I am hoping to set up a WWW page or maybe an ftp site that involves sound samples (I teach actors how to learn accents and dialects and I want samples to be available online…). I figure many voice people are technophobes so I want to set up my site as a "one-stop shopping" centre.

I was wondering what kind of sound capabilities my LC III has, what kind of shareware, freeware, etc. I could get my paws on, and what is good. And could you help us figure out what all the 8-bit sound, .aiff .au .snd .wav stuff means? I realize that it is a lot to cover, but sound is a major part of the future of multimedia and the Net.
— Eric Armstrong, via the Internet.

t is rather a lot to cover, but let's see what we can manage. Your LC III is capable of playing back 8-bit stereo sound, but its sound-in jack—which does not support the PlainTalk Microphone and must use the giant pill-shaped microphone, commonly called the Apple Microphone and officially called the Omni-Directional Microphone—only supports 8-bit mono input. Moreover, the Apple Microphone is only a mic-level device and the 8-bit sound input and output is limited to 22 kilohertz (kHz).

Whether these capabilities are enough to produce recordings of suitable quality for teaching accents and dialects you'll only find out by trying—but let's translate the paragraph above into something a little more meaningful anyway.

igitized sounds will almost always be either 8-bit or 16-bit and the differences between the two are analogous to the differences between an 8-bit and 16-bit colour display, excepting you are considering the volume or dynamic range rather than colour accuracy. An 8-bit digital sound has 256 separate volumes to choose from while a 16-bit sound can be select from up to 65,536 discrete changes in volume.

The other important part of a digitized sound is the rate at which it was first sampled. Sampling rates are literally that: the number of times per second the digitizing software and hardware listen to the sound source. The greater the number of samples per second, the greater the frequency response of the recording and the closer the sample comes to re-creating the original sound. There are three sampling rates you are likely to come across on your Mac: 11 kHz, 22 kHz and 44 kHz (although these numbers are not exact, 22 kHz is actually 22.254 Hz and 44 kHz is actually 44.100 Hz, for example).

A sound sampled at 11 kHz produces a quality akin to what you hear over the telephone, while 22 kHz is close to AM radio quality. 16-bit sound, sampled at 44 kHz, is commonly called 'CD quality' sound and that is true to the extent that CDs play back at that bit depth and at that sampling rate.

CDs are also, for the most part, pressed from masters which were recorded in recording studios where the mics are baffled against ambient noise and the mixing console is able to tweak out all the coughs and burps. Even if you can record a 16-bit 44 kHz CD-quality sound on your Mac, all the ambient noise will be duly recorded along with your dulcet tones: it will be no less annoying for being 'CD quality' ambient noise.

s noted above, the Apple Microphone is a 'mic-level' device. Without going into MEGO (Mine Eyes Glazeth Over) inducing detail there are essentially three different audio signal levels commonly produced by microphones: mic level, line level, and professional line level, in order of increasing quality. (The PlainTalk Microphone, by the way, produces a line level signal.)

It is possible to plug non-Apple mics into the sound input jack of Macs which use the Apple Microphone, as long as you have an appropriate adaptor. I've not done this myself but Craig O'Donnell, author of the excellent (if somewhat aged) Cool Mac Sounds   and all-round sound expert, is a fan of the Radio Shack PZM used in conjunction with adaptor #274-047, also from Radio Shack. This microphone, according to O'Donnell, produces better and smoother samples than Apple's own and even 'outperforms more expensive microphones.'

egardless of what sound quality your Mac can record, you need software to record with. The Sound control panel does have an 'Add...' button but it only allows for up to ten seconds of recording and is limited to 22 kHz mono. There are many excellent commercial products available for sound recording on your Mac including HyperCard, Kaboom! Factory, Audioshop and Sound Edit Pro . For anyone just starting out on the sound recording road, I'd recommend grabbing a copy of E J Campbell's shareware application, Ultra Recorder. It can

convert sounds to and from several formats and uses disk space and not just RAM to store sounds being recorded, removing a significant limitation of many other sound recording applications.

It's not much of a sound editor, however. Again any of the applications above might be worth investing in but, before doing so, check out Player Pro, an excellent shareware sound editor produced by Antoine Rosset. It is aimed mainly at producing MOD files, which are designed for music, but can export edited files to AIFF format.

Campbell's application does not have a particular home on-line but is available widely (I've found it on eWorld, CompuServe and every UMich mirror I've tried in the US, Australia and England). Player Pro is equally widely spread but does have a particular spot to check if you want to be sure of getting the latest available version: http://WWW.mm.se/playerpro/ .

