



Standards for Digital Screen Advertising. 3rd Edition

3.1 SAWA RECOMMENDED STANDARDS

Section 2.2.1 of this document illustrated SAWA's two minimum quality thresholds: the SAWA Recommended Standards and the SAWA Minimum Standards. Table 2 is shown again (as Table 3) to recapitulate where the SAWA

Recommended Standards lie within the various categories of digital cinema (D-Cinema) and electronic cinema (E-Cinema) currently deployed. This Section specifies the SAWA Recommended Standards.

Categories		Description	Standards	Typical Equipment
E-Cinema	SD < 720	SD (Standard Definition) and HD (High Definition); the number refers to the number of horizontal lines that make up the image	Numerous options available with little assurance of interoperability and not generally considered to be able to fulfil expectations of cinema quality	
	HD 720			
	HD 1080P (SAWA Minimum Standard)	High Definition system with 1080 lines each with 1920 pixels where each frame comprises all lines progressively, not using interlacing		
D-Cinema (SAWA Recommended Standard)	2K	2K describes systems that can achieve a maximum resolution of 2048 x 1080 4K describes systems that can achieve a maximum resolution of 4096 x 2160	As specified by key Hollywood movie studios (DCI) and as standardised by SMPTE and ISO	DCI-compliant projectors and playback servers or media blocks with precisely-defined light-level and colour-accuracy performance including compatibility with 3D Digital Cinema in selected theatres
	4K			

Table 3: Image Categories of Digital and Electronic Cinema Systems

Category	Subcategory	Standard	Reference
Digital Advertising Distribution Master (Postproduction)	Image resolution	1998 x 1080 (2K) or 3996 x 2160 (4K)	Section 3.3.2 and SMPTE428-1, 428-9
	Image frame rate	24 fps	Section 3.3.2, 3.3.1.2.1, and SMPTE428-1
	Image file format	TIFF	Section 3.3.2, and SMPTE428-5
	Audio channel count	6 channel	Section 3.3.2 and SMPTE428-2, 428-3, 428-4
	Audio channel format	5.1 approved mix for cinema replay as per SAWA Sound Manual	Members' section of http://www.sawa.com
	Audio level	Maximum 82 dBLeq(m) as per International Standard ISO 21727 (British Standard BS5550 7.4.2)	http://www.iso.org/ search keyword: 21727; http://www.bsonline.bsi-global.com/search/ search keyword: 5550-7.4.2
	Audio modulation, sample rate, bit-depth, and delivery medium	Pulse Code Modulation (PCM); 48,000 samples per second; 24 bits; Broadcast WAVE (.wav)	Section 3.4.2.2 and Glossary of this publication under 'PCM', 'WAVE'
Audio sync relationship (number of audio samples per frame)	For 24 fps: 2000.000 samples per frame	Glossary of this publication under 'Audio sync relationship'	
Digital Advertising Package	Image coding system	JPEG2000	SMPTE429-4 and Glossary of this publication under 'JPEG2000'
	Image coding max bit rate	Max 250 Mbps	Section 3.4.2.1 of this publication and Glossary for 'max bit rate' definition
	Image resolution	1998 x 1080 (2K) or 3996 x 2160 (4K)	Section 3.3.2 and SMPTE428-1, SMPTE428-9
	Image frame rate	24 fps	Section 3.3.2, and SMPTE428-5, SMPTE429-2
	Audio level	Maximum 82 dBLeq(m) as per International Standard ISO 21727; (British Standard BS5550 7.4.2)	http://www.iso.org/ search keyword: 21727; http://www.bsonline.bsi-global.com/search/ search keyword: 5550-7.4.2
	Audio modulation system, sample rate, bit depth, and file type	PCM, 48,000 Hz, 24 bit, DCP audio track file	Section 3.4.2.2, SMPTE429-3, and Glossary of this publication under 'PCM'
	Content pre/post-roll	Pre-roll: 6 frames; post-roll: 6 frames	See section 3.4.2.3 and Glossary of this publication under 'Content pre/post roll'
	Content packaging	DCP	SMPTE429-2 through 429-14
Image-audio synchronisation	Audio stream in-sync with image stream	See section 3.4.2	
Presentation	Projection image resolution	2K or 4K DCI	SMPTE431-1 and RP431-2
	Projection image frame rate	24 fps	Section 3.3.1.2.1 and Glossary of this publication under 'Image frame-rate'
	Projection image aspect ratio	1.85:1	Section 3.6.2.6
	Projection image brightness	14 fL (2D) 4.5 fL (3D)	Section 3.6.2.6, Section 3.6.2.7, SMPTE431-1
	Projection image contrast ratio	2000:1 sequential contrast ratio	Section 3.6.2.6, SMPTE431-1 and RP431-2
	Audio layout	6 channel to International Standard ISO 2969 and ISO 22234 (Society of Motion Picture Television Engineers standard SMPTE 202M and recommended practice SMPTE RP200)	Section 3.6.3.7 and http://www.iso.org/ search keywords: 2969 and 22234 (http://www.smpte.org/smpte_store/)

