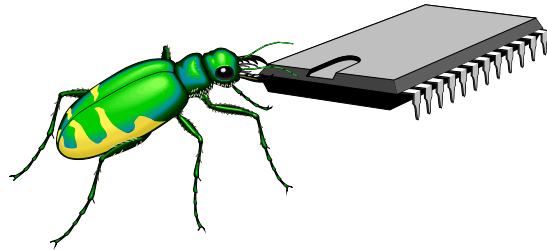


Bug Bytes



Managing Wiretap Cases with Computers

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The Audio Challenge

Just as a large collection of documents is a challenge for the trial lawyer, so is a large collection of audiotape. While the large document case is somewhat new to the criminal defense lawyer, the large “tape” case is not new. Such cases are fairly common, especially in federal courts in the United States, but also in many state and Canadian prosecutions. While we have seen a proliferation of “document management” systems, there has been no parallel development of systems for dealing with audio information.

In one sense the content of taped conversation is simple compared to the complex and multi-dimensional information that can be contained in one “document.” The content can often be appreciated by simply listening, or reading a transcript if there is one. But audio information involves the same problems of categorization, storage, retrieval, and presentation that afflict large document cases. Additionally, there are very special issues in “tape” cases that makes utilization of the tapes at least as challenging as the utilization of documents in large “document” cases.

This article will explore some of the problems frequently encountered in what we call “tape” cases, and some very simple ways that that evidence can be more effectively dealt with using nothing more than the tools native to the Microsoft Windows operating system and WordPerfect, with suggestions for additional tools in databases and the use of CD-ROM devices for storage and retrieval purposes.¹

A. Physical problems with analog tapes

In cases where there are a lot of documents, there is a price to pay for the lawyer who wants to be familiar with or use the documents. Their location is usually inconvenient, the logistics of copying, retrieval and refiling involve large cost, time, and the possibility of error and loss. These problems are also present in “tape” cases.

It is time consuming and expensive to make copies of numerous tapes for numerous lawyers, and the copies can degrade significantly in the process. If a lot of copies are not made, and there are several counsel, there is difficulty of access and the problem of “lost” tapes when tapes are shared.

Documents can be cataloged roughly by looking at them. They can be placed in some sort of typical, topical or chronological arrangement without in-depth analysis. Tapes are not susceptible to such cursory categorization, especially from the physical tapes themselves.

With tapes we have problems of actually locating pertinent tape segments. Where are the segments that relate to your client or your theory of the case? This is a cataloging problem such

¹Although this article refers to specific software programs and environments, the procedures referred to here are possible with every operating system and many types of software packages. This article is not about programs, but the concept of converting analog audio signals to digital audio files for storage, retrieval and use.

as is encountered in document cases. We usually have the benefit of the (usually) handwritten logs prepared by the intercepting agency, but some are without useful narrative.

But documents can be numbered and have page numbers within them. Even knowing what tape and which conversation on the tape was likely to be pertinent, it is not easy to queue it up correctly. We all have discovered that no two analog tape players have “counters” that are identical. Using tape player “counters” requires that the tape be rewound to the beginning, and be on the correct side. This takes time (and patience) and therefore costs money. Tapes can easily be damaged and ensnared in the tape mechanism.

Because of the logistical difficulties in actually listening to the most pertinent conversations, like the enormous, and disproportionately long period needed to queue up a tape to the right spot, it is hard for counsel to even begin to prepare to actually affirmatively use the tapes as part of the defense or to attack the government witnesses. Even if that preparation were adequate, however, the same problems make it clumsy to present the evidence forcefully to the jury. Either a composite tape will be required--which destroys flexibility and further degrades what is already a bad copy—or there will be a need for tedious preparation to insure that there is some correlation between the “counter” readings on which you have relied and the counter operation on the government’s machinery. Or you bring in your own tape players, etc. This may be true even with minimal amounts of relevant audio information.

No wonder tape evidence is so frequently the preferred tool of prosecutors: they have much more control over it, and in a large tape case they count on the defense to *react* to the taped conversations that the government deems “relevant” and not to mine the “irrelevant” tapes for helpful information for the counterattack.

Moreover, experience has taught the prosecutor that, generally, only those tapes identified by the government as the “relevant” ones will be closely examined by the defense. This means that potentially confounding or even exculpatory material present in the tapes might never be discovered by the defense out of hundreds of hours of supposedly “irrelevant” material. Although the clients may sometimes have been participants in the beneficial conversations, experience teaches that they cannot often be relied upon to unearth this information.

Of course, as with legibility problems in documents, there are audibility problems in tape cases. These problems are much more real in tape cases. There can be very different interpretations of tape segments, having as much to do with the bias of the listener as with the content of the conversation.

B. The problem with “logs” of intercepted communications

Apart from information that might be written on a tape itself, which may be minimal, there will always exist some “logs” of intercepts. Usually these are handwritten, and contain simple “audiographic” information, such as date, phone line, call number, whether ingoing or outgoing. There might be information about the phone number of the other phone, time beginning, time ending. The voices might be identified, and there may be an effort to capsulize the conversation.

Usually such records are made contemporaneously to the call and it will therefore be

typical that earlier notes regarding conversations will be more obscure and less accurate before voices are recognized, correct names or uniformly spelled nicknames and “code words” are recognized.

What use should be made of these logs? While each individual counsel ought to browse the information as a whole, each is interested in answers to the same types of questions we ask of documents in a large document case: what conversations relate to what people and what issues? What are the chronological (especially in cases where there are more than one phone line being tapped) and topical relationships between calls. Where is the helpful information?

The Digital Alternative

Enter digitization to the rescue! By “digitization” I refer to the conversion of what we call “analog” information to digital information capable of being interpreted and stored and copied (and even manipulated) by computer.

A. Digital Audio

“Analog” sound is the way we describe the preservation of sound waves, derived from audible sounds (voice) on electromagnetic medium such as tape, or the vinyl of a phonograph record. In analog tapes the fluctuation of the electromagnetic signal on each track of the tape corresponds to the physical sound wave. The variations in the groove of vinyl phonograph records similarly contain an “analog,” or replica, of sound waves.

