Accurate Mario Kart 64 ripping

This guide will walk you through how to make high-quality rips of Mario Kart 64 music with 100% accuracy to the game in most cases.

It relies on an excellent tool by Sauraen called **seq64**, which allows for edited MIDIs to be injected into some first-party Nintendo 64 games in place of the original music.

You can use MIDIs that were originally exported from N64SoundbankTool as the basis for your rip, or you can export the MIDI directly from seq64 itself if you prefer.

Once the edited music is in the game, the audio can be recorded from an N64 emulator (like Project64) with the original instruments, tempo, ADSR and console effects intact.

This method bypasses a number of accuracy issues which you'd usually face when using soundfonts to render MK64 music, including:

- Missing console envelope effects (especially release) and missing reverb
- Equalizer differences with the in-game music
- Percussion accuracy issues in some cases

This technique can also be used for a number of other first-party N64 games, including Super Mario 64 (and 64DD), Ocarina of Time, Majora's Mask, Wave Race 64, Yoshi's Story, and possibly some others. However, the instructions for ripping these games may be slightly different from Mario Kart 64. Refer to the seq64 quickstart guide for more info.

These instructions use the **original version of seq64 (v1)** with the light interface. You can find it here: https://github.com/sauraen/seq64/releases/tag/V1.0

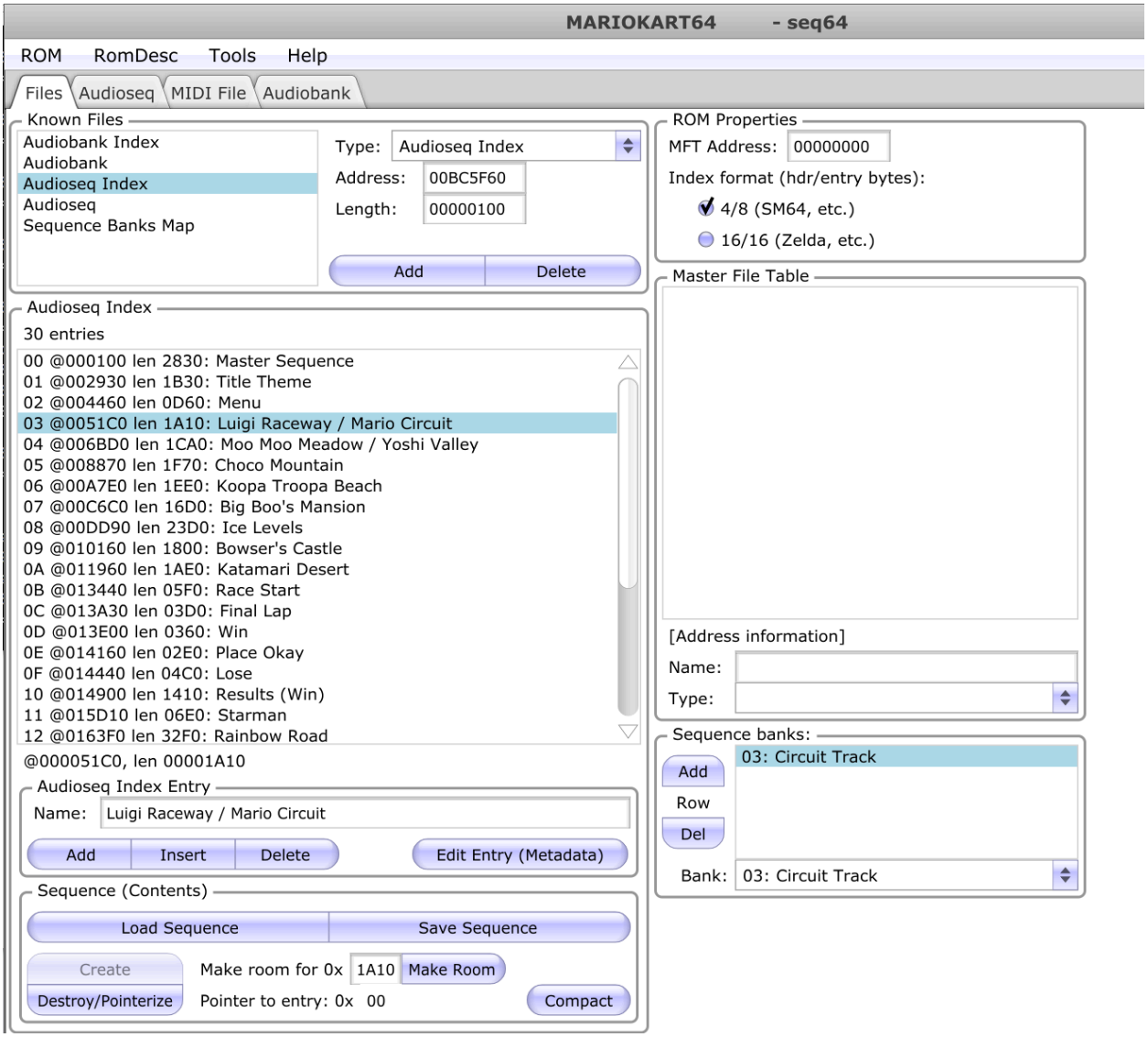
Part 1: Editing your ROM

1. Make a copy of your Mario Kart 64 ROM, so that you can use this for editing and keep your original ROM intact (Note: I do not condone piracy).

