Digital Capture Specifications

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Maintained by:	Lead, Preservation
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1. Document Control

Version	Approved By	Approval Date	Revisions
1.0	Content Steering Group	10 April 2019	Final review of specifications by Preservation Services
1.1		April 2020	Updated to include greater clarity around AV file naming
1.2	Content Steering Group	July 2021	Updated commissioned video to ProRes 422HQ/4444
2.0	Executive Director, Content	August 2024	Reviewed AV capture specifications, added 3D capture specifications. Added wording for redacted content, and cultural warning statements

2. Introduction

This document details the specifications for the capture of digital source files for State Library's collections, to meet current and future access and preservation requirements. The document covers the imaging of a broad range of media, including photographs, manuscripts, objects and other original documentary heritage materials and publications. It also applies to the digitisation of audiovisual content and outlines the file formats for each type of digital object.

State Library recognises that the application of standards and specifications in line with international best practice is critical to the successful implementation and sustainability of digital content. Digital information is fragile in ways that differ from analogue and hard copy information and, as such, presents many preservation challenges. Digital content is at risk of being lost due to the rapid pace of development in computer hardware, operating systems and application software, coupled with the short effective life of most physical storage media. In addition, digital files are more easily corrupted or altered without realisation.

Digital asset management, long-term preservation, and storage must be considered at all stages of the life cycle of digital objects. Ensuring quality specifications are in place at the point of capture/creation is an important strategy to protect State Library's increasing investment in digital content.

3. Principles

- State Library digitises physical collections once, at a standard that will ensure long-term access and preservation.

- Digital versions are created by digital capture from the original version, or from the highest quality version available, and will be exchangeable across platforms, broadly accessible, and will be digitised according to documented specifications.

- Where digital files are being donated and are of significant importance, the requirement for these files to meet State Library's specifications may be waived. However, every endeavour should be made to ensure the files being provided are at the highest quality possible.

4. Scope

The below specifications cover digital content captured for State Library from physical collections, either in-house, or from external vendors. They also cover the standards expected of born digital content received by the library from donors and vendors.

5. Visual works and Printed content

Visual works here are defined as two-dimensional works that communicate meaning, information or an artistic experience by visual means. Works may be created using traditional analogue processes or digital technologies.

Material types within this category include:

- photographs and items created using photographic processes, including
    - silver gelatin prints
    - negative film on ester, celluloid or nitrate bases
    - colour positive film such as 35mm slides and transparencies on ester, celluloid or nitrate bases
    - negatives on glass base such as silver gelatin and wet plate collodion.
    - other early photographic processes such as salted paper prints, daguerreotypes and ambrotypes
    - digital prints created through pigment transference, ink jet, dye sublimation and other such technologies
    - digital files created through capture devices such as cameras or scanning equipment
- maps
- architectural drawings and plans
- posters
- post cards
- pictorial content in newspapers
- two-dimensional works of art

Printed and written material includes both hand written and typescript, published and non-published works on paper. Published works may include but are not limited to:

- books
- newspapers
- street directories
- inserts and foldouts (maps)
- atlases
- music scores
- ephemera
- journals/serials
- non-published works such as diaries, correspondence and other manuscript material.

Recommended Source File Specifications

Uncompressed TIFF (Tagged Image File Format) is used by State Library as the primary archival file format.

Use	Description	Resolution	Size	Format	File extension
All Archival materials including photographs, transparencies, maps, albums, plans & artworks	24-bit colour	600 ppi	6000 pixels (across longest dimension)	TIFF	.tif
Extraordinary and highly unusual collections supported with colour chart and ruler including: • Significant artworks • Illuminated addresses • Items listed as Treasures in the Disaster Plan • Artist Books & Realia	24-bit colour	600 ppi	1:1 100%	TIFF	.tif
Published and non-published works on paper including manuscripts, diaries, printed text	24-bit Adobe RGB colour	600 ppi 600+ ppi	Items sized **less than A5 and greater than A6 (**148 x 210 mm or 8.3 x 5.8 in and 148 x 105 mm or 4.1 x 5.8) Items **less than A6** digitised to a minimum of 6000 pixels on the longest dimension	TIFF	.tif
Extraordinary and highly unusual collections supported with colour chart and ruler including:	24-bit Adobe RGB colour	600 ppi -	Items **sized greater than A5 and less than A6 (**148 x 210 mm or 8.3 x 5.8 in and 148 x 105 mm or 4.1 x 5.8)	TIFF	.tif

