

Chapter 6 – Copying the Original: Audio Cassette

Last updated: 1 November 2005

First, some general copying guidelines:

1. CRT monitors are terrible noise sources. LCD monitors are much quieter. If you are using a CRT monitor it's important to keep your turntable, reel-to-reel tape deck or audio cassette deck at least four feet from the monitor.
2. Operating your monitor (especially if it's the CRT type) on a line-isolation transformer may help to reduce the noise. Also reversing the monitor's mains cord plug and/or the turntable or tape deck plug may help. (I've seen a plug reversal make a 6 dB noise level difference so it pays to experiment.)
3. Power your computer and monitor on a different electrical circuit from the one powering your audio playback equipment. Have an electrician put in a new circuit if this is needed.
4. Copy the original source to a WAV file format: at least 16-bit stereo and 44,100 samples per second. This is the "Red Book" standard for CDs. You can copy at a higher resolution and a faster sample rate and then use your audio editing software to convert to the Red Book standard but it's doubtful that any of your source material will benefit from the extra time and hard drive space needed to do this.

Audio Cassette

You will need an audio cassette recorder or playback deck [1]. These usually have a built-in preamp which will directly connect to your sound card's line-input. If you have a playback deck with a low output or a sound card with a low sensitivity (such as the *Waveterminal* 192X which we like) you may need another preamp (with flat equalization) between the tape deck and your sound card. Since we often use the *Waveterminal* sound card, we use one of our model 457 Audio Control Centers to provide the extra gain and also a convenient volume control. When we're using a 457, we just set the tape deck volume to maximum and control the level to the sound card with the 457. (For more information on the 457, please [click here](#).)

As with other music sources you will also need a computer with a good quality sound card [2], a program to copy the sound card output to your hard drive [3], and good quality cables to connect the tape deck output to the sound card input [4]. If the tape is stereo, just use a stereo cable. If the tape is mono, then connect the left output from the tape deck to both the left and right sound card line-input connectors using an adapter. The type adapter you will need depends on the tape deck and sound card connectors.

Virtually all commercial audio cassettes are stereo. The only way you would be likely to find a mono cassette is a "home recording" or a copy of a mono record. Even if the cassette is mono, it's better to make the copy in stereo because I have found it easier to do the "clean up" – that is,

removing the noise and tape hiss (and possibly hum).

1. Inexpensive audio cassette recorders are not up to CD quality. We have a high quality record and playback unit built by *Bang & Olufsen of Denmark*. It's only disadvantage is its size and it's too large to rack mount so we usually use our rack mount *Sony*. (If you have a lot of audio equipment, rack mounting is almost mandatory.) We also have an excellent quality deck made by *ADS* (a model C2) which isn't working. We haven't been able to fix it for lack of a Service Manual or even a circuit diagram – it has two large circuit boards full of parts. **Can anyone help?**

The quality of commercial audio cassettes varies greatly from one manufacturer to another. We have some that sound terrible when played on a good quality deck and there's not much you can do about it.

If you are interested in a new deck, the *Denon DRW-555P* and *Marantz PMD501* are nice (and rack mountable). You can probably find used models on *eBay*.

2. Sound cards are not created equal. For a fairly comprehensive comparison go to (<http://www.pcavtech.com/soundcards/compare/index.htm>). The site operator, Mr. Arnold Krueger, tests the cards and posts his findings. We like the *Turtle Beach Santa Cruz* card (it has a score of 7 with 5 being the best) and the *Waveterminal 192X* (it's not rated but it does up to 24-bit sampling at up to 192 kHz). Also check out the cards at (<http://www.tracertek.com>).

3. There are many programs which you can use to copy the sound card output to your hard drive. Among other, we use the following: *CoolEdit Pro* (in May 2003 *Adobe* bought the *Syntrillim* software and *Cool Edit Pro* became *Adobe Audition*), *Dart XP Pro* (*DARTech, Inc.*, 7400 Metro Blvd #350, Edina, MN 55439. 800-799-1692. (<http://www.dartpro.com>) and *Sony Sound Forge 8*, (<http://www.sony.com/mediasoftware>).

4. Buy the best quality cables you can afford! Cheap cables have insufficient shielding to keep noise and power line hum out of your audio. If you have gotten this far, you have already spent quite a few dollars getting set up for restoration so get good cables. Primarily, we use *Dayton Audio Cables* from *Parts Express* (<http://www.partsexpress.com>). *Radio Shack Goldline Cables* are pretty good too. (<http://www.radioshack.com>)

Please click [here](#) to download a copy of this chapter in *Adobe Acrobat* (pdf) format.

TDL® Technology, Inc.
Las Cruces, New Mexico USA