TECHNICAL SPECIFICATIONS FOR DELIVERY OF "MPEG-2 Air Ready" TELEVISION PROGRAMS TO

Insert Broadcaster Name and Logo

This document is a guide to the technical standards for delivery of MPEG-2 based Air Ready Masters as agreed by the North American Broadcasters Association and the Digital Production Partnership for use in Canada and the United States.

The document includes:

NABA-DPP Common Technical Specifications:

- Technical parameters which must be used and that all material must meet to be acceptable by the NABA broadcasters.
- Metadata Specifications.

Broadcaster Specific Instructions and Requirements:

- Mandatory broadcaster Delivery Requirements, which details the broadcaster Specific instructions for the de livery of program material.
- Broadcaster Production and Post Production requirements, which form part of the binding contract for the delivery of program material. This section includes individual broadcaster requirements for Program Production and Post Production and guidance on the expected perceptual picture and sound quality.

Picture and Sound quality assessment is subjective and therefore highly dependent on the nature of the program. Some quality requirements may be expressed in relative terms ("reasonable", "not excessive" etc.), and it will be necessary to make a judgment as to whether the quality expectations of the program's intended audience will be fulfilled and whether the broadcaster will feel that value for money has been achieved. Every program submitted for transmission must satisfy both an Objective Technical Quality Control process and a Subjective Picture and Sound Quality Assessment as specified by **[BROADCASTER'S NAME]**. Any program failing to meet these requirements may be rejected.

Note: Unless specifically stated, quoted standards documents shall refer to the published version in force at the time of reading (e.g. ITU-R BT.709 shall be the version obtained from http://itu.int)

The main body of the document outlines the main Technical Specification as adopted by NABA DPP members.

Appendix A of this document outlines parts of the specification that are specifically unique to **[BROADCASTER NAME]** Individualized Delivery Requirements.

Appendix B of this document outlines parts of the specification that are specifically unique to **[BROADCASTER NAME]** Individualized Production and Post Production Requirements.

Please ensure you are using the current version of this document, available at:

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1. NABA-DPP Common Technical Specifications

1.1 Technical Requirements - Video

1.1.1 High Definition Format

The specific format required for HDTV program delivery will be specified by each broadcaster (see Appendix A) but will be either:

- 1920 x 1080 in an aspect ratio of 16:9 at 59.94 interlace fields (29.97 frames per second) as defined by SMPTE ST 274 System 5. Upper field first.
- Color sub-sampled at a ratio of 4:2:2 (4:2:0 is acceptable with broadcaster approval)
- Bit depth must be 8.

or

- 1280 x 720 pixels in an aspect ratio of 16:9 at 59.94 progressive frames per second as defined by SMPTE ST 296 System 2.
- Color sub-sampled at a ratio of 4:2:2 (4:2:0 is acceptable with broadcaster approval)
- Bit depth must be 8.

1.1.2 Video Levels and Gamut (illegal signals)

High Definition digital signals will be assessed according to the current version of recommendation **ITU-R BT.709** (1920 x 1080) or **ITU-R BT.1848** (1280 x 720)

Video levels must be received within the specified limits so that the program material can be used without adjustment. Any signal outside the specified limits is described as a gamut error.

Measuring signal levels

Digital video levels are usually measured with a device which displays a trace like a traditional waveform monitor. This gives readings in mV (emulating an analogue signal), or as a percentage of the allowable levels.

The limits of signal levels are defined by reference to a nominal black level and a nominal white level. Black level comprises R, G and B all at zero (or 0% or 0mV) and white level is all three components at 100 % or 700mV.

In a picture signal, each component is allowed to range between 0 and 100% (or 0mV and 700mV). This equates to digital sample levels 16 and 235 (8-bit systems) or 64 and 940 (10 bit systems).

Tolerance on color gamut signals

In practice it is difficult to avoid generating signals slightly outside this range, and it is considered reasonable to allow a small tolerance, which has been defined as follows under **EBU Rec103**:

- RGB components must be between -5 % and 105% (-35 and 735mV)

and

- Luminance (Y) must be between -1% and 103% (-7mV and 721mV)

Slight transient overshoots and undershoots may be filtered out before measuring, and an error will only be registered where the out of gamut signals total at least 1% of picture area. Many monitoring devices are designed to detect errors to this specification.

1.2 Technical Requirements – Audio

This section of the NABA DPP delivery documents gives guidance for the mixing and delivery of programs using the technical requirements set out in *ATSC Recommended Practice A/85: Techniques for Establishing and Maintaining Audio Loudness for Digital Television*, published by the Advanced Television Systems Committee Inc.

1.2.1 Loudness Terms

The broadcast industry uses the terms listed below for the measurements of audio loudness.

Term	Description	Measurement	Reference
LKFS	Loudness K-weighted relative to Full Scale	LKFS	ITU-R BS.1770
NABA Delivery Requirements			
Program Loudness	loudness, K-weighted, relative to full scale, measured with equipment that implements the algorithm specified by ITU-R BS.1770	LKFS	ATSC A/85
Maximum True Peak	The maximum absolute level of the signal waveform in the continuous time domain, measured per ITU-R BS.1770	dBTP (True Peak)	ATSC A/85
Dialog Loudness	The loudness, in LKFS units, of the Anchor Element	LKFS	ATSC A/85
Anchor Element	The perceptual loudness reference point or element around which other elements are balanced in producing the final mix of the content, or that a reasonable viewer would focus on when setting the volume control.		ATSC A/85
Short Form Content	Advertising, commercial, promotional or public service related material or essence. Also termed “interstitial” content. The typical duration is less than approximately 2 to 3 minutes		ATSC A/85
Long Form Content	Show or program related material or essence. The typical duration is greater than approximately 2 to 3 minutes.		ATSC A/85

1.2.2 Program Loudness requirements and guidelines

The program loudness shall comply with ATSC A/85. The audio signal measured using a broadcast loudness meter having the ITU-R BS.1770 compliant algorithm shall meet the following requirements.