Use	Description	Resolution	Size	Format	File extension
• Very small or very large collections - eg miniature diaries/scrolls • Items listed as Treasures in the Disaster Plan • Artist Books & Realia		600+ ppi -	Items **sized smaller than A6** digitised to a minimum of 6000 pixels on the longest dimension		

Blank pages are only captured to maintain online viewing sequence. Where an item contains 10 or fewer continuous blank pages, the pages will be digitally captured. Where an item contains more than 10 continuous blank pages, a digital insert is included to indicate 'The following pages are blank'. 'Blank' is defined as not containing any original content (eg. lined pages without text are considered 'blank').

Pages missing from the original:

The following pages are missing from the original item, and therefore are unable to be digitised.

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Pages too fragile to be digitised, or damaged:

The following pages of the original item are damaged or too fragile to be digitised.

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Queensland Government

slq.qld.gov.au

No retouching of imperfections in the original image will be performed to ensure faithful capture.

Double page items such as bound books, newspapers, and journals, will be captured page-by-page, rather than a double-page spread.

All files will have the minimum of post digitisation editing, which should only involve:
- minor changes in levels (lightness, darkness, contrast) to match the original image or to slightly enhance important detail
- photographic print collections with a white border will be cropped to display a minimal portion of the border to just beyond the image area of the photograph
- photographic print collections with a white border containing inscriptions will not be cropped thereby displaying the entire border
- Cropping of additional white borders or non-image components such as photo corners, mount boards, frames etc.
- Adjustments in colour balance to match the original
- Transparency collections will be cropped to the image area
- Transparency collections with original inscriptions on the borders or mountings will not be cropped

Technical metadata must include at a minimum:
- file size
- pixel dimensions
- date of creation
- compression scheme

but would also be beneficial to include:
- Equipment make and model
- Exposure information
- Colour space
- Software type used.

Recommended minimum standard for donated material

Where digital files are donated to State Library the preferred minimum standard is as outlined above. Where digital files do not meet the specifications but are considered significant and appropriate for donation, the requirement for these to meet the specifications may be waived. However, donated digital files should be at the highest resolution possible and all endeavours should be made to acquire with at least the following specifications:
- If supplied as JPEG files, the smallest amount of compression
- For digital cameras, captured at highest quality settings
- RAW files preferred if captured with a digital camera
- Unedited files direct from the camera or digitisation device if RAW files are unavailable
- The preferred format for text based documents is MS Word (docx)

6. Audiovisual content

Audiovisual material refers to moving image and sound collections. They can be recorded or stored on different mediums or carriers such as motion picture film; grooved and optical discs; magnetic media including videotapes, audiotapes, data-tapes and hard drives.

Audiovisual collections can be in analogue or digital format and are usually dependent on equipment and software technology to access the information. Digital in this context refers to file-based digital audiovisual content.

The file/container format is the video wrapper that encapsulates the video, audio and data essences, also known as encoding formats or codecs. Some file/container formats can only contain a specific encoding format, e.g. Windows Media file format can only contain Windowsm Media Video and Audio codec. Other video file/container formats such as Quicktime, AVI and MXF can encapsulate different types of codecs such as MPEG-2, DV, uncompressed etc.

Recommended Capture/Source File Specifications:

Audio Capture

Audio Source	Analogue Tape (turning digital)	Digital File (born digital)
File format	BWF, Broadcast Wave version of the WAV file (preferred) or WAV	Make copies of original as is; create normalised versions. For Audio Compact Disc (CDDA), create 16 bit, 44.1kHz WAV files.
Channels	Same as original	Same as original
Audio encoding	LPCM - Linear Pulse-Code Modulation	LPCM
Compression mode	No compression	No compression
Bit depth	24 bit or native	Native to source, minimum 16 bit
Sampling rate	96 kHz or native	Native to source, minimum 44.1kHz

All audio digital primary files captured from analogue sources must be a straight transfer without any enhancements.

