

Spectrum Media and Wrapper Formats

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Media Formats and Metadata

Spectrum Systems support the following compressed and uncompressed media formats.

Important

Media format support varies per Spectrum I/O module. For I/O module details, refer to the corresponding "Specifications" section in the *Spectrum System Installation Guide*. Also check the Spectrum release notes for any issues relating to media and wrapper formats.

- DV
- DVCPRO, DVCPRO 50, DVCPRO HD
- MPEG-2 I-Frame, MPEG-2 IMX, MPEG-2 Long GOP
- VC-3
- AVC-Ultra (Panasonic*), XAVC-I class 100 (Sony*), RP 2027 class 50/100 (generic), AVC (H.264) Long GOP. Note the following:
 - For the ChannelPort, AVC (H.264) Long GOP is available only when re-wrapped from PitchBlue[®] transport streams. (PitchBlue is a registered trademark of Vigor Systems.)
- ProRes
- Audio:
 - 48 kHz PCM (16 or 24 bit); optionally, PCM can contain AC-3 (16 bits) or Dolby[®] E (24 bits)
 - Dolby[®] E support with licensed Spectrum X or ChannelPort as follows:
 - Support for the decoding of all encoded Dolby E (16, 20 and 24bit) program configurations (0-23) to PCM.
 - Support up to four unique decodes of Dolby E per Spectrum I/O module.
 - Support for down mixing of Dolby E 5.1 and 7.1 (program configurations 11, 22) to stereo or mono channels. Note that 5.1+2 and 5.1+1+1 channel configurations that wish to be down mixed must be done as 5.1 with the other channels not mixed.
 - No support for outputting decoded Dolby E metadata as ancillary packets.
 - No support for using any decoded Dolby E metadata mix levels as part of the 5.1 and 7.1 down mixing to stereo or mono channels.

VANC and VBI Storage

The following table shows supported VANC and VBI Storage media types.

Metadata Type	Video Media Type	Embedded Video	Side-Band
Uncompressed VBI	Standard Definition MPEG-2	Omneon user data	Omneon VBI File (QuickTime only) GXF VBI track
	DV, DVCPRO, DVCPRO50	Unavailable	Omneon VBI File (QuickTime only) GXF VBI track SMPTE 436M (MXF OP1a only) GXF VBI track
	High Definition MPEG-2	SMPTE 328M	SMPTE 436M (MXF OP1a only) GXF VANC track
VANC	DVCPRO HD	SMPTE 375M	
	AVC-Ultra	Panasonic Spec	
	Others	Unavailable	


Please note the following:

- Capture and playout of SD VANC information is supported. Contact Harmonic Technical Support for additional information.
- SMPTE 328M: VANC is stored in the MPEG-2 user data.
- SMPTE 436M: HD and SD VANC is stored in MXF SMPTE 436M track.
- Omneon VBI File: VBI data is stored in an Omneon proprietary format in the clip.
- Panasonic Embedded: For AVC-Ultra the Panasonic specification describes a technique for storing VANC in the essence.
- DV Embedded: This is stored in the essence according to SMPTE 374/375/376. For SD VANC formats, only audio, timecode, and closed caption data are stored.

Media Wrapper Formats and Audio Track Type Compatibility

The following table shows supported combinations of audio types and media wrapper formats.

Wrapper Format	AIFF (Big Endian)	WAV (Little Endian)	AES3	8-bit A law
QuickTime Reference	Total of (2, 4, 6, 8, 10, 12, 14, or 16) audio channels recorded with (1, 2, 4, or 8) channels per file or per track with sample size (16 or 24) bits.		No	No
QuickTime Self-Contained				
MXF OP1a (Standard)				
MXF OP1b (External)				
MXF OP1a (eVTR)	N/A		Total 8 audio channels recorded with 8 channels per file with 24-bit samples stored in 32 bits each.	N/A
MXF AS-02 (2009, 2011)	Total of (2, 4, 6, 8, 10, 12, 14, or 16) audio channels recorded with (1, 2, 4, or 8) channels per file with sample size (16 or 24) bits.		No	No
MXF OP1a (Standard and Low Latency)				Yes

