

Audio mastering essay



**ASSIGN
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Overview of the Mastering Process For every good mastering engineer, meticulousness and attention to detail is the norm, not the exception. What is Mastering? •? Mastering is the last creative step in the audio production process, the bridge between mixing and replication - your last chance to enhance sound or repair problems in an acoustically - designed room - an audio microscope. What is a Mastering Engineer? •?

A Mastering Engineer requires the same ear training as a recording and mixing engineer, except that the mastering engineer becomes expert in the techniques for improving completed mixes, while the mixing engineer specializes in methods for improving the mix by altering the sound of individual instruments within it. 1 What is the Mastering Process? •? Mixing is the art of blending individually recorded sounds through a console or on a DAW, controlling the level, and pan of each sound to create a final " mix" of your musical selection.

Mixes may either be recorded to tape or stored on the hard drive of a DAW. •? Master assembly means editing a collection of individual song mixes into a complete " Master" that flows from start to finish in the desired order and with the desired amount of space between selections. A final master may be assembled by transferring between two digital recorders, or by physically editing mixes on analog tape. •? Premastering/mastering is the link between the production process and the manufacturing facility where copies will be made.

Overall program level is set, as well as song-to-song or " relative" levels. EQ and/or compression may also be used to make the material sound as good

as possible when it is played in the listening environment of the customers who buy the end product. Once optimized, the resulting program is transferred to an appropriate " Production Master" for the plant that will make the actual copies. CDs From Conception to Manufacturing 2 Editing and Premastering •?

After the initial editing & mixing process, it is followed by premastering, which is the official name of our profession, to distinguish it from the technical mastering that takes place at the plant (though everyone calls us " mastering engineers" for short). •? Naturally, the output medium of premastering is officially called the premaster, but we usually label it master. What is the Manufacturer's Role? •? Manufacturing is when the actual copies are made and packaged for distribution and sale: •?

For CDs, the master tape is transferred to a " glass master" from which molds are made for replication, a multi-step process involving injection molding. •? For Cassettes, the production master is transferred into a " digital bin," a storage device that converts the program from digital to analog at high speed and sends it to " slave" machines that record on cassette tape, which is then bulk loaded into cassette shells. •? For vinyl records, the master lacquer is used to make molds which are used to press the records. At the Plant •?

At the plant, the premaster is used to create the ' glass master' - an ephemeral product that actually gets destroyed during the production process! •? Lets take a look at the manufacturing process at the plant... 3 Class " 10" Clean Room At, many plants, glass mastering is performed in a

class " 10" clean room by engineers wearing white " space suits. " Multi-million dollar Laser Beam Recorders take the digital information for the master, and then encodes it to the proper format and then sends an encoded laser beam onto a light sensitive emulsion applied to the surface of a 9.5" glass disc.

Delivery Formats The definition of what is the Master has become even more vague, since multimedia projects may be finished at the audio mastering studio, or authoring added at some studio down the road. Audio - only projects may arrive in multiple forms, from DATs to Pro Tools Hard discs to CD ROMs to analog tapes. Projects may be two channel or multi-channel surround; they may arrive as full mixdowns, partial mixdowns (stems) or combinations. Analog ? " & ? " Tape •? Analog recording has been the traditional method of storing signals on various media since Edison developed the cylinder phonograph. 4

CD-R, CD-ROM & DVD ROM •? CD-R: By far, the most reliable digital format available today. CD-Rs may be made on standalone CD-R decks, or on DAWs equipped with CD-R drives and CD-Audio recording software. •? CD-R (Orange Book) & DVD-Rom (Book C): Is an up and coming medium that can use DDP image files. Sony PCM - 1610/1630 Used since the introduction of the CD as a mastering medium from which glass masters are cut, this format uses an encoder to store digital audio information in video form on the ? " video cassettes and videotape recorders of the professional U-Matic video standard. DTRS: ADAT & Tascam DA-88

These 8-track “ modular digital multi-track” (MDM) formats are used primarily for multi-track recording. The machines employ video technology and have many of the same advantages as DAT. The DA-88 format is also commonly used to deliver 5. 1 channel surround sound mixes for DVD. 5

What are the Most Common formats used? •? For the CD Plant: A CD-R or PCM 1630 tape •? For the Cassette Duplicator: A CD-R or DAT •? For the Vinyl Record Pressing Plant: A “ master lacquer”

What are the Most Accurate formats to use? •? DDP (Disc Description Protocol*) •? PCM-1630 (on ? ” video cassette) •? CD-R (Orange Book, write-once media) DDP or Disc Description Protocol identifies and describes collections of data that will be recorded onto a CD or DVD disc.

