AUDIO PRESERVATION
A Selective Annotated Bibliography and Brief Summary of Current Practices

American Library Association
Association for Library Collections & Technical Services
Preservation and Reformatting Section
Photographic and Recording Media Committee
Audio Preservation Task Force

Robin Dale
Janet Gertz
Richard Peek
Mark Roosa

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ACKNOWLEDGMENTS

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INTRODUCTION

The Audio Preservation Task Force was charged in 1995 with producing a short, selective bibliography of works covering the preservation of sound recordings of all types, from cylinders through digital, although the emphasis is on analog formats. The intended audience is librarians and archivists who are not specialists in caring for sound recordings but whose collections contain audio materials that should be preserved. Since many, if not most, of the important articles in the field lie outside the usual library journals, we have attempted to bring them together here. We have provided annotations to the nine most-significant items but have included citations to many other titles for further reading that may be of use to anyone coping with a collection of sound recordings.

A number of the articles cited were authored by consultants or vendors whose opinions might also support the products or services they offer to the business world. Caveat lector. It is not the intention of this bibliography to advertise professional services or products; rather the Task Force feels that despite some possible shortcomings, these articles contain useful information that, when taken in context of other articles on the same subject, will provide important facts needed to fully understand the many complex issues involved in the preservation of audio materials.

The bibliography is divided into several subject areas: general works, description and history of media and formats, storage and handling, disaster response, reformatting/ re-recording, technical studies, and bibliographies. Following the subject sections are a list of applicable standards, a list of useful journals, and a list of relevant professional organizations and institutions. The final content section describes six sound archives that participated in the Association for Recorded Sound Collections’ Associated Audio Archives (ARSC/ AAA) National Endowment for the Humanities-funded planning study of 1988, the de facto guideline for preservation of audio materials. The bibliography concludes with an author/ subject index.
ANNOTATED CITATIONS


This lengthy publication was produced by the ARSC Associated Audio Archives Committee as the final report for an NEH-supported audio preservation planning study (January 1986–December 1987). The committee was given the charge of developing prioritized recommendations, procedures, and standards intended to guide the custodians of audio collections in the development of preservation strategies. As might be expected for a publication of this size (860 pages, including a 326-page bibliography, a 106-page index, and a 49-page glossary), a broad range of general and specific audio preservation topics are covered. Particularly useful information is offered on bibliographic control for preservation, audio equipment considerations, environmental control for disc and cylinder recordings, and the establishment of preservation priorities for sound collections. The report also includes the results of a worldwide survey on institutional audio preservation activities.


This technical report was prepared for the National Archives and Records Administration to predict quantitatively and qualitatively the expected useful lifetime of polyester-based recording media. The Polymers Division of the Institute for Materials Science and Engineering (NBS) tested magnetic tapes containing recorded data at several temperatures and relative humidities. After accelerated aging, attempts were made to read the data previously on the tapes. Any inability to read the data was used to make preliminary estimates of tape life expectancy. Based upon the criteria established through testing, the authors estimate a useful tape lifetime of twenty years when the tapes are stored at ambient conditions. The Division is, however, careful to point out that during the course of testing, tape failures occurred at the equivalents of both less than and more than twenty years. The findings of this report provide guidelines and factors that one should take into account when planning reformatting projects or selecting materials for audio preservation. The report also provides recommendations for use and storage that will stabilize and possibly increase a tape's useful life expectancy.


This Music Library Association technical report will prove particularly helpful to anyone given the responsibility for selecting furniture and equipment and designing the overall space of an audiovisual library. Other topics of interest include considerations for enhancing audio playback and proper storage and handling procedures for the "new" technologies of compact discs and videos.

Cuddihy reports on an experiment that examined the effects of hydrolysis on magnetic tape. The experiment exposed samples of one type of back-coated polyester instrumentation recording tape to varying combinations of relative humidity and temperature in open air and in nitrogen; other samples were hermetically aged. The author concludes that relative humidity, rather than oxygen, is the primary factor in oxide degradation and infers that at a certain temperature and relative humidity tape does not chemically age. He notes in particular that it is the chemical age of the tape rather than the calendar age that is most important in predicting tape life since environmental conditions have such a profound impact on tape degradation. The experiment did not address lubricant breakdown or other forms of physical aging, nor did it deal specifically with audiotape. The article, while technical in nature, is readable and provides readers with a clear understanding of the experiment and its results.  


