BACKGROUND

This document provides a general overview of the GRAMMY Foundation’s requirements and recommendations regarding preservation and archiving methodology for projects funded by the Foundation. A panel of experts convenes each year to review this document. As technology is constantly changing, at the writing of this document the following are recommended best practices.

A general response (by applicant) in the proposed project’s methodology that states “current or standard methodology will be applied to the project” is not sufficient. Each applicant should detail specific methodology that pertains to the archiving of its unique material, even if that methodology deviates from the recommendations below.

The task of archiving and preserving recorded sound involves: identification, assessment, preparation, documentation, preservation and access. During this process, many times materials are found to be unstable or compromised in which case the materials must also be stabilized and prepared for conversion by a qualified professional. When considering all these factors in addition to digitization, common formulas for calculating the amount of time to allocate to preserving a collection is three to four times the play time for most analog collections. When necessary, content and copyright (see grant guidelines for ownership and rights requirements) verification must also be factored into the time estimate to complete the project. Resources for assessment, preservation and access are available at the end of this document.

Preservation is a precise process, therefore professionals experienced with preparation of the source media, destination archive format and processes must be used. It is imperative that during the preservation process the best possible copy of the original source material is captured. All archiving and preservation projects are required to either consult with, or retain qualified specialists with knowledge of current standards of preservation for both planning and execution of the archiving and preservation project. This includes but is not limited to qualified sound archivists, audio engineers and preservation technicians. Also please note, while we understand it is prudent for many institutions to engage students and interns, a qualified supervisor is required to be on hand during the transfer process.

Applicants and their technical staff should be familiar with two documents provided by the International Association of Sound and Audiovisual Archives (IASA)\(^1\).

- IASA TC-03 is recommended for collection managers and non-technical staff overseeing the project. This document gives an overview of basic methodology for archiving and preservation. http://www.iasa-web.org/sites/default/files/downloads/publications/TC03_English.pdf

- IASA TC-04 should be reviewed by technical staff for detailed technical methodology and standards. Collection managers and non-technical staff will also benefit from the first ten pages. http://www.iasa-web.org/tc04/audio-preservation

The following are a few recommendations and requirements for basic methodology. At the end of this document is a reference list of several archiving and preservation resources.

\(^1\) Both of the above documents can be downloaded in various formats here: http://www.iasa-web.org/technical-guidelines
### CONVERSION

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>IDEAL METHODOLOGY</th>
<th>MINIMUM STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling frequency and bit rate</td>
<td><strong>Analog to Digital</strong> - 192 kHz/24-bit If original source is digital, migrate <em>in the digital domain</em> at original sampling frequency and bit depth.</td>
<td><strong>Analog to Digital</strong> - 96kHz /24-bit If original source is digital, migrate <em>in the digital domain</em> at original sampling frequency and bit depth.</td>
</tr>
<tr>
<td>File format</td>
<td>Open standard: Uncompressed Broadcast Wave Format (BWF). Allows easy conversion and bundling of audio/video content and metadata.</td>
<td></td>
</tr>
<tr>
<td>Recorded track configuration</td>
<td>• Flattened mono files for mono • Flattened interleaved stereo files for stereo recordings • Flattened multiple mono files for multi-channel</td>
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</tr>
</tbody>
</table>

- All media must be monitored individually (1-to-1), either during initial digitization or as a quality control step. Monitoring more than one tape, disk, etc. at a time during the archiving process is not acceptable.
- **Do not use Post-processing (including noise reduction)** to create master digital preservation files (except for decoding of noise reduction systems such as Dolby or DBX).
- **Do not use DAT** as an archival medium
- **Do not use individual hard drives** as an archival medium
- **Do not use internal computer audio converters and sound cards** for analog to digital conversion
- **Do not use lossy compression formats** (MP3, AAC, etc.) as an archival format; however, they may be permitted for website and access² listening copies

Archival copies are to be converted flat (unprocessed), without any audio manipulation, dynamics, equalization (other than source machine alignment), before noise reduction decoding, if appropriate, takes place to preserve as much of the original sound information as possible. Organizations can provide listening copies that have been “cleaned up,” but these should be noted as such and stored as access audio.

