Application Note

Nexio® G8™ Video Guide

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Trademarks

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Video Clip Best Practices

This is a list of best practices for different video clip codecs. Start with these suggestions when creating video clips for your content.

Considerations

G8 offers few restrictions when you create your content. Keep the following considerations in mind during the design and troubleshooting of your content.

- The size of finished clips varies considerably depending on the codec and the available options (bit rate, compression, etc.) Be sure that you have enough drive space to store your clips.
- Optimum bit rates depend on the video standard, available compression settings, and the complexity of the video. Values that are too high will produce larger files which require more disk space and disk bandwidth during playback, and values that are too low will produce compression artifacts.
- Complex layouts with many items require more CPU and GPU resources than do simpler layouts. If you find that your clips require too much time to set up, or if the items in your layouts have difficulty playing, you may need to simplify your content, increase the time between transitions, or lower your clip bit rate.

General Guidelines

The following are general guidelines for creating G8 video clips.

Field Order

We recommend the following field order settings when creating interlaced video clips.

- HD: Upper field first.
- SD PAL: Upper field first.
- SD NTSC: Upper field first.

Frame Rates

Usually the content that is being ingested has already had its frame rate set, in which case no change should be necessary. The broadcast standards for each region should also be considered.

When creating content for progressive scan monitors, be sure it is de-interlaced.

Resolution

Scaled clips require more processing power than full-size ones. If you are creating complex layouts with many items and quick transitions, consider rendering your clips at the same size as your video items if possible.

Codec Guidelines

Each codec has its own ideal settings beyond the general guidelines listed above. The following additional guidelines are for systems with:

- Altitude Express or G411 hardware with Clip option.
- 2x Opteron 2220 CPU
- 4 GB DDR-800 RAM

Codec Guidelines

Codec	Guidelines
H.264	The recommended HD bit rate for 1080p clips is 20,000 kbps.
LTV	If you have Altitude Express or G411 hardware and wish to create LTV files, please see LTV Cookbook.
MPEG-2	The recommended HD bit rate for 1080p clips is 15,000 kbps.
VIA	VIA animation files created for G8 should be rendered at 59.95 frames per second.
WMV	Systems can handle a relatively high bit rate for both SD and HD WMV clips. ▪ SD bit rate: 5,000 - 8,000 kbps, constant. ▪ HD bit rate: 8,000 kbps, constant. Below 8,000 kbps, HD WMV clips generally show a noticeable degradation of quality.

LTV Cookbook

The LTV file format is a flexible, high-quality multimedia codec which plays natively on Altitude Express® hardware. The combination of LTV files and Altitude Express hardware is a key component of the superior playback ability of Nexio G-Scribe™ for Altitude Express, Nexio Channel ONE™, and Nexio RTX Net™ for Altitude Express systems.

Technical Details

LTV files use Imagine Communications's proprietary CDW codec.

CDW is a simple intra-field or frame wavelet codec with a block size of 16x2, a lowpass filter to improve compression, and configurable fill and alpha bitrates. It does not support multiplexing, digital rights management technologies, or video/audio synchronization.

LTV files contain video fill and alpha information. Audio support is provided by WAV file "sidecar audio" which can be captured with the GCap utility.

The size of finished LTV files vary greatly depending on the bit rate and amount of compression applied. The most significant advantage of LTV files over other formats is the ability of the Altitude Express board to play LTV files natively as opposed to using CPU resources.

Using LTV Files in Imagine Communications Products

You can use LTV files within Nexio G-Scribe for Altitude Express, Channel ONE, and RTX Net for Altitude Express systems.

LTV Support in Imagine Communications Products

Product	LTV Support
G-Scribe for Altitude Express	• Added to CG layouts as background clips. • Added to G-3D layouts as background clips. • Organized within the Media Store module.
Channel ONE	• Added to InfoCasts as video clip items.
RTX Net for Altitude Express	• Played using the HardwareVideoEffect class.

Settings

Depending on your encoding method, the following options are available when you capture or convert an LTV file.

- *8-bit or 10-bit video bit depth.* Increasing bit depth can improve the appearance of complex video material.

  10-bit support is forthcoming. Currently only 8-bit video depth is supported.
- *Choice of uncompressed or a configurable fill and alpha bit rate.* The best setting to use depends on the complexity of the fill and alpha information.