Gibson explores what is known about how discs and cylinders age in storage. A general overview of disc and cylinder formats is provided, and their inherent preservation problems are discussed. Factors that contribute to the physical deterioration of these formats are cited, including inappropriate handling—such as touching the grooves of a wax cylinder with oily fingers—as well as storage that can lead to other kinds of damage. The author notes that instantaneous disc recordings (acetates)—one of the most fragile formats—are susceptible to surface delamination in which the information contained in the grooves literally peels off. Many chemically induced forms of deterioration are caused by poor storage conditions in which the temperature and humidity fluctuate, accelerating and encouraging the natural aging process of discs and cylinders. Cleaning procedures for discs are covered, and commercially available products for this purpose are discussed. Finally, guidelines are proposed regarding the use of digital recording for preservation, based on recommendations prepared by the Association of Recorded Sound Collections, Associated Audio Archives Committee. Appended to the paper are recommendations for the storage of cylinders, discs, and magnetic media.


The author discusses entry into the field of audio preservation vis à vis personal experience with a collection donated to the Popular Music Collection at Georgia State University. When the collection was donated to Georgia State, archivists discovered instantaneous (acetate or lacquer) disc sound recordings among the material. The archivists were unprepared to properly identify and preserve such materials. Searches of relevant literature failed to turn up the needed information, a common complaint among librarians and archivists searching for such material. The author relates the journey of the next few years spent by archivists researching a solution. The

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1 This annotation originally appeared in Midwestern Archivist 16, no. 1: 31-47.  
   It is reprinted here with the permission of the author, Christopher Ann Paton.
last half of the article not only provides the “happy ending” to Georgia State’s “adventure,” but also provides information on identifying types of acetate recordings (sizes, appearances, etc.); problems inherent to the different formats; and guidance for cleaning, storage, and reformatting of the rare and fragile discs.


This is the final report of an investigative study into the manufacture and deterioration of sound recordings supported by a grant from the Rockefeller Foundation. Researchers at the Department of Engineering Mechanics at the Texas Southwest Institute, Pickett and Lemcoe produced a report outlining the many factors affecting the longevity of audio materials. The highlights of the report are those sections detailing the chemical deterioration of phonograph discs and magnetic tape. Despite the age of the study, the recommendations for environmental controls and proper shelving practices for sound collections are still relevant today.


Van Bogart, the principal investigator of media stability studies for the National Media Laboratory, produced this report addressing proper care and handling of magnetic media to prevent information loss and maximize life expectancies. Titles for sections of the report include: “What Can Go Wrong?” (binder degradation, magnetic particle instabilities, substrate deformation, format issues, and magnetic tape recorders); “Preventing Information Loss”; “Life Expectancy”; “How Can You Prevent Magnetic Tape from Degrading Permanently?” (care and handling, storage conditions, standards, and refreshing of tapes); and a glossary. In comparing magnetic media as a format to paper and film, the author is careful to emphasize that magnetic media have special storage needs if they are to be preserved for longer than ten years. If the information is to be preserved indefinitely, periodic transcription (his word) or reformatting from old media to new will be necessary, not only because the media are unstable, but because the recording technology will become obsolete. The report provides librarians and archivists—those who are familiar with magnetic media and those who are not—with technical information and recommended procedures. Finally, the report is a useful tool for decision-making and cost-benefit analyses for librarians, archivists, and administrators who have responsibility for the long-term preservation of information stored on magnetic media.


Ward provides a good overview of the basics of archival information management and sound collections preservation and frequently draws comparisons between sound archives and textual archives. The information management section covers such topics as acquisition and documentation, copyright, and equipment and facilities planning. The preservation section offers brief histories of the production of sound disc and magnetic media; useful information on disc properties and longevity; and recommendations for handling, cleaning, copying, and storage procedures. The ARSC Audio preservation: A planning study glossary is reprinted.
BIBLIOGRAPHY

General Works


Audio Preservation Bibliography


McWilliams, Jerry. 1979. The preservation and restoration of sound recordings. Nashville, Tenn.: American Association for State and Local History.


