Sound Directions
Best Practices for Audio Preservation

Appendix 1
Version 1.0

Indiana University Archives of Traditional Music
The Audio Technical Metadata Collector (ATMC)

An Introduction to Technical and Structural Metadata Elements in ATMC

Contents

1 Introduction

The Audio Technical Metadata Collector (ATMC) software developed at Indiana University supports the collection and generation of metadata on the source audio object that is the target of preservation transfer, digital files created as a result of transfer, and the digitization process. This tool currently supports features allowing the user to do the following:

- Enter and edit a wide variety of technical and structural metadata for audio objects
- Enter and edit audio object evaluations to support tracking physical and aural degradation over time
- Parse audio files to automatically collect relevant metadata
- Generate MD5 checksum information
- Enter and edit parent/child relationship information for audio objects
- View audio object relationships in tree-like diagrams
- Enter and edit processing history (digital provenance) information for events undertaken with audio objects
- Export standards-compliant XML for audio objects and processing history
- Store data in an Oracle database to support preservation management of, and research in, ATM collections over time. There is also a local-only version that writes files to a local folder

ATMC is a Java Swing-based application that uses Tomcat and Axis to communicate to a server via a SOAP protocol. The server uses JDBC to connect to an Oracle database which stores the audio object information in XML form. The application also incorporates a portion of software from JHOVE (JSTOR/Harvard Object Validation Environment) to assist with parsing audio files and extracting metadata.

Evaluation of an individual sound recording or group of recordings may occur at several points along their journey, from entry into the Archives to final preservation and cataloging. The process of playing back a recording represents an especially important point in its life. In an archive of 110,000 recordings, any one item may experience playback only once or twice. Playback represents the best opportunity to gather in-depth information on a recording's physical attributes and condition as well as preservation-related problems. Every recording that is reformatted at the ATM for reasons of preservation and/or access is evaluated. Over time, this will generate ever-increasing data on the Archives' holdings, especially those holdings requested for use and/or selected for preservation.

The metadata elements described below are presented in order by the tabs or sections in the ATMC software at the current time. This software is at a relatively early stage of development and will likely grow and change in its capabilities over the next year. Funding from NEH is currently providing for an additional stage of development geared towards making ATMC available as open source software. It is also likely that some metadata elements will change as our metadata strategy evolves. Questions or comments may be directed to: soundir@indiana.edu

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2 Documenting Physical Audio Objects

2.1 Search Window Screen

This is the first data entry screen encountered by ATMC users, from which it is possible to search for an existing database record or create a new one. The generic format of the audio object is also entered from here.

Search Element	Instructions
Shelf number	Enter the shelf number or filename of the audio object you are searching for or documenting. This is the unique number by which the recording is placed on shelves in storage or by which a digital file is identified.
Format	Enter the generic type or physical format of the recording being evaluated. A more precise format selection is made on the Format tab below. Data entry choices: *Analog tape*, *Analog disc*, *Digital disc*, *Other*

2.2 IUCAT Tab

This tab is designed for administrative data that we hope to eventually extract directly from IUCAT, the Indiana University online public access catalog. For now, it must be completed by hand for each audio object. Descriptive metadata is handled outside of ATMC, but this minimal amount serves to provide basic identification of the audio object.

Data Element	Instructions
Accession Number	Enter the ATM accession number for the recording. This is the collection-level number for each recording in a collection.
Collector (optional)	Enter the name of the collector(s), if known.
Title (optional)	Enter collection title, from either the IUCAT record or as generated by the ATM Archivist.

2.3 General Data Tab—All Formats

This tab is used for general metadata that applies to all recordings, regardless of format.

Data Element	Instructions
Date Recorded	If known, enter the date that the recording you are evaluating (the specific audio object in your hands) was recorded. When evaluating a copy or a commercial recording, we are *not* interested in the date that the underlying content was recorded, which is already tracked in the IUCAT bibliographic record. Rather, for preservation management, we document the date that each physical object—whether original or copy—was recorded so we can better understand its risk and track its deterioration. Enter partial dates if full dates are not available. If the exact date is unknown but there is evidence to support an educated guess, or if the date is listed as circa, check the box labeled "Approximate."
Field/ Commercial	Was the recording you are evaluating released for commercial sale? A commercial release was manufactured and mass produced, sometimes in small runs, to be sold to the public or distributed to a group or organization. Note that this applies only to the physical object you have in your hands, not the underlying content. We are *not* concerned here with documenting the eventual use of field recordings whose content was later issued commercially on another format. Date entry choices: *Field, Commercial, Unknown*
Generation	If the item you are evaluating is a field recording, enter the generation of the item, if known. This field does not apply to commercial recordings. Data entry choices: • *Original (1st generation)* - A tape, disc or other format recorded directly by the recording machine that first captured the sound at the time of performance. • *Copy* – Use this entry if the object is a copy but the generation of the copy is unknown. • *First copy (2nd generation)* • *Second copy (3rd generation)* • *Third copy (4th generation)* • *Fourth copy (5th generation)* • *Fifth copy (6th generation)* • *Unknown* • *Digital Clone* - Digital file derivatives of other digital files

Use	Use refers to the role or function of the recording within the Archives. Data entry choices: • *Original Master* – Original carrier (tape, disc, or other format) on which the audio content was recorded directly by the recording machine, usually during the real-time event of a live performance. • *ATM source* – In cases where the ATM does not possess the Original Master recording, the earliest copy owned by the ATM should receive the designation of "ATM source." • *Preservation Master* – A derivative sound recording which has been designated as the primary preservation surrogate and is/was considered the best possible carrier for long-term preservation when created. The recording should still today reasonably qualify as a Preservation Master. Examples include 24/96 digital files created today and 10.5" open reel tapes created to ARSC/AAA standards in the 1990's. • *Preservation Master–Intermediate* – A derivative sound recording that is somewhat optimized and acts as a stand-in for the Preservation Master • *Production Master* – A derivative sound recording that is created to provide a source for the production of further copies. • *Service Copy—physical audio* – A sound recording created for repeated playback for researchers or other end users. • *Service Copy—digital file* – An audio file designated for repeated playback for listeners who use the collection. • *Backup Copy* – A non-service copy made to act simply as a safeguard to the original. The copy was not created to preservation standards or with the intent of creating a copy designated as the best possible format to carry the content into the future. Occasionally, an audio object will belong to more than one category. For example, an open reel tape created using preservation standards as a preservation master for which the original tape was returned to the collector would be considered both a Preservation Master and an ATM source. Enter both categories to document the use of the recording.
Originals at ATM?	This field tracks whether the ATM holds the original. In some cases we don't know if the ATM recording is the original. In this situation use Unknown. Data entry choices: *Yes*; *No, Unknown*
Notes	Enter notes that apply to the entire audio object being documented.

Disposition	Disposition refers to where the recording is stored or the final disposition of the audio object. For physical recordings this will usually be the ATM Vault although it is possible that eventually some recordings may be stored in ALF, the IU Auxiliary Library Facility. Data entry choices: *ATM Vault, Missing, Returned to collector, ALF*
Collector's Number	Enter the number assigned to this audio object by the collector, if known.
Original Recording Equipment	If this is a field recording, enter this data if it is known: • Field Recording Machine: Manufacturer and model number • Recording Machine Power source: Enter either batteries, 50Hz AC, 60Hz AC, or describe the power source • Microphone used: Manufacturer and model number • Other equipment used
Analog or digital flag	Data entry choices: *Analog, Physical digital, File digital* *Note:* This field is automatically completed based on the choice of format, above, and does not appear in the interface.
Audio Data Encoding	Encoding for a digital recording. For current ATM work the entry is "PCM". This field is not applicable for analog recordings. *Note:* This field is automatically completed based on the choice made in the analog/digital flag field, above, and does not appear in the interface. The default is PCM

2.4 Format Tab

This tab collects metadata relevant to the specific format of the recording.

