

Standards for Digital Audio Recording Systems

Michigan State Court Administrative Office

Scope of These Standards

These standards are established to ensure that courts purchase and operate audio recording systems that are designed to meet the special requirements of courtroom recording. [MCR 8.109(A)]. The standards include minimum system requirements in a checklist format to guide to courts when selecting digital audio recording systems.

As this technology changes, so too will the industry standards for compression, storage, and functionality. These standards will require periodic review and updating. As such, this document should be viewed as a living document which will evolve with the systems it describes.

Acknowledgments

The State Court Administrative Office gratefully acknowledges the contributions made by the following people which have helped in the development of this document:

Mr. Keith Beasley, Michigan Association of Circuit Court Administrators
Ms. Deborah Dolman, Dolman Technologies Group, Inc.
Mr. Rudi Edel, 46th Circuit Trial Court
Dr. P. David Fisher, MSU Dept. of Electrical and Computer Engineering
Mr. David W. Green, Jefferson Audio Video Systems, Inc.
Mr. Leo Halpern, BCB Voice Systems, Inc.
Ms. Kerry J. Johnson-Piazza, State Shorthand Reporting Service
Mr. Ted Lewis, Lewis Communications
Mr. Eric Ligé, FTR, Ltd.
Ms. Pamela Miller, Michigan Probate and Juvenile Registers Association
Mr. Robert Randolph, Michigan Court Administrators Association
Ms. Charlotte Shade, Michigan Electronic Court Recorders Association
Mr. Andy Treinis, CourtSmart Digital Systems, Inc.

Description of Digital Audio Recording Systems

Digital audio systems generally incorporate three types of components:

Dedicated hardware - workstations, servers, disk and tape drives, etc. that are dedicated to the system;

Proprietary hardware - sound processing equipment (sound cards, mixers, voice processors) and tape duplication equipment (especially high-speed duplicators) are often developed by the vendor and often cannot be replaced with off-the-shelf components;

Proprietary software - the software used to operate the system will have many proprietary components, but may also accomplish some of its functions through generally-available utilities and programs. The customer may be able to select certain components, based on which functions of the system are desired.

System Design

Systems vary widely in their designs. Some operate on a standalone PC, while others take advantage of the benefits of network technology. Courts should consider the benefits of each approach, as well as the vulnerabilities and costs of each design.

To guarantee that courts will be able to choose from many potential system vendors, and to ensure that systems are able to grow and take advantage of new technologies, all systems must adopt an open architecture design. This approach enables different vendors to supply different parts of the overall system. As such, device interfaces must conform to industry standards.

Required:

Open architecture

A system must utilize an open architecture approach, utilizing devices with standard interfaces.

Compatibility with peripherals

A system must support standard peripheral devices used in transcription, such as foot pedals and headphones, using industry standard interfaces.

Audio Recording

The core function of digital audio recording systems is to convert the audio signal from the various microphones into a digital format and store it as a computer file. Many systems allow multi-channel recording (as many as 4), which allows individual speakers to be isolated on playback. This improves the chances that an accurate transcript will be made when two or more people are speaking at the same time.

Required:

Audio recording

A system must record the court's proceedings and store the recording in a digital format with a continuous time stamp.

Optional:

Record playback

Some systems are capable of playing back a portion of the recording while continuing to record.

Storage

Digital audio recording systems create a computer file, usually on the computer's hard drive. However, the permanent (archive) file is created by copying the file on the hard drive to some other, often external, medium. This may be done manually, or automatically by the system. These media fall into two categories: magnetic and optical. Examples of magnetic storage media are floppy disks, DAT tapes, and JAZ drives. Optical media include compact disks and DVD's. Some optical media can be written to only once, but read many times (WORM), while others can be rewritten (RW). Magnetic media, by their nature, can be rewritten.

Required:

Recording format

A system must store the converted audio signal in an open, publicly available (non-proprietary) digital format. Examples include WAV and MPEG II. Lossy compression algorithms (in which the decompressed file does not contain all the information present in the original file) are permitted if they do not detract from the playback quality of the file or inhibit the creation of a complete, true, and correct transcript.

Long-term backup

A system must create a backup of the audio files (and annotations database if applicable) for disaster recovery.

Long-term storage medium

A system must archive the permanent copy of the digital recording on a widely-available, industry-accepted medium which can be stored separately from the system. Both magnetic and optical media are allowed, but optical media are strongly encouraged due to their durability, widespread acceptance by the industry, and ability to be configured to write only once to a given disk.

Optional:

Find and restore

Some systems provide a means of tracking and locating material that has been moved to long-term storage. (See "Organization" in the Appendix.)

Playback and Transcription

After recording and storage, the digital audio files will need to be transferred to the transcriptionist. In many cases, only part of a day's proceedings will need to be transferred.

