

CIS 3000 Reason 4.0 Tutorial

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Overview

Reason is a program that (using software) simulates a number of pieces of musical hardware. It includes synthesizers, samplers, effects processors, mixers and sequencers. In their hardware form, these units would be put together in a rack and wired together with physical wires. The wires are used to route audio from the instruments through the effects processors to the mixer, which then sends it to any outputs we might have such as speakers. You can follow the path of all audio signals from the instruments to the speakers.

Reason tries to imitate this setup exactly, but has the advantage of being in software and not hardware. Therefore, we can duplicate these machines as many times as we want with the only cost being a small amount of CPU power. Also, working with many units is much simpler as we are not using physical connections that can break, but virtual wires.

There are three main sections to Reason's interface: the **Rack**, the **Sequencer**, and the **Transport**. The **Rack** contains the actual instruments and effects used in the composition, the **Sequencer** holds all the notes and performance data that make up the composition, and the **Transport** is used to control the playback of the composition.



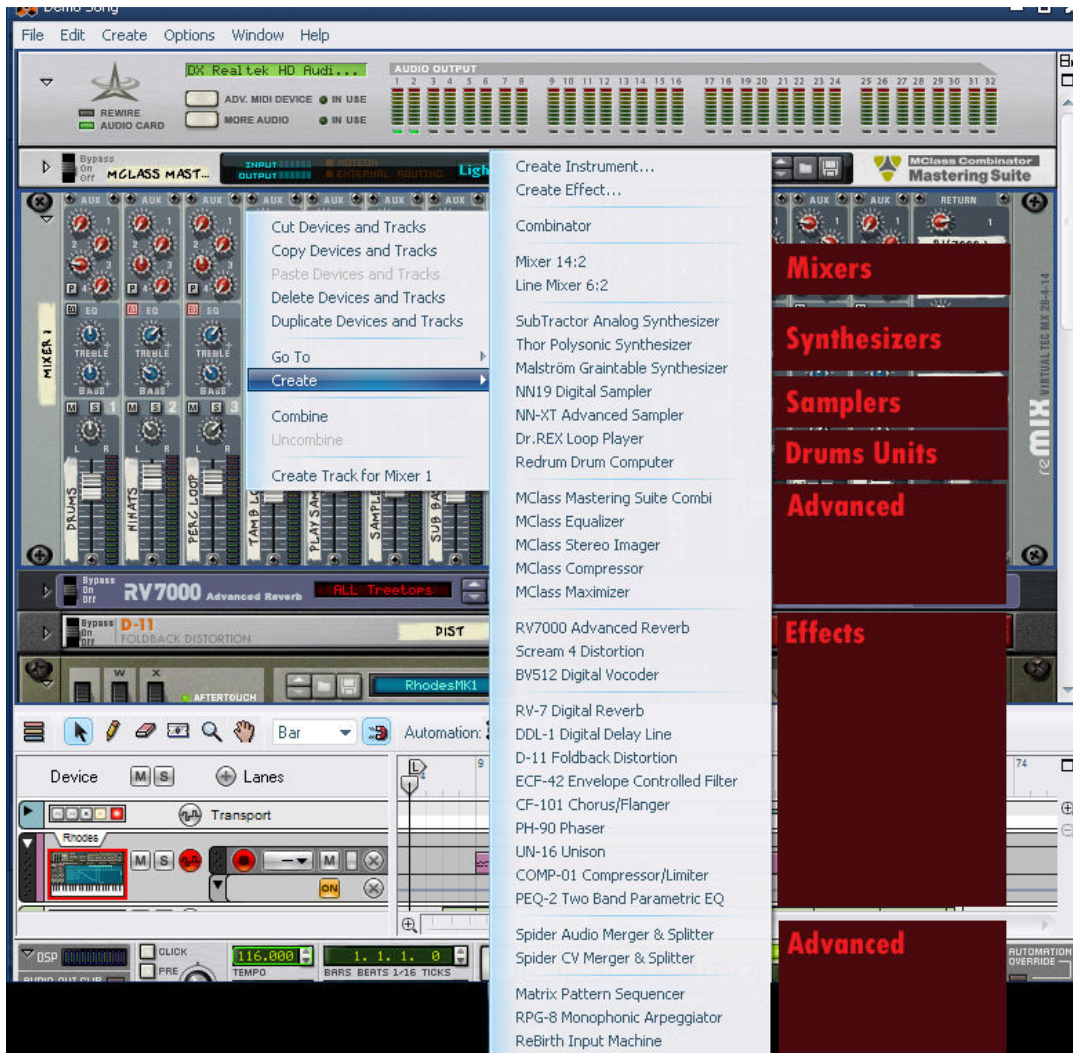
The Rack

The **hardware interface** is the interface between our virtual rack of instruments and the real world. Basically, any audio routed into the hardware interface will be played on the computer's sound card. Also, the hardware interface takes MIDI (note) data from sources outside the computer, like a keyboard, and sends it into Reason. The hardware interface must be hooked up to a mixer in order to create music (which Reason will do for you by default). You will probably never need to touch this.



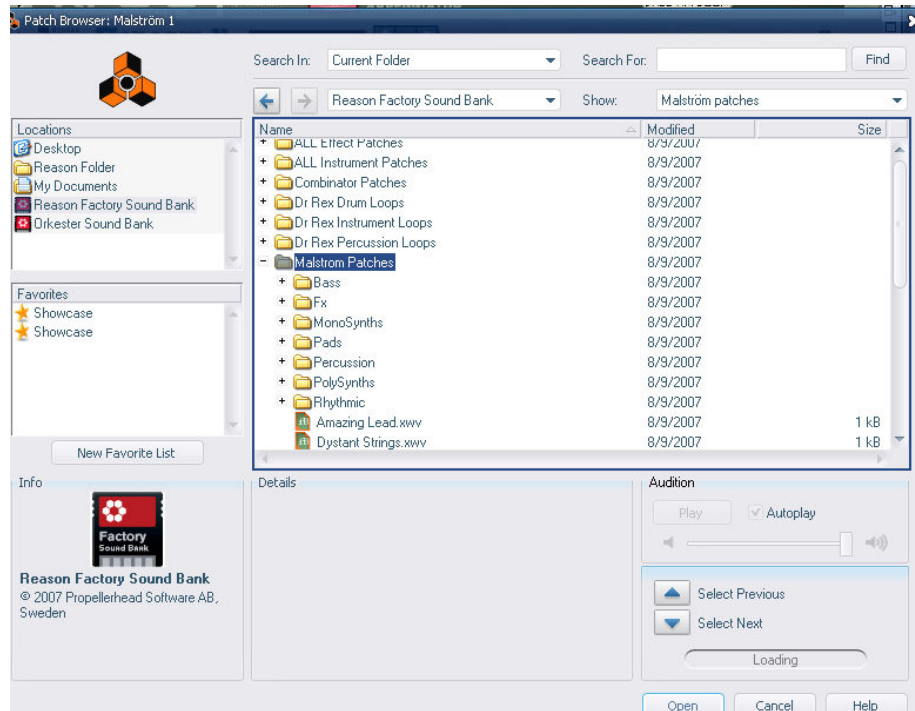