2. Open seq64, go to the "ROM" menu and select "Load..." to open your ROM.

3. Using the top menus, load your Mario Kart 64 ROM and the RomDesc file for MK64 (this should be in the `/seq64/` directory, and named `mk64_info.xml`)

4. Open the "Files" tab. From the "Known Files" list in the top-left corner, click "Audioseq Index". A list of the game's tracks will appear in the "Audioseq Index" box.



5. Select your target sequence (music track) to edit, and then click "Load Sequence" in the lower section of the interface.

6. Open the "MIDI File" tab, and click "Import MIDI" to load your edited MIDI file. If prompted to overwrite the loaded sequence, click "OK".

7. Return to your "Files" tab, and with your target sequence still selected, click "Save Sequence". Click "OK" to confirm.

8. Save your ROM ("ROM" > "Save" or "Save As...").

Part 2: Playing back in an emulator

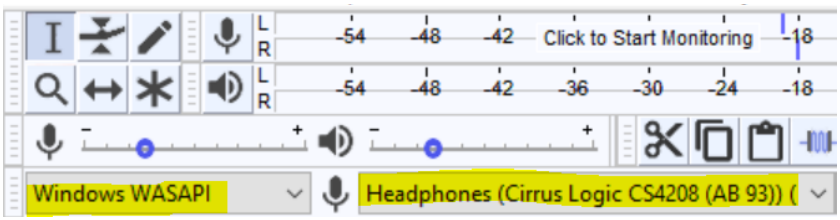
1. Open your edited ROM in a Nintendo 64 emulator (like Project64).

2. If you haven't used this emulator before, configure some controller settings in the emulator so that you're able to navigate through the in-game menus. You can either use a plug-and-play controller, or map the buttons to your keyboard if you don't have a controller handy.

3. With your emulator running in the background, open a new project in **Audacity** and make a couple of changes so that you can record your computer's sound output:

    - Look for the audio host drop-down menu in your top toolbar (it'll usually be MME as default) and change it to "Windows WASAPI".

    - Next, look for the recording device drop-down menu (usually immediately to the right of the audio host) and select whichever device you're currently using to listen to audio on your computer, usually either "Headphones" or "Speakers".



4. Press record to start recording audio. Check that it's working by swapping over to the emulator window and seeing if any sound waves are being recorded in Audacity.

5. With Audacity still recording, go back to your emulator and start a new Time Trial game. Select any character, and select a circuit that uses your edited music.

6. Once the race starts, press [Start] to pause. You'll notice the music going quiet, and importantly, the kart engine sound effects being muted. Allow the music to run for as long as you need so that you have a full loop of your edited audio.

7. After recording, select your audio in Audacity and amplify it (Effects > Amplify...) to a peak amplitude of between -2.0 and 0.0 dBs. Ensure that "Allow clipping" is left unticked.

You should now have a clean recording of your edited track from the game, which you can trim/edit/loop using your favored audio editing software.

Remember to set your Audacity audio host back to "MME" when you're finished.

Troubleshooting

1. The loop isn't working in the emulator playback

In some cases, the in-game audio will fall silent instead of looping at the expected point. If this happens, try manually extending your MIDI by a bar or two past the loop point (so that you can capture this and create a manual loop in your DAW or audio editor) and then re-import this into your ROM.

2. The start of the track gets missed before pausing to record

If the start of the track doesn't get recorded due to the need to pause the game, and if the starting section isn't repeated later in the sequence, you can work around this by adding some silence at the beginning of your MIDI to give you extra time to pause the game.

If your DAW allows it, move all of your notes ***and all other channel events*** (like channel panning, volume, etc.) forward by 4 bars.

If the channel events are too difficult to move in your DAW, you can use a secondary MIDI editor like Sekaiju to move all of your notes and events in one go:

1. Open your MIDI in Sekaiju. You'll see a grid with a piano roll preview of all tracks in the game.
2. Use your mouse to select all bars in all channels in the grid, ***except*** for the first empty row (as this contains your basic MIDI events like "start track" and tempo)
3. Click and drag the selected bars 4 bars forward, then save your MIDI.

3. The edited MIDI is longer than the original track in the ROM

If your edited MIDI is significantly longer than the original, you may encounter an error when overwriting the original track in the ROM ("Loaded sequence is X bytes, but there are only X bytes available").

You can work around this by loading your MIDI into a different target sequence in the game which has more space available (like Rainbow Road, which is the longest in the game).

If you do this, make sure you change the sequence bank (i.e. your instrument set) in the bottom-right corner of the "Files" tab to match your target sequence before you click "Save Sequence". e.g. if you're putting an edited Raceway MIDI into the Rainbow Road sequence, change the sequence bank in the bottom-right corner from "0F: Rainbow Road" to "03: Circuit Track"

4. An instrument is missing from the emulator playback

Very occasionally, you may notice that a track is missing when you play back your ROM.

In the rare event that this happens, I recommend rendering the missing track separately in your DAW using a DLS soundfont ripped from N64SoundbankTool, and then combining it with your emulator-recorded tracks.

The result may not be 100% accurate, but it will be better in most cases than ripping exclusively with a MIDI and a soundfont.