Normalised processing and noise reduction techniques can only be performed on copies of the digital primary files.

Technical metadata will include at least:
- file format
- codec
- creator
- date of creation e.g. 2015-01-28 (yyyy-mm-dd)
- duration e.g. 00:01:23 (hh:mm:ss)
- chroma subsampling rate
- bit depth
- bit rate
- audio channels

For digital primary files transferred from an analogue source, technical metadata may include:
- source material format and original identification number
- playback and digital converter equipment make, model and serial number
- analogue (format type, speed, channels) conversion to digital (bit depth, sampling rate)
- software information
- checksum file (MD5)
- software used

Motion Picture Film Capture

Digital capture will ensure the entire exposed image frame is captured, regardless of sprocket hole/perforation position on each film cell.

Film Source	Film: 35mm/16mm/9.5mm	Film: 8mm/Super8
Image sequence output		
File format	Uncompressed 16 bit TIFF - Each frame is scanned as a file, and numbered sequentially	Uncompressed 16 bit TIFF - Each frame is scanned as a file, and numbered sequentially
Aspect ratio	4:3, 16:9 or native (For films, depending on film gauge, add black sections to match aspect ratio. No cropping of image)	4:3, 16:9 or native (For films, depending on film gauge, add black sections to match HD aspect ratio. No cropping of image)
Timing, grading	One-light transfer with best setting determined prior to scanning	One-light transfer with best setting determined prior to scanning
Bit depth	16 bit or native	16 bit or native
Resolution	- 4K (4096 pixels across) or minimum 2K (2048 pixels across) - capture entire image area	- 2K (2048 pixels across) or minimum HD (1920 pixels across) - capture entire image area
Color model	RGB	RGB
Film Audio		
File Format	BWF, Broadcast Wave version of the WAV file (preferred) or WAV	BWF, Broadcast Wave version of the WAV file
Channels	Same as original or dual mono	Same as original or dual mono
Compression mode	No compression	No compression
Audio encoding	LPCM	LPCM
Bit depth	24 bit	24 bit
Sampling rate	48 kHz	48 kHz

Video Capture

Video Source	Turned digital	Born digital
File/Container format	MKV – Matroska ver.4 ; or QT MOV	- Native - For DVD videos make a copy of directory and contents - Select MOV if exporting from video editing program. - For complex CD/DVD create a disk image .iso file.
Video encoding	FFV1 ver. 3 - FF Video Codec 1 (for MKV ver.4); or V210 (for MOV). V210 files will be converted to preferred FFV1 codec in a MKV wrapper	- Native - If exporting from video editing program, export at ProRes 422 HQ/ 4444 (if using alpha channel)
Compression mode	Lossless FFV1	- Native - Uncompressed for MOV, No further compression selected for FFv1 or ProRes 422 HQ/ 4444
Video definition	SD 720x576, HD 1920x1080 or native	- Native - Export video definition settings in video editing program to be as per camera or HD 1920 x 1080
Aspect ratio	SD 4:3, HD 16:9 or native	- Native
Bit depth	10 bit or 8 bit (minimum)	- Native - If exporting from video editing program, 10 bit

Video Source	Turned digital	Born digital
Color space	Y:Cb:Cr	Y:Cb:Cr
Chroma sub-sampling	Native, 4:2:2 (minimum) or 4:4:4	- Native - Export from video editing software to 4:2:2 (minimum) or 4:4:4
Frame rate	25 fps (minimum) or native e.g. 24 fps, 50fps	Native or 25 fps
Audio (within container)		
Channels	Native or 2 channels	Native or 2 channels
Compression mode	No compression	No compression
Audio encoding	LPCM	Native or export in LPCM
Bit depth	24 bit	Native or 24 bit
Sampling rate	48 kHz	Native or 48 kHz

For specifications for commissioned video works for the library's collections, please see Appendix A.