The **mixer** takes all of the audio data from your hardware (i.e. instruments) and mixes them together. The mixer unit allows you to adjust the volume, panning, treble, and bass for each instrument through the use of sliders and knobs. You can also use the red knobs to control the levels of any effects units hooked up to the mixer (more on this later). There is a master control unit that allows you to control the volume of all instruments. In theory, you can hook up mixers to mixers, to allow a limitless amount of instruments.

Now that you have a mixer, you need to be able to create some additional hardware units, so that you can begin making music. When creating hardware units, you need to have their output hooked up to the mixer so that we can hear them. The easiest way to do this is to right click on the unit we want to hook something up to (in this case the mixer), and right click on it. Then, choose **Create** and pick the unit of your choice.



Synthesizers & Samplers

There are three “brands” of **synthesizer**: Subtractor, Thor, and Maelstrom. Each synthesizer has different types of **patches**. While you could make your own sounds from scratch with each of the instruments using the controls on the front of them, Reason comes with many patches which you can load in to give you sounds and instruments that have already been created. To load a patch in, click on the Folder icon on your synthesizer. Use the Patch Browser to navigate between all of the possible patches. Click on “Reason Factory Sound Bank” in the Locations menu if you ever get lost.



Samplers (named NN-XT and NN-19) work in a very similar manner to the synthesizers. However, Samplers directly sample recorded clips of actual instruments, as opposed to synthesizers, which use all sorts of wave data to create sounds. If you are looking to create music that uses traditional instruments and sounds more like “real” music, Samplers are a more effective unit to use. Likewise, for a more electronic feel, synthesizers might be more appropriate. Experiment with all of the samplers and synthesizers to get a feel for them.