Common File Formats 6 Platforms, Extensions and Resource Forks •? Macintosh files are divided into two parts, the data fork (which is the main part and which is transferable to a PC), and resource fork. •? Most Macintosh programs look for the file type in the resource fork, unique to Macintosh computers. •? The resource fork is the MAC way of telling programs who created a file, its file type, and additional information proprietary to the particular file type; it is analogous to the three letter extension on the PC. e. g. . aif, . wav, etc...) •? These were invented to allow users to double-click on a file and automatically open a program, an advance over the DOS command line. •? However, resource forks cannot be transmitted over the internet**, and can only be transferred between platforms in a limited manner.

File Formats •? . WAV •? . AIFF •? . BWF •? .

SD2 7 Most Common •? When transferring files between platforms, the WAV, AIFF and BWF file types are the most universal, because they do not depend on resource forks for anything except file type, and the file type is also duplicated within the Header (in the data fork) if the resource fork is missing.

AIFF •? Audio Interchange File Format: supports standard bit resolutions in multiples of 8, up to 32 bits fixed point. •? While most professional Pc programs can read and write AIFFs, this format was created for use on MACs. •? A mono or split AIFF contains one channel, as opposed to interleaved AIFFs, which can contain multiple channels. •? There is no official provision for time-stamping. WAVE/BWF •? The WAVE file format, developed by Microsoft, is probably the most popular audio format. •? It supports a variety of bit resolutions, both fixed and floating point, sample rates, and channels of audio. ? Wave files can be split or interleaved. •? There is provision for time-stamping in one of the standard SMPTE timecode formats. •? It is recommended to save files in fixed-point WAVes, as they are the most compatible between platforms. (at this time) 8 Sound Designer II (SD2) •? SDII format was invented by Digidesign for use on the MAC. •? This format is particularly not reliable on the PC because of their reliance on resource forks. •? SD2s can either be multiple-channel mono, or dual-channel interleaved stereo. •? Most common sample rates are 48kHz, but some limited programs can go to 96kHz. MOTU) •? SD2 has been officially obsoleted by Digidesign.

Preparing Tapes and Files for Mastering Logging •? The logs that accompany mixes are very important. They keep a project from being delayed as we don't have to chase down the catalog number or other essential information. •? All logs should indicate the full title of each song, the corresponding abbreviated file name on disc, and the order the song is to appear on the final, plus your comments about fades, noises, or anything that concerns you. •? Also provide files and information on Stem Mixes, Splits and Alternate Mixes. Linear Media (DAT, Analog tape, Stand-alone CDR) •? Don't bother to re-order the songs, because the copy process may introduce

errors. •? Leave the outtakes and alternate mixes. •? Leave ‘ handles’ for each song. •? Use program IDs to identify the cuts. •? Create at least one safety copy. •? When using a CDR, always leave at least a second’s pause before the downbeat. Tape to Tape Dubbing •? Always monitor the output of the recorder while copying. •? If you must pause during copying, make sure to roll in record for at least 10 seconds before the tune begins. ? ** DAT tapes can never have the short spacing we like on a CD. 10 Level Check •? Print the mix with levels well under the top and no OVERS! •? -3dBFS Maximum! •? If using a DAW, re-visit each plug-in, reset the clip indicator and check the mix. Preserve Data Integrity •? Send the earliest generation, unprocessed material to the mastering house. •? Avoid copying or going to second-generation in a DAW. •? If you must edit, keep everything at unity gain if at all possible. •? Do not Normalize, even if the material is peaking low. Maximum CD Program Length •?

The final CD Master tape, including songs, spaces between songs, and reverberant decay at the ends of songs, must not exceed the limit, which totals 79: 38. 11 Labeling Tapes or Discs. Which is the Master? •? Put Name & Phone number on all Sources. •? Label the source media: Submaster or Work Tape, or Mix, or Final Mix, or Session Tape, or Edited Mix, or Compiled Mix, or Equalized Mix, etc... Analog Box Label CD Jewel Box Label 12 Analog Tape Preparation •? Begin and end the reel with some ‘ bumper’ followed by leader. •? If possible, put leader between songs. •? Tape should be slow wound, tails out. ? Label each reel. •? Indicate tape speed, record level for 0VU in nw/ M, record EQ(NAB or IEC, track configuration, mono, stereo, or multi-channel. •? Indicate if noise reduction is used, and include NR