Option	Notes
Metadata	If required, specified by broadcaster in Appendix A
Normalization	-24LKFS
Tolerance	±2dB
Max True Peak	-2dBFS (ATSC RP A/85) See broadcaster Specification for any further constraints
Dialogue Normalization	See broadcaster Specification
Dialogue Tolerance	See broadcaster Specification

Although the target loudness is -24 LKFS, in exceptional circumstances other target levels may be permitted by agreement with the broadcaster. Other target levels must be agreed with the broadcaster before the final mix.

Channel allocations:

The audio channel allocation required for HD delivery is defined for each broadcaster in Appendix A.

For compatibility with stereo systems, any audio generated as mono must be presented on two phase- coherent tracks, and flagged as stereo.

Any use of stereo mix sequences up-converted to a 5.1 mix in a program shall be pre-approved.

The naming conventions used in all related documentation and metadata must match those specified by the broadcaster in Appendix A.

1.2.3 Transmittable audio bandwidth

20 Hz to 20kHz for all channels excluding the LFE channel.

Up to 120Hz for the LFE channel.

1.2.4 Described Video (DV)

The audio level of these channels should be similar to the main program level and comply with the loudness specifications.

1.2.5 Audio synchronization

Audio/Video synchronization is extremely important. The end-to-end (program master to home TV) has an A/V tolerance of approximately ±15ms therefore each part of the broadcast chain must maintain a much tighter tolerance to avoid lip sync errors becoming visible. A delivered file should have an AV sync error no greater than ±5ms.

1.3 File Delivery Requirements

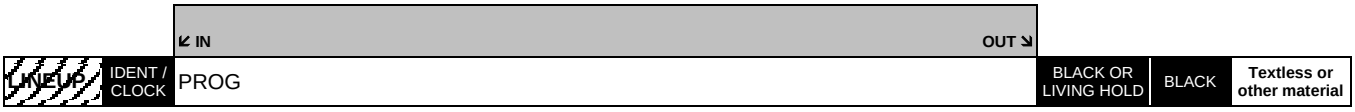
All programs delivered as files must comply with all the relevant video and audio requirements above.

This document covers the requirements for broadcast-ready files. Refer to the NABA – DPP Library Master Technical Specification for additional requirements for programs intended for further editing, re-versioning or archiving.

Each program should be delivered as a single principal MXF file containing the audio and video. There must be only one program in each file, although a program may be either soft or hard-parted within that file, as specified by the broadcaster, according to the diagrams below. Only when agreed in advance with the relevant broadcaster, programs in several parts may be delivered in more than one file, as shown in the third diagram below.

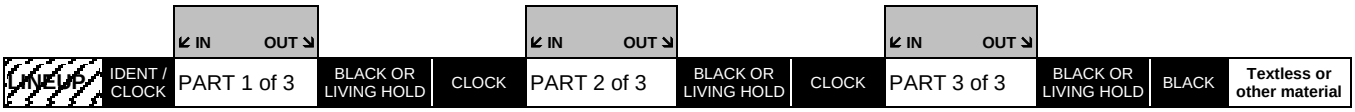
Single part or soft parted program

A single part program will always be played out from start point to end point without interruption. Soft parting is where a program is provided as a single continuous program, but the broadcaster may break the transmission of the program at several points to insert commercials or for other reasons. IN and OUT points for continuous playback only must be included with the delivery metadata; suggested timecodes for breaks should not be included.



Hard - parted program

A hard-parted program is billed and scheduled for transmission as a single entity, but is delivered as a single file containing clearly separated parts between which adverts, trails etc. will be inserted.

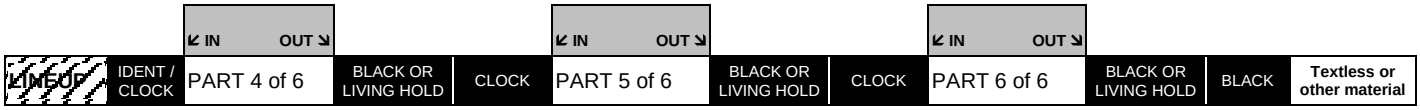


Multi - part program delivered on multiple files

Where a program's delivery must be split over more than one file, e.g. due to editing up to transmission.

FILE 1

FILE 2



1.3.1 File format

Program files must conform to AMWA AS-11 X8 which defines an MXF OP1a file format.

Note: The AMWA AS-11 family of Specifications defines constrained media file formats for the

delivery of finished media assets to a broadcaster or publisher. Each Specification is developed for a particular business purpose.

The AMWA AS-11 specifications are provided here: *http://www.amwa.tv/projects/AS-11.shtml* Consult your systems suppliers to ensure they can provide AS-11 X8 compliant files.

1.3.2 Video and Audio encoding

The full details of the video and audio encoding are given in AMWA AS-11 X8. The video is MPEG-2 encoded and this aspect of the Specification is based on SMPTE RDD 9 (XDCAM). All audio is encoded as PCM with a sample rate of 48kHz.

The content shall be delivered using one of these options:

Mode	RDD Categorization	MPEG2 Profile/Level	MPEG-2 bit Rate	Audio bits per sample	Image Size and Frame Rate
Option 1a	HD420	MP@HL	35Mbits/s	16	1 280 x 720 @ 59.94fps Progressive
Option 1b	HD420[1]	MP@HL	35Mbits/s	16	1 920 X 1 080 @ 29.97fps Interlace
Option 2a	HD422	4:2:2P@HL	50Mbits/s	24	1 280 x 720 @ 59.94fps Progressive
Option 2b	HD422	4:2:2P@HL	50Mbits/s	24	1 920 x 1 080 @ 29.97fps Interlace

Where required, Dolby surround metadata specified in SMPTE RDD 6 must be carried in an SMPTE ST 436 track, as detailed in AMWA AS-11 X8.