Video Modified Primary Files (for non-archival video formats e.g. donated videos that get modified for preservation and access)

Source	**Turned digital** film and video	Digital video
File/Container format	MKV - Matroska	MKV - Matroska
Video encoding	FFV1 ver. 3 - FF Video Codec 1	FFV1 ver. 3 - FF Video Codec 1
Compression mode	Lossless FFV1	Lossless FFV1
Video definition	Native	SD 720x576, HD 1920x1080 or native
Aspect ratio	Native	SD 4:3, HD 16:9 or native
Bit depth	Native	10 bit or 8 bit (minimum) or native
Color space	Native	Y:Cb:Cr or native
Chroma sub-sampling	Native	Native, 4:2:2 (minimum) or 4:4:4
Frame rate	Same as film speed	25 fps (minimum) or native e.g. 24 fps, 50fps
Audio (within container)		
Channels	Native	Native or 2 channels
Compression mode	No compression	No compression
Audio encoding	Native or LPCM	LPCM
Bit depth	Native or 24 bit	24 bit
Sampling rate	Native or 48 kHz	48 kHz

When creating FFV1 in MKV wrapper with FFMPEG software, the following switches are used:
```
-c:v ffv1
-level 3
-coder 1
-context 1
-g 1
-slices 24
-slicecrc 1
-c:a copy
```

FFv1 in MKV and V210 in MOV are designated archival digital video formats. Analogue videotape will be captured to digital preservation primary format, FFv1 in MKV or V210/V410 in MOV; and non-archival digital video will be converted to modified primary file, FFV1 in MKV.

The preservation primary file for film, is the image sequence where each frame (cell) of film is represented by an image file (TIFF).

Video producers are expected to export their project at the highest quality uncompressed e.g. V210 in MOV. They should not export as a compressed file before converting it to uncompressed.

Technical metadata will include at least:
- file format
- compression format
- creator
- duration e.g. 2015-01-28 (yyyy-mm-dd)
- date of creation
- sampling rate
- bit depth
- bit rate
- chroma-subsampling
- color space
- audio channels
- video signal- PAL/NTSC/SECAM

For primary digital files transferred from an analogue source, technical metadata may include:
- source material format and original identification number
- playback and digital converter equipment make, model and serial number
- analogue (format type, speed, channels) conversion to digital (bit depth, sampling rate)
- software information
- time code
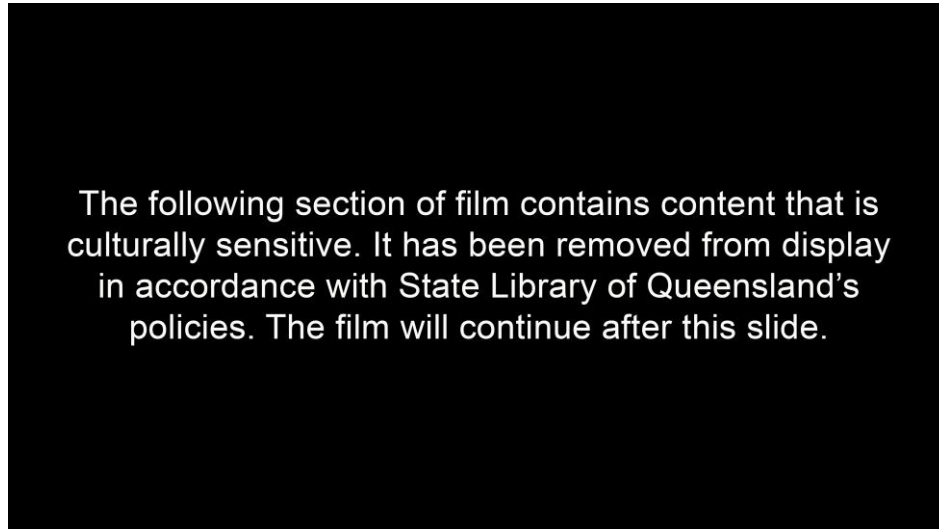- hash sums

7. Three Dimensional (3D) content

Collection items in this category include three dimensional objects such as realia, works of art, and artists' books. Three dimensional objects from the collection will be selectedfor digital capture and rendering (either in 3D digital depictions, and/or via the production of 3D print files) dependent on the suitability of the object for this type of capture. Three dimensional capture includes scanning of the object shape, and photogrammetry capturing the surface level appearance of the object.

