

<http://www.cakewalk.com/Support/24BitTips.html>

Tips for Using Cakewalk Pro Audio 9 on 24-bit Audio Projects

When first installed, Cakewalk Pro Audio 9 is set by default to create projects containing 16-bit audio sampled at 44.1khz. Almost all soundcards available today support this kind of audio data (at least in mono if not in stereo, and at least in half-duplex if not full-duplex mode.) Many “professional” soundcards offer the capability to record/play audio at a higher bit-depth (more bits per sample), and possibly also at a higher sampling rate. Cakewalk Pro Audio 9 software can take advantage of this enhanced capability, allowing you to produce very high-quality “professional-caliber” audio projects. However, to get the best results when working at these higher levels, you need to keep the following points in mind:

- **Set the desired bit-depth and sampling rate before recording any audio:**

You should specify the desired bit rate and sampling rate for your project *before* starting to record or insert any audio into the project, i.e., when the project is newly created and still “empty”. (It is possible to change a project’s bit-depth after audio has already been recorded into it, using **Tools—Change Audio Format...**, but doing so can degrade the quality of the existing audio data. It is not possible in Pro Audio 9 to change the sampling rate of a project after audio has been recorded; other sound editing applications can be used for this purpose, but the sample-rate conversion may also degrade the quality of existing audio.)

Specifying the desired bit rate and sampling rate is accomplished in the **Options—Audio...** dialog box, on the “General” tab. The section of the dialog labeled “Default Settings for New Projects” allows you to specify the sampling rate and the sample size (bit-depth) of audio data that will subsequently be stored into your new project.

Make sure that you do not choose a sampling rate that your soundcard doesn’t actually support. (For example, don’t select “48000 Hz” if your soundcard can only go up to 41100 Hz; Pro Audio 9 will *not* display an error message if you select a sampling rate that is not supported by your card, but the software will fail to record your audio data in this case.)

- **Choose a “File Bit Depth” of 24 if you intend to use your soundcard at 18-, 20-, or 24-bit depth:**

You may choose a “File Bit Depth” of either 16- or 24-bits. If your soundcard supports 18-, 20-, or 24-bit operation and you want to take advantage of that capability, you *must select “24” in the “File Bit Depth” list*, or else the data received from your soundcard will be truncated and stored in your project file as 16-bit samples, defeating the benefits of your card’s higher-bit-depth capability.

- **Try to use the soundcard driver at 24-bits even if your soundcard only operates at 20- or 18-bits:**

Having established the default settings for new files, you must also specify at what bit-depth you want your soundcard to operate. In the same **Options—Audio** dialog box, set the “Audio Driver Bit Depth” to the desired value. Even if your soundcard’s highest bit-depth is only 18- or 20-bits, you should try selecting an “Audio Driver Bit Depth” of “24” first. If you receive an error message when doing so, try selecting “20”. If this also produces an error message, try selecting “18”. In other words, if you want Cakewalk to operate your soundcard at any bit-depth greater than 16-bits, try selecting the highest value possible in the “Audio Driver Bit Depth” setting, and work downward from there if you have to.

(If your soundcard’s maximum bit-depth is 20-bits and you specify an “Audio Driver Bit Depth” of 24 as advised above, audio data will still be sampled by your soundcard in 20-bit

samples, but each sample will automatically be “padded” with extra 0’s to produce a 24-bit sample, which will be stored at full 24-bit resolution in your project file (assuming you have set the “File Bit Depth” to “24” as advised above.) The advantage of this is that any subsequent processing performed by Cakewalk on that audio—such as applying off-line or real-time audio effects—will be performed and stored at full 24-bit resolution, ensuring maximum quality and signal-to-noise ratio for your audio.