Appendix A gives the broadcaster requirements for Video, Audio encoding and Surround Sound metadata requirements.

1.4 Closed captions

Closed captions (or subtitles) must be delivered in the MXF file AND as a separate file. The separate file must be named identically to the principal MXF file, apart from the filename extension.

Please provide a separate caption file with the following specifications (no exceptions):

Parameter	Specification
File Format	.cap or .scc Cheetah as specified by the broadcaster
Frame Rate	29.97fps, with drop frame mode. Note: The closed caption must be formatted for a 29.97fps Drop Frame Time Code regardless of the video file's frame rate.
Starting Timecode	as specified by broadcaster in Appendix A

The timing, positioning and content of the captions in the MXF file and separate file MUST be identical.

This Technical Specification strives to ensure that all North American viewers have full access to video services and programs.

For U.S. Broadcaster specifications require that viewers who are deaf or hard of hearing be

[1] This option is not included in RDD 9 currently but is an extension added by AS-11 X8

provided closed captions that are accurate, synchronized, properly placed and complete, Pursuant to the FCC's Report and Order, Declaratory Ruling, and Further Notice of Proposed Rulemaking, ("FCC 14-12" Feb. 24, 2014), this specification supports the following non-technical quality standards for all closed captioning: http://www.fcc.gov/document/closed-captioning-quality-report-and-order-declaratory-ruling-fnprm

For Canadian Broadcaster specifications, this document supports Broadcast Regulatory Policy CRTC 2012-362 Quality standards for English language closed captioning and Broadcast Regulatory Policy CRTC 2011-741 Quality standards for French language closed captioning.

1.5 Action and On Screen Text Safe Areas

Captions, credits and all other on-screen text must be clear, legible and must be within the safe areas specified. All font sizes must be legible on HD displays and also after down conversion for the SD viewer.

There are two primary caption safe areas defined for 16:9 material for transmission:

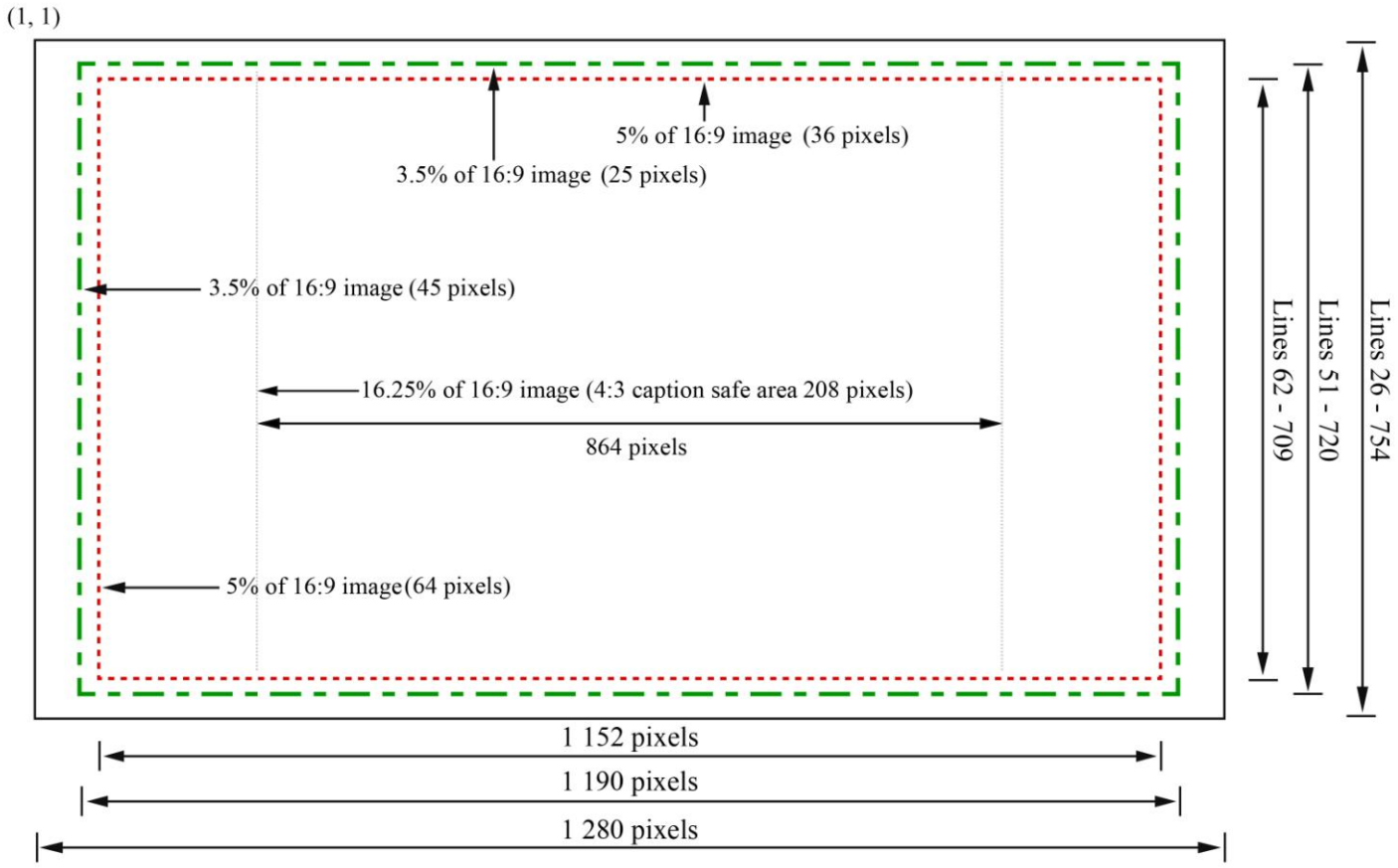
- 16:9 used for the majority of programs/broadcasters.
- 4:3 required for certain programs/broadcasters for end credits or for programs distributed internationally.

