

have to know how to write notes and clefs on staves to publish your music! To download Rosegarden 15.10, which is the current stable version, click the **Get Rosegarden** link. If you need the Windows version, go to the Xyglo web site at <http://xyglo.com/rosegarden-for-windows/> (see Figure 2-1), as I did, and download version 15.10.

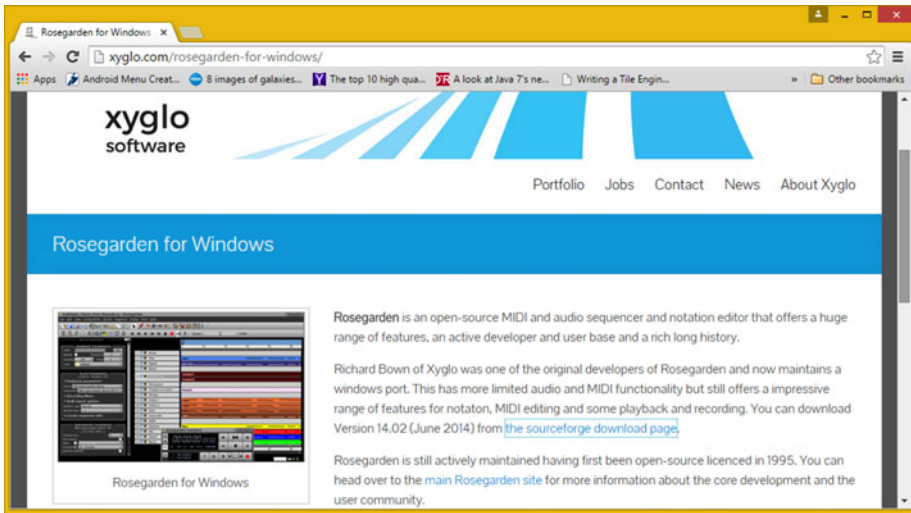


Figure 2-1. Go to the xyglo.com/rosegarden-for-windows/ web page

Download the **rosegarden-win32-alpha-4.exe** installer file if you are using Windows (otherwise, download the Linux version), and then double-click it to start the installation process. Currently, there is no Mac OS X version of this software. (But contact Apple and ask for it—maybe they will listen to your request for Mac support!)

Rosegarden for Windows is a 32-bit version; if you want to run the 64-bit Rosegarden, then use Linux. Once the installation starts, read the licensing agreement, and then click the **I Agree** button.

Next, select the check boxes for the components that you wish to install. I selected **Rosegarden ► Fonts ► Start Menu Shortcuts**. Click the **Next** button and select your destination folder (I used the default `C:\Program Files (x86)\Xyglo\Rosegarden\`). Finally, click the **Install** button. You are then shown an installation progress bar and a **Show Details** button.

Once you launch Rosegarden the first time, you see a **Welcome!** dialog (see Figure 2-2), which provides suggestions on plug-ins, audio servers, synthesizer software (MIDI generates no sound; it is performance-only, which you will see later in this chapter), tutorials, web sites, and documentation.

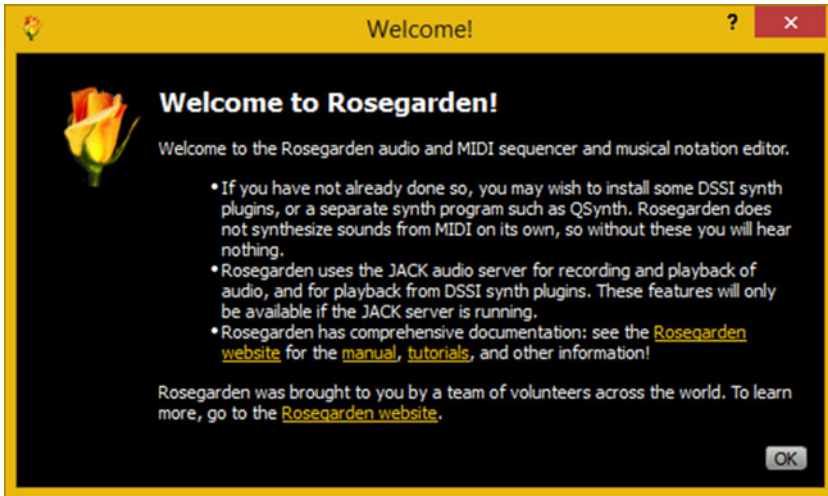


Figure 2-2. *Rosegarden Welcome! dialog containing important information*

Once you click the **OK** button in the Welcome! dialog, you see an empty Rosegarden project, as shown in Figure 2-3.

