. We work with broadcasters and program producers to ensure that we can create accurate, readable captions and that those captions are delivered accurately and consistently. We have an experienced engineering staff that is available full-time to provide technical assistance.

### How is VITAC maintaining leadership in DTV captioning?

VITAC has been an active member of the subcommittee and working group that created EIA-708-B, the standard that governs DTV captioning. VITAC lobbied hard among TV manufacturers for a standard that would improve the display of captions, just as DTV improves the display of picture and sound. We brought these issues before deaf consumers to ensure that their voices would be part of the discussion as to how to improve captioning in the next generation of television systems, and we contributed lengthy comments to the FCC in their deliberations on DTV captioning. We support the National Center for Accessible Media in their efforts to ensure that caption-encoding systems for DTV are fully functional and that proper monitoring of captions takes place.

VITAC has developed its own non-linear, fully digital captioning system, and we took the features of EIA-708 into account during that development so that we can be sure of our ability to deliver high-quality captions for all caption encoding and transmission systems. We carefully monitor developments that would warrant changes in our approach to DTV captioning, and to ensure that the interests of our clients and caption viewers are always met.