Please note that the Action, Caption and Other On Screen Text safe areas requirements are detailed in SMPTE ST2046-1 and SMPTE RP2046-2. ITU-R BT.1848 gives further details if needed,

Action and Text Safe for 720 Line Images

NOTE: See Appendix B for specific Broadcaster Requirements

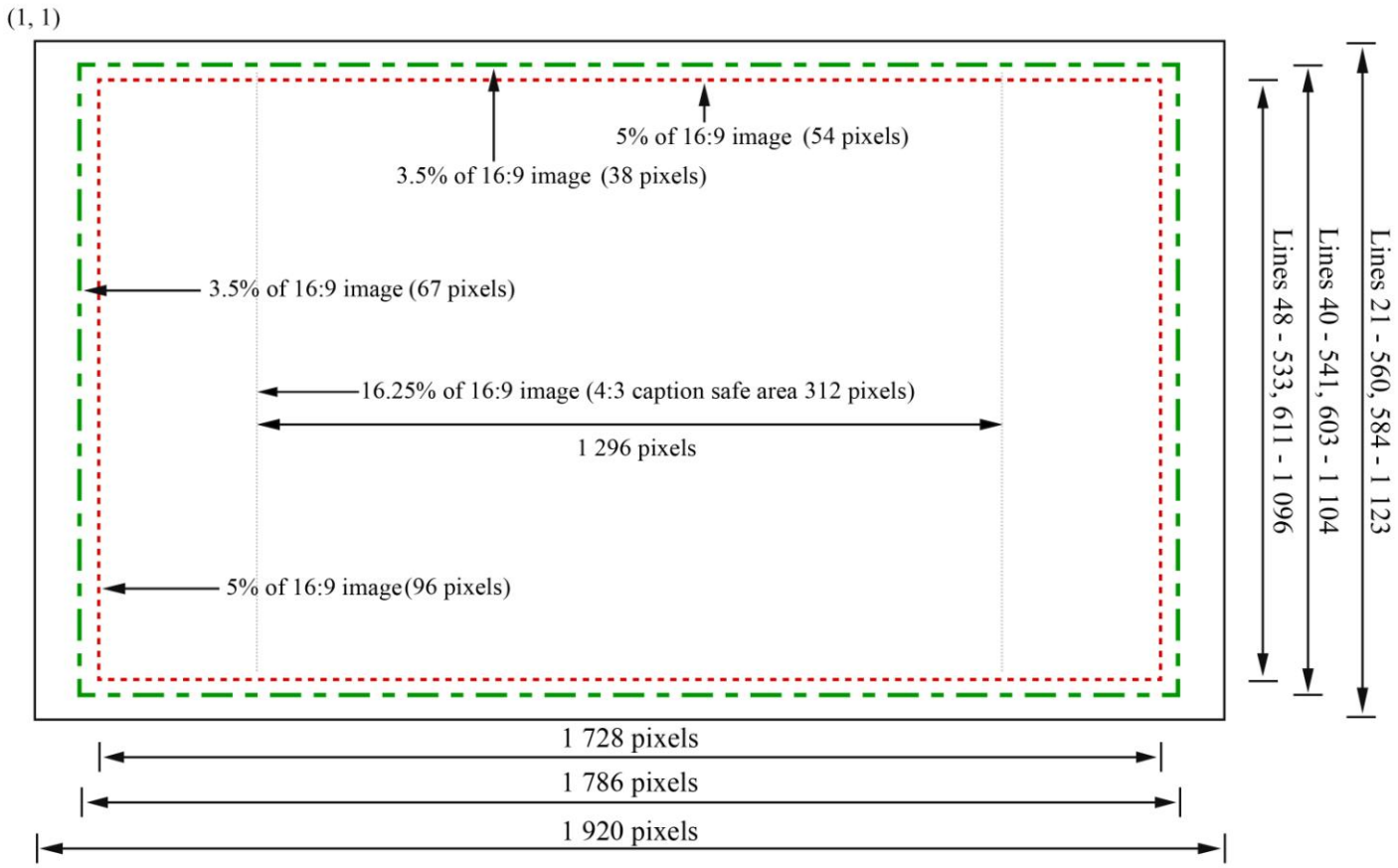
Text Safe Area for 720 x 1280 (Progressive)	Defined as percentage (%) of active picture	HD pixels (inclusive) first pixel numbered 1	TV line numbers (inclusive) line numbering as per "ITU-R BT.1848"
Action Safe	93% of Width 93% of Height	45 – 1 234 25 - 694	- 51 - 720
16:9 Caption safe	90% of Width 90% of Height	64 – 1 215 36 – 683	- 62 - 709
4:3 Caption safe	67.5% of Width 90% of Height	208 – 1 071 36 – 683	- 62 - 709



