Reaper - compensating audio and MIDI latencies

You may wanna run the following tests using an additional, portable installation of Reaper to keep all settings of your "production version" untouched. The goal is to find out if your current settings produce audio and MIDI recordings that are in sync with Reaper's grid or not and if ReaInsert is correctly compensating for latencies.

Before running the test, set your audio system to a buffer size that yields flawless recording and playback without pops, clicks or other types of glitches.

Audio latency test

1. Insert a click track via *Insert -> Click source*, move it to start at bar 5 and extend it to 20 seconds in length. Glue the click track to audio. The glued click track will provide a very accurate reference signal for the tests.

2. Configure a hardware output send for the click track (via unused hardware out).

3. Create a second track and set its hardware input to receive the signal.

4. Make sure to have input monitoring of this track set to off to avoid feedback, then record-arm the track.

5. Set the cursor to bar 3 and record 10 seconds of the click. Zoom in closely and check if the resulting audio wave form is off and not in sync with the source click track. If it is out of sync, proceed with the test, else, your latency settings my be already ok and you can jump to the MIDI latency test.

6. Go to menu *Options -> Preferences -> Audio -> Recording* and uncheck *use audio driver reported latency.*

7. Load ReaInsert as an effect into the click track and configure an in/out loop for the signal with it (connecting the chosen hardware output of the interface directly with the hardware input chosen in ReaInsert; no further external processing).

8. Disable *automatic device latency adjustment* in ReaInsert and click "*Ping detect*"

9. Type the reported latency value into the field "*Samples*" under *Options -> Preferences -> Audio -> Recording -> Input manual offset.*

10. Remove ReaInsert from the click track and instead set up a hardware output send for the click.

11. Choose the appropriate input on the second track and record the click signal.

12. Set the time ruler format to "*samples*".

13. Zoom into the audio wave form of the recording and check if it's perfectly aligned with the source click track.

14. Maybe you will have to correct *Input manual offset* by one or two samples to achieve perfect alignment.

Note that changing buffer size or sample rate may require another latency measurement for some particular audio devices!

MIDI latency test

1. Open an empty project and insert a click track as a reference as described above in step 1.

2. Configure another track as a MIDI track (MIDI input, MIDI output, load ReaControlMIDI, choose a percussive sound with instant attack in your keyboard)

3. Additionally, create a new audio track to record the keyboards output signal as audio simultaneously. Record-arm both tracks.

4. Configure Reaper so that you only hear the click track and no signal from the keyboard while tapping on a key.

5. Start recording and try to tap one key on the keyboard as precisely as possible in sync with the click.

6. Zoom into both recorded tracks. The audio track should be pretty much aligned to the click track (only some human jitter), the MIDI track will probably be shifted by a noticeable amount.

7. Due to the lack of a dedicated MIDI input latency compensation in Reaper the MIDI item has to be manually nudged to the right location. The perfectly aligned audio recording serves as a reference to accomplish this.

8. Set the time ruler format to "*samples*".

9. Zoom into the items and drag a time selection to measure the offset between a MIDI note and the start of the corresponding audio wave.

10. Run the action "*Item edit: Nudge/set ...*". In the leftmost drop-down menu choose "*Nudge*" then "*position*", then type in the measured sample offset and set the last menu to "*samples*".

11. Click on the MIDI item to select it.

12. In the nudge dialog click on "Nudge left" to nudge the item backwards on the time line.

13. Zoom in again and verify that the item has been shifted to be perfectly aligned with the audio wave form. If necessary, undo the shift and repeat the nudging process with another sample value.

Recording MIDI as audio

In case you want to record MIDI tracks as audio (recording the audio output of a keyboad while playing back a MIDI track into it), another latency has to be compensated for: MIDI output latency.

1. Create a MIDI track with an Item containing 6 bars of quantized MIDI notes.

2. Select a percussive sound on the keyboard (instant attack when pressing a key).

3. Create an audio track and record the audio output of the keyboard while playing back the quantized MIDI item.

4. Set the time ruler format to "*samples*".

5. Zoom into the audio wave afterwards to verify the amount of offset.

6. Go to menu *Options -> Preferences -> Audio -> MIDI Devices* and find the resprective MIDI output used by the keyboard. Double click it and type in the offset in milliseconds under *Offset output to this device by: XX.XX ms*.

7. Record the keyboard signal again and zoom in to verify if the offset is gone and MIDI is perfectly aligned with the audio wave form.

You should now be able to

- record audio and MIDI perfectly aligned

- use ReaInsert plugin without any latency issues

- record MIDI as audio with no alignment issues