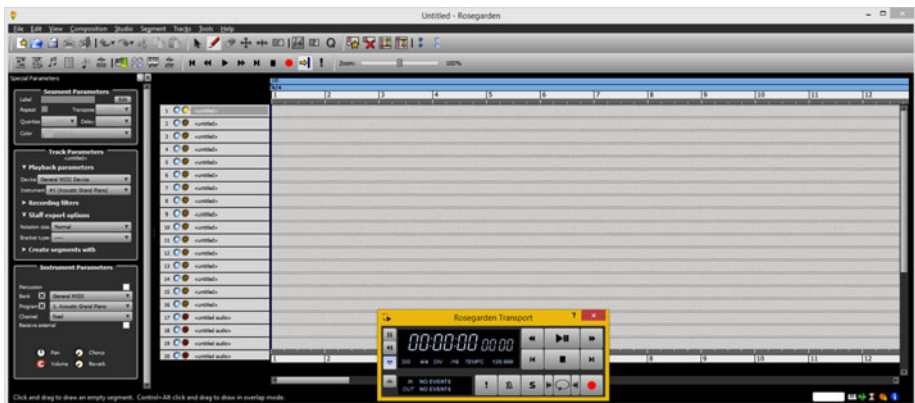


Figure 2-3. Rosegarden software on start-up, with empty project

Let's look at some MIDI data and the Rosegarden user interface by opening the open source **fidelio.mid** file. As you can see in Figure 2-4, there is a transport, which you can position anywhere on your screen, and MIDI tracks in the primary editing view of the software. On the left, there is a **control panel** that contains **parameters** for segment, track, and instrument selections. Along the top, there are icons that allow access to the Rosegarden recording, editing, and scoring features.

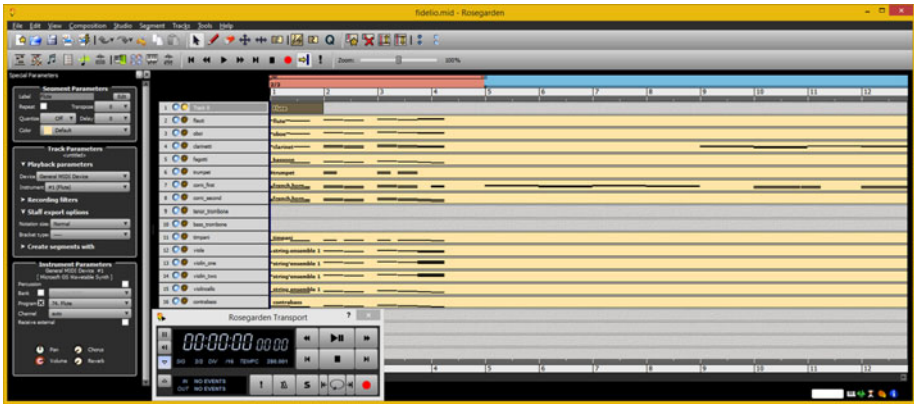


Figure 2-4. Open source fidelio.mid MIDI sample data file

Let's take a look at how Rosegarden 14 automatically scores any **MIDI composition data** into **musical score publishing**. Select five of the performance tracks by holding down the **SHIFT** key and clicking the five tracks that are shown on the right side of Figure 2-5, invoking Rosegarden's **multi-select** feature.

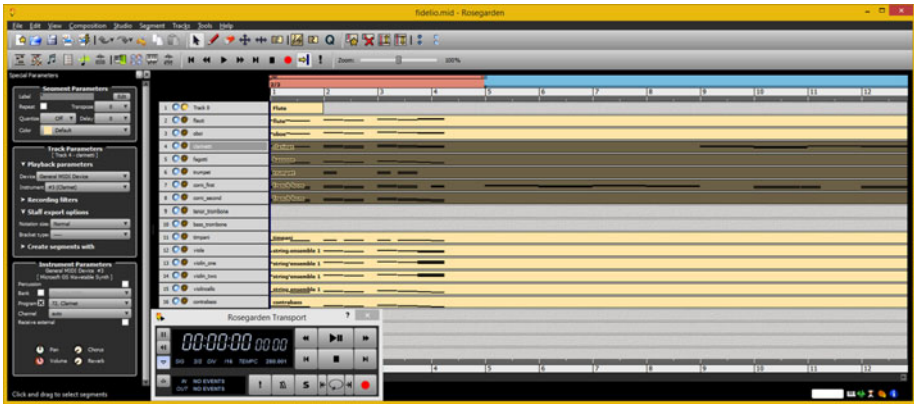


Figure 2-5. Select several tracks to try out the scoring engine

Click the Notation (Note) icon (the third option in the second icon bar on the left side of the screen). This opens the Notation window shown in Figure 2-6, where you can see that Rosegarden can turn your MIDI performances (keyboard keys) into professional staff notation containing notes and timing. Amazing software!