Data Element	Instructions
Format	Enter the specific format of the recording you are documenting. Data entry choices: • *Open reel tape* • *Audio cassette—analog* • *Lacquer disc* Coated or "acetate" disc—an instantaneous recording with a coating. • *Aluminum disc* Another form of instantaneous recording with grooves embossed into aluminum that has no coating. • *Digital file*

	• *LP* Commercial microgroove disc • *45 rpm disc* Commercial disc with speed of 45 rpm. • *Commercial 78 (shellac)* Commercial, shellac, coarse-groove disc, usually with speed of 78rpm • *Transcription disc* Coarse or microgroove commercial or mass-produced 16" transcription disc. • *Wire recording* • *CD* – Compact audio disc. • *DVD* • *DAT* – Digital Audio Tape. • *Cylinder* • *Minidisc* • *8-track* • *Microcassette* • *VHS format videotape* • *Beta format videotape*

2.4.1 Open reel tape

When open reel tape is selected for format, the following fields are available for data entry:

Data Element	Instructions
Number of Directions Recorded	Enter "1" if there is recorded signal in only one direction on tape, "2" if there is recorded signal in two directions.
Total Tape Thickness	The thickness of the tape, in either mils or micrometers.
Tape Base Thickness	The thickness of the tape base, in mils. Data entry choices: *1.5, 1.0, 0.5, Unknown*
Back coating	Enter "yes" if the tape has back coating, "no" if not. Back coating, usually black in color, was applied to mastering-quality tape starting around 1969. Back-coated tape brands include Scotch 206, 208, 226, 250, 808, 908 and 996 along with Ampex 406, 456 and 499, among others.
Magnetic Pigment (oxide layer) Type/Coating	The chemical makeup of the tape's pigment layer. This is ferric (iron) oxide for almost all open reel tapes. BASF manufactured a few chromium dioxide *(CrO_2)* open reel tapes.

Dimensions—Diameter	Enter the diameter of the flange or reel that carries the tape, in inches.
Tape Width	The width of the tape. Enter “0.25” inch. *Note:* This field will be automatically completed based on the format choice above. For open reel tapes, the entry will be 0.25 inches.
Unwound Length	Physical length of recording in feet, if the tape were unwound from end to end.

2.4.2 Audio cassette - analog

The following fields are available for data entry for analog audio cassettes:

Data Element	Instructions
Number of Directions Recorded	Enter “1” if there is recorded signal in only one direction on tape, “2” if there is recorded signal in two directions.
Total Tape Thickness	The thickness of the tape, in either mils or micrometers.
Tape Type	Over time, cassette tapes were manufactured with a magnetic pigment or oxide layer that had significantly different properties, leading to the classification of cassettes by type. These type classifications were standardized by the IEC (International Electrotechnical Commission). Each type had different bias and equalization requirements with specific settings that were used by the tape machine during playback. Data entry choices: *Type I*, *Type II*, *Type III*, *Type IV*
Magnetic Pigment (oxide layer) Type/Coating	The chemical makeup of the tape’s pigment layer. Data entry choices: • *Ferric (Iron) Oxide (Fe_20_3)* • *Chromium Dioxide (CrO_2)* • *Cobalt-doped Ferric Oxide (Fe_3O_4)* • *Ferric Oxide and Chromium Dioxide* • *Metal Particle* • *Unknown*
Screws on Cassette Shell	Enter “yes” if the cassette shell is held together by screws, “no” if not.

Tape Width	The width of the tape. Enter “0.15” inch. *Note:* This field will be automatically completed based on the format choice above. For analog audio cassettes the entry will be 0.15 inches.
Potential Playback Time (minutes)	The manufacturer’s stated recording length, in minutes. Often, this will appear on the cassette shell or case label as C-60, C-90, etc. For odd lengths not found in the drop down box, enter the number by hand into this field.
Playback Equalization	This field is completed automatically depending on the value in the Tape Type field. Data entry decisions: • *Type I = 120 µs* • *Type II = 70 µs* • *Type III = 70 µs* • *Type IV = 70 µs*
Dimensions—Length	Metadata in all dimensions fields is automatically generated. Length is defined as the dimension with the largest measured size. The value for this field is 3.94 inches for analog audio cassettes.
Dimensions—Width	Width is defined as the dimension with the second largest measured size. The value for this field is 2.5 inches for cassettes.
Dimensions—Depth	Depth is defined as the dimension with the smallest measured size. The value for this field is 0.31 inches for cassettes.

2.4.3 Analog disc

All analog disc choices have the same fields available for data entry, but the default entries differ between the specific formats.

Data Element	Instructions
Sides Recorded	If the disc contains modulated grooves on just one side enter “1”. If on both sides, enter “2”. *Note:* This field defaults to “2” for LPs, commercial 78s and 45s. It defaults to blank (awaiting a selection) for other formats.

Playback Direction	If the disc starts playback on the outer edge and the stylus moves towards the center of the disc enter "outside in." If the stylus starts on the inside of the disc and moves out enter "inside out." *Note:* This field defaults to "Outside in" for LPs, commercial 78s and 45s. It defaults to blank (awaiting a selection) for other formats.
Dimensions—Diameter	Enter the diameter of the recording in inches. *Note:* This field defaults to 10" for commercial 78s and 7" for 45s. It defaults to blank for other formats.
Disc Surface Material	Material on the outermost surface of the disc. Data entry choices: • *none* • *lacquer* – "Acetate" discs • *shellac* – Commercial 78's • *unknown* • *vinyl* – LP's, 45's • *aluminum* • *zinc* *Note:* This field defaults to "Lacquer" for lacquer discs, "Aluminum" for aluminum discs, "Vinyl" for LPs and 45s, "Shellac" for commercial 78s, and is blank for transcription discs.
Groove Size	This field defaults to "Coarse" for lacquer, aluminum and commercial 78s, and "Microgroove" for LPs and 45s.
Groove Orientation	*Lateral* or *vertical.* *Note:* This field defaults to "Lateral" for all disc types. Change to "Vertical" if you are transferring a vertical-cut commercial 78.
Groove Creation Method	The process used to create the grooves on the disc. Default value for disc formats cut in the field (lacquers and aluminums): "Direct Cut". Default value for commercial discs: "Press Moulded".
Dimensions—Shape	Used to describe the actual shape of the recording. This field is provided primarily for objects with an unconventional shape, such as a square 45 rpm record. *Note:* This field defaults to "Circle" for all disc formats.

2.5 Structure Tab

The structure of the audio object documented is represented hierarchically using the four levels described below: Audio Object, Face, Region, and Stream.

2.5.1 Audio Object

This is the root of the hierarchy, containing data that applies globally to the entire audio object being evaluated. Within the Structure Tab in ATMC, the total duration of the audio object is available at the Audio Object level. This number is automatically calculated from the durations entered in the various Regions, below, and is not editable at this level.

