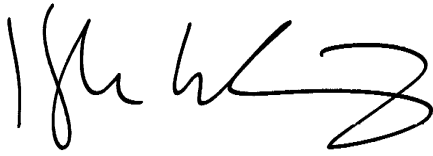PRODUCERS &
ENGINEERS WING

The use of digital technology and the availability of powerful yet relatively inexpensive computing hardware and software has exponentially expanded both the scope and variety of creative tools used in the recording process. However, the continued evolution and even consequent obsolescence of these very tools increasingly threatens our ability to revisit the original master tracks, even in the short-run.
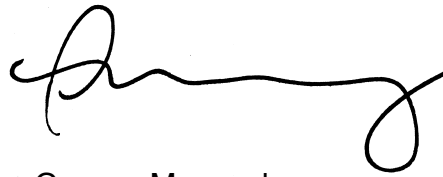
With this in mind, Nashville members of the P&E Wing of The Recording Academy® formed a Delivery Specifications Committee, which has created The Delivery Recommendations for Master Recordings document. This is a concise yet expansive document containing guidelines for both short-term (transitional) and long-term (archival) storage of master recordings, which are the very essence of the recording artist's work and the core of the record industry's asset base.  It is essential that all concerned - producers, engineers, artists, record labels and manufacturers - work together to ensure that these often-irreplaceable artistic historical assets are preserved.

The document includes a "snapshot" of the formats most widely in use today.  It will maintain its relevance with bi-annual updates by the Delivery Specifications Committee, which will gather in open meetings to discuss new formats and technologies as they evolve, and to note expiring technologies and materials at risk.  The Delivery Recommendation document stresses the importance of *documentation* and creating documentation in machine-readable formats ready for "ingestion" into data farms.  There is little agreement at this time as to the format of the documentation; it is nonetheless critical to notate the recording project in detail, and we provide some examples of a starting point.

It is vitally important to address these issues now, as professional recording formats have never before been subject to such an accelerated rate of obsolescence.

Kyle Lehning                               George Massenburg

Delivery Specifications Committee Co-Chairs,
The Producers & Engineers Wing of the Recording Academy
May 27th, 2003

# **Producers & Engineers Wing**
## **Delivery Specifications Committee**

| | | |
|---|---|---|
| Chuck Ainlay | Tom Endres | Jake Nicely |
| Jeff Balding | Garth Fundis | Gary Paczosa |
| Steve Bishir | Susan Heard | Mike Purcell |
| Alison Booth | Scott Hendricks | Traci Samczyk |
| Tony Brown | Steve Marcantonio | Kay Smith |
| Barry Cardinael | Pat McMakin | John Spencer |
| Eric Conn | Marshall Morgan | Bil VornDick |
| Sharon Corbitt | Betsy Morley | |

**<u>Contents:</u>**

Delivery Document.

Documentation Examples.
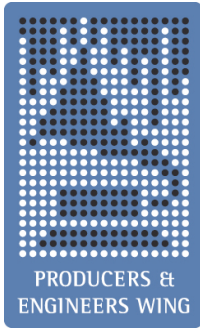
# The Producer's and Engineer's Wing

# Recommendation for Delivery of Recorded Music Projects

*030609 rev 31*

This document has been created as *a Recommendation for Delivery of Recorded Music Projects*. This document specifies the *physical deliverables* that are the foundation of the creative process, with the understanding that it is in the interest of all parties involved to make them accessible for both the short term and the long term. Thus, this document recommends reliable backup, delivery and archiving methodologies for current audio technologies, which should ensure that music will be completely and reliably recoverable and protected from damage, obsolescence and loss.

The Delivery Specifications Committee, comprised of Producers, Engineers, Record Company Executives and others working primarily in Nashville, New York and Los Angeles (and in conjunction with the AES Technical Committee on Studio Practices and Production and the Nashville Chapter of the Audio Engineering Society), developed the Delivery Recommendations over the course of two years. During its development, the committee met regularly at the Recording Academy® Nashville Chapter offices to debate the issues surrounding the short term and long term viability of the creative tools used in the recording process, and to *design a specification in the interest of all parties involved in the recording process.* The committee reached consensus in July, 2002 and the committee's recommendations were finalized and presented to the P&E Wing Membership, the recording community and press in Nashville on July 19, 2002. The document was also presented to the AES in the Studio Practices and Production Tech Committee meeting on October 7th, 2002 in Los Angeles, and on March 24th in Amsterdam.

The P&E Wing's Delivery Specifications Committee will review the document vis à vis recording techniques, hardware and formats *every 6 months* for its continuing relevance within commonly accepted industry practices. This Committee is open to all comment from interested parties, and notification of meetings is available by e-mailing p&edeliveryrecs@grammy.com.

# *Summary of the Delivery Recommendations*

There are two Recommendations for Music Delivery:
1. Minimum
2. Preferred (includes "Minimum")

For each of four recording technologies:
1. Analog Multi and Two Track Tape
2. Digital Multi and Two Track Tape (and Digital MO)
3. Proprietary-Format Multi and Two Track Hard Disk Recorder (Proprietary HDD)
4. Digital Audio Workstation or DAW (HDD)

*Delivery Recommendations:*

The *Minimum Delivery Recommendation* provides the capability to reuse the original recording in the short-term and, if necessary, to re-create the original recording and/or mix as closely as possible. This will allow the owner of the master (Record Company) quicker access to the elements of the project in use at the conclusion of the mixing process.