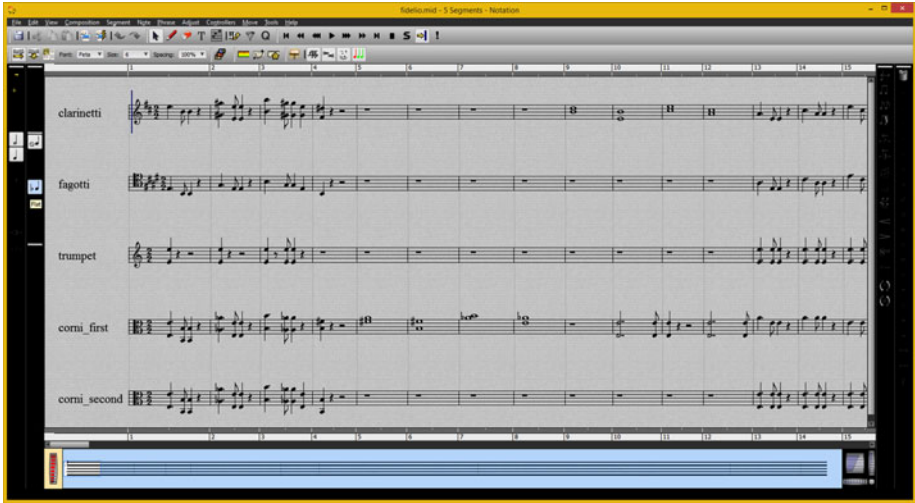


Figure 2-6. Showing music notation features of *Rosegarden 14.02*

Now that I have shown you *Rosegarden* and MIDI data, and what it can become, let's get into MIDI and the history of audio.

The Digital Audio Player Piano: MIDI Data

Digital audio editing, synthesis, MIDI sequencing, composition, sweetening, sound design, and special effects can all be quite complex, especially at the professional level. Even though this is a “fundamentals” book, I am going to try to cover a lot of concepts, history, techniques, terminology, software, formats, content delivery platforms, and work processes, so that you really get your money's worth.

MIDI Data: Your Musical Instrument Data Interface

MIDI stands for **Musical Instrument Data Interface**. It was one of the very first ways that anyone could work with audio using a personal computer—as long as you had a 5-pin MIDI port connected to a MIDI interface, and drivers that allowed your operating system to see and talk to the MIDI interface. The origins of MIDI date all the way back to the 1980s, so MIDI has been “in play” (no pun intended) for more than 30 years. MIDI holds an important role in the evolution of digital audio, and is a key component of music synthesis and sound design.

The first computer to feature integrated MIDI ports and MIDI interface hardware was Atari's ST1040. This MIDI computer allowed me to plug my keyboard synthesizer (at the time, it was a Yamaha DX7) into the MIDI ports. MIDI allowed me to play and digitally record my **performance data** using a computer, which used a **MIDI data format**, along with audio software known as a **MIDI sequencer**, which sequenced playback data using **tracks**, allowing me to build up my musical composition over time.

Digital Performance Data: MIDI Is Not Digital Audio

A MIDI file contains no audio data; that is, the MIDI file format contains no digital audio, only **digital performance data**. This performance data is played back into the synthesizer by the computer, using the MIDI hardware (interface, cables, and ports) that connects the computer and synthesizer together with an **in** and **out** cable, so that your computer and synthesizers can talk to each other. As the computer is playing back your existing track using the **synth in port**, it is recording the next track, which you are composing as you listen to the computer play your previous MIDI tracks.

The computer is therefore recording the data coming from the out port on your synthesizer at the same time it is playing your existing tracks into the in port on your synthesizer. Fortunately, computers are able to process MIDI data rapidly!

There is also a MIDI **through cable**, so that more than one synthesizer can be connected simultaneously. My MIDI synthesis setup includes the Yamaha TX-802, which is eight DX-7 synths in one rack mount, the Roland D-50 rack mount, and the Korg Z1. My setup only needs one keyboard synthesizer due to this through port, because performance data that I played on a Korg Z1 routes into the TX-802 and D-50 for rack-mount synth module playback.

MIDI records the piano keys pressed on a synthesizer keyboard or a sampler keyboard. It also records the keypress duration, the amount of pressure the key was pressed with (the **aftertouch**), and similar playback performance nuances.

It is important to note a third type of keyboard, called a **controller**, which is used only to generate MIDI performance data. It looks like a synthesizer or sampler keyboard, but it requires a rack-mount synthesizer or sampler, or digital audio software, to trigger samples or synthesize the sound waves that the MIDI performance data would trigger.

Audio Synthesis: Synthesizers Create Sound Waves

MIDI performance is silent. As you have seen with Rosegarden, it records your performance data, while the digital audio waveforms created by that performance are actually made with your keyboard synthesizer. Your synthesizer, or “synth,” generates artificial or “synthesized” audio tones using the MIDI performance data to specify how to create your digital audio (synthesized) sound waves. A **sampling keyboard** plays back a digital audio sample (pre-recorded waveform) based on the MIDI performance data. It provides an even more aural-realistic (like photo-realistic imagery) performance, because each note on the instrument is sampled, or recorded, whether it is a piano, guitar, bass, fiddle, banjo, horn, flute, oboe, or drums.

When MIDI files are played back through the synthesizer, or through a sampler, it replicates the exact performance of the performer or the composer; even though that person is no longer playing the performance track, the computer is playing it back.

Let’s discuss the way MIDI data is used in MIDI sequencer software. You play an instrument track, record the instrument performance for your music composition using MIDI data, and the MIDI sequencer then plays the performance while you play a second instrument track—alongside the first instrument’s performance track.

While the computer is handling the MIDI performance data (recording and playback), the controller keyboard is handling the performance data generation and the rack-mount synthesizer or sampler is processing the performance playback MIDI data, which it is receiving from the MIDI sequencer software.