



Lightspeed Live Capture Preserving VBI & VANC Data



Synopsis 2

Live Capture VBI and VANC Data Storage..... 2

Frame-based Methods 4

Track-based Methods 6

Processing Media Files with VBI/VANC Data 6

Copyright and Trademark Notice 7

Note: This guide is written for video professionals who are familiar with using Vantage and know how to create workflows and submit jobs. If you aren't familiar with Vantage, we suggest that you review the Vantage User Guide and Vantage Domain Management Guide as needed.



Synopsis

Vantage Lightspeed Live Capture can preserve data contained in baseband SDI signals and pass it into a variety of output file formats. This application note explains how, during capture, Lightspeed Live Capture preserves this data either within individual video frames or into the file's container data tracks.

Live Capture VBI and VANC Data Storage

VBI and VANC data is stored in media files in different ways. Generally speaking, the data can be stored with each video frame as data or as a separate data track within a file container. In the following table, Lightspeed Live Capture's frame-based and track-based methods for storing VBI /VANC data into video frames or file container formats are identified.

Preservation of VBI and VANC					
	Frame Based		Track Based		
	Preserves VBI data (such as Time Code and Closed Captions) and VANC data in video essence	Preserves Captions in User Data	All VBI VANC data is passed through in the <i>TIFO</i> file's data track for use in Vantage	<i>QuickTime</i> CC track created (608 or 708)	Preserves VBI and VANC data in <i>MXF OP1a</i> - SMPTE 436m
Codecs - Primary Output					
AVC-Intra	-	-	Yes	Yes	Yes
AVC	-	Yes, SEI user data	Yes	Yes	Yes
DV / DVCPRO	-	-	Yes	Yes	Yes
DVCPRO HD	Yes, VAUX data	-	Yes	Yes	Yes
DNxHD	Yes, proprietary Avid spec	-	Yes	Yes	Yes
DNxHR	-	-	Yes	Yes	-
HEVC (S/W)	-	Yes, SEI user data	Yes	Yes	-
IMX	Yes, in VBI lines	-	Yes	Yes	Yes
JPEG2000 LossLess (Comprimato)			Yes	-	Yes
JPEG2000 Lossy (Comprimato)			Yes	-	Yes
MPEG-2					

Preservation of VBI and VANC					
ProRes 422/444	Yes, proprietary Apple spec	-	Yes	Yes	-
Uncompressed (10-bit)			Yes	Yes	Yes
x264	-	Yes, SEI user data	Yes	Yes	Yes
x265	-	Yes, SEI user data	Yes	Yes	-
XAVC			Yes	-	Yes
XDCAM 4:2:0/4:2:2	-	Yes, MPEG2 user data	Yes	Yes	Yes

Frame-based Methods

Frame-based (essence) data carriage methods are associated with the specific video codec. Some use standard methods while others are proprietary.

Apple ProRes 422/444

Apple ProRes created by Lightspeed Live Capture preserves VANC data into each video frame using an Apple proprietary format. Lightspeed Live Capture can wrap ProRes into a QuickTime container or into Telestream TIFO container files. TIFO files created by Lightspeed Live Capture containing ProRes video, will also carry VANC data in a separate TIFO metadata track (See [Track-based Methods](#), below.)

Lightspeed Live Capture preserves VANC data within ProRes frames using Apple proprietary methods.

Vantage can decode Lightspeed Live Capture's QuickTime files containing VANC in ProRes frames.

Avid DNxHD (SMPTE 2019m VC3)

Avid DNxHD carries VANC data in each video frame using an Avid proprietary format. DNxHD is carried in QuickTime or MXF containers, or in Telestream TIFO files. TIFO files created by Lightspeed Live Capture containing DNxHD video, will also carry VANC data in a separate TIFO metadata track (see Track Based methods above).

Lightspeed Live Capture preserves VANC data within DNxHD frames using Avid proprietary methods.

Vantage can decode Lightspeed Live Capture's QuickTime files containing VANC in DNxHD frames.

AVC, AVC-Intra, x264, x265, HEVC

The SEI USER Data standard specifies the mapping of Closed Captions data packets into SEI USER Data.