The *Preferred Delivery Recommendation* provides a more robust solution to the long-term issues that confront Record Labels in their efforts to maintain their assets. *It is therefore the Committee's recommendation that all of the audio tracks[1] be "flattened" and migrated to the Broadcast Wave file format* with a maximum of 1 channel per BWF file[2] (for further information about the file structure of the Broadcast Wave File click on: **EBU Technical Documents Site** (http://www.ebu.ch/tech_32/tech_32xx.html) then click on 3285 on the left-hand side. A "flattened" file is one segment of digital audio that plays continuously from the start of the *track* to the end. Open-source file formats (such as the Broadcast Wave file) and enterprise-class storage media provide access to the audio files after the proprietary equipment used to create them may no longer be available. These file formats will readily adapt to any current or future computing infrastructure.

*To fulfill the Minimum Delivery Recommendation*:

Deliver to the record label the Primary Master (from Table 1) and two Backups/Safeties for each and every master. The Primary Backup/Safety and the Secondary Backup/Safety should be delivered in two different approved storage

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[1] For the purposes of this document, a "Track" is the place where one indivisible unit of source material is stored, and may be from 1 to n channels of audio; a "Track" is further defined in the Glossary of Terms.

[2] It is unclear at this time whether the specification of the Broadcast Wave File format can be amended to *explicitly* include multi-channel (for numbers of channels > 2) files in time for release of this document. Also, BWF files with more channels are more likely to exceed the FAT32 maximum file size of 2gbytes. When the BWF Standard is so amended it is understood that this document will be updated to include multichannel content in BWF files.

media from the Acceptable Transitional Master Backup Storage Media listing (Table 2). The Backups/Safeties should have sampling rates and precisions equal to or better than the "Master" (88.2, 96, 176.4, 192, 352.8, and 384 kHz are recommended, as are 24 or higher bit depths). These same sampling rates and precisions are required for A/D conversion. Also, there should be no level adjustments, truncation, dither or noise-shaping, or modification of the digital signal.

The "Master" is defined as a collection of the various original components of the recording process for a given production, each in their originally recorded formats, and collected in a form that is ready for transition to the *next phase* of the process. (For example, the recorded 'masters' from the tracking and overdubbing processes are collected in a form that is ready for transition to the mixing process. The mixed 'masters' are collected in a form that is ready for transition to the mastering process. The mastered 'master' is ready for transition to the manufacturing process.) *"Masters"* include (but are not limited to) all open-reel tapes, hard disk drives (HDD), and incremental backups made during the recording process. They include all of the original components of the recording process for a given production each in their originally recorded formats. There should be no deletions of useful material from the *"Masters",* such as out-takes, artist's talking, incomplete or unreleased recordings, etc. The constitution of "useful material" is determined by agreement between Record Company and Producer prior to the commencement of the recording project.

A Glossary of Technical Terms as well as a Glossary of Recording Technologies are also provided with the document. Some industry-standard nomenclature was been sharpened (for instance, "Masters" and "Tracks").

Additionally, it is highly recommended that paper documentation accompany all Master deliverables and Backups/Safeties and that all documentation accompany them in machine-readable form. Traditionally, this documentation has included tracking sheets, engineer notes, set-up notes, sketches of microphone placement, and any other data pertinent to the recording project. The Delivery Specifications Committee recommends that all Masters and Backups have concise labeling. We recommend a label such as the **Media ID Label**, a document developed by the Nashville Chapter of the Audio Engineering Society (AES). The label should be completed and affixed to each and every Master and Backup/Safety for the recording project. The Media ID Label provides important data (expected to be formatted with metadata to accompany electronic delivery) about each physical Master and Backup/Safety deliverable, and can be included within Broadcast Wave files. A sample copy of the Media ID Label is attached to this document. Also, a document such as the **Recording Map** should be completed, as it provides important metadata about the entire recording process and methodology. The Recording Map should be maintained throughout the course of the Recording Project as it details information about the original sources, transfers and backups/safeties. An example of a Recording Map follows this document.

_To fulfill the Preferred Delivery Recommendations:_

In addition to the Master and Backups/Safeties described in the Minimum Delivery Recommendation above, each track[3] of each song should be "flattened" or converted to continuous Broadcast Wave Files[4] without processing or automation. The Broadcast Wave Files should then be transferred to an Approved Long Term Backup Storage Medium (Table 3).  In some situations ancillary processing may be understood to be a key component of the final product (volume level automation, compression, etc.)   This processing may be included in a _separate "flattened" file_ in addition to the unprocessed "flattened" file, as mutually agreed by the Producer and the Record Company.

_Regarding Time Code for the Broadcast Wave Files:_

_If time code was supported in the recording process_, the original positional reference should be incorporated in the Broadcast Wave file format in the "Time Reference" field of the "bext" chunk as a high-precision 64bit integer representing sample count.  All files/regions for each track should be consolidated to a single file.  The standard rule that should apply is that there will be no more than one (1) file per track.  Every effort should be made for all of the Broadcast Wave files to be a bit-to-bit copy of the original digital tracks.