Source	Description	Size	Format	File extension
3D archive object file	This is an ASCII file format that allows the surface geometry of an item to be recorded as vertices making up complex poloygons.	around 600,000 polygons	OBJ	.obj
Material Template Library file	This is an ASCII companion file for the OBJ and defines such things as colour, texture and lighting properties.	N/A	MTL	.mtl
Archive texture file	Stored as a 24 bit, uncompressed TIFF image file. The image texture of the item is recorded as a 2 dimensional image file. When rendering the 3D model, every surface point is assigned a coordinate in this 2-dimensional image which is applied to the 3D surface.	Variable depending on size and complexity of original	TIFF	.tif
Hero image file	Stored as a 24 bit, uncompressed TIFF image file. Either a photograph of the original item or a screen grab of the 3D digital model to represent the file.	600 ppi, 6000 pixels (across longest dimension)	TIFF	.tif
3D Delivery format	This file combines all the elements from a 3D model (see above), including materials, node hierarchy and cameras, in a single compressed file. This is used for online viewing of 3D scans through the catalogue/Rosetta Viewer.	Same poloygon count as OBJ but compressed file	GLB	.glb

8. Redacted Content

Occasionally, there may be a need to remove a section of a written work, video or audio recording, due to cultural sensitivities or at the request of the donor/creator. In these instances, a statement will be included in the redacted section to alert the viewer/reader of the exclusion.

Culturally sensitive material (film/video):

The following section of film contains content that is culturally sensitive. It has been removed from display in accordance with State Library of Queensland's policies. The film will continue after this slide.

Personal information (printed materials):

If sections of printed or handwritten digital works are redacted to exclude private information (names, addresses, financial details, etc.), or at the request of the creator/donor, a statement will be inserted at the beginning of the file:

Portions of this work have been removed or redacted at the request of the donor/creator, or to comply with relevant Australian privacy laws.

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9. Aboriginal and Torres Strait Islander content

Film and videos with Aboriginal and Torres Straight Islander content will include a cultural statement inserted at the beginning of the access copy:

> Aboriginal and Torres Strait Islander viewers
> are advised that the following footage
> may contain images and voices of
> deceased persons.

10.   Related Documents

- [Content Strategy](#)
- [Digitisation Policy](#)
- [Descriptive metadata standards](#)
- [Directory Naming Conventions](#)
- [File Naming Conventions](#)
- [Preservation Policy](#)
- [Transcript standard](#)

11.   Definitions

Term	Definition
Analogue	Analogue video and audio is created using analogue technology where information is translated into electric pulses of varying amplitude (as opposed to digital technology, which transforms information into binary format (zeros and ones) and each bit is representative of two distinct amplitudes.
Authenticity	The quality of being reliable or trustworthy. In the case of digital materials it refers to the fact that whatever is being cited is the same as it was when it was first created unless the accompanying metadata indicates any changes. Confidence in the authenticity of digital materials over time is crucial owing to the ease with which alterations can be made.
Authentication	A mechanism which attempts to establish the authenticity of digital materials at a particular point in time. Mechanisms to assure authentication may include digital signatures, naming schemes, watermarking and various kinds of (open) encryption techniques.
Born-digital	Digital material that was created and exists only in a digital format, for which there has never been and is never intended to be an analogue equivalent.
BWF	Broadcast WAV Format
CDDA	Compact Disc Digital Audio
Codec	coder-decoder/compressor-decompressor
Digital content	A broad term for an object of some sort (text, image, sound, and video) captured in digital format.