Action and Text Safe for 1080 Line Images

NOTE: See Appendix B for specific Broadcaster Requirements

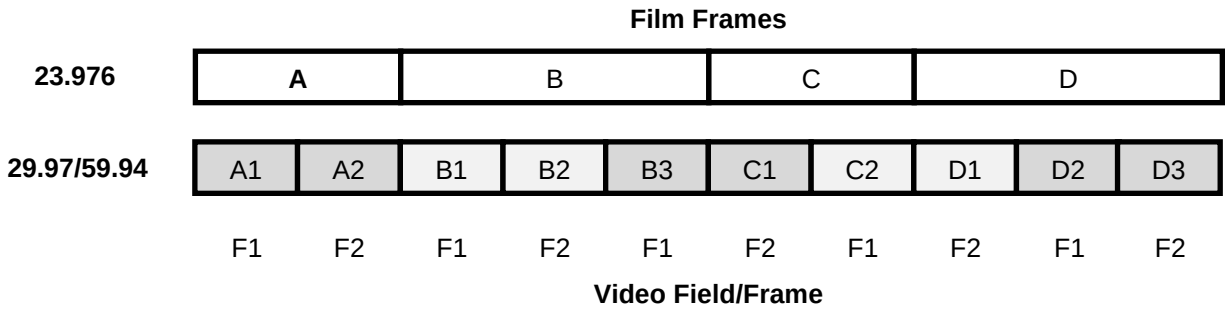
Text Safe Area for 1920 x 1080 (Interlace)	Defined as percentage (%) of active picture	HD pixels (inclusive) first pixel numbered 1	TV line numbers (inclusive) line numbering as per "ITU-R BT.709"
Action Safe	93% of Width 93% of Height	67 – 1852 38 - 1041	- 40 - 541 (F1) & 603 - 1 104 (F2)
16:9 Caption safe	90% of Width 90% of Height	96 – 1 823 54 – 683	- 48 – 533 (F1) & 611 – 1 096 (F2)
4:3 Caption safe	67.5% of Width 90% of Height	312 – 1 607 54 – 683	- 48 – 533 (F1) & 611 – 1 096 (F2)



1.6 2:3 Pulldown

The 2:3 pulldown (commonly referred to as 3:2 pulldown), used to convert 4 film frames into 5 video frames, shall be as described in SMPTE RP 197:2003.

If 4 film frames are represented as A, B, C, D, the pulldown sequence of the video fields generated from them shall be:



This 2:3 sequence shall be respected not only for film transfers but also for frame rate conversions performed with any other system (standard converters, non-linear editing systems, etc.). It will ensure a fluid perception of movements.

1.7 Timecode

Timecode must be as specified in the AMWA AS-11 X8 specification. To ensure compatibility with downstream systems it is very important that timecode is inserted in the file exactly as specified.

1.8 Metadata

Metadata is the name for all the information which is not the audio or video essence, but which is required to ensure that the contents of the file can be identified correctly, and can be played back or converted in various systems.

Metadata within the principal MXF file must be as described by the AMWA AS-11 X8 specification and must correctly reflect the material contained in the file.

1.8.1 Filenames

Filenames for the MXF files must be supplied as specified by each broadcaster, and should contain the relevant program identifier information. Filenames must be in upper case, with filename extensions in lowercase. Allowable characters are ‘A-Z’, ‘0-9’, ‘-‘ & ‘_’ .

The broadcaster specific naming convention is shown in Appendix A.

1.8.2 Required Metadata

The table below gives an informative overview of the descriptive metadata which must be embedded in the MXF file (it is embedded as an XML document). Refer to AMWA AS-11 X8 for the full and authoritative details.

The “Required?” column indicates which fields must be completed before delivery of the file.

Note: the following table is subject to change until the AS-11 X8 specification is published

Field Name *(International English used)*	Definition *(US English used except in xml terms)*	Required?	Example *(Examples in italics)*
Identifiers *(At least one Identifier must be included)*			
Identifier_Value	The identifier itself	Required	*PGMID*
Identifier_Type	The type of identifier in Identifier_Value. Examples include broadcaster ID, Production Number, ISAN, EIDR, and UMID	Required	*NABA broadcaster ID*
Identifier_Authority	The entity responsible for issuing the identifier	Optional	*NABA broadcaster*
Program Domain Specific Metadata			
Title_1	The final name of a "group" of episodes to which the program belongs. These episodes have a shared identification and branding and are linked by common characters, subject matter, style or story.	Required	*Family – Season 2*
Title_2	The final name of the program used to identify it as an editorially distinct member of a series / season (in other words: an "episode"). This name may include a number (or consist only of a number) indicating the position of the episode within the series / season.	Required	*Episode 3 – Fire*
Title_3	The final name of the program including details of any specific purpose for which this program was created (in other words: "version" information).	Required	*Episode 3 Pre-watershed*
Synopsis	A brief descriptive summary of the program.	Required	*An eventful day for all the residents of the house.*
Genre	A single style or category describing the whole program.	Optional	*Drama*
Completion_Date	The date on which the program file was completed ready for delivery to the broadcaster.	Required	*2016-11-13*
Copyright_Year	The full year in which one of the following occurred or will occur: completion of the production of the program; delivery of the completed file to the broadcaster; transmission of the delivered program.	Required	*2016*
Originator	The name of the person or organization responsible for creating the program.	Required	*NABA Studios*
Distributor	The name of the person or organization responsible for supplying the program to the broadcaster.	Optional	*John Doe Productions*
Contact_Email	The email address for the person or organization responsible for supplying the program file to the broadcaster.	Required	*john@example.com*
Contact_Telephone_Number	The telephone number for the person or organization responsible for supplying the program file to the broadcaster.	Required	*+1 555 123 4567*
Picture_Ratio	The ratio of the display width to the display height of the smallest rectangle that completely contains (throughout the duration of the entire program) the region of the video frame used for "program content" (where "program content" includes all pictures, captions, etc. but excludes any black bars).	Optional	*Full Frame* *1.33:1 centered pillarbox* *2.39:1 centered letterbox*
Product_Placement	A flag to indicate whether the program contains "product placement".	Optional	*Yes*
Textless_Elements_Exist	A flag to indicate whether the program contains "textless elements" after the end of the main program content.	Optional	*Yes*