Wrapper Format	AIFF (Big Endian)	WAV (Little Endian)	AES3	8-bit A law
MXF OP1a (SMPTE RDD9 and Internal, early Sony style XDCAM-HD RDD9)	No	Total of (2, 4, 6, or 8) audio channels recorded with 1 channel per file with sample size (16 or 24) bits. <div style="border: 1px solid #ccc; background-color: #ffffcc; padding: 10px; margin-top: 10px;">  Note 16 audio channels are supported but such configurations may not work with all software or devices that expect compliant material. </div>	No	No
MXF ARD_ZRD_HDF (01a, 01b, 02a, 02b, 03a, 03b)	No	8 or 16 mono tracks	No	No
GXF (Play only)*	No	Total of (1, 2, 4, 8, 10, 12, 14, or 16) audio channels with 1 channel per file with sample size (16 or 24) bits.	No	No

Please note the following about support for GXF:

- GXF is a read-only format. It is a serialization of Grass Valley's native asset. If it is necessary to make any modifications to a GXF clip for use on Spectrum systems, Harmonic suggests rewrapping the clip into either an MXF or QuickTime format.
- GXF-wrapped clips must have a ".gxf" extension.
- Offspeed play and shuttle/jog of GXF clips is not supported.
- "Complex GXF" and "Compound GXF" clip types are not supported. Only "Simple GXF" clip types are supported.

Media Wrapper Formats and Supported Track Types

The following are supported combinations of media wrapper formats and track types.

QuickTime (Reference and Self-contained)

- DV, DVCPRO, DVCPRO 50, DVCPRO HD
- MPEG-2: I-Frame, IMX, LGOP
- VC-3
- AVC-Ultra, XAVC-I class 100, RP2027 class 50/100, AVC (H.264) Long GOP
- ProRes
- Audio

MXF OP1a/OP1a low latency/OP1b

- DV, DVCPRO, DVCPRO 50, DVCPRO HD
- MPEG-2: I-Frame, IMX, LGOP
- VC-3
- AVC-Ultra, XAVC-I class 100, RP 2027 class 50/100, AVC (H.264) Long GOP
- Audio

MXF OP1a RDD9

- MPEG-2 LGOP
- Audio

MXF OP1a EVTR

- MPEG-2 IMX
- Audio

MXF AS-02 2009/2011

- DV, DVCPRO, DVCPRO 50, DVCPRO HD
- MPEG-2: I-Frame, IMX, LGOP
- Audio

GXF (Play only)

- DV, DVCPRO, DVCPRO 50, DVCPRO HD
- MPEG-2: I-Frame, IMX, LGOP
- AVC-I class 50, AVC-I class 100
- Audio

Media Wrapper Format Workflow Limitations

Media Wrapper Format	Play Behind Record	Play Behind FTP	FTP Behind Record	Active Transfer Behind Record
QuickTime (referenced and self contained)	supported	not supported	not supported	supported
Op1a standard	supported	supported**	not supported	supported
Op1a low latency (standard, eVTR, RDD9)	supported*	supported**	supported	supported
Op1b	supported	not supported	not supported	supported
AS-02	supported	not supported	not supported	supported

*Op1a low latency play behind record limitations:

- Play behind record is supported when the player recording the clip and the player playing the clip are on the same Spectrum server.
- If the player recording the clip and the player playing the clip are on different Spectrum servers sharing an EFS, play behind record is supported with the following "Op1a play behind FTP limitations."

**Op1a play behind FTP limitations:

- Play behind FTP is supported when playing at normal speed from the beginning of the clip.
- Play behind FTP is supported when playing at normal speed from an offset into the clip when the time code is continuous (including pre-charge) and it is the first or only clip in the playlist.
- When playing off speed, frames may be dropped and black frames may be played.
- When playing from an offset into the clip and the time code is not continuous, the start of play may not be frame accurate.
- When playing from an offset into the clip and it is not the first clip in the playlist, black frames may play before the clip starts to play.

File Imports

By creating a "watch folder" on your Spectrum system, you can configure Spectrum to demultiplex transport stream files from a PitchBlue® system, or re-wrap LXF files that are transferred via FTP or Samba to the specified "watch folder" on your Spectrum video server.

For demultiplexed transport stream files, the resulting AVC/H.264 files can be played out with a Spectrum ChannelPort licensed for AVC/H.264.

For details and configuration instructions, see "Configuring Watch Folders" in the *Harmonic SystemManager User Guide*.

About support for the LXF wrapper format

Harmonic supports the LXF wrapper format only for files that are imported into a Spectrum "watch folder," and then re-wrapped as described in the "Configuring Watch Folders" section of the SystemManager User Guide. Harmonic does not support the playback of native LXF files.