The standard computer “sound card” or “sound board” is capable of “listening” to analog sound signals, such as from a microphone, MIDI device or synthesizer, record or a tape recording, and converting the sound into a “digital audio” file. This is accomplished by “sampling” the audio information. That information is put in a “digital-audio” file. This file is stored on the computer just as any other file, and can be played back on the computer, using the built in or attached speakers now sold with many computers.

Although digital audio files are similar to the sound information on a music CD, they are in a different format. If you ever do have analog audio tapes converted to digital, make sure your vendor (if you use one) understands that you want digital audio files, in “.WAV” format, not CD Audio, even though your vendor might actually be putting the files on a CD-ROM for your use. Both forms of digital sound information can play on your computer’s CD-ROM drive, with different software for each, but they are quite different in the use to which you can put them.

The digital audio recording and the playback are accomplished using software that is made to look like the normal analog tape player/recorder. Some of the digital file formats are recognized by the .VOC, .SND, and WAV file extensions. Here we will only deal with the .WAV file that is the standard for Windows digital audio.

By digitizing tape recorded conversations, and storing those digital audio files on the computer’s hard drive, or on CD-ROM, the sound files can not only be readily accessible to the attorney, but the attorney can with precision play the exact portion of the conversation desired

without painstaking queuing of tapes, and can automate the playback function to allow for fast interactive examination of witnesses using genuine “sound bites” or “bug bites.” Because the information is then stored as a computer file, it has the same advantages over analog tape cassettes as graphic images have over paper documents: ease of reproduction, distribution and utilization.

Below is a section which describes how to use the standard Windows environment to create your own digital audio, and “bug bytes.”

B. Digitizing phone logs

A more obvious process lies in the conversion of handwritten logs of police intercepts into computer readable and searchable manipulable text. The challenge involved in this, and the method used, will vary depending on the volume of information, your timetable, and the availability of “in-house” resources.

In some cases we have had a vendor take the handwritten wiretap logs and key them into a standard database program. In other cases we have distributed the logs among numerous counsel for “in-house” conversion. While the former can be more expensive in terms of out-of-pocket costs (expect about 11-15 cents per entry), the latter can be more expensive in terms of quality control, delay, and putting the final product from each attorney’s office together. The last section of this paper illustrates the “in-house” process, anticipating the differing computing capabilities of 20 individual offices and volume of several thousands calls on over 900 audio cassettes.

In any case one has to work carefully to assure that the data concerning the tapes is entered in such a way that the material can be sorted chronologically (by date and time), by phone line, and that certain computations can be done, such as the individual and total “on air” duration of calls, but then reorganized by the computer database program into the order it appears on the logs themselves.

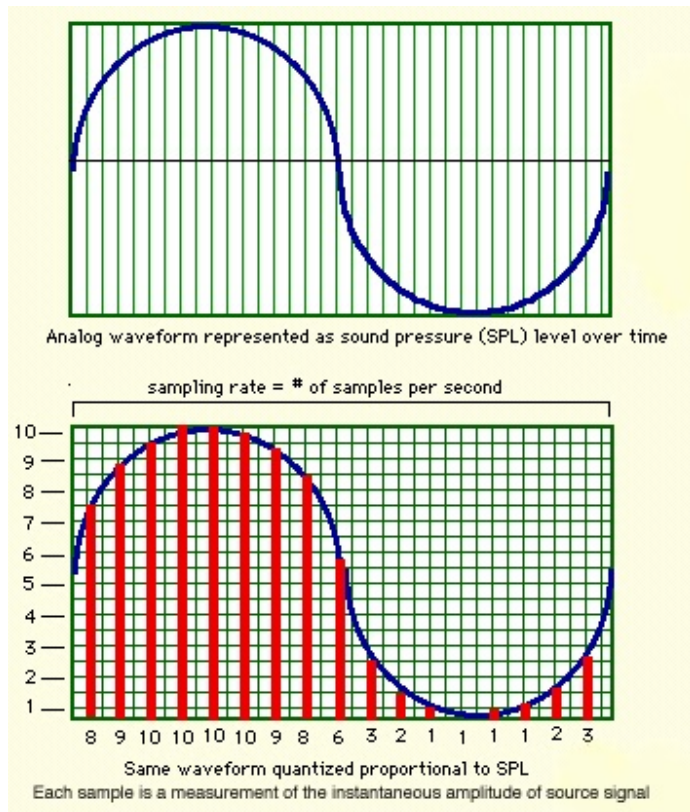
This will surely require adding “fields” to the database that are not native to the phone logs themselves. This, in turn, requires some understanding of computer databases.

Since this is not a straight process like transferring analog sound to digital audio, there is room for those doing the manual conversion to “add value” to the logs by correcting errors in spelling, expanding abbreviations, unifying variations on nicknames, replacing real names for known undercover operatives who might be described as “UC-1” etc. Advanced word processing features, like WordPerfect’s “Quick Correct” which can change designated abbreviations on the fly can be helpful in this type of task.

Once digitized, and placed in a database file that can be distributed to each attorney, each accused can search the text for conversations of interest. The databases can be further augmented with additional information added to existing fields, like additional information about the contents of a call, calculations of the duration of the call and issue or importance coding.

Recording digital audio

Sounds from the real world are recorded and digitized using an Analog-to-Digital Converter (ADC). As in the diagram below,² the circuit takes a sample of the instantaneous amplitude (not frequency) of the analog waveform. Frequencies will be recreated later by playing back the sequential sample amplitudes at a specified rate. The ADC will produce sound files



Samples are taken at a regular time intervals called the sampling rate. The sampling rate is responsible for the "frequency response" of the digitized sound.

sound information, not necessarily to save space, but to speed up the speed at which sound files are processed. But more importantly, sounds do not need to always be digitized at the same sampling rate and quality as needed for CD-ROM quality audio. This is especially true in the case of recorded telephone conversations.

which have to be saved, at the location you select, on the computer's drive. From there they can be copied to CDs or sent as e-mail attachments.