Systems must be able to replay a recording so that the court can create a transcript of the proceedings. Most systems provide a separate software utility designed to play back the recording.

Required:

Non-proprietary transfer medium

Any medium used to transfer the digital recordings to transcriptionists must be a widely-available, industry-accepted medium (e.g., CD, JAZ, DAT, etc.) so they can replay the recording on readily-available equipment.

Access

A system must be able to access a digital recording using rewind, fast forward, search by timestamp, and other direct access methods to enable a system operator to quickly find passages of interest.

Playback quality

A system must play the recording back at a sufficient quality level to enable the preparation of a complete, true, and correct transcript. Playback quality will be determined by the customer.

Voice isolation

A system must be able to isolate the voices of speakers who speak simultaneously.

Separate volume controls

A system must provide separate volume controls for each channel.

Optional:

Selection of material

A system may have the ability to identify recorded material that needs to be sent to the transcriptionist, or the user may develop a process to extract this information. (See "Organization" in the Appendix.)

Peripherals

Some vendors may supply transcriptionists with the peripheral devices (e.g., CD-ROM drive, foot pedal, etc.) necessary to produce the transcript.

Annotations

Many systems include an integrated note-taking utility, which allows the system operator to take notes that are tied to time stamps marking particular sections of the audio recording.

Although an integrated note-taking utility can enhance the efficiency of a digital audio recording system, it is not central to its functioning and is therefore not required. However, if a system includes such a utility, it must permit the editing of the notes after they have been taken.

Required:

Editing annotations

An integrated note-taking utility must allow notes to be changed after they have been made, either through system functionality or by exporting, editing in a different program, then re-importing to the system.

Optional:

Session setup

The system may provide utilities useful in preparing to record a session, such as entering the date and time, courtroom, judge, case number, etc. for the case about to be recorded.

Customization

This is the ability to make configuration choices that will affect the use of the system by all users, as well as to make changes to the interface that are specific to each session.

Multiple annotators

Some systems provide a utility that allows users other than the court recorder to take notes and link them by time stamp to the audio.

Search annotations

This is the ability to search through the annotations to find specific material to play back.

Highlight current tag

Some systems highlight the annotations corresponding to the audio as it is played back.

Reliability and Security

Because court recording is “mission critical”, equipment used in performing this function must be reliable. Systems need to provide operators with various forms of information that indicate that the system is functioning properly.

Because digital audio recording systems are PC-based, security becomes an issue. Courts should rely on their existing computer security policies and apply them to digital audio recording systems.

Required:

“Live” channel indicators

A system must continuously monitor all microphones and provide at least visual indication that each is picking up a signal. An audio alarm, in addition to a visual indicator, is desirable.

Confidence monitoring

A system must continuously monitor the storage medium and provide at least visual indication to the operator that the signal is being recorded.

Redundancy

To ensure that the recording is captured in the event of failure of a storage device, a system must store the signal to two separate storage devices simultaneously. One may be used as the emergency backup.

Audio “pause” indicator

A system must periodically produce an audible alarm when the system has been put in “pause” or “mute” mode, such as during a bench conference, to alert the operator to resume normal operation when the conference has ended.

Optional:

Security and privileges

The system may be configured to allow different levels of access to different users.

Identify edited files

The system may allow the user to determine whether audio or text files (if the system contains a note-taking utility) have been edited or otherwise changed since they were created. The system may also be able to indicate whether copies of files are identical to original files created by the system.

Integration

The ability of a system to be integrated with other PC-based utilities will protect courts in the event that the system becomes unusable, obsolete, or no longer supported by the vendor. The degree of integration also presents opportunities to use a digital audio recording system more effectively by incorporating audio recordings from depositions, other hearings, etc.

Required:

Accessibility of data by non-system utilities

Because the storage format must be non-proprietary, it follows that the files must be able to be read by non-system software utilities.

Optional:

Importing sound recordings from an external source

This is the ability of a system to integrate non-system audio recordings into the digital audio system. This accommodates audio testimony or audio records created using a different system.

Importing case data

Some systems may allow the user to import case information (case name, number, parties, etc.) into the recording system, avoiding the need for manual entry of the information.

Analog Duplication

Digital technology represents great improvements over traditional analog recording equipment. For the foreseeable future, however, there will be a need to convert the digital recording to an analog recording and transfer it to audio cassettes for those who wish to have a copy of the recording but do not have access to the necessary digital equipment. Thus, digital systems must be “backward compatible” with cassette-based systems, primarily as a backup measure should the court find it necessary.

Required:

Produce tape

A system must be able to convert the digital recording to an analog recording and transfer it to a standard cassette tape.