2.5.2 Face

Create the appropriate number of Faces to represent the object. A Face is a group of one or more Streams (audio channels or tracks) grouped together that are meant to be played synchronously. A disc contains two Faces that correspond to what we might call Side A and Side B. A full track or half track stereo tape contains one Face as the tape is recorded in only one direction. A half track mono tape recorded in two directions contains two Faces. A four track tape with independent content on each track contains four Faces.

Documentation at the Face level consists only of naming the Face, indicating its direction, and calculating its duration. All other documentation related to characteristics associated with the object occurs at the Region level.

Data Element	Instructions
Direction	This field indicates the orientation of the Face related to the audio object. If the object contains multiple Faces, it is necessary to order them, deciding which Face should be played first, second, etc. Use collection documentation, existing indexes, or data gathered from playback to determine where content (and the first Face) begins. For tapes, separate "passes" or recording sessions must be used to transfer content that is aligned in different directions on the tape. That is, one recording pass is used to transfer content in the first direction, then the tape is "flipped" and a second pass is needed to transfer content in the second direction. It might be flipped again for a third pass in the original direction, if three tracks are recorded on a quarter track tape. For field discs, it is often impossible to know which side (if any) is the first side. For this reason we typically use “A_Pass” to indicate which was transferred first and considered Side A. At the ATM, we label each pass of an open reel tape by naming the actual physical tracks that were played. See the Label field, below. Data entry choices: *A_PASS*, *B_PASS*, *C_PASS*, *D_PASS*

Label	Use this field to name the Face. This is where we can use local (ATM) terminology to make this meaningful in relation to past convention at the Archives. For cassettes use “Side A” and Side B.” Even though audio cassettes have physical tracks similar to open reel tape, but arranged slightly differently, it has become standard to label the different Faces as “Side A” or “Side B,” probably due to analogies to discs when the format was developed. For discs, use “Side A” or “Side B”. For open reel tape, enter the number of the track(s) (as located physically on the tape) that was played, as shown below.

2.5.2.1 Open Reel Tape

Enter the actual physical tracks that were played for the Face you are documenting. You may have entries like: *Tracks 1 and 2, Tracks 1 and 3, Track 1*

The following table details possible track arrangements with the correct entry choice:

Tracking Configuration	Pass	Track(s) played Correct Label field entry
Full track	A_PASS	Track 1
Half track mono—first direction	A_PASS	Track 1
Half track mono—second direction	B_PASS	Track 2
Half track stereo	A_PASS	Tracks 1 and 2
Quarter track mono—first direction	A_PASS	Track 1
Quarter track mono—second direction	B_PASS	Track 4
Quarter track mono—third direction	C_PASS	Track 3
Quarter track mono—fourth direction	D_PASS	Track 2
Quarter track stereo—first direction	A_PASS	Tracks 1 and 3
Quarter track stereo—second direction	B_PASS	Tracks 4 and 2

Note that it is possible to have a quarter track tape with several tracks running in the same direction. It would take multiple passes to transfer these and require the creation of multiple Faces. As above, label these tracks as they actually exist physically on the tape.

2.5.2.2 Face Duration

The duration of the Face you are documenting. Note that this value will be automatically calculated from the duration of the Region(s) contained in this Face.

2.5.3 Region

Faces are divided into multiple Regions if necessary, each characterized by a change in a basic characteristic of the format within the Face. If a tape is recorded at 15 ips but switches to 7.5 ips for its remainder, then the Face would contain two Regions, one for each speed. A Face must have at least one Region. Note that the term "Region" is often used to denote sections of a digital file bounded by markers. However, we are using this term here for sections that are defined (conceptually) on the source physical audio object, which is often an analog tape or disc. The determining factor for dividing a Face into multiple Region elements is a change in the source audio object in one of the following fields:

Base Material
Manufacturer/Brand/Product Number
Playback Speed
Sound Field
Tracking Configuration
Equalization
Noise Reduction

The fields described below are only available at the Region level. Create as many Regions as appropriate to document the audio object.

Data Element	Instructions
Region Label	If multiple Regions are present, label the Region by the characteristic that changes. For example, a tape that has sections recorded at 3.75 ips and 1.875 ips would have two Regions labeled "3.75 ips" and "1.875 ips."
Notes	Use this field for miscellaneous notes that are specific to the Region you are documenting.
Region Duration	Enter the duration of the Region in h:mm:ss
Playback Speed	Standard, intended, or expected playback speed
Speed Adjustment	Used to record any required refinement of the standard playback speed, given as a positive or negative number.
Speed Adjustment—Units	(Required if Speed Adjustment value is entered)**:** Data entry choices: *Inches per second*, *Percent*, *Semi-tones*, *Revolutions per minute*
Manufacturer/ Brand	Company that made the tape or the blank disc or other blank media. Pay attention to generic tape boxes which, for example, may say Scotch even if the tape itself is another brand. A generic box (no product number listed) by itself is insufficient evidence to determine manufacturer.
Product Number	Type of tape/disc made by above company. This field may include both numbers and letters.

Base Material	Base material of the tape or disc you are evaluating. Data entry choices: • *Acetate* • *Polyester* • *Paper* • *PVC* • *Unknown* • *Aluminum* • *Glass* • *Cardboard* • *Vinyl* • *Polycarbonate* • *Wax* • *Shellac* • *Zinc* • *Steel* • *Metallic Soap* • *Multiple bases*
Sound Field	Current data entry choices: *Mono, Stereo, Unknown*
Equalization	Any inherent equalization curve that must be applied during playback to properly recover the recorded sound. Data entry choices: *Unknown, None, RIAA, NAB, IEC, 78 rpm era curve*
Noise Reduction	Any inherent noise reduction processing that must be applied to the recording during playback to properly recover the recorded sound. Data entry choices: *None, Dolby B, Dolby C, dbx1, dbx2, Telcom c4, Dolby A, Dolby S, Unknown*
Track Configuration	Document the configuration of the tracks on the tape. This field is only available if an analog tape format is selected. Data entry choices: • *Full track* • *Half track mono* • *Half track stereo* • *Quarter track stereo* • *Quarter track mono* • *Unknown*

2.5.4 Stream

A Stream is an individual channel of audio information contained within a Region. Each Region must have one or more Stream elements. If a digital file audio object contains interleaved audio channels, those channels are documented as individual Streams. If there are multiple audio files representing multi-channel audio, then each file is a separate audio object with a separate ATMC entry.

Documentation at the Stream level consists only of naming the Stream, assigning a channel number, and indicating its map location. All other documentation related to characteristics associated with the object occurs at the Region level.

Data Element	Instructions
Label	Assign a number in sequence. Left channel of a stereo pair would be “Stream 1”, right channel “Stream 2”.
Notes	Use this field for notes that are specific to the Stream you are documenting.
Channel Number	Assign a number in sequence. The left channel of a stereo pair would be channel 1.
Channel Map Location	The space within the audio sound stage that the enclosing Stream should occupy. Data entry choices: *Left, Right, Center, Left Rear, Right Rear, Sub*

2.6 Evaluation Tab

This tab is used to document the preservation condition and characterize the sonic content of the recording. Choice of format will dictate which set of fields documenting preservation problems will be available for data entry. The list of potential sonic problems remains the same for all formats.

2.6.1 General Data

Data Element	Instructions
Evaluated By	Name of the person who completed the evaluation.
Data Entry By	Name of the person entering the evaluation data.
Date (required)	Enter the date this evaluation was performed.
Level (required)	This field tracks whether the evaluation is based on visual inspection or playback. Data entry choices: *Visual inspection, Playback inspection, Unknown*
Notes	Use this area to add any additional notes on characteristics or problems associated with the recording not covered adequately in the fields below.
Section Evaluated	Designate the section of the recording that you are evaluating. This will be either the entire object or a specific Region or Stream.