_If no time code or positional reference was used in the recording process_, all recorded tracks (Digital and or Analog tracks) should be converted to the continuous Broadcast Wave file format with a start time of the sample count equivalent of 1:00:00:00 (where possible). (For example, 2" Analog Tape as well as raw AIFF files may have no time code present)  All tracks including partial tracks, such as guitar solos, background vocals, etc. should have the same start time to maintain proper time relationships between tracks.

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3 As regards how "track" is defined, see footnote 1 on preceding page.

4 As regards how "Broadcast Wave Files" are defined, see footnote 2 on preceding page.

## Table 1. ***Primary*** <u>Master Delivery Media</u>[5]

| ANALOG | | |
|---|---|---|
| | 24 tk | 2" analog tape |
| | 16 tk | 2" or 1" analog tape |
| | 8 tk | 2" or 1" analog tape |
| | 2 tk | 1/4", 1/2" or 1" analog tape |
| **DIGITAL TAPE** | | |
| | PCM3348  48 tk | 1/2" digital tape |
| | PCM3348HR (48/24bit)  48 tk | 1/2" digital tape |
| | PCM3324  24 tk | 1/2" digital tape |
| | Tascam DA-88 / DA-98 / Sony PCM800 16-bit | 8mm cartridge tape |
| | Tascam DA-78, DA-98HR 24-bit | 8mm cartridge tape |
| | Tascam DS-D98 96k, 192k 24-bit; DSD-capable | 8mm cartridge tape |
| | Alesis ADAT, XT 16-bit | VHS tape |
| | Alesis XT-20 / M-20 20-bit | VHS tape |
| **DIGITAL MO** | | |
| | Genex GX8500 | MO |
| | Genex GX9048 | MO |
| **HARD DISK RECORDERS** | | |
| | RADAR II / RADAR 24 | Proprietary HDD |
| | Mackie HDR/MDR 2596 | Proprietary HDD |
| | Alesis HD-24 | Proprietary HDD |
| | Tascam MX-2424 | (MacOS) SCSI HDD |
| | Tascam MMR-8, MMP-16 (player only) | (MacOS & FAT32) SCSI HDD |
| | Euphonix R-1 | Proprietary HDD |
| | Fairlight MFX / MFX plus | Proprietary HDD |
| | Fairlight Merlin | Proprietary HDD |
| **DIGITAL AUDIO WORKSTATIONS** | | |
| | ProTools 24, Mix, Mix Plus | (MacOS) SCSI/FW HDD |
| | ProTools HD | (MacOS) SCSI/FW HDD |
| | Nuendo | (MacOS & FAT32) SCSI/FW HDD |
| | Paris | (MacOS) SCSI/FW HDD |
| | Cubase VST | (MacOS & FAT32) SCSI/FW HDD |
| | Digital Performer | (MacOS) SCSI/FW HDD |
| | Emagic Logic | (MacOS) SCSI/FW HDD |
| | Sonic Solutions / Sonic SolutionsHD | (MacOS) SCSI HDD |
| | Merging Technologies Pyramix (PCM & DSD) | Windows NT/2000 SCSI/FW HDD |
| | SADiE (PCM & DSD) | (FAT32) SCSI/FW HDD |
| | Sony Sonoma (DSD) | (FAT32) SCSI/FW HDD |
| **DIGITAL OPTICAL** | | |
| | Alesis Masterlink | AIFF files on CD-24 (ISO9660 format on CD-R) |

Hard Disk Drives should be delivered in safe, shockproof cases such as the Pelican, which the Record Company may provide as necessary. ATA/IDE/EIDE Hard Drives are acceptable, but only in Firewire-interfaced enclosures.

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[5] The P&E Wing's Delivery Specifications Committee will review the document vis à vis recording techniques, hardware and formats <u>every 6 months</u> for their continuing relevance within commonly accepted industry practices.  This Committee is open to all comment from interested parties, and notification of meetings is available by e-mailing <u>p&edeliveryrecs@grammy.com</u>.

## Table 2. *Transitional* Master Backup Storage Media

| COMPUTER TAPE ARCHIVE | | |
|---|---|---|
| | AIT (includes DSD archives) | Sony |
| | DLT/SDLT | Quantum |
| | VXA | Exabyte (except 8505 & EL820) |
| | LTO | Hewlett-Packard, IBM, and Seagate (currently) |
| **DIGITAL AUDIO TAPE** | | |
| | PCM3348  48tk/16bit | Sony |
| | PCM3348HR 48tk/24bit | Sony |
| | DA-78, DA-98HR | Tascam |
| | DS-D98 (includes DSD archives) | Tascam |
| | | |
| | | |
| **COMPUTER HARD DISK** | | |
| | SCSI I/F HDD | (many, standard) |
| | FireWire I/F HDD (includes ATA/EIDE/IDE/) | (many, standard) |
| **COMPUTER OPTICAL DISK** | | |
| | CD-R | (many, standard) |
| | CD-RW | (many, standard) |
| | DVD-R | (many, standard) |
| | DVD-RW | (many, standard) |
| | DVD-RAM | (many, standard) |
| | MO (includes DSD archives) | Genex |

Hard Disk Drives should be delivered in safe, shockproof cases such as the Pelican, which the Record Company may provide as necessary.