Read, Oliver. 1952. The recording and reproduction of sound. 2d ed. Indianapolis, Ind.: H. W. Sams.


Record companies play for copyright protection. 1986. New Scientist 112:30.


Description of Media and Formats

This section includes works describing recording media and their composition, period of currency, and history.


Association for Recorded Sound Collections, Associated Audio Archives Committee. 1981. Survey of pre-"LP" sound recordings. Silver Spring, Md.: Association for Recorded Sound Collections.


Reitman, Valerie. 1990. High-fidelity digital audio tape is stuck on slow forward in U.S. Philadelphia Inquirer 18 Feb.: 1F, 9F.


Audio Preservation Bibliography


Storage, Housing, and Handling

This section contains materials that discuss standards, guidelines, and best practices for environmental controls, shelving, enclosures, and handling of various media as well as describing causes of media degradation.


**Disaster Response**


Reformatting and Transfer Re-recording

This section contains works that discuss standards, guidelines, and best practices for both analog and digital re-recording.


Technical Studies

This section includes works describing various research and development efforts investigating the longevity of audio materials and equipment.


Bibliographies


## Audio Preservation Bibliography

### STANDARDS

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>AES22-1997</td>
<td>AES Recommended Practice for Audio Preservation and Restoration: Storage of Polyester-Base Magnetic Tape</td>
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<tr>
<td>ANSI IT9.23-1997</td>
<td>Polyester Base Magnetic Tape: Storage</td>
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<td>ANSI IT9.25-1997</td>
<td>Optical Disc Media: Storage</td>
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<tr>
<td>ANSI S1.1-1994</td>
<td>Acoustical Terminology</td>
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<tr>
<td>ANSI S1.6-1981 (R1994)</td>
<td>Preferred Frequencies, Frequency Levels, and Bands for Acoustical Measurements</td>
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<tr>
<td>ANSI S1.8-1989</td>
<td>Reference Quantities for Acoustical Levels</td>
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<tr>
<td>ANSI S1.9-1996</td>
<td>Instruments for Measurement of Sound Intensity</td>
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<tr>
<td>ANSI S1.11-1986 (R1993)</td>
<td>Specifications for Octave-Band and Fractional Octave-Band Analog and Digital Filters</td>
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<td>ANSI S1.13-1995</td>
<td>Methods for Measurements of Sound Pressure Levels</td>
</tr>
<tr>
<td>ANSI S4.3-1982 (R1992)</td>
<td>Methods for Measurements of Weighted Peak Flutter of Sound Recording and Reproducing Equipment</td>
</tr>
<tr>
<td>ANSI S4.43-1991</td>
<td>AES Recommended Practice for Digital Audio Engineering Serial Multichannel Audio-Digital Interface (MADI, AES-10)</td>
</tr>
</tbody>
</table>
Audio Preservation Bibliography

**ANSI/EIA RS-338-1967**
Unrecorded Magnetic Tape for Reel-to-Reel Instrumentation Applications
(R 1987)

**ANSI/EIA 518-1986**
Tape Recorder Measurement Standard

**NAB-1965**
Standard for Magnetic Tape Recording and Reproducing (Reel-to-Reel)
RELEVANT JOURNALS

American Archivist
ISSN: 0360-9081
Chicago: Society of American Archivists

ARSC Journal
ISSN: 0004-5438
Fairfax, Va.: Association for Recorded Sound Collections

IEEE Transactions on Magnetics
ISSN: 0018-9464
New York: Institute of Electrical and Electronic Engineers for the Magnetics Group

Journal of the Audio Engineering Society
ISSN: 0004-7554
New York: Audio Engineering Society

Phonographic Bulletin
ISSN: 0253-004x
Utrecht: International Association of Sound and Audiovisual Archives

Studio Sound
ISSN: 0144-5944
Croyden, UK: Link House Publications
ORGANIZATIONS AND ACRONYMS

AES — Audio Engineering Society, Subcommittee on the Preservation and Restoration of Audio Recordings
60 East 42nd Street, Room 2520
New York, NY 10017 USA
Tel: (212) 661-8528
Fax: (212) 682-0477
Web site: http://www.aes.org
Primary contact: Chair, Subcommittee on the Preservation and Restoration of Audio Recordings

