

A PROPOSAL FOR THE ESTABLISHMENT OF INTERNATIONAL RE-RECORDING  
STANDARDS

by

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AUTHOR'S NOTE:

The basic premise of this article was originally presented to the International Association of Sound Archives (IASA) Conference, 1979, in Salzburg, Austria, and later at the ARSC Annual Conference, 1980 in Ottawa. Not surprisingly, a number of the issues raised have proven controversial.

In this fledgling business little has changed since 1980, so the author presents this written version of the proposal as it was particularized to ARSC.

The IASA technical committee is currently engaged in considering problems regarding re-recording, the author's suggestions being but one of the many factors to consider. In the interest of obtaining the most objective strategy, constructive criticism and suggestions regarding this paper would be appreciated.

Preserving sound for posterity is not an easy job. But what adds to the difficulty is that audio archivists have not yet agreed on or developed universal re-recording standards. In fact, no formal agreement has been reached that re-recording standards should even exist. So the first question we must ask ourselves is "Should we have standards governing the re-recording process?" I believe there is only one answer-- yes.

Re-recording is necessary for the preservation of sound, but what assurances have we that a re-recording represents the faithful reproduction of the original sound? Without standards, re-recording sound for posterity becomes an exercise in personal preferences. How many times have we heard claims by individuals or companies as to the superiority of their re-recording methods and equipment? Anyone can claim to have the finest laboratory or to produce the best re-recordings. But no legitimate claim of superiority for re-recordings or equipment is even possible without standards to measure the evidence, scientifically, not subjectively. A more honest appraisal of these efforts might read:

Caruso-- as interpreted by John Doe  
Caruso-- the way I like to hear him, by Joe Smith  
Caruso-- enhanced for your enjoyment by the X Record Co.

In each case the re-recording engineer usually will find people who are willing to sing the praises of his reproduction over another. But in effect what is happening is that the engineer is generating an entirely new product. It may be more pleasing to a particular audience but at the same time remain an inaccurate accounting of the original sound and artist. Its historical and scholarly value must be considered suspect.

This may be fine for some companies reproducing older records strictly for commercial sale and profit, but from an archival point of view it is unacceptable. Preservation, not profit, has to be the primary goal. Therefore, the purposes of this paper are (1) to recommend the establishment of international re-recording standards, and (2) to suggest the conditions necessary to facilitate the formulation of such standards.

### Conditions

There are three conditions that should precede consideration of re-recording standards. The first condition is that we agree that the inherent sound quality of the records is their primary value. Most people are visually oriented and readily treasure that which they can see--books, paintings, antiques, etc. Sound, on the other hand, is usually taken for granted and rarely receives the emphasis it deserves. We can even find record collectors who value the recordings more as art objects to be looked at rather than as sound sources to be listened to.

It is true that the variety of colors, sizes and shapes of recordings is visually fascinating; however, as sound archivists we must be careful not to become preoccupied with the visual at the expense of aural characteristics. Our purpose is to preserve sound, and it is to that purpose we should be devoting our time, attention, and skills.

The second condition is, because re-recording is essential to our purpose, we must encourage communications regarding re-recording techniques. It is most surprising that since the inception in 1967 of the ARSC Journal and in 1971 of the IASA Journal, Phonographic Bulletin, articles have rarely been published exploring the topic of re-recording technics, let alone the standardization of them. In the first ARSC Journal, the "Report of the Education and Standards Committee" indicated that recording and re-recording standards were of concern to ARSC (I: 1, p. 13). Unfortunately, except for one

recommendation by Walter L. Welch in the very next volume (II: 1,p. 8) follow-through in setting standards disappeared. Many articles in both the ARSC and IASA journals did contain lists of the equipment in certain institutions, but only alluded to methodology. Furthermore, when the topic of standards did appear it was generally confined to the selection, format, and preservation of tape. But we must recognize that tape is only a storage medium; it has little value if the method for transferring the original sound to the tape is not accurate and verifiable.

One article that did concentrate on the re-recording process was written by Wilfried Zahn, of the Deutches Rundfunk Archive, Frankfurt, ("About the Reproduction Problems of Edison Cylinders," Phonographic Bulletin, No. 21, July '78, pp. 28-29). Mr. Zahn described various analytical techniques his laboratory has been using to gain a better knowledge of Edison's recording and re-producing technology. Cylinders were optically analyzed both in the reflected mode and by taking groove impressions. This was followed by spectral analysis of pink noise recorded onto and reproduced from previously blank cylinders. Finally, a re-recording process was illustrated that used an electronic pick-up and a phasing circuit as a means to reduce noise from cylinders.