Field Name *(International English used)*	Definition *(US English used except in xml terms)*	Required?	Example *(Examples in italics)*
Programme_Has_No_Text or Programme_Has_Text	The presence of Programme_Has_Text indicates that the main program content contains text overlays (or similar) in the video.	Required	*Program Has Text* Program Text Language: *en*
Total_Programme_Duration	The sum of the durations of all the parts / segments in the entire program.	Required	*00:59:02;00*
Line_Up_Start	The timecode at which the line-up test signals begin.	Required	*00:59:30;00*
Ident_Clock_Start	The timecode at which the initial "ident" / slate / countdown clock begins.	Required	*00:59:50;00*
Is_Not_Three_D or Is_Three_D	The presence of Is_ Three_D indicates that the file contains video intended for stereoscopic rendition.	Required	*Is Not 3D*
In Vision Access Services			
Open_Captions_Not_Present or Open_Captions_Present	The presence of Open_Captions_Present indicates that the program contains visible (in-vision) subtitling information.	Required	*Open Captions Present* Caption Language: *en* Caption Type: *Translation*
Signing_Not_Present or Signing_Present	The presence of Signing_Present indicates that the program contains visible (in-vision) signing.	Required	*Signing Present* Signing Language: *ase* Signing Type: *Signer with program*
Content Details			
Audio_Comments	A description of the subjective quality of the audio in the program including notes on any global characteristics or audio treatments.	Optional	*Some audio clicks throughout as a result of using archive content*
Video_Comments	A description of the subjective quality of the video in the program including notes on any global characteristics or video treatments.	Optional	*Some video noise throughout as a result of using archive content*
Audio_Loudness_Specification	The Audio Loudness Specification to which the maker of the program intended the finished (ready for transmission) audio content to comply	Required	*ATSC A/85 (Dialog Anchor)*
Compliance_To_Specification_Is_Not_Achieved or Compliance_To_Specification_Is_Achieved	The presence of Compliance_To_Specification_Is_Achieved indicates that the finished (ready for transmission) audio content complies with the indicated Audio Loudness Specification	Required	*Compliance To Specification Is Achieved*
Programme_Loudness_Value	The "Program Loudness Value" in LKFS as measured in accordance with the indicated Audio Loudness Specification. This is intended to give an indication of the degree to which the content deviates from the indicated Audio Loudness Specification, rather than a precise measurement of the loudness of the content.	Optional	-24.1

2. Appendix A – [BROADCASTER] REQUIREMENTS:

RED DENOTES EXAMPLE TEXT ONLY – BROADCASTERS WILL REPLACE THIS IN THEIR OWN VERSION

This section outlines Instructions and Requirements that are unique to {Broadcaster Name]

Contact Details

Contact	Title	Email	Telephone
Add Contact Name	*Add Contact Title*	*Add Contact Email Address*	*Add Contact Number*

Contact and Delivery Instructions:

This area is reserved for broadcaster specific contact instructions and process instructions, as required.

File Naming

Required Program File Name Format	Program Example Filename	Unique ID (EIDR/Ad-Id/etc)	Notes
Add broadcaster file name format detail	*Add broadcaster file name example*	*Add required UID detail as needed*	*Notes as needed*

2.1 Technical Parameters

Video Encoding *Example 720 and 1080 included for reference only*

Video Format	Frame and Scan Type	Mode	Reference
1 280 x 720	*59.94 progressive*	*Option 2a (See 1.3.2)*	*SMPTE ST 296 System 2*
1 920 x 1 080	*59.94 interlace*	*Option 2b (See 1.3.2)*	*SMPTE ST 274 System 5*

Audio Channel and Track Allocation:

Program Versions	Channel/Track	Content	Abbreviation
Surround 5.1 Example	*1*	*Left*	*L*
	2	*Right*	*R*
	3	*Centre*	*C*
	4	*Low Frequency Effects*	*LFE*
	5	*Left Surround*	*Ls*
	6	*Right Surround*	*Rs*
Additional audio example	*7*	*Mono/Left/DV*	*-*
	8	*Mono/Right/DV*	*-*

Notes on unused audio and any additional guidance on audio levels here

Program Content Timecode

Content	Timecode	Notes
File Start	*00:59:30;00*	
Line-up	*00:59:30;00*	*100% with BLITS on surround services and GLITS on Stereo*
Slate	*00:59:50;00*	*See section 3.4 for slate details*
Program	*01:00:00;00*	
Post Program	*-*	*Hold or freeze for 5 seconds after end of program*
Closed Caption File	*00:59:55;00*	*Program identifier for 3 seconds prior to program start. First caption may not appear before 01:00:00;00*

2.2 Leader Requirements

This area is reserved for broadcaster specific requirements for the file leader (Color Bars, Tones, Black and Silence, Sync Pop etc.)

2.3 Broadcaster Slate Requirements

File shall contain the following information on slates

This area is reserved for broadcaster specific requirements for slates and count-in clocks. Instructions related to these requirements should be detailed here.

Production number (if applicable)

Full Program Title

Season name (including year, when applicable)

Season number (when applicable)

Episode title/number (when applicable)

Name of production company

Name of post or finishing company

2.4 Broadcaster Specific File Delivery Administrative Detail

This area is reserved for broadcaster specific delivery instructions such as delivery service to be utilized or other requirements, as required.

2.5 Broadcaster Specific File QC Requirements and reports

This area is reserved for broadcaster specific QC requirements and details relating to the individual broadcaster's specific QC reporting. This area may include a hyperlink to online access to broadcaster Specific Reporting Forms or Examples.

2.5.1 Quality Control (QC)

It is the responsibility of the production company to ensure programs meet the technical and editorial requirements of the commission and the company carrying out the QC process has adequate resources.

The QC process has three sections

- Automated Quality Control (AQC) testing
- 'Eyeball' Quality Control testing
- File compliance testing

Automated Quality Control (AQC)

Any device that carries out the NABA DPP AQC tests based on the EBU QC Test Items can be used:

- Details of the AQC requirements can be found at **[BROADCASTER LINK HERE]**

The production company should ensure that all technical and editorial warnings or comments are acted on or noted. Mandatory requirements must be acted on or rectified.