ALA/ALCTS/PARS — American Library Association, Association for Library Collections & Technical Services, Preservation and Reformatting Section
ALCTS/ PARS
50 East Huron Street
Chicago, IL 60611 USA
Tel: (312) 280-5035
Fax: (312) 280-5033
Web site: http://www.ala.org/alcts/organization/ pars/
Primary contact: Chair, Preservation and Reformatting Section

ANSI — American National Standards Institute
11 West 42nd Street, 13th Floor
New York, NY 10036 USA
Tel: (212) 642-4900
Fax: (212) 398-0023
Telex: 424296 ANSI UI
Web site: http://www.ansi.org
Primary contact: President

ARSC, AAA — Association for Recorded Sound Collections, Associated Audio Archives Committee
P. O. Box 543
Annapolis, MD 21404-0543 USA
Tel: (410) 757-0488
Fax: (410) 349-0175
(Telephone and Fax numbers change with the election of the Executive Director)
Web site: http://199.75.220.16/ aacommg/ arsc/ arsc/ arsc.htm
Primary contact: Chair, Associated Audio Archives Committee

34 quai du Louvre
Paris cedex 01 FRANCE
Tel & Fax: 33 1 40205787
IASA — International Association of Sound and Audiovisual Archives
  c/o Albrecht Haefner
  Süedwestfunk Baden-Baden
  Postfach 820 D-76522
  Baden Baden, GERMANY
  Fax: +49 7221 922094
  Web site: http://www.llgc.org.uk/iasa/
  Primary contact: Secretary General (changes yearly; see Web site for current contact)

IEEE — Institute of Electrical and Electronic Engineers
  345 East 47th Street
  New York, NY 10017 USA
  Tel: (212) 705-7900
  Fax: (212) 705-4929
  Web site: http://www.ieee.org
  Primary contact: General Manager

ISO — International Organization for Standardization
  (International name: Organisation Internationale de Normalisation)
  1, rue de Varembe
  Case Postale 56
  CH-1211 Geneva 20, SWITZERLAND
  Tel: 41 22 7490111
  Fax: 41 22 7333430
  Telex: 41 22 05 ISO CH
  E-mail: central@socs.iso.ch
  Web site: http://www.iso.ch
  Primary contact: Secretary General

MLA — Music Library Association, Preservation Committee
  P.O. Box 487
  Canton, MA 02021 USA
  Web site: http://www.musiclibraryassoc.org
  Primary contact: Chair

NAB — National Association of Broadcasters
  1771 N Street NW
  Washington, DC 20036 USA
  Tel: (202) 429-5300
  Fax: (202) 429-5343
  Web site: http://www.nab.org
  Primary contact: CEO/President

NARA — National Archives and Records Administration
  8th at Pennsylvania Avenue NW
  Washington, DC 20408 USA
  Tel: (301) 713-7060 at branch
Audio Preservation Bibliography

Fax: (301) 713-6904 at branch  
E-mail: inquire@arch2.nara.gov  
Web site: http://www.nara.gov  
Primary contact: Assistant Branch Chief, Motion Picture, Sound and Video Branch

**NML — National Media Laboratory**  
Building 235-3A-20  
St. Paul, MN 55144-1000  
Tel: (617) 736-4969  
Web site: http://www.nta.org (site administered by National Technology Alliance-NTA)  
Primary contact: NTA encourages contact via Web site

**SAA — Society of American Archivists, Preservation Section**  
600 South Federal Street, Suite 504  
Chicago, IL 60605 USA  
Tel: (312) 922-0140  
Fax: (312) 347-1452  
Web site: http://www.archivists.org  
Primary contact: Chair, Preservation Section

**SMPTE — Society of Motion Picture and Television Engineers**  
595 West Hartsdale Avenue  
White Plains, NY 10607 USA  
Tel: (914) 761-1100  
Fax: (914) 761-3115  
Web site: http://www.smpte.org  
Primary contact: Executive Director
SOUND ARCHIVES

Information was solicited from six sound archives that participated in the ARSC/AAA NEH-funded planning study of 1988, the de facto guideline for preservation of audio materials. The authors of the bibliography wish to thank the staffs of the archives who made available the information provided below.