While the validity of this or any other re-recording technique may be debated, at least in this instance archivists have the opportunity to evaluate the merits of the process. Communication of this sort can help to determine the re-recording elements that require standardization, and once established, assure conformation with these standards.

The technical procedures described by Mr. Zahn point to the third condition we must consider before suggesting standards: the implementation of re-recording standards and the investigation of re-recording techniques require expertise in audio engineering. Re-recording is not a simple dubbing process that is easily performed because you have a turntable, amplifier, speakers, a tape deck, and the recommended type of tape. False impressions can be created of what many early recordings really sounded like unless procedures and terms are properly defined and understood.

For example, "straight" dubbing and "flat" dubbing are often understood as meaning the same thing. They are not. If the purpose of "straight" dubbing is to reproduce faithfully the originally intended sound of a record, then "straight" dubbing should not be understood as synonymous with "flat" response phono pre-amplification. Re-recording all records with a "flat" response phono curve would be an error, since many manufacturers required different playback curves to compensate for intentional equalization pre-emphasis used in the original recording process. Older Columbia records had a playback

curve different from that of newer ones. The same holds for R.C.A., Decca, and others. This is only one of many technical variables that must be taken into account in the development and verification of re-recording processes. Re-recordings should be produced by qualified engineers who can appreciate these problems and are able to see that prescribed standards are followed.

The conditions necessary to promote the establishment of international re-recording standards are in short: 1) to first recognize that the sound within a record is the most important thing to save; 2) that saving the sound requires common knowledge of the re-recording techniques; and 3) that re-recording should be performed by qualified personnel.

### Type I and Type II Re-recordings

At this point, it is important to recognize that sound preservation can take two legitimate directions: (1) the sound preservation of audio history, and (2) the sound preservation of an artist. In this context, audio-history sound preservation is defined as the perpetuation of the sound of an original recording as it was initially reproduced and heard by the people of the era. Sound preservation of an artist, on the other hand, is defined as the perpetuation of the true sound of a performer. In its purest form this means the faithful re-creation of the live sound of an artist. The preservation of an artist's sound is not the same as audio history preservation, but, rather, a dependent function of it. In other words, the preserved live sound can only be as good as what the recording equipment and engineers of the time produced. The Edison tone-test concert series was a serious effort to make the live versus recorded sound comparison but, generally, experimentation and battles to gain control over the market by manufacturers did little to guarantee sonic authenticity. So it may be argued that many early recordings were not faithful to the artists and that this justifies manipulation of the normal playback criteria for the recordings.

From an archival viewpoint, we must ask to whom do we owe allegiance--to audio history or to the recording artists? The answer has to be to both since the qualities of one cannot be understood without knowing the qualities of the other. Consequently, not one but two types of re-recordings are possible from each original record.

Type I preserves audio history, and Type II attempts to re-create the live sound of an artist. If guided by standards, Type I re-recordings of identical records should, theoretically, sound the same regardless of where the re-recordings were made. On the other hand, Type II re-recordings can be experimental and may initially sound quite different. But these, too, if guided by standards, should

eventually culminate in similar reproductions of the performer's live sound.

The following guidelines are based on this concept of two re-recording types. They are by no means complete, but the hope is that they will stimulate constructive criticism and further discussion.

### Standards for Audio History Preservation

The first set of standards is primarily directed at Type I re-recordings of audio history sound preservation. You will recall the premise that audio history sound preservation is based on--the replication of the recordings as they were originally played and perceived by the people of the era.

The first requirement should be to index all identifying characteristics of the record. These include: (1) label and manufacturer; (2) alpha-numeric symbols; (3) format (cylinder, tape, disc, etc.)--these could also specify track configuration for tape or "lateral" versus "vertical" for discs; (4) composition of recording (wax, shellac, vinyl, acetate, etc.); (5) playback speed; (6) significant dimensions such as diameter and thickness; (7) selection title(s); (8) artist(s); (9) composer(s); (10) production data, such as original recording facility, engineer, and producer; (11) liner notes; and (12) unusual markings or characteristics.

The discographers in the group may have better recommendations in this area, but in any event all of this information should be catalogued in order to assure researchers that the re-recordings have been properly identified.

With the record properly identified, the second requirement is to use the proper playback equipment. Since the purpose of audio history preservation is to hear how records originally sounded to the general public, the original equipment that gives optimum reproduction should be employed. If this is not possible, then whatever system is used to reproduce the record should be described and justified. The standards for such an alternative system could be established by consensus of the ARSC and IASA technical committees and archivists.