Broadcasters require an AQC report, named according to the file naming convention to be delivered with the master program file. AQC reports must be in PDF form.

Subjective Quality Control

The subjective QC check is to ensure picture and sound quality are consistent throughout, and that dialogue is clear and understandable by a first time viewer. Further information on the subjective QC parameters and an eyeball QC form template go to: **[BROADCASTER LINK HERE]**

Broadcasters require a Subjective QC report, named according to the file naming convention to be delivered with the master program file. Subjective QC reports must be in PDF form.

The image and audio quality of HD programs provided shall be evaluated according to the five-point scale suggested in the International Telecommunication Union:

- ITU-R BT.500-13 standard for video
- ITU-R BS.1284-1 standard for audio

The two standards propose a similar evaluating scale.

Rating	Impairments	Quality
5	Imperceptible	Excellent
4	Perceptible but not annoying	Good
3	Slightly annoying	Fair
2	Annoying	Poor
1	Very annoying	Bad

File Compliance

The File Compliance check confirms that the file itself meets the NABA DPP technical requirements.

3. Appendix B – [BROADCASTER] QC & Post Example:

3.1 [Broadcaster Name] Specific Production/Post Production Quality Requirements

This area is reserved for broadcaster specific Production and Post Production requirements. Examples of these would be Camera/Sensor/Lens requirements, use of archival material, the use of Graphics and text, etc.

3.1.1 Archive Material

This area is reserved for broadcaster specific requirements on the inclusion of archive material. Instructions related to these requirements should be detailed here.

3.1.2 Use of Non-HD material

Some high definition programs will contain some material from standard definition originals, and sources which are not considered to meet HD broadcast standards, such as domestic camcorders. This material is all called 'non-HD' in this document.

To maintain a high standard and meet audience expectations the amount of non-HD material is limited to **Insert percentage required by broadcaster** of the program's total duration. Non-HD material must not be used for large uninterrupted sections of the program, unless agreed by the broadcaster. This includes archive material.

Instructions related to these requirements should be detailed here.

3.1.3 Film for High Definition Acquisition

This area is reserved for broadcaster specific requirements on the inclusion of film acquired material. Instructions related to these requirements should be detailed here.

3.1.4 Frame Rate Conversion

This area is reserved for broadcaster specific requirements frame rate conversion (including 24fps). Instructions related to these requirements should be detailed here.

3.1.5 Aspect Ratio

This area is reserved for broadcaster specific requirements on the inclusion material originated in other aspect ratios (2.35, 1.85, 4:3…). Instructions related to these requirements should be detailed here.

3.1.6 AFD

This area is reserved for broadcaster specific AFD requirements

3.2 Broadcaster Safe Action and Text Area Requirements

This area is reserved for broadcaster specific requirements on Action and Other on Screen Text requirements when they are needed (DELETE IF NOT REQURED)

3.3 Broadcaster Specific Metadata Requirements

This area is reserved for broadcaster specific Metadata Requirements. Many broadcasters require specific metadata deliveries well in advance of program delivery. Instructions related to these requirements should be detailed here.

If not required by the broadcaster this section will be removed.

3.4 Broadcaster Specific Audio and Surround Requirements

This area is reserved for broadcaster specific audio mix and format requirements

Sub-sections can be included for:

3.4.1 Audio Metadata Settings

Where the broadcaster requires surround sound metadata, it is vital that for correct reproduction of the audio by domestic receivers, that this metadata is input and carried through the broadcast chain to the consumer. The broadcaster may require different settings based on program type or genre as well as requirements for specific or dedicated television channels (e.g. Sport Channels, Movie Channels, Music Channels etc.).

If not required by the broadcaster this section will be removed or replaced by other Instructions.

3.4.2 Dialogue in a surround mix

This area is reserved for broadcasters who may have specific requirements on dialogue within a surround mix.

If not required by the broadcaster this section will be removed.

3.4.3 Guidance for acquired programs and movies

If not required by the broadcaster this section will be removed or replaced by other Instructions.

Parameter	Value
Dialogue Level	*-24dB*
Line Mode Compression	*Film Light*
RF Mode Compression	*Film Standard*
Center Down-Mix Level	*-3dB*
Surround Down-Mix Level	*-3dB*
Surround 3dB Attn.	*Enabled*
Dolby Surround Mode	*Not Dolby Surround*
Preferred Stereo Down-Mix	*LtRt*
Surround Phase Shift	*Enabled*
Dialogue Mix Mode	*As original*

3.4.4 Guidance for all other programs

If not required by the broadcaster this section will be removed or replaced by other Instructions.

Parameter	Value
Dialogue Level	*-24dB*
Line Mode Compression	*None*
RF Mode Compression	*Film Light*
Center Down-Mix Level	*Content dependent (-3dB or -6dB)*
Surround Down-Mix Level	*Content*

Parameter	Value
Surround 3dB Attn.	*Disabled*
Dolby Surround Mode	*Not Dolby Surround*
Preferred Stereo Down-Mix	*LoRo*
Surround Phase Shift	*Disabled*
Dialogue Mix Mode	*Option 1*