Sound files get to be quite large quickly. The primary way that we avoid excessive size is by reducing the actual data that is collected in the digitization process. The process of digitization can be seen in two dimensions: how frequently the sounds to be recorded are "sampled" and how big the sample is. CD quality sound is recorded at 44 kHz (that's 44,000 samples a second, and the size of each sample is 16 bits, which is two bytes of data. At that rate, a minute of recorded sound would be greater than 5 megabytes of data!

There is a built in audio recorder in the Windows and Macintosh operating systems. And there is third party software that can perform the same tasks with a lot more features.

There are compression schemes that allow for the compaction of digital

²The sampling diagram – and the technical information about digital audio were obtained from the article entitled "Principles of Digital Audio," by Prof. Jeffrey Hass, of the Center for Electronic and Computer Music, Indiana University [http://www.indiana.edu/~emusic/digital_audio.html]

Any non-noise waveform can be thought of as a combination of sine waves at different frequencies and amplitudes, the amplitude of each sine wave changing over time. There is a rule, known as Nyquist's Law, that holds that you can adequately recreate any waveform by sampling it at double the frequency of the highest frequency wave contained in the source waveform. Sampling at a higher rate than this does not increase the accuracy of the output waveform, because you are sampling frequency components that aren't there.

In practice, you have to sample at slightly higher than twice the highest frequency component. Phone companies typically “roll off” all frequencies over 6kHz from their phone lines, so there is no point at sampling phone conversations above 11kHz. This would be different if the original recording were digital and direct, or if the entire phone system were digital, which will happen soon enough). This would also differ for “live” intercepts from body wires, room “bugs” or parabolic microphones, etc.



Sound recorder, Windows built in digital audio tool, has too little power.

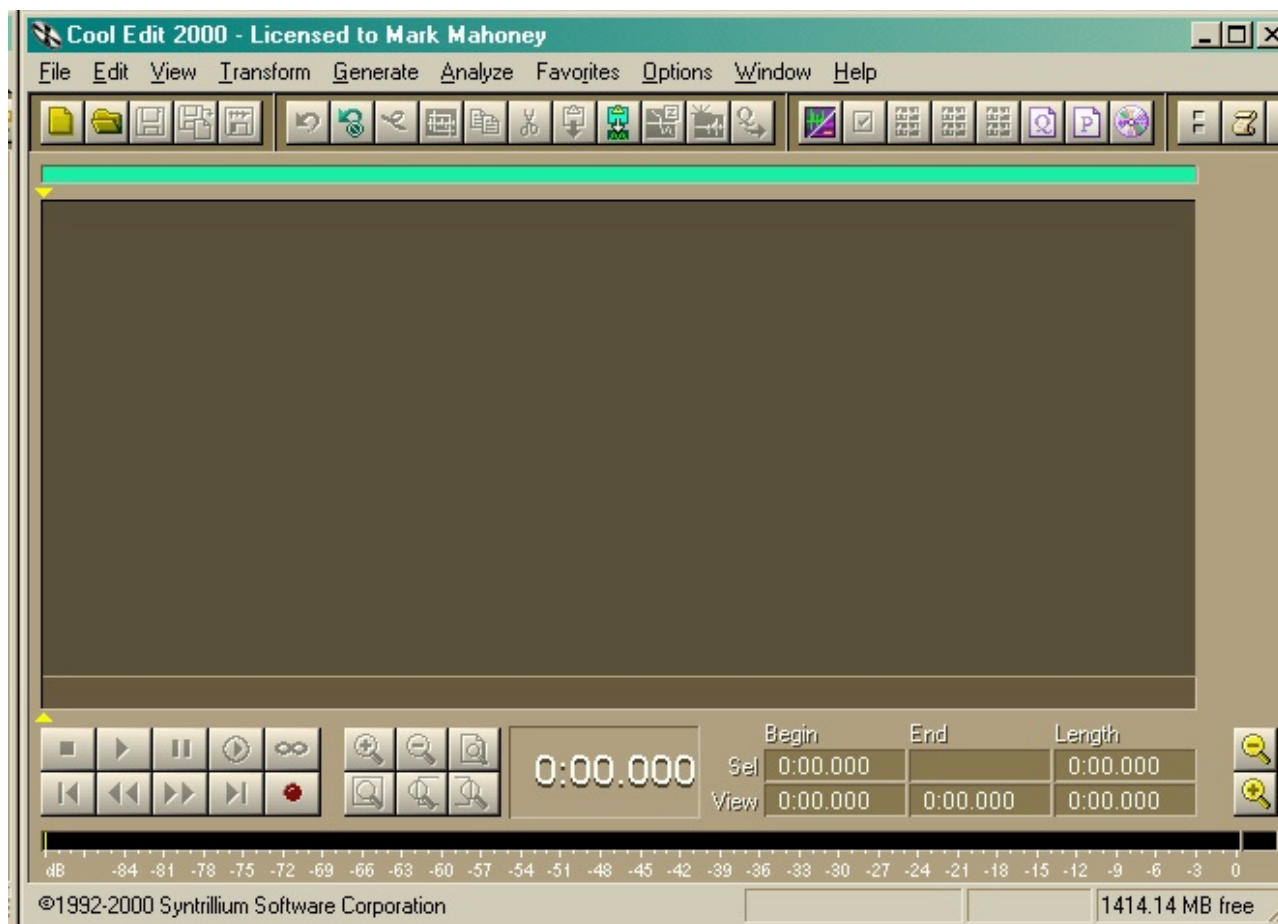
The "Sound Recorder" is the Windows system's tool for recording and playback of digital sound files by your computer's sound card. [You reach the "Sound Recorder" by selecting, from the **Start** button, select **Programs**, **Accessories**, **Entertainment**] The Sound Recorder is a crude tool, but it will help you experiment and get comfortable with certain aspects of digital audio. However it is too limited to serve any of the purposes laid out in this article. (Oddly, the earlier “Extended Recorder” and “Audio Recorder” in Windows 3.1 were more powerfully featured.)

Alternatively, there is currently an add-on to Windows XP called “Microsoft Plus! Digital Media Edition” that has more tools, but not everyone has Windows XP and most may never have.