<u>The Future</u>

The Delivery Specifications Committee expects that *direct delivery* (via secure connection on the Internet & etc) will be commonplace in the future, and uploading files to very large-scale Digital Libraries will be recommended*. <u>Digital source files should readily adapt to any general computing infrastructure</u>* that is in place or anticipated to be put in place by the owners of the masters. The recording industry recognizes the need to make all of the audio elements available on the storage media types that are used by these systems**.** Based on these criteria, acceptable media for the *<u>Preferred</u>* deliverables are listed in Table 3, below:

Table 3. ***Long Term*** <u>Master Backup Storage Media</u>

| COMPUTER TAPE ARCHIVE | | |
|---|---|---|
| | AIT (includes DSD archives) | Sony |
| | DLT/SDLT | Quantum |
| | LTO | Hewlett-Packard, IBM, and Seagate (currently) |

# Quick Reference Guide
## for Delivery of Masters and Backups/Safeties
### (or "What The Producer Delivers To Receive Final Payment")

## **Minimum Delivery**

*For all of the Recording Technologies listed below, the Producer and/or Engineer should deliver to the Record Label:*

a.) The Masters, in their originally recorded formats, b.) A Primary Backup/Safety in one of the mediums from the "Currently Acceptable Transitional Storage Media Listing", (Table 2), c.) A Secondary Backup/Safety, in a *different* medium than the Primary Backup/Safety also from the "Currently Acceptable Transitional Storage Media Listing" (Table 2.), and d.) Catalog Files for HDD Backup/Safeties, if applicable.  Digital Backups/Safeties should have sampling rates and precisions equal to or better than the Master.

In addition to the physical masters and safeties, include "Traditional" Documentation (Tracking Sheets, Lyrics, Charts, Orchestral Arrangements and Parts, Mix Documentation).  For a guideline as to what constitutes documentation, we recommend using The Media ID Label for specific labeling of each element in the delivery, and The Recording Map for detailing the recording process and related methodologies.

## **Preferred Delivery**

In addition to the Minimum Delivery elements listed above, the Preferred Delivery would include "Flattened" continuous Broadcast Wave Files of every multi-track and two track element, without processing or automation, on a currently approved *Long Term* Master Backup Storage Media (Table 3).  In some situations, processing is considered to be a key component of the final product (volume level automation, compression, etc.)  This may be included as a separate file in addition to the unprocessed 'flattened file, as mutually agreed by the Producer and the Record Company.

## ***If You Are Recording or Mixing To:***

Analog Multi-Track or Two Track, 2", 1", 1/2", or 1/4" Analog Tape is the Master.

Note: High-quality Analog to Digital conversion should be used to convert Analog Masters to Digital Backups/Safeties using sample rates of at least 88 and 24 or higher bit depth. It has been determined that various DSD technologies are acceptable for analog backup. We strongly encourage all users of this technology to contact Sony/Phillips directly for further guidance.

Digital Multi-Track or Two Track Tape (and Digital MO), 1/2" Digital, 8mm Cartridge Tape,  VHS Tape, or MO is the Master.

<u>Proprietary-Format Hard Disk Drive Multi- or Two Track</u>, the Proprietary HDD is the Master. (for Alesis Masterlink, CD-R is always the Master)

*Radar II/Radar 24, Mackie HDR/MDR 2496, Alesis HD-24, Tascam MX-2424, Euphonix R-1, Fairlight MFX/MFX plus, Fairlight Merlin, and Alesis Masterlink)*

<u>Digital Audio Workstation (DAW),</u> the HDD is the Master

*ProTools 24 Mix/Mix Plus, ProTools HD, Nuendo, Paris, Cubase VST, Digital Performer, SADiE, Emagic Logic, Sony DSD (SACD). Valid logical backups for ProTools include Dantz Retrospect and Unix/Linux tar (tape) formats.*

# Glossary of Technical Terms

**32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192 / 352.8 / 384kHz** – Refers to the sample rate of a digital recording (samples per second).

**16 bit / 24 bit / 32 bit** – Refers to the bit *width* (sometimes called bit depth), or *precision* of a PCM digital signal (or recording).

**AIFF –** Audio Interchange File Format.  A computer file type which contains digital audio data.  Notably, the AIFF format does not support time stamping.

**AIT** – Advanced Intelligent Tape.  Helical-Scan Magnetic Tape Storage Format developed by Sony.

**ATA** – Advanced Device Attachment.  Often used in the same context as IDE or EIDE.
Short for ***A**dvanced **T**echnology **A**ttachment,* a disk drive implementation that integrates the controller on the disk drive itself. There are several versions of ATA, all developed by the *Small Form Factor (SFF) Committee:*

* **ATA:** Known also as *IDE*, supports one or two hard drives, a 16-bit interface and PIO modes 0, 1 and 2.
* **ATA-2:** Supports faster PIO modes (3 and 4) and multiword DMA modes (1 and 2). Also supports logical block addressing (LBA) and block transfers. ATA-2 is marketed as *Fast ATA* and *Enhanced IDE (EIDE).*
* **ATA-3:** Minor revision to ATA-2.
* **Ultra-ATA:** Also called *Ultra-DMA, ATA-33,* and *DMA-33,* supports multiword DMA mode 3 running at 33 MBps.
* **ATA/66:** A version of ATA proposed by Quantum Corporation, and supported by Intel, that doubles ATA's throughput to 66 MBps.
* **ATA/100:** An updated version of ATA/66 that increases data transfer rates to 100 MBps.