2.6.2 Physical Problems

Some of the descriptions of physical problems offered below are adapted from the IASA Cataloging Rules, Appendix C, available from the IASA website; and from the National Film and Sound Archive (Australia) Technical Glossary of Common Audiovisual Terms, also available online. Others are derived from our own experience. Both physical and sonic problems are evaluated using the following scale:

0 = the problem is not found on the recording
1 = there is a slight or infrequent occurrence of the problem
2 = there is moderate occurrence of the problem
3 = there is severe or frequent occurrence of the problem

2.6.2.1. Analog Audio Tape Problems

Fields for the following analog audio tape problems are available

Problem	Identification and Definition
Backing Loss	Backcoat particles separating from the tape base and accumulating on surfaces that are in contact with the back of the tape. Apart from the loss of functionality of the backcoat itself, loose debris can deposit on the playing surface of the adjacent layer of the tape and on the tape machine, impairing playback quality. Look for (usually) black colored flakes from the back coating on points along the tape path where the outside part of the tape makes contact. Back coating is found on professional-quality mastering tape.
Binder Loss	It is not always easy to determine what type of material is lost as a tape sheds. According to Ampex engineers, a cream colored deposit on tape heads is binder material coming from Ampex mastering-quality tapes. Use the notes field to describe the color of deposits on the tape machine if different from the color of the oxide coating or back coating.
Blocking	The layer-to-layer adhesion or sticking together of adjacent layers of tape, usually due to long-term storage under conditions of high relative humidity or temperature, deterioration of the binder or excessive tape pack stresses. Sometimes layers will appear to adhere because of static electricity which can be discharged, solving the problem. This is not blocking. *See also pinning*.
Brittleness	The tape breaks easily.
Cinching	The wrinkling, or folding over, of tape on itself in a loose tape pack. Normally occurs when a loose tape pack is stopped suddenly, causing outer tape layers to slip past inner layers, which in turn causes a buckling of tape in the region of the slip.

Contact Problems	This field documents poor tape to head contact, often resulting from curling or cupping on an acetate based tape.
Cupping	Curvature across the entire tape surface, along its width rather than its length.
Delamination	The cracking and separating of the coating of a tape from its base
Dirt/Dust	The presence of dirt or other foreign matter on or in the tape pack. A significant amount of foreign matter may cause drop-outs or lead to spacing loss from poor tape-to-head contact.
Edge Curling	The transverse warping of magnetic tape at its edges, more commonly seen on acetate-based tapes. This can cause poor contact between the tape and playback head resulting in signal loss.
Flange Pack	A condition where all or part of the tape pack is wound against one of the flanges of the tape reel instead of suspended in the middle.
Fungus	Look for patterned, fuzzy, thread-like, or hairy-looking growths on the surface of the tape pack. Typically, these growths are white in color although they may also be black, brown, or mustard-colored. Try to distinguish mold from other types of visible contamination such as dirt, which may look similar but usually does not appear as fuzzy or patterned.
Magnetic Pigment or Oxide Loss	Look for oxide flakes (brown colored if the tape oxide coating is brown) on any of the points along the tape path where the oxide part of the tape makes contact with the guides, heads or rubber parts of the tape machine's transport system.
Pinning	Small, limited areas where there is adhesion. *See also blocking*.
Popped Strands	The tape pack may have individual layers of tape misaligned with each other so that some layers stick up from the others. These misaligned layers are often called popped strands. Many groups of misaligned layers indicate a condition called a stepped pack, feathering, or scatter wind. Sometimes this is the result of winding the tape on fast forward or rewind and can be corrected by playing from beginning to end on play or library wind mode without stopping.

Slotted Hubs	Note the presence of a specific type of slotted hub in the middle of the tape flange. The outer, round part of an *unslotted* hub is unbroken—there is a solid surface for the tape to rest against all the way around. Probably none of the plastic flanges on our 5 and 7" tapes have truly unslotted hubs. All of them will have at least one small slot used for threading the tape. *Slotted* hubs have open spaces around their edges. There can be just one narrow slot as described above or, at the other extreme, three wide, open slots. It is this extreme that we are documenting. The tape, under pressure within the tape pack, begins to sag into the open space, often causing problems such as windowing and/or spoking or leading to drop outs. These flanges are most often found on older, acetate-based tapes. We define this category as the existence of one or more wide slots. If there are wide slots, you are most likely to see three of them. Note that there will be examples of flanges that are in-between those described above. Again, it is the presence of the wider slots that clearly cause problems in the tape pack that we want to track. If you are conducting an evaluation based on playback, replace the flange and use the Notes field to indicate replacement. The presence of these hubs should still be documented so we may understand on-going problems with the tape.
Splices	If no splices are present enter "0". Use the other ratings to indicate the number and condition of the splices, putting any further explanations in the notes area of the form.
Spoking	Usually the tape pack has uniform, circular layers. Sometimes the circle is not uniform and the layers curve non-uniformly, looking a bit like waves. It also may appear as if there are kinks in the circle. There will often be radial lines, or a pattern radiating out from the hub, known as spokes. Excessive tension leads to spoking which results from the outer layers in the pack compressing the inner layers so that the turns develop a small kink instead of a smooth curve. These kinks align radially and look like a spoke when you look through the flange from the edge of the tape.
Squealing	Sonic distortion that occurs in the playback of a tape recording, often from massive shedding from Sticky Shed Syndrome or other problems, causing friction as the tape passes over the playback head. This type of squealing is heard acoustically and also enters the signal chain and can be heard in the digital file. If the tape will not play without constant squealing, rate as a 3.
Stepped Pack	Many groups of misaligned layers that may look like ridges across the tape pack. This is sometimes called feathering or scatter wind. Individual layers that are misaligned are called popped strands.

Stick Slip	A description of various processes of friction between magnetic tape and tape heads. The process may occur when: • the tape sticks to the recording head because of high friction; • the tape tension builds because the tape is not moving at the head; • the tape tension reaches a critical level, causing the tape to release from and briefly slip past the read head at high speed; • the tape slows to normal speed and once again sticks to the recording head; • this process is repeated indefinitely. Stick Slip is characterized by jittery movement of the tape in the transport and/or audible squealing of the tape.
Stiction	A term loosely used to describe the phenomenon of tape adhering to transport components such as heads or guides.
Stretched	Polyester-based tape will stretch when too much force is applied to it; acetate-based tape will break. The width of a stretched tape will get noticeably smaller in places where it has stretched and then expand back to normal width. This is more likely to happen with ½ mil or 1 mil base tape than 1.5 mil. The audio on the stretched portion of the tape is usually unrecoverable.
Vinegar Smell	Particularly when examining acetate based tapes, smell the tape as soon as you open the box. If there is any trace of a vinegar-like smell, close the box immediately. One of the by-products of the deterioration of acetate materials—both film and magnetic tape—is acetic acid. This type of deterioration has been named the Vinegar Syndrome. It is relatively rare in magnetic tape, but is highly infectious to other tapes. Please also make a note of other strong, peculiar smells that are associated with tape degradation: a dirty socks smell, a waxy smell, or an astringent/pungent smell.
Windowing	A gap in the tape pack caused by obvious pack deformation. You can actually see through the pack, like looking through a window, because of the separation of tape layers.
Wrinkling	Multiple creases in the tape.