Therefore, it makes the most sense to purchase a readily available and industry standard digital audio recording and editing programs, like CoolEdit [www.syntrillium.com] Sound Forge from Sonic Foundry [www.sonicfoundry.com] Both programs have additional components you can purchase for creating CD's in different formats and utilities to manage sound files and to convert them to CD-Audio and MP3 (this becomes very important). Also programs like CD-Creator can be used to create CD's. Of course the advance of DVD technology promises even greater storage capacity, and DVD-burning is now becoming feasible for the regular consumer. With this are also some very advanced capabilities in terms of file compression.³

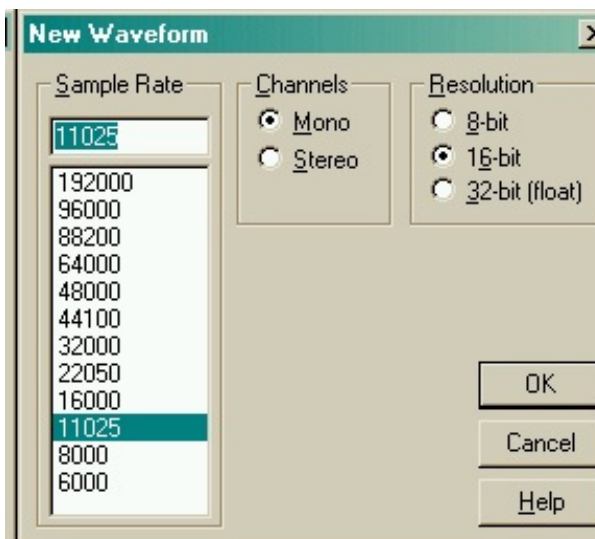
CoolEdit is terrific recording and editing software and is useful for creating play lists of particular sections of a sound files.

³Sonic Foundry's new 5.1 Surround Plug-In-Pack lets you encode to Dolby Digital AC-3 format, a very powerful method of compressing digital audio files, and includes tools to burn these files to a DVD. Burning to the strict DVD-Audio (DVD-A_ format is not yet available.



The blank CoolEdit screen has all the controls of an analog recorder.

To create a new sound file from an audiotape, just connect the “line out” or any headphone port of a tape player to the “line in” port of the sound card of your computer. Or in the case of a CD, have the CD ready to play. While in older computers you might have to tell identify the source of the sound (microphone, CD, line in, MIDI) in today’s computers the sound card will automatically select the “input” source as the one actively being used, whether it is the microphone, direct line in, or CD or other device. In CoolEdit, from the opening screen select File, New, and a screen pops up which allows you to determine the sampling rate and size.



In CoolEdit you determine the sample rate and size

If you are using a tape as the source, before recording consider how important it is to synchronize the “beginning” of the tape with the time 00:00 on the electronic file you are creating. If you can identify the actual beginning of the analog tape, best to start there, so that the time 19:22 in your digital audio file roughly correlates to the point 19:22 into the analog tape.

Ordinarily tapes do not have a time track, but that is not true of digital audio recordings (DAT) which do have a time track. DAT recordings are in digital mode, but are not in the form of digital audio sound files. So in the case of using DAT cases it is important to stick as closely as possible to the original time register.

For telephone taps, and even for body wires, I have found that using a 11kHz sampling rate, and a 16-bit sample is generally as clear as the original. Digitizing body wires and room recorders at 22kHz, 16 bits is also adequate. You can experiment with different sampling rates and size and see for yourself. But in testing the adequacy of each recording parameter, turn up the volume, like it would be for the courtroom. Sometimes only at volume can one hear the distortion that comes with too low a sampling rate or size. Unless the input is stereo, and it is important to keep stereo, using mono saves substantially on the size of files.

Storage of digital audio files

The biggest problem with audio files in larger cases is storage. As noted, even with lower sampling rates, the files get large quickly. A one minute conversation recorded at 11kHz and 16-bits would be more than 1.3 MB! Although in smaller cases a substantial amount of digital audio files can be stored on the existing hard drives, or on several spread across a network, this is not much help in making the data portable, so that it can be used in court. Unless, of course there is a great deal of spare disk space on the portable computer to be used in Court.

The initial answer to this, at the present time, is clearly to transfer the digital audio files to CD-ROM R and RW disks. Not only has it become extremely economical to record CD's, but it is now easy and economical to get portable computers that have built-in CD-ROM RW drives which can both read and record CDs.

A standard CD-ROM holds over 660 megabytes of information. This means that about 10 hours of digital audio will easily fit on one CD-ROM. However these files can be compressed by several methods in cases where there is a huge amount of data.

A. Compression

Some compression methods are considered “lossy” methods as the output is not exactly as good as the input. Others are not so lossy, but require higher initial sampling rates. And some methods of compression work better with different types of inputs. One has to experiment, not only with the actual compression method, but also make sure that it works well with whatever playback system you have in mind. As a rule, if your audio software can perform a type of compression, it can play it back as well. But bear in mind the capabilities of co-counsel, the client, and the courts.

1. ADPCM (*Adaptive Differential Pulse Code Modulation*)

The Microsoft ADPCM format consists of 4-bit per channel compressed data (providing 4:1 compression). Files saved in this format will automatically be expanded to 16-bits when loaded, regardless of their original resolution. For this reason, it is best to save to this format from 16-bits. The International Multimedia Association (IMA) flavor of ADPCM compresses 16-bit data to 4-bits/sample (4:1) using a different (faster) method than Microsoft ADPCM, and has different distortion characteristics, which can give better, or worse results depending on the sample being compressed. As with Microsoft ADPCM, it is best to save to this format from 16-bit rather than 8-bit.

2. MPEG (*MP3*)

MPEG (pronounced M-peg), stands for Moving Picture Experts Group. It is the nickname given to a family of International Standards used for coding audio-visual information in a digital compressed format. "MP3" is a variety of MPEG compression that has become the standard for the compression of audio files for transmission over the internet. MP3 is not illegal, it is simply an audio compression format, even though it also happens to be the format in which music has been transferred in violation of copyrights.