Effects

Reason also allows you create **effects** units, which modify the sounds of an existing instrument unit. There are many different types of effects you can create, including Reverb, Delay, Distortion, Chorus, Flanger, Phaser, and more. There are two ways that we can hook up an effects unit: to an instrument (directly or indirectly), or to the mixer.

To hook up an effects unit to an instrument, simply right click on the instrument you want to attach it to and choose **Create** (similar to hooking up instruments to the mixer). You are also allowed to chain effects units, which can be done simply by right-clicking on your first effects unit and then creating the second, attach the third to the second, etc.

An effects unit can also be hooked up to the mixer by right clicking on the mixer and creating it. This allows you to use one effect on many instruments at once (for instance, using a delay on all of the tracks for a creepy or empty effect). Once you have hooked up the effects unit to the mixer, you will see its name on the pieces of tape just above the Master Volume slider. Each effect will have a number next to it (and thus, you can have a maximum of four effects units hooked up to a single mixer. To adjust the levels of a particular effect on a track, use the corresponding red knobs above the slider for a particular instrument.



Drums

Because of the nature of the instrument, creating **drum** tracks for your songs requires a slightly different process and different units. There are two units that you can use to create drum loops: **Dr. Rex Loop Player** and **ReDrum Drum Computer**.

Dr. Rex, the simpler of the two units, allows you to use and edit pre-existing drum **loops**. You would choose a loop in the same manner that you would to pick a patch on an instrument (click the Folder icon, use the Patch Browser to find a loop). After loading your loop, you can preview it with the preview button, or play around with effects of your choice. When you are done, you will need to create track data for the drum unit by hitting the “**To Track**” button. Dr. Rex will create as many measures of your loop as possible in between the L and R markers in your Sequencer.



ReDrum, on the other hand, is more advanced, but allows for much more creativity and flexibility. There are two sections to the ReDrum unit: the upper section, which holds information about individual drums, and the lower section, which holds the information on the patterns in which you want to hit the drums.

After creating the ReDrum unit and loading in a patch of your choice, take a look at the line of sixteen grey buttons in the lower section. Each of these, in standard 4/4 time, represents a sixteenth note. For example, if you wanted to create a beat that hit on every quarter note, you would click the 1, 5, 9, and 13 buttons. You can change the number of steps if necessary (typically only when you're recording in a time signature other than 4/4) or the size of the steps (i.e. each square can represent an eighth note instead of a 16th).

In the upper section of the ReDrum unit, you will see ten different sections of knobs. Each one which represents one drum (i.e. a snare, cymbal, high-hat, etc). To change which drum you want to write a line for, click the select button towards the bottom of that drum's section. To preview what that drum sounds like, hit the play button near the top of that drum's section.

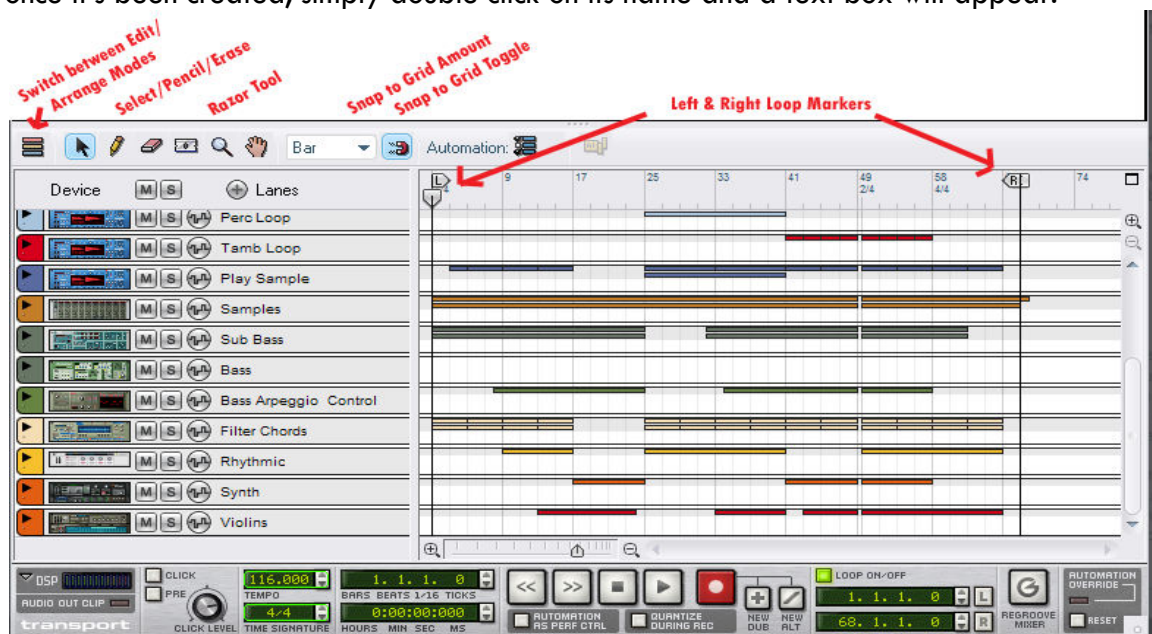
While creating your beat, you can click the "Run" button to give you an idea of how your loop sounds. When you've finally finished, you would put the track data into the sequencer by right clicking the ReDrum unit and choosing "Copy Pattern to Track" similarly to Dr. Rex.