2.6.2.2 Analog Disc Problems

Fields for the following analog disc problems are available:

Problem	Identification and Definition
Broken	The disc has broken into distinct parts. This applies to shellac discs or glass-based lacquer discs.
Bubbles	Bubbles in the disc, usually caused by faulty pressing.
Chips	Small missing pieces from the edge or rim of a recording.
Cracks	A break without physical separation of the disc into distinct, separate parts.
Crayon Markings	The grooved surface of the disc has marks on it that were created by a crayon. Sometimes called chinagraph markings.
Crazing	Thin fracture lines on the surface of a lacquer disc caused by shrinkage of the lacquer coating.
Cutover Grooves	The breaking through the wall of one groove into the wall of the next groove, usually caused by overmodulation
Delamination	The cracking and then separating of the coating of a disc from its base. Enter “0” if there are no signs of delamination, “1” if there are a few cracks starting to appear on the surface of the disc, “2” if there are a significant number of cracks and some separating of the coating, “3” if the coating is clearly coming off in a number of places.
Dirt/Dust	The presence of dirt or other foreign matter on the disc. A significant amount of foreign matter may cause drop-outs or lead to spacing loss from poor tape-to-head contact.
Foreign Matter	Usually describes material (cardboard, etc.) which has adhered to, or become embedded in, the surface of vinyl or shellac discs following manufacture.
Fungus	Look for patterned, fuzzy, thread-like, or hairy-looking growths on the surface of the disc. Typically, these growths are white in color although they may also be black, brown, or mustard-colored. Try to distinguish mold from other types of visible contamination such as dirt, which may look similar but usually does not appear as fuzzy or patterned.
Locked Groove	Usually a spiral groove at the end of a recording that provides a groove for the stylus to ride in until an automatic record changer mechanism is tripped. Here, the term is used for any groove that is closed, that is, there is no path to the next groove
Marks	Any type of a mark such as a fingerprint or a scuff on the grooved surface.
Pitting	A visible pit or break in the surface of the recording.

Plasticizer Exudation	In lacquer discs, the movement of the plasticizer (usually castor oil turning into palmitic acid) to the surface of the disc. This is the first step towards delamination. It manifests as a white, oily sheen on the surface of the recording. It is not fungal growth, and there are no fuzzy parts as there often are with fungi.
Scratches	Using the categories outlined above, document the number and severity of scratches on the disc.
Stains	Water or other stains on the surface of the disc.
Surface Imprint	The transfer of material from the recording sleeve to the surface of the recording itself due to high contact stress caused by high temperatures, wrinkled or uneven surfaces of the packaging material, or uneven storage pressure. The transferred material may interfere with stylus tracking.
Tracking Problems	Scratches, chips, cracks, damaged grooves, etc. that impede playback on a disc may cause the stylus to lift out of the groove and/or skip grooves or otherwise mis-track. Use “0” if the disc contains scratches but plays with no problems. Use “1” if the disc contains a problem or two that impedes playback but is able to be played by adjusting the tracking force, anti-skate, adding weight, etc. Use “2” if most of the disc is playable but one or several problems cause mis-tracking regardless of attempts to get the disc to play. Use “3” if the disc is worse than above and seems beyond repair.
Warped	Alteration in disc surface shape (usually along several planes), causing the stylus to jump when the disc is played

2.6.3 Sonic Problems

Problems related to sonic content may be documented at the Audio Object level or at the Region level, as appropriate. However, additional Regions should NOT be created based on changes in any of these fields. Regions are created only for changes in a basic characteristic of the format.

The following fields are available to document sonic problems:

Problem	Identification and Definition
Artificial Tone	This field documents the presence of an on-going, spurious tone of recognizable pitch on a tape recording. This tone, which is not part of the intended recorded content, may be generated by the tape machine.
Buzz	Similar to hum, but buzz has more harmonics which extend to a higher audible frequency.

Clarity Problems	This field tracks problems with clarity of the content on the recording. Use it to rate tapes that sound muffled, unintelligible or contain music and/or speech that is difficult to understand or follow because it does not sound clear.
Cross Talk	The leakage of a signal into adjacent channels or into another part of a system. Crosstalk may occur through electrical, mechanical, magnetic, capacitive or other forms of coupling, for example, between adjacent heads in a multi-track recorder or between adjacent grooves on analog disc recordings.
Disc Noise	This field documents crackles and clicks from the playback of discs.
Distortion	Unwanted or unintended changes in sound quality and/or frequency response. It may be caused by inadequate playback or recording equipment, poor manufacture of the recording or by factors during the recording or re-recording process such as over-modulation.
Dropouts	*Brief* signal loss or reduction caused by a tape head clog, defect in the tape, debris, or other feature that causes an increase in the head-to tape spacing. A dropout can also be caused by missing magnetic material.
Hiss	An undesirable wide spectrum noise heard when a recorded tape is played back. It sounds similar to a leaky steam pipe and is caused by various factors including recording at too low of a level or speed, or using poor quality tape.
Hum	A low frequency noise, generally related to the power-line frequency of a sound system or its harmonics that is recorded onto the tape with the program content.
Overmodulation	A recording with very high levels resulting in problems such as distortion.
Print-through	The unwanted transfer of a magnetic field and its audio signal from one layer to another within a roll of tape. This causes an echo from one layer of tape while the next layer is passing over the playback head. The echo may occur either before the main signal or after.
Speed Problems	This field documents periodic variations in speed and pitch that may or may not be from wow and flutter.
Tape Noise	This field documents non-hum, non-buzz noise from the operation of a tape machine.
Undermodulation	A recording with very low levels leading to problems such as high amounts of hiss or lack of clarity.

Wow-Flutter	Fluctuations in frequency, often characterized as changes in pitch, caused by vibration in a tape transport. It is a distortion that occurs in sound reproduction as a result of undesired speed variations during recording or reproducing. Technically, wow occurs below approximately 6 Hz and flutter above 6 Hz.

2.7 Overall Ratings

After completing the evaluation, assign an overall rating for physical condition and an overall rating for sonic quality. The categories and definitions used by the ATM in these areas are available upon request.

3 Documenting Digital Files

Digital files created by the preservation transfer process or from born digital accessions are documented in ATMC like any other audio object. When ATMC parses a digital file it creates an MD5 digest (checksum) and automatically collects the following metadata about the file:

Data Element	Definition
Format (digital file)	The standard recognized name for the format of the audio object.
File Type	(.wav)
Audio Encoding	The encoding scheme used when audio digitization occurred for the described audio object. The majority of digital audio recordings will have a value of 'PCM'.
Bit Depth	The number of bits per sample for the audio content of the described audio object. This element describes the actual number of bits of the sample, whereas Word Size describes the number of bytes used to contain the sample.
Block Alignment	
Sample Rate	The sample rate of the audio data for the described audio object.
Word Size	Indicates how many bytes are used to represent a single audio sample.
Byte Order	The order in which a sequence of bytes are stored in computer memory. Used to indicate whether the file is in little-endian or big-endian order.
Checksum Value	A string indicating the checksum signature of the audio object.
Checksum Creation Date	Indicates the time and date the signature in the checksum value element was generated.
Data Length	

Duration of File	
Origination Date of File	(taken from the Broadcast Wave <bext> chunk metadata)

In addition, ATM workers currently enter the collection accession number and audio object use by hand for digital files.