By using MPEG audio coding, you may shrink down the original sound data from a CD by a factor of 10 or more. More important, the size seems to be far less affected by the original sampling rate.

3. *Dolby AC-3*

When we get to recording to DVD discs, with far greater capacity, it will be possible to use Dolby AC-3 compression, which may not yield greater size savings compared to MP3 but may yield better sound reproduction. However, at this time I have no experience with AC-3 coding, which exists on certain high-end sound cards and in DVD burning applications.

Compression overview

	22kHz	44kHz
Standard WAV format	2,900 Kb	4,861 Kb
ADPCM (.WAV)	725 Kb	1,223 Kb
MP3 (.MP3)	270 Kb	221 Kb

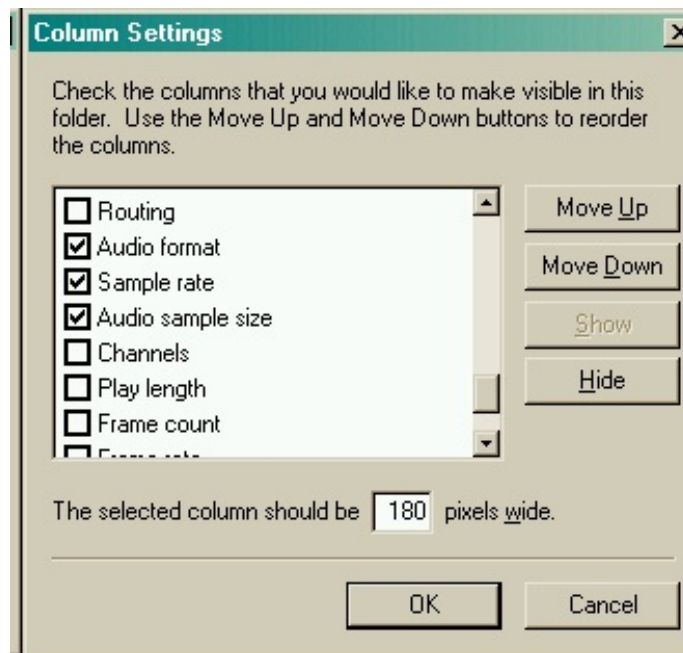
File naming

After you have recorded the file it must be saved to the disk with a useful file name that helps sort the files in a meaningful way and identify the contents. For wiretaps we have used the system of :

YYMMDD-pp-nn-d.WAV (or MP3)

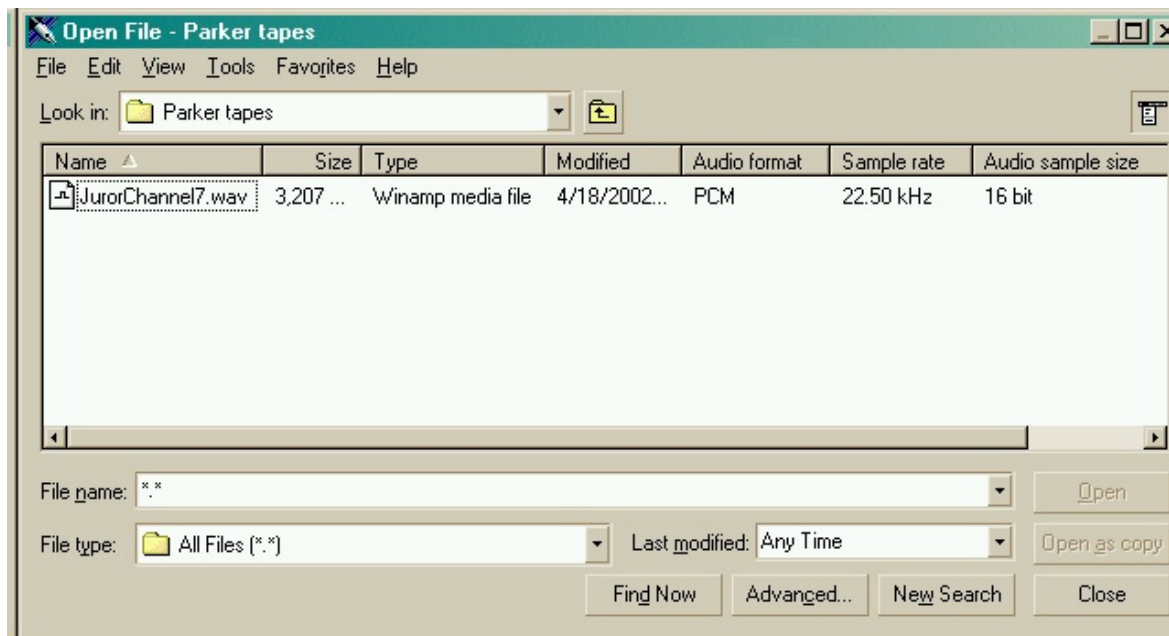
where *pp* is the line number, *nn* is the number of the call on a particular day and *d* is the *direction* ("i"n or "o"ut). Of course there can be other formulations of this, and the point is to keep in mind the different ways one might like to be able to sort or select the files. (The extension .WAV is added by the program and is useful to identify the file type. Keeping the .WAV extension is very convenient to identify sound files generally.

With the above system the files would sort chronologically, by phone line. Using the parameter of **i.wav* would show a list of incoming call files. Additionally, in WordPerfect 9 and above, at least on a Windows 2000 system, it is possible to edit the file manager display to reveal the attributes of WAV sound files.



In WordPerfect, right-clicking on the column heads in the file manager allows customization to include columns for sound file attributes

As a result of these choices, the file manager will reveal file characteristics that might be hard to find otherwise:



WordPerfect's Open File manager set up to display sound file attributes

Using Digital Audio

Once we have digitized the relevant audio information, and created our enhanced database based on the police logs of the phone calls (or conversations otherwise), how do we gain access to this information for case preparation and for use in court?

This may first involves associating the sound files with documents or database records also pertaining to that conversation.. Next this involves various methods for presenting the conversations in court at the precise time needed and in the most helpful context.

A. Getting sounds into documents

There are a number of ways to get a sound file into a document, whether that document is a word processing “play list” or a transcript itself, or a record in a database. Such sound files can be played instantaneously right from within the database, spreadsheet or word processing programs as long as they are actually accessible to the program.