Term	Definition
Digital material	A broad term encompassing both born-digital and digital surrogates created as a result of converting analogue materials to digital form (digitisation).
Digital object	Data stored as computer files and requiring applications software for viewing, including databases, spreadsheets, word processor documents, web pages, video, audio, images, maps, 2 and 3-D models etc.
Digital preservation	The series of managed activities required to maintain continued access to digital materials beyond the limits of media failure or technological change for as long as necessary
Digital preservation strategies	Technical approaches to long-term digital preservation including such strategies as data migration, normalisation, technology preservation (hardware and software) and technology (software) emulation.
Digital surrogate	A digital copy of an analogue object that has been created using digital technologies
Digitisation	The process of converting a non-digital object into a digital object. The resulting digital surrogate would then be classed as digital material and subject to the same broad challenges involved in preserving access to it as born-digital materials
HD	High Definition (1920x1080 pixels)
FCP	Final Cut Pro editing software
FFV1	FF Video Codec 1
FPS	frames per second
LPCM	Linear Pulse-Code Modulation
kHz	kilohertz
Metadata	Data about data. Information which describes significant aspects of a resource such as context, content and structure of records and their management through time. Metadata supports a variety of operations on objects.
Mbps	Megabit per second
MBps	Megabyte per second (1 megabyte = 8 megabit)
MKV	Matroska wrapper/container for video (Open Source)
MOV	Apple Quicktime wrapper/container for video
Preservation Metadata	Preservation metadata is intended to store technical details on the format, structure and use of digital content, the history of all actions performed on the digital material including changes and decisions, the authenticity information such as technical features or custody history, and the responsibilities and rights information applicable to preservation actions.
Preservation	The processes and activities involved in protecting something from loss and ensuring the survival of material through time.
QT	Apple Quick Time
Redacted Content	Content that has been edited to obscure or remove sensitive information.
SD	Standard Definition (720 x 576 pixels)
Secure digital repository	A storage system in which digital objects are stored for subsequent access or retrieval. A secure digital repository aims to provide reliable, long-term access to managed digital resources to its designated community, now and in the future.
TIFF	Tagged Image File Format
Trusted digital repository	A storage system in which digital objects are stored for subsequent access or retrieval. A secure digital repository aims to provide reliable, long-term access to managed digital resources to its designated community, now and in the future. A trusted digital repository will also meet the assessment criteria in developed certification checklist

Term	Definition
WAV	Waveform Audio File Format

12.   Approval

Anna Raunik   5 /   8 /2024

Executive Director, Content

Born Digital Video Specifications

Maintained by:	Lead, Preservation
Review date:	June 2024
Next review date:	June 2026

1   Document control

Version	Approved by	Approval date	Revisions
v1.0	Endorsed by Content Steering Group	29 July 2021	
V1.1	Endorsed by Content Steering Group	June 2024	

2   Purpose

These specifications outline the required standards and components for born digital video created for State Library's collections.

3   Scope

The specifications apply to any person or business involved in creating digital video content for State Library's collections.

4   Video primary files

Video primary files should be created to the following specifications:

File Format/Container	QT MOV
Video definition	1920 x 1080
Aspect ratio	16:9 or native
Frame rate	25/29.97 fps or native
Compression	No further compression
Compression format (codecs)	ProRes 422HQ
Bit rate	220 Mbps
Bit depth	10 bit
Chroma sub-sampling	4:2:2 (minimum)
Progressive/Interlaced	Progressive
Color space	Y:Cb:Cr

5   Audio files (within video container)

Audio files should be created to the following specifications:

Bit depth	24 bit
Sampling rate	48 kHz
Format	PCM
Compression	None
Channels	2

6   Additional derivative files

In addition to the video primary files, all of the below derivatives must be provided, to the following requirements:

6.1 Subtitle file:

- Separate SRT (SubRip Format Text File) for subtitles in hh:mm:ss,mss. Also, MOV and MP4 video files should have subtitles as default (not burnt in).

6.2 Video derivative:
- MP4 (MPEG-4 Part 14) with H.264/MPEG-4 Part 10, Advanced Video Coding (MPEG-4 AVC High@3.2) - Compressed video file format - 1920x1080, 8 bit, 5mbit/s, 4:2:0 chroma-subsampling with AAC audio.

6.3 Transcripts:
- MS Word

6.4 Checksum (hash) files:
- ALL files (primary files and derivatives) must be accompanied with an MD5 checksum file with the individual file extension. e.g. xxxx-0001.mov has xxxx-0001.mov.md5 (or .hash).

6.5 Representative image:
- A single TIF uncompressed image to represent the video

7   Capture quality and compression

Devices used for video capture should generate files of a high quality - either equal to, or greater than the specifications listed above. Files should not be upscaled after capture to meet required specifications. Similarly, the primary files exported from editing programs such as Final Cut Pro, should be exported as ProRes 422 HQ and not upscaled after exporting.
Files which have been upscaled after project export will be rejected.

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