Wiring

When creating your units in Reason, by right-clicking and then hitting create, your units should always be wired up properly, but sometimes things may go wrong (or you just want to play around with how everything is connected). Fortunately, Reason gives you this freedom. To see how all of your units are wired up, hit the "Tab" key, which will then show you the back of all the units. You can pull on a cable to remove it from one port to bring it to the next, or just click on a port and drag to another to create a wire.

The Sequencer

Now that we know how to insert instruments into our compositions, we must create notes that the instrument will play. When we create an instrument in the rack, a track for it in the sequencer is created automatically. The sequencer has two modes: **Arrange** and **Edit**. To rename a track once it's been created, simply double click on its name and a text box will appear.



Arrange Mode

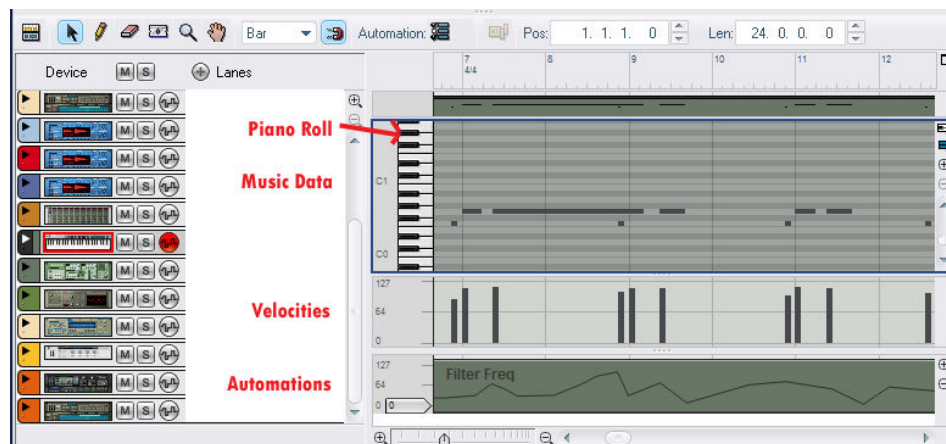
Arrange mode allows you to look at all of the recorded data thus far and manipulate it. When recording in Reason, the program will automatically group any notes you record into a **clip**. Clips are a powerful way to organize your themes, as they allow you to group by certain melodies or themes (and can be copy + pasted as well). To join two or more clips, simply highlight them, right click, and choose “Join Clips”. If you want to split up a clip into multiple clips, select the **Razor** tool from the top of the Sequencer and click where you want to separate the clips.

When moving tracks around, you may find the **Snap to Grid** tool (the magnet icon) useful. By enabling this, each clip is allowed to begin only on the interval that you specify in the drop-down menu on its left. For example, if you have a group of 8 measures and want to move it to a later part, you might want to snap it to 1 bar, so that your melody does not begin in the middle of a measure (thus forcing everything off-beat).

When experimenting with the sounds of your tracks, you can both **mute** and **solo** any track of your choice. By hitting the M button, you will mute that track (any track with the M highlighted will not be played back). If you hit the S button on a track, then only those instruments that have the S highlighted will be played.