alignment tone. •? Include alignment tones 30secs or longer each, minimum 50Hz, 100Hz, 1kHz, and 10kHz. •? It is highly recommended to include 45Hz and 5kHz at 0VU without noise reduction. And, a tone sweep from 20Hz through 500Hz. •? Tones must be recorded through the same process as the music. What Sample Rate? •? Work at the highest sample rate and longest wordlength available. •? Remain at the same sample rate as the multitrack recording. 13 Random Access Media File Preparation •? Leave blank sound at the head of the file to prevent glitches that often occur at the file start. •? For stereo, interleaved files are preferred. No . mp3's! •? Try to stay in the same sample rate. •? Choose a high-quality brand CDR blank. (74 min blanks are most reliable) •? For lowest error rate, cut at 2X or 4x speed, no faster! •? Write a Fixed disc (Closed Session). Then, verify that the disc has been fixed in a non-CD-writing drive. File Naming •?

File names should not include hyphens (-), use an underscore instead. Do not use the / or character. •? For best multi-platform compatibility, stay away from spaces and use alphas, numerics and underscores only. •? One trick for naming files is to include the intended track number at the beginning (using 2 digits), which makes it much easier to assemble them in the intended order. •? For example: " 01_I_Need_Somebody" •? Avoid periods in MAC file names on MAC discs because they might be transferred to a PC. Media Verification, Archiving, and Backups 14 Listening & Quality Control •?

In larger mastering facilities, this is performed by a separate QC department. •? If a single unacceptable tic or noise is discovered anywhere in the master, the entire full-length master has to be remade and listened to/evaluated. •? Critical listening using headphones is important. •? 3-4 hours are typically

required to QC a 1 hour program. •? Documenting the time code region of each offending noise is important. •? Verification that the proper songs are in the proper place, based on client supplied lists of the song lengths, lyric sheets, etc... •? Make sure proper master is delivered.

Objective Media Verification / Error Checking •? Digital media are susceptible to data dropouts, which is why all the recommended digital audio storage formats, DAT, Exabyte, PCM-1630, and DLT tapes, and optical discs, CDR and DVD utilize error correction algorithms.. •? Uncorrected errors result in glitches, clicks, and other noises. •? We do not know the amount of error correction which is occurring. It can sound great, but the tape or disc could be near death! 15 CD-A Report Block Error Rate (BLER) •? The most critical criterion for CD-A and CDR quality is called BLER (Block Error Rate). ? A very good CD can have a BLER as low as 10, yet CDs will still play with BLERs of 1000 or even above! •? CD ROMs use an additional layer of error correction. •? Typically, CDs with BLER over 100, or any CD with an E32 (uncorrectable) error are rejected. Error Concealment •? Error Concealment is the last defense mechanism in digital playback. If the error correction does not work, that is, if there is an uncorrectable error, then the playback machine uses an interpolater. •? The interpolater looks at the audio level before and after a dropout and supplies an intermediate replacement. ? If performed well, error concealment can sound very good, but professionals never use a master so degraded unless they have no other options. •? Remember, any uncorrectable error is cause for rejection of a master! 16 FTP using . ZIP or . SIT •? Programs like ZIP for the PC and Stuffit for the Mac have an error-detection built in. •? On opening, an error will be generated if a stuffed file

does not contain the identical data that was used to create it. •? Using such a ‘ coded master’ can confirm that the file remains intact through all transfers up to the point of glass mastering.

Session Backups •? Used for short-term storage & maintenance. •? Save logs on hard disc with all the materials. •? Make an in-house audio backup on some form of computer storage. (speeds up the load-in in case a revision is needed. This is not a permanent solution because computer technology is constantly changing.) •? IDE drives •? CD ROM, DVD ROM •? Exabyte Tapes, Archives •? The critical difference between a backup and an archive is that an archive is made to a medium which is supposed to last a long time (30 years or more). 17

Putting the Album Together “ It’s not how loud you make it. It’s how you make it loud. ” The Album Philosophy •? Treat every album that comes for mastering as a “ concept album,” even if it doesn’t have a fancy theme, artwork or gatefold. •? The way songs are spaced and leveled contributes greatly to the listener’s emotional response and overall enjoyment of the album. •? It is possible to turn a good album into a great album just by choosing the right song order, though, unfortunately, the converse is true. Song Sequencing: •? Sequencing is an art.