For databases and spreadsheets there is usually a field type for putting in a graphic or sound “object” that is to be associated with that record. This could be the digital audio file itself, a graphic image of the transcript of the conversation, or the text of the transcript in a

WordPerfect file.

In WordPerfect a sound file can be inserted into a document and played right from that document, using the Windows Sound Recorder engine in the background. This is done from the Insert, Sound menu choices. Once the sound file is inserted a speaker symbol appears in the left margin. (as shown to the left) Merely clicking on the sound icon starts the sound playing.

1. *Linking vs embedding*

Sound files can be “linked” or “embedded.” When “embedded” or “Stor(ed) in document”) or application file, the digital audio information actually becomes part of the document (or database, etc. files). This is a disadvantage because of the typically huge size of sound files. Because most programs use the Windows Sound Recorder engine for playing back sound objects, one can only embed .WAV, not .MP3 files in the document. That overhead difficulty can be avoided by merely creating a “link” between the sound file and the application. When so “linked” in a document, the “linking” codes tell the application where to find the files.

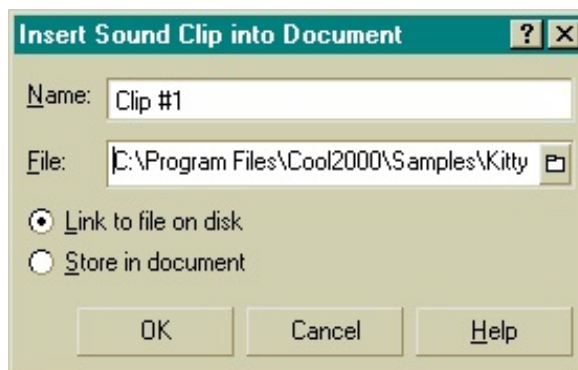
The disadvantage to “linking” sound objects is that if the location of the files change in some way, the “links” may be “broken.” As long as the file is in the same relative location, on each computer where the document is to be used, there is no difficulty. Ordinarily this is best achieved by putting sound files on a CD-ROM that will be the “D:” drive on *most* computers. This is best thought of in advance, as the links cannot be edited, once put into the WordPerfect document or other application, except to give a name to the sound clip. The file location can only be changed by creating a new link and getting rid of the old link.

A nice feature would be to allow linking to files in the same directory as the document, without specification of a drive letter or path to that directory. If we store and use the documents in the same directory or on the same CD-ROM as the audio files linked to those documents (like an e-Brief), there would be no problem with at all. This is especially true given the capacity to create a “Direct CD” which can be edited and rewritten in a CD-RW drive. This option, however, does not exist now.

2. *Using sound files in WordPerfect*

WordPerfect has a “transcribe” feature which allows a person to control the playback of the digital audio file on the same screen as an open document. One accesses this by either double-clicking on sound icon, or right-clicking on the icon and selecting “Transcribe”:

This allows one to control the playback of the sound file while editing a transcript of a conversation. (Perhaps putting in time markers in



From the WordPerfect Insert, Sound menu choices, select a sound file. Choose “Link” or “Store in document”



the transcript as well)

Apart from the sound icon the WordPerfect inserts at the left margin, a sound file can

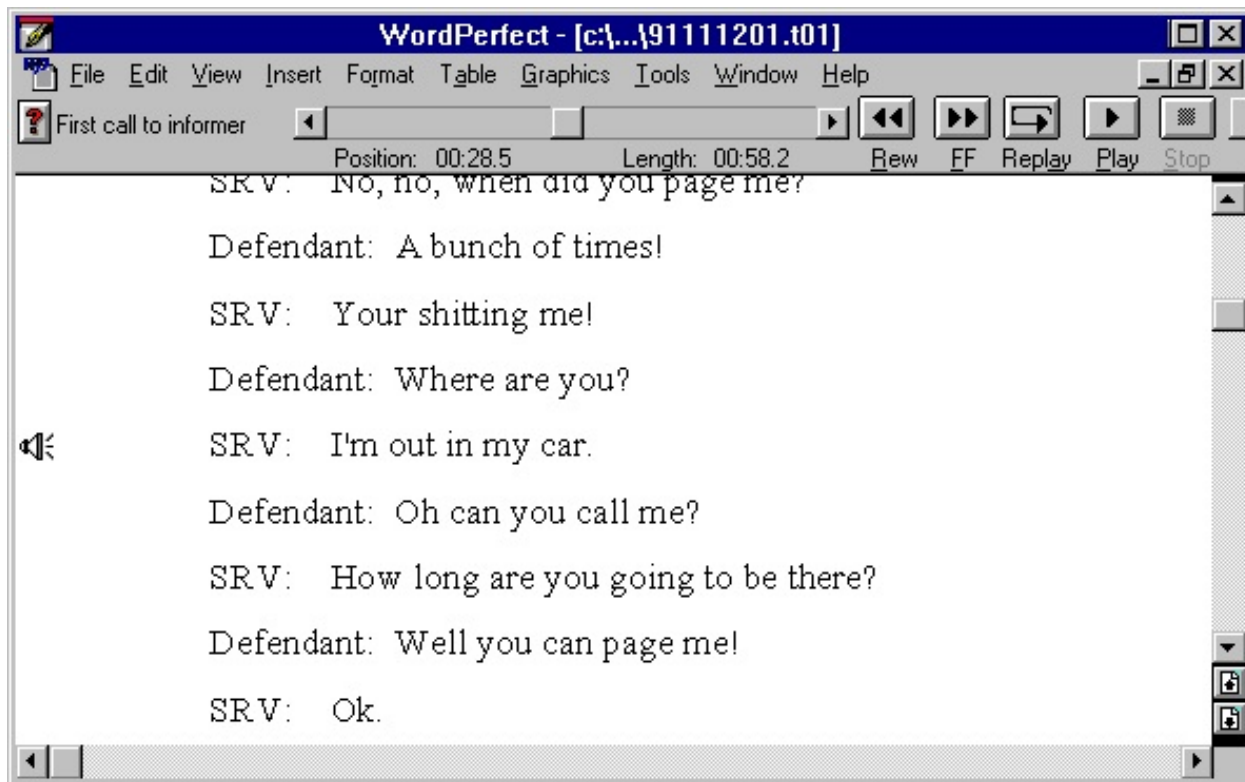


Figure 11 The speaker icon in the left margin of the WordPerfect document represents the sound file that has been linked to the document at this point. Clicking on the speaker icon plays the file. Using the right mouse button one can access the "transcribe" tool bar which allows control of the playback, useful at least for preparing transcripts of tapes.