4. Appendix C – Standards and Specifications

Documentation Title	Publication Title
Parameter values for the HDTV standards for production and international program exchange **Link:** https://www.itu.int/rec/R-REC-BT.709	ITU-R Recommendation ITU-R BT.709
Advanced Video Coding for Generic Audio-Visual Services **Link:** https://www.itu.int/rec/T-REC-H.264	ITU-T Rec H.264
Description and Guide to the Use of the Dolby E Audio Metadata Serial Bitstream **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7290139	SMPTE RDD 6:2008
Text-Based Metadata Carriage in MXF **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7290394	SMPTE RP 2057:2011
Format of Audio Metadata and Description of the Asynchronous Serial Bitstream Transport **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7291402	SMPTE ST 2020-1:2008
Material Exchange Format (MXF) File Format Specification **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7292071	SMPTE ST 377-1:2011
MXF Multichannel Audio Labeling Framework **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7290580	SMPTE ST 377-4:2012
Material Exchange Format (MXF) File Format Specification **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7291543	SMPTE ST 377:2004
MXF Operational pattern 1A (Single Item, Single Package) **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7291762	SMPTE ST 378:2004
Material Exchange FormatMapping AVC Streams into the MXF Generic Container **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7291687	SMPTE ST 381-3:2013
Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7290973	SMPTE ST 382:2007
MXF Mappings for VBI Lines and Ancillary Data Packets **Link:** http://ieeexplore.ieee.org/servlet/opac?punumber=7291528	SMPTE ST 436:2006

5. Appendix D – Glossary

This is a glossary of some of the terms used in the technical documents that this specification references.

2-byte Local Length Encoding: The syntax encoding defined in SMPTE ST 377-1:2011 for "Local Sets" that uses 2-byte Tags and 2-byte Lengths.

ANC Frame Element: A KLV triplet containing one frame's worth of an Essence Element carrying ANC packets such as VANC Data Packets.

Audio Channel: A distinct collection of sequenced audio samples that are intended for delivery to a single loudspeaker or other reproduction device.

Audio Layout Mode: specifies a value for each of the following: "Channel Assignment Label", "MCA Labeling Present".

Audio Program: A collection of one or more audio channels.

Constrained Ancillary Data Mapping: The mapping of VANC Data Packets into ANC Frame Elements is as specified in SMPTE ST 436:2006.

Descriptive Metadata: Generic term used for descriptive data whose purpose is to describe Essence data.

DM Framework: A Descriptive Metadata Class that is a Subclass of Descriptive Framework.

DM Scheme: A mechanism for defining collections of Descriptive Metadata.

DM Scheme Label: An identifier for a DM Scheme. It is stored in an MXF file's Preface::DMSchemes property to signify the use of that DM Scheme in the file.

DM Segment: An MXF structure used to generically contain Descriptive Metadata on a Track.

Dolby E Audio Metadata Serial Bitstream: A serial communication protocol that is used to transfer audio metadata between various products manufactured by Dolby, as defined in SMPTE RDD 6:2008.

Edit Unit: A temporal division of a Track.

Essence: A bitstream comprising picture, sound or data.

Essence Container: A part of an MXF file that carries one or more Essence streams.

Essence Element: The entire essence stream of a single Track.

Essence Track: A type of Track that references Essence.

Filler: An MXF structure used to describe empty space on a Timeline Track.

Frame Wrapping: A method for dividing and interleaving Essence Elements for each frame of Picture Essence.

Generic Container: A MXF data structure used to store Essence data in an MXF file. The Generic Container is internal to the file.

Header Metadata: MXF data structures that collectively describe the data in the Essence data in an MXF file.

Header Partition: The first Partition in the MXF file. This Partition always contains a copy of the Header Metadata.

Index Table: A structure in an MXF file used to efficiently access Essence data.

Index Table Segment: A part of an Index Table.

KLV Alignment Grid: A notional byte spacing which may be used to align KLV items within a Partition.

KLV Fill: Refers to the well-defined means of inserting empty, "fill", data in an MXF file.

Material Package: An MXF data structure that describe an output timeline of the file.

Partition: A portion of the MXF file. An MXF file consists of a sequence of Partitions.

Picture Essence: A type of Essence containing predominantly picture data.

Picture Essence Descriptor: MXF technical metadata that describes the Picture Essence.

Picture Track: A type of Essence Track that references Picture Essence.

Preface: The root of the Strong Reference tree of the Header Metadata.

Program Segmentation Track: A Program Segmentation Track is a Timeline Track that contains a Sequence that is composed of zero or more Filler objects.

Random Index Pack: A table that contains the byte offsets of all Partitions.

Sequence: A Structural Metadata Class that is a Subclass of Structural Component.

Soundfield Group: A collection of Audio Channels meant to be played out simultaneously through a given Soundfield Configuration.

Sound Track: A type of Essence Track that references Sound Essence.

Source Essence: Essence data referenced by a Source Package.

Source Package: MXF data structure that describes source Essence.

Timecode: An annotation of elapsed time along a Track.

Timecode Component: An MXF structure that stores Timecode information.

Timecode Track: An MXF Track that stores one or more Timecode Components.

Timeline Track: A specialized MXF Track that describes a timeline by specifying an origin and rate.

Top-Level File Package: A Source Package that is internal to the file and which is directly referenced by a Material Package of the file.

Track: MXF data structure used to describe the content structure.

VANC Data Packet: An ancillary data packet in the vertical ancillary data space (VANC)

Video Format Identification

Some standards bodies, equipment manufactures and broadcasters are using an updated video format identification. The identification states the Active Line count (e.g. 1080 or 720) followed by the system Scanning Type (e.g. i = interlace and p = progressive) then a back slash (/) and finally the Frame Rate.

Examples:

- A 720-line progressive image at 59.94 frames a second would be **720p/59.94**
- A 1080- line interlace image at 59.94 fields a second would be **1080i/29.97**

6. Appendix E – Version Control

NABA DPP North American Version

Version	Date	Section	Required/Information	Update
Version 1.0	04/18/2016	All	-	New Document
Version 1.01	04/04/2017	2.5.1		Corrected Typo

[Broadcaster Name] Version

Version	Date	Section	Required/Information	Update
Version 1.0	04/18/2016	All	-	New Document