**Blu-Ray**  – A new, as-of-yet-unreleased optical disk technology that utilizes a short-wavelength (hence, "blue") laser to write and read, allowing far greater amounts of data to be reliably stored.

**Broadcast Wave File** –   A computer file type which contains, among other items, digital audio data.  The Broadcast Wave File format is an EBU (European Broadcast Union) standard whose data format is based on the Microsoft RIFF wave format; there is room for additional information in the file (as specified in the "header") which allows for storage of metadata.  Technical specifications are available at http://www.ebu.ch/tech_32/tech_32xx.html (click on document #3285).

**BWF** – Broadcast Wave Format. Same above.

**B-Wave** – Broadcast Wave Format.  Same as above.

**CD** – Compact Disc.  5.25 inch Optical storage medium that allows storage of either 74 min./650 MB or 80 min./700 MB of information.

**CD-R** – Compact Disc, recordable *one time*. The CD-R is 5.25-inch optical media with same storage capability as CD.

**CD – RW** – Compact Disc Recordable/Writable.  5.25-inch Compact Disc format that may be written to, erased, and re-written many times.

**Channel** – one indivisible "stream" of audio.  "One" channel would refer to a mono source, "two" channels might refer to a stereo source, 6 channels (and perhaps more) could refer to a "Surround" source.

**Consolidate (as it refers to audio files)** – The process of taking the constituent audio files with edits & etc for a single track ("vocal", "guitar" & etc) and combining them into *one continuous file*.

**DAW** – Digital Audio Workstation.  ProTools, Nuendo, Fairlight, Digital Performer, Emagic Logic, Sonic Solutions, SADiE & etc.

**Deliverables** – Materials turned into the Record Label upon completion of a project. Refers to all media and documentation.  NARAS Master Delivery Specifications set a Minimum and Recommended set of delivery requirements.

**DLT** – Digital Linear Tape.  Magnetic tape backup format owned by Quantum.

**DSD** – Direct Stream Digital.  Refers to the *process* used for encoding audio in a high sample rate (2.8224 MHz) / one-bit depth format.  Certain recorders from Genex, Tascam, and DAW's from SaDIE & Merging Technologies (see below) support this format type.  DSD is the technology at the foundation of Sony's SACD release format.

**DVD** – Digital Versatile Disc - 5.25 inch Optical storage format that allows for storage of 4.7 GB for single sided media and 9.4 GB for double-sided media. There are many types of consumer DVD's (e.g., the well-known DVD-Video, and more recently DVD-A, which provides multiple formats including 5.1, or surround, audio)  and personal computer formats (DVD-R, DVD-RW, DVD+RW, DVD-RAM), some of which are not compatible with certain players.

**Ecrix (was Exabyte) 820/8505** – 8mm proprietary magnetic tape storage format. Used in many RADAR II and RADAR 24 digital recorders as backup device.  No longer manufactured.

**Ecrix (was Exabyte) VXA** – 8mm proprietary magnetic tape storage format. Currently holds a maximum of 66GB of compressed data per tape (33GB uncompressed).  Can be considered as a replacement to Exabyte 8505/ 820 (see above).

**EIDE** - See **ATA** above.

**Enterprise-Class Storage Media** – Media types that are in use by large corporations (Fortune 500, etc.).  These storage types include LTO, SDLT, and AIT.

**Exabyte –** see **Ecrix**

**FAT32** – *Logical* disk format method used by PC compatible machines.

**Firewire Drive** – Hard disk utilizing a **Firewire** physical interface and typically composed of a Firewire to IDE bridge chip and, inside the box, most often an IDE/EIDE drive.

**Flatten (Audio Files)** – Refers to the process of taking audio files used on a Digital Audio Workstation and converting them into one continuous file for each track.  Also referred to as "Consolidation" (see above).

**HDD** – Hard Disk Drive.

**IDE** – Integrated Device Electronics.  See **ATA** above.

**HFS, HFS Plus (also called "Extended")** – *Logical* (as contrasted to *Physical*) disk format method developed by Apple.  HFS Plus increases the number of allocation blocks, especially useful for high capacity hard disk drives.

**Linux / Unix <tar>** – Logical format originally developed for archival of files on Unix Machines.  tar is an acronym for "Tape Archive Retrieval". tar format is accepted as a universal and open-source logical storage format.  It is *most often* used with streaming tape physical media.

**LTO** – Linear Tape Open. Magnetic Tape Format co-developed by Hewlett-Packard, Seagate and IBM.  Multiple vendors for both drives and media.

**Master** – A "Master" is defined as a collection of the various original components of the recording process for a given production, each in their originally recorded formats, and collected in a form that is ready for transition to the *next phase* of the process. (For example, the 'Master' from the tracking process is collected in a form that is ready for transition to the overdubbing process. The 'Master' from the overdubbing process is then prepared for the mixing process.  The mixed 'Master' is in a form that is ready for transition to the mastering process. And so

on; e.g, the *mastered* 'Master' is ready for transition to the manufacturing process (where, presumably, other 'Masters' may prevail).