4 Documenting Processing History or Digital Provenance

This module of ATMC collects data on the process of digitizing an audio object, including what was done to the object and how, why, where, and by whom it was done. Each instance of processing is considered an event, which is defined as a procedure(s) applied to an audio object. Events always have outcomes (for example, successful or unsuccessful), and may have inputs and outputs that often, but not always, fundamentally change the audio object.

4.1 General Tab

Data Element	Instructions
Event Type	Enter the appropriate term from the controlled list below that describes the type of event, Data entry choices: • *Preservation transfer* – Analog re-recording, digitization or digital transfer of an audio object with the intent of creating a Preservation Master digital file or a Preservation Master tape. • *Access transfer* – Analog re-recording, digitization or digital transfer of an audio object for the purpose of creating an access copy to fill an order or request. • *Creation of derivative file* – Generation of a derivative digital file, (such as a Production Master File, for example) from a source digital file • *Signal processing* – Altering a digital file to remove unwanted noise or to change the sound of the contents. This does not include dithering and noise shaping. • *Digital processing* – Standard processing of a digital file to obtain the best resolution and least noise possible. This includes dithering and noise shaping. It also includes gain changing and normalizing. Although these are forms of signal processing they have a somewhat different intent. • *Sample rate conversion* – Downsampling the source digital file. • *Editing* – Removing or adding content or "silence" from a digital file. Access copies may have long "silences" removed or loud machine or microphone thumps taken out, for example. This is never done in a Preservation Master File

	• *Cleaning* – Cleaning an analog or physical digital audio object. • *Baking* – Baking a Sticky Shed Syndrome tape • *Physical restoration* – Physical restoration procedures other than cleaning and baking. These procedures will be named and described as free text in this field. Examples include such things as repairing splices, dealing with cupping, and others. • *Other* – Procedures other than the above. A description of the event must be provided in the notes field.
Purpose of Event	This field provides a concise description of why the event was undertaken and its results, taken from a controlled list of descriptions. **a. Preservation transfer:** Choose the most appropriate description from the options below: • Digitization of an analog source recording to create a Preservation Master digital file. • Transfer of a digital source recording to create a Preservation Master digital file. • Analog re-recording of an analog source recording to create a Preservation Master tape. • Digitization of an analog source recording to create both a Preservation Master and Preservation Master–Intermediate digital file simultaneously. • Simultaneous digitization of multiple analog source recordings to create Preservation Master digital files. **b. Access transfer:** Choose the most appropriate description from the options below: • Digitization of an analog source recording to create an access digital file to fill an order or service copy request. • Transfer of a digital source recording to fill an order or service copy request. • Analog re-recording of an analog source recording to fill an order or service copy request. • Analog re-recording of an analog source recording for general backup purposes or with unknown intent. **c. Creation of derivative file:** Choose the most appropriate description from the options below: • Creation of a Production Master File for use in generating additional derivatives. • Creation of a derivative access digital file to fill an order or service copy request. • Creation of a preservation co-master using the Preservation Master–Intermediate file type. [Used for some types of Preservation Master-Intermediate files, specifically when they are cloned from Preservation Master Files. Not

	used for Intermediates that are created simultaneously with Preservation Masters from disc transfers.] **d. Digital Processing**: Choose the most appropriate description from the options below: • Dithering of file. • Dithering and noise shaping of file. • Gain changing and dithering of file. **e. Cleaning**: Enter "Cleaning of audio object for playback." **f. Baking:** Enter "Baking of open reel tape as treatment for Sticky Shed Syndrome."
Date/Time Stamp	The date and time that the event took place. Select the "Use current" button to add the current day/time.
Event Performed By	The name of the person who performed the event
Organization	The institution or unit that performed the event. This defaults to "Indiana University Archives of Traditional Music".
Processing Location	The specific location within the organization where the event took place. Choose the ATM studio or other location that handled the event.
Notes	Add miscellaneous notes related to the event.

4.2 Input/Output Tab

Data Element	Instructions
Input Object	Enter the audio object upon which the event was performed.
Output Object	Enter the audio object, if any, that was created as a result of the event.
Device/Tool Chain	Select the device or tool chain that was used in the event. These chains are built in advance by selecting Studio Setup from the ATMC Search Window.
Device/Tool Patchbay	Using the virtual patchbay, create the appropriate patches to represent the signal chain used for the event.
Tools in Chain	Select Edit/Add to confirm that all tools used in the event are present. Select each device/tool as necessary to enter or update values for device/tool settings.

4.3 Studio Setup

In this module of ATMC, individual devices and tools are documented and multiple devices/tools are grouped together into signal chains. From the Search Window, select the Studio Setup button. From the ATMC Studio Setup window, it is possible to document a new tool, edit an existing tool, create a new tool chain, or edit an existing tool chain.

Documenting a New Tool:

Data Element	Instructions
File Location	Select the location on the local workstation where the data for this tool should be stored.
Nickname	A local name by which the device/tool is known and/or easily recognized.
Tool Type	The generic category for the device or tool. For example: *Open Reel Tape Machine, A/D Converter, Turntable*, etc.
Manufacturer	The company that manufactured the device or tool.
Model Number	The model number given to the device or tool by the manufacturer
Serial Number	The serial number given to the device or tool by the manufacturer. The ATM assigns serial numbers to devices that were not given one by the manufacturer. This enables differentiation between multiple devices of the same brand and model number.
Software Version	For software tools, enter the manufacturer's version number.
Settings	Document all settings on the device/tool that are subject to manipulation. • **Name:** The name of the setting, exactly as it appears on the device or tool. Use parentheses to add additional information for clarity. For example, one converter uses the label "FS" for sample rate. We add information for clarity: "FS (Sample Rate)". • **Interface:** The precision by which the setting is manipulated. Data entry choices: *Analog Stepped, Analog Free, Digital* • **Group:** This enables the grouping of related settings together. Enter a name that represents the group. • **Value:** The value used for this setting during the event. • **Units:** The units that the above value is measured in. • **Transition:** For parametric settings, the choices are Ramped or Instantaneous.

Channels	Document all channels into and out of the device or tool. • **Label:** The label that describes the channel. For example: *Left In, Digital Out, Word Clock In*. • **Format:** The type of channel. Data entry choices: • *ANALOG_BALANCED_XLR* • *ANALOG_BALANCED_TRS* • *ANALOG_UNBALANCED_TS* • *ANALOG_RCA* • *DIGITAL_AES_EBU* • *DIGITAL_SPDIF_COAXIAL* • *DIGITAL_SPDIF_OPTICAL* • *DIGITAL_SDIF* • *PCI SLOT* • *WORD_CLOCK* • *SUPER_CLOCK* • *LIGHT_PIPE* • *USB_1.1* • *USB_2.0* • *IEEE_1394* • *IEEE_1394B* • *OTHER* • **Routing:** Where the channel is routed. Data entry choices: *Input, Output, Send, Return, Through* • **Sync source:** Check this box if the channel provides sync to downstream devices. • **Modules:** A module may be thought of as a device/tool within a device/tool, or as a tool capable of multiple, simultaneous processes. In ATMC, we use modules as a convenient abstraction to document logically such things as the tonearm, cartridge, and stylus that are attached to a turntable. See the device/tool chain examples, below. Data entry fields for modules are the same as for any device/tool—Nickname, Tool Type, Manufacturer, Model Number, Software Version, Settings and Channels—as detailed by everything presented above.