Analog tapes should only be played back on tape machines that match the speed and format of the original recording and that are properly maintained, cleaned and aligned. Alignment of playback machines should be to original recording levels and tones when possible. If analog noise reduction “encoding” (such as Dolby or DBX) is employed on original recording, this should be aligned and “decoded” in the analog domain and captured as part of the archival version. Analog discs should only be played back on turntables with corrected speed and balance, historic playback equalization³, and proper styli for the disc type. If transferring analog discs please reference the IASA or ARSC documents regarding the current best practices regarding flat (unprocessed) transfers and clearly detail your method in your application.

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² While there is broad agreement on the term “Preservation Master”, the version of the files readily available for preview are called many things, including access, reference, use, convenience, etc.

³ Some professionals recommend digitization without playback equalization. This is acceptable if you can defend the choice in your narrative, provided it is clear to the user. If historic playback equalization is applied, you must note the equalization used in your metadata, along with playback speed and stylus size used.
**ARCHIVING**

<table>
<thead>
<tr>
<th>Digital media and Redundancy requirements</th>
<th>MINIMUM STANDARD</th>
<th>IDEAL STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Redundant Array of Independent Disks (RAID 1 or greater)*</td>
<td>Preservation master files stored in an OAIS (ISO 17421:2003) Compliant TRAC certified Trusted Digital Repository (ISO 16363). If your institution doesn’t have a TDR, store files with a partner organization or service provider.</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>AND</td>
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<tr>
<td></td>
<td>Automated Media Library (AML)* including continuous check sum monitoring</td>
<td>One physical back up on one of the following media – data CD/DVD/BR-ROM, or preferably a data tape standard such as Linear Tape Open (LTO), using open source software such as LTFS or TAR.</td>
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<tr>
<td></td>
<td>AND</td>
<td>AND</td>
</tr>
<tr>
<td></td>
<td>An open source tape standard such as Linear Tape Open (LTO6) using LTFS or TAR software to write the tape</td>
<td>Plus well-maintained playback equipment for the digital storage media and/or applications/equipment either properly stored or available for lease. Contents to be validated and migrated every 2-5 years.</td>
</tr>
<tr>
<td></td>
<td>Plus well-maintained playback equipment for the digital storage media and/or applications/equipment either properly stored or available for lease. Contents to be validated and migrated every 2-5 years.</td>
<td>(1 selection from each is required to have a minimum of 2 copies)</td>
</tr>
</tbody>
</table>

(1 selection from each is required to have a minimum of 2 copies)

*If these resources are not currently available to you, you should consider partnering with a trusted digital repository (see page 4 in bold).

**METADATA**

Please refer to the following documents for an overview of this important subject.

http://www.iasa-web.org/tc04/audio-preservation

http://www.ala.org/alcts/sites/ala.org.alcts/files/content/resources/preserv/audio_metadata.pdf

LONG-TERM STORAGE, MAINTENANCE AND ACCESSIBILITY

Originals:

Original source materials and playback equipment should always be retained, maintained and stored. All recorded media—tapes and discs, analog and digital—need a cool, dry, dark, stable climate (60 to 70 degrees F., 30-40% relative humidity). Cooler is generally better, but extremely dry conditions are bad for tapes. Keep media away from wiring, power generators, and other electro-magnetic fields (including loud speakers.) Tapes and discs should be stored “on end,” not stacked, in proper sleeves or boxes. Do not pack shelves too tightly. Remember when using open source formats that you must also “archive” equipment (hardware and software) that will play archive files and media back.

Digital Surrogates:

Long-term preservation includes a digital mass-storage solution located at a secure host. Individuals and small- to medium-sized archives that do not have the capacity for such storage are strongly encouraged to partner with an institution with long-term storage facilities and preservation expertise. Possibilities include universities, state libraries, museums or other institutions that would have an interest in storing and providing access to the archived collection.

When archival copies are made, store a complete second set at a secure, climate-controlled, off-site location. Back up your computer files (documentation, metadata and editing software) and store the backups off-site.

Digital preservation requires management. Once a collection has been preserved it must also be checked regularly (2-5 years), including the use of checksums as well as timely migration of the data to prevent “Data Rot” (http://en.wikipedia.org/wiki/Bit_rot).

Applicants should address long-term storage in their overall preservation plan. Collections without long-term storage provided gratis by their host institution or a dissemination partner should discuss how they will maintain access to their collection for their designated user community for a set period of time. If you do not have access to a Trusted Digital Repository, please refer to the following:

http://www.digitalpreservation.gov/ndsa/working_groups/documents/NDSA_Levels_Archiving_2013.pdf

The preservation plan should also include access or listening copies (on- or off-line) in addition to the preservation master files. Websites are not archives.