"Masters" include (but are not limited to) all analog and digital master tapes, hard disks, optical media, and all backups in turn made of *these* during the recording process.  The Masters include all of the various original components of the recording process for a given production in each of their originally recorded formats. These 'Masters' should have no deletions of useful material (out-takes, artist talking, incomplete or unreleased recordings, etc.).  The constitution of "useful material" is determined by agreement between Record Company and Producer prior to the commencement of the recording project.

**Metadata** - Metadata is data (or "information") about data or other information.

**MO** – Magneto-Optical.  Storage method which uses an optical laser and a magnetic field to record data on an optical disk.

**Optical Storage Media** – Understood as recordable media which consists of several materials, one of which is heated with a laser to allow absorption (instead of reflection) to expose the 'pits' in the material which, when read by a laser, can be interpreted as data.  CD-R, CD-RW DVD-R, DVD-RW & etc.

**PCM** – Pulse Code Modulation that refers to an encoding process used when converting analog audio to a binary digital file that may be written in a variety of formats.

**PDF** – Portable Document Format.  An Adobe product standard that generalizes document format; it allows the same document format to be created on, and transferred between many different types of computers.

**PHDD** – Proprietary Hard Disk Drive.

**Positional Reference** – Timing reference used during the recording/ overdub/ mixing process used to synchronize devices and mix automation.

**SACD** – Super Audio Compact Disc. 5.25 inch optical format utilizing Direct Stream Digital (DSD) technology to record and play music with a "single-bit" running at a high sampling frequency (2.8224 MHz).

**SCSI** – Small Computer Systems Interface.  An interface often used on computers for connecting devices (usually hard drives) to a computer.  SCSI is currently the fastest large format random access technology available, making it desirable for Pro Audio use.

**SDII** – Sound Designer II.  Used to refer to a type of audio data file developed by Digidesign.  Limited to a maximum sample rate of 48kHz.

**SDLT** – Super DLT. Magneto-Optical tape format owned by Quantum.  Next generation of the DLT format.

**Time Code** – The most common type of Positional Reference, usually refers to SMPTE time code (developed by the Society of Motion Picture and Television Engineers).  The number (30, 29.97, 29.97drop-frame, 25, 24) specifies the time-code reference in number in frames per second.

**Track** – "Track", for the purpose of audio storage, is a place where elements of program (music & etc) material are put.  Meanings abound, however…

Track (n.):  Originally, in analog tape recording, a term synonymous with one channel of content.  An Ampex 301 3-track recorder had the capability of 3 separate channels of audio.

Track (n.):  (proposed modern definition for audio recording) A unique, irreducible *element* in the context of a "production".  A modern "track" may contain one or more channels of program material (e.g., the "lead vocal track" would most often be a single-channel track, whereas the "live room track" recorded on a DAW in *surround*, may have 4 or more "channels" of audio).  Tracks might also include, or even be limited to, MIDI or sequencing data.

The word "Track" has various additional meanings in and around music and production.

Track (n.):  One individual selection on a CD or an "LP" or etc.

Track (v.):  The process of recording.  (example, "to track a session")

Track (v.):  Logistically, to locate.  (example, "can you track down a drummer who can play in tempo?")

# Glossary of Recording Technologies

**Alesis ADAT & XT** – 8-Track 16-bit Modular Digital Recorder that uses VHS videotape.

**Alesis HD-24** – 24-Track Hard Disk Recorder

**Alesis XT-20 / Alesis M-20** – 8-Track 20-bit Modular Digital Recorder that uses VHS videotape.

**Cubase VST** – Host Based Digital Audio Workstation software.

**Digital Performer** - Host Based Digital Audio Workstation software.

**Emagic Logic** - Host Based Digital Audio Workstation software.  Recently purchased by Apple (July 2002).

**Euphonix R-1** – Multitrack Digital Hard Disk Recorder.  Configurable up to 96 tracks & supports 24-bit/ 96-kHz recording.

**Fairlight MFX / MFX Plus** – Digital Audio Workstation utilizing a proprietary Hard Disk Drive format for audio storage.

**Fairlight Merlin** – 24 or 48-Track 24-bit Digital Hard Disk Recorder

**Genex GX8500 & GX9048** – 8-channel High-Density 24-bit/ 96-kHz PCM (8500) & PCM/DSD (9048) Magneto Optical Disk Recorders.

**Mackie HDR / MDR 2496** – 24-Track Hard Disk Recorder manufactured by Mackie. HDR/ MDR recorders utilize removable IDE drives in a proprietary format.

**Merging Technologies (Pyramix)** – Host Based Digital Audio Workstation software.

**Nuendo** – Host-based (meaning running on a Macintosh or a PC) Digital Audio Workstation manufactured by Steinberg.  Supports up to 32-bit / 96-kHz Recording.

**Paris** – Multitrack Digital Audio Workstation manufactured by Ensoniq.

**PCM 3348 / PCM 3348-HR** – Open reel digital 48-track recorder.  PCM3348-HR machines support 24-bit resolution.  PCM 3348 machines support only 16-bit resolution.

**PCM 3324** – Open reel digital 16-bit 24-track recorder manufactured by Sony.

**ProTools 24, Mix, Mix+ –** Digital Audio Workstation manufactured by Digidesign. Limited to a maximum resolution of 48kHz, 24 bit. A "host-based" system, it runs on either a Macintosh or a PC.

**ProTools HD** – Newest revision of a host-based (meaning running on a Macintosh or a PC) Digital Audio Workstation released by Digidesign. Supports sample rates & resolutions up to 192-kHz/ 24-bit.