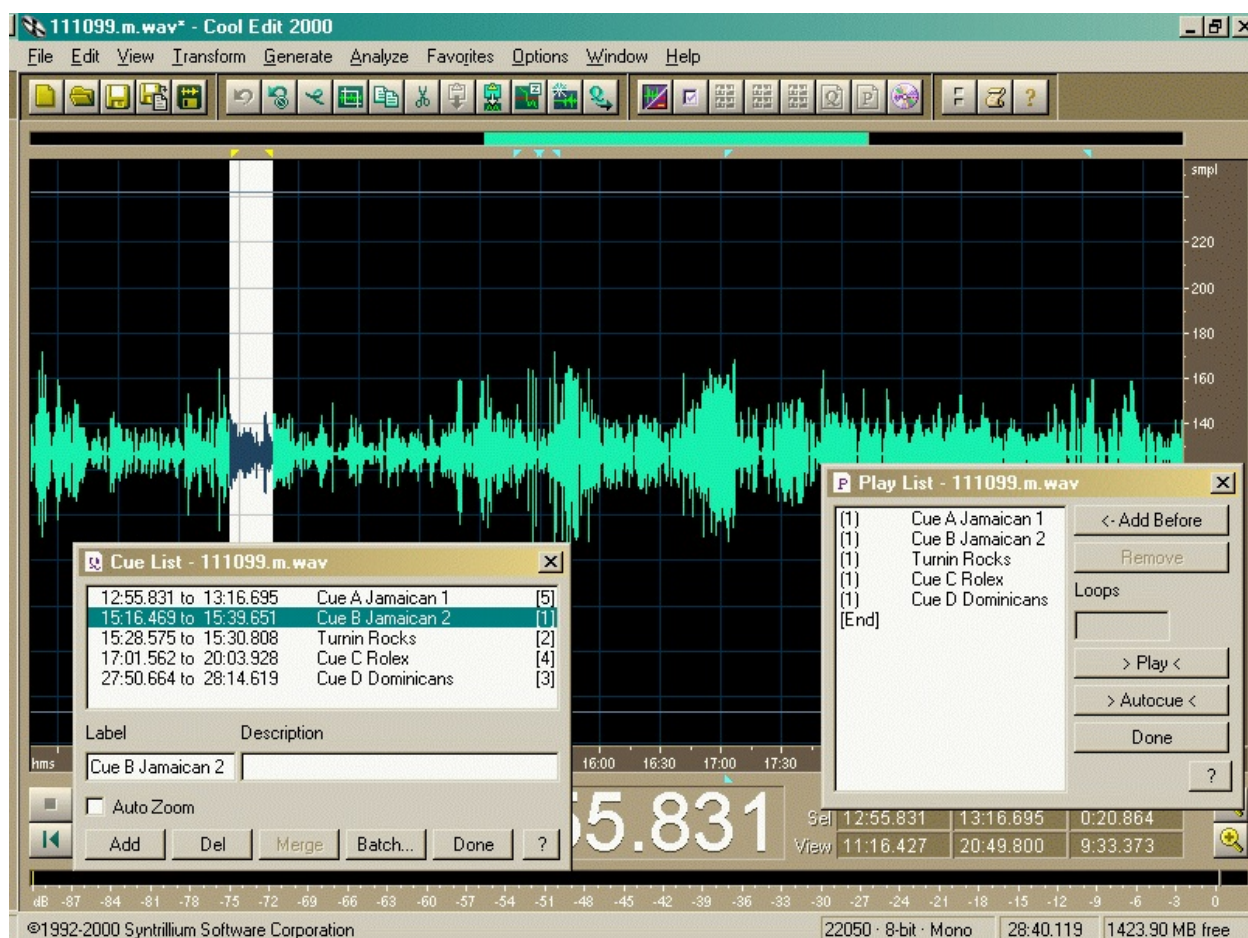
also be started with a macro. Such a macro can be run like any other: from the macro command <Alt-F10>, or the macro can be put on a toolbar or as a button or hyperlink in the document. At present the only macro command that seems to work directs that a sound file *already in the document* and at a *later position in the document* be played from the starting point. [The macro command is "SoundClipPlayNext"] WordPerfect documentation tells us that a macro can be written to play a sound file beginning and ending at a certain point. This could be extremely be useful for very specific sound bites done in rapid succession, without having to store a multiplicity of sound files. Unfortunately, though documented, this macro feature is not in fact operational in any versions of WordPerfect as far as I can tell.

The types of documents that one might use would include transcripts, which have the digital files linked to icons for each segment of the conversation. Or you might place excerpts from audio files in a WordPerfect document that serves as a "play list" of "sound bites" for use during the case. There are more advanced programs, such as Sanction (verdictsystems.com), however.

B. Using sound files in court: the “sound bite” play list

For purposes of using sound files in court, we can go beyond simply using the computer as a playback device. One could have an outline of examination in the form of a word processing file with sound bites strategically located throughout. This would allow for the rapid and surefire use of recorded material at critical points of the examination.

If you were only interested in using a small segment of a conversation to illustrate a point, then that portion can be blocked and saved as a new digital audio file. That new sound clip can be linked to a section of a document as described above. Of course the individual sound files can be pulled up in the Sound Recorder or in other audio software and be played on its own. As these clips became more numerous, however, and storage becomes a problem, we might look for a better way. What if, instead of making a new digital audio sound file for each sound bite, we were able to tell the computer to play particular timed segments of an existing sound file.?



Sections of a waveform can be marked precisely and added to a cue list, and then added to a play list. Items can be played in any order.

