

## VIDEO SPECIFICATIONS

Video program material shall be produced using current industry standards and accepted norms.

### **Production Formats**

Video signals from cameras or telecine equipment shall be produced with an aspect ratio of 16:9 and must comply with one of the 1920 x 1080 standards specified by SMPTE-274M.

### **Tape Format**

Tapes delivered to Allegheny Image Factory must be HDCAM or HDCAM-SR in the 1080i format (1080 lines interlaced 2:1 at a frame rate of 59.94 Hz) and signal parameters must conform to SMPTE 274M with no visible video impairment such as blocking errors or pixelization artifacts. Luminance and color difference signals must not exceed the bounds of legal gamut.

### **Accompanying Program Delivery**

HDCAM (or HDCAM-SR) masters delivered for broadcast must also be accompanied by a standard definition Digital Betacam down converted clone. Generally, the standard definition dub shall contain a 4:3 image obtained from the HD master by either a “pan and scan” or “centre cut” process which ensures that no critical picture information is lost. Program content shall be exactly the same as the HD master and timecodes shall match exactly. Audio shall match also for any Lt/Rt or Lo/Ro content but no Dolby E is necessary (please see section 2 regarding audio requirements). If available, the stereo M&E mix can exist on channels 3 & 4 of the standard definition master. Closed captioning shall be on line 21.

### **Time Code**

HD tapes must be recorded with drop frame time code. Program start time code must read 01:00:00:00. Time code should be continuous, without error, and contain the appropriate flagging information in adherence with SMPTE specification 12 M.

All time code references, i.e. vertical interval time code, (VITC), longitudinal time code. (LTC) or audio sector time code on Digital formats (ATSC) must match exactly.

### **Start Time**

Program content shall commence at 01:00:00:00 TC. There must be a minimum of 30 seconds of black following the last program picture and audio before any textless elements or added material.

### **Closed Captioning**

Program content shall be closed captioned as defined in EIA-708-B and EIA-608B.

## Acquisition Formats

Video Footage should be acquired using formats acceptable to Allegheny Image Factory on professional-quality media. Productions may be photographed using any of the following formats:

High Definition Formats	Acceptable Up conversion Formats	Film Formats
Sony HDCAM	Sony Digital Betacam	35 mm Film
Sony HDCAM SR	Sony Betacam SP	70 mm Film (IMAX)
Sony XDCAM HD (35 or 50 mbps only)	Sony MPEG IMX 50 mb (tape)	
Panasonic DVC PRO HD 100 mb	Sony MPEG IMX 50 mb (XDCAM)	
Panasonic HD-D5 (Film Transfers)	Panasonic DVC PRO 50 (tape)	
HDV at 1080i	Super 16 mm film	
HVX-200 DVC PRO HD 100		
XDCAM HD-EX		
AVCHD (70mbps +)		

Material not acquired in one of the acceptable formats must be approved by the Production Manager prior to the commencement of production. No more than 25% of an HD production's final content may be material unconverted from standard definition

## Editing Codecs

Video program material shall be produced using industry standard and accepted norms good practice and workmanship. Allegheny Image Factory requires that its production partners use only selected codecs and media types when working in non-linear editing systems. Systems that use uncompressed HDSDI are acceptable, as are systems use the native codecs for the DVCPRO HD and HDCAM formats. Systems that are incapable of using HD-resolution media are not acceptable for online output.

### Acceptable Editing Codecs

Codec	Bit rate or Ratio
Uncompressed SMPTE 292	1200 mbps
AVID DnX HD 8 and 10 bit	220 mbps or 145 mbps
Sony HDCAM codec	140 mbps
DVCPRO HD	100 mbps
XD-HD	50 mbps
HDV	25 mbps
AVCHD	70mpbs +

### Unacceptable Editing Codecs

Codec	Bit rate or Ratio
Any Exclusively Standard Definition Codec	Various

## **AUDIO SPECIFICATIONS**

Audio program material shall be produced using current industry standards and accepted norms. The audio portion of the master and source audio and videotapes must be produced so that no noise, static, dropouts or extraneous distortion is recorded in the audio.

Program audio must reflect reference tone level. Audio levels must be consistent throughout the program.

### ***Stereo (LPCM) Programs***

#### **Phasing**

Stereo audio must be fully mono compatible, i.e. the audio channels must be in the proper phase. NOTE: Full Mono compatibility means that when the left and right stereo channels are actively combined to mono there is no discernible change in audio level or fidelity.

Full mix and M & E audio tracks should be phase coherent (synchronized) and level matched to prevent difficulty editing between these tracks, as necessary.

#### **Sound to Video Synchronization (Lip-synchronization)**

The relative timing of sound to video should not exhibit any perceptible error. Sound should not lead or lag the vision by more than 10ms. This synchronization must be achieved at the last point at which the program supplier, or their facility provider, has control of the signal.