Lightspeed Live Capture preserves VANC Closed Captions data within SEI USER Data.

Vantage can decode Closed Captions contained in SEI USER Data of Lightspeed Live Capture's QuickTime AVC, AVC-Intra, x264, x265 and HEVC files.

DVCPProHD

The SMPTE 375m standard specifies the mapping of VANC data packets into the payload area of the DV-based 100 Mbps digital interface format (DIF) structure VAUX DIF blocks. This is defined in SMPTE 370M.

Lightspeed Live Capture preserves VANC data within DVCPHD frames using SMPTE 375m.

Vantage can decode Lightspeed Live Capture's QuickTime DVCPHD files with SMPTE 375m VANC data.

IMX/MPEG-2 I frame

Lightspeed Live Capture captured IMX video will preserve the original VBI data by preserving all incoming VBI lines.

Vantage can decode VBI data contained in Lightspeed Live Capture IMX I-frame files.

QuickTime

QuickTime is Apple's file container format for a vast variety of video and audio codecs. Some Lightspeed Live Capture video formats carried in QuickTime containers can include VANC data in each video frame (see above).

HD Formats

- *DVCPHD*—VANC is preserved video frames using SMPTE 375m.
- *Apple ProRes*—VANC is preserved video frames using Apple proprietary methods.
- *DNxHD*—VANC is preserved video frames using Avid proprietary methods.
- *XDCAM*—VANC is preserved in MPEG2 User Data.
- *AVC, AVC-Intra, x.264, HEVC*—VANC is preserved in SEI User Data.

SD Formats

- *D10/IMX*—data contained in VBI is preserved.
- *DV/DVCPHD*—no data is preserved in Lightspeed Live Capture's DV video frames.

QuickTime also supports a closed caption track, which Lightspeed Live Capture creates for both HD and SD formats. (See [Track-based Methods](#), immediately following.)

Vantage can decode Lightspeed Live Capture's QuickTime files containing VANC in specific video frames (see above) and from standard VBI when present.

XDCAM

The MPEG2 USER Data standard specifies the mapping of Closed Captions data packets into MPEG2 USER Data.

Lightspeed Live Capture preserves VANC Closed Captions data within MPEG2 USER Data.

Vantage can decode Closed Captions contained in MPEG2 USER Data of Lightspeed Live Capture's QuickTime XDCAM files.

Track-based Methods

Track-based data carriage methods are associated with specific containers (MXF, QuickTime, and TIFO). Some use standard methods while others are proprietary.

MXF (SMPTE 436m)

MXF format is specified by a variety of SMPTE standards. SMPTE 436m describes the embedding of VANC data or standard definition uncompressed VBI data within an MXF file. The standard specifies a variety of formats for this data.

Vantage can decode Lightspeed Live Capture MXF OP1a files with SMPTE 436m VANC data.

QuickTime

All QuickTime files created by Lightspeed Live Capture can contain a Closed Caption track which is populated with data from VBI or VANC.

Vantage can decode QuickTime Closed Caption tracks for re-purposing within respective workflows.

Telestream Intermediate Format (TIFO)

Telestream Intermediate Format (TIFO) is a proprietary intermediate file format wrapper. This format is used primarily for integration between Lightspeed Live Capture and Telestream transcoding products. Any data contained in VBI or VANC within the incoming HD/SD-SDI input can be preserved as a Data/Control track within the TIFO output file produced by Lightspeed Live Capture applications. This data can then be processed by Vantage into appropriate output files.

Vantage can decode Lightspeed Live Capture TIFO files with track-based VBI/VANC data.

Processing Media Files with VBI/VANC Data

Lightspeed Live Capture-generated media files which contain data in video frames or file container tracks can be further transcoded in Vantage by creating a workflow with any output format that supports VBI/VANC data preservation.

Note: Vantage decoder updates may be required to support certain VBI/VANC data preservation methods.

See the appropriate Vantage documentation or contact Telestream Technical Support for details on processing Lightspeed Live Capture files containing track or frame based VBI/VANC data.

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