The third requirement for preserving audio history is the selection of the appropriate re-recording process based on whether a record was originally intended to be played with or without electronic amplification. For those records originally played without electronic amplification, the only acceptable means of capturing the sound is to use a calibrated microphone in the re-recording process. The distance of the microphone from the transducer and the average sound-pressure

level should be noted. Furthermore, the re-recording should be done in a controlled acoustic environment where the influence of room acoustics is negligible on a reproduced signal.

On the other hand, records originally reproduced with electronic amplification should not use a microphone but a phono cartridge to interpret the sound. These re-recordings should be done as "straight" dubs. As previously mentioned, "straight" dubbing implies the use of the manufacturer's recommended playback curve. "Flat" dubbing, or the use of non-equalized preamplification, would be applied in this context only if it was the designated "curve." "Flat" dubbing without regard for designated curves could be used for comparative analysis but re-recordings generated in this fashion should indicate that fact.

Other than using controls to re-create the manufacturer's intended playback curve, no signal manipulation by equalizers, filters, reverberation devices, etc., should be permitted. An exception to this might be "pop" and "click" suppressors that can be shown to attack and eliminate those defects only. In one article reprinted in the ARSC journal A.C. Griffith states,

I like to do all the equalizing myself, as I have found by experience that when two or more try to agree on this subject the result is neither one thing nor the other--though each view is probably perfectly valid ("Historical Transcriptions: Problems and Techniques in the Transfer of Historical Recordings to L.P." [VIII: 1, p. 3]).

I agree that the result will be neither one thing nor the other. That is, however, why neither view can be considered perfectly valid or accurate historically. Their subjective nature precludes that possibility.

The fourth requirement for preserving audio history should be that all equipment used for transferring the original sound to a storage medium, such as tape, be precisely calibrated. Documentation of the system's response should be kept in order to define its inherent limitations. At least the following documentation should be required: (1) The playback and record response of tape decks with reference to Ampex or other standard alignment tapes. (2) A frequency-response test of the composite system based on real-time spectrum analysis of pink noise through the system. (3) The system's signal-to-noise ratio. (4) Distortion characteristics. (5) Re-recordings should include reference tones, as specified by IASA and ARSC.

The fifth standard for preserving audio history involves one of the most controversial topics in audio--the standardization of the

playback monitoring system. The selection of a playback monitoring system, more often than not, is a matter of personal taste. But choosing a speaker that you prefer, and not one that is calibrated to a standard, is a luxury no archivist can afford. Given the definition of audio-history sound preservation stated earlier, the re-recording should be able to withstand a direct A-B comparison test with the original recording. That is possible only when the loudspeaker playback system is linear with respect to the input signal. Bad recordings will sound bad, good recordings will sound good, and that is as it should be. The trained human ear is not being demeaned here; it is a strong asset, but without a standardized playback system, conclusions regarding the recordings can only be considered opinions.

Today's recording companies, artists, producers, and engineers are using multi-track recorders, over-dubbing techniques, and all kinds of electronic gadgets to manipulate the sound: The final product's relationship to reality is often of little or no concern. For an audio engineer in an archive fifty years from now to try and guess what these records were once supposed to sound like, without the use of a standardized monitoring system, will be an exercise in guesswork, not unlike the situation we have today.

ARSC and IASA, therefore, should try to do what the recording industry has not done--establish a standard playback system. The quality should be as high as reasonably possible and should be a standard by which all recordings can be evaluated. The hope is that such an action may influence the industry to follow suit.

Ideally, (1) all archives should have a control room of the same size and acoustic treatment; (2) all amplifiers and speakers should be the same; (3) calibrated to a standard, and (4) similarly positioned. Realistically, that probably will not happen but it is certainly reasonable to expect that a re-recording laboratory meet the following requirements.

The monitoring system's frequency response should be within +2 db at a specified sound-pressure level, of an IASA and ARSC recommended curve. This curve should be consistent with the goal of output equaling input. Similarly, the control-room acoustics should be maximized for accurate reproduction. Noise-criteria levels should not exceed 25 db, and the sound should be diffused with a minimum of echoes and standing waves. As with all other calibrated components, the response of the speaker monitors within the control room should be documented.

The one element that can simplify the standardization of a monitoring system is the selection of a reference speaker. IASA and ARSC should specify one, and only one, speaker as the standard

reference speaker. Other speaker brands and models that exhibit the desired characteristics for frequency, distortion, and transient response could be listed and used as a proximity of the reference speaker but not as a substitute. The speaker should be of high quality, have a basically "flat" response curve, and be affordable to the average archive.