#### **Audio compression:**

Program audio should have good dynamic range, within the parameters listed above, but not be overly dynamic. While some compression may be needed to control the dynamic range of the program audio, excessive audio compression of the final mix should be avoided as this reduces the perception of audio quality by the listener.

### ***Surround Programs***

#### **Formats**

5.1, 5.0 or LCRS mixes are permitted. Surround English Fullmix (regardless of configuration (5.1, 5.0, etc) shall be expressed as Dolby 'E' on ch3/4 of HDCAM master.

#### **Documentation**

An Audio Program Data Sheet shall be delivered with the master tape. (See accompanying example)

**20bit Dolby E (6 channel)**

Valid metadata in the Dolby 'E' stream for all contribution/transmission parameters is mandatory (including all Extended Bitstream Information parameters (e.g. Preferred Downmix)

Timecode shall be present in the bit stream, reflecting picture master.

**Sync**

The Dolby E stream shall be formatted such that the program is in sync following Dolby 'E' decoding using a DP572 or equivalent. One frame of audio delay is incurred for both Dolby E encoding and decoding. Program audio that is advanced two frames relative to picture prior to Dolby E encoding will therefore be advanced one frame as it is recorded to the HDCAM master. Following normal playback, the Dolby E decode cycle will delay one additional frame, bringing the program back into sync.

**Peak Program**

Maximum permissible audio peaks in a 5.1 or 5.0 soundtrack shall be -3dBFS (+21dBm)

Although the Max dynamic range (max. peaks) for 5.1 channel mixes is considerably higher than for Stereo-only LPCM mixes, it is understood that many 5.1 mixes will have a dynamics structure which more closely resembles a -12dBFS stereo mix in order to facilitate the simple creation of an Lt/Rt fold-down mix.

**Stereo English Full-mix (LPCM, conventional stereo digital)**

This shall be recorded on channels 1 and 2 of the HDCAM master tape and may be used for screening and/or Standard Definition Transmission.

This mix shall be derived from the 5.x channel surround mix. i.e. "Fold-down" of the 5.1 or 5.0 mix to LCRS or Stereo (L/R).

This stereo mix should be expressed as Dolby Surround (Lt/Rt) whenever possible, or Lo/Ro if Dolby Surround encoding is not available. Tape labeling and slate information shall reflect the nature of channels 1 and 2 (either Lt/Rt or Lo/Ro). In either case (Dolby Stereo or not), the LPCM stereo Full-mix shall obey the conventional specifications for audio delivery (e.g. Max peaks to 8dB over ref.).

**Channel Allocations**

All HDCAM masters should have the following audio channel allocations:

**(A) SURROUND PROGRAM**

Channel 1 - Program left (Lt or Lo)

Channel 2 - Program right (Rt or Ro)

Channel 3 - Dolby E

Channel 4 - Dolby E

Address Track - SMPTE drop frame time code

**(B) STEREO PROGRAM**

Channel 1 - Program left (Lt or Lo)

Channel 2 - Program right (Rt or Ro)

Channel 3 - M&E left

Channel 4 - M&E right

\*If the stereo program is Dolby Surround encoded (Lt/Rt), then any stereo M&E mix (where applicable) shall also be expressed as Lt/Rt.

Address Track - SMPTE drop frame time code



## MUSIC AND EFFECTS TRACKS TECHNICAL FORMAT

### Accompanying Audio Multi-track Format (if required)

Accepted formats are **DTRS (DA-88, DA-98,etc)** or **Broadcast Wave File(s) (BWF)** on CD-R or DVD-R.

### TRACK ALLOCATION

#### 8 Track Digital Audio (DA-98 or DA-88 or BWF)

Track 1 - English Fullmix Left		(Lt if available)
Track 2 - English Fullmix Right		(Rt if available)
Track 3 - undipped (preferred, dipped acceptable)	BG/FX Left	(Lt if available)
Track 4 - undipped (preferred, dipped acceptable)	BG/FX Right	(Rt if available)
Track 5 - undipped (preferred, dipped acceptable)	Music Left	(Lt if available)
Track 6 - undipped (preferred, dipped acceptable)	Music Right	(Rt if available)
Track 7 - Narration/VO dialogue		
Track 8 - On-camera/Actuality dialogue		

29.97 Drop Frame SMPTE Time Code on the Time Code Track to be synchronous with picture.

*\*NOTE: For BWF delivery – same track content as above, delivered as Stereo Interleaved 16bit, 48kHz BWF files, with synchronous timestamps.*

*For Programs finishing in Multi-Channel formats up to and including 5.1 Surround – the audio deliverable structure above applies, but should be provided in both “original” (i.e. 5.1) and “2-channel” configurations.*

*e.g. For a program finishing in 5.1 – the Music Stem shall be delivered as both a 5.1 undipped Music stems, and as a 2-channel (Lt/Rt, or Lo/Ro) stem.*

#### Mix reference

Reference on all Masters shall be -20dBFS (or equivalent) and peak program level shall be restricted to 8dB above reference (or -12dBFS)

#### Timecode

On a DA-88 Master, timecode shall match picture Masters (i.e. 01:00:00:00 or 10:00:00:00 program start, drop-frame). For BWF delivery – the timestamps in each file shall match picture Masters.