It is relatively simple thing in CoolEdit and other similar programs to create a series of cues to mark segments of the waveform, and then to add those marked sections to a play list with descriptive information identifying each clip. Using this approach the lawyer can have audio

information ready to play at any time, in court or out of court.

Government Audio

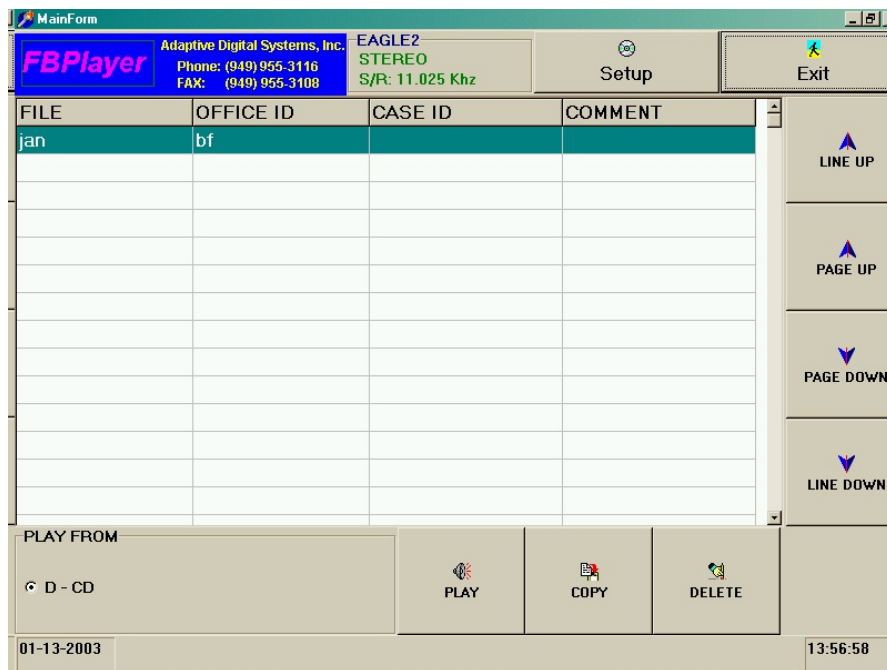
Typically the government and police agencies have relied on analog (audiotape) recording of sound information and have used that in the courtroom as well. One advance has been the use of the Sanction software to synchronize the scrolling of transcripts of taped conversations with the audio, which involves the use of digital audio.

However, some agencies have begun to digitally record audio information, at least in the case of body wires and surveillance bugs. This is owing, no doubt, to the fact that the smallest self-contained recording devices are digital units. Typical of these is the “Eagle” series of audio recorders from Adaptive Digital Systems (ADS) in Irvine California. ADS makes a variety of very small audio and video digital recording devices designed for use by police and intelligence agencies, including “friendly” foreign intelligence services.

The Eagle device (the current version is Eagle8) stores digital audio in a proprietary format which, at the conclusion of the recording session, is downloaded to a PC set up with FBird [read “FBI-rd”] software which is used to create The digital files are addressed using their FBPlayer software. FBPlayer is distributed with the CD-ROM discs onto which the sound files have been copied. However, it can be obtained at

<http://www.adaptivedigitalsystems.com/Commercial/Downloads/>

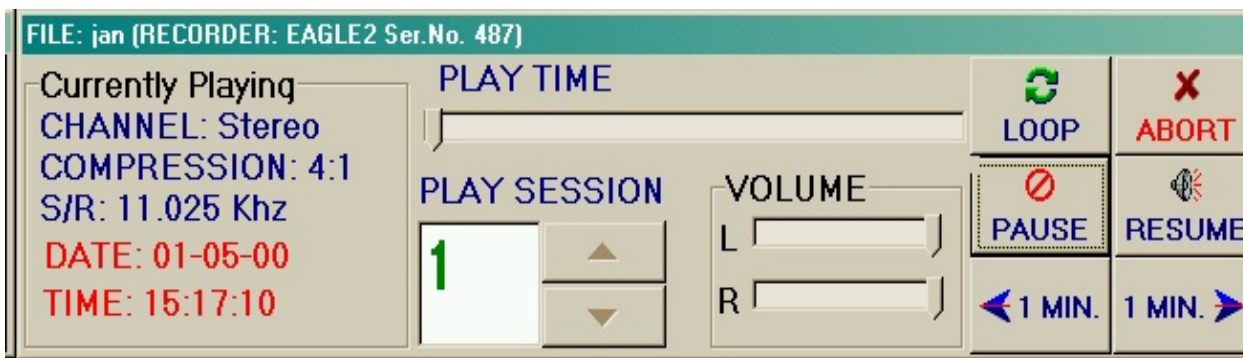
It has no utility other than as a vehicle for playing digital files recorded on the Eagle series of recorders and other recorders from ADS.



FBPlayer is for playing digital recordings from the Eagle series of recorders.

Note that the sampling rate, but not size, is shown.

I do not much like the FBPlayer interface, as I would like to have editing capabilities right in there. And you cannot go directly to a certain point in a recording. Instead you can only start at incremental points, about every 15 seconds or so, depending on the overall length of the recording.



The sound file can be started at certain increments throughout the file. Note: time is in military time of day for the actual recording, not the duration of the audio file itself.

. Also, if you wish to do more with digital audio files created by the FBird software, it is necessary to convert them to .WAV format. ADS has a utility program that can be used to convert files from its proprietary format to .WAV format. This utility, called "FBWAVE" can be downloaded from

<http://www.adaptivedigitalsystems.com/Police/Downloads/downloads.html#FBWAVE>

The FBPLAYER WAVE program converts FBIRD recorder files into WAV compatible files which can be played back through your PC.. A full 650MB writeable CD with BIRD files will hold up to five hours of converted recorder files (wav). This will also require one to have the ability to create "Direct CD" formatted CD-ROM RW discs which behave like "floppy" discs in a CD-RW drive.

Conclusion

By mastering a few software features, in a few readily accessible programs, any attorney can make far better use of audio information which bears on the case.

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