  Uncompressed support is forthcoming. Currently only compressed video is supported.
- *Choice of video standard and interlaced or progressive encoding*.

  When creating interlaced LTV files, we recommend using upper-field first for PAL and HD files, and lower-field first for NTSC files.
- *Setting of non-destructive trim and loop points*.
- *Adding of metadata such as notes and keywords.* This metadata is accessible within the G-Scribe Store module.

Choosing a Bit Rate

An LTV file's fill and alpha bit rate can be set to optimum values, depending on the video standard and compression settings. The best setting to use depends on the complexity of the fill and alpha information.

Values that are too high will produce larger LTV files which require more disk space and disk bandwidth during playback, and values that are too low will produce compression artifacts.

Note: The After Effects plugin measures bit depth by MB/s (megabytes per second), and the Convert to LTV tab measures bit depth by Mb/s (megabits per second). To convert megabits to megabytes, divide the number of megabits by eight.

Shaped (Premultiplied) Versus Unshaped (Straight) Fill

LTV files are always encoded as shaped. For this reason, always ensure that the output of your Imagine Communications product is set to shaped mode, otherwise you will experience keying issues.

When you create an LTV file with the GCap utility using the Convert to LTV tab you need to choose whether the *source* material has a shaped or unshaped key. It is essential that you choose the same option -- shaped or unshaped -- that the source material was generated with. Choosing a different option results in incorrect coloration of semi-transparent areas and a "halo" around transparency gradients.

Create LTV Files

There are three ways to create LTV files, each with its own set of features. The method you use depends on your source material and the LTV features you require.

- The GCap utility captures audio and video from live Altitude Express input feeds and saves to a variety of formats, including LTV. Use this method when you need to capture live media and when you require metadata or associated audio.
- The Convert To LTV tab within the GCap Utility converts image sequences into LTV files. Use this method when your source material is a sequence of images.
- The plugin for Adobe® After Effects® converts After Effects projects into LTV files. Use this method when your source material is created within After Effects.

The following table outlines the features and limitations of each method.

LTV Creation Comparison

Feature	GCap	Convert to LTV tab	After Effects Plugin
Source material	Live audio & video	Image sequences	After Effects projects
Set bit depth	-	-	Yes*
Set bit rate for fill and alpha	-	Yes (Mb/s)	Yes (MB/s)
Select compressed or uncompressed encoding			Yes*
Set shaped or unshaped fill	Yes**	Yes	-
Set video standard and field order	Yes**	Yes	Yes
Set trim and loop points	Yes	-	-
Set thumbnail	Yes	-	-
Add metadata	Yes	-	-
Batch capture	Yes	-	-
Capture sidecar audio	Yes	-	-

** Not currently supported.*

*** The current settings of the Altitude Express board are automatically used. To change these settings, configure the board with the System Manager application.*

GCap

The GCap utility allows you to capture full-screen high resolution video clips from live input feeds, using the video settings of the Altitude Express board. You can then trim the length of the captured video clip

to create shorter clips or loops, add metadata such as keywords and notes, and set a thumbnail for the clip.

GCap also allows you to simultaneously capture audio to a "sidecar" WAV file. This file is automatically associated with the LTV when played within G-Scribe.

The video bit rate is hardcoded to 300 Mb/s for fill and 80 Mb/s for alpha.

Note: As with audio, the trims, loops, metadata, and thumbnails set within GCap are only recognized by G-Scribe. This information is stored within an xm_scribe file for each LTV.

This utility is available on G7 and G8 systems. See the Utilities chapter in the G-Scribe User Manual to learn how to use the GCap utility.

Convert to LTV Tab

Within the GCap utility, switch to the Convert to LTV tab to build an LTV file from a series of individual image files. The Convert to LTV tab contains settings for shaping, video standard, and bit rate. The image files used are typically a series of TGA files.

The LTV file's fill and alpha bit rate can be set to optimum Mb/s values, depending on the video standard and compression settings.

After Effects Plugin

The After Effects plugin opens within After Effects and converts After Effects projects to LTV files, with control over bit depth, bit rate, video standard, field order, and a choice of compressed or uncompressed encoding.

The LTV file's fill and alpha bit rate can be set to optimum MB/s values, depending on the video standard and compression settings.

See the After Effects notes to learn how to install and use the plugin.