	Image-audio playback synchronisation	Audio to be delayed by total picture projection and image decode latency LESS audio decode latency to maintain sync	Section 3.6.2.8.4 and Glossary of this publication under 'Image-audio playback synchronisation'
Reporting	Audit trail (proof of play)	Higher levels of reporting such as: time and date; position in reel; cinema location; screen number	Section 3.5.1 and Glossary of this publication under 'Audit trail'

Table 4: SAWA Recommended Standards for Digital Screen Advertising

3.2 SAWA MINIMUM STANDARDS

Section 2.2.1 of this document illustrated SAWA's two minimum quality thresholds: the SAWA Recommended Standards and the SAWA Minimum Standards. Table 2 is shown again (as Table 5) to recapitulate where the SAWA

Minimum Standards lie within the various categories of digital cinema (D-Cinema) and electronic cinema (E-Cinema) currently deployed. This Section specifies the SAWA Minimum Standards.

Categories		Description	Standards	Typical Equipment
E-Cinema	SD < 720	SD (Standard Definition) and HD (High Definition); the number refers to the number of horizontal lines that make up the image	Numerous options available with little assurance of interoperability and not generally considered to be able to fulfil expectations of cinema quality	
	HD 720			
	HD 1080P (SAWA Minimum Standard)	High Definition system with 1080 lines each with 1920 pixels where each frame comprises all lines progressively, not using interlacing	In line with current HD broadcast standards typically through ITU-R	High brightness and high resolution large-venue projectors
D-Cinema (SAWA Recommended Standard)	2K	2K describes systems that can achieve a maximum resolution of 2048 x 1080	As specified by key Hollywood movie studios (DCI) and as standardised by SMPTE and ISO	DCI-compliant projectors and playback servers or media blocks with precisely-defined light-level and colour-accuracy performance including compatibility with 3D Digital Cinema in selected theatres
	4K	4K describes systems that can achieve a maximum resolution of 4096 x 2160		