Example: Signal chain metadata for preservation transfer of disc 9-3, side A

Tool Chain Name: Disc Preservation Transfer
Tools/Devices in Chain: SP15 Turntable/KAB Preamp/Mytek Stereo 96 ADC Converter/Lynx Sound Card/Host Computer

Tool 1: Turntable

Nickname: SP15 Turntable
Tool Type: Turntable
Manufacturer: Technics; Model Number: SP-15; Serial Number: ATM01

Settings:

1) Name: Speed – Interface: Analog Stepped – Group: Speed – Value: 78 – Units: rpm
2) Name: Pitch control – Interface: Analog Stepped – Group: Speed –Value: 0.0 – Units: percentage

Channels:

1) Label: Channel 1 Out – Format: ANALOG_RCA – Routing: Output
2) Label: Channel 2 Out – Format: ANALOG_RCA – Routing: Output

Modules:

Module 1: Stylus

Nickname: Stylus
Tool Type: Stylus
Manufacturer: Expert Stylus; Model Number: None

Settings:

a. Name: Size – Interface: Analog Free – Value: 1.5 – Units: mils
b. Name: Shape – Interface: Analog Free – Value: CT [conical, truncated]

Module 2: Cartridge

Nickname: Stanton Cartridge
Tool Type: Cartridge
Manufacturer: Stanton; Model Number: 500

Settings:

a. Name: Serial Number – Value: ATM06

Module 3: Tonearm

Nickname: SME Tonearm
Tool Type: Tone arm
Manufacturer: SME; Model Number: 3012

Settings:

a. Name: Serial Number – Value: ATM03
b. Name: Tracking Force – Interface: Analog Free – Value: 5 – Units: Grams
c. Name: Anti-skate – Interface: Analog Free – Value: 5
d. Name: Horizontal Alignment – Interface: Analog Free – Value: 298 (Pivot to Spindle) – Units: mm

Tool 2: Preamp

Nickname: KAB Preamp
Tool Type: Turntable preamp
Manufacturer: KAB; Model Number: EQS MK12; Serial Number: ATM09

Settings:

1) Name: Capacitance Left – Interface: Analog Free – Group: Capacitance – Value: 75 Units: pf
2) Name: Capacitance Right – Interface: Analog Free – Group: Capacitance – Value: 75 – Units: pf
3) Name: Loop 1 – Interface: Analog Stepped – Group: Loop– Value: Out
4) Name: Rumble filter – Interface: Analog Stepped – Group: Process – Value: Off
5) Name: Stereo/Mono – Interface: Analog Stepped – Group: Process – Value: Stereo
6) Name: Lateral/Vert – Interface: Analog Stepped – Group: Process – Value: Lateral
7) Name: Mono Mix – Interface: Analog Free – Value: Middle
8) Name: Gain – Interface: Analog Stepped – Value: -6 – Units: db
9) Name: Resistance – Interface: Analog Stepped – Value: 47 – Units: K ohm
10) Name: Chronologic EQ – Interface: Analog Stepped – Value: Flat
11) Name: Phono Select – Interface: Analog Stepped – Value: In
12) Name: Loop 2 – Interface: Analog Stepped – Group: Process – Value: Out

Channels:

1) Label: Phono 1 left – Format: ANALOG_RCA – Routing: Input
2) Label: Phono 1 right – Format: ANALOG_RCA – Routing: Input
3) Label: Phono 1 left send – Format: ANALOG_RCA – Routing: Send
4) Label: Phono 1 right send – Format: ANALOG_RCA – Routing: Send
5) Label: Phono 1 left return – Format: ANALOG_RCA – Routing: Return
6) Label: Phono 1 right return – Format: ANALOG_RCA – Routing: Return
7) Label: TRS out left – Format: ANALOG_BALANCED_TRS – Routing: Output
8) Label: TRS out right – Format: ANALOG_BALANCED_TRS – Routing: Output
9) Label: RCA out left – Format: ANALOG_RCA – Routing: Output
10) Label: RCA out right – Format: ANALOG_RCA – Routing: Output

Tool 3: Analog-to-Digital Converter

Nickname: Myek Stereo 96 ADC 051
Tool Type: A/D converter
Manufacturer: Mytek; Model Number: Stereo 96; Serial Number: STEREO96ADC-R5-051

Settings:

1) Name: FS (Sample rate) – Interface: Analog Stepped – Value: 96 – Units: KHz
2) Name: Word Length (Bit depth) – Interface: Analog Stepped – Value: 24 – Units: Bits
3) Name: Volume – Interface: Analog Free – Value: -15 – Units: dbfs
4) Name: Word Clock – Interface: Analog Stepped – Value: Internal

Channels:

1) Label: Left In – Format: ANALOG_BALANCED_XLR – Routing: Input
2) Label: Right In – Format: ANALOG_BALANCED_XLR – Routing: Input
3) Label: Digital Out – Format: DIGITAL_AES_EBU – Routing: Output
4) Label: Word Clock In – Format: WORD_CLOCK – Routing: Input
5) Label: Word Clock Out – Format: WORD_CLOCK – Routing: Output

Tool 4: Soundcard

Nickname: Lynx Soundcard
Tool Type: Sound card (PCI)
Manufacturer: Lynx; Model Number: AES 16; Serial Number: 2405230490

Settings:

1) Name: Rate select – Interface: Digital – Value: 96 – Units: KHz
2) Name: Rate lock – Interface: Digital – Value: on
3) Name: Dual Wire In – Interface: Digital – Value: off
4) Name: Dual Wire Out – Interface: Digital – Value: off
5) Name: Preferred Clock Source – Interface: Digital – Value: Digital In 1

Channels:

1) Label: Input 1 and 2 – Format: Digital_AES_EBU – Routing: Input – Sync Source?: Y
2) Label: Input 3 and 4 – Format: Digital_AES_EBU – Routing: Input
3) Label: Input 5 and 6 – Format: Digital_AES_EBU – Routing: Input
4) Label: Input 7 and 8 – Format: Digital_AES_EBU – Routing: Input
5) Label: Output 1 and 2 – Format: Digital_AES_EBU – Routing: Output
6) Label: Output 3 and 4 – Format: Digital_AES_EBU – Routing: Output
7) Label: Output 5 and 6 – Format: Digital_AES_EBU – Routing: Output
8) Label: Output 7 and 8 – Format: Digital_AES_EBU – Routing: Output
9) Label: Word clock In – Format: WORD_CLOCK – Routing: Input
10) Label: Word clock Out – Format: WORD_CLOCK – Routing: Output
11) Label: PCI slot output – Format: PCI Slot – Routing: Output

Tool 5: Host Computer

Nickname: Host Computer
Tool Type: Computer (PC)
Manufacturer: Dell; Model Number: Optiplex GX620; Serial Number: 3HXBQ81
Software Version: Microsoft Windows XP Pro Ver 2002

Settings:

1) Name: Processor – Interface: Digital – Value: Pentium 4 CPU 3.80 GHz
2) Name: RAM – Interface: Digital – Value: 2.0 – Units GB
3) Name: Operating System – Value: Windows XP Pro Ver 2002

Channels:

1) Label: Input – Format: PCI slot – Routing: Input

Modules:

Module 1: Recording/Editing Software

Nickname: Wavelab 6.0
Tool Type: Recording/Editing Software
Manufacturer: Steinberg; Model Number: Wavelab 6; Software Version: 6.00b

Settings:

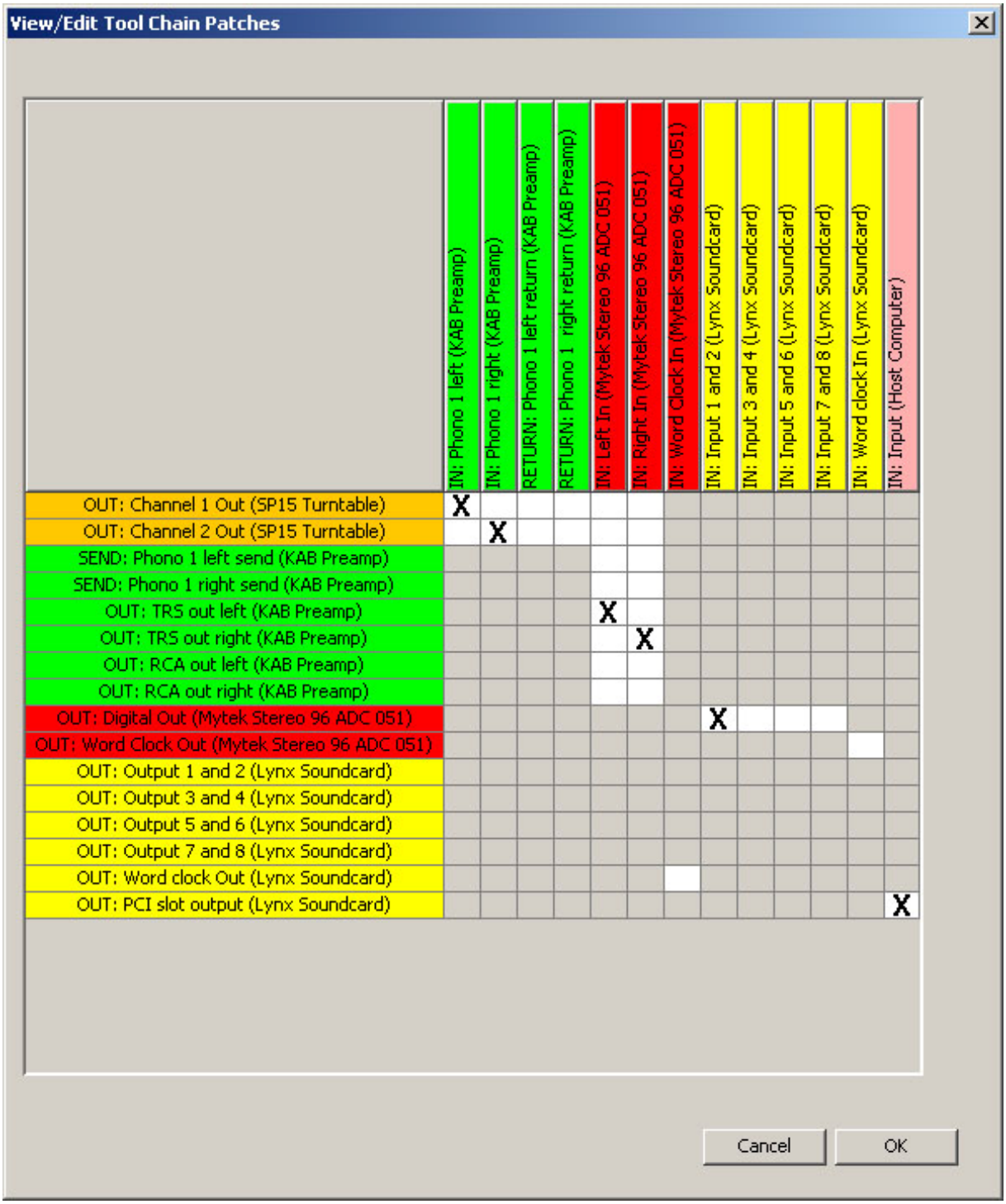
a. Name: Type – Interface: Digital – Group: Audio File Format dialog box – Value: Wave
b. Name: Audio Format – Interface: Digital – Group: Audio File Format dialog box – Value: PCM (uncompressed)
c. Name: Channels – Interface: Digital – Group: Audio File Format dialog box – Value:Stereo
d. Name: Sample Rate – Interface: Digital – Group: Audio File Format dialog box – Value: 96 – Units: KHz

e. Name: Bit Resolution – Interface: Digital – Group: Audio File Format dialog box – Value:24 – Units: bit
f. Name: Playback device – Interface: Digital – Group: Preferences: Audio device tab – Value: MME-WDM Lynx AES16 Device 1
g. Name: Playback buffer number – Interface: Digital – Group: Preferences: Audio device tab – Value: 6
h. Name: Playback buffer size – Interface: Digital – Group: Preferences: Audio device tab – Value: 16384
i. Name: Recording device – Interface: Digital – Group: Preferences: Audio device tab – Value: MME-WDM Lynx AES16 Device 1
j. Name: Recording buffer number – Interface: Digital – Group: Preferences: Audio device tab – Value: 6
k. Name: Recording buffer size – Interface: Digital – Group: Preferences: Audio device tab – Value: 16384
l. Name: Playback resolution – Interface: Digital – Group: Preferences: Audio device tab – Value: 24 – Units: bit
m. Name: 24 bit sample format – Interface: Digital – Group: Preferences: Audio device tab – Value: 32 – Units: bit (4 bytes)
n. Name: Time code – Interface: Digital – Group: Preferences: Wave edit tab – Value: 30 – Units: FPS

Channels:

a. Label: Input 1 – Routing: Input
b. Label: Input 2 – Routing: Input
c. Label: Input 3 – Routing: Input
d. Label: Input 4 – Routing: Input
e. Label: Return 1 – Routing: Return
f. Label: Return 2 – Routing: Return
g. Label: Send 1 – Routing: Send
h. Label: Send 2 – Routing: Send

Below is an image of the patchbay in ATMC, showing the signal routing for this processing history instance.


View/Edit Tool Chain Patches
IN: Phono 1 left (KAB Preamp)
IN: Phono 1 right (KAB Preamp)
RETURN: Phono 1 left return (KAB Preamp)
RETURN: Phono 1 right return (KAB Preamp)
IN: Left In (Mytek Stereo 96 ADC 051)
IN: Right In (Mytek Stereo 96 ADC 051)
IN: Word Clock In (Mytek Stereo 96 ADC 051)
IN: Input 1 and 2 (Lynx Soundcard)
IN: Input 3 and 4 (Lynx Soundcard)
IN: Input 5 and 6 (Lynx Soundcard)
IN: Input 7 and 8 (Lynx Soundcard)
IN: Word clock In (Lynx Soundcard)
IN: Input (Host Computer)
OUT: Channel 1 Out (SP15 Turntable)
OUT: Channel 2 Out (SP15 Turntable)
SEND: Phono 1 left send (KAB Preamp)
SEND: Phono 1 right send (KAB Preamp)
OUT: TRS out left (KAB Preamp)
OUT: TRS out right (KAB Preamp)
OUT: RCA out left (KAB Preamp)
OUT: RCA out right (KAB Preamp)
OUT: Digital Out (Mytek Stereo 96 ADC 051)
OUT: Word Clock Out (Mytek Stereo 96 ADC 051)
OUT: Output 1 and 2 (Lynx Soundcard)
OUT: Output 3 and 4 (Lynx Soundcard)
OUT: Output 5 and 6 (Lynx Soundcard)
OUT: Output 7 and 8 (Lynx Soundcard)
OUT: Word clock Out (Lynx Soundcard)
OUT: PCI slot output (Lynx Soundcard)
Cancel
OK