Reference speaker, as the name implies, should be the speaker referred to for comparative analysis. Of course, disagreements about which speaker is best for this purpose are inevitable. However, the associations can avoid a time-consuming debate by stipulating a finite period in which to consider all the possibilities before rendering this very important decision.

One possible approach might be to form a committee specifically charged with the responsibility of implementing a procedure to gather all relevant information necessary to reach a consensus. Committee members could include one sound engineer from each archive actively engaged in re-recording. Additional members could be recruited from the standards committee or from officers of the Audio Engineering Society.

The standards listed so far have been for Type I re-recordings, whose purpose is the preservation of audio history. Briefly stated they are: (1) the identifying characteristics of a record should be indexed; (2) a record should be played back on the originally intended machine; (3) the re-recording process should be a direct function of whether the original playback system did or did not use electronic amplification; (4) the equipment used to make the new recording should be precisely calibrated; (5) archives should use one standardized reference speaker.

#### Standards for the Preservation of the Sound of Artists

The knowledge acquired through audio-history preservation provides the sound engineer with a logical place to begin the next step--the search for the "true" sound of an artist. Again, the preservation of the sound of an artist, referred to as Type II re-recording, is based on the goal of perpetuating the "live" sound of the original performers. Therefore, the obligation of the re-recording engineer, in this case, is to the artist and not necessarily to audio history.

The basic obstacle to this quest is that, in most cases, the performers are no longer available to make a live versus recorded-sound comparison test. This does not mean that one interpretation or re-recording is as valid as another, quite the contrary. Only those re-recordings that can meet, at least, the following standards should



deserve archival consideration.

The first three standards were incorporated in audio-history sound preservation and are equally applicable here. They are: (1) the use of the indexing procedure; (2) the calibration of the equipment used to make new recordings; and (3) the use of the standard reference speaker.

What truly distinguishes Type I from Type II re-recordings is the fourth standard. Compliance with this standard requires dedication as well as some sophisticated audio equipment, but if it is adhered to, the results should be worth saving for posterity. That standard is: re-recording processes that are attempting to re-create the live sound of an artist may use playback equipment other than that originally intended so long as the researcher proves that the process is objective, valid, and verifiable.

For example, if a cylinder is to be reproduced with an electronic pickup, the playback specifications of this hybrid system should be documented. With such documentation, the process could be accurately repeated allowing the results of one trial re-recording to be verified by others. As a researcher develops new techniques, or compares his results with that of others, an accumulation of the data should eventually lead to a definition of characteristics--those of the artist compared to those of the original recording medium. The ability to make this differentiation is what would establish the validity of a re-recording process, and should be mandatory for any re-recording process that professes to re-create the live sound of an artist.

Not until a researcher makes this distinction can devices such as filters, equalizers, and delay networks be employed legitimately in a final re-recording process. Totally subjective implementation of such equipment is not a valid approach for discovering the truth of an artist's voice and must be discouraged. What is desirable is to extract a better signal than the original reproducing equipment was capable of producing, and to minimize noises that were inherent in the system or have been caused by aging and abuse. Once the noises and anomalies have been scientifically determined and documented, selective filtering and equalization can then be used far more objectively. This does not mean that one will necessarily like the way the record sounds. But it does establish a foundation on which to begin constructing a playback curve that better approximates reality.

In keeping with this theory, the re-recording laboratory should photo-document the spectral response of a record over a period of time ( $\Delta t$ ), prior to processing, and then repeat the analysis after processing. Superimposition of the two events should give a clear and concise picture of the changes that were made. It is hoped that

this will result in conclusions based on fact and will discourage manipulation of sound based solely on one's hearing or one's biases. Since the net effect of many of the changes would now be identifiable, isolated victories could become repeatable re-recording strategies.

Type II recording standards therefore include: (1) the indexing of identifying characteristics of the record; (2) the use of precisely calibrated recording equipment; (3) the use of an agreed-upon reference speaker; (4) documentation of the methods used to re-create the sound of the artist; and (5) scientific proof that the process is objective, valid, and verifiable.

### Conclusions

In summary, audio archivists must recognize that preservation of the sound within records deserves their highest priority. Processes used for this purpose should be accurate, verifiable, and objective, in order to establish an authenticity. Two types of interdependent re-recording standards have been proposed. Type I--Audio History Sound Preservation which would result in re-recordings faithful to the best audio reproduction of a record during its era. Type II--the Sound Preservation of Artists that would attempt to re-create the live sound of the performers. Special attention was also given to the establishment of a standard reference monitoring system.

One of the greatest delights in listening to records is the personal pleasure and meaning one derives from the sound. We who are sound archivists must be careful not to impose our perceptions on those listeners through biased re-recordings. We must establish and abide by standards.

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