Table 5: Image Categories of Digital and Electronic Cinema Systems

Category	Subcategory	Standard	Reference
Digital Advertising Distribution Master (Postproduction)	Image resolution	As per International Telecommunication Union – Radiocommunication, Rec. ITU-R BT.709 (HD1080P)	http://www.itu.int/ITU-R/ , http://www.itu.int/rec/R-REC-BT.709/en
	Image frame rate	The Screen Advertising Contractor chooses one of the following image frame rates and sets this as their delivery requirement: either your territory's broadcast standard (PAL/SECAM = 25 fps; NTSC = 29.97 fps) OR the cinema standard of 24 fps	Section 3.3.1.2.1 and Glossary of this publication under 'Image frame-rate'
	Audio channel count	6 channel	Section 3.3.3 and section 4.1.2.1.2
	Audio channel format	5.1 approved mix for cinema replay as per SAWA Sound Manual	Members' section of http://www.sawa.com
	Audio level	Maximum 82 dBLeq(m) as per International Standard ISO 21727 (British Standard BS5550 7.4.2)	http://www.iso.org/ search keyword: 21727; http://www.bsonline.bsi-global.com/search/ search keyword: 5550-7.4.2
	Audio modulation, sample rate, bit-depth, and delivery medium	Pulse Code Modulation (PCM); 48,000 samples per second; 16 or 24 bits; DTRS tape, Broadcast WAVE (.wav) or Audio Interchange File Format (.aif)	Glossary of this publication under 'PCM', 'DTRS', 'WAVE', and 'Audio Interchange File Format'
Audio sync relationship (number of audio samples per frame)	For 24 fps: 2000.000 samples per frame For 25 fps: 1920.000 samples per frame For 29.97 fps: 1601.601 samples per frame	Glossary of this publication under 'Audio sync relationship'	
Digital Advertising Package	Image coding system	MPEG2 MP@HL	Glossary of this publication under 'MPEG2' & 'MP@HL'
	Image coding max bit rate	Min 19.7 Mbps – Max 80 Mbps	Section 3.4.3.1 of this publication and Glossary for 'max bit rate' definition
	Image resolution	1920 x 1080	Section 3.3.3
	Image frame rate	To match image frame rate of the Screen Advertising Contractor's Digital Advertising Distribution Master and system requirement (as above)	Section 3.3.1.2.1 and Glossary of this publication under 'Image frame-rate'
	Audio level	Maximum 82 dBLeq(m) as per International Standard ISO 21727; (British Standard BS5550 7.4.2)	http://www.iso.org/ search keyword: 21727; http://www.bsonline.bsi-global.com/search/ search keyword: 5550-7.4.2
	Audio coding system	AC3 as per Rec. ITU-R BS.1688	http://www.itu.int/ITU-R/ , http://www.itu.int/rec/R-REC-BS.1688/en
	Audio coding bit rate	448 kbps	See section 3.4.3.2 and Glossary of this publication under 'Audio coding bit-rate'
	Audio coding sample rate	48 kHz	See section 3.4.3.2 and Glossary of this publication under 'Audio coding sample-rate'
	Audio coding embedded TC	No	See section 3.4.3.2 and Glossary of this publication under 'Audio coding embedded TC'
	Content pre/post-roll	Pre-roll: 6 frames; post-roll: 6 frames	See section 3.4.3.2 and Glossary of this publication under 'Content pre/post roll'
	Content packaging	MPEG2 Transport Stream	See section 3.4.3.2 and Glossary of this publication under 'Transport Stream'
Image-audio synchronisation	Coded audio stream in-sync with image stream; do not compensate for audio decoding latencies	See section 3.4.3.2 and Glossary of this publication under 'Coded audio stream in-sync'	
Presentation	Projection image resolution	Minimum 1280 x 720 (WXGA)	Glossary of this publication under 'WXGA'

	Projection image frame rate	To match image frame rate of the contractor’s Digital Advertising Distribution Master requirement (above)	Section 3.3.1.2.1 and Glossary of this publication under ‘Image frame-rate’
	Projection image aspect ratio	16:9 [unless resolution is higher]	Section 3.6.3.6
	Projector brightness (at 1x screen gain)	6 m wide screen : Minimum 4000 Lumens	Section 3.6.3.6
		9 m wide screen: 4500 – 6800 Lumens	Section 3.6.3.6
		12 m wide screen: Minimum 8000 Lumens	Section 3.6.3.6
	Projection image contrast ratio	Minimum 900:1 sequential contrast ratio	Section 3.6.3.6
	Audio ployout	6 channel to International Standard ISO 2969 and ISO 22234 (Society of Motion Picture Television Engineers standard SMPTE 202M and recommended practice SMPTE RP200)	http://www.iso.org/ search keywords: 2969 and 22234 (http://www.smpte.org/smpte_store/)
	Audio metadata dialnorm	Disabled	Glossary of this publication
	Image-audio playback synchronisation	Audio to be delayed by total picture projection and image decode latency LESS audio decode latency to maintain sync	Section 3.6.3.7.4 and Glossary of this publication under ‘Image-audio playback synchronisation’
Reporting	Audit trail (proof of play)	Higher levels of reporting such as: time and date; position in reel; cinema location; screen number	Section 3.5.1 and Glossary of this publication under ‘Audit trail’

Table 6: SAWA Minimum Standards for Digital Screen Advertising