- **You may have to manually specify the proper DMA buffer sizes when operating at 24-bits:**

Pro Audio 9’s “Wave Profiler” doesn’t always configure DMA buffer sizes properly when examining soundcards capable of full 24-bit operation. If your soundcard is capable of full 24-bit operation, you *may have to manually specify the proper DMA buffer sizes for Pro Audio 9*. After your soundcard has been “profiled” by Pro Audio 9, examine the “Device Profiles” tab in the **Options—Audio...** dialog box. If the buffer size values reported there *aren’t* exact multiples of 3, it is possible that you may experience problems during audio playback at 24-bits because of this “miscalculation”. If you experience dropouts, glitches, stutters, or other audio interruptions during playback at 24-bits, re-visit this dialog, manually multiply each of the reported DMA buffer size values by **3**, and re-enter the new, larger values into the fields on the “Device Profiles” tab. Then click “OK” to close the dialog. This should resolve your audio playback problems. If problems persist, please consult the online Help built into Pro Audio 9: locate the Help topic “Dropouts and Other Audio Problems” for assistance.

(You can ignore this issue when operating at 16-bit depth; “Wave Profiler” correctly calculates the DMA buffer sizes for 16-bit operation.)

- **Some 24-bit cards require a few extra configuration settings to be made manually:**

Some professional soundcards require that additional special settings be made in Pro Audio 9 to ensure proper operation. Pro Audio’s “Wave Profiler” will not automatically make these settings; you must make them yourself, manually. For example, when using the Yamaha DSPFactory card at 24-bits, you should first open the **Options—Audio...** dialog, click on the “Advanced” tab, and:

1. Enable the “Unpack >16 bit audio” checkbox
2. Enable the “Left-justify unpacked data” checkbox

These settings affect how 24-bit audio samples are transferred from the soundcard into the Pro Audio 9 software, and affect the “efficiency” of the transfer. You’ll get the best performance from this card when working at 24-bits if you make sure that these settings are enabled. If you’re not sure whether your particular soundcard requires these settings, consult the documentation that came with your soundcard. You should also check the web page

<http://www.cakewalk.com/Support/Soundcardtips.html> to see if any information is available there regarding configuration of your particular soundcard in Cakewalk. When in doubt, leave these settings disabled.

(These settings are only relevant when working with soundcards at >16 bits-per-sample. You can ignore them when operating at normal 16-bit depth.)

- **Using 24-bit depth and/or high sampling rate can be “costly”:**

While using 24-bit audio can improve the sound quality of your recordings, there are some important drawbacks to keep in mind. Projects stored at 24-bit depth will require 50% more disk space than those stored at 16-bits; if you have a large number of audio tracks (and keep in mind that stereo tracks require twice as much data as mono tracks!), your audio project file can grow very large and use up lots of disk space. Also note that recording, playing, and processing 24-bit data utilizes more CPU resources than working with 16-bit data. This means that for a given computer configuration, you will be able to record/play/process a

smaller number of total simultaneous tracks, and use a smaller number of simultaneous real-time effects, in a 24-bit project than you would be able to in a 16-bit project. This is also true when working at higher sampling rates (i.e., a 24-bit/96khz project requires substantially more computing resources than a corresponding 16-bit/44.1khz project). Depending on the size of your project and the configuration of your computer (CPU, RAM, disk), you may need to reconsider whether working at the higher bit-depth/sampling rate is justified or even possible.

It's also worth noting that not all audio projects benefit equally from the use of higher bit-depth/sampling rates. Most professional sound engineers will tell you that 24-bit, higher-sampling-rate audio is most beneficial when working with music that focuses on natural acoustic instruments and/or vocals recorded with very high-quality microphones. The benefits of 24-bit/high-sampling-rate recording are less audible when working with highly synthetic or highly compressed program material, often found in contemporary popular music. You must make your own judgement about whether the benefits of higher-capacity audio justify the extra demands it places on your computer.

- **Note:** Red Book Audio CDs are still 16-bit (44.1 sampling rate), so if your goal is to burn a CD, you will have to mixdown to 16-bit.