Belfer Audio Laboratory and Archive, Syracuse University Library

Syracuse University Library
222 Waverly Avenue
Syracuse, New York 13244-20

Tel: (315) 443-3477
Fax: (315) 443-9510
E-mail: ststinso@library.syr.edu

Contact persons:
Susan T. Stinson, curator, Belfer Audio Laboratory and Archive, for reference and research information about the archive collections
Martha Hanson, preservation administrator/director, Belfer Audio Laboratory and Archive, for information on administrative policy for the archive

Tel: (315) 443-1947
Fax: (315) 443-9510
E-mail: mjhanson@library.syr.edu

Description:
The function of the Belfer Audio Laboratory and Archive is to maintain a historical collection of sound recordings to support the university curricula, especially in the areas of music industry and the performing arts, and other areas of research and teaching. In addition, staff focus attention on preserving the archive's content by using optimum storage and handling procedures as well as preservation reformatting where necessary and appropriate. Availability of materials for use by faculty, staff, students, and researchers is subject to meeting legal-use requirements either by fair-use or by express permission of copyright owners.

Primary clientele:
• students, faculty, and staff of Syracuse University
• researchers in need of items held by the archive
Services offered to other institutions:
consultancy/advisory services to other institutions regarding identification, storage, and handling of audio materials

Archive staff will fill requests from others for private research on a fee-based and time-available basis. Although the archive generally does not accept requests for tape reproductions of recordings from a user's private collection, it may make exceptions if the material is needed to support Syracuse University classroom or research needs.

Rates:
- $40 per hour for Syracuse University personnel for nonacademic purposes
- $75 per hour (minimum charge of 1/2 hour) for research and re-recording for nonuniversity individuals and institutions
- additional charge to cover the cost of tape and other materials used

Preservation approaches taken:
- Masters: 1/4" analog 10.5" reels at 7.5 ips, full track or 2-track; no splices or leadering; no noise reduction in the re-recording process; recordings are cleaned, and any necessary repairs are made to allow optimum playback
- User copies: copies made to analog cassettes or to 1/4" tape reels if specified; user copies are used in the library or classrooms and returned to the archive for retention. Any use other than classroom use requires appropriate copyright clearance for the recording.

Equipment used:
- professional analog tape decks
- 12" and 16" turntables with variable speed and assorted styli sizes
- equalization and noise reduction: analog filters, Packburn Transient Noise Suppressor and Continuous Noise Suppressor
Library of Congress Magnetic Recording Laboratory

Magnetic Recording Laboratory
Motion Picture, Broadcasting and Recorded Sound Division
Library of Congress
Washington, DC 20540-4696

Tel: (202) 707-9077
Fax: (202) 707-2371
E-mail: amcc@loc.gov

Contact person:
Allan McConnell, head

For general information on preservation policy for a/v materials contact:
Gerald D. Gibson
Audio and Moving Image Preservation Specialist
Preservation Research & Testing Division
Library of Congress
Washington, DC 20540-4560
Tel: (202) 707-1055
Fax: (202) 707-6449
E-mail: ggib@loc.gov

Description:
The purposes of the Library of Congress Magnetic Recording Laboratory (the audio preservation reformatting facility) are twofold:
• to make preservation transfer copies of those audio and video items in the library's collections in danger of loss because of deterioration
• to make copies of the materials from the library's collections for researchers and scholars once necessary legal clearances are in-hand (fair-use, permissions, etc.)

Primary clientele:
• the managers of collections at the Library of Congress
• researchers who use the library's collections.

Services offered to other institutions:
none, other than limited consultative information and copies of collections, as noted under Description

Rates:
• $74 per hour, minimum of 1/4 hour, plus raw materials

Preservation approaches taken:
• Masters: recorded flat, with editing limited to removal of physical damage to original carrier (clicks, pops, etc.), onto 10.5" diameter, precision reels, 1/4" open-reel analog, 7.5 ips, 2 track
• Service copies: flat transfer copies onto either standard audio cassettes or R-DAT
For customers, within potential legal restrictions and on a per-hour fee basis, the laboratory will make any reasonable editing changes that a customer may request; copies may be made onto a wide assortment of analog and digital media (open reel or cassette tapes; CD-R; R-DAT; open-reel digital).