Think of the album as a concert! •? Albums produced by a band member(s) sometimes suffer from the “ more me syndrome,” where each musician wants to hear his or her instrument louder. •? The only way to avoid “ more me” is to use a producer/engineer who has no ‘ political’ alliances and is working for the concept of the album as a whole. 18 The Album as a concert

•? Concerts are usually organized into sets, with pauses between the sets when the artist can take a break, talk briefly to the audience, and prepare the audience for the mood of the next set. •?

However, on an album, a set can consist of only one song, but most often is three or four. There are not strict rules, but usually the space between sets is a little greater than the typical space between the songs of a set, in order to establish a breather, or mood change. •? Sometimes there can be a long segue (crossfade) between the last song of a set and the first of the next. •? These basic principles apply to all kinds of music, vocal and instrumentals. FYI •? Classical albums have shorter spaces between movements than between the major numbers! •?

Not every song is a masterpiece, but it's important to give your best impression as early as possible! How to Order the Songs •? Make a simple list that describes each song's characteristics in one or two words or symbols, such as uptempo, ballad, driving, etc.. •? Sometimes you can give letter grades to indicate which songs are most exciting or interesting, trying to place some of the highest grade songs early in the order. •? The key signature can also be important . •? The opening track is the most important; it sets the tone for the whole album and must favorably prejudice the listener. 9 Spacing the Album •? As a general rule, the space between two fast songs is usually short. •? The space between a fast and a slow song is medium length. •? The space between a slow and fast song is usually long. •? The space following a fadeout is usually very short. •? Then there's the question of the ideal space, when the rhythm to the previous song leads very well into the attack of the next, where we count beats, and make the

following song land on the beat. •? Manipulate spaces to produce special effects -surprises, super-quick and super-long pauses make great effects! FYI •?

If you space an album in the morning when you are relaxed, it almost always sounds more leisurely than one which has been paced in the afternoon, when hearts are beating faster. PQ Coding 20 PQ Lists The name PQ comes from the letter-code abbreviations for the information contained in the subcode of the CD. The P flag is the most primitive flag; it changes state to indicate the beginning of a new track. The Q subcode contains information such as timing and program length, copy prohibit or permit, emphasis condition, and ISRC codes, most of which will be stored in the Table of Contents (TOC).

Spaces and PQ (Track) Coding •? The CD Redbook standard does not permit official pauses shorter than 2 seconds between tracks. This means that there will be no official pause between tracks where the CD player would be counting backwards. (Index Zero) •? When two songs segue into one another, the placement of the next track mark is critical, because CD players take finite time to cue-up to about 5 SMPTE frames, for older players. •? Live albums with applause require special attention to both editing and PQ coding. •? Try to find a track position that doesn't reveal the previous noise, or up-cut the downbeat of the track. PQ Offsets •? Since CD Players can vary in their reaction times, the editing programs can apply typical offsets, or show the PQ codes exactly as they appear on the disc. •? For example, a start time offset of " 12 CD frames" means that the actual track mark will be 12 frames (160ms) in front of its visual location on the screen if you choose <https://assignbuster.com/audio-mastering-essay/>

to display the mark without the offset. 21 Redbook Limits •? The Redbook defines the standards for the audio CD as defined by Sony and Philips. •? A CD may have up to 99 tracks. •? Each of these 99 tracks may have 99 indexes. Rarely do we code CDs with indexes because most players do not support them. •? The minimum CD length is 4 seconds. Disc-at-Once, Track-at-Once and Standalone CD Recorders •? Never use a stand alone recorder to make CDs for replication. •? Why? There is no provision for Index 0, and the location of Index 1 (the track mark) because it can only be as accurate as a manual button push. •? When recording one track at a time, these standalone recorders work in Track-at-Once mode, which puts an E32 error onto the disc wherever the laser stops recording. •?

Computer based machines should be set to work in Disc-at-Once mode, which means that the CD must be written in one continuous pass. Hiding Information in the Gap •? audio Play and starting the tune on the downbeat vs. the R listener at home wants to hear the atmosphere between cuts. •? to accomplish this, take advantage of the CD's Index 0 and Index 1 times. •? The time between Index 0 and Index 1 is called the pause or gap T time, during which the CD player counts backwards to zero, but in this case there is sound in the gap. •? This permits the CD player's random play function to ignore the T irrelevant parts. 22