**RADAR II / RADAR 24** – 24-Track Hard Disk Recorder currently manufactured by iZ Technologies. RADAR utilizes a proprietary hard disk drive format and generates proprietary backups on DVD or Exabyte 820 / 8505 8mm Media

**Tascam DA-88 / Sony PCM 900** – 8-Track 16-bit Modular Digital Recorder which uses Hi-8 format tapes.

**Tascam DA-78 / Tascam DA-78HR** – 8-Track 16-bit Modular Digital recorder which uses Hi-8 format tapes. The DA-78HR refers to the High-Resolution version that supports 24-bit width recording.

**Tascam DA-98 / Tascam DA-98HR** – 8-Track Modular Digital Recorders with basic editing and routing functions which use Hi-8 format tapes. The DA-98HR refers to the High-Resolution version that supports a 24-bit width recording, the DA-98 is a 16 bit machine.

**Tascam DS-D98** – Modular Digital Recorder which may be configured as a 2-track tape- based DSD (SACD format) recorder or up to 8-Track digital recorder. Supports sample rates up to and including 192 kHz.

**Tascam MMR** – 8 or 16 - track (16 is play only) Hard disk recorder with removable media (SCSI hard disk in either FAT32 or MacOS format). Unusual in that it reads Digidesign-format project files.

**Tascam MX 2424** – 24-Track Hard Disk Recorder that uses both internal and removable SCSI Hard Drives formatted in either Fat-32 or HFS formats.

# Recording Map

**Date Created:** _____

## General

**Label:** _____
**Project Number:** _____

**Artist:** _____
**Producers:** _____
**Production Assistants:** _____
**Engineers:** _____
_____

**Assistant  Engineers:** _____
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**Studios:** _____
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## Song Title: _____

**Start Time:** _____

**General Notes:**

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**PRODUCERS &
ENGINEERS WING**

# Tracking

**Artist:** _____

**Song Title:** _____

**Recording Date:** _____

**Studio:** _____

**Engineers:** _____

**Assistant Engineers:** _____

**Original Tracking Format:** _____

| Analog Machine Information: | Digital Machine Information: |
|---|---|
| **Analog Tape Machine:** _____ | **Digital Machine:** _____ |
| **Tracks:** ____ **Tape Speed:** _____ | **Tracks:** ____ **Tape Speed:** _____ |
| **Tones:** ____ **Fluxivity:** _____ | **Bit Depth:** _____ **Sample Rate:** _____ |
| **Overbias:** _____ **Total Machines Used:** ___ | **Bit Split?** _____ **Total Machines Used:** ___ |
| **SMPTE Rate:** _____ **Track:** ___ | **SMPTE Rate:** _____ **Track:** ___ |
| **Sync Source:** _____ | **Sync Source:** _____ |
| **Noise Reduction Used:** _____ | **Media Manufacturer:** _____ |
| **Tape Manufacturer:** _____ | **A/D Conversion:** _____ |
| **Notes:** _____ | **Reference Level:** _____ |
| _____ | **Notes:** _____ |

### Digital Audio Workstation (DAW) Information:

**DAW Program:** _____ **Host Computer:** _____ **DAW Software Version:** _____

**Sample Rate:** _____ **Bit Depth:** _____ **Sync Source:** _____

**Host Computer Operating System:** _____ **Saved File Format:** _____

**A/D Conversion:** _____ **Reference Level:** _____

**Hard Disk:** _____ **Notes:** _____

**General Tracking Notes:**

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# Overdubs

**Artist:** _____

**Song Title:** _____

**Date:** _____      **Overdub:**____

**Studio:** _____

**Engineer:** _____      **Assistant:** _____

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### Analog Machine Information:

**Analog Tape Machine:** _____

**Tracks:** ____      **Tape Speed:** _____

**Tones:** ____      **Fluxivity:** _____

**Overbias:** _____      **Total Machines Used:** ____

**SMPTE Rate:** _____      **Track:** ____

**Sync Source:** _____

**Noise Reduction Used:** _____

**Tape Manufacturer:** _____

**Notes:** _____
_____

### Digital Machine Information:

**Digital Machine:** _____

**Tracks:** ____      **Tape Speed:** _____

**Bit Depth:** _____      **Sample Rate:** _____

**Bit Split?** _____      **Total Machines Used:** ____

**SMPTE Rate:** _____      **Track:** ____

**Sync Source:** _____

**Media Manufacturer:** _____

**A/D Conversion:** _____

**Reference Level:** _____

**Notes:** _____

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### Digital Audio Workstation (DAW) Information:

**DAW Program:** _____    **Host Computer:** _____    **DAW Software Version:** ____

**Sample Rate:** _____    **Bit Depth:** _____    **Sync Source:** _____

**Host Computer Operating System:** _____    **Saved File Format:** _____

**A/D Conversion:** _____    **Reference Level:** _____

**Hard Disk:** _____    **Notes:** _____

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**General Overdub Notes:**

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# Mixing

**Artist:** _____
**Song Title:** _____

**Mix Date:** _____
**Studio:** _____
**Monitoring:** _____        Mono    Stereo    Surround
**Engineer:** _____
**Assistant Engineer:** _____
**Console:** _____
**Console Automation:** _____
**Console Automation Backup Format:** _____