#### Sample Rates

On DA-88 Master, sampling rate shall be 48kHz (16bit) and noise shaping (where applicable) shall not be used on Mix Stems (tracks 3 through 8). If noise shaping is employed on stereo full mix, this shall be noted on tape labels.

#### Audio Compression and Limiting

Mix Stems shall NOT be dynamically buss-limited (i.e. stems are not restricted to the 12dB over ref. peak limit). Stems summed at unity gain shall result in an unlimited version of the stereo full mix.

#### Reference Signals

Test tones for all Multi-track Masters shall be 1kHz tone @ -20dBFS.

**NTSC/ STANDARD DEFINITION TECHNICAL REQUIREMENTS****Video Specifications:**

**Video program material** shall be produced using current industry standards and accepted norms. Allegheny Image Factory does not consider direct non-linear output using lossy compression as an accepted industry norm. The output of compressed non-linear editing systems is considered unacceptable.

**Program Tape Format**

Master videotapes must be supplied on **Digital Betacam**. Allegheny Image Factory requires that active video material fill the available picture area vertically and horizontally. Program material derived from a wide screen master must be converted by either a “pan and scan” or “centre cut” process which ensures that no critical picture information is lost.

**Time Code**

NTSC tapes must be recorded with drop frame time code. Program start time code must read 1:00:00:00. Time code should be continuous, without error, and contain the appropriate flagging information in adherence with SMPTE specification 12 M. All time code references, i.e. vertical interval time code, (VITC), longitudinal time code. (LTC) or audio sector time code on Digital formats (ASTC) **must** match exactly.

**NTSC/ Standard Definition Specifications:**

Vertical Blanking	20 lines
Horizontal Blanking	10.7 microseconds, +0.3;-0.2
White level	700 mV (940 DEC/ 10 bit) (100 IRE)
Black Level	0 mV (64 DEC/ 10 bit) (7.5 IRE)
Colour difference signals (chroma)	+/- 350mV

Digital video signals must comply with standards specified by SMPTE-259 and CCIR Rec. 601 and, when encoded to NTSC composite, signals shall comply with RS 170A.

**Gamut**

Video levels, including reference signals, shall be within specified limits so that program content can be used without adjustment. When matrixed to RGB, all of the R, G or B signals should lie within the range -5% to +105% (-35mV to 735mV). The resultant luminance signal should lie within the range -1% to 103% (-7mV to 731mV).

**Closed Captioning**

Closed Captioning (when provided) must meet technical standards. The base of the captioning signal must rest at 0mV and reach a level of 350 mV. Closed captions must be encoded on line 21 of the vertical blanking interval, and normally be displayed on the bottom of the screen unless that placement interferes with program elements.



**NTSC/ STANDARD DEFINITION TECHNICAL REQUIREMENTS****Audio Specifications:**

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Program audio must reflect reference tone level. Audio levels must be consistent throughout the program.

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**Sound to Video Synchronisation (Lip-synchronisation)**

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**NTSC/ STANDARD DEFINITION TECHNICAL REQUIREMENTS****Videotape Channel Allocations**

- (A) STEREO (Where an M&E **is not** available)  
 Channel 1/3 - Program left  
 Channel 2/4 - Program right  
 Address Track - SMPTE drop frame time code.
- (B) STEREO (Where an M&E **is** available)  
 Channel 1 - Program left  
 Channel 2 - Program right  
 Channel 3 - M&E left  
 Channel 4 - M&E right  
 Address Track - SMPTE drop frame time code

**Accompanying Audio Multi-track Format (if required)**

Accepted formats are **DTRS** (DA-88, DA-98, etc.) or **Broadcast Wave File(s) (BWF)** on CD-R or DVD-R.

**Track Allocations****8 Track Digital Audio (DA-98 or DA-88 or BWF)**

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**Mix reference**

Reference on all Masters shall be -20dbFS (or equivalent) and peak program level shall be restricted to 8db above reference (or -12dbFS). Test tones for all Multi-track Masters shall be 1kHz tone @ -20dbFS

**Timecode**

On DA-88 Master, timecode shall match picture Masters (i.e. 01:00:00:00 or 10:00:00:00 program start, drop-frame)

**Sample Rates**

On DA-88 Master, sampling rate shall be 48kHz (16bit) and noise shaping (where applicable) shall not be used on Mix Stems (tracks 3 through 8). If noise shaping is employed on stereo full mix, this shall be noted on tape labels.

**Audio Compression and Limiting**

Mix Stems shall NOT be dynamically buss-limited (i.e. stems are not restricted to the -12db peak limit). Stems summed at unity gain shall result in an unlimited version of the stereo full mix.

**CONTACT INFORMATION**

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