Edit mode

Edit mode is useful for creating and modifying any MIDI data that Reason is going to use to make music. MIDI is the backbone behind how Reason works, as it tells Reason what musical notes to play on your instrument.



To add notes, press the **Switch Mode** button to go into **Edit mode**. In edit mode we are shown a piano roll on which to place notes. You can choose which track we are editing by left clicking on its name in the track list. The keys of the piano go bottom to top, while the measures run left to right. If you click on the notes of piano on the side, the note will play on the current instrument. To begin writing music, click on the pencil tool, and then highlight the portion of the song you want to write your music in by clicking and dragging the cursor on the section with measures. Within that highlighted section, you can draw your notes by clicking where you want your note to begin and then dragging to the point where you want your note to end, choosing the appropriate row associated with the note you want.

If you ever want to go back and edit a section of notes you previously used, Reason 4.0 can be a little frustrating in that sometimes it will overwrite your music when you click within a clip that contains information. To best edit your music, choose the select tool and then double click on the clip which you want to edit. You will know you did it right if all the notes in that section become red.

In edit mode, you can additionally edit your **velocity** and **automations** for a particular track. The velocity bar, located right under the piano roll, adjusts how “hard” a note is hit – the higher its value, the louder the sound will play (note: some units/effects might ignore this value. If this is a problem, you could automate the “Master Volume” for your particular track). Its value is also changed via the pencil tool – click on a bar and drag up to increase, down to decrease.

If there is a knob, slider, etc on a unit that you want to move around during a song, you can also create an **automation** for that particular parameter. To do so, right click on the appropriate part of your unit in the rack and right click, then choose “Edit Automation”. In the sequencer, a new bar will appear with the current automation data. To start automating, simply use the pencil tool to draw in the values you want for a particular section of your song (remember to select, double-click if you want to come back and edit it). You can also automate by hitting the record button on your track and then moving the knob around.

The Transport

So we have our instruments chosen and our music written – all we need to do now is be able to play it! This is where the **Transport** comes in.

Playing Your Music

To play your music, simply use the play button. The music will begin playing wherever the play marker is currently located, and will continue on until you stop it (even if it reaches the end of the song). If you want to listen to a particular **loop** of music in your song, place the L and R markers around the particular part of the song, and make sure that the Loop On/Off button is on (green).

If you'd rather record your music live with a keyboard than create it in the sequencer, you can do this too. To do so, first pick the track you want to record to on the sequencer. Make sure the red circular record button is fully red, so that recording to that track is enabled. Then, hit the record button in the transport – your notes will start recording from your keyboard. When recording, you will most likely want to **quantize** your notes. Quantizing essentially means that even the notes you record will be “snapped” to a certain length of a note, so that your music will fit neatly within the rigid musical structure that Reason has. Generally, eighth notes or sixteenth notes work best. After the fact, you can also pick your track in the sequencer, then hit F8 to show the Tool Window. Select Tools, and then you can quantize using that option.

Sometimes when writing songs, you might want to change the tempo or time signature mid-song. Fortunately, in Reason 4.0 we are now allowed to do this! These changes are essentially like the automations discussed in the Rack section. Simply right click on the tempo or time signature, hit edit automation, then pencil in a block for however many measures you want. Double click on it

with the select tool, then pencil in the values you want (or for time signature, just right click and choose it).

Importing and Exporting

Importing a MIDI File

In addition to writing your music in the sequencer and recording it with a keyboard, there is another way that you can put music data in Reason. This requires you to write out a MIDI file before hand, in any third-party program of your choice. After you've done that, simply go to File -> Import MIDI File.

If you're looking for a program to write MIDI data in, Sibelius and Finale are two popular (though not free) programs people have used. If you are a guitarist, you may want to check out the free Power Tab Editor, which can export to MIDI for you. Otherwise, try Google and see if you can find a good editor, if both using the sequencer and recording with a keyboard do not work for you.

Exporting

When you're ready to wrap up your song and use it in your game, you're going to need to export it to a .wav file so that XNA can use it. To export your entire song (from measure 1 to where your E marker is), go to File -> Export Song as Audio File. If you want to export a certain section, use the L and R markers to isolate it, then choose "Export Loops as Audio File". A dialog will prompt you to title your file, and then another will ask you about your Sample Rate. Your choice for this will affect both the quality and size of the .wav files you create. Choose a value between 22 kHz (smaller size, less quality) and 44 kHz (larger size, more quality) and hit OK.