**Mix Bus Signal Path:**
_____
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**Final Mix Source:** _____
**D/A Conversion:** _____
**Mix Recorder:** _____

| Mix Analog Machine Information: | Mix Digital Machine Information: |
|---|---|
| **Analog Tape Machine:** _____ | **Digital Machine:** _____ |
| **Tracks:** ____   **Tape Speed:** _____ | **Tracks:** ____     **Tape Speed:** _____ |
| **Tones:** ____   **Fluxivity:** _____ | **Bit Depth:** _____   **Sample Rate:** _____ |
| **Overbias:** _____   **Total Machines Used:** ___ | **Bit Split?** _____   **Total Machines Used:** ___ |
| **SMPTE Rate:** _____   **Track:** ___ | **SMPTE Rate:** _____        **Track:** ___ |
| **Sync Source:** _____ | **Sync Source:** _____ |
| **Noise Reduction Used:** _____ | **Media Manufacturer:** _____ |
| **Tape Manufacturer:** _____ | **A/D Conversion:** _____ |
| **Notes:** _____ | **Reference Level:** _____ |
| _____ | **Notes:** _____ |

## Mix Digital Audio Workstation (DAW) Information:

**DAW Program:** _____   **Host Computer:** _____   **DAW Software Version:** _____
**Sample Rate:** _____   **Bit Depth:** _____   **Sync Source:** _____
**Host Computer Operating System:** _____   **Saved File Format:** _____
**A/D Conversion:** _____   **Reference Level:** _____
**Hard Disk:** _____   **Notes:** _____

**General Mixing Notes:**
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# Transfers

**Artist:** _____
**Song Title:** _____

**Transfer Date:** _____  **Transfer:** ____
**Location/Studio:** _____
**Engineer:** _____  **Assistant:** _____

| ☐ Transfer Source  ☐ Transfer Destination | ☐ Transfer Source  ☐ Transfer Destination |
|---|---|
| **Analog Tape Machine:** _____ | **Digital Machine:** _____ |
| **Tracks:** ____  **Tape Speed:** _____ | **Tracks:** ____  **Tape Speed:** _____ |
| **Tones:** ____  **Fluxivity:** _____ | **Bit Depth:** _____  **Sample Rate:** _____ |
| **Overbias:** _____  **Total Machines Used:** ____ | **Bit Split?** _____  **Total Machines Used:** ____ |
| **SMPTE Rate:** _____  **Track:** ____ | **SMPTE Rate:** _____  **Track:** ____ |
| **Sync Source:** _____ | **Sync Source:** _____ |
| **Noise Reduction Used:** _____ | **Media Manufacturer:** _____ |
| **Tape Manufacturer:** _____ | **Conversion:** _____ |
| **Notes:** _____ | **Reference Level:** _____ |
| _____ | **Notes:** _____ |

**☐ Transfer Source  ☐ Transfer Destination**

**DAW Program:** _____  **Host Computer:** _____  **DAW Software Version:** ____
**Sample Rate:** _____  **Bit Depth:** _____  **Sync Source:** _____
**Host Computer Operating System:** _____  **Saved File Format:** _____
**Conversion:** _____  **Reference Level:** _____
**Hard Disk:** _____  **Notes:** _____

**General Transfer Notes:**
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# Track Sheet

**Bit Length:** _____

**Sample Rate:** _____

**Artist:** _____

**Song Title:** _____

**Start Time:**

_____

| No. | Track Name | Performer | Comments |
|-----|-----------|-----------|----------|
| _____ | _____ | _____ | _____ |
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# AES/NARAS Media ID Label

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| Version | Name | Version | Name |

Plug Ins/Peripherals Used

| | | |
|---|---|---|
| Artist | Project# | Disk_____of_____ |
| Project/Song | | Date |
| Label | Contact: | Phone: (    ) |
| Producer | Phone: (    ) | |
| Studio/Contact | Phone: (    ) | |
| Engineer | Phone: (    ) | |
| Asst. Engineer | Phone: (    ) | |

| Physical Format: | Bit Depth | Sample Rate | File Format |
|---|---|---|---|
| | ☐ 16 | ☐ 44.1 ☐ 88.2 ☐ 176.4 ☐ 356 | ☐ AIFF ☐ QT ☐ BWF ☐ WAV |
| | ☐ 24   Other_____ | ☐ 48 ☐ 96 ☐ 192 ☐ 384 | ☐ SDII ☐ AES 31   Other_____ |

| CD Data Format | Time Code Format | Sync Reference (or master) |
|---|---|---|
| ☐ Redbook     ☐ Masterlink | ☐ 24 ☐ 29.97 NDF ☐ 30 ☐ SMPTE | |
| ☐ Yellowbook  ☐ ISO 9660 | ☐ 25 ☐ 29.97 DF ☐      ☐ MTC | |
| Other_____ | | |

| ☐ Master | DAW Platform | Software |
|---|---|---|
| ☐ Dig (Clone) Copy | ☐ Mac | ☐ DP  ☐ Nue  ☐ Sadie  ☐ Logic |
| ☐ Analog Copy | ☐ PC       O/S _____ | ☐ PT  ☐ TDM  ☐ LE  ☐ HD |
| ☐ Work Tracks/Files | | Software version_____   Other_____ |

Songs/Files

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