The other thing to note at this point is that you will need a pretty large hard disk to store all your recorded sounds on. Sixty seconds worth of 8-bit sound recorded at 22 kHz will take up about 1.2 MB of space; the same sound recorded at 16-bits and 44 kHz will take up nearly 11 MB of hard disk space.

t last, we'll consider the sound file formats I've been tossing around without explanation. You ask about several formats but I'm going to begin with one you don't mention: sfil. 'sfil' files are stored in your System file and are the type of file you produce when you record a sound in the Sound control panel. If you drag a sound file out of the System suitcase onto the Desktop its icon is a standard blank document icon with a speaker and sound waves: double-click it and it plays.

Another format commonly found on the Mac is the 'snd ' format (and that space is deliberate). 'snd ' files are commonly found as resources inside applications and HyperCard stacks which is why their file type is described with four letters (one of which is a space). All resources on the Mac have four-character codes associated with them, no more and no less.

(For Tech heads only) There are actually two separate 'snd ' formats, known as Formats 1 and 2, the only difference between them being what sort of data they contain: Format 2 'snd ' files always contain a sound sample, while the older, Format 1, files can contain a sound sample or a wave-table or a command sequence which refers to another resource which actually contains the sound.

AIFF stands for Audio Interchange File Format and is a standard developed by Apple and a number of third-party developers to enable sharing of sound data between applications. It is the format built-in to QuickTime, is also used by Audioshop and non-linear video editing applications such as Adobe Premiere and has been adopted as a standard format by Silicon Graphics for its Unix based workstations such as the Reality Engine. AIFF-C (or AIFC, to give its four letter file-type code) is a compressed version of the same format. It takes up a lot less room but sacrifices sound quality to do so.

AIFF files are preferable for long sounds and also have the advantage of being multi-channel. Multi-channel isn't stereo per se, since 'snd ' and 'sfil' files can also be stereo. However, a four-channel sound, for example, can divide a sound into left, centre, right and surround (or rear) channels for true surround sound and this capability is used to great effect in games such as Marathon II: Durandal. The maximum number of channels currently supported by

the Mac OS (via the Sound Manager) is six.

WAV and VOC files are interlopers from the Wintel world. WAV (or '.wav' pronounced 'dot-wav, after their default filename extension) files are the standard sound format used by Windows and VOC ('.voc') files are files in a format commonly used by software included with the SoundBlaster range of sound cards. Like 'snd' and AIFF files they come in a range of fidelities from 8-bit to 16-bit and from 11 kHz to 44 kHz.

Other formats you may come across include '8SVX' and 'MOD'; both of which originated on the Amiga (the latter is a particularly useful format for music sampling and editing and it is emerging as something of a cross-platform standard); FSSD, which is an older Mac format common in the days before System 7.0; and '.au' files, which are also known as Ulaw, Mu-law and μ-law files. These latter are the standard sound formats used by the Sun and NeXT versions of Unix. The format is actually a rather low fidelity International Telephony format (8-bit mono at 8 kHz to be precise).

None of these formats is interoperable, of course, which means you'll need to consider another software package, this time for converting to and from the various formats. My two favourites are SndConverterPro 2.2, by David Lambert and Brian's Sound Tool by Brian Scott. Brian Scott's application is freeware, while David Lambert's, which handles more formats and does a whole bunch more besides, is shareware.

What formats and fidelities you will need is impossible to answer. AIFF is a good format for high quality sound but hasn't been widely adopted outside the Mac and SGI worlds. WAV files are common, if only because Windows is so common, but non-Windows users will need to acquire an application to play the sounds. (Mac OS users can use Sound Machine and you could serve up such an app along with your sounds when your site us up and running of course.) If you find that hi fidelity is not all that important, '.au' files are an excellent choice: most operating systems can handle them or have freely available applications which can handle them.

Remember, however, that a 10 MB file is not an attractive proposition for downloading since almost all of us pay for our on-line time by the hour. If you must go the hi-fi route, you may need to consider CD-ROM, sold via subscription perhaps, as you preferred means of distribution.

f, after taking a deep breath and spending a day or two digesting all this, you've decided your Mac isn't up to the job, there is not a lot available to improve things I'm afraid. Disk space and RAM can be improved on the LC III (with no effective limit on disk space and a maximum RAM expansion of 36 MB) but improving the sound input and output options is rather more difficult.

Two years ago there were at least two 16-bit sound cards available for the PDS (Processor Direct Slot) inside your LC III—the Audiomedia LC card from Digidesign and the PAS-16 LC from MediaVision, although the PAS-16, which was based on the Pro-Audio Spectrum card used in PCs, did not have a good reputation. I'm not aware of either of them being available today.

Finally, setting up an ftp site is easier than setting up a Web page and, if you are only going to serve up files, is probably the way to go. On the downside, most people find ftp sites more

intimidating and less attractive places to visit, a concern if your intended audience is as technophobic as you suggest.— Brian Forté