Individual external or internal hard drives, while a valuable working medium, are not to be used as an archival medium or for storage.
RESOURCES

These resources are provided as a courtesy to our grant applicants looking for guidance for their archiving and preservation projects. Resources listed are not partners, sponsors, employees or agents of the GRAMMY Foundation. The GRAMMY Foundation will not be involved with these services or compensation. Applicants are not required to use a resource from this list. It is, however, crucial to the funding of any project that a qualified archivist be identified.

Assessment:

*Columbia University Libraries* - This survey tool evaluates preservation needs for a wide range of audio and moving image formats. Designed for non-specialist users it provides a mechanism for setting preservation priorities based on the quantities and types of audio and moving image materials, their physical condition and housings, information about existing levels of intellectual control and intellectual property rights, and the potential research value of each collection. Click on Survey Tools at [http://www.columbia.edu/cu/lweb/services/preservation/index.html](http://www.columbia.edu/cu/lweb/services/preservation/index.html)

*Field Audio Collection Evaluation Tool (FACET)* - A point-based, open-source software tool that ranks audio field collections based on preservation condition, including the level of deterioration they exhibit and the degree of risk they carry. It assesses the characteristics, preservation problems, and modes of deterioration associated with the following formats: open reel tape (polyester, acetate, paper and PVC bases), analog audio cassettes, DAT (Digital Audio Tape), lacquer discs, aluminum discs, and wire recordings. [http://www.dlib.indiana.edu/projects/sounddirections/facet/index.shtml](http://www.dlib.indiana.edu/projects/sounddirections/facet/index.shtml)

*Audiovisual Self-Assessment Program (AvSAP)* - This tool exists to assist cultural heritage institutions with audiovisual materials in their collections and staff who have little to no training in audiovisual preservation. AvSAP is also an excellent tool for those with experience with AV materials and its informational and advisory components can help fill out areas where the AV preservation expert could use some refreshers. Our goal is to help collections managers develop a prioritized preservation plan as well as educate them on extending the lives of their collections with the resources at hand. The scope of material AvSAP covers are: film, videotape (open-reel and cartridge based; analog and digital), audio recordings (extending from cylinder grooved media to disc; analog and digital) and optical media such as CD and DVD. [http://www.library.illinois.edu/prescons/projects_grants/grants/avsap/](http://www.library.illinois.edu/prescons/projects_grants/grants/avsap/)

Other resources:


Technical:


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Library of Congress (LOC) –  
http://www.digitalpreservation.gov/

National Academy of Recording Arts & Sciences / Audio Engineer Society (AES) -  
www.grammy.com/PDFs/Recording_Academy/Producers_And_Engineers/DeliveryRecs.pdf

Society of American Archivists (SAA) –  
http://www.archivists.org/

Sound Directions –  
http://www.dlib.indiana.edu/projects/sounddirections/index.shtml

The Science and Technology Council of the Academy of Motion Picture Arts and Sciences (AMPAS) -  

Image Permanence Institute for additional long term storage information -  
https://www.imagepermanenceinstitute.org/webfm_send/301

Broadcast Wave Format (BWF) -  
http://www.ebu.ch/fr/technical/publications/userguides/bwf_user_guide.php

Redundant Array of Independent Disks (RAID) –  
http://en.wikipedia.org/wiki/RAID

Metadata standards:

METS - http://www.loc.gov/standards/mets/
OLAC - http://www.olacinc.org/drupal/

Guidelines from the American Library Association on existing metadata standards for audio -  
http://www.ala.org/alcts/resources/preserv/defdigpres0408

Guidelines from the American Library Association on minimum capture specifications -  
http://www.ala.org/alcts/resources/preserv/minimum-digitization-capture-recommendations

Guidelines: Embedded Metadata in Broadcast WAVE Files, FADGI Audio-Visual Working Group -  
http://www.digitizationguidelines.gov/guidelines/digitize-embedding.html

A Primer on Codecs for Moving Image and Sound Archives, by Chris Lacinak, AudioVisual Preservation Solutions -  

PBCore –  
http://pbcore.org/

PREMIS –  
http://www.loc.gov/standards/premis/

BWF MetaEdit, broadcast wave embedded metadata editor –  
http://bwfmetaedit.sourceforge.net