



INTRODUCTION TO DIGITAL AUDIO

This updated guide has been adapted from the full article at <http://www.itrainonline.org> to incorporate new hardware and software terms.

Types of audio files

There are two most important parameters you will be thinking about when working with digital audio: sound quality and audio file size.

Sound quality will be your major concern if you want to broadcast your programme on FM. Incidentally, the size of an audio file influences your computer performance – big audio files take up a lot of hard disc space and use a lot of processor power when played back.

These two parameters are interdependent – the better the sound quality, the bigger the file size, which was a big challenge for those who needed to produce small audio files, but didn't want to compromise the sound quality.

That is why people and companies tried to create digital formats that would maintain the quality of the original audio, while reducing its size. Which brings us to the most common audio formats you will come across: wav and MP3.

wav files

Wav files are proprietary Microsoft format and are probably the simplest of the common formats for storing audio samples.

Unlike MP3 and other compressed formats, wavs store samples "in the raw" where no pre-processing is required other than formatting of the data. Therefore, because they store raw audio, their size can be many megabytes, and much bigger than MP3.

The quality of a wav file maintains the quality of the original. Which means that if an interview is recorded in the high sound quality, the wav file will be also high quality. This is why some radio stations use wav files for their FM broadcasts. Because of its size, wav files are not suitable for using on the Web. They are not recommended for use in archiving audio either, as they take up a lot of disk space.

In order to reduce the size of a wav file, but to preserve the sound quality as much as possible, you can convert it into an MP3. In the majority of cases, we will save completed shows as MP3 to conserve space.

MP3s

MP3 is fast becoming the industry standard for listening to audio files on the Web. This is mainly because the audio files are highly compressed whilst retaining a high level of sound quality. For example a raw audio file of 36MB will become a high quality MP3 file of 3.6MB. You can squeeze around 10 hours of audio in MP3 format onto a CD (which usually only stores around one hour of non-compressed audio).

In making MP3s "perceptual" encoding is used, which means that only the sounds one can hear are saved, while the sounds a human ear won't pick up are discarded. It makes the MP3s smaller but still very high quality.

What you need to listen to and create digital audio

The sole process of creating an audio file is not complicated, once you have all the software and hardware you need. To help you with getting the right tools, we will give you few suggestions on what hardware to buy and where to find the software for listening and manipulating audio files.

Hardware



Handheld Recording Devices

These include Mini-disc recorders and solid state recorders/MP3 recorders with inbuilt or attached microphones.

Studio Desk linked to PC, or PC with Microphone

PC Sound support.

Check the back of your computer. Find the "Line-in" , "Mic-in"  and "Line-out"  sockets. These are visible parts of your sound card. If you can't find them, you need to buy a sound card. A good quality sound card influences the quality of the audio one is manipulating. The better the sound card, the better the quality of an edited audio.

PC Storage

Each broadcast-quality digital audio file (especially wav) can require several megabytes of storage space. But once you have downloaded the programme, you can save space recording it onto CD or other sound storage mechanisms. The more space on your hard drive, the more you will be able to do more with your computer. It is recommended you have at least 10% free space on your hard drive.

Software

The station uses Adobe Audition 1.5 for recording and editing. This is relatively expensive, so we will suggest some web addresses where you can download free software for MP3.

Software for listening to MP3s

If you are running Windows operating system, check if you have Windows Media Player. Depending on how often you plan to play MP3 music, that may be all you ever need.

If you are using Mac, you can download iTunes for free.

Software for manipulating audio files

Your audio files can be modified (edited) in the same way as any other MS Word document – you can cut and paste, move portions of audio and you can convert your audio into the MP3 format. All this can be done using editing software, such as SoundForge or Adobe Audition.

But, you might just want to convert your audio material (from a CD or a minidisk) into a digital file of MP3 format without editing it on your computer. For this, you only need encoders or rippers.

Before you get excited about the prospects of audio file manipulation, bear one thing in mind - you will not be able to improve the quality of your sound significantly by using encoders or editing software. If a recording is poor quality with lots of noise and distortion, you won't be able to improve it significantly.

Rippers and encoders for MP3

In order to make your own MP3 files you need rippers and encoders software; MP3 players such as Windows Media Player & iTunes have this software as a basic, and can be set to rip music to MP3 in the options menu. Rippers don't allow you to edit audio on your computer, so they are only really good if you have got the finished programme ready on your computer.

If you find your MP3 player doesn't suit you, you can find other software. Search the web for MP3 rippers and encoders – eventually, you will find good free software. Sites such as Wikipedia offer good lists of both pay-for and free ripping software for PC, Mac and Linux.

Audio Conversion software

You might want to convert your wav files into an MP3. There is a lot of software on the Net that does this. Again, Wikipedia offers a list of both pay-for and free audio conversion software for PC, Mac and Linux.



Audio editing software

Most of the free rippers and encoders can not be used for editing your audio – they only convert an already edited file. Some of them also can't import a sound from the external audio device - they can only convert audio that is on your in-built CD/DVD on your hard drive.

To overcome this, you can use editing software. They usually not free, but they are great all-in-one packages - enabling you to digitise, edit and convert your audio into the desirable format.

You might be able to download a trial version of Cool Edit (the old name for Audition) from <http://www.syntrillium.com/> but there will generally be serious restrictions on the use of these trial versions (for example, you might not be able to save the file you've digitised and edited using the trial version).

There is a free editing software programme called Audacity <http://www.audacity.com/> which will enable you to digitise your audio from external device and convert it into an MP3 or wav. It's not as intuitive or easy to use as Cool Edit/Adobe Audition, but it comes with in-depth online help, so you can master it fairly quickly.