Administration

Digital audio recording systems often provide a number of tools that make using the system easier.

Optional:

User setup

A system may include utilities to allow users to identify themselves on the system (e.g., user names and passwords).

Management reports

A system may provide utilities that generate basic reports on the status and contents of the system files (and annotations database if applicable), which is useful in identifying frequency and patterns of use, needs for training, and storage capacity planning.

Appendix: Factors to be considered by a prospective purchaser

Organization

- How will the files created by the system be stored: by case? by day?
- How will the court track the location of files?
- How will files be named?
- How does the digital audio system support these operational processes?

User interface

- How intuitive and accessible is the system's interface?
- How much training will be required to use the system?

Sufficient field length

- Does the system allow sufficient space in the data fields to store the necessary information?

On-line capacity

- How much data can be stored on the system's local drive? How many cases/days does this represent?

Off-line storage

- What storage medium options are available for backing up the local data?
- How efficient is the storage medium (how much data can you store on a given disk, tape, etc.)?

Duplication speed

- How long does the system's tape duplicator take to transfer a given file to an analog tape?

Maintenance functions

- Can users perform tasks necessary to maintain the system (defining network settings and disk structures, correcting interfaces, rebuilding databases, etc.), or must the vendor perform them?

Vendor Support

- Will the vendor provide a free analysis of the components needed to provide the level of functionality the court desires, prior to the sale?
- Will the vendor install the system, including network interfaces, and test it?
- Will the vendor train court staff on the operation and maintenance of the system?
- What type of support will the vendor provide after installation?
- Does the purchase or maintenance agreement include any future upgrades?

DIGITAL AUDIO RECORDING SYSTEM STANDARDS CHECKLIST

The State Court Administrative Office (SCAO) has established the Digital Audio Recording System Standards, which govern systems used in Michigan's trial courts. This checklist is intended as a tool for courts and vendors to use in assessing a digital audio recording system's compliance with the standards.

Court Information

Court	Contact person	Telephone no.	Date
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System Information

Vendor	Vendor Contact	Telephone no.
Manufacturer	System name	Version
Hardware components:		
Software components:		

System Design

Does the design utilize an open architecture approach, supporting internal and external devices using standard interfaces? Yes No

Does the system allow the user to use a foot pedal and headphones with standard interfaces when preparing a transcript? Yes No

Audio Recording

Does the system record the court's proceedings and store the recording in a digital format with a continuous time stamp? Yes No

File Format

Does the system store the converted audio signal in an open, publicly available (non-proprietary) digital format? Yes No

What format does the system store audio files in (e.g. WAV, MPG, etc.)? _____

Long-Term Backup and Storage Medium

Does the system create a backup of audio files for disaster recovery? Yes No

Does the system archive the permanent copy of the digital record on a widely available, industry accepted medium which can be stored separately from the system? Yes No

What storage medium is used to store the archive copy (e.g. CD, JAZ, DVD, etc.)? _____

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Playback and Transcription

Is the medium which is used to transfer the digital recordings to transcriptionists a widely available, industry accepted medium? Yes No

Which medium will be used to transfer the digital recordings to transcriptionists? _____

Does the system enable direct access to specific passages, or sections, of the recording? Yes No

What mechanisms are used to provide direct access (fast forward/rewind, search by timestamp, search using scroll bar, etc.)? _____

Does the system play back the recording at a sufficiently high quality to enable a transcriptionist to prepare a complete, true, and correct transcript? Yes No

Is the system able to isolate the voices of multiple speakers who speak simultaneously? Yes No

Does the system provide separate volume controls for each channel? Yes No

Annotations

Does the system include an integrated note-taking utility? Yes No

If yes:

Does this note-taking utility allow notes to be changed after they have been made? Yes No

Does this utility provide editing functions? Yes No

Does this utility require the user to export the notes to a different program to perform editing and then to reimport them into the system? Yes No

Does this utility enable the user to enter information about the session (e.g. date and time, courtroom, judge, case name and number, etc.)? Yes No

Does the system create a backup of the annotations database for disaster recovery? Yes No

Reliability and Security

Does the system continuously monitor all microphones and provide at least visual indication that each is picking up a signal? Yes No

Does the system continuously monitor the storage medium and provide at least visual indication to the operator that the signal is being recorded? Yes No

Does the system store the signal to two separate storage devices simultaneously? Yes No

Does the system periodically produce an audible alarm when the system has been put in "pause" or "mute" mode, such as during a bench conference, to alert the operator to resume normal operation when the conference has ended? Yes No

Integration

Are other non-system utilities (e.g. standard audio play back software) able to play back the recording created by the system? Yes No

Analog Duplication

Is the system is able to convert the digital recording to an analog recording and transfer it to standard cassette tapes? Yes No