Equipment used:
- professional analog and digital tape decks
- multispeed turntables with wide range of styli
- various noise suppression and digital editing systems (CEDAR, Sonic-Solutions)
Marr Sound Archives, University of Missouri-Kansas City

5100 Rockhill Road
Kansas City, MO 64110-2499

Tel: (816) 235-2798 or 235-1679
Fax: (816) 333-5584
E-mail: chaddix@ctr.umkc.edu
Web site: http://www.umkc.edu/lib/onsite/00_media.htm#marr

Contact persons:
Charles Haddix, sound recording specialist
Laura Gayle Green, music/media librarian

Description:
The focus of the collection is the American experience as reflected in recorded sound. The archives collects primarily American popular music recorded before 1955, jazz, historic voices, vintage radio programs and newscasts, and authors reading their own works as well as opera and classical music. Past corporate patrons include Merchant-Ivory Films, Capitol Records, Disney/EMM, CBS News, and National Public Radio. Notable projects include Ain't Seen Nothing Like It Since, a documentary about the Kansas City Monarchs of the Negro Baseball Leagues for KCPT, Kansas City's public television station; a complete reissue of the recordings of Julia Lee on the Bear Family label of Germany; and reference services for Robert Altman's film Kansas City.

Primary clientele:
Public service is available by appointment Monday through Friday from 8:00 am to 5:00 pm. The faculty, staff, and students of the University of Missouri–Kansas City are the primary users of the archives' facilities, but the archives also serves the public and scholarly communities. The archives also provided archival recording services for St. Olaf College by re-recording all of their choir recordings.

Services offered to other institutions:
• on-site listening
• duplication of materials for research purposes, within the provisions of United States Copyright Law
• preservation services for a fee
• recording services for a fee for noncommercial recordings

Rates:
Three price tiers exist for those with different research or corporate needs. Prices are stated according to studio hours, including the time needed to prepare and duplicate the item. One half-hour of studio time is the minimum charged. The staff reserves the right to submit bids for phonoduplication projects and may negotiate total project prices accordingly.

• $30 per hour of studio time for UMKC students, faculty, and staff
• $60 per hour of studio time for nonprofit organizations and non-UMKC researchers (for example, researchers affiliated with other higher education institutions, public radio, public television, and PBS)
• $75 per hour of studio time for other corporate users (for example, recording labels, commercial producers)

Preservation approaches taken:
• Masters: recorded onto open-reel analog tape (AGFA 468)
• Service copies: recorded onto cassette (BASF TPII)

Equipment used:
• Technics SP 15 turntable with SME model 3012-R tone arm that are mounted on a base that allows sufficient clearance to play 16" discs
• Stanton 500 cartridges with a variety of styli ranging from microgroove to 3.7 truncated elliptical, for most 78s, 3.0 to 3.3 TE; for lacquers, 1.5 to 1.9 TE
• Stanton model 310B preamplifier with flat mode
• 2 Owl One restoration modules
• Orban parametric equalizer/ notch filter model 642B
• Urei 565 filter set
• Packburn audio noise suppressor model 323A
• Mackie CR-1604 16 channel MC/ line mixer
• 2 Aphex model 120A distribution amplifiers
• 3 -10/+4 audio interfaces model 124A
• 2 Furman PB 40 patch bays with 1/ 4" cables
• 2 Trip Lite AC voltage regulators with AC spike and line noise filters
• 2 Panasonic 3700 DAT machines with remotes
• 2 Tascam 122 mk II cassette machines with remotes
• Otari MX 55 open-reel tape machine with stand and remote
• Otari 5050 open-reel tape machine with stand and remote
• Leader 20 MHz oscilloscope 8020
Rodgers and Hammerstein Archives of Recorded Sound, The New York Public Library for the Performing Arts

40 Lincoln Center Plaza
New York, NY 10023-7498

Tel: (212) 870-1663
Fax: (212) 870-1720
E-mail: rha@nypl.org

Contact persons:
Don McCormick, curator
Mark Tolleson, assistant chief

Description:
Holdings include approximately 500,000 sound recordings in all subjects and books, periodicals, and catalogs on all aspects of recorded sound. The archives is open to the general public for on-premises listening and study. It is a division of The New York Public Library Research Libraries. Professional and technical staff are very involved with preservation of deteriorating audio recordings, especially relatively rare, unpublished, and noncommercial materials.

Primary clientele:
• general public (college-age or higher) for on-premises listening/viewing
• international public by mail, telephone, or e-mail reference

Services offered to other institutions:
• training to institutional staff involved in audio preservation transfer work
• limited preservation transfer services for small amounts of materials (cylinder or acetate disc primarily) for professional fees
• personal tape copies of out-of-print, published recordings provided for a fee

Rates:
• $40 per hour plus materials for analog recording from standard sources
• $50 per hour plus materials for analog recording from nonstandard sources
• $60 per hour plus materials for digital recording (DAT)

Preservation approaches taken:
• Analog re-recording to archival open-reel tape (7.5 ips or 15 ips).
• Service copies: analog audio cassettes; also currently experimenting with recording onto CD

Equipment used:
• Technics SP-15 variable speed turntable
• Custom-made base for 16" transcriptions
• SME 3012 tone arm
• Stanton 500-AL cartridge
• Owl One restoration module
• Urie 565 notch/ pek filter
• Orban 642B parametric filter
• Otari MX-55 1/2" track, reel-to-reel
• Panasonic SV-3900, R-DAT recorder
• Marantz CDR-610 MK-II CD recorder
• Tascam 122 MK-III cassette recorder
Stanford University Archive of Recorded Sound

Braun Music Center
Stanford University
Stanford, CA  94305-3076

Tel: (415) 723-9312
Fax: (415) 725-1145
E-mail: rm.str@forsythe.stanford.edu

Contact persons:
   Barbara Sawka, head, Music Library and Archives of Recorded Sound
   Richard Koprowski, librarian, Archive of Recorded Sound

Description:
The archive houses more than 200,000 recordings and more than 4,000 print and manuscript items. Almost every format developed to record sound may be found here: wax cylinders, shellac and vinyl discs, acetate and aluminum transcription discs, magnetic wire recordings, tapes (analog, digital, and audio cassette), compact discs, and laser discs.

Clientele:
   • Stanford University students, faculty, and staff
   • outside researchers

Services offered to other institutions:
   • on-site playback
   • duplication of selected material for research/teaching purposes
   • photocopying
   • Yamaha Disklavier
   • Midi-keyboards

Rates:
   Consult archive staff

Preservation approaches taken:
   • For master materials: analog, reel-to-reel tape.
   • For service copies: generally analog cassette, some DAT.

Equipment used:
   Consult archive staff
Yale Collection of Historical Sound Recordings

Yale University Library  
P. O. Box 208240  
New Haven, CT  06520-8240

Tel: (203) 432-1795  
E-mail: Rwarren@pantheon.cis.yale.edu  
Web site: http://www.library.yale.edu/histsoun.html

Contact person:  
Richard Warren Jr., curator

Description:  
The Yale Collection is an audio archive that documents performance practice in Western concert music, jazz, American musical theater, drama, literature, and history from the beginning of the recording era to the present day. The collection was founded by Mr. and Mrs. Laurence C. Witten II and has been expanded from their collection of recordings of nineteenth-century singers into other areas through others’ donations. Its purpose is to collect, preserve, and make these materials available for study.

Primary clientele:  
• Yale University faculty and students  
• scholars conducting serious discographical research

Services offered to other institutions:  
Staffing limits permit no such services.

Rates:  
N/A.

Preservation approaches taken:  
• Originals are re-recorded onto open-reel analog tape in one direction only, stored end-out; originals themselves are kept in the safest possible conditions  
• Service copies: on open-reel, audio cassette, or DAT cassette

Equipment used:  
Revox, McIntosh, Shure, Panasonic, Packburn, Tandberg, Lane Audio, UREI, Orban, Thorens, Pioneer, Fons, and Thiel, among others, to maintain capability to play back and re-record as many types of early recordings as possible
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