



AUDIO PROCEDURES (VERSION 1.90)

DIGITAL ARHIVISTS
ARCHAEOLOGY DATA SERVICE
<https://archaeologydataservice.ac.uk/>

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1. Purpose of this document

1.0.1 This documents current ADS procedures for production of dissemination and preservation copies of digital audio files. It contains a list of current dissemination and preservation formats and how to migrate files to required formats. More information on this data type, can be found in the G2GP for Digital Audio http://guides.archaeologydataservice.ac.uk/g2gp/Audio_Toc.

2. Formats

Offered format	Accepted	Preservation	Presentation	Notes
Waveform Audio .wav	YES	Waveform Audio .wav	MPEG-1 Audio Layer III .mp3	LPCM encoding preferred. Embedded metadata should be preserved, and where none has been created we will require software used to create/encode, bit rate (kbps) and sampling frequency range (KHz). May be supplied in a compressed form using some form of codec, so be sure to check on delivery.
Broadcast Wave Format .bwf Preferred format	YES	Broadcast Wave Format .bwf	MPEG-1 Audio Layer III .mp3	Embedded BEXT-chunk, iXML-chunk or other metadata should be preserved. May be supplied in a compressed form using some form of codec, so be sure to check on delivery.

Audio Interchange File .aif (likely from Mac users)	YES	Waveform Audio .wav , or Broadcast Wave Format .bwf	MPEG-1 Audio Layer III .mp3	Embedded ID3 or other metadata should be preserved. May be supplied in a compressed form using some form of codec, so be sure to check on delivery. Uncompressed or LPCM encoding preferred.
SUN au .au	NO			
FLAC .flac	YES	Waveform Audio .wav	MPEG-1 Audio Layer III .mp3	.flac also holds metadata ¹ make sure this is preserved if needed.
Advanced Audio Coding .aac	YES	Waveform Audio .wav , or Broadcast Wave Format .bwf	MPEG-1 Audio Layer III .mp3	An ISO standard format based on MPEG-2 and MPEG-4 formats The format is widely supported by a number of common devices (Wii, Playstation, iPod, iPhone amongst others) and is designed to be the successor of the MP3 format. AAC format data may be commonly packaged in MP4, 3GP, ADIF and ADTS container formats. Suitable for dissemination but not for preservation.
Speex .ogg	YES	Waveform Audio .wav , or Broadcast Wave Format .bwf	MPEG-1 Audio Layer III .mp3	An open, free codec developed by the Xiph.Org Foundation. ² As with other Xiph.Org Foundation formats (e.g. Vorbis, FLAC), Speex is a free and open codec. Speex is targeted specifically at providing high quality compressed voice/speech files. Suitable for

¹ <http://xiph.org/flac/format.html>

² <https://xiph.org/> .

				dissemination but not for preservation
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3. Documentation / Metadata

3.0.1 Currently there is no dedicated template for metadata, but, as the G2GP recommend, the following documentation should be supplied with each file.

Element	Description
Bit Depth	e.g. 16 or 24 bit.
Bit Rate	Optional, often recorded as kbps
Sample Rate (KHz)	e.g. 44.1kHz
Codec Used	The codec used in creating the file e.g. FLAC or ACC.
Length of Recording	Preferably recorded in hours, minutes, seconds (hh:mm:ss).
Channels	
Supporting Documentation	
Copyright Clearances	These are very important for audio files, especially oral histories/interviews.
Transcriptions of interviews	Transcripts of interviews can be important documentation particularly in clarifying those involved in recordings and allowing specific individuals to be identified.

3.0.2 This table is derived from the G2GP

http://guides.archaeologydataservice.ac.uk/g2gp/Audio_3.

3.0.3 Metadata templates are available from the Guidelines for Depositors.³

3.1 Associated metadata

3.1.1 It is important that any copyright information/permissions are stored alongside the requisite file in a suitable preservation format. Similarly transcriptions of audio files should be stored in a suitable preservation format (see ADS Data Procedures: Binary and Plain Text).

³ <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml>.

3.2 Embedded metadata

3.2.1 If the Digital Archivist has decided that embedded metadata is a significant property of a file, then this should be extracted and saved in a suitable preservation format. Many audio software packages contain metadata editors/extractors that allow the export of metadata, but there are also a host of freeware standalone tools that provide similar functionality (e.g. Meta-Extractor; BWF MetaEdit; JHOVE). In an ideal world we should ask for metadata to be supplied separately in an XML or TXT form but this is not always possible. IF we receive separate metadata it should be preserved and disseminated alongside the relevant files (see below for notes on storage).

4. Accessioning checks

4.1 Checks

- Do we have the necessary documentation
- Depositors should be encouraged to supply uncompressed and compressed version of audio files. The compressed versions are to be used for web delivery.
- The necessary rights and clearances have been attained from contributors with regard to copyright
- Embedded metadata (BEXT, iXML chunks) - ensure that all technical metadata is preserved either within the normalised file, OR is preserved separately.
- Associated project files (.pts, .ptf, .aup) - all documentation should be managed/documentated externally
- Transcriptions (where appropriate)

4.2 Significant properties

- The G2GP recommends that the following significant properties should be maintained during preservation (after Knight 2010: 8-10)
- Duration - i.e. the length of the audio file in Timecode character format (TCF). Checks should be made to ensure that the file matches its intended length.
- Bit Depth - indicates the number of bits of information stored per sample and is an indicator of audio quality e.g. 16 or 24 bit.
- Sample Rate - an indicator of the number of samples per second, sample rate is usually expressed in hertz e.g. 44.1 kHz (a common sample rate) and is, like bit depth, an indicator of the quality of the file.
- Channels - A descriptive or numeric value that indicates the number of distinct streams within an audio object or a description of their configuration e.g. "2 (stereo)".

4.3 File-naming

4.3.1 Where possible files should retain the same name as the original. On occasion (and normally for dissemination), it may be necessary to create different versions of the same file. In these cases a logical naming strategy should be used, and should be accompanied by explanation in the Processes section of the CMS.

4.3.2 Extracted metadata should also be named consistently, for example

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- myaudio_meta.xml

4.3.3 All files and metadata should be placed in the appropriate location as outlined below.

5 How to convert files

Starting Format	Procedure	End Format	Checks
Waveform Audio .wav	<p>Audacity</p> <ol style="list-style-type: none"> 1) Decide on dissemination format you wish to create. Generally OGG or MP3 (although see discussion above). If you are creating MP3 files you will need to install an encoder to export as MP3 or use the Lame option in Mediacoder http://lame1.buanzo.com.ar/#lamewindl 2) Open Audacity. Use File => Preferences then the File Formats tab to adjust the settings for the export format. 3) File > Open to open the file 4) File > Export as MP3 OR File > Export as OGG to export files to desktop 5) Listen to file, check length of file and carry out other checks as documented in the AHDS Audio Preservation Handbook 	MPEG-1 Audio Layer III .mp3	<ul style="list-style-type: none"> • bit depth and file duration are retained and the same as the original(NB: There may be some slight discrepancy of the former when converting dissemination formats due to the inherent characteristics of lossy encoding formats that make use of variable bit depth for each sample. Whilst slight discrepancies in file duration may be consequential of the handling of milliseconds in some software packages). • Original fidelity has been retained. • Embedded metadata, where possible, has been preserved.
Waveform Audio .wav	<p>Extracting metadata with SoX - http://sox.sourceforge.net/⁴</p> <ol style="list-style-type: none"> 1) From the DOS prompt navigate to the folder where SoX is installed 2) Enter the command 'sox [file location]audio.wav [file location]audio.mp3' 3) Jobs a good one! 	eXtensible Markup Language .xml	

⁴ Unfortunately SoX does not directly support the MP3 format, consequently you will need to install an encoder/decoder .dll files that allows conversion. For encoding/writing try a web search for lame-enc.dll, libmp3lame-0.dll, libmp3lame.dll, or cygmp3lame-0.dll, whilst for decoding/reading try libmad-0.dll, libmad.dll or cygmad-0.dll. These .dll files should be placed in the same directory as SOX.EXE file.

<p>Waveform Audio .wav</p>	<p>Extracting metadata with Meta-Extractor - http://meta-extractor.sourceforge.net/ User's guide - http://meta-extractor.sourceforge.net/documentation.htm</p> <p>1) Download and unzip the Meta-Extractor files in an appropriate place (e.g. C:\Program Files\metadata-extractor). There is useful installation guide if you require further guidance (http://meta-extractor.sourceforge.net/documentation.htm)</p> <p>2) Open the metadata.bat file and the graphical interface will appear.</p> <p>3) Set the 'destination' to a meaningful location, or leave it in its default setting.</p> <p>4) Click 'Tools' > 'New Object' > 'Simple Object' or 'Complex Object'. You can then add files to the list of files from which the metadata is to be extracted.</p> <p>5) Once the list is complete click 'Tools' > 'Process', and the .xml files will magically appear in your destination folder. These can then be moved to the required location (see below).</p>	<p>eXtensible Markup Language .xml</p>	
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6 Storage

6.1 Storing data

6.1.1 Data should be stored in appropriately named folders, as described in the ADS Repository Operations manual.⁵ Any directory structure from the SIP should be retained in the AIP. In some cases editing/restructuring may be necessary, but such restructuring should be recorded in the Processes section of the CMS.

6.1.2 Otherwise, store data in one of the following directory structure:

```

/preservation
  /{original_structure}
    myaudiofile.wav
  
```

```

/dissemination
  /{original_structure}
    myaudiofile.mp3
  
```

6.2 Storing metadata

6.2.1 File and embedded metadata (copyrights, documentation, etc) should be stored in an appropriate archival format with the preservation/dissemination files in a "documentation" folder within the requisite folder, for example:

```

/preservation/
  /{original_structure}/
    myaudiofile.wav
  /documentation
    myaudiofile_metadata.docx
    myaudiofile_embedded_metadata.xml
  
```

```

/dissemination/
  /{original_structure}/
    myaudiofile.mp3
  /documentation
    myaudiofile_metadata.pdf
  
```

6.2.2 For dissemination, any embedded metadata can be left within the file, although care should be taken to make sure this metadata remains unchanged, particularly following conversion. If this metadata is supplied by depositor separately, then this should be presented with the dissemination data. For example:

⁵ <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp>.

```

/dissemination
  /{original_structure}
    myotheraudiofile.mp3
  /documentation
    myotheraudiofile_metadata.pdf
    myotheraudiofile_embedded_metadata.xml

```

6.2.3 If metadata has been extracted from an existing file the Digital Archivist should make sure that these files are named logically (i.e. relate them to the file(s) and what they contain). Any metadata extraction should be recorded in the Processes section of the CMS.

7. Creating and linking objects in the OMS tables

7.0.1 See Match Objects Overview for general overview {internal access only}
 see also CMS-OMS TableStructure for MOS data requirements {internal access only}

8. Tech watch / things to note

9. Archival notes

10. References

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http://www.digitalpreservation